



**NORTH FALLS**

*Offshore Wind Farm*

# **PRELIMINARY ENVIRONMENTAL INFORMATION REPORT**

## **Chapter 23 Onshore Ecology**

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*Date: May 2023*

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*May 2023*

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Appendix 23.2 Great Crested Newt eDNA Survey Report
Appendix 23.3 Riparian Mammals (Water Vole and Otters) Survey Report
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Appendix 23.6 Terrestrial and Aquatic Invertebrate Survey Report
Appendix 23.7 National Vegetation Classification (NVC) Survey Report

## Glossary of Acronyms

ASNW	Ancient Semi Natural Woodland
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BEIS	Department for Business, Energy & Industrial Strategy
BEP	Biodiversity Enhancement Plan
BNG	Biodiversity Net Gain
BoCC4	Birds of Conservation Concern 4
BPM	Best Practical Means
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CLWS	Candidate Local Wildlife Site
CRoW	Countryside and Rights of Way
DCO	Development Consent Order
DECC	Department of Energy & Climate Change
DESNZ	Department for Energy Security and Net Zero
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
EFC	Essex Field Club
EIA	Environmental Impact Assessment
EMP	Ecological Management Plan
EPP	Evidence Plan Process
EPS	European Protected Species
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GI	Green Infrastructure
HDD	Horizontal Directional Drilling
IAQM	Institute of Air Quality Management
ILP	Institute of Lighting Professionals
INNS	Invasive Non-Native Species



IPC	Infrastructure Planning Commission
IRZ	Impact Risk Zone
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LEMP	Landscape and Ecological Management Plan
LPA	Local Planning Authority
LWS	Local Wildlife Site
NERC	Natural Environment and Rural Communities
NFOW	North Falls Offshore Wind Farm Limited
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NVC	National Vegetation Classification
OLEMS	Outline Landscape and Ecological Management Strategy
PAWS	Plantations on Ancient Woodland Sites
PEIR	Preliminary Environmental Information Report
SPA	Special Protected Area
SSSI	Site of Special Scientific Interest
TCC	Temporary Construction Compound
UKFS	UK Forestry Standard
UKHPI	UK Habitats of Principal Importance
UXO	Unexploded Ordnance
WTG	Wind turbine generator
Zol	Zone of Influence

## Glossary of Terminology

Horizontal directional drill (HDD)	Trenchless technique to bring the offshore cables ashore at the landfall. The technique will also be used for installation of the onshore export cables at sensitive areas of the onshore cable route.
Landfall compound	Compound at landfall within which HDD or other trenchless technique would take place.
Landfall search area	Locations being considered for the landfall, comprising the Essex coast between Clacton-on-Sea and Frinton-on-Sea.
Onshore cable corridor(s)	Onshore corridor(s) within which the onshore export cables and associated infrastructure will be located. A final onshore cable route for which consent will be sought will be selected from within these corridor(s).
Onshore project area	The boundary in which all onshore infrastructure required for the Project will be located (i.e. landfall; onshore cable route, accesses, construction compounds; onshore substation and National Grid substation extension), as considered within the PEIR.
Onshore scoping area	The boundary in which all onshore infrastructure required for the Project will be located, as considered within the North Falls EIA Scoping Report.
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the National Grid.
Onshore substation zone	Area within which the onshore substation will be located.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.

## 23 Onshore Ecology

### 23.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the North Falls offshore wind farm (hereafter 'North Falls' or 'the Project') on onshore ecology. The chapter provides an overview of the existing environment for the onshore project area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Project.
2. This chapter has been written by Royal HaskoningDHV, with the assessment undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS). Details of these and the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effects Assessment (CEA) are presented in Section 23.4.
3. At present, the onshore project area is the subject of ongoing refinement and as such some targeted ecological (i.e., species-specific) surveys are still in the process of being undertaken and results analysed. Therefore, this chapter presents a preliminary Ecological Impact Assessment (EcIA) using the information available at the time of writing and will be updated once the onshore project area is further refined and the data analysis for all remaining baseline ecological surveys has been completed and reported upon. The updated EcIA will be presented in the Environmental Statement (ES) that will be prepared to accompany the Development Consent Order (DCO) application. Similarly, the CEA will be reviewed and updated where required once the onshore project area has been finalised.
4. The assessment should be read in conjunction with following PEIR chapters (Volume I):
  - Chapter 19 Ground Conditions and Contamination;
  - Chapter 20 Air Quality;
  - Chapter 21 Water Resources and Flood Risk;
  - Chapter 22 Land Use and Agriculture;
  - Chapter 24 Onshore Ornithology; and
  - Chapter 26 Noise and Vibration.
5. Additional information to support the Onshore Ecology assessment includes the following appendices (Volume III):
  - Appendix 23.1 Extended Phase 1 Habitat Survey Report;
  - Appendix 23.2 Great Crested Newt eDNA Survey Report;
  - Appendix 23.3 Riparian Mammals (Water Vole and Otters) Survey Report;
  - Appendix 23.4 Reptile Survey Report;
  - Appendix 23.5 Hazel Dormouse Survey Report;
  - Appendix 23.6 Terrestrial and Aquatic Invertebrate Survey Report; and

- Appendix 23.7 National Vegetation Classification (NVC) Survey Report.
6. In addition to the survey reports listed above, a Bat Emergence / Re-entry Survey and Bat Activity Survey have been undertaken to inform the EclA. The reports detailing the findings of these surveys are not yet available at the time of writing but will be available to inform the Project's ES.

## 23.2 Consultation

7. Consultation with regard to onshore ecology has been undertaken in line with the general process described in Chapter 6 EIA Methodology (Volume I). The key elements to date have included scoping and the ongoing technical consultation via the Onshore Ecology and Ornithology Expert Topic Group (ETG). The feedback received has been considered in preparing the PEIR. Table 23.1 provides a summary of how the consultation responses received to date have influenced the approach that has been taken.
8. This chapter will be updated following the consultation on the PEIR in order to produce the final assessment, which will be presented in the ES that will be submitted with the DCO application. Full details of the consultation process will also be presented in the Consultation Report as part of the DCO application.

**Table 23.1 Consultation responses**

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
Essex County Council (Places Services)	July 2021, North Falls Onshore Ecology and Ornithology ETG.	Noted that Essex County Council could also help with providing information on Roadside Verges which would not be available in existing biological records check.	NFOW added Essex Field Club and Essex County Council to data records search (see Section 23.4.2.2 and 23.5.2).
Essex County Council (Places Services)	July 2021, North Falls Onshore Ecology and Ornithology ETG.	Recommended both local and national district licencing teams are involved in the call with the EPS licencing team because the EPS team is not always aware of action on the ground.	<p>Natural England's European Protected Species (EPS) Licensing team and the National District Level Licensing team held a discussion on 19th August 2021 regarding licensing approaches for great crested newts (see Section 23.6.1.13).</p> <p>Place Services to pass on details of local contacts in the district level licensing team to Natural England, Royal HaskoningDHV and NFOW.</p>
Natural England	July 2021, North Falls Onshore Ecology and Ornithology ETG.	Natural England support the use of the Defra biodiversity net gain (BNG) 3.0 metric. NE has a list of BNG projects in Essex which could be considered by the project. They also emphasised the potential to consider offshore BNG to be discussed in an appropriate ETG.	<p>NFOW are exploring opportunities to deliver a minimum of 10% biodiversity net gain (BNG) for the onshore elements of the Project, as articulated within the Environment Act 2021. The BNG delivered would be determined following completion of the latest version of the Defra Biodiversity Metric (currently version 4.0), which will be completed as part of the DCO application.</p> <p>All current information on the BNG baseline for the onshore project area is detailed in Appendix 23.1, Annex 7 (Volume III).</p>

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
			Natural England provided a list of BNG projects for NFOW for future consideration on 29.09.21. These will be taken into account as the impacts of the Project become clearer and proposals for BNG develop in consultation with the onshore ecology ETG.
Environment Agency	August 2021, North Falls Scoping Opinion (p. 130).	Concerned that scoping has excluded the potential for saline intrusion with HDD at the landfall, and of overtly noting the potential for localised changes to groundwater flow in terms of barriers e.g., excavations proximal to shallow groundwater abstractions.	This is addressed in Chapter 21: Water Resources and Flood Risk (Volume I), and in Section 23.6.1.1.
Environment Agency	August 2021, North Falls Scoping Opinion (p. 131).	Concerns regarding the recording of wildlife sites and the use of HDD. Horizontal Direct Drilling is referred to: whilst this can help to avoid sensitive surface features, there remains some serious concern about this approach. There have been serious, recent incidents where bentonite breakout from HDD operations have resulted in long term habitat contamination issues on two Sites of Special Scientific Interest (SSSIs) and Special protection Areas (SPAs) in East Anglia. Although inert, bentonite is considered a pollutant due to its ability to smother sensitive receptors such as intertidal feeding areas and such incidents cannot be allowed to happen again. The Environment Agency will seek assurances that method, geology and best practice will all be investigated, evaluated and mitigated at an early stage to ensure that such a pollution event is safeguarded against for this project. We are raising this issue at an early stage to ensure that all potential problems are raised and eliminated. The Environment Agency can provide more information concerning some preferred safeguards in due course.	NFOW requested further information on preferred safeguards from the Environment Agency and received a response on 09.12.21.  Potential effects arising from the use of HDD are assessed in Section 23.6.1.1.
Essex County Council	August 2021, North Falls Scoping Opinion (pg. 138)	We note that proposed surveys for Hazel Dormice will still be restricted to “all suitable woodland habitats that may be affected by the project” despite highlighting that a small population of these European Protected Species was found to be present in non-woodland habitat (on the embankment to the south of the existing A120 and the population was considered to be of value at a County level. This is a live application with ECC (CC/TEN/31/21) within the onshore scoping area. We therefore recommend	Section 23.5.4.6 details the hazel dormice baseline within the habitat and species study area based on the 2022 field surveys, and Section 23.6.1.15 provides an assessment of the potential impacts on hazel dormice. Full survey results from the

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		<p>that the details for the Phase 2 ecology surveys scheduled for 2022 are amended to include all suitable habitats that may be affected by the project. The timing for these surveys is also critical as East Anglian Dormice have been found to breed later in the year so optimal survey window is later and this change in methodology is to be published soon (pers comm, Essex &amp; Suffolk Dormouse Group).</p> <p>We welcome the inclusion of Hazel Dormice to the list of species of key concern for the onshore EIA of this NSIP.</p> <p>Please note that any section relating to badgers should be clearly marked on the front cover as confidential due to its sensitive information so that it will not be widely available. If this information is contained within the ES ecology chapter, the above requirements applies so that the sensitive section can be redacted before it goes into the public domain.</p>	<p>hazel dormouse surveys are detailed in Appendix 23.5 (Volume III).</p> <p>Sections 23.5.4.1 and 23.6.1.10 in this chapter relate directly to badgers, although contain no location-specific information and so have been retained within the public-facing version of this chapter. The badger field survey results detailed in Appendix 23.1, Annex 5 (Volume III) do contain full details of the locations of badger field signs and as such this Annex is marked as confidential and will be removed from public versions of the PEIR.</p>
Essex County Council	August 2021, North Falls Scoping Opinion (paragraph 4.2.4)	<p>The report mentions that there will be some habitat fragmentation and impact on local ecology (Section 3.5.3 pages 171-173) through the installation of cables and onshore substations. These impacts need to be minimised by mitigation measures and habitats or vegetation should be reinstated where appropriate. Any habitat enhancements, whether boundary hedgerow, field margin, grassland or wildflower meadow, grass strips, or woodlands all need to be connected to landscape wide GI network to prevent fragmentation and promote biodiversity migration. It is recommended that the Ecological Management Plan incorporates the mitigation measure for habitat/ GI removal, fragmentation and potential impact on protected designated sites (i.e., Holland Haven Marshes and Weeleyhall Wood SSSI's) to be identified in the EIA. There should also be the inclusion of a 'Landscaping and Screening Proposal' for the onshore substation that could result in a beneficial impact.</p>	<p>Section 23.6.1 assesses the impacts of habitat fragmentation on local ecological receptors (and where required additional mitigation needs) including designated sites, protected and notable species, and habitats. Table 23.5 sets out embedded mitigation in North Falls Project design.</p>
Essex County Council	August 2021, North Falls	<p>Noted that the offshore elements of this proposal appear well developed and researched, however concern was raised that the onshore implications are vague and un-proven at this time, as the submission itself does acknowledge.</p>	<p>A broad onshore scoping area only was provided within Scoping Report, this has since been revised down to onshore project area for assessment in the PEIR (see</p>

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
	Scoping Opinion (p. 134).		Sections 23.5 for description of existing environment and 23.6 for assessment of significance).
Essex County Council	August 2021, North Falls Scoping Opinion (p. 137).	In accordance with Regulation 14 of the EIA Regulations, the ES should provide a statement about the relevant expertise or qualifications of the competent experts involved in its preparation.	This has been provided in Chapter 1 Introduction (Volume I).
Essex County Council	August 2021, North Falls Scoping Opinion (p. 137).	It will be necessary to provide sufficient information on non-significant impacts on protected and Priority species and habitats. This information should be included in the EIA submission as a specific chapter or attached as a separate document. This is necessary in order that the local planning authorities (LPAs) have certainty of all likely impacts, not just significant ones, and can issue a lawful decision with any mitigation and compensation measures needed to make the development acceptable.	Assessment of significance provided in Section 23.6 and summary Table 23.59
Essex County Council	August 2021, North Falls Scoping Opinion (p. 137).	Planning application will need to be supported by adequate ecological surveys and assessments to enable the SoS to determine any application submitted in line with national and local policy and its statutory duties. This will include likely impacts on designated sites (international, national and local), Protected species and Priority habitats and species - not just significant ones.	See Sections 23.5 for description of existing environment and 23.6 for assessment of significance.
Essex County Council	August 2021, North Falls Scoping Opinion (p. 138).	Ecological assessments should take data search records & survey information and use professional judgement to come to reasoned conclusions as to the likelihood of species being present and affected by the proposed development. All surveys must be undertaken by suitably qualified ecologists at the appropriate time of year, using standard methodologies.	See Section 23.5 for a description of existing environment.
Essex County Council	August 2021, North Falls Scoping Opinion (p. 138).	Effective and robust measures, in line with the mitigation hierarchy, must also be proposed which have a high degree of certainty for their deliverability in the long term. If there are residual impacts, these will need to be compensated for on site or offsite with long term management secured, and appropriate enhancements included to ensure measurable Biodiversity Net Gain from development.	Embedded mitigation table is provided in Section 23.3.3 and 23.6 includes additional mitigation. Table 23.59 is summary of potential effects.



Consultee	Date / Document	Comment	Response / where addressed in the PEIR
Essex County Council	August 2021, North Falls Scoping Opinion (p. 138).	Welcome the addition of Essex Field Club as a data source in Table 3.13 for records of protected, notable and invasive non-native species as recommended at the Onshore Ecology Expert Topic Group meeting on 6 July. However, this data source still needs to be added to Table 3.16 for ornithological datasets.	Essex Field Club has also been included in Chapter 24 Onshore Ornithology (Volume I).
Essex County Council	August 2021, North Falls Scoping Opinion (p. 139).	<p>Highlight that Defra Biodiversity Metric v 3.0 (2021) is now available so should be used for the Biodiversity Net Gain (BNG) calculations instead of v 2.0.</p> <p>We recommend that this report demonstrates the baseline assessment and details of losses and compensatory habitat as well as biodiversity enhancements to demonstrate net gain of habitats.</p> <p>As there is no Local Nature Recovery Network for Essex as yet, we would support improving the condition of existing Priority habitat as enhancements particularly in relation to losses from the cable landfall and onshore substation.</p> <p>We also expect this report to include details of enhancements for relevant species on the site and any need for off-site habitat provision and its long-term management and monitoring. Full Metric calculations should also be provided.</p> <p>We recommend that the applicant thoroughly explores all reasonable options to deliver additionality for the measurable BNG to restore biodiversity networks &amp; their ecological functionality and also provide enhancements for Priority species affected by the</p>	<p>NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project.</p> <p>All current information on the BNG baseline for the onshore project area is detailed in Appendix 23.1, Annex 7 (Volume III).</p> <p>The Project is engaging with ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG.</p> <p>Habitat condition for the habitats within the study area is set out in Table 23.18.</p> <p>This was recorded in accordance with the Biodiversity Metric 3.0 Auditing and accounting for biodiversity: User Guide<sup>1</sup> (Panks et al., 2021).</p>

<sup>1</sup> At the time of the Extended Phase 1 Habitat Survey, the Defra Biodiversity Metric versions 3.1 and 4.0 had not yet been released, therefore this stage of the assessment was based on Version 3.0.

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		development. We look forward to the BNG report to be submitted which shows how these species will benefit from these new habitats created and enhanced.	
Essex County Council	August 2021, North Falls Scoping Opinion (p. 142).	Essex County Council currently provides advice on green infrastructure (GI) schemes for major developments. Essex County Council have been a consultee on GI since the 2018. Although there are no statutory requirements for GI, the 25-Year Environment Plan and emerging Environment Bill will place significant importance on protecting and enhancing GI, accessibility and biodiversity net gain.	Noted - no specific actions.
Essex County Council	August 2021, North Falls Scoping Opinion (paragraph 4.1.3)	Having reviewed the Environment Impact Assessment Scoping report, we would advise the following recommendations are considered for enhancements to the scheme that would improve the GI network and help achieve net environmental gains.	North Falls have not undertaken an audit of GI across the onshore project area as part of the habitat survey. An audit as requested by ECC involves several other disciplines, for example socio-economic, tourism and recreation. We will look to engage with ECC at the appropriate time to feed in any GI opportunities to our overall BNG strategy, which will be submitted as part of the DCO application.
Essex County Council	August 2021, North Falls Scoping Opinion (p. 142)	<p>Essex County Council look to ensure that adequate provision, protection and improvements of high-quality GI comply with the objectives and planning principles set out in the following documents:</p> <ul style="list-style-type: none"> <li>- Tendring's Infrastructure Delivery Plan (2017), Tendring's Open Spaces Strategy (2008)) and associated Infrastructure Delivery Plan, as well as Tendring's Local Development Plan policies regarding the Council's approach to GI provision in the local authority area.</li> <li>- Essex Green Infrastructure Strategy, 2020 aims to enhance the urban and rural environment, through creating connected multi- functional GI that delivers multiple benefits to people and wildlife. It meets the Council's aspirations to improve GI and green spaces in our towns, cities and villages, especially close to areas of deprivation.</li> </ul>	
Essex County Council	August 2021, North Falls Scoping Opinion (p. 142).	The Environment Impact Assessment (EIA) and Environment Statement (ES) will need to identify appropriate measures for avoiding or reducing significant adverse effects on the functionality of GI assets. It can also assist in identifying measures for compensating/off-setting unavoidable significant adverse effects on GI assets to protect the overall integrity of the surrounding and wider landscape scale GI network. Existing habitats green and blue features should be considered as GI *Essex GI	

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		Strategy, 2020, Chapter 8.5) and designed and managed correctly to improve the environmental benefits of the wider landscape.	
Essex County Council	August 2021, North Falls Scoping Opinion (p. 143).	Recommend that the habitat survey includes an audit of existing GI within the site boundary. The audit should include, existing GI assets, areas for improvement and opportunities to meet gaps in provision in response to local need.	
Essex County Council	August 2021, North Falls Scoping Opinion (p. 143).	The Essex and South Suffolk Shoreline Management Plan has noted that Holland Haven Marshes SSSI represents an outstanding example of a freshwater to brackish water transition and includes a number of nationally and locally scarce species. Holland Haven country park, situated on the flood plain of Holland Brook, is important both for conservation and recreational value. The reclaimed Holland Haven marshes are likely to contain well-preserved paleoenvironmental deposits. Internationally important Palaeolithic remains are known to exist on the Clacton Cliffs and foreshore SSSI. There are also important links to be made between historic freshwater grazing marshes, for example, and the rare plants and animals they support. Finally, the historic environment makes an important economic contribution to the area, through tourism associated with heritage assets and historic landscapes.	Noted - no specific actions (see Section 23.5.2).
Essex County Council	August 2021, North Falls Scoping Opinion (p. 143).	Recommend that following the publication of the EIA that a biodiversity enhancement plan (BEP) is developed. The purpose of the BEP is to lay out the specific objectives for biodiversity and the means by which these objectives will be achieved, including the protection of existing species and habitats (GI), the establishment of specific enhancements (including net gain), their maintenance and monitoring. Biodiversity enhancements should be selected to fit the physical attributes of the site and should tie in with existing habitats and species of value on and around the site. Furthermore, they should be compatible with the primary purpose of the site – to generate wind power (all be it mainly onshore substations and underground cables). If agricultural production is also planned for the site, biodiversity enhancements should aim to dovetail with these goals.	NFOW will seek to capture this in a project Outline Landscape and Ecological Management Strategy (OLEMS), rather than a separate BEP, submitted as part of the Project's DCO application (Section 23.3.3). The OLEMS will include the findings of a BNG Assessment and include proposals for achieving BNG for the onshore elements of the Project, in addition to any mitigation identified within the EIA in relation to onshore ecological receptors.
Essex County Council	August 2021, North Falls	Documents such as the Construction Environmental Management Plan (CEMP), Landscape and Ecological Management Plan (LEMP) and Biodiversity Enhancement	This will be captured in the OLEMS.

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	Scoping Opinion (p. 144).	<p>Plan will help ensure appropriate tasks, mitigating measures and methods are in place to:</p> <ul style="list-style-type: none"> <li>• Protect the retained trees and hedgerows;</li> <li>• Develop a schedule of advanced planting to create a landscape structure or evidence is shown that substantive GI is secured as early as possible in subsequent phases;</li> <li>• Develop a landscape management and maintenance plan and work schedule for a minimum of 10 years including how management company services for the maintenance of GI assets and green spaces shall be funded and managed for the lifetime of the development;</li> <li>• Address recommendations within the habitat and ecology survey to enhance the ecological value through the proposed development; and</li> <li>• Demonstrate measurable net gains for biodiversity, as outlined under paragraph 8[C], 153, 174[a][d] and 179 of the National Planning Policy Framework updated 2021.</li> </ul>	Note suggested 10 years planting aftercare requirement (see Section 23.3.3 embedded mitigation).
Essex County Council	August 2021, North Falls Scoping Opinion (p 144).	Phased implementation within the CEMP of new GI and protecting of retained vegetation of the development during construction will allow for the GI to mature and it will provide the further benefit of reducing/buffering the aesthetic impact from the construction work. The LEMP will ensure appropriate management and maintenance arrangements and funding mechanisms are put in place to maintain high- quality value and benefits of the GI assets.	This will be captured in the OLEMS (Section 23.3.3).
Essex County Council	August 2021, North Falls Scoping Opinion (p. 145).	The Biodiversity Enhancement Plan will provide opportunities for biodiversity and environmental net gains through the development, enhancing the current value of the site. This can contribute positively to reversing the long-term decline in biodiversity and enhance quality of life for people. Ultimately, the best Landscape/GI/ biodiversity plans will be those developed through engagement with the local community, the landowner and local and national conservation organisations. Although we recommend these are submitted early in the planning process, these documents can be conditioned or submitted at the reserved matters stage.	These measures are proposed to be captured in the OLEMS (see Section 23.3.3).

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Essex County Council	August 2021, North Falls Scoping Opinion (p. 145).	EIA Scoping report mentions the potential decommissioning of the site and it should be capable of removal and reversible. However, it is important that any benefits created are maintained, this includes any gains in biodiversity, habitat creation, multifunctional GI assets, sustainable drainage features, improvement in land and soil quality, etc. We would welcome the EIA recommending the development of Restoration plans. These can provide significant opportunities for habitat creation, biodiversity, climate change mitigation, GI and blue infrastructure enhancements and can include elements of public access for recreation. Restoration plans will need to be identified at early stage of planning and regularly updated.	Restoration plans - as above, this will be discussed in OLEMS (see Section 23.3.3).
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 180).	Particularly concerned about any impact on Ancient Semi Natural Woodland (ASNW) and will expect to see careful consideration of any impact and any weightings which might be applied to any assessments of route options/or site choice.	Impacts on ASNW are included in Section 23.6.1.2 and Section 23.6.1.5.
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 180).	<p>Ancient woodland is an irreplaceable habitat. As highlighted in the para 175 NPPF, whilst Nationally Significant Infrastructure Projects are not subject to the NPPF it sets out the importance of these irreplaceable habitats.</p> <p>This applies both to Ancient Semi Natural Woodland (ASNW) and Plantations on Ancient Woodland Sites (PAWS). The scoping document does list a number of Ancient Woodlands, and these will be woodlands above 2 ha which is the smallest size currently defines as ancient by Natural England, however this does not mean there are not others. Also we would wish to see all woodland included in any assessment this includes any new planting. Given the Climate change imperatives and the government policy towards tree planting it is imperative that we endeavour to protect what we have.</p>	Assessment of the impact on all woodland (as recorded in the Extended Phase 1 Habitat Survey (Appendix 23.1, Volume III)) is provided in Section 23.6.1.2 and Section 23.6.1.5).
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 180).	Suggested using the National Forest Inventory data sets to identify irreplaceable woodland on site. <a href="https://data.gov.uk/dataset/cd748245-e68c-41e4-bb1a-4728bc64163c/national-forest-inventory-woodland-england-2018">https://data.gov.uk/dataset/cd748245-e68c-41e4-bb1a-4728bc64163c/national-forest-inventory-woodland-england-2018</a> (last updated 2020) these go down to 0.5 ha.	Section 23.4.2 lists the sources of data and Section 23.5.3.4 describes the woodland resource across the onshore project area.

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Forestry Commission	August 2021, North Falls Scoping Opinion (p. 180).	<p>Forestry Commission expects the applicants to avoid all irreplaceable habitats, and other woodland wherever possible. One of the most important features of Ancient Woodlands is the quality and inherent biodiversity of the soil; being relatively undisturbed physically or chemically it is also a major seed bank. Direct impacts of development that could result in the loss or deterioration of ancient woodland or ancient and veteran trees include:</p> <ul style="list-style-type: none"> <li>• Damaging or destroying all or part of them (including their soils, ground flora or fungi)</li> <li>• Damaging roots and understorey (all the vegetation under the taller trees)</li> <li>• Damaging or compacting soil around the tree roots</li> <li>• Polluting the ground around them</li> <li>• Changing the water table or drainage of woodland or individual trees</li> <li>• Damaging archaeological features or heritage assets</li> </ul>	Effects on ancient woodland assessed in Section 23.6.1.2.
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	By thorough mapping and identifying woodland it can be considered appropriately to avoid any of the above impacts. e.g., rerouting pipes, moving temporary stockpiles and balancing ponds. It is also essential that fuels, chemicals, or waste materials such as topsoil, minerals or hard-core are not stored on ancient woodland soils or under the woodland canopy.	Effects on woodland are assessed in Section 23.6.1.5
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	Refer NFOW to further technical information set out in Natural England and Forestry Commission's Standing Advice on Ancient Woodland – plus supporting Assessment Guide and Case Decisions.	Guidance taken into consideration - see Section 23.4.3.1.2.
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	UK Forestry Standard (UKFS) sets out the UK government's approach to sustainable forestry and woodland management, including standards and requirements as a basis for regulation, monitoring and reporting requirements. The UKFS has a general presumption against deforestation. Page 23 of the Standard states that: "Areas of woodland are material considerations in the planning process...."	Effects on woodland have been assessed in Section 23.6.1.5.

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Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	Lowland mixed deciduous woodland is on the Priority Habitat Inventory (England). This recognises that under the UK Biodiversity Action Plan they were recognised as being the most threatened and requiring conservation action. The UK Biodiversity Action Plan has now been superseded by the UK Post-2010 Biodiversity Framework but this priority status remains.	Lowland mixed deciduous woodland has been considered in Section. 23.6.1.5.
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	Expected that there will be a thorough assessment of any loss of all trees and woodlands within the project boundary and the development of mitigation measures to minimise any risk of net deforestation. A scheme that bisects any woodland will not only result in significant loss of woodland cover but will also reduce ecological value and natural heritage impacts due to habitat fragmentation, and a huge negative impact on the ability of the biodiversity (flora and fauna) to respond to the impacts of climate change. Woodland provides habitat for a range of Section 41 Priority Species including all bats.	Effects on woodland have been assessed in Section 23.6.1.2 and Section 23.6.1.5.
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	Where woodland loss is unavoidable, it is expected that there will be significant compensation and the use of buffer zones to enhance the resilience of neighbouring woodlands. These zones could include further tree planting or a mosaic of semi-natural habitats.	Buffer zones have been considered when assessing impacts on woodland (Section 23.6.1.2 and Section 23.6.1.5).
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 181).	For any woodland within the development boundary, land required for temporary use or land where rights are required for the diversion of utilities you must take into consideration the Root Protection Zone. The Root Protection Zone (as specified in British Standard 5837) is there to protect the roots of trees, which often spread out further than the tree canopy. Protection measures include taking care not to cut tree roots (e.g., by trenching) or causing soil compaction around trees (e.g., through vehicle movements or stacking heavy equipment) or contamination from poisons (e.g., site stored fuel or chemicals). Therefore in scoping it is useful to set a buffer area around woodland to enable cable routing to be far enough away.	Buffer zones have been considered when assessing impacts on woodland (Section 23.6.1.2 and Section 23.6.1.5).
Forestry Commission	August 2021, North Falls	If it becomes necessary, the mitigation hierarchy (set out in Paragraph 175 of the NPPF) sets out a useful structure for considerations of mitigation and compensation. Whilst the NPPF does not apply to NSIPs this ethos remains the same.	Effects on woodland are assessed in Section 23.6.1.2 and Section 23.6.1.5.

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	Scoping Opinion (p. 181).		
Forestry Commission	August 2021, North Falls Scoping Opinion (p. 182).	Some of the previous comments will become more relevant once the onshore cable route and infrastructure locations are determined.	Noted - no specific actions.
Natural England	August 2021, North Falls Scoping Opinion (p. 233).	<p>Section 1.5.3 Figure 1.5</p> <p>The location of Site of Special Scientific Interest (SSSI) should also be clearly identified within Environment Impact Analysis (EIA) Figures. Consideration should also be given to Impact Risk Zones for each SSSI as available from Magic.</p> <p>Include SSSIs in relevant ES Figures and consider impacts within any EIA.</p>	Impacts on Holland Haven Marshes SSSI are assessed in Section 23.6.1.1.
Natural England	August 2021, North Falls Scoping Opinion (p. 234).	<p>Section 1.5.3 Figure 1.5</p> <p>There may also be a number of Candidate Local Wildlife Site (CLWS) throughout the scoping area, and these should be illustrated within Figures and given due consideration in EIA.</p> <p>Include CLWS in relevant ES figures and consider impacts to these sites within any EIA.</p>	Impacts on statutory and non-statutory designated sites are assessed in Section 23.6.1.2.
Natural England	August 2021, North Falls Scoping Opinion (p. 234).	<p>Section 1.5.3 Figure 1.5</p> <p>There are a number of areas of Ancient Woodland within the scoping area which are not currently identified in the Figure.</p> <p>Identify and include all areas of Ancient Woodland, including appropriate buffers, in relevant ES figures and provide an assessment within any subsequent EIA.</p>	Section 23.5.3.4 describes the woodland resource across the onshore project area and has included all ancient woodland.



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Natural England	August 2021, North Falls Scoping Opinion (p. 234).	<p>Section 1.6.3 Points 70 + 76</p> <p>Much of the scoping area is being considered for woodland creation and we suggest that the Applicant contact the Forestry Commission for further information regarding this and possible consideration within the EIA.</p> <p>Contact Forestry Commission to obtain information regarding woodland creation proposals.</p>	The Forestry Commission's website <sup>2</sup> [Accessed 13 January 2023] has been reviewed for potential areas of woodland creation within the onshore project area. These have been considered in Section 23.5.3.4.
Natural England	August 2021, North Falls Scoping Opinion (p. 235).	<p>Section 1.8.2.4 Point 98</p> <p>"Embedded mitigation will be incorporated into the project design..."</p> <p>This statement could go further. Ideally, most potential impacts could be avoided, or effects reduced at the design stage of the project, through early consideration of ecological constraints, which along with consideration of other environmental features would be used to refine scheme layout, siting and design. Further impacts could also be avoided through micro-siting of infrastructure at the construction stage. We advise that the ES demonstrates that the mitigation hierarchy has been followed wherever appropriate.</p>	Section 23.3.3 details the embedded mitigation for North Falls.
Natural England	August 2021, North Falls Scoping Opinion (p. 256).	<p>Section 3.5.3.1.3</p> <p>We welcome HDD under important hedgerows. Should the creation of any gaps in hedgerows be necessary during construction or operation Natural England would advise that they are as small as possible with hedges either side of gaps allowed to</p>	This commitment is addressed in Section 23.3.3.

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<sup>2</sup> <https://www.forestergis.com/Apps/MapBrowser/>

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		<p>thicken up during construction and operation to facilitate use as feeding and commuting corridors for wildlife.</p> <p>The ES should commit to this mitigation measure.</p>	
Natural England	August 2021, North Falls Scoping Opinion (p. 256).	<p>Section 3.5.1.3</p> <p>Protected Species Licence- Please contact the Natural England Case Officer and the Licensing team as early in the process as possible regarding information required for a protected species Licence and the possibility of a Letter of No Impediment.</p> <p>The Applicant to contact Natural England regarding Protected Species Licences at an early stage.</p>	Meeting held with Licensing Team on 19th August 2021 specifically to discuss great crested newt licencing. Consultation will continue in advance of ES submission (licensing addressed in Section 23.6).
Natural England	August 2021, North Falls Scoping Opinion (p. 256).	<p>Section 3.5.1.3 Point 471</p> <p>HDD- We would welcome a detailed specification to be included in EIA of the HDD process and protocols to be put in place to prevent break outs or Frack-outs from occurring or minimise impacts should this occur.</p> <p>Further detail on these matters should be presented in the ES.</p>	An outline HDD method and break-out (i.e. 'frack-out') contingency plan to be included in the ES (see Section 23.3.3).
Natural England	August 2021, North Falls Scoping Opinion (p. 256).	<p>Section 3.5.1.1 Point 511</p> <p>It is not clear why the Applicant has selected a 5km radius as a screening tool for designated sites. The screening area should be based on Impact Risk Zone (IRZ) for designated sites as available on Magic, and the ecology, i.e. foraging areas of designated species of sites in proximity to the proposed development area.</p> <p>Scoping area to be based on designated sites IRZ rather than an arbitrary 5km.</p>	<p>Explanation for basis for buffers used to scope in sites is provided in Section 23.3.1.</p> <p>It is noted that the IRZ for designated sites is 5km.</p>

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Natural England	August 2021, North Falls Scoping Opinion (p. 256).	Section 3.5.4 Point 541  Net Gain- Natural England are delighted that NFOW are keen to ensure Biodiversity Net Gain is included within the projects design and support this approach.	Noted - no specific actions.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p.71).	White-clawed crayfish.  It's stated that white-clawed crayfish are recorded as being present within the onshore scoping area and surveys are planned for 2022.  The Inspectorate notes the potential for hydrological / ecological connectivity from the Proposed Development to protected sensitive habitats and species. As part of its assessment of spread of INNS, the Applicant should consider the potential for the Proposed Development to facilitate the spread of non-native crayfish and crayfish plague, which could impact native crayfish and their habitats.	Whilst records of white-clawed crayfish were found within 2km of the onshore scoping area and therefore highlighted within the Scoping Report, no records were found within 2km of the onshore project area (see Appendix 23.1 Extended Phase 1 Habitat Survey Report, Volume III), nor was suitable habitat noted within the report. As such no targeted white-clawed crayfish surveys were undertaken to inform the ecological baseline, and white-clawed crayfish are considered likely absent from the onshore habitats and species study area.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p.72).	Mitigation measures - timing of works.  The ES should explain the timing of the proposed construction and / or operational activities and any measures to avoid key / sensitive periods for species, such as spawning / breeding and migration periods. The ES should assess the duration of impacts in relation to the ecological cycles (e.g. life cycles, breeding / spawning seasons, migration periods, etc.) of the receptors being assessed.	Table 23.5 details embedded mitigation as part of North Falls Project design. Impacts on individual ecological receptors, including seasonality and timings of species life cycles, are addressed in Section 23.6.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.2).	Paragraph 86 of the Scoping Report (detailing the overarching assessment methodology for the EIA) states that study areas defined for each receptor are based on the Zone of Influence (Zoi) and relevant characteristics of the receptor (e.g., mobility / range). Inspectorate notes that for many of the aspect chapters included, study areas and Zois have not been stated. Where this detail has been provided, it is not clear how these study areas relate to the extent of the impacts and likely significant	Explanation for basis for buffers used to scope in sites is provided in Section 23.3.1.

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		effects associated with the Proposed Development, how they have been used to determine a Zol, and what receptors have been identified within the Zol. The ES should provide a robust justification as to how study areas have been defined and why the defined study areas are appropriate for assessing potential impacts.	
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.3).	Where aspect chapters and assessments of the ES are separated into onshore and offshore assessments, it is unclear to what extent such assessments consider the potential for impacts to overlap and interrelate. Furthermore, there are instances whereby cross- references are made to impacts that have not been addressed in the appropriate aspect(s) of the Scoping Report. For example, the Ground Conditions and Contamination aspect chapter highlights the potential for direct impacts to surface water receptors and associated ecological habitats from contamination, however, this impact is not addressed within Onshore Ecology. There are similar examples of other cross-cutting matters (e.g., Unexploded Ordnance (UXO) clearance, underwater noise, spread of invasive non-native species (INNS), etc.) that have not been appropriately cross- referenced. The ES should assess impacts that overlap or interrelate between offshore and onshore receptors where there is a likely significant effect and consider the potential for such impacts to act cumulatively. Where appropriate, study areas should be refined based on the results of updated survey data.	Interactions (where effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects with different disciplines as a result of that interaction) are discussed in Section 23.9.  Interrelationships (where effects identified and assessed in this chapter have the potential to interrelate with each other) are addressed in Section 23.10.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.6).	Figures presented in the ES and used to support the assessment should be legible and show all relevant information, including receptors considered in the assessment. The ES should include figures illustrating designated and non-designated ecological sites, including SSSIs and Impact Risk Zones where relevant, ancient woodland, and receptors used in the assessment of air quality, noise and vibration.	See Figures (Volume II).
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.9).	Some aspect sections of the Scoping Report have identified specific receptors, whereas others identify broad categories of receptors only. Specific receptors should be identified within the ES, alongside categorisation of their sensitivity and value. Section 1.8.2.1 of the Scoping Report explains the generic approach to defining receptor sensitivity in order to assess the potential impacts upon each receptor. The inspectorate expects a transparent and reasoned approach to be applied to assigning receptor sensitivity to be defined and applied across the aspect chapters.	See importance definitions in Section 23.4.3.1.1.

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Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.14).	The ES should include details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	See Section 23.4.6.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.17).	Section 1.7.2 and Table 1.4 of the Scoping Report explains that an Evidence Plan Process (EPP) with specialist stakeholders commenced in 2021 to agree the 'detailed methodologies for data collection and undertaking the impact assessments' in respect of certain aspects to be scoped into the ES. This approach to agreeing the finer details of the assessment is welcomed. Other aspects, including fisheries, aviation and radar, and shipping and navigation, would fall outside of the EPP but the Applicant has committed to consultation at an early stage of the assessment process. The Applicant should ensure that any agreements reached during EPP, or other consultation process are evidenced within the ES.	Noted – responses to points made during the EPP are detailed in this section.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.18).	Section 1.9.3 of the Scoping Report sets out the planning policy and legislation context for the Proposed Development. It would be beneficial for the aspect chapters of the ES to also include reference to aspect specific planning policy and legislation, where this has been used to inform the methodology used for assessment.	See Section 23.4.1 for details of planning and legislative context relevant to this chapter.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.20).	The Inspectorate notes that in a number of instances the potential for impacts to ecological receptors (including offshore ornithology, onshore ecology and onshore ornithology) arising from the use of new lighting during the construction, operational and decommissioning phases of the Proposed Development are identified. The Scoping Report states that in respect of onshore receptors, the risk of disturbance from lighting is low. In addition, the Inspectorate notes that there is potential for night-time lighting, which could result in effects to the setting of cultural heritage receptors, as well as seascape, landscape and visual receptors. The ES should include a description of the expected lighting emissions, appropriate visual representations and an assessment of effects, where significant effects are likely to occur. The ES should include details of any measures proposed to mitigate significant effects, including the use of lighting controls, and how this would be secured within the DCO.	See Section 23.6 for consideration of lighting on different receptors.

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Planning Inspectorate	August 2021, North Falls Scoping Opinion (paragraph 3.3.23).	Any mitigation relied upon for the purposes of the assessment should be explained in detail within the ES. The likely efficacy of the mitigation proposed should be explained with reference to residual effects. The ES should also address how any mitigation proposed is secured, with reference to specific DCO requirements or other legally binding agreements.	See Section 23.3.3 for embedded mitigation and Section 23.6 for additional mitigation in relation to each receptor. See also Summary Table 23.59.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 61).	<p>Paragraph 444</p> <p>Ecological receptors.</p> <p>The Inspectorate notes that no reference is made to Riddles Wood SSSI and Stour and Copperas Wood, Ramsey SSSI, which are located to 0.5km south and 3km northwest of the scoping boundary respectively, and whether these designated sites would be potentially sensitive to air quality changes including from construction traffic movements once the onshore components of the Proposed Development are refined. This should be confirmed in the ES and where there is potential for likely significant effects, these receptors should be scoped into the assessment.</p>	The study area for construction vehicle movements has been defined based on the Traffic and Transport assessment and then effects upon designated sites within 500m of the network has been considered in the EclA (see Section 23.6.1.2).
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 64).	<p>Paragraph 470</p> <p>Potential impacts – heritage and ecological receptors.</p> <p>The Inspectorate considers that there is potential for indirect effects to below ground heritage assets arising from flood risk and drainage impacts.</p> <p>The ES should set out the method for defining the sensitivity of both heritage and ecological receptors to flood risk and drainage impacts where significant effects are likely to occur.</p>	Chapter 21 Water Resources and Flood Risk (Volume I) has defined potential study area for groundwater impacts. The effects of changes to groundwater resources is considered upon ecological receptors is considered in Sections 23.6.1.1 and 23.6.1.2. Effects upon heritage receptors are considered separately in Chapter 25 Onshore Archaeology and Cultural Heritage (Volume I).
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 69).	No matters have been proposed to be scoped out.	Noted – no specific actions.

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Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 69).	<p>Potential impacts during construction.</p> <p>The Inspectorate notes that geotechnical survey (including sample boreholes and test pits) is proposed to be undertaken within the onshore scoping area. Given the potential proximity of the Proposed Development to the Stour Estuary and Hamford Water Ramsar sites, the ES should assess the potential for drawdown effects upon wetland habitat and the site's qualifying features, where significant effects are likely to occur.</p> <p>The ES should also fully assess the risks associated with the proposed construction techniques and excavations (including HDD and the potential for bentonite breakout and habitat contamination) on protected/ sensitive habitats and species where significant effects are likely to occur, including impacts upon Local Wildlife Sites.</p>	<p>An assessment of the effects upon the designated features of Hamford Water SAC and Ramsar site and Stour and Orwell Estuaries Ramsar site are provided in Section 23.6. An assessment of the potential adverse effect upon the integrity of European designated sites and Ramsar sites has been provided separately in the Report to Inform Appropriate Assessment, published alongside this PEIR.</p> <p>An assessment of the risk posed by effects of construction techniques and excavations (including HDD) is presented in see Section 23.6.</p>
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 69).	<p>Section 3.5.3.1.2</p> <p>Potential impacts - permanent and temporary loss of terrestrial habitats.</p> <p>Where significant effects are likely to occur, the ES should consider not only the direct effects of habitat loss (i.e., on species mortality and abundance), but also consider the effective areas of habitats subject to disturbance and displacement effects (including from noise / vibration, lighting, footfall and presence of workforce, and the presence and operation of the WTGs) that may serve to diminish the functional size of sensitive and / or protected habitats.</p>	Section 23.6 considers impacts of permanent and temporary habitat loss.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 70).	<p>Paragraph 417</p> <p>Existing environment - Ancient Woodland.</p>	This is considered in Section 23.5. Effects on ancient woodland are assessed in Section 23.6.1.2 and veteran trees in Section 23.6.1.5.

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		<p>The Scoping Report states that there are 28 areas of ancient woodland located within the onshore scoping area; however, it's not known which woodland inventories have been relied upon to identify ancient and veteran trees.</p> <p>The ES should reference the source(s) of this data. The ES should assess likely significant effects on all relevant ancient woodland receptors, explain the effort made to avoid direct impacts on ancient woodland and veteran trees, and increased fragmentation of these habitats.</p>	
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 70).	<p>Air quality effects.</p> <p>Chapter 3.5 does not refer to any potential air quality effects (e.g., from dust or nitrogen deposition from construction vehicles) on the ecological receptors identified and it's not indicated whether there are any designated sites within proximity of the Proposed Development that would potentially be sensitive to air quality changes.</p> <p>The Inspectorate expects the ES to include an assessment of these effects where significant effects are likely to occur.</p>	Section 23.6.1.2 considers potential air quality effects on different receptors.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 70).	<p>Paragraph 541</p> <p>Biodiversity Net Gain (BNG).</p> <p>It's stated that an assessment of BNG will be appended to the Onshore Ecology ES chapter. The ES should clearly differentiate between essential mitigation and enhancement that is proposed as part of the DCO.</p>	<p>All current information on the BNG baseline for the onshore project area is detailed in Appendix 23.1, Annex 7 (Volume III).</p> <p>The Project is engaging with ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for exploring opportunities to deliver BNG.</p>
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 70).	<p>Table 3.8</p> <p>Watercourses and the Water Framework Directive (WFD).</p>	Details of effects of the project upon watercourses and their WFD status are provided in Chapter 21 Water Resources and Flood Risk (Volume I), and Appendix



Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		<p>Table 3.8 (Water Resources and Flood Risk) suggests that crossings of main rivers or other sensitive watercourses may be required as part of the proposed works.</p> <p>The ES should describe the nature of any proposed works within or in proximity of watercourses and demonstrate that there is sufficient detail regarding the design as to inform a meaningful assessment of likely significant effects on watercourse hydraulics and ecology, including consideration of impacts upon migrating and / or spawning fish.</p> <p>The ES should consider the potential of such works to negatively impact the ecological status of watercourses under the WFD and the results of the WFD Assessment should be reported in the ES and / or associated Technical Appendix.</p>	<p>21.3 WFD Compliance Assessment (Volume III).</p> <p>Fish have been also included as a receptor in this EclA (see Section 23.6.1.16).</p>
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 71).	<p>Paragraph 528</p> <p>Invasive non-native species (INNS).</p> <p>The ES should assess the potential for construction and operational activities within proximity of watercourses and / or drainage ditches to facilitate the spread of INNS. Where significant effects are likely to occur, the ES should also consider the potential for climate change- related effects to facilitate the spread and exacerbate the impacts of INNS.</p> <p>The ES should describe any necessary mitigation and / or biosecurity precautions required to prevent the spread of INNS. Any measures relied upon in the ES should be discussed with relevant consultation bodies, including NE and the EA, in effort to agree the approach. Measures relied upon in the ES should be adequately secured e.g., through a Construction Environmental Management Plan (CEMP).</p>	This has been considered in Section 23.6.1.17.
Planning Inspectorate	August 2021, North Falls Scoping Opinion (p. 73).	<p>Section 3.6.3</p> <p>Potential impacts - habitat loss.</p> <p>Chapter 3.5 (Onshore Ecology) states that the ES will include an assessment of temporary and permanent terrestrial habitat loss. The Inspectorate considers that this</p>	<p>This has been considered in Section 23.6.</p> <p>Interactions (where effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects with different</p>

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		<p>assessment should interrelate with, and include appropriate cross-reference to, other relevant assessments of the ES. This should include consideration of the impacts of temporary and long-term terrestrial habitat loss on Onshore Ornithology, including those qualifying features of onshore designations that may rely on terrestrial habitats for nesting, roosting, breeding, foraging, etc.</p> <p>Where significant effects are likely to occur, the ES should consider not only the direct effects of habitat loss (i.e., on species mortality and abundance), but also consider the effective areas of habitats subject to disturbance and displacement effects (including from noise / vibration, lighting, and the presence and operation of the WTGs) that may serve to diminish the functional size of sensitive and / or protected habitats.</p>	disciplines as a result of that interaction) are discussed in Section 23.10.
Essex County Council (Places Services)	November 2022, North Falls Onshore Ecology and Ornithology ETG.	Tendring District Council are looking for potential ways to improve the biodiversity of Holland Haven Country Park and Local Nature Reserve [through biodiversity net gain]	<p>As noted above, NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project.</p> <p>All current information on the BNG baseline for the onshore project area is detailed in Appendix 23.1, Annex 7 (Volume III).</p> <p>The Project is engaging with ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG, and this will continue prior to the DCO application.</p>
Essex County Council (Places Services)	November 2022, North Falls Onshore Ecology and Ornithology ETG.	Were the last dates for bat transects late enough for picking up any migrating Nathusius pipistrelles?	The last bat transect surveys were completed in the last two weeks of October, including some closer to the coast so they could pick up migrating Nathusius pipistrelles. Some transects do not have an October visit due to Avian flu concerns, in which case the last survey would be late September, however, it is expected that

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
			sufficient information will have been collected to enable an assessment of their usage. Full details of the bat activity surveys have not been reported on at the time of writing, and will be detailed in full within the ES.
Natural England	November 2022, North Falls Onshore Ecology and Ornithology ETG.	It is important to state that [biodiversity net gain] within the Holland Haven Marshes SSSI] can only occur where the SSSI site is not impacted (directly or indirectly) by the development. Secondly, we have consulted our BNG team who have advised us that there will be an update on this matter in the forthcoming UK Government BNG consultation response, which means that information on this could change. However, in the meantime, we would advise that if enhancement is on the non-designated features and, if Natural England consent the proposal, then BNG could be delivered this way.	Noted. The Project will continue to engage with Natural England and other ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG prior to the DCO application.
Essex Wildlife Trust	November 2022, North Falls Onshore Ecology and Ornithology ETG.	Have NFOW considered protected species the Project can provide habitat creation for e.g. hazel dormice (mature hedgerows and woodland), ditch network for water vole habitat (Holland Haven Marshes) – and including within written landscaping scheme what type of habitat and potential location.	All habitat creation proposed as part of BNG for the Project will include consideration of the local protected species, for example hazel dormice and water vole. Further details of BNG proposals will be provided with the DCO application.
Essex Wildlife Trust	November 2022, North Falls Onshore Ecology and Ornithology ETG.	How close is the onshore project area to Great Holland Pits Essex Wildlife Trust reserve?	The reserve is located outside of the onshore project area (see Figure 23.3c, Volume II).

## 23.3 Scope

### 23.3.1 Study area

9. The study area for onshore ecology has been defined on the basis of the onshore project area, within which relevant impacts would be concentrated. Different study areas have been used for different receptors depending on their importance and their habitat preferences. These study areas were selected according to standard industry guidance (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018) as well as using professional judgement and experience. These study areas were agreed with stakeholders during the EPP and set out in Table 23.2. The study areas are also shown in Figures 23.1 – 23.9 (Volume II).

**Table 23.2 Study areas for onshore ecology receptors**

Data/ survey	Study area	Justification	Study area name used in the remainder of this document
Statutory designated sites	Within and up to 5km of the onshore project area.	Reasonable worst case maximum extent of ex-situ habitat for qualifying features of sites (e.g., habitat use by bats, where all bat species core sustenance zones, with the exception of barbastelle <sup>3</sup> , are below 5km (Bat Conservation Trust (BCT), 2016b) / extent of indirect effects (e.g., downstream fluvial connectivity).	Statutory designated sites study area
Non-statutory designated sites	Within and up to 2km of the onshore project area.	Reasonable worst case maximum extent of indirect effects (e.g., downstream fluvial connectivity).	Non-statutory designated sites study area
UK Habitats of Principal Importance (UKHPI) and Local Biodiversity Action Plan (LBAP) habitats	Within and up to 50m of the onshore project area.	Reasonable worst case maximum extent of direct and local indirect effects (e.g., run off from construction works).	Habitats and species study area
Protected and notable species	Within and up to 50m of the onshore project area.	Reasonable worst case maximum extent of direct and local indirect effects	Habitats and species study area

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<sup>3</sup> Core sustenance zone for barbastelle is 6.47km. Sites designated for barbastelle within this buffer zone from the onshore project area have also been considered.

Data/ survey	Study area	Justification	Study area name used in the remainder of this document
(excluding great crested newts)		(e.g., run off from construction works).	
Great crested newts	Within and up to 250m of the onshore project area.	Extent of species foraging zone from breeding ponds.	Great crested newt study area

10. The survey areas (i.e., the areas where field surveys have been undertaken) have not always directly corresponded with the study area. This is due to the refinement of the onshore project area during the course of the ecological surveys as a result of engineering feasibility studies and also limits to land access at the time of the surveys. This has resulted in some surveys being undertaken within areas that are now excluded from the onshore project area and a very small number of areas that have either not been surveyed or have not been fully surveyed.
11. Table 23.3 describes the survey areas for each receptor, as agreed through consultation with the ETG, are as follows.

**Table 23.3 Survey area of each ecological receptor**

Data/ survey	Survey area	Survey date	Survey area name used in the remainder of this document
Extended Phase 1 habitat survey	Within and up to 50m of the onshore project area.	Autumn 2021 and spring 2022.	Extended Phase 1 habitat survey area.
Terrestrial and aquatic invertebrate survey	Within and up to 250m of the Holland Haven Marshes SSSI.	Summer 2021.	Terrestrial and aquatic invertebrate survey area.
National Vegetation Classification (NVC) survey	Within and within up to 250m of the Haven Marshes SSSI.	Summer 2021.	NVC survey area.
Great crested newt eDNA surveys	All ponds within and up to 250m from the onshore project area.	Spring/summer 2022.	Great crested newt survey area.
Bat emergence/ re-entry surveys	All features (buildings, trees) within and up to 50m of the onshore project area.	Summer 2022.	Bat emergence/ re-entry survey area.

Data/ survey	Survey area	Survey date	Survey area name used in the remainder of this document
Water vole and otter surveys	All suitable watercourses within and up to 50m of the onshore project area.	Spring/summer 2022.	Water vole and otter survey area.
Hazel dormouse surveys	All suitable habitats within and up to 50m of the onshore project area.	Spring – autumn 2022.	Hazel dormouse survey area.
Reptile surveys	All areas of suitable habitats that may support significant populations of reptiles within and up to 50m of the onshore project area.	Spring and autumn 2022.	Reptile survey area.
Bat activity surveys	Key linear features (e.g., hedgerows) and suitable commuting/foraging habitats within and up to 50m of the onshore project area.	Spring/summer 2022.	Bat activity survey area.

### 23.3.2 Realistic worst case scenario

12. The final design of the Project will be confirmed through detailed engineering design studies that will be undertaken post-consent. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst case scenarios have been defined in terms of the potential effects that may arise. This approach to EIA, referred to as the Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst case scenario for each individual impact, so that it can be safely assumed that all other scenarios within the design envelope will have less impact. Further details are provided in Chapter 6 EIA Methodology (Volume I).
13. The realistic worst case scenarios for the likely significant effects scoped into the EIA for the onshore ecology assessment are summarised in Table 23.4. These are based on project parameters described in Chapter 5 Project Description (Volume I), which provides further details regarding specific activities and their durations.

**Table 23.4 Realistic worst-case scenarios**

Potential impact	Parameter	Notes
<b>Construction</b>		
Impacts relating to the landfall	Landfall HDD (temporary works) physical parameters: HDD temporary works area (4 circuits) = 100 x 200m Transition joint bay size = 4 x 15m Maximum no. of transition joint bays = 4 Maximum HDD depth = 20m Maximum number of HDD = 5 Drill exit location = subtidal exit below MHWS (up to 8m depth)	Duration includes compound establishment, HDD, transition bays, and reinstatement.
	Duration: 13 months (of which HDD = 6 months) HDD to include 24 hour / 7 days working where required	
Impacts relating to the onshore cable corridor(s)	Cable corridors construction physical parameters: Working width = 60m for open cut trenching Corridor length = 24km Cable trench width = 3.75m No. of trenches = 4 Maximum cable burial depth = 2m Haul road width = 6m Jointing bays = 80 – 192 (approximately every 500m) buried below ground Jointing bay construction footprint (per bay) = 13 x 5m	Overall duration includes establishing / reinstating temporary construction compounds (TCCs) and haul roads, cable installation (trench excavation, duct installation, cable jointing), HDD (includes compound establishment, HDD, and reinstatement).

Potential impact	Parameter	Notes
	<p>Temporary construction compound footprint = 150 x 150m (general cable construction compounds) to 100 x 100m (small cable construction compounds).</p> <p>No. of construction compounds (est.) = 7</p> <p>Replanting restrictions = 37m swathe in which only shrubs (growth up to max. 5m height) can be planted.</p>	
	<p>Trenchless crossings physical parameters:</p> <p>Maximum width of buried cable = 122m</p> <p>Maximum trenchless crossing depth = 20m</p> <p>Temporary HDD compound dimensions = 40 x 120 (minor HDD compounds) to 80 x 120m (major HDD compounds).</p>	
	<p>Durations:</p> <p>Overall duration = 18 – 24 months</p> <p>Cable installation = 12 months</p> <p>Major HDD (each location) = 8 months (of which HDD = 4 months)</p> <p>Minor HDD crossings = 2 months</p> <p>Major HDD crossings to include 24 hour / 7 days working where required.</p>	
Impacts relating to the onshore substation	<p>Onshore substation (temporary works) physical parameters:</p> <p>Permanent substation footprint = 267 x 300m</p> <p>Construction compound footprint = 150 x 250m</p>	



Potential impact	Parameter	Notes
	<p>Durations:</p> <p>Construction duration = 6 months preparation, 24 months construction.</p>	
<b>Operation</b>		
Impacts relating to the onshore cable route	<p>Cable corridors operational physical parameters:</p> <p>No. of link boxes = up to 196</p> <p>Link box footprint (per box) = 1.5m<sup>2</sup></p> <p>Cross-sectional area of cement-bound sand = 0.6m<sup>2</sup></p>	
Impacts relating to the onshore substation	<p>Onshore substation physical parameters:</p> <p>Permanent substation footprint = 267 x 300m</p>	<p>Normal operating conditions would not require lighting at the onshore substation, although low level movement detecting security lighting may be utilised for health and safety purposes. Temporary lighting during working hours would be provided during maintenance activities only. Low level continuous noise emissions would also be generated by the onshore substation during operation.</p>
<b>Decommissioning</b>		
<p>No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable corridor(s) and onshore substation. It is also recognised that legislation and industry best practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused, or recycled where possible and the transition bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst case scenario, the impacts will be no greater than those identified for the construction phase.</p>		

### 23.3.3 Summary of mitigation embedded in the design

14. This section outlines the embedded mitigation relevant to the onshore ecology assessment, which has been incorporated into the design of North Falls (Table 23.5). Where other mitigation measures are proposed, these are detailed in the impact assessment (Section 23.6), where applicable.

**Table 23.5 Embedded mitigation measures**

Parameter	Mitigation measures embedded into North Falls design
Ecological Management Plan	<p>Prior to works commencing, North Falls will prepare an Ecological Management Plan (EMP) setting out full details of the ecological mitigation measures which will be adhered to during the Project's construction. This will include:</p> <ul style="list-style-type: none"> <li>• A programme of works;</li> <li>• A list of roles and responsibilities for ecological mitigation, including the role of an ecological clerk of works (ECOW);</li> <li>• A plan showing ecological constraints;</li> <li>• Full details of best practice mitigation required in relation to all species and habitats affected by the Project;</li> <li>• Full details of any project-specific mitigation identified within this chapter, including habitat creation or protected species mitigation programmes. Any such programmes will be accompanied by mitigation layout plans;</li> <li>• A list of protected species licences and site consents required to facilitate construction;</li> <li>• Habitat reinstatement method statements for all habitats proposed to be reinstated following the completion of construction (including grassland, hedgerows, watercourses and arable field margins – see below).</li> </ul> <p>Any associated standalone mitigation plans, e.g., reptile precautionary method of works, invasive species management plan, etc. as required. As part of the Project's DCO application, an OLEMS will be submitted which will set out the ecological mitigation requirements identified within the ES that must be incorporated into the EMP for delivery during the Project's construction. The OLEMS will act as the single source for all ecological mitigation measures proposed within the ES. It will also include identification of the amount of biodiversity units the project proposes to create as part of delivering BNG for the Project.</p>
Best practice measures	<p>The EMP will include details of best practice for minimising impact to notable habitats and legally protected and notable species, including (but not limited to):</p> <ul style="list-style-type: none"> <li>• Avoid sensitive times of the year for construction activities, including:</li> <li>• Avoid undertaking vegetation removal during the bird nesting season (March – August inclusive, although weather dependent) (see Chapter 24 Onshore Ornithology, Volume I) where practicable. Where this cannot be achieved, a pre-construction check of all nesting habitat is required no more than 48 hours prior to removal. Should a nest be found, a buffer zone (minimum 5m) around the nest must be created, and no works must be undertaken within the buffer zone until the young have fledged. This mitigation also applies to suitable habitat for ground nesting birds.</li> <li>• Avoid undertaking above ground vegetation removal during the reptile active period (March – October inclusive) wherever practicable and avoiding undertaking below ground vegetation removal e.g., roots and coppice stools during the reptile hibernation period (November – February inclusive) where practicable. If not practicable, above ground vegetation identified as suitable to support reptiles</li> </ul>

Parameter	Mitigation measures embedded into North Falls design
	<p>removed during the reptile active period must be done so whilst adhering to a precautionary method of working (PMoW) for reptiles, supervised by a suitably qualified ecologist. A precautionary methodology for vegetation removal will involve cutting vegetation to a minimum height of 150mm, allowing reptiles to vacate the area, allowing an ecologist to search for any reptiles, then once cleared further cutting can take place. For any reptiles found during construction, a suitable translocation area will be decided upon to re-release the reptiles away from construction activities.</p> <ul style="list-style-type: none"> <li>• Undertaking pre-construction checks of all habitats identified of being of conservation importance prior to works, to ensure that the ecological constraints identified prior to consent have not changed.</li> <li>• Ensuring security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and Institute of Lighting Professionals (ILP), 2018), This will include the following measures:</li> <li>• Ensure lighting is cowled and angled downwards and does not shine directly on sensitive habitats;</li> <li>• Ensure lighting is motion activated to minimise unnecessary lighting;</li> <li>• Ensuring best practice pollution prevention measures are adhered to at all times to minimise the risk of pollutant release to sensitive habitats (see also Chapter 21 Water Resources and Flood Risk, Volume I).</li> <li>• Best Practical Means (BPM) to be employed during construction to limit dust, odour, and exhaust emissions during construction works, to reduce potential effects upon air quality-sensitive habitat (see Chapter 20 Onshore Air Quality, Volume I).</li> <li>• All habitats temporarily disturbed during construction are reinstated in full upon completion of construction.</li> </ul>
Mitigation by site selection	<p>The onshore project area and onshore substation zone have been defined following an extensive site selection process, which has sought to take account of environmental, engineering, planning and land requirements to seek to identify the most sensitive project location. The site selection process is described in detail in Chapter 4 Site Selection and Assessment of Alternatives (Volume I). The site selection process has included consideration of the following ecological criteria as part of the process:</p> <ul style="list-style-type: none"> <li>• Avoidance of statutory and non-statutory designated sites for conservation and associated buffer zones for indirect effects, as far as practicable;</li> <li>• Avoidance of ancient woodland and associated buffer zones for indirect effects, as far as practicable;</li> <li>• Avoidance of UKHPI as far as practicable;</li> <li>• Avoidance of habitat potentially suitable for supporting legally protected and notable species as far as practicable;</li> </ul> <p>As part of this process, the onshore project area presented in Chapter 5 Project Description (Volume I) does not overlap with any European sites designated for nature conservation nor ancient woodlands. The onshore project area does cross one SSSI (Holland Haven Marshes). However, the SSSI will be crossed using HDD techniques thereby avoiding any direct impacts on habitat (see below).</p>
Mitigation by construction method selection	<p>North Falls has committed to seeking to use trenchless techniques (e.g., HDD) where practicable at all key sensitive linear features, including the following:</p> <ul style="list-style-type: none"> <li>• All 'important' hedgerows, and those hedgerows potentially suitable for supporting dormice and/or commuting / foraging bats;</li> </ul>

Parameter	Mitigation measures embedded into North Falls design
	<ul style="list-style-type: none"> <li>• Main rivers and watercourses potentially suitable for supporting water voles / otters;</li> <li>• Veteran trees;</li> <li>• Woodland UKHPI;</li> <li>• Ponds UKHPI.</li> </ul> <p>At this stage in the Project's design trenchless techniques cannot be committed to at all locations, where the engineering feasibility of using such techniques needs further assessment before it can be confirmed. The list of techniques being considered at each crossing is described in Chapter 5 Project Description (Volume I), Appendix 5.1 Crossing Schedule (Volume III).</p> <p>At all trenched watercourse crossings, best practice measures will be in place to minimise disturbance of the beds, banks and downstream habitats (see Chapter 21 Water Resources and Flood Risk, Volume I):</p> <ul style="list-style-type: none"> <li>• Either temporary dams or flumes are used to divert water during trenched installation;</li> <li>• Where temporary dams are used: <ul style="list-style-type: none"> <li>○ Prior to dewatering the area between the temporary dams, a fish rescue would be undertaken;</li> <li>○ Flumes or pumps would be adequately sized to ensure that flows downstream are maintained whilst minimising upstream impoundment;</li> </ul> </li> <li>• The amount of time that temporary dams or flumes are in place will be kept to a minimum;</li> <li>• Scour protection would also be used to protect the river bed downstream of the dam from high energy flow at the outlets of flumes and pumps; and</li> <li>• Sympathetic reinstatement of channel and banks.</li> </ul>
Draft 'Break-out' Contingency Plan	As advised by Natural England during the EPP, an Outline HDD Method and Draft 'Break-out' Contingency Plan will be submitted with the Project's DCO application. This will provide assurance that reasonable steps will be taken to minimise the risk of effects upon interest features of the Holland Haven Marshes SSSI as a result of a mud 'break-out' during the landfall HDD beneath the SSSI.
Mitigation by design	<p>NFOW have committed to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable corridor working width at hedgerow crossings. Hedgerows will be replanted following construction but note that canopy tree species cannot be replanted within 6m of the buried cables, which will restrict tree planting for a 37m swathe during hedgerow reinstatement (as the maximum width of hedgerow removal is 30m, in practice this restriction will only apply for a maximum 30m swathe).</p> <p>Hedgerow planting would be undertaken in the first winter season following construction.</p>
Habitat reinstatement	<p>As noted above, where practicable all habitats subject to temporary disturbance during construction, will be reinstated in full following the completion of construction. The specific details of the reinstatement will be set out within the EMP for each habitat. The following core principles for habitat reinstatement would be included within the EMP:</p> <p>Grassland habitats</p>

Parameter	Mitigation measures embedded into North Falls design
	<p>All topsoil stripped in grassland areas would be stored separately and reinstated following the completion of construction. Topsoil storage would be subject to a Soil Management Plan (secured through a DCO Requirement), which would also detail measures for soil storage and handling. Grassland reseedling would be undertaken using a local seed mix, to be agreed in advance with Natural England and Essex Wildlife Trust.</p> <p>Trees and hedgerows</p> <p>As advised by Essex County Council during the EPP, all tree and shrub planting undertaken by NFOW will be subject to an up to 10 year after care period.</p> <p>As advised by Natural England during the EPP, all hedgerows within the onshore project area not removed for construction to be allowed, where practicable, to thicken up during construction and operation to facilitate use as feeding and commuting corridors for wildlife.</p> <p>All reinstated hedgerows will be replanted using locally important and native species, as advised by Essex Wildlife Trust and following the Essex Hedgerow LBAP.</p> <p>Arable field margins</p> <p>If landowner permission can be reached, this habitat will be reinstated in consultation with Essex Wildlife Trust and the local landowner to ensure the optimum benefits can be gained from each margin affected. Prior to construction, the arable field margins will be re-surveyed to assess their conservation value. Attempts will then be made to ensure habitat reinstatement takes the form of one of the following (Joint Nature Conservation Committee (JNCC), 2008f):</p> <ul style="list-style-type: none"> <li>• Cultivated, low-input margins (land managed specifically to create habitat for annual arable plants);</li> <li>• Margins sown to provide seed for wild birds (margins or blocks sown with plants that are allowed to set seed and which remain in place over the winter);</li> <li>• Margins sown with wildflowers or agricultural legumes and managed to allow flowering to provide pollen and nectar resources for invertebrates;</li> <li>• Margins providing permanent, grass strips with mixtures of tussocky and fine-leaved grasses.</li> </ul>
Biodiversity Net Gain (BNG)	<p>NFOW are exploring opportunities to deliver a minimum of 10% BNG for the onshore elements of the Project, as articulated within the Environment Act 2021. The Project is engaging with Natural England and other ecological stakeholders and members of the Onshore Ecology ETG to identify suitable projects and plans for delivering this BNG. Further details regarding the location of the Project's BNG will be set out within the Project's ES.</p>

## 23.4 Assessment methodology

### 23.4.1 Legislation, guidance and policy

#### 23.4.1.1 National Policy Statements

- The assessment of likely significant effects upon onshore ecology has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision-making documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to the Project are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);

- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b);
  - NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c);
  - Draft Overarching NPS for Energy (EN-1) BEIS 2021a);
  - Draft NPS for Renewable Energy Infrastructure (EN-3) (BEIS 2021b); and
  - Draft NPS for Electricity Networks Infrastructure (EN-5) (BEIS 2021c).
16. The UK Government announced a review of the existing NPSs within its December 2020 Energy White Paper (HM Government, 2020) and issued a draft version of Overarching NPS for Energy EN-1, NPS for Renewable Energy Infrastructure EN-3 and NPS for Electricity Networks Infrastructure EN-5 for consultation on 6<sup>th</sup> September 2021 (BEIS 2021a; BEIS 2021b; BEIS 2021c). At the time of writing this PEIR chapter, final versions of the revised NPSs are not available.

The specific assessment requirements for onshore ecology, as detailed in the NPS, are summarised in Table 23.6 together with an indication of the section of the PEIR chapter where each is addressed.

**Table 23.6 NPS assessment requirements**

NPS Requirement	NPS Reference	PEIR Reference
<b>Overarching NPS for Energy (EN-1)</b>		
'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 Infrastructure Planning Commission (IPC) consider thoroughly the potential effects of a proposed project.'	Section 5.3.3	Potential impacts on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity are considered in Section 23.6.
'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.'	Section 5.3.4	Embedded mitigation measures are provided in Section 23.3.3 and where applicable, additional mitigation measures are outlined in Section 23.6.
'When considering the application, the IPC will have regard to the Government's biodiversity strategy as (sic) set out in 'Working with the grain of nature', which aims to halt or reverse declines in priority habitats and species; accept the importance of biodiversity to quality of life. The IPC will consider this in relation to the context of climate change. As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological	Section 5.3.5 – Section 5.3.8	Site selection decisions and embedded mitigation measures have sought to minimise impacts to features of biodiversity and geological interest.  Embedded mitigation measures are provided in Section 23.3.3 and where applicable, further

NPS Requirement	NPS Reference	PEIR Reference
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. In taking decisions, the IPC should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; habitats and other species of principal importance for the conservation of biodiversity; and to biodiversity and geological interests within the wider environment.'		mitigation measures are outlined in Section 23.6.
'For the purposes of considering development proposals affecting them, as a matter of policy the Government wishes pSPAs to be considered in the same way as if they had already been classified. Listed Ramsar sites should, also as a matter of policy, receive the same protection'.	Section 5.3.9	Designated sites are presented in Section 23.5.2. Note that SPAs and pSPAs are considered in the project's Habitats Regulations Assessment (HRA) Screening Report and Report to Inform Appropriate Assessment, published alongside this PEIR, and qualifying features of SPAs and pSPAs are considered in Chapter 23 Onshore Ornithology (Volume I).  Site selection decisions will be made to minimise impacts to interest features within designated sites.
'Many SSSIs are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection.'	Section 5.3.10	Designated sites are presented in Section 23.5.2.  Site selection decisions will be made to minimise impacts to interest features within designated sites.
'Where a proposed development on land within or outside a Site of Special Scientific Interest (SSSI) is likely to have an adverse effect on a SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any	Section 5.3.11	Designated sites are presented in Section 23.5.2.  Site selection decisions will be made to minimise impacts to interest features within designated sites.



NPS Requirement	NPS Reference	PEIR Reference
broader impacts on the national network of SSSIs.'		
'Sites of regional and local biodiversity and geological interest, which include Regionally Important Geological Sites, Local Nature Reserves and Local Sites, have a fundamental role to play in meeting overall national biodiversity targets; contributing to the quality of life and the well-being of the community; and in supporting research and education. The IPC should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent.'	Section 5.3.13	Designated sites are presented in Section 23.5.2.  Site selection decisions will be made to minimise impacts to interest features within designated sites.
'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 IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat. 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.'	Section 5.3.14	The onshore cable corridor(s) do not cross areas of ancient woodland. However, ancient woodland is present within the PEIR boundary and information relating to this is presented in Section 23.5.2.
The IPC should maximise opportunities to build in beneficial biodiversity features when considering proposals as part of good design.	Section 5.3.15	Enhancement measures will be considered and discussed with stakeholders through the development of NFOW.
The IPC shall have regard to the protection of legally protected species and habitats and species of principal importance for nature conservation.  'The IPC should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits (including need) of the development outweigh that harm. In this context, the IPC should give substantial weight to any such harm to the detriment of biodiversity features of national or regional importance which it considers may result from a proposed development.'	Sections 5.3.16 – 5.3.17	Information on protected species and habitats is provided in Section 23.5 and the outcome of the assessment process is provided in Section 23.6.
The applicant should include appropriate mitigation measures as an integral part of the proposed development and demonstrate that:	Section 5.3.18	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated



NPS Requirement	NPS Reference	PEIR Reference
<p>During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;</p> <p>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;</p> <p>Habitats will, where practicable, be restored after construction works have finished; and</p> <p>Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.</p>		with potential impacts are presented in Section 23.6.
'The IPC will need to take account of what mitigation measures may have been agreed between the applicant and Natural England ... and whether Natural England ... has granted or refused or intends to grant or refuse, any relevant licences, including protected species mitigation licences.'	Section 5.3.20	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated with potential impacts are presented in Section 23.6.
<b>NPS for Renewable Energy Infrastructure (EN-3)</b>		
'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.'	Section 2.4.2	Project design has avoided sensitive features where practicable. Embedded mitigation measures are presented in Section 23.3.3 and further mitigation measures are set out in Section 23.6.
'Ecological monitoring is likely to be appropriate during the construction and operational phases to identify the actual impact so that, where appropriate, adverse effects can then be mitigated and to enable further useful information to be published relevant to future projects.'	Section 2.6.71	Monitoring is discussed in mitigation and is set out in Sections 23.6 and 23.11.
'There may be some instances where it would be more harmful to the ecology of the site to remove elements of the development, such as the access tracks or underground cabling, than to retain them.'	Section 2.7.15	Decommissioning is discussed in Section 23.6.3 and will be expanded upon at DCO application stage. Further details of decommissioning will be provided in the ES.
<b>NPS for Electricity Networks Infrastructure (EN-5)</b>		
'The applicant will need to consider whether the proposed line will cause such problems at any point along its length and take this into consideration in the preparation of the EIA and ES (see Section 4.2 of EN-1). Particular consideration should be given to feeding and	Section 2.7.2 – 2.7.3	Embedded mitigation measures are presented in Section 23.3.3. Mitigation measures associated with potential impacts are presented in Section 23.6.

NPS Requirement	NPS Reference	PEIR Reference
<p>hunting grounds, migration corridors and breeding grounds.'</p> <p>'The IPC should ensure that this issue has been considered in the ES and that appropriate mitigation measures will be taken where necessary.'</p>		
<b>Draft Overarching NPS for Energy (EN-1)</b>		
No change from EN-1.		
<b>Draft NPS for Renewable Energy Infrastructure (EN-3)</b>		
No change from EN-3.		
<b>Draft NPS for Electricity Networks Infrastructure</b>		
No change from EN-5.		

#### 23.4.1.2 Other legislation, policy and guidance

17. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of onshore ecology. These include:
  - The Conservation of Habitats and Species Regulations 2017 (or 'the Habitats Regulations 2017');
  - Wildlife and Countryside Act 1981 (as amended);
  - The Protection of Badgers Act 1992;
  - Natural Environment and Rural Communities (NERC) Act 2006;
  - The Hedgerows Regulations 1997;
  - Marine and Coastal Access Act 2009;
  - The Commons Act 2006;
  - Countryside and Rights of Way Act 2000 (CRoW);
  - National Planning Policy Framework (NPPF);
  - Natural Environment White Paper 2011;
  - Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services;
  - Tending's Infrastructure Delivery Plan (2017);
  - Tending's Open Spaces Strategy (2009);
  - Tending District Local Plan 2013-2033 and Beyond (2021; 2022);
  - Essex Green Infrastructure Strategy (2020);
  - Natural England and Forestry Commission's Standing Advice on Ancient woodland, ancient trees and veteran trees: advice for making planning decisions (2022).
18. Further detail is provided in Chapter 3 Policy and Legislative Context (Volume I).

## 23.4.2 Data sources

### 23.4.2.1 Site specific

19. To provide site specific and up to date information on which to base the impact assessment, a site characterisation survey was conducted. The surveys will be ongoing up to the DCO submission, however for the purpose of this PEIR, results of the surveys undertaken between September 2021 and August 2022 are presented. These include:
- Extended Phase 1 Habitat survey;
  - Terrestrial and aquatic invertebrate survey;
  - National Vegetation Classification survey;
  - Great Crested Newt eDNA survey;
  - Hazel Dormouse survey;
  - Reptile survey;
  - Bat emergence/ re-entry surveys;
  - Bat activity surveys; and
  - Water vole and otter surveys.
20. Further detail of the dates and methodology for the field surveys carried out are detailed in Section 23.5.

### 23.4.2.2 Other available sources

21. A desk study including a data search with the local biological records centre, the Essex Field Club (EFC), was completed in November 2021. EFC holds biological records and information on non-statutory designated nature conservation sites such as County Wildlife Sites (CWS) and Roadside Nature Reserves (RNR) within Essex.
22. EFC has only recently taken over the running of the local biological records centre, which was formerly 'Essex Wildlife Trust Biological Records Centre' at the time of submission of the Scoping Report, July 2021.
23. Other sources that have been used to inform the assessment are listed in Table 23.7.

**Table 23.7 Other available data and information sources**

Data source	Data Set	Spatial Coverage	Year
JNCC and MAGIC Website	Statutory designated sites <sup>4</sup> : <ul style="list-style-type: none"><li>• Ramsar sites</li><li>• Local Nature Reserve (LNR)</li><li>• Special Areas of Conservation (SAC)</li></ul>	Within 5km of the onshore project area.	2021

<sup>4</sup> Please note that SPAs are considered in Chapter 24 Onshore Ornithology

Data source	Data Set	Spatial Coverage	Year
	<ul style="list-style-type: none"> <li>SSSI</li> <li>National Nature Reserve (NNR)</li> </ul>		
Essex Wildlife Trust Biological Records Centre	Non-statutory designated sites: <ul style="list-style-type: none"> <li>Essex Local Wildlife Sites (LWS)</li> <li>Special Roadside Verges</li> <li>Buglife – The Invertebrate Conservation Trust 'B-lines' - Pollinator corridors</li> </ul>	Within 2km of the onshore project area.	2021
Essex Wildlife Trust Biological Records Centre	Protected' species includes all those listed under The Conservation of Habitats and Species Regulation 2017 (as amended), the Wildlife and Countryside Act 1981 (as amended) and the Protection of Badgers Act 1992: <ul style="list-style-type: none"> <li>NERC Act 2006 Section 41 species (UK species of principal importance)</li> <li>Essex Biodiversity Action Plan (BAP) species</li> <li>International Union for Conservation of Nature (IUCN) 'Red List' species</li> <li>Birds of Conservation Concern (BoCC4) 'Red list' species</li> <li>Locally or nationally rare or scarce species</li> <li>Veteran trees</li> </ul>	Within 2km of the onshore project area.	2021
JNCC	UKHPI	Within 50m of the onshore project area.	2008
Essex County Council	Special roadside verges.	County level.	2021
Forestry Commission	National Forest Inventory Woodland England.	National level.	2020

### 23.4.3 Impact assessment methodology

24. Chapter 6 EIA Methodology (Volume I) explains the general impact assessment methodology applied to North Falls. The following sections describe the methods used to assess the likely significant effects on onshore ecology.
25. The EcIA methodology that has been applied in relation to onshore ecology is based on the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018). This methodology was consulted on and agreed with stakeholders through the ETG process.
26. The CIEEM 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.

27. The approach to determining the significance of an impact follows a systematic process for all impacts. This involves identifying, qualifying and, where practicable, quantifying the importance, value and magnitude of all ecological receptors which have been scoped into this assessment. Using this information, a significance of each potential impact has been determined. Each of these steps is set out in the remainder of this section.
28. The EclA has used professional judgement to ensure the assessed significance level is appropriate for each individual receptor, taking account of local values for biodiversity to avoid a subjective assessment wherever practicable as per the CIEEM guidelines. As a result, the assessed significance level may not always be directly attributed to the guidance matrix detailed below.

#### 23.4.3.1 Definitions

29. For each potential impact, the assessment identifies receptors within the study area which are sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e., magnitude) on given receptors. The definitions of importance and magnitude for the purpose of the onshore ecology assessment are provided in Table 23.8 and Table 23.9.

##### 23.4.3.1.1 Importance

30. CIEEM identifies important ecological features as those key sites, habitats and species which have been identified by European, national, and local Governments and specialist organisations as a key focus for biodiversity conservation in the UK. These include:
  - Statutory and non-statutory designated sites for nature conservation;
  - Species occurring on national biodiversity lists;
  - UK Habitats of Principal Importance (UKHPI); and
  - Red listed, rare or legally protected species.
31. 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.

**Table 23.8 Definition of importance for an onshore ecological receptor**

Importance	Definition
<b>High</b>	Habitats or species that form part of the cited interest within an internationally or nationally protected site, such as those designated under the Habitats Directive (e.g., SACs) 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). Habitats or species that form part of the cited interest within a nationally designated site, such as an SSSI or an 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 as a SSSI. Presence of UK habitats or species of principal importance, in good condition.
<b>Medium</b>	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 LNR, or some local-level

Importance	Definition
	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 designation. Presence of LBAP habitats or species, where the action plan states that all areas of representative habitat or individuals of the species should be protected.
<b>Low</b>	A feature of importance at district 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.
<b>Negligible</b>	A feature of importance at 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.

32. In addition to the features listed in Table 23.8 and Table 23.9, ecological features which play a key functional role in the landscape or are locally rare have been considered. The importance of such features has been determined by professional judgement.
33. CIEEM places the emphasis on using professional judgement when considering importance of ecological receptors, based on available guidance, information and expert advice (CIEEM 2018). Various aspects of ecological importance should be considered, including designations, biodiversity value, potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features.

#### 23.4.3.1.2 Magnitude

34. 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 practicable within a reasonable timescale or there is no intention to reverse the impact; and
  - The timing and frequency of the impact, i.e., conflicting seasons or increasing impact through repetition.

**Table 23.9 Definition of magnitude for onshore ecology.**

Magnitude	Definition
<b>High</b>	The impact is likely to have an adverse effect on the integrity of a site or the conservation status of a species or species assemblage.
<b>Medium</b>	The impact adversely affects an ecological receptor but is unlikely to adversely affect its integrity or conservation status.
<b>Low</b>	The impact adversely affects an ecological receptor but would not adversely affect its integrity or conservation status.
<b>Negligible</b>	There would be minimal effect on the ecological receptor.

Magnitude	Definition
No change	There would be no detectable change from the baseline condition of the ecological receptor.

#### 23.4.3.1.3 Duration

35. The definitions of duration used within this EclA are dependent on the individual ecological receptor, and how sensitive it is to effects over different timescales. However, in general terms the following definitions have been used:
- **Short term**– effects which at most occur over a part of – or over a part of a key period of – a species’ active season or a habitat’s growing season, i.e., typically impacts which occur over a matter of days or weeks;
  - **Medium term**- effects which occur over the full duration of a species’ active season or a habitat’s growing season, i.e., typically impacts which occur over a matter of months or one year; and
  - **Long term**- effects which occur over the multiple active or growing seasons, i.e., typically impacts which occur over more than one year.

#### 23.4.3.2 Significance of effect

36. The assessment of significance of an effect is a function of the importance of the receptor and the magnitude of the impact (see Chapter 6 EIA Methodology (Volume I) for further details). The determination of significance is guided by the use of a significance of effect matrix, as shown in Table 23.10. Definitions of each level of significance are provided in Table 23.11.
37. Likely significant effects identified within the assessment as major or moderate are regarded within this chapter as significant. Appropriate mitigation has been identified, where practicable, in consultation with the regulatory authorities and relevant stakeholders. The aim of mitigation measures is to avoid or reduce the overall significance of effect to determine a residual effect upon a given receptor.
38. 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.
39. CIEEM recommend that the following factors are considered 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).
40. Following the identification of receptor importance and magnitude of effect, the significance of the impact has been considered using the matrix presented in Table 23.10 below and knowledge of the ecological features affected.
41. The assessment of potential impacts has been undertaken assuming implementation of embedded mitigation and project commitments made as part of the design process. Where, following this assessment, significant impacts (moderate or major) are identified, additional mitigation measures are then proposed. A final assessment of the residual impacts remaining following implementation of these additional mitigation measures is then made.

**Table 23.10 Significance of effect matrix**

Importance	Adverse magnitude				Beneficial magnitude			
	High	Medium	Low	Negligible	Negligible	Low	Medium	High
	High	Major	Major	Moderate	Minor	Minor	Moderate	Major
Medium	Major	Major	Moderate	Minor	Minor	Minor	Moderate	Major
Low	Moderate	Minor	Negligible	Negligible	Negligible	Minor	Minor	Moderate
Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

**Table 23.11 Definition of effect significance**

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

42. Note that for the purposes of the EIA, major and moderate impacts are deemed to be significant. In addition, whilst minor impacts are not significant in their own right, it is important to distinguish these from other non-significant impacts as they may contribute to significant impacts cumulatively or through interactions.

#### 23.4.3.3 Approach to mitigation

43. This EcIA will propose mitigation according to the mitigation hierarchy set out by CIEEM in their *Guidelines for Ecological Impact Assessment* (CIEEM 2018).



44. To minimise the impacts of a project the mitigation hierarchy follows, in order, the below mitigation strategies:
- **Avoidance:** Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
  - **Mitigation:** Negative effects should be avoided or minimised through mitigation measures, either through the design of the Project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
  - **Compensation:** Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
  - **Enhancement:** Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

#### 23.4.4 Cumulative effects assessment methodology

45. The cumulative effects assessment (CEA) considers other plans, projects and activities that may result in cumulation with North Falls. Chapter 6 EIA Methodology (Volume I) provides further details of the general framework and approach to the CEA.
46. For onshore ecology, these activities include:
- Other offshore wind farms (general operation and construction of onshore elements);
  - Roadworks (corridor improvements and traffic management schemes); and
  - Residential projects (construction of dwellings).

#### 23.4.5 Transboundary effects assessment methodology

47. The transboundary assessment considers the potential for transboundary effects to occur on onshore ecology receptors as a result of North Falls; either those that might arise within the Exclusive Economic Zone (EEZ) of European Economic Area (EEA) states or arising on the interests of EEA states e.g., a non UK fishing vessel. Chapter 6 EIA Methodology (Volume I) provides further details of the general framework and approach to the assessment of transboundary effects.
48. For onshore ecology, no potential for transboundary effects has been identified and therefore do not need to be considered for this chapter.

#### 23.4.6 Assumptions and limitations

49. The 2021 and 2022 Extended Phase 1 Habitat Surveys (herein the 'Extended Phase 1 Habitat Survey') collectively covered approximately 95.6% of the onshore project area (as defined at the time of writing). The remaining 4.4% equates to an area that is currently unsurveyed due to no landowner access being granted at the time of the 2022 survey.
50. In the absence of field survey data, the habitats present within the unsurveyed areas have been digitised using aerial mapping, and these habitats are also

shown on Figure 23.3 (Volume II) using a separate colour scheme to those habitats which have been identified in the field.

51. Some areas of habitats could not be fully accessed during the 2021 survey due to the presence of physical barriers, such as (but not limited to) dense scrub, which prevented safe entry for the surveyors. However, such areas were small and discrete and were encountered infrequently. In the few locations where they were encountered, they were noted as potentially providing field signs which could not be confirmed during the 2021 survey.
52. The 2021 survey was undertaken in April, July, September, and early-October and the 2022 survey in March. These months are considered to be within the optimal surveying window for identifying ground flora species and habitat communities. Therefore, sufficient evidence of key indicator species was found which in turn has enabled the successful identification of habitat communities present within the survey area. Additionally, the majority of habitats encountered within the survey area is consistent with those expected of agricultural landscapes and colonised by identifiable species, for example scrub dominated by bramble *Rubus fruticosus* and hawthorn *Craetagus monogyna*. Therefore, it is considered that the survey (and its findings) is robust in being used to characterise the existing site conditions and in turn be used to inform and support the ecological impact assessment presented in this PEIR.

## 23.5 Existing environment

### 23.5.1 Overview

53. The onshore project area is dominated by arable fields interspersed with field margin drains, rivers and areas of scattered and dense scrub. Field boundaries are typically hedgerows (species-poor intact and/or defunct) and dominated by hawthorn and/or blackthorn *Prunus spinosa*. Other small areas of habitat present which are considered to be of a higher ecological value include semi-improved grassland, marshy grassland, woodland (broadleaved and mixed semi-natural and plantation) and woodland/scrub successional habitats.
54. Species such as common pipistrelle *Pipistrellus pipistrellus*, hazel dormice *Muscardinus avellanarius* and common nesting birds are associated with hedgerows within the onshore project area. Trees and woodland are also valuable to badgers *Meles meles*, bats and hazel dormice for nesting and foraging resources. Other terrestrial habitats such as grassland support notable species including reptiles and, in particular within Holland Haven Marshes SSSI, terrestrial invertebrates.
55. Water vole *Arvicola amphibius*, otter *Lutra lutra*, great crested newts *Triturus cristatus* and, notably within Holland Haven Marshes SSSI, aquatic invertebrates are associated with waterbodies within the onshore project area.

### 23.5.2 Designated sites for nature conservation

56. Statutory and non-statutory designated sites that are located within the study area are presented in Table 23.12 and shown in Figure 23.1 (Volume II). Table 23.12 also provides a summary of the qualifying features/reasons for notification of these designated sites.

57. Please note that European sites have been assessed separately as part of the project's HRA Screening Report and Report to Inform Appropriate Assessment, published alongside this PEIR. Where their qualifying features may be affected by the development of the project, they have been assessed individually within this chapter. Please also note that SPAs have not been included in the table below and are instead described and assessed in Chapter 24 Onshore Ornithology (Volume I).

**Table 23.12 Designated sites for nature conservation**

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
Holland Haven Marshes	Located within onshore project area		SSSI	<p>An area of reclaimed estuarine saltmarsh and freshwater marsh situated between Holland-on-Sea and Frinton-on-Sea. The site is bisected by Holland Brook and its tributaries, from which an extensive ditch system radiates. The citation states that the ditch network represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, which include several nationally and locally scarce species. The adjoining grasslands are of botanical importance as well as acting as a buffer zone to the ditch system. Further interest is provided by the aquatic and terrestrial invertebrates and the birds which frequent the area, especially in winter.</p> <p>Given the location of this site in relation to the onshore project area, detailed baseline surveys have been undertaken for the site to inform this EclA. Further details on the results of these surveys are presented in Section 23.5.2.1.</p>
Simon's Wood	0.00 (directly adjacent to onshore project area).		LWS Ancient Woodland	Comprises Essex BAP Priority Habitat ancient woodland, which has been densely replanted with conifers, particularly Pines <i>Pinus</i> spp. with scattered Larch <i>Larix decidua</i> , as well as UK Biodiversity Action Plan (UKBAP) Priority Habitat lowland mixed deciduous woodland.
Little Bromley Churchyard	0.04		LWS	This small churchyard represents a remnant of the dry acid grassland that would formerly have been widespread on the Tendring plateau. It is now the only such grassland, other than the nearby Great Bromley churchyard, that remains in an otherwise intensively cultivated landscape. Includes UKBAP priority habitat lowland acid grassland and Essex BAP lowland grassland habitats.
Great Holland Pits	0.06		LWS	The varied habitats of this ex-gravel pit include heathy grassland, pasture, a remnant of old woodland, large and small pools, and wet depressions. Contains UKBAP priority habitat open mosaic habitat on previously developed land, and Essex BAP brownfield sites.
Frinton Cliffs	0.17		LWS	Frinton Cliffs represent a significant extent of maritime slope grassland of varying quality and with scattered scrub adding to the habitat diversity. The flat top part of the cliff is managed as amenity grassland. Includes UKBAP maritime cliff and slopes habitat.
Manning Grove	0.23		LWS	Comprises Essex BAP Priority Habitat ancient woodland as well as UKBAP priority habitat lowland mixed deciduous woodland.

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
			Ancient Woodland	
Tendring Grove	0.31		LWS Ancient Woodland	This is an ancient woodland with a variety of woodland species. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Hollandhall Wood	0.4		LWS Ancient Woodland	Much of this wood canopy is characterised by Pedunculate Oak standards. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Thorpe Green	0.43		LWS	Thorpe Green contains a good mix of grass and herb species. Includes UKBAP priority habitat lowland meadows and Essex BAP lowland grassland habitat.
Gravel Wood	0.47		LWS Ancient Woodland	Gravel Wood is an ancient coppice-with-standards wood. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Stonehall Wood	0.50		LWS Ancient Woodland	This woodland was last actively managed around 1990. The close proximity of Gravel Wood adds to the value of this site. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
St. Michael's Churchyard	0.69		LWS	This extensive, well-managed churchyard contains both areas of mown and long sward grassland.
Goose Green Verge	0.76		LWS	This roadside bank is unusual in that it has plants along its entire 85m length.
Far Thorpe Green	0.86		LWS	This essentially grassland site also supports a few ponds, a small planted broadleaved copse and scrub, mainly along the site boundaries. Includes UKBAP priority habitat lowland meadows and Essex BAP lowland grassland habitat.

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
Pilcox Wood	0.9		LWS Ancient Woodland	This is a fine example of NVC community W10 Oak-Bracken-Bramble woodland that is probably very close to the natural climax vegetation type for the light soils of the Tendring plateau. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Home Wood	1.16		LWS Ancient Woodland	Extensively damaged by the October 1987 storm, this ancient woodland has a coppice-with-standards structure. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Beaumont Marsh	1.2		LWS	This section of grassland is the only remnant of grazing marsh in the area, although formerly all of the surrounding land would have been such a grassland. This site is currently grazed by sheep. Includes UK and Essex BAP coastal and floodplain grazing marsh.
Great Bromley Churchyard	1.36		LWS	This site represents a small remnant fragment of relatively unimproved acid grassland (UKBAP priority habitat) in a local landscape that is dominated by agriculture, with no other significant areas of grassland.
Killgrove Wood	1.51		LWS Ancient Woodland	Killgrove is one of a small cluster of ancient woods in the area. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Wignall Street Grassland	1.6		LWS	Thick hedgerows to the east and south bound this undulating, west-sloping area of old grassland. Includes UKBAP priority habitat lowland acid grassland.
Glebe Wood	1.64		LWS Ancient Woodland	Glebe Wood is one of a number of closely grouped ancient woods in an otherwise poorly wooded part of the district. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Upper Holland Brook	1.72		LWS	This Site comprises grassland, scattered trees, secondary woodland, scrub, and reservoir along the upper reaches of the Holland Brook, beyond the SSSI downstream. Near Hunters Bridge (at the downstream end) the first part of this site is flood plain grazing marsh, currently grazed by cattle. This includes UKBAP priority coastal and floodplain grazing marsh.

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
Island and Roger's Grove	1.82		LWS Ancient Woodland	Island Grove is a neglected ancient wood. Roger's Grove, divided by a railway line, comprises neglected ancient wood and surrounding secondary woodland. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Wignall Brook Grasslands	1.89		LWS	This is an extensive series of stream valley grasslands either side of Wignall Brook, Lawford. The character of the site varies from dry semi-acid, through dry neutral to marshy grassland. Includes UKBAP priority habitats lowland acid grassland and lowland meadows; and Essex BAP lowland grassland habitats.
Broadmeadow Wood	1.92		LWS Ancient Woodland	Broadmeadow is ancient coppice-with-standards woodland with an open understorey structure. Includes UKBAP priority habitat lowland mixed deciduous woodland and Essex BAP ancient woodland.
Lawford Churchyard	1.93		LWS	The grassland surrounding the church of St Mary the Virgin, Lawford, is relatively unimproved and supports a wide variety of plant species. Includes UKBAP priority habitat lowland acid grassland.
Weeleyhall Wood	2.32		SSSI Ancient Woodland	One of the largest ancient woods in the Tendring peninsula. It contains one of the best examples in Essex of base-poor springline alder woodland, a type of woodland which is rare in the county, as well as good examples of lowland hazel-pedunculate oak and some wet ash-maple woodland, and chestnut coppice-with-standards derived from these last two.
Holland Haven	Located within onshore project area		LNR	Comprises of mown amenity grassland, hawthorn scrub, rough grassland, wet grazing marsh, scrape area and ponds. This site is known to support invertebrates such as the ruddy darter dragonfly <i>Sympetrum sanguineum</i> , larger carder bee <i>Bombus muscorum</i> , and Roesel's bush cricket <i>Metrioptera roeselii</i> . Plants include birds foot trefoil <i>Lotus corniculatus</i> , birds foot fenugreek <i>Trigonella foenum-graecum</i> and soft hornwort. Many bird species have also been recorded on site including purple sandpiper, avocet, and short eared owl.
Ardleigh Gravel Pits	2.11		SSSI	Geological SSSI (see Chapter 19 Ground Conditions and Contamination, Volume I).
Hamford Water	0.28		Ramsar	Qualifies under Criterion 6 (A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird):

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
				<ul style="list-style-type: none"> <li>Species with peak counts in spring/autumn:</li> <li>Ringed plover, <i>Charadrius hiaticula</i> (Europe/Northwest Africa)</li> <li>Common redshank, <i>Tringa totanus tetanus</i></li> <li>Species with peak counts in winter:</li> <li>Dark-bellied brent goose, <i>Branta bernicla bernicla</i>,</li> <li>Black-tailed godwit, <i>Limosa limosa islandica</i> (Iceland/W Europe)</li> <li>Grey plover, <i>Pluvialis squatarola</i> (E Atlantic/W Africa -wintering)</li> </ul>
			SAC	<p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> <li>4035 Fisher's estuarine moth <i>Gortyna borelii lunata</i>.</li> </ul>
			NNR	<p>Classified as a coastal embayment that has been formed due to a natural dip in the underlying geology of the area, unlike most other NNRs in the local area. The bird life that this variety of habitats attracts is outstanding, especially the waders and waterfowl that can be seen in winter. Main habitats: salt marsh, intertidal mud flats, coastal, grazing marsh, sands, shingle, small freshwater ponds, and ditches.</p>
			SSSI	<p>Hamford Water is a tidal inlet whose mouth is about three miles south of Harwich. It is a large and shallow estuarine basin comprising tidal creeks, intertidal mud and sand flats, saltmarshes, islands, beaches, and marsh grasslands. The site is of international importance for breeding Little Terns and wintering Dark-bellied Brent Geese, wildfowl, and waders, and of national importance for many other bird species. It also supports communities of coastal plants which are rare or extremely local in Britain, including Hog's Fennel <i>Peucedanum officinale</i> which is found elsewhere only in Kent.</p>
Stour and Orwell Estuaries	3.30		Ramsar	<p>Qualifies under Criterion 2 (A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities):</p>



Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
				<p>Contains nationally scarce plants and British Red Data Book invertebrates.</p> <p>Qualifies under Criterion 5 (A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds):</p> <p>Species with peak counts in winter: 51,285 waterfowl</p> <p>Qualifies under Criterion 6 (A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird):</p> <p>Species with peak counts in winter:</p> <p>Black-tailed godwit, <i>Limosa limosa islandica</i> (Iceland/W Europe)</p> <p>Common redshank, <i>Tringa totanus totanus</i></p> <p>Dark-bellied brent goose, <i>Branta bernicla bernicla</i>,</p> <p>Dunlin, <i>Calidris alpina alpina</i> (W Siberia/W Europe)</p> <p>Grey plover, <i>Pluvialis squatarola</i> (E Atlantic/W Africa -wintering)</p> <p>Red knot, <i>Calidris canutus islandica</i> (W &amp; Southern Africa)</p>
Stour Estuary	3.30		SSSI	The Stour Estuary is nationally important for 13 species of wintering waterfowl and three species on autumn passage. The estuary is also of national importance for coastal saltmarsh, sheltered muddy shores, two scarce marine invertebrates and a vascular scarce plant assemblage.
Holland on Seacliff	0.94		SSSI	Geological SSSI (see Chapter 19 Ground Conditions and Contamination, Volume I).
Cattawade Marshes	3.37		SSSI	The grazing marshes with associated open water and fen habitats are of major importance for the diversity of their breeding bird community, which includes species that have become uncommon throughout lowland Britain because of habitat loss. The site has benefited from a sympathetic management regime aimed at enhancing the ornithological interest. The marshes are also of value as a complement to the adjacent Stour Estuary SSSI where breeding habitats for birds are relatively scarce.
Clacton Cliffs and Foreshore	4.87		SSSI	Geological SSSI (see Chapter 19 Ground Conditions and Contamination, Volume I).

Designated site name	Distance onshore area (km)	from project	Designation	Summary of reasons for site designation
The Naze	4.62		SSSI	Geological SSSI (see Chapter 19 Ground Conditions and Contamination, Volume I).
Pickers Ditch Meadow	2.99		LNR	Meadow surrounding Pickers Ditch tributary, representing a valuable green space in the Great Clacton area. Hedge planting along the border helps screen the site, whilst tree planting in the adjacent area provides a copse area surrounding the existing footpath.
Wrabness	4.32		LNR	The reserve is located on the southern bank of the River Stour between Manningtree and Harwich, and is a mixture of unimproved grassland, wooded areas and marshland with extensive intertidal mudflats and saltmarsh. In the spring, nightingales can be heard, which are a BoCC4 'Red list' species and therefore add to the ecological value of this LNR.

58. All statutory designated sites for nature conservation are considered to be of high importance, in accordance with the criteria set out in Table 23.8.
59. All non-statutory designated sites are considered to be of medium importance, in accordance with the criteria set out in Table 23.8.

#### 23.5.2.1 Holland Haven Marshes SSSI and LNR

60. Given the location of this site in relation to the onshore project area, detailed baseline surveys of the interest features of the Holland Haven Marshes SSSI and LNR have been undertaken for the site to inform this EcIA. The information presented in this section excludes ornithological interest features of the site, which are considered in Chapter 24 Onshore Ornithology (Volume I).
61. The SSSI is designated for the following<sup>5</sup>:
  - Its ditch network which, the citation states, represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, and which include a number of nationally and locally scarce species;
  - The adjoining grasslands, which are of botanical importance in their own right as well as acting as a buffer zone to the ditch system; and
  - Aquatic and terrestrial invertebrates associated with these habitats.
62. The Holland Haven Marshes LNR supports coastal grassland and marshland, associated wildfowl and waders, as well as aquatic insect life, including some rare beetles and damselflies, and the great green bush-cricket *Tettigonia viridissima* (Essex Wildlife Trust, 2021).
63. In order to inform this EcIA, detailed botanical surveys of the ditch network and adjoining grasslands and detailed terrestrial and aquatic invertebrate surveys of the SSSI and its immediate surrounds were undertaken in 2021. The results of these surveys are summarised below, and full details can be found in Appendix 23.6 and Appendix 23.7 (Volume III).

##### 23.5.2.1.1 Aquatic invertebrates

64. The ditch habitats within Holland Haven Marshes SSSI were sampled for aquatic invertebrates.
65. Most of the ditches are at a late seral stage, with substantial growth of emergent common reed, while more open conditions (extensive open water) are in the recently cleared ditches or wider ditches.
66. A total of 48 species were collected across 16 ditch stations within the two sampling periods. The beetles were the richest group, with 21 species collected.
67. Using metrics provided by Buglife – The Invertebrate Conservation Trust, the majority of species have low salinity tolerance, marsh fidelity and species quality scores, and are therefore considered to be freshwater species without particular habitat association. The surveys concluded that:

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<sup>5</sup> Excluding ornithological interest features.

- Species that are tolerant of brackish conditions were recorded from two stations (3 and 4) and species dependent on mildly brackish conditions were recorded in one station (11, the main channel of the Holland Brook);
  - Species which are widespread or typical of grazing marsh assemblages were found in five stations (five species); and
  - Species scoring more than the minimum in terms of quality / status scores were found in 11 stations, with 12 species scoring either 2 or 3 on a scale from '1' to '5'. (Species scoring 2 are equivalent to species considered to be of local occurrence and species scoring 3 were Nationally Scarce at the time the scoring developed).
68. The surveys recorded three species of water beetle which are of conservation concern and are listed as Nationally Scarce within the most recent review (Foster, 2010). All three are believed to be widespread on the Essex coastal marshes. These species are:
- *Peltodytes caesus*;
  - *Hydaticus seminiger*; and
  - *Hygrotus parallelogrammus*.
69. It should also be noted that the ruddy darter *Sympetrum sanguineum*, listed on the citation of Holland Haven Marshes SSSI and the soldier fly *Stratiomys singularioris* listed on the SSSI citation are no longer of conservation concern, due partly to range expansion and greater survey effort revising its known distribution.
70. The overall value of Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e. local) importance for freshwater invertebrates. Notably, no species of grazing marsh fidelity were recorded, highlighting that assemblages of aquatic invertebrates were comprised of more common generalist species.
71. There are historic records of several Essex BAP species within the habitat and species study area. However, these are historic (i.e. prior to 2000) and this information, combined with the county importance of the Holland Haven Marshes SSSI invertebrate assemblage results in the importance of aquatic invertebrates being defined as 'low' (see Table 23.8).
72. Additional details on aquatic invertebrate assemblages are provided in the Terrestrial and Aquatic Invertebrate Survey Report in Appendix 23.6.

#### 23.5.2.1.2 Terrestrial invertebrates

73. Holland Haven Marshes SSSI citation includes the following terrestrial invertebrates:
- Roesel's bush cricket *Metrioptera roeselii*.
  - Bee species *Bombus muscorum*;
  - Brown Argus *Aricia agestis*.
74. Roesel's bush cricket is no longer of conservation concern, having undergone a substantial climate-driven range expansion since the 1990s. *Bombus muscorum* is a UK species of principal importance and although not listed as being of conservation concern, it is considered likely that it has undergone

declines and therefore justifies a Nationally Scarce status (see Appendix 23.6 (Volume III) for further details).

75. In addition to these species, the Fisher's estuarine moth *Gortyna borelii lunata* is a protected species associated with maritime grassland in Essex and north Kent, with legal protection under The Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). A data search revealed a series of records of this species within the SSSI from 2005-2019 Natural England monitoring of the SSSI (see Appendix 23.6, Volume III). Specific Fisher's estuarine moth surveys were not carried out in the 2021 surveys for Project, however, the moth's sole foodplant (hog's fennel *Peucedanum officinale*) was recorded within the grassland habitats as part of the NVC survey (see Section 23.5.2.1.3, and Appendix 23.7, Volume III) and so it is therefore assumed the moths are present within Holland Haven Marshes (see Appendix 23.7 (Volume III) for location). This assumption of moth presence is made due to both the Fisher's estuarine moth and hog's fennel having extremely limited distributions and close association with one another.
76. Field sampling was undertaken at six sampling stations, comprising tall maritime grassland with varying extents of open short and disturbed ground conditions. These sampling stations covered the range of terrestrial habitats and included the areas of habitat judged to be of the highest quality and most likely to support significant species and assemblages.
77. Six species that are currently listed as being of conservation concern were recorded (of which one has Red Data Book (RDB) status and two are Nationally Scarce).
78. Three of these are bees / wasps that would be classed as common or 'least concern' based on the current descriptions of their distribution and occurrences in authoritative reviews. These are:
  - Megachile leachella;
  - Heriades truncorum; and
  - Philanthus triangulum.
79. The remaining three species noted as being of conservation concern were:
  - Rove beetle, Tachyporus formosus;
  - Small heath butterfly, *Coenonympha pamphilus*; and
  - Cinnabar moth, *Tyria jacobaeae*.
80. The presence of the Fisher's estuarine moth, as well as other species of conservation concern, defines the importance of the terrestrial invertebrate assemblage as being high (see Table 23.8).
81. Additional details on terrestrial invertebrate assemblages are provided in Appendix 23.6 (Volume III).

#### 23.5.2.1.3 Ditch network and adjoining grasslands

82. National vegetation classification (NVC) field surveys of the terrestrial and aquatic habitats of the Holland Haven Marshes SSSI and its immediate surroundings were conducted in summer 2021. Botanical communities inside

and within 50m of the SSSI boundary and onshore project area were recorded, as well as the presence and absence of botanical interest features.

83. 130 terrestrial quadrats were sampled, all of which were assigned to a community.
84. In terms of aquatic species, 93 ditch samples were taken. All but two of these were assigned an emergent vegetation community, while 51 of the 93 were assigned an aquatic vegetation community. The unassigned aquatic samples largely indicate an absence of aquatic vegetation.
85. The site largely consists of grassland, much of it grazed and managed as traditional grazing marsh by cattle. The Holland Brook drains the marsh and enters the sea at a controlled sluice north of Holland Haven Country Park. The marsh is divided by ditches which are mostly connected to the Brook. The eastern, seaward end demonstrates a clear saline influence. The eastern section of the site is used as a golf course and the terrestrial and emergent vegetation there has been significantly modified. A total of 32 different vegetation communities were identified on the site, these are listed in Table 23.13.
86. Notable floral species in the survey area include (those which are nationally notable are highlighted in **bold**):
  - Marram *Ammophila arenaria* (Essex RDB)
  - Sea fern grass *Catapodium marinum* (Essex RDB)
  - Rock samphire *Crithmum maritimum* (Essex RDB)
  - Water horsetail *Equisetum fluviatile* (Essex RDB)
  - Downy oat *Helictotrichon pubescens* (Essex RDB)
  - Sea barley *Hordeum marinum* (**SSSI species**, Essex RDB vulnerable);
  - Fat duckweed *Lemna gibba* (**SSSI species**, scarce in Essex);
  - Dittander *Lepidium latifolium* (Essex RDB)
  - Tubular water dropwort *Oenanthe fistulosa* (**SSSI species**, Essex RDB vulnerable);
  - Parsley water dropwort *Oenanthe lachenalii* (**SSSI species**, Essex RDB near-threatened);
  - Corky-fruited water dropwort *Oenanthe pimpinelloides* (Essex RDB)
  - Hog's fennel *Peucedanum officinale* (Essex RDB)
  - Small pondweed sp. *Potamogeton berchtoldii/pusillus* (Essex RDB (both))
  - Lesser spearwort *Ranunculus flammula* (**England RDB vulnerable**);
  - Yellow rattle *Rhinanthus minor* (Essex RDB)
  - Grey bulrush *Scirpus tabernaemontani* (**SSSI species**, scarce in Essex);
  - Marsh ragwort *Senecio aquaticus* (Essex RDB)
  - Pepper saxifrage *Silaum silaus* (Essex RDB)

- Greater duckweed *Spirodela polyrhiza* (**SSSI species**, Essex RDB)
- Strawberry clover *Trifolium fragiferum* (**UK RDB vulnerable**); and
- Sea clover *Trifolium squamosum* (Essex RDB).

**Table 23.13 NVC communities from terrestrial and aquatic surveys**

NVC community
<b>Mesotrophic Grasslands</b>
MG1 <i>Arrhenatherum elatius</i> grassland, no sub-community (watercourse banks)
MG1a <i>Arrhenatherum elatius</i> grassland, <i>Festuca rubra</i> sub-community (coastal grassland)
MG5a <i>Cynosurus cristatus</i> - <i>Centaurea nigra</i> grassland, <i>Lathyrus pratensis</i> sub-community
MG7c <i>Lolium perenne</i> – <i>Alopecurus pratensis</i> – <i>Festuca pratensis</i> grassland
MG10b <i>Holcus lanatus</i> – <i>Juncus effusus</i> rush pasture, <i>Juncus inflexus</i> sub-community
MG12a <i>Festuca arundinacea</i> grassland, <i>Lolium perenne</i> – <i>Holcus lanatus</i> sub-community
MG13 <i>Agrostis stolonifera</i> – <i>Alopecurus geniculatus</i> grassland
<b>Swamp communities</b>
S4a <i>Phragmites australis</i> reedbed, <i>Phragmites australis</i> sub-community
S6 <i>Carex riparia</i> swamp
S7 <i>Carex acutiformis</i> swamp
S14c <i>Sparganium erectum</i> swamp, <i>Mentha aquatica</i> sub-community
S14d <i>Sparganium erectum</i> swamp, <i>Phalaris arundinacea</i> sub-community
S19a <i>Eleocharis palustris</i> swamp, <i>Eleocharis palustris</i> sub-community
S19c <i>Eleocharis palustris</i> swamp, <i>Agrostis stolonifera</i> sub-community
S20 <i>Scirpus tabernaemontani</i> swamp
S21a <i>Scirpus maritimus</i> swamp, <i>Scirpus maritimus</i> dominated sub-community.
S22 <i>Glyceria fluitans</i> swamp
S28a <i>Phalaris arundinacea</i> swamp, <i>Phalaris arundinacea</i> sub-community
<b>Saltmarsh communities</b>
SM12 <i>Aster tripolium</i> saltmarsh community
SM16b <i>Festuca rubra</i> saltmarsh, sub-community with <i>Juncus gerardii</i> dominant
SM23 <i>Spergularia marina</i> – <i>Puccinellia distans</i> saltmarsh community
SM24 <i>Elytrigia atherica</i> saltmarsh community
<b>Woodland Communities</b>
W21 <i>Crataegus monogyna</i> – <i>Hedera helix</i> scrub
W22 <i>Prunus spinosa</i> – <i>Rubus fruticosus</i> scrub



NVC community
W23 <i>Ulex europaeus</i> – <i>Rubus fruticosus</i> scrub
W24 <i>Rubus fruticosus</i> – <i>Holcus lanatus</i> scrub
<b>Open Vegetation Communities</b>
OV25 <i>Urtica dioica</i> – <i>Cirsium arvense</i> community
<b>Aquatic Communities</b>
A1 <i>Lemna gibba</i> community
A2a <i>Lemna minor</i> community, typical sub-community
A3 <i>Spirodela polyrhiza</i> – <i>Hydrocharis morsus ranae</i> community
A5b <i>Ceratophyllum demersum</i> community, <i>Lemna minor</i> sub-community
A12 <i>Potamogeton pectinatus</i> community

87. As no sensitive SSSI habitats are located within the ditch network within the onshore project area, the importance of onshore project area is based on the presence of locally scarce species and is therefore considered to be of medium importance.
88. SSSI habitats (mesotrophic grasslands) and SSSI species are present within the adjoining grassland habitats of the onshore project area, therefore this receptor is of high importance.
89. Full details of the NVC report can be found in Appendix 23.7 (Volume III).

#### 23.5.2.1.4 Summary

90. In summary, Holland Haven Marshes SSSI is considered to be of low importance for its aquatic invertebrate species, high importance for its terrestrial invertebrate (especially the fisher's estuarine moth), medium importance for the botanic interest of the ditch network, and high importance for the botanic interest of the adjoining grassland habitats.

### 23.5.3 Habitats

91. The baseline presented is based on the findings from the Extended Phase 1 Habitat Survey.
92. Full details of the habitats present are provided in Appendix 23.1 Extended Phase 1 Habitat Survey Report (Volume III).
93. Features of interest within each habitat are denoted using Target Notes (TNs), which are referenced using a numbering system. The locations of the TNs are shown on Figure 23.3 (Volume II) and further details are provided within Appendix 23.1 (Volume III). Please note that habitat areas provided here relate to the areas of habitat found within the habitats and species study area (i.e., the onshore project area plus a 50m buffer).
94. In the Extended Phase 1 Habitat Survey and NVC surveys, the following 9 UKHPI were identified within the onshore habitat and species study area:



- Coastal saltmarsh;
- Ancient woodland;
- Deciduous woodland;
- Semi-improved grassland;
- Hedgerows;
- Arable field margins;
- Reedbeds;
- Rivers; and
- Ponds.

95. In addition, coastal floodplain grazing marsh and lowland fen UKHPI were identified within the Natural England 'Priority Habitat Inventory' dataset within the habitats and species study area. It should be noted that these habitats overlap the Phase 1 / NVC habitats identified within the Extended Phase 1 Habitats Survey and NVC Surveys, and therefore have not been included within the habitat calculations set out in Section 23.5.3.12. The location of these UKHPI habitats can be seen on Figure 23.2 (Volume II) with their respective areas shown in Table 23.14.

96. Details of the habitats which underpin coastal floodplain grazing marsh and lowland fen UKHPI are described below and in Appendix 23.7 (Volume III).

**Table 23.14 UKHPI footprints within the onshore project area (based on Natural England 'Priority Habitat Inventory' dataset)**

UKHPI	Area (ha) within the onshore project area
Coastal and floodplain grazing marsh	41.46
Lowland fens	1.87

97. The habitats recorded within the habitats and species study area are described below.

#### 23.5.3.1 Coastal saltmarsh

98. Small areas of transitional saltmarsh habitat were recorded within Holland Haven Marshes SSSI during the NVC Survey (see Maps 2k, 2L and 2n, in Appendix 23.7 (Volume III)). This habitat was typically recorded in narrow areas behind the sea defences or found in dried pools in the brackish part of the marsh.

99. Note that as this habitat was only recorded during the detailed habitat surveying undertaken during the NVC survey, unlike the remaining habitats detailed below saltmarsh is not included within the habitat calculations set out in Section 23.5.3.12. Approximately 6ha of this habitat are present within the onshore project area.

#### 23.5.3.2 Arable land

100. The largest habitat by area within the habitat and species study area is arable land (JNCC Phase 1 Habitat code J1.1) at 1,078.30ha. At the time of both the

2021 and 2022 surveys, some of these fields were in crop and some were ploughed. In 2022, some of these were showing young crops.

101. An additional 2.26ha of arable field margins were also recorded in the habitat and species study area. These typically comprised set aside areas, including crop stubble, and grassland buffer strips.

#### 23.5.3.3 Boundary features

102. Field boundaries within the habitat and species study area were comprised predominately of hedgerows, with some field margin drainage ditches (both dry and wet), scattered scrub and trees. The predominant type of hedgerow recorded was species-poor intact (J2.1.2). the hedgerows recorded within the habitat and species study area are detailed in Table 23.15 below.

**Table 23.15 Hedgerows recorded within the habitat and species study area**

Hedgerow type	Length (m)
Species-poor intact (J2.1.2)	13,025.08
Species-poor defunct (J2.2.2)	4,906.03
Species-poor with trees (J2.3.2)	7,858.12
Native species-rich with trees (J2.3.1)	5,392.22
Native species-rich defunct (J2.2.1)	2,038.74
Native species-rich intact (J2.1.1)	1,650.89

103. Key species recorded in hedgerows throughout the habitat and species study area included hawthorn and blackthorn, with bramble, dog rose *Rosa Canina*, English oak *Quercus robur*, ash *Fraxinus excelsior*, elm *Ulmus* spp. and hazel *Corylus avellana*.
104. An additional 1,366.7m of hedgerows have been identified using aerial imagery within areas un-surveyed due to no landowner access being granted at the time of the Extended Phase 1 Habitat Survey. Specific details of these hedgerows will be ground-truthed to identify species present and their hedgerow classification (e.g., species-rich/species-poor etc.) at a later date and will be detailed in the ES where necessary.
105. The total length of hedgerows within the habitat and species study area, including areas identified in aerial imagery, was 21,757.44m.

#### 23.5.3.4 Woodland

106. A total of 12.25ha of woodland (A1.1.1, A1.1.2, A1.3.1 and A1.3.2) was recorded throughout the habitat and species study area and included semi-natural and plantation broad-leaved woodland, semi-natural and mixed plantation woodland and a small area of coniferous plantation woodland. These areas ranged from larger areas of woodland to smaller roadside and field margin copses. A high proportion of woodland areas contained game bird pens and feeding apparatus. Notable parcels of woodland within the onshore project area include:
- 1.3ha south of the network rail infrastructure at Great Holland (TN410);

- 0.7ha of mixed plantation woodland north of the A120 at Horsleycross Street (TN416);
  - 1.8ha of woodland east of Damant's Farm Lane, Thorpe-le-Soken (TN421);
  - 1.6ha of mixed semi-natural woodland along the Tendring Brook river corridor, south of Lodge Lane, Tendring (TN525); and
  - 0.7ha of mixed plantation woodland north of the A120 at Horsleycross Street (TN474). (The locations of the TNs are shown on Figure 23.3, Volume II).
107. Key species recorded included oak, ash, elm, white poplar *Populus alba*, sweet chestnut *Castanea sativa*, hazel, holly *Ilex aquifolium*, sycamore *Acer pseudoplatanus*, birch *Betula* spp., and pine species.
108. An additional 1.31ha of woodland has been identified using aerial imagery within areas un-surveyed due to no landowner access being granted at the time of the 2022 survey. Specific details of this woodland will be ground-truthed to identify habitats and species present at a later date and will be detailed in the ES where necessary.
109. An additional 2.21ha of parkland and scattered trees were recorded within the habitat and species study area, 0.48ha of which was recorded as broadleaved parkland (A3.1) and 0.08ha of which was recorded as mixed (A3.3).
110. Six areas of ancient woodland were found within 500m of the onshore project area, these are:
- Simon's Wood;
  - Manning Grove;
  - Tendring Grove;
  - Hollandhall Wood;
  - Gravel Wood; and
  - Stonehall Wood.
111. In the Extended Phase 1 Habitat Survey, veteran trees were also recorded in the target notes (Appendix 23.1, Annex 2 (Volume III)). Descriptions of the veteran trees are detailed in Table 23.16, and their respective locations are detailed in Appendix 23.1, Annex 2 (Volume III).

**Table 23.16 Target noted veteran and mature trees**

Target Note	Description
TN399	Line of four mature oak trees, potentially of remnant hedgerow. Two trees potentially notable and/or veteran due to size.
TN502	Veteran oak tree, isolated in field.
TN505	Veteran oak tree, on roadside.
TN507	Veteran oak tree, in hedgeline.
TN519	Veteran oak tree, ivy-clad, in hedgeline.
TN530	Veteran oak tree, in hedgeline.

Target Note	Description
TN534	Veteran oak tree, in hedgeline.
TN558	Veteran oak tree, in treeline.
TN559	Veteran tree, ivy-clad with multiple fissures.
TN560	Veteran tree, decayed bore.

#### 23.5.3.5 Scrub

112. A total of 7.86ha of dense and scattered scrub (A2.1 and A2.2) were recorded within the habitat and species study area and key species comprised hawthorn, hornbeam *Carpinus betulus*, bramble, bracken *Pteridium aquilinum*, nettle *Urtica dioica* and cow parsley *Anthriscus sylvestris*.
113. These areas represented a range of habitat sub-types including transitional habitat associated with boundary features, field margins, woodland successional habitats, and watercourse margins.
114. An additional 0.79ha of scrub has been identified using aerial imagery within areas surveyed due to no landowner access being granted at the time of the 2022 survey. Specific details of this habitat will be ground-truthed (if required) to species level at a later date and will be detailed in the ES where necessary.

#### 23.5.3.6 Improved grassland

115. A total of 56.75ha of improved grassland (B4) was recorded across the habitat and species study area, mainly consisting of grazing pasture for sheep, cattle, and horses. These grasslands were characterised by short sward perennial rye grass *Lolium perenne* with limited herbs including ragwort *Jacobea vulgaris*, clover *Trifolium* spp., and dandelion *Taraxacum officinale* with areas of scattered/dense shrubs and/or scrub.

#### 23.5.3.7 Semi-improved and poor semi-improved grassland

116. An area of 3.19ha of semi-improved (B2.2) and 44.50ha poor semi-improved (B6) grassland was recorded throughout the habitat and species study area. These areas comprised coarse ruderal grass and herb species such as Yorkshire fog *Holcus lanatus*, brome *Bromus hordeaceus*, common bent *Agrostis capillaris*, perennial rye grass, and cock's foot *Dactylis glomerata*.

#### 23.5.3.8 Amenity grassland

117. An area of 44.56ha of amenity grassland (J1.2) was recorded within the habitat and species study area, generally consisting of short sward perennial rye grass subject to frequent mowing.
118. In addition, a further 14.11ha of grassland have been identified using aerial imagery within areas un-surveyed due to no landowner access being granted at the time of the 2022 survey. Specific details of this habitat will be ground-truthed at a later date where necessary.

#### 23.5.3.9 Other tall herb and fern - ruderal

119. An area of 8.41ha of ruderal herbs (C3.1) was recorded within the habitat and species study area, ranging from unmanaged fields through to field margins and set-aside areas within arable crops.

120. Key species noted included bristly ox-tongue *Helminthotheca echioides*, common and ribwort plantain *Plantago spp.*, fleabane *Pulicaria dysenterica*, common hogweed *Heracleum sphondylium*, nettle, ox-eye daisy *Leucanthemum vulgare* and teasel *Dipsacus fullonum*.

#### 23.5.3.10 Standing and running water

121. Watercourses in the habitat and species study area included 3,861.94m / 7.96ha of standing water (G1) (drainage ditches / ponds) and 3,098.49m / 1.99ha of running water (G2) such as rivers.
122. In addition, standing water bodies were recorded within the habitat and species study area plus a 250m buffer, in order to carry out Habitat Suitability Index (HSI) assessments for great crested newts. A total of 110 standing water bodies were recorded.

#### 23.5.3.11 Other habitats

123. The following habitats were also recorded within the habitat and species study area:
- Caravan site, 0.07ha (J3.4);
  - Buildings, 1.82ha (J3.6);
  - Wall, 40.49m (J2.5); and
  - Artificial sea wall, 1,922.10m (J3.5).

#### 23.5.3.12 Summary

124. Table 23.17 shows the key habitats which were recorded within the indicative onshore development area during the Extended Phase 1 Habitat Survey.

**Table 23.17 JNCC Phase 1 habitats recorded within the habitats and species study area during the Extended Phase 1 Habitat Survey**

JNCC Phase 1 habitat code	JNCC Phase 1 habitat description	Area (ha)
A1.1.1	Broadleaved woodland – semi-natural	5.45
A1.1.2	Broadleaved woodland – plantation	2.43
A1.3.1	Mixed woodland – semi-natural	0.90
A1.3.2	Mixed woodland – plantation	3.47
A2.1	Scrub – dense/continuous	7.83
A2.2	Scrub - scattered	0.03
A3.1	Broadleaved parkland/ scattered trees	0.48
A3.3	Mixed parkland/ scattered trees	0.08
B2.2	Neutral grassland – semi-improved	3.19
B4	Improved grassland	56.75
B6	Poor semi-improved grassland	44.50
C1.2	Bracken- scattered	0.07

JNCC Phase 1 habitat code	JNCC Phase 1 habitat description	Area (ha)
C3.1	Other tall herb and fern – ruderal	8.41
G1	Standing water	7.96
G2	Running water	1.99
H4	Boulders/ rocks above high tide mark	0.28
J1.1	Cultivated/ disturbed land – arable	1,078.30
J1.2	Cultivated/ disturbed land – amenity grassland	44.56
J1.3	Cultivated/ disturbed land – ephemeral/ short perennial	0.17
J3.4	Caravan site	0.07
J3.6	Buildings	1.82
J4	Bare ground	1.50
J5	Other habitat	0.13
JNCC Phase 1 habitat code	JNCC Phase 1 habitat description	Length (m)
G1	Standing water	3,861.94
G2	Running water	3,098.49
J2.1.1	Intact hedge – native species-rich	1,650.89
J2.1.2	Intact hedge – species-poor	13,025.08
J2.2.1	Defunct hedge – native species-rich	2,038.74
J2.2.2	Defunct hedge – species-poor	4,906.03
J2.3.1	Hedge with trees – native species-rich	5,392.22
J2.3.2	Hedge with trees – species-poor	7,858.12
J2.5	Wall	40.49
J2.6	Dry ditch	7,100.03
J3.5	Artificial sea wall	1,922.10

125. For each of the habitats recorded during the Extended Phase 1 Habitat Survey, 'habitat condition' was also recorded for use in BNG calculations. Habitat condition was recorded following the Biodiversity Metric 3.0 Auditing and accounting for biodiversity: User Guide<sup>6</sup> (Panks *et al.*, 2021). Habitat condition

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<sup>6</sup> At the time of the Extended Phase 1 Habitat Survey, the Defra Biodiversity Metric versions 3.1 and 4.0 had not yet been released, therefore this stage of the assessment was based on Version 3.0.

for the habitats within the habitats and species study area is set out in Table 23.18.

126. Habitat condition was recorded to ensure that the Project can calculate the biodiversity units lost during the development of the Project, in order that the Project can identify the degree of BNG required achievable for the Project. This calculation will be undertaken following submission of the PEIR, once the onshore project area has been further refined in advance of the DCO submission. The Onshore Ecology ETG will be consulted on the findings, and on the outline BNG proposals to be presented with the Project's DCO submission.

**Table 23.18 Habitat condition within the habitat and species study area assessed during the Extended Phase 1 Habitat Survey using Panks *et al.*, 2021**

Habitat	UK Hab code	Condition	Footprint within onshore project area (ha) <sup>7</sup>	JNCC Code
Hedgerows	h2a 75	Poor	2,000.97	J2.1.1, J2.1.2
		Moderate	2,324.67	
		Good	2,283.20	
	h2a 1170	Poor	1,788.40	J2.3.1, J2.3.2
		Moderate	1,644.31	
		Good	2,907.99	
	h2 77	Poor	2,593.45	J2.2.1, J2.2.2
		Moderate	1,192.87	
		Good	550.99	
Woodland	w1 37	Poor	0.31	A1.1.1
		Moderate	3.24	
		Good	0.08	
	w1 36	Poor	0.00	A1.1.2
		Moderate	0.39	
		Good	-	
	w1h 36	Poor	0.36	A1.3.2
		Moderate	0.72	
		Good	1.21	

<sup>7</sup> Onshore project area used here as direct effects in the form of habitat loss would only occur within the onshore project area and not the larger habitat and species study area.

Habitat	UK Hab code	Condition	Footprint within onshore project area (ha) <sup>7</sup>	JNCC Code
Scrub	h3	Poor	0.09	A2.1
		Moderate	-	
		Good	-	
Improved grassland	g4	Poor	8.51	B4
		Moderate	4.25	
		Good	-	
Poor semi-improved grassland	g3c6	Poor	-	B6
		Moderate	1.73	
		Good	-	
Other tall herb and fern – tall ruderal	g3 16	Poor	0.42	C3.1
		Moderate	3.85	
		Good	0.18	
Standing and running water	r1, r2	Poor	3,659.00	G1 G2
		Moderate	838.18	
		Good	-	
Arable Field Margin	c1a	Poor	1.47	J1.1
		Moderate	-	
		Good	-	
Arable	c1c	Poor	29.66	J1.1
		Moderate	-	
		Good	-	

## 23.5.4 Protected and notable species

### 23.5.4.1 Badger

127. Badgers are legally protected under the Protection of Badgers Act 1992. This makes it a criminal offence to:

- Willfully kill, injure, or take a badger (or attempt to do so);
- Cruelly ill-treat a badger;
- Dig for a badger;



- Intentionally or recklessly damage, destroy or obstruct access to a badger sett;
  - Cause a dog to enter a badger sett; and
  - Disturb a badger when it is occupying a sett.
128. As a nationally protected species, which are common within the region, badgers are considered to be of medium importance (see Table 23.8).
129. Badgers have been recorded at 159 locations by the Essex Field Club within 2km of the onshore project area. There have been 162 different recordings throughout these locations and 57 of these coming within the last 10 years (up to 2021).
130. A search for signs of badgers, within the habitat and species study area was undertaken concurrently with the Extended Phase 1 Habitat Survey (Appendix 23.1, Annex 4 (Volume III)). Signs such as setts, tracks, hairs, bedding and spoil heaps, snuffle holes and latrines were checked for. This survey area included any badger activity within the habitats and species study area.
131. A total of seven active badger setts were recorded during the Extended Phase 1 Habitat Survey (one annex sett and six outlier setts). In addition, one snuffle hole was also recorded within the habitat and species study area. The field signs and setts located within the onshore project area are shown in Figure 23.4 (Volume II).
132. Where active setts were noted, they were classified using the following categories, which follows the *Scottish Badgers Surveying for Badgers: Good Practice Guidelines* (Scottish Badgers, 2018):
- Main sett– several holes with large spoil heaps and obvious paths leading from and between sett entrances;
  - Annex sett– normally less than 150m from a main sett, comprising several holes. These setts may not be in use all the time, even if main setts are very active;
  - Subsidiary sett– these are usually at least 50m from a main sett with no obvious paths connecting them to other setts. These may only be used intermittently; and
  - Outlier sett– little spoil present outside holes, with no obvious paths connecting to other setts. These are only used sporadically and may also be used by foxes and/or rabbits.
133. Confidential Annex 4 of Appendix 23.1 (Volume III) provides additional details on sett locations and field signs recorded during surveys. This includes location of the badger setts found within the habitat and species study area which are shown on Figure 23.4 (Volume II).

#### 23.5.4.2 Bats

134. All bat species are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as an EPS. This makes it a criminal offence to:

- deliberately take, injure, or kill a wild bat;
  - intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
  - damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time);
  - possess or advertise/sell/exchange a bat of a species found in the wild in the European Union (EU) (dead or alive) or any part of a bat; and
  - intentionally or recklessly obstruct access to a bat roost.
135. Furthermore, all bat species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb a bat whilst occupying such a structure or place.
136. Six of the UK's 17 resident bat species are listed as UK species of principal importance. These include:
- Barbastelle bat *Barbastella barbastellus*;
  - Bechstein's bat *Myotis bechsteinii*;
  - Soprano pipistrelle *Pipistrellus pygmaeus*;
  - Brown long-eared bat *Plecotus auratus*;
  - Greater Horseshoe Bat *Rhinolophus ferrumequinum*;
  - Lesser Horseshoe Bat *Rhinolophus hipposideros*.
137. As a result of these protections, all bat species in the UK are of high importance according to the definition set out in the assessment methodology (Table 23.8).
138. A desk study using Essex Field Club biological records found records of 15 bat species within the habitat and species study area as follows:
- Barbastelle bat;
  - Serotine bat *Eptesicus serotinus*;
  - Natterer's bat *Myotis nattereri*;
  - Lesser noctule *Nyctalus leisleri*;
  - Nathusius's pipistrelle *Pipistrellus nathusii*;
  - Common pipistrelle;
  - Soprano pipistrelle; and
  - Brown-long eared bat.
139. Of the bat species identified by the desk study, the common pipistrelle is the only one listed in the Essex BAP.
140. A search for suitable habitat to support both roosting and commuting / foraging bats within the habitat and species study area was undertaken concurrently with the Extended Phase 1 Habitat Survey.

#### 23.5.4.2.1 Roosting bats

141. All trees, buildings, and structures (e.g., bridges and farm buildings) were assessed from the ground using binoculars for their potential to support roosting bats (Table 23.19). Each feature was assigned a classification of either 'negligible', 'low', 'moderate' or 'high' suitability for supporting roosting bats, in accordance with the guidelines set out in Table 4.1 of the BCT's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (BCT, 2016a). The results are shown on Figure 23.5 (Volume II).

**Table 23.19 Features and their suitability to support roosting bats.**

Feature	Number within the habitat and species study area
Bat roost trees/ structures with high suitability	1
Bat roost trees/ structures with moderate suitability	66
Bat roost trees/ structures with low suitability	88
Bat roost trees/ structures with negligible suitability	49

142. Following the BCT guidelines (BCT, 2016a), those trees or structures assessed as providing moderate or high suitability for supporting roosting bats (plus those structures assessed as providing low suitability) were subject to emergence / re-entry surveyed during Summer 2022. The confirmed presence / absence results of these surveys are summarised in Table 23.20. The results of these surveys are still provisional at the time of writing, with the species recorded and roost type yet to be confirmed.

143. The full results of the bat (roosting) survey will be provided alongside the Project's ES.

**Table 23.20 Trees and structures with confirmed presence / likely absence for roosting bats**

Feature	Number within the onshore project area	Number within the habitats and species study area (onshore project area plus 50m buffer)
Trees / structures with confirmed presence	7	9
Trees / structures with confirmed likely absence	42	58

#### 23.5.4.2.2 Commuting and foraging bats

144. All linear features (e.g., tree lines, waterbodies, and hedgerows) were also assessed for their potential to provide commuting and foraging habitat for bats, in accordance with the BCT guidelines (BCT, 2016a) (Table 23.21). The locations of such features are shown in Figure 23.5 (Volume II).

**Table 23.21 Features and their suitability to support commuting/ foraging bats.**

Feature	Number within the habitat and species study area
Bat commuting/ foraging features with high suitability	0

Feature	Number within the habitat and species study area
Bat commuting/ foraging features with moderate suitability	68
Bat commuting/ foraging features with low suitability	27
Bat commuting/ foraging features with negligible suitability	11

145. Bat activity surveys of the habitat and species study area are ongoing at the time of writing and will be reported on within the Project's ES.
146. For the purpose of this PEIR and in line with the realistic worst case scenario, it will be assumed that all commuting/ foraging features with low to high suitability identified during the Extended Phase 1 Habitat Survey are utilised by bats.

#### 23.5.4.3 *Water vole and otter*

147. Otter are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This make it a criminal offence to:
- deliberately take, injure, or kill a wild otter;
  - intentionally or recklessly disturb an otter in its place of rest;
  - damage or destroy a place used by otters for breeding or resting;
  - possess or advertise/sell/exchange an otter found in the wild in the EU (dead or alive) or any part of an otter; and
  - intentionally or recklessly obstruct access to an otter's resting place.
148. Furthermore, both otters and water vole are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb an otter or water vole whilst occupying such a structure or place.
149. Both water vole and otter are also listed as UK species of principal importance.
150. As a result of these protections, water vole and otter are of high importance according to the definition set out in the assessment methodology (Table 23.8).
151. The Essex Field Club holds 57 records of water vole within 2km of the habitat and species study area, three of which were recorded within the last 10 years. These three records were shown within the Harwich Gateway retail park, Dovercourt Dock River and the River Colne, all of which are outside the onshore project area. Holland Haven Marshes has historically supported water voles and anecdotal feedback from Natural England confirmed that water voles are still present in the SSSI.
152. The Essex Field Club holds 14 records of otter within the habitat and species study area, of which five were recorded within the last 10 years. The five most recent recordings were shown within Holland Haven, Ardleigh reservoir, Alresford Creek, and Tenpenny Brook.

153. Both water voles and otters are subject to the Essex BAP.
154. All standing and running waterbodies within the survey area were assessed for their suitability to support water voles and otters during the Extended Phase 1 Habitat Survey. The assessment of the suitability of a waterbody to support water voles and/or otters was made in line with *The Water Vole Mitigation Handbook* (Dean *et al.*, 2016) and Natural England's *Standing advice for local planning authorities who need to assess the impacts of development on water voles* (Natural England, 2015). The findings of this assessment are summarised in Table 23.22. These watercourses are shown on Figure 23.6 (Volume II).

**Table 23.22 Watercourses suitable for supporting water vole and otters.**

Species	Suitable watercourses within the habitat and species study area
Water vole	6
Otter	1

155. Based on watercourse suitability assessed in the Extended Phase 1 Habitat Survey, further field surveys were conducted on six<sup>8</sup> watercourses for water vole and otter within the habitat and species study area.
156. Three of these watercourses were found to have signs of water vole presence including latrines, feeding remains, burrow entrances and prints during the surveys:
- TN017 – Holland Brook and associated drains with Holland Haven Marshes SSSI;
  - WV003 – Tendring Brook, near Tendring;
  - WV004 – Tributary of the Tendring Brook, near Tendring (outside the onshore project area).
157. No evidence of water voles was found on the remaining three watercourses surveyed.
158. The relative population density of the populations recorded on each of these three watercourses, based on the approach detailed in *The Water Vole Mitigation Handbook* (Dean *et al.*, 2016), was 'low'.
159. No watercourses had signs of otter within the habitat and species study area.
160. One watercourse (WV003) showed presence of invasive non-native American mink *Neovison vison*, with surveyors finding an old mink spraint. Mink pose a direct competition to otters as well as a predator of water voles so can negatively affect populations of both species.

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<sup>8</sup> Note that, for the purposes of the water vole and otter survey, all the watercourses and drainage ditches within Holland Haven Marshes SSSI were surveyed as a single watercourse (TN017).

161. The water vole and otter survey findings are summarised in Table 23.23, and are shown on Figure 23.6 (Volume II).

**Table 23.23 Summary of water vole and otter field survey findings**

Waterbody ID	Species	Field signs
TN017	Water vole	Feeding remains, latrines (5)
W003	Water vole	Feeding remains
	American mink	Spraint (old)
W004	Water vole	Burrows (4), latrines (1), prints (1)

162. Further details of the water vole and otter field survey are detailed in Appendix 23.3 (Volume III).

#### 23.5.4.4 *Great crested newt*

163. Great crested newts are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This makes it a criminal offence to:
- deliberately take, injure, or kill a wild great crested newt;
  - intentionally or recklessly disturb a great crested newt in its place of rest;
  - damage or destroy a place used by great crested newts for breeding or resting;
  - possess or advertise/sell/exchange a great crested newt found in the wild in the EU (dead or alive) or any part of a great crested newt; and
  - intentionally or recklessly obstruct access to a great crested newt's resting place.
164. Furthermore, great crested newts are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection, or disturb a great crested newt whilst occupying such a structure or place.
165. Great crested newts are listed as UK species of principal importance.
166. As a result of these protections, great crested newts are of high importance (see Table 23.8).
167. The Essex Field Club holds 10 records of great crested newt within 2km of the habitat and species study area, four of which were recorded within the last 10 years. These records were shown within Weeley, Kirby Cross, and Ardleigh.
168. During the Extended Phase 1 Habitat Survey, all standing water bodies within 250m of the onshore project area were mapped and subjected to a Habitat Suitability Index (HSI) assessment for their suitability to support breeding populations for great crested newts (following Oldham *et al.*, 2000).

169. Suitable water bodies identified in the HSI assessment are outlined in Table 23.24. The locations of the standing water bodies subject to HSI are shown in Figure 23.7 (Volume II).

**Table 23.24 Ponds and their habitat suitability index for supporting great crested newts.**

Feature	Number within the habitat and species study area
Number of ponds	110
Number of ponds with excellent HSI	5
Number of ponds with good HSI	11
Number of ponds with average HSI	10
Number of ponds with below average HSI	16
Number of ponds with poor HSI	9
Number of ponds where no HSI was undertaken	59

170. eDNA testing was conducted on 95 water bodies within the great crested newt study area. Of the 95 tested, 13 returned a positive result for great crested newt presence, all of which are located outside the onshore project area. A further 28<sup>9</sup> water bodies were not subject to testing due to access restrictions (11 waterbodies) or they were unsuitable (17 waterbodies) at the time of survey. The full great crested newt survey report is detailed in Appendix 23.2 (Volume III), and results are provided in Table 23.25.

**Table 23.25 Great crested newt survey results**

Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO01	TM 23238 18578	0.86	Excellent	Negative
PO02	TM 23060 18351	0.82	Excellent	Negative
PO03	TM 23063 18339	0.82	Excellent	Negative
PO04	TM 23029 18319	0.82	Excellent	Negative
PO05	TM 23022 18306	0.86	Excellent	Negative
PO06	TM 23034 18306	0.86	Excellent	Negative
PO07	TM 23027 18300	0.86	Excellent	Negative
PO08	TM 22935 18244	0.86	Excellent	Negative
PO09	TM 22920 18228	0.86	Excellent	Negative

<sup>9</sup> The additional water bodies (i.e. to equal 123 water bodies considered for eDNA testing) not subject to HSI during the Extended Phase 1 Habitat Survey included those picked up during other Phase 2 ecological surveys during 2022.



Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO10	TM 15652 24379	0.86	Excellent	Negative
PO11	TM 22872 18209	0.68	Average	Negative
PO12	TM 22873 18193	0.62	Average	Negative
PO13	TM 22869 18185	0.79	Excellent	Negative
PO14	TM 61544 22507	1	Excellent	Negative
PO15	TM 62286 21818	1	Excellent	Negative
PO16	TM 22859 18183	1	Excellent	Negative
PO17	TM 22864 18176	1	Excellent	Negative
PO18	TM 22798 18127	0.76	Good	Negative
PO19	TM 22718 18053	0.79	Excellent	Negative
PO20	TM 22708 18046	0.79	Excellent	Negative
PO21	TM 22622 17966	0.72	Good	Negative
PO22	TM 22589 17929	0.68	Average	Negative
PO23	TM 22575 17920	0.68	Average	Negative
PO24	TM 22557 17918	0.68	Average	Negative
PO25	TM 22558 17910	0.68	Average	Negative
PO26	TM 22334 17693	0.82	Excellent	Negative
PO27	TM 21924 17653	0.52	Below average	Negative
PO28	TM 21916 17582	0.72	Good	Negative
PO29	TM 21768 17568	0.72	Good	Negative
PO34	TM 21136 18788	0.58	Below average	Negative
PO35	TM 21174 18656	0.31	Poor	Negative
PO36	TM 20916 18505	0.73	Good	Negative
PO37	TM 20452 18437	0.71	Good	Negative
PO59	TM 20329 19152	0.74	Average	Negative
PO60	TM 20262 19254	0.50	Below Average	Positive
PO64	TM 20225 19307	0.62	Average	Negative
PO65	TM 20193 19342	0.58	Below Average	Positive
PO66	TM 20149 19368	0.86	Excellent	Negative
PO67	TM 20121 19408	0.57	Below Average	Positive
PO68	TM 20182 19480	0.49	Poor	Positive



Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO69	TM 20202 19503	0.53	Below Average	Positive
PO76	TM 20614 20151	0.60	Average	Negative
PO78	TM 20198 20524	0.30	Poor	Negative
PO79	TM 20381 21316	0.68	Average	Negative
PO81	TM 19500 21879	0.70	Good	Negative
PO82	TM 19080 22018	0.70	Good	Positive
PO83	TM 19706 22392	0.69	Average	Negative
PO84	TM 19728 22526	0.72	Good	Positive
PO85	TM 19415 22677	0.80	Excellent	Negative
PO86	TM 19273 22709	0.84	Excellent	Negative
PO87	TM 19189 22953	0.68	Average	Negative
PO88	TM 19326 23209	0.67	N/A	Negative
PO94	TM 17317 23195	0.32	Poor	Negative
PO98	TM 16505 23432	0.53	Below Average	Negative
PO99	TM 16475 23393	0.81	Excellent	Positive
PO 100	TM 16303 23523	0.70	Good	Negative
PO 101	TM 16161 23542	0.63	Average	Positive
PO 102	TM 16082 23551	0.80	Excellent	Positive
PO 103	TM 16098 23862	0.61	Average	Positive
PO 104	TM 16325 23943	0.73	Good	Negative
PO 105	TM 16452 24005	0.54	Average	Negative
PO 106	TM 16664 24317	0.64	Average	Negative
PO 107	TM 15894 24061	0.67	Average	Negative
PO 112	TM 15709 25239	0.75	Good	Negative
PO 113	TM 15557 25153	0.68	Average	Negative
PO 114	TM 15442 25077	0.65	Average	Negative
PO 115	TM 15030 24861	0.65	Average	Negative
PO 116	TM 14887 24994	0.72	Good	Negative
PO 117	TM 15438 25475	0.65	Average	Positive
PO 118	TM 14691 25342	0.54	Below Average	Negative
PO 120	TM 15022 25938	0.70	Good	Negative

Water body Ref.	Grid Ref	HSI Score	HSI Category	eDNA Result
PO 124	TM 14102 26511	0.54	Below Average	Negative
PO 125	TM 14217 26683	0.64	Average	Negative
PO 127	TM 13093 27091	0.71	Good	Negative
PO 128	TM 12555 28100	0.56	Below Average	Negative
PO 129	TM 13255 28265	0.51	Below Average	Negative
PO 130	TM 13137 29295	0.69	Average	Negative
PO 131	TM 13205 29298	0.65	Average	Negative
PO 132	TM 13265 29325	0.74	Poor	Negative
PO 134	TM 12275 29994	0.74	Good	Negative
PO 135	TM 11336 29737	0.30	Poor	Negative
PO 138	TM 10198 30183	0.55	Below average	Negative
PO 141	TM 10858 28469	N/A	N/A	Negative
PO 142	TM 11851 27529	0.75	Good	Negative
PO 143	TM 11123 27625	0.82	Excellent	Negative
PO 147	TM 09673 27216	0.45	Poor	Negative
PO 174	TM 22864 18176	0.76	Good	Negative
PO 176	TM 17503 23948	0.75	Good	Negative
PO 178	TM 11446 29778	0.45	Poor	Negative
PO 183	TM 11680 27882	0.71	Good	Negative
PO 192	TM 15211 26033	0.78	Good	Positive
PO 193	TM 15175 26030	0.51	Below average	Negative
PO 195	TM 11643 28069	0.72	Good	Negative
Inc01	TM 61498 22485	0.68	Average	Negative
Inc02	TM 61928, 22261	0.78	Good	Negative

#### 23.5.4.5 Reptiles

171. All common UK reptile species (grass snake *Natrix natrix*, adder *Vipera berus*, common lizard *Zootoca vivipara* and slow worm *Anguis fragilis*) are part-protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), making it an offence intentionally kill or injure, or to sell or offer to any of these four species of reptile.
172. All common UK reptile species are listed as UK species of principal importance.

173. As a result of these protections, all common UK reptile species are considered of high importance (see Table 23.8). The Essex Field Club holds records of 24 adders, 68 common lizards, 33 grass snakes and 49 slow worms within 2km of the habitat and species study area.
174. Habitat capable of supporting large populations of reptiles were recorded during the Extended Phase 1 Habitat Survey within the habitats and species study area. These areas comprised transitions between habitats (ecotones), rank grassland, piles of debris or bare ground which form part of a habitat mosaic providing suitable reptile hibernation, basking and/or foraging habitat suitable for supporting large populations of reptiles (Edgar, Foster, and Baker, 2010I).
175. In addition, a further four suitable habitat mosaics were identified during Summer 2022 Phase 2 ecology surveys, resulting in 11 habitat mosaics identified as potentially supporting large populations of reptiles.
176. Table 23.26 details the number of areas suitable to support large populations reptile species, identified in the Extended Phase 1 Habitat Survey. The locations of these areas are shown on Figure 23.8 (Volume II).

**Table 23.26 Features suitable for supporting reptiles.**

Feature	Number within the habitat and species study area
Mosaics suitable for supporting large populations of reptiles	11

177. A total of 11 reptile presence/ absence surveys were conducted across these habitat mosaics in two survey windows May-June and September-October 2022. Artificial refugia were placed at locations that offer the most suitable habitat for common reptiles, i.e., structurally diverse grassland habitats with areas of bare ground/short vegetation and transitional ecotone habitats. Full details of the reptile surveys are outlined in Appendix 23.4 (Volume III).
178. Reptile population classes are assessed in accordance with criteria from *Froglife Advice Sheet 10* (Froglife, 1999). This system classifies populations of individual reptile species into three distinct categories, based on the total number of adult animals observed during individual survey occasions. These population categories are set out in Table 23.27.

**Table 23.27 Population size class estimates based on the maximum number of adults by one person in one day, taken from Froglife (1999).**

Species	Low population	Good population	Exceptional population
Adder	<5	5-10	>10
Grass snake	<5	5-10	>10
Common lizard	<5	5-20	>10
Slow worm	<5	5-20	>10

179. The results of the reptile presence/ absence surveys are set out in Table 23.28. Locations of suitable reptile habitat are illustrated on Figure 23.8 (Volume II). In

summary, reptiles were recorded at seven of the 11 habitat mosaics surveyed, with 'good' populations of common lizard recorded at four of these.

**Table 23.28 Reptile species recorded during field survey and population size estimation within the habitat and species study area.**

Site ID (Figure 23.8)	Number of refugia	Number of surveys	Species recorded	Peak count (adults)	Population size estimate
TN426	70	7	Common lizard	4	Low
			Grass snake	1	Low
TN446	81	3	None	N/A	N/A
TN448	100	7	Common lizard	5	Good
			Adder	1	Low
TN525	117	7	Common lizard	9	Good
			Grass snake	1	Low
TN531	30	7	None	N/A	N/A
TN570	40	7	Common lizard	2	Low
TN581	27	4	None	N/A	N/A
TN582	71	7	None	N/A	N/A
TN583	34	7	Common lizard	7	Good
TN584	41	7	Common lizard	5	Good
TN585	67	7	Common lizard	3	Low
			Grass snake	1	Low

180. Further details of the reptile surveys are outlined in Appendix 23.4 (Volume III).

#### 23.5.4.6 Hazel dormice

181. Hazel dormice are protected under The Conservation of Habitats and Species Regulations 2017 (as amended) and are classified as EPS. This makes it a criminal offence to:

- deliberately take, injure, or kill a wild hazel dormouse;
- intentionally or recklessly disturb a hazel dormouse in its place of rest;
- damage or destroy a place used by hazel dormice for breeding or resting;
- possess or advertise/sell/exchange a hazel dormouse found in the wild in the EU (dead or alive) or any part of a hazel dormouse; and
- intentionally or recklessly obstruct access to a hazel dormouse's resting place.

182. Furthermore, hazel dormice are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally

kill or injure or intentionally or recklessly damage or destroy a structure or place used for shelter or protection or disturb a hazel dormouse whilst occupying such a structure or place.

183. Hazel dormice are listed as UK species of principal importance.
184. As a result of these protections, hazel dormice are of high importance (see Table 23.8).
185. Essex Field Club holds 29 records of hazel dormouse within 2km of the habitat and species study area. Furthermore, hazel dormice are subject to the Essex BAP.
186. Habitat suitable for hazel dormice was recorded during the Extended Phase 1 Habitat Survey within the habitats and species study area. This included habitats such as woodland parcels, hedgerows and areas of species-rich scrub that are connected to woodland areas, which have a high degree of species diversity within the tree and shrub species (Bright, Morris and Mitchell-Jones, 2006).
187. Table 23.29 outlines suitable areas for supporting hazel dormice, identified in the Extended Phase 1 Habitat Survey. These areas are shown on Figure 23.9 (Volume II).

**Table 23.29 Features suitable for supporting hazel dormice.**

Feature		Number within the habitat and species study area
Hedgerows	Suitable for supporting dormice	12
	Sub-optimal for supporting dormice	34
Woodland areas	Suitable for supporting dormice	4
	Sub-optimal for supporting dormice	5

188. Hazel dormice surveys of the habitat and species study area were undertaken on all 16 of these features during 2022. The survey comprised of a nest-tube monitoring survey of suitable hedgerows, and a nest box survey of all suitable woodlands. The survey was undertaken in accordance with best practice methods from *The Dormouse Conservation Handbook* (Bright, Morris and Mitchell-Jones, 2006). Full details of the survey design are provided in Appendix 23.5 (Volume III).
189. From 16 hedgerows and woodlands identified as suitable for supporting hazel dormice, dormice presence was recorded within 12 (see Figure 23.9, Volume II):
  - H079
  - H085
  - H075
  - TN410
  - H127

- TN503
  - H136
  - H149
  - H154
  - H155
  - H221
  - TN509.
190. Furthermore, H156, H089 and TN041 are all directly adjacent to, and connected with, habitats in which dormice were recorded during the surveys. Therefore all three of these features should also be treated as potentially supporting dormice. This also applies to H136, which was not scoped into the dormouse surveys due to access restrictions, however due to its proximity to H135 is highly likely to support dormice.
191. These hedgerows and woodland parcels are all located south of Swan Road, Beaumont, with particular concentrations around Swan Road, Beaumont itself, and Great Holland Pits Nature Reserve, Great Holland.
192. In summary, a total of 16 hedgerows and woodlands have or potentially support dormice.
193. Further details of the hazel dormouse surveys are outlined in Appendix 23.5 (Volume III).

#### 23.5.4.7 Fish

194. The Essex Field Club desk study did not highlight any notable fish species within the habitat and species study area. However, searches of the Environment Agency National Fish Population Database returned records of brown/ sea trout *Salmo trutta* in Holland Brook, which is a UK species of principal importance.
195. As a nationally important species which is uncommon in the region, brown trout presence makes fish an ecological receptor of medium importance.
196. No field survey data has been collected to identify the presence/ likely absence of fish species in watercourses within the onshore project area.

#### 23.5.4.8 Invasive non-native species

197. Where present, the location and extent of invasive non-native species were recorded during the Extended Phase 1 Habitat Survey. These focused on those species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).
198. Records of invasive non-native species recorded within 2km of the habitats and species study area held by Essex Field Club included American mink, butterfly bush *Buddleja davidii* and Japanese knotweed *Reynoutria japonica*.
199. Japanese knotweed has been recorded at 21 locations, including Clacton-Holland cliffs, Frating Green, Frinton and Walton Cliffs, Great Clacton, Stour Estuary, and Wivenhoe Marshes.
200. During the field surveys one area of giant hogweed *Heracleum mantegazzianum* was recorded within the survey area (TN437) and one ditch

contained water fern *Azolla filiculoides* over approximately a five-metre length (TN566). The locations of both target notes are shown on Figure 23.3 (Volume II). In addition, New Zealand pigmyweed *Crassula helmsii* and Nuttall's waterweed *Elodea nuttallii* were also recorded in six and 10 locations respectively within the ditches of Holland Haven SSSI during the NVC survey (see Appendix 23.7, Volume III).

201. If invasive non-native species were to be spread during construction, there is potential for harm to be caused to local designated sites and locally important habitats and species. As a result, the importance of this receptor is medium.

#### 23.5.5 Future trends in baseline conditions

202. In the event that the Project is not developed, a description of the anticipated changes in future baseline conditions for onshore ecology has been carried out and is described within this section.
203. With no development, ecological baseline conditions will continue to change following natural trends and increasing influence from climate change. 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, it appears that declining trends in biodiversity for the habitats and species present within the study areas may continue. Therefore, it is assumed that the ecological baseline within the study area will continue to change over time as measures to try and manage the decline in protected species and habitats continue to occur concurrently to natural changes in the environment.
204. The degree of environmental change in the 'no development' scenario therefore depends upon biodiversity management success, climate change trends, and naturally occurring changes outside of anthropogenic influence.
205. Most species of conservation concern subject to targeted ecological surveys in relation to this EclA are experiencing negative trends in the form of population declines, shifts or contractions in range, habitat loss, fragmentation of habitats and species populations and from the spread of diseases and non-native species. These long-term trends are associated with a range of factors including climate change, alterations to land-use (particularly intensification of farming and increased built development), increased human disturbance and anthropogenic pollution of waters, land, and air.
206. However, measures such as legislation regarding protection of species and habitats, changing farming practices and nature conservation efforts are, in some cases, limiting the magnitude of these negative trends, particularly at specific scales relevant to the onshore project area (e.g. county/district scale). Where an ecological receptor is known to be experiencing baseline natural trends that are relevant to this impact assessment, this is noted in the relevant individual assessment below.

#### 23.6 Assessment of significance

207. The following sections describe the impacts upon those ecological receptors described in Section 23.5 that have the potential to arise because of the



construction, operation, and decommissioning phases of the Project. The assessment follows the methodology set out in Section 23.4.3. The assessments are based on the worst-case scenarios set out in Section 23.3.2 and include the incorporation of embedded mitigation and project commitments set out in Section 23.3.3.

208. All findings of this section are summarised in Table 23.59.

### 23.6.1 Potential effects during construction

#### 23.6.1.1 *Impact 1: Impacts to Holland Haven Marshes SSSI and LNR*

209. As the only designated sites for nature conservation located within the onshore project area, consideration of potential effects upon Holland Haven Marshes SSSI and LNR have been assessed separately to other designated sites. Potential effects upon other designated sites are considered under Impact 2 below.

210. Impacts upon Holland Haven Marshes SSSI and LNR have been considered against the interest features of the SSSI identified in Section 23.5.2.1, i.e.:

- The ditch network, which, the citation states, represents an outstanding example of a freshwater to brackish water transition intimated by the aquatic plant communities, and which include a number of nationally and locally scarce species.
- The adjoining grasslands, which are of botanical importance in their own right as well as acting as a buffer zone to the ditch system.
- Aquatic and terrestrial invertebrates associated with these habitats.

211. The potential impacts assessed in relation to Holland Haven Marshes SSSI and LNR are as follows:

- Indirect effects from HDD breakout; and
- Indirect effects from road traffic emissions.

#### Ditch network

212. The NVC survey of the flora present at Holland Haven Marshes SSSI found a range of notable aquatic and emergent species associated with the ditch network, including at least once species listed vulnerable in the England RDB (Lesser spearwort) and at least seven aquatic, emergent or marginal species listed on the SSSI citation. It also recorded communities within the onshore project area which fit the SSSI citation including saltmarsh communities SM24, SM16b and SM23. Other SSSI communities were also recorded, but these areas of the SSSI are located outside of the onshore project area. It is notable that no ditches characteristic of the habitats listed on the SSSI citation were recorded within the onshore project area (although these were recorded within the ditches of the upstream sections of the SSSI).

213. As noted in Section 23.3.3, the Project has sought to minimise the potential interaction with Holland Haven Marshes as far as practicable through the use of construction methodologies that are likely to minimise any potential effects upon the habitats present within the SSSI. The commitment to install cable ducts underneath the SSSI using HDD techniques will ensure that there is no pathway



for direct impacts upon the interest features of the SSSI or LNR. No works within the SSSI will be required to facilitate this construction, as all works for cable landfall installation will be undertaken from a HDD launch pit, located within the indicative landfall HDD compound area located landward of the SSSI.

214. During the drilling process, there is the potential for the release of inert drilling fluids should a 'break-out' occur. In such an instance the materials released will largely comprise bentonite, an inert clay. The release of such material into the ditch system has the potential to give rise to a temporary smothering of sensitive aquatic or emergent plant species within the ditch system before it disperses or is removed.
215. As part of embedded mitigation, the HDD will be designed appropriately to the local ground conditions to minimise the risk of a breakout where practicable. Furthermore, a HDD Method Statement and 'Break-out' Contingency Plan will be prepared in advance of construction which will detail the measures to be taken in the event of a drilling fluid break-out in order to minimise effects upon the features of the SSSI, including procedures to manage the removal of bentonite.
216. Chapter 20 Onshore Air Quality (Volume I) has identified that there is potential for emissions from road traffic movements to cross the threshold of 1% of the site relevant critical load for NO<sub>x</sub> for Holland Haven Marshes SSSI, above which effects need to be considered (the North Falls alone road traffic NO<sub>x</sub> concentration is 1.8% of the relevant critical load). This is an extremely minor exceedance of the threshold for short term, temporary effects associated with road traffic emissions, and is highly unlikely to be a driver of the condition of SSSI features (which are primarily land management, agricultural run-off and upstream pollution events). In light of this, indirect effects from air quality emissions are considered to contribute a negligible impact upon the SSSI features.

#### Adjoining grasslands

217. The NVC survey of the flora present at Holland Haven Marshes SSSI found a small number of notable flora species associated with the grasslands within the SSSI and LNR, including at least once species listed vulnerable in the UK RDB scarce species (strawberry clover) and at least one marginal grassland species listed on the SSSI citation (sea barley). It also recorded communities within the onshore project area which fit the SSSI citation including mesotrophic grassland MG13. Other SSSI grassland communities were also recorded, but these areas of the SSSI are located outside of the onshore project area. It should be noted that MG13 grasslands were not recorded within the golf course area of the SSSI.
218. As noted above, direct effects upon the SSSI have been avoided through the use of HDD techniques.
219. During the drilling process, there is the potential for the release of inert drilling fluids should a 'break-out' occur. In such an instance the materials released will largely comprise bentonite, an inert clay. The release of such material into the grassland is unlikely to result in significant effects upon the grassland species of the SSSI, as releases would be localised in scale and the bentonite released in such an event will be removed immediately under the 'Break-out' Contingency Plan.

220. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible impact upon the SSSI features.

#### Aquatic invertebrates

221. The overall value of Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e., local) value for freshwater invertebrates (see Appendix 23.6, Volume III). Notably, no species of grazing marsh fidelity were recorded, highlighting that assemblages of aquatic invertebrates were comprised of more common generalist species. Further information regarding aquatic invertebrates within the onshore project area are detailed in Appendix 23.6 (Volume III).
222. The commitment to install cable ducts underneath the SSSI using HDD techniques will ensure that there is no pathway to direct impacts upon the interest features of the SSSI or LNR. No works within the SSSI will be required to facilitate this construction, as all works for cable landfall installation will be undertaken from a HDD launch pit, located within the indicative landfall HDD compound area located landward of the SSSI.
223. During the drilling process, there is the potential for the release of inert drilling fluids should a 'break-out' occur. In such an instance the materials released will comprise bentonite, an inert clay. The release of such material into the ditch system has the potential to give rise to a temporary smothering of aquatic or emergent plant species which are important to the lifecycle of the nationally scarce water beetles recorded within the ditch system, before it disperses or is removed.
224. As noted above, embedded mitigation measures will ensure this level of risk is minimised.
225. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible impact upon the SSSI features.

#### Terrestrial invertebrates

226. Desk study data highlights the presence of the Habitats Directive Annex II species Fisher's estuarine moth within Holland Haven Marshes SSSI and therefore potentially within the onshore project area. Fisher's estuarine moths rely on a sole host plant, hog's fennel, for food and oviposition so destruction of this plant within the onshore project area could negatively impact this species.
227. Additionally, six other species of conservation concern were recorded in field survey so could also be active within the onshore project area. Further information regarding terrestrial invertebrates within the onshore project area are detailed in Appendix 23.6 (Volume III).
228. As noted above, direct effects upon the SSSI have been avoided through the use of HDD techniques.
229. The hog's fennel habitat which supports the Fisher's estuarine moth is not considered to be at significant risk from bentonite breakout during the use of HDD for the same reasons as set out above. This is because bentonite breakout in these areas, in the unlikely event it should occur, would be localised in scale, and the bentonite released in such an event can be largely removed from any affected areas immediately through manual removal and washing in the event of a breakout occurring. As such loss of the stands of hog's fennel is considered unlikely.

230. As noted above, indirect effects from air quality emissions upon all SSSI features are likely to only contribute a negligible impact upon the SSSI features.

#### 23.6.1.1.1 Magnitude of impact

231. The magnitude of impact of the different interest features of the SSSI / LNR are as follows:

- **Ditch network:** The magnitude of this impact is low, as the embedded mitigation minimises the risk of effects from HDD breakout. Potential effects would be temporary and reversible.
- **Adjoining grasslands:** The magnitude of this impact is negligible, both from risks arising from bentonite breakout and a small-scale, temporary increase in NO<sub>x</sub> emissions arising from road traffic movements during the Project's construction. Potential effects would be temporary and reversible.
- **Aquatic invertebrates:** The magnitude of this impact is low, as the embedded mitigation minimises the risk of effects from HDD breakout. Potential effects would be temporary and reversible.
- **Terrestrial invertebrates:** The magnitude of this impact is negligible, negligible, both from risks arising from bentonite breakout arising from a small-scale, temporary increase in NO<sub>x</sub> emissions arising from road traffic movements during the Project's construction. Potential effects would be temporary and reversible.

#### 23.6.1.1.2 Importance of receptor

232. The importance of the different interest features of the SSSI / LNR are as follows:

- **Ditch network:** As the ditches within the onshore project area do not support habitats for which the SSSI is designated, and instead only locally scarce species, the ditches are considered to be of medium importance.
- **Adjoining grasslands:** SSSI habitats (mesotrophic grasslands) and SSSI species are present within the onshore project area, and therefore this receptor is of high importance.
- **Aquatic invertebrates:** Recent invertebrate surveys undertaken of the SSSI indicate that Holland Haven Marshes SSSI is considered to be of less than 'county' (i.e., local) value for freshwater invertebrates. As a result this receptor is of low importance.
- **Terrestrial invertebrates:** The presence of the Annex II Fisher's estuarine moth, as well as other species of conservation concern, defines the importance of the terrestrial invertebrate assemblage as being high.

#### 23.6.1.1.3 Significance of effect

233. The significance of the effect of the different interest features of the SSSI / LNR is set out in Table 23.30. Overall, the worst case effect upon Holland Haven Marshes SSSI and LNR is predicted to be minor adverse, which is not significant in EIA terms.

**Table 23.30 Impact 1: Impacts on Holland Haven Marshes SSSI and LNR - summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Ditch network	<p>These habitats could be subject to temporary and reversible impacts during construction, due to the potential for 'break-out' during HDD works underneath the ditch network</p> <p>Potential effects arising from temporary NO<sub>x</sub> emissions from road traffic during construction.</p>	Medium	Low	<p>Use of HDD to avoid direct impacts upon SSSI.</p> <p>HDD Method Statement and 'Break-out' Contingency Plan.</p>	Minor adverse
Adjoining grasslands	<p>These habitats could be subject to potential effects arising from of NO<sub>x</sub> emissions from temporary NO<sub>x</sub> emissions from road traffic during construction.</p>	High	Negligible	<p>Use of HDD to avoid direct impacts upon SSSI.</p> <p>HDD Method Statement and 'Break-out' Contingency Plan</p>	Minor adverse
Aquatic invertebrates	<p>These species could be subject to temporary and reversible impacts during construction, due to the potential for 'break-out' during HDD works underneath the ditch network.</p> <p>Potential effects upon supporting habitat arising from temporary NO<sub>x</sub> emissions from road traffic during construction.</p>	Low	Low	<p>Use of HDD to avoid direct impacts upon SSSI.</p> <p>HDD Method Statement and 'Break-out' Contingency Plan</p>	Negligible
Terrestrial invertebrates	<p>These species could be subject to potential effects upon their habitat arising from of NO<sub>x</sub> emissions from temporary NO<sub>x</sub> emissions from road traffic during construction.</p>	High	Negligible	<p>Use of HDD to avoid direct impacts upon SSSI.</p> <p>HDD Method Statement and 'Break-out' Contingency Plan</p>	Minor adverse

23.6.1.2 *Impact 2: Impacts to statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI / LNR)*

234. The potential impacts assessed on statutory and on-statutory designated sites (excluding Holland Haven Marshes SSSI / LNR) are as follows:
- Indirect effects from dust emissions;
  - Indirect effects from road traffic emissions;
  - Indirect effects from air quality emissions; and
  - Indirect effects arising from sediment / pollutant release into watercourses.
235. In addition to Holland Haven Marshes SSSI and LNR, there are a further seven statutory and 25 non-statutory designated sites of nature conservation located within 5km and 2km of the onshore project area respectively (Table 23.12) (Figure 23.1, Volume II). These sites have all avoided direct effects through the North Falls site selection process as part of the embedded mitigation (see Chapter 4 Site Selection and Assessment of Alternatives (Volume I) for further information).
236. The potential for indirect effects upon these sites arising from noise and visual disturbance, dust and air quality and changes to the hydrological conditions have been considered. The selection of sites for assessment using impact pathways to identify potential effects is set out below.
237. A precautionary buffer zone of influence (ZOI) of 500m has been set as the maximum distance within which changes in the noise environment due to the Project could potentially occur (see Chapter 26 Noise and Vibration (Volume I) for further details). Based on this ZOI, there is one non-statutory designated site which supports features potentially sensitive to noise and visual disturbance.
238. Temporary indirect effects resulting from non-road mobile machinery and dust emissions have been determined to have a ZOI of 500m when applying the Institute of Air Quality Management (IAQM)'s 2020 *Guide to the assessment of air quality impacts on designated nature conservation sites* (IAQM, 2020). Based on this ZOI, one statutory designated site (Hamford Water SSSI, SAC and NNR) and 10 non-statutory designated sites are potentially affected by air quality effects.
239. In addition, Chapter 20 Onshore Air Quality (Volume I) has undertaken an exercise to identify designated sites for nature conservation which are potentially affected by changes in road traffic emissions, based on the construction road traffic routes assessed in Chapter 27 Traffic and Transport (Volume I). The assessment identified that there is potential for emissions from road traffic movements to cross the threshold of 1% of the site relevant critical load for two statutory designated sites and five non-statutory designated sites, above which effects need to be considered.
240. Temporary indirect effects arising from changes to water resources which have functional connectivity to designated sites are assessed based on the relevant catchment areas for surface watercourses. In this instance one statutory designated site (Hamford Water SSSI, SAC and NNR) is located downstream of the onshore project area.

241. An assessment of the potential effects upon statutory and non-statutory designated sites is provided in Table 23.31.

**Table 23.31 Potential effects upon designated sites for nature conservation**

Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential effects	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
Simon's Wood	0.00	LWS Ancient Woodland		✓		Ancient woodland (mixed)	<p>Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p> <p>Potential effects arising from deposition of NOx, NH3 and nutrient nitrogen arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 1.5%, 1.1% and 1.8% of the critical load respectively, which are very minor in scale, temporary in nature (18 - 24 months only during construction) and apply to a non-nutrient limited habitat.</p>	Negligible
Little Bromley Churchyard	0.04	LWS		✓		Dry acid grassland	<p>Potential effects arising from dust emissions during the Project's construction, which are unlikely to lead to any deleterious effects upon this habitat. In addition, embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p>	Negligible
Great Holland Pits	0.06	LWS	✓	✓		Woodland, grassland and pond habitats and associated species bird and invertebrate species	<p>Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p> <p>There is the low potential for noise disturbance to occur upon species associated with Essex WT Reserve. However, the works are temporary in nature (18 – 24 months only) and the woodland is expected to provide a high degree of screening for any noise generated during temporary construction works, and as such any effects are likely to be minimal.</p>	Negligible
Frinton Cliffs	0.17	LWS		✓		Maritime slope grassland	<p>Potential effects arising from dust emissions during the Project's construction, which are unlikely to lead to any deleterious effects upon this habitat. In addition, embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p>	Negligible
Manning Grove	0.23	LWS Ancient Woodland		✓		Ancient woodland (mixed)	<p>Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p>	Negligible
Tendring Grove	0.31	LWS Ancient Woodland		✓		Ancient woodland (mixed)	<p>Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.</p>	Negligible



Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential effects	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
Hollandhall Wood	0.4	LWS Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.	Negligible
Thorpe Green	0.43	LWS		✓		Lowland meadows	Potential effects arising from dust emissions during the Project's construction, which are unlikely to lead to any deleterious effects upon this habitat. In addition, embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.	Negligible
Gravel Wood	0.47	LWS Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.	Negligible
Stonehall Wood	0.50	LWS Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from dust emissions during the Project's construction, which have the potential to lead to temporary localised, short term effects on tree functioning (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next rain storm), and any nutrient effects from dust on woodland habitats are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.	Negligible
Walls Wood	Road network	Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 28%, 6.2%, 14.2% and 11.8% of the critical load respectively i.e. all below the critical load, and which are temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible
Unnamed Woodland	Road network	Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from deposition of NOx, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 2.3%, 2.6%, 2.1% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible
High Barn Wood	Road network	Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 31.7%, 13.8%, 26.8% and 13% of the critical load respectively i.e. all below the critical load, and which are temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible
Guttridgehall Wood	Road network	Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 3.8%, 1%, 2.8% and 2% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible



Designated site name	Distance from onshore project area (km)	Designation	Within ZOI for:			Receptors	Potential effects	Magnitude
			Noise and visual disturbance	Air quality	Water resources			
Unnamed Woodland	Road network	Ancient Woodland		✓		Ancient woodland (mixed)	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 4.7%, 1.2%, 3.1% and 2.4% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible
Hamford Water	0.28	SAC		✓	✓	Fisher's estuarine moth <i>Gortyna borellii lunata</i> (Annex II species)	Potential effects arising from dust emissions during the Project construction, which have the potential to lead to temporary localised, short term effects on tidal flora (e.g. photosynthesis) however any such effects are limited to the extreme short term (i.e. until the next tidal cycle), and any nutrient effects from dust on coastal are minimal. Embedded mitigation set out in Chapter 20 Onshore Air Quality (Volume I) to manage dust emissions will also reduce the release of dust down to a level identified as non-significant within that chapter.	Negligible
		NNR		✓	✓	Main habitats: salt marsh, intertidal mud flats, coastal, grazing marsh, sands, shingle, small freshwater ponds, and ditches.	Potential effects arising from increases in sediment / potential pollutant release during installation of cable ducts across watercourses located approximately 300m upstream, of the Hamford Water SSI, SAC and NNR. As part of the Project's embedded mitigation, the watercourses which feed Hamford Water are proposed to be crossed using trenchless techniques to minimize the risks of any downstream effects. As such the only effects which may arise will be in the event of 'break-out'. As detailed previously, the development and implementation of a 'Break-out' Contingency Plan will mitigate potential effects.	Negligible
		SSSI		✓	✓	Tidal creeks, intertidal mud and sand flats, saltmarshes, islands, beaches, and marsh grasslands. It supports communities of coastal plants which are rare or extremely local in Britain, including Hog's Fennel <i>Peucedanum officinale</i> which is found elsewhere only in Kent.		Negligible
Stour and Orwell Estuaries	3.30	Ramsar		✓		Contains nationally scarce plants and British Red Data Book invertebrates.	Potential effects arising from deposition of NOx, NH3, nutrient nitrogen and acid deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 13.6, 5.9%, 4.6% and 2.1% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible
Stour Estuary	3.30	SSSI		✓		The estuary is of national importance for coastal saltmarsh, sheltered muddy shores, two scarce marine invertebrates and a vascular scarce plant assemblage.		Negligible
Cattawade Marshes	3.37	SSSI		✓		Grazing marshes with associated open water and fen habitats	Potential effects arising from deposition of NOx and NH3 deposition arising from road traffic emissions (see Chapter 20 Onshore Air Quality, Volume I). For this site, the increase in these emissions are 13.6 and 5.9% of the critical load respectively, which are very minor in scale, temporary in nature (up to 18 - 24 months only during construction) and apply to a non-nutrient limited habitat.	Negligible

#### 23.6.1.2.1 Magnitude of impact

242. As described in Table 23.31, the worst case magnitude of impact upon any statutory or non-statutory designated sites is considered to be negligible.

#### 23.6.1.2.2 Importance of receptor

243. Statutory designated sites are of high importance and non-statutory designated sites are of medium importance.

#### 23.6.1.2.3 Significance of effect

244. For statutory designated sites, the significance of effect is considered to be minor adverse, which is not significant in EIA terms; similarly for non-statutory designated sites, the significance of effect is minor adverse, which is not significant in EIA terms.

**Table 23.32 Impact 2: Impacts to statutory and non-statutory designated sites - summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Simon's Wood LWS	Indirect effects for dust emissions Indirect effects from road traffic emissions	Medium	Negligible	Embedded measures to manage light spill, dust and air pollutant generation and noise emissions are set out in Table 23.5.	Minor adverse
Little Bromley Churchyard LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Great Holland Pits LWS	Indirect effects for air quality emissions Indirect effects from noise and visual disturbance	Medium	Negligible		Minor adverse
Frinton Cliffs LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Manning Grove LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Tendring Grove LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Hollandhall Wood LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Thorpe Green LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Gravel Wood LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse
Stonehall Wood LWS	Indirect effects for air quality emissions	Medium	Negligible		Minor adverse

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Walls Wood Ancient woodland	Indirect effects from road traffic emissions	Medium	Negligible	N/A (effects have arisen due to changes in road traffic only)	Minor adverse
Unnamed Woodland Ancient woodland	Indirect effects from road traffic emissions	Medium	Negligible		Minor adverse
High Barn Wood Ancient woodland	Indirect effects from road traffic emissions	Medium	Negligible		Minor adverse
Guttridgehall Wood Ancient woodland	Indirect effects from road traffic emissions	Medium	Negligible		Minor adverse
Unnamed Woodland Ancient woodland	Indirect effects from road traffic emissions	Medium	Negligible		Minor adverse
Hamford Water SSSI, SAC, NNR	Indirect effects for air quality emissions Indirect effects arising from sediment / pollutant release into watercourses	High	Negligible	<p>HDD Method Statement and 'Break-out' Contingency Plan will be prepared in advance of construction which will detail the measures to be taken in the event of a drilling fluid breakout, in order to minimise downstream effects upon Hamford Water (SAC) during crossing of upstream watercourse.</p> <p>Embedded measures to manage light spill, dust and air pollutant generation and noise emissions are set out in Table 23.5.</p>	Minor adverse

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Stour and Orwell Estuaries SAC	Indirect effects from road traffic emissions	High	Negligible	N/A (effects have arisen due to changes in road traffic only)	Minor adverse
Stour Estuary SSSI	Indirect effects from road traffic emissions	High	Negligible		Minor adverse
Cattawade Marshes SSSI	Indirect effects from road traffic emissions	High	Negligible		Minor adverse

#### 23.6.1.3 *Impact 3: Permanent and temporary loss of saltmarsh*

245. The potential impacts assessed on saltmarsh are:

- Indirect effects from HDD breakout; and
- Indirect effects from dust emissions.

246. Saltmarsh comprises approximately 6ha of the onshore project area, located entirely within Holland Haven Marshes SSSI, as shown in Appendix 23.7 (Volume III). Saltmarsh is a UKHPI.

247. Saltmarsh is defined as “Angiosperm-dominated stands of vegetation, occurring on the extreme upper shore of sheltered coasts and periodically covered by spring high tides” (JNCC, 2022).

248. All saltmarsh within the onshore project area is proposed to be crossed by HDD as part of the Project’s embedded mitigation, removing the potential for direct effects upon this habitat.

249. During the HDD process, there is the potential for the release of inert drilling fluids which may temporarily smother small areas of the saltmarsh within Holland Haven Marshes. As part of the Project’s embedded mitigation, the HDD will be designed to minimise the risk of a breakout. Furthermore, an HDD Method Statement and ‘Break-out’ Contingency Plan will be prepared in advance of construction which will detail the measures to be taken in the event of a drilling fluid breakout, to minimise any short term potential effects upon saltmarsh.

250. Potential indirect effects upon saltmarsh habitats arising from dust emissions generated during construction works will be short term (i.e., until the tide removes dust from the area) and localised and managed through the use of best practice dust management measures set out in Chapter 20 Onshore Air Quality (Volume I).

##### 23.6.1.3.1 *Magnitude of impact*

251. The assessment has concluded a negligible magnitude of impact on saltmarsh due to the low risk of impacts occurring and embedded mitigation measures.

##### 23.6.1.3.2 *Importance of receptor*

252. As saltmarsh is a UKHPI, it is classified as having a high importance.

##### 23.6.1.3.3 *Significance of effect*

253. The overall significance of effect is minor adverse, which is not significant in EIA terms.

**Table 23.33 Impact 3: Impacts on saltmarsh- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Saltmarsh	<p>Indirect impacts arising from the risk of potential 'break-out' during landfall HDD works. Impacts will be temporary and reversible</p> <p>Indirect temporary effects from dust deposition.</p>	High	Negligible	<p>Use of HDD avoids direct impacts on saltmarsh habitats of Holland Haven Marshes (SSSI and LNR).</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p>	Minor adverse

#### 23.6.1.4 *Impact 4: Permanent and temporary loss of coastal and floodplain grazing marshes*

254. The potential impacts assessed on coastal and floodplain grazing marshes are as follows:
- Indirect effects from HDD breakout; and
  - Indirect effects from dust emissions.
255. Coastal and floodplain grazing marshes are a UKHPI and comprise 41.46ha of the onshore project area. Figure 23.2 (Volume II) shows the location of this habitat within the onshore project area.
256. Grazing marshes are defined as “periodically inundated pasture, or meadow with ditches which maintain the water levels, containing standing brackish or fresh water” by JNCC (2008a). These ditches are usually rich in plant and invertebrate species.
257. This habitat can also be valuable for breeding waders. Further details on bird assemblages within the onshore project area are detailed in Chapter 24 Onshore Ornithology (Volume I).
258. All coastal floodplain and grazing marsh within the onshore project area is located within Holland Haven Marshes SSSI. Therefore, the Project’s commitment to use HDD under the Holland Haven Marshes SSSI will avoid direct impacts on this habitat during construction.
259. During the HDD process, there is a low risk of the release of inert drilling fluids, which may temporarily smother small areas of the coastal floodplain and grazing marshes. The preparation of a ‘Break-out’ Contingency Plan as part of the Project’s embedded mitigation will minimise the potential effects upon this habitat in the unlikely event of a break-out.
260. Potential indirect effects upon coastal floodplain and grazing marsh habitats arising from dust emissions generated during construction works will be short term and localised and managed through the use of best practice dust management measures set out in Chapter 20 Onshore Air Quality (Volume I).
261. There is potential for birds that use this habitat to be affected by light and/ or noise during the construction phase. These potential impacts are addressed in Chapter 24 Onshore Ornithology (Volume I).

##### 23.6.1.4.1 *Magnitude of impact*

262. A temporary, negligible magnitude impact on coastal grazing and floodplain marsh is concluded because of the low risk of a potential breakout associated with the HDD and embedded mitigation measures for mud breakout and construction dust emissions.

##### 23.6.1.4.2 *Importance of receptor*

263. As coastal floodplain grazing marshes are a UKHPI, they are classified as being of high importance.



#### 23.6.1.4.3 Significance of effect

264. The overall significance of effect is minor adverse. This is considered to be not significant in EIA terms.

**Table 23.34 Impact 4: Impacts on coastal and floodplain grazing marsh- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Coastal and floodplain grazing marsh	Indirect impacts arising from the risk of potential 'break-out' during landfill HDD works. Impacts will be temporary and reversible.	High	Negligible	Use of HDD avoids direct impacts on habitats of Holland Haven Marshes (SSSI and LNR).	Minor adverse
	Indirect temporary effects from dust deposition.			Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).	

#### 23.6.1.5 Impact 5: Permanent and temporary loss of woodland habitat including veteran trees

265. The potential impacts of permanent loss and indirect effects from dust emissions on woodland habitat and veteran trees are assessed in this section.
266. Lowland mixed deciduous woodlands contribute to 5.82ha of the onshore project area, comprised of small parcels of less than 3ha in size scattered throughout the onshore cable corridor(s). Lowland mixed deciduous woodlands are a UKHPI and are of heightened conservation and ecological value. All UKHPI within the onshore project area are shown in Figure 23.2 (Volume II). This includes six woodlands designated as ancient woodland located within 500m of the onshore project area. Potential effects upon these ancient woodlands have been considered in Section 23.6.1.2 above.
267. Lowland mixed deciduous woodlands are comprised of mixed broad-leaved tree species. Ground flora and canopy composition of this habitat type are rich and often highly vary between sites and can host a wide variety of species (JNCC 2008g).
268. Eleven veteran trees were identified in the Extended Phase 1 Habitat Survey carried out within the habitat and species study area. All 11 veteran trees were also located within the onshore project area.
269. As part of the Project's embedded mitigation, site selection has sought to avoid locating infrastructure within woodland as far as practicable. Where this has not

been practicable, direct effects upon all remaining woodland parcels will be avoided through the use of HDD to install cable ducts beneath woodlands. Where this takes place, cable ducts will be installed at least 2m below ground level to ensure the majority of the root zone is avoided. As noted in Section 23.6.1.2 above, no ancient woodland will be directly affected by the Project's onshore works, including Simon's Wood ancient woodland, where no works will take place within 15m of the habitat.

- 270. In some instances, veteran trees are located in areas not suitable for HDD. In these instances, if the cable route passes close to the veteran tree, cable ducts will be micrositied around the root protection area of the veteran tree during detailed design, post-consent. Trees where this is the case will be identified in the Project's ES, once further route refinement work has taken place.
- 271. A pre-construction walkover survey will be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that will be implemented to protect any trees that are located adjacent to the construction working areas. This will include the identification of root protection areas to avoid damage to the trees. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works.
- 272. Potential indirect effects upon woodland habitats arising from dust emissions generated during construction works will be short term (i.e., until rain washes the dust from foliage) and localised and managed through the use of best practice dust management measures set out in Chapter 20 Onshore Air Quality (Volume I).

#### 23.6.1.5.1 Magnitude of impact

- 273. The magnitude of impact is considered to be negligible, as woodlands are avoided altogether or by the use of HDD during construction and indirect effects from dust emissions will be minimal and managed through best practice mitigation.

#### 23.6.1.5.2 Importance of receptor

- 274. The importance of UKHPI deciduous woodlands and veteran trees is considered to be high.

#### 23.6.1.5.3 Significance of effect

- 275. The significance of effect for woodlands is minor adverse, which is not significant in EIA terms.

**Table 23.35 Impact 5: Impacts on woodland habitats including veteran trees- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Lowland mixed deciduous woodland	Potential indirect effects arising from dust emissions.	High	Negligible	<p>Direct loss of woodland habitats will be avoided by using HDD to install cable ducts at all locations where woodland is encountered along the onshore cable corridor(s).</p> <p>Pre-construction walkover surveys will be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that will be implemented to protect trees that are located adjacent to the construction working areas. This will include the identification of root protection areas. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works.</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p>	Minor adverse
Veteran trees	Potential indirect effects arising from dust emissions.	High	Negligible	<p>Direct loss of veteran trees will be avoided by using HDD to install cable ducts at all locations where veteran trees are encountered, or through micro-siting of the final cable location outside of the trees' root protection area during detailed design.</p> <p>Pre-construction walkover surveys will be undertaken by an appropriately qualified arboriculturist. This survey will define specific mitigation measures that will be implemented to protect trees that are located adjacent to the construction working areas. This will include the identification of root protection areas. The arboricultural report will be submitted to and agreed with the local authority prior to the commencement of any construction works.</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p>	Minor adverse

#### 23.6.1.6 Impact 6: Permanent and temporary loss of good quality semi-improved grassland habitat

276. Good quality semi-improved grassland comprises 3.19ha of the onshore project area, located in a narrow strip behind the sea wall within Holland Haven Marshes SSSI. This habitat is classified as a UKHPI and is shown on Figure 23.3 (Volume II). The semi-improved grassland surveyed indicated varying degrees of agricultural improvement, however, some species diversity remains.
277. All good quality semi-improved grassland within the onshore project area will be crossed by HDD at the landfall as part of embedded mitigation, avoiding direct effects upon this habitat. As noted above, during the drilling process, there is the potential for the release of inert drilling fluids should a 'break-out' occur. The release of such material into the grassland is unlikely to result in effects upon grassland species present behind the sea wall, as any release would be localised in scale and will be removed immediately under the 'Break-out' Contingency Plan.
278. Potential indirect effects upon grassland habitats arising from dust emissions generated during constructions works are unlikely to occur, as the grassland is located greater than 200m from the nearest dust generating activity; the indicative landfall construction compound area.

##### 23.6.1.6.1 Magnitude of impact

279. Based on the information above, no pathway to effect upon this receptor is discernible. The magnitude of this impact is negligible, arising from the risk of bentonite breakout.

##### 23.6.1.6.2 Importance of receptor

280. As good quality semi-improved grasslands are UKHPI, their importance as a receptor is considered to be high.

##### 23.6.1.6.3 Significance of effect

281. The significance of effect for good quality semi-improved grassland is minor adverse, which is not significant in EIA terms (Table 23.36).

**Table 23.36 Impact 6: Impacts on good quality semi-improved grassland habitats- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Good quality semi-improved grassland	None	High	Negligible	N/A	Minor adverse

#### 23.6.1.7 Impact 7: Permanent and temporary loss of hedgerows

282. The potential impacts assessed on hedgerows are:
- Direct effects from permanent and temporary habitat loss; and
  - Indirect effects from dust emissions.

283. There are 16,494.1m of hedgerows recorded within the onshore project area. Hedgerows are shown on Figure 23.3 (Volume II). Hedgerows are listed as a UKHPI.
284. Hedgerows are of high ecological value as they provide foraging and nesting resources, commuting corridors and habitat connectivity in the wider landscape, as well as being a refuge for biodiversity within intensively managed agricultural environments.
285. At this stage in the Project's design trenchless techniques cannot be committed to at all hedgerows, where the engineering feasibility of using such techniques needs further assessment before it can be confirmed. The list of techniques being considered at each crossing is described in Chapter 5 Project Description (Volume I), Appendix 5.1 Crossing Schedule (Volume III). North Falls has sought to use trenchless techniques (e.g., HDD) to minimise impact on sensitive features where feasible. Where this is not practical, the working width at hedgerows has been narrowed to 30m to minimise the length of hedgerow which needs to be removed.
286. For hedgerows, in the worst case scenario (as detailed in Appendix 5.1, Volume III) 58 of the total 110 hedgerows within the onshore project area may be crossed using open cut trenching. Trenching could result in up to 30m being lost per hedgerow. A 6m loss per hedgerow would be required at a further 26 hedgerows to facilitate construction of a haul road only. This gives a total of up to a maximum 1.87km loss of hedgerow habitat within the onshore project area. However, further design and cable route selection is expected to reduce this figure for the ES. The remaining hedgerows will be retained in full and crossed using trenchless technologies.
287. Construction of the onshore substation may require the permanent removal of up to 30m of hedgerow.
288. To be considered a priority habitat, hedgerows need to consist at least 80% native woody species (JNCC, 2008b). Within the onshore project area the most ecologically valuable hedgerows recorded were 1,055.44m of native species-rich intact hedgerows and 3,160.49m of native species-rich intact hedgerows with trees. However, it should be noted that 74% of the hedgerow network surveyed within the onshore project area comprised heavily managed species-poor hedgerows, with minimal buffer strips providing little ecological value. In general, hedgerows were well connected to woodland parcels and river corridors.
289. Embedded mitigation in relation to hedgerows includes:
- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable corridor working width at hedgerow crossings;
  - Haul roads will be micro-sited to use existing hedgerow gaps where practicable during the Project's detailed design;
  - Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally

important and native species as advised by Essex Wildlife Trust and following the Essex Hedgerow LBAP. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS; and

- All hedgerow sections permanently removed at the onshore substation would be replaced as part of the Project's landscaping scheme. The details of the outline scheme will be prepared and presented as part of the ES.

290. Potential indirect effects upon hedgerow habitats arising from dust emissions generated during constructions works will be short term (i.e., until rain washes the dust from foliage) and localised and managed through the use of best practice dust management measures set out in Chapter 20 Onshore Air Quality (Volume I).

#### 23.6.1.7.1 Magnitude of impact

291. With implementation of embedded mitigation, the magnitude of impact in the short term is low and negative during the time it takes for the hedgerows to re-establish (3-7 years). In the long term, the magnitude is low and positive, as replanting of removed hedgerows with native species mix post-construction has been committed to and will positively influence the conservation status and integrity of hedgerows in the onshore project area.

#### 23.6.1.7.2 Importance of receptor

292. The importance of hedgerows is high due to their listing as a UKHPI. This covers all hedgerows within the onshore project area, whatever their ecological status.

#### 23.6.1.7.3 Significance of effect

293. The significance of effect in the short term is moderate adverse, and in the long term is moderate beneficial, as the quality and quantity of this UKHPI will be improved through construction embedded mitigation. Both these are effects are significant in EIA terms.

**Table 23.37 Impact 7: Impacts on hedgerows- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Hedgerows	<p>In the worst case scenario, 58 hedgerows within the onshore project area could be crossed using open cut trenching. Trenching would result in 30m being lost per hedgerow, plus a further 6m loss of a further remaining 26 hedgerows, totalling up to a maximum of 1.87km loss of hedgerow habitat within the onshore project area.</p> <p>Potential indirect effects arising from dust emissions.</p>	High	<p>Low adverse (short term)</p> <p>Low beneficial (long term)</p>	<p>Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required.</p> <p>Haul roads will be micrositied to use existing hedgerow gaps where practicable during the Project's detailed design.</p> <p>Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using of locally important and native species as advised by Essex Wildlife Trust and following the Essex Hedgerow LBAP. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS.</p> <p>All hedgerow sections permanently removed at the onshore substation would be replaced as part of the Project's landscaping scheme. The details of the outline scheme will be prepared and presented as part of the ES.</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p>	<p>Moderate adverse (short term)</p> <p>Moderate beneficial (long term)</p>



### 23.6.1.8 Impact 8: Permanent and temporary loss of rivers, ponds, reedbeds and lowland fen

294. The potential impacts assessed on rivers, ponds, reedbeds and lowland fen habitats are as follows:
- Direct effects from temporary habitat loss during open cut trenching;
  - Direct effects from permanent watercourse rerouting;
  - Indirect effects from HDD breakout; and
  - Indirect effects from dust emissions.
295. Rivers, ponds, reedbeds and lowland fen are all listed as UKHPI. These habitats are shown on Figure 23.3 (Volume II).
296. The surveys recorded 2,577.06m of linear river habitat within the survey area, plus an additional 1.53ha of transitional and estuarine habitat (Holland Brook downstream of Little Clacton Road). Marginal vegetation associated with watercourses relies on many factors such as the geology, slope and water quality. Rivers and other watercourses also host protected and notable species such as otters and water vole, increasing their importance as a habitat (JNCC 2008c).
297. Ponds form a significant component of the 6.04ha of standing water identified within the onshore project area. Ponds are strongly associated with their aquatic invertebrate assemblages as well as being a vital breeding resource for amphibian species, including the protected great crested newt (JNCC 2008d). The 3,278.49m of linear standing water identified within the onshore project area is comprised mainly of agricultural drainage ditches, which can also provide habitat for water voles and otters.
298. Reedbeds, lowland fen and associated marginal vegetation of freshwater bodies provide valuable habitat for a wide range of species. For example, great crested newts lay their eggs and fold them into leaves of marginal vegetation available at their breeding ponds (JNCC 2008e). Additionally, many bird species use reedbeds for nesting (e.g., moorhen *Gallinula chloropus* and reed warbler *Acrocephalus scirpaceus*). Further details into bird assemblages within the onshore project areas are detailed in Chapter 24 Onshore Ornithology (Volume I).
299. Nine watercourses and two ponds in the onshore project area will be crossed using HDD, as detailed in Table 23.38. Further site selection work is likely to reduce this as part of ongoing detailed cable route design. This will avoid direct construction impacts on these features. Further details of watercourses affected are outlined in the Project's crossing schedule (Appendix 5.1, Volume III) and Figure 5.1 (Volume II).

**Table 23.38 Watercourses and ponds which will be crossed using HDD.**

Section of the cable route	Obstacle ID	Obstacle details
Landfall	WX-05	Watercourse/ drain
Section 1	WX-07	Watercourse/drain



Section of the cable route	Obstacle ID	Obstacle details
Section 1	WX-08	Watercourse
Section 1	WX-10	Watercourse/ drain
Section 1	WX-11	Watercourse
Section 1	EOX-25	Pond
Section 1	WX-12	Watercourse
Section 3	WX-13	Watercourse/ drain
Section 3	WX-14	Watercourse
Section 3	WX-16	Watercourse
Section 4	EOX-90	Pond

300. Embedded mitigation as previously set out relating to the HDD design and breakout contingency planning will be implemented to minimise the risk of effects on watercourses and ponds.
301. In the worst case scenario, up to six watercourses within the onshore project area could be subject to open cut trenching. The construction techniques at these locations will ensure that water flow is maintained and that the risk of release of pollutants and sediment is minimised as far as practicable (see Table 23.5 for embedded mitigation measures to be employed during open cut trenching of watercourses). Reinstatement and monitoring of habitat will take place as soon as possible post-construction.
302. Construction of the onshore substation will potentially result in the permanent rerouting of one standing water field drain and one minor watercourse, depending on the location of the final onshore substation infrastructure. As part of embedded mitigation, all watercourses which are permanently lost during construction will be re-routed and their biodiversity value will be increased as part of the North Falls OLEMS, to be submitted with the Project's DCO application.
303. Potential indirect effects upon water habitats arising from dust emissions generated during constructions works will be minimal and localised, and managed through the use of best practice dust management measures set out in Chapter 20 Onshore Air Quality (Volume I).

#### 23.6.1.8.1 Magnitude of impact

304. With embedded mitigation the magnitude of impact upon watercourses is negligible. There will be small-scale temporary and reversible effects on the river habitats during construction. Although there will be potential permanent change at the substation, there will be no net loss of habitat overall.

#### 23.6.1.8.2 Importance of receptor

305. These habitats are all of high importance as examples of UKHPs in good condition, as well as providing habitat for several protected and notable species.

#### 23.6.1.8.3 Significance of effect

306. The overall significance of effect is minor adverse with embedded mitigation measures in the construction design, which is significant in EIA terms.

**Table 23.39 Impact 8: Impacts on rivers, reedbeds and ponds - summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Watercourses	<p>In the worst case scenario up to six watercourses would be subject to open cut trenching.</p> <p>Two watercourses are potentially permanently rerouted during construction of the onshore substation.</p> <p>Air quality emissions have the potential to impact freshwater habitats within the onshore project area. These impacts could potentially include dust deposition and an increase in nitrogen emissions during construction.</p>	High	Negligible	<p>Nine watercourses are set to be subject to HDD crossing for cable route construction to avoid direct impacts.</p> <p>The construction techniques at watercourses crossed by open cut trenching will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable (see Table 23.5). habitats will be reinstated upon completion.</p> <p>For all watercourses which may be permanently lost during the construction of the onshore substation these will be recreated as part of the Project's landscaping scheme and managed to enhance biodiversity.</p> <p>Reinstatement of directly impacted habitats will take place as soon as possible post-construction. Monitoring will be carried out if required.</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p>	Minor adverse
Ponds	Potential indirect effects arising from dust emissions.	High	Negligible	Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).	Minor adverse

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Reedbeds and lowland Fen	Potential indirect effects arising from dust emissions.	High	Negligible	Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).	Minor adverse

#### 23.6.1.9 Impact 9: Loss or damage to arable field margins

307. Direct effects from temporary and permanent habitat loss are assessed in this section.
308. Arable field margins are listed as a UKHPI where they are specifically being managed for wildlife. A total of 2.26ha of the onshore project area was comprised of arable field margins. The location of these field margins is shown in Figure 23.3 (Volume II).
309. Temporary disturbance of arable field margins may occur during open cut trenching for installation of cable ducts. As part of embedded mitigation, all habitats will be reinstated within the first season following the completion of construction. A method statement for reinstatement of the arable field margin habitats will be included in the EMP as described in Table 23.5.
310. Construction of the onshore substation may give rise to permanent loss of up to 1.1ha of arable field margin managed for wildlife, under a Countryside Stewardship (Middle Tier) scheme (see Chapter 22 Land Use and Agriculture (Volume I)). If this habitat is lost, efforts will be made to incorporate arable field margins as part of the onshore substation's landscaping scheme. The details of this will be set out in the OLEMS to be submitted with the Project's DCO application.

##### 23.6.1.9.1 Magnitude of impact

311. The changes to terrestrial habitats are permanent for the onshore substation, however, they are negligible in scale with minimal impact in the viability of this habitat within the region. As such the magnitude of impact would be negligible.

##### 23.6.1.9.2 Importance of receptor

312. The UKHPI status of the arable field margins makes the importance of this receptor high.

##### 23.6.1.9.3 Significance of effect

313. The significance of effect is therefore anticipated to be minor adverse. This effect is not significant in EIA terms. However, beneficial effects are also anticipated in the long term (although not quantified here), as arable field margin losses are reinstated and even increased with habitat creation and management as embedded mitigation post-construction.

**Table 23.40 Impact 9: Impacts on arable field margins - summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Arable field margins	Temporary disturbance of arable field margins may occur, during open cut trenching for installation	High	Negligible	As part of embedded mitigation, all habitats will be reinstated within the first season following the completion of construction.  Furthermore, efforts will be made to incorporate arable field margins as part of the	Minor adverse

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
	of cable ducts.  Permanent loss of up to 1.1ha of arable field margins at the onshore substation.			onshore substation's landscaping scheme	

#### 23.6.1.10 Impact 10: Permanent and temporary impacts on badgers

314. The potential impacts assessed for badgers are as follows:

- Direct disturbance of setts or mortality of badgers from construction activities;
- Indirect effects from noise;
- Indirect effects from light spill; and
- Indirect effects from dust emissions.

315. The Extended Phase 1 Habitat Survey recorded a total of seven badger setts within the habitat and species study area, of which three active outlier badger setts were within the onshore project area (Appendix 23.1, Confidential Annex 4 (Volume III)). A further three setts (two outlier and one annex) were within 30m of the onshore project area and will be considered in the impact assessment, following guidance from English Nature (2002). Locations of setts within 30m of the onshore project area are shown on Confidential Figure 23.4 (Volume II).

316. Badgers are not listed as UK species of principal importance (nationally or locally). However, they are still legally protected under the Protection of Badgers Act 1992. This makes it a criminal offence to intentionally hunt, injure or disturb badgers, as well as protecting their setts from destruction and disturbance.

317. Direct disturbance of setts or mortality of badgers can be caused by construction activities in close proximity to setts. Indirect disturbance could also result from noise, light and air pollution. All of these effects will be temporary, while construction is undertaken in the vicinity of badger habitat.

318. As part of embedded mitigation, the site selection work (cable route refinement and onshore substation location) will seek to avoid micro-siting of the Project infrastructure within 30m of confirmed main badger setts where practicable. A pre-construction badger survey will be undertaken across the entire onshore project area to confirm the status of badgers prior to works commencing. The OLEMS will also detail best practices measures for minimising noise, dust and light disturbance during construction.

319. If construction works directly affect a sett, the appropriate Natural England licence would be obtained to allow construction works to proceed.

#### 23.6.1.10.1 Magnitude of impact

320. The magnitude of impact on badgers is defined as negligible at the population level due to implementation of embedded mitigation (pre-construction badger survey, micro-siting and obtaining the appropriate Natural England licences if any licensable works are deemed necessary)

#### 23.6.1.10.2 Importance of receptor

321. Badgers are defined as having medium importance as they are legally protected by the Protection of Badgers Act 1992.

#### 23.6.1.10.3 Significance of effect

322. The overall significance of effect on badgers is considered to be minor, as encounters on site are unlikely due to the setts within 30m of the onshore project area being outlier or annex setts. This is not significant in EIA terms.

**Table 23.41 Impact 10: Impacts on badgers- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Badgers	<p>Direct disturbance or mortality to badgers and their setts in construction is likely to be caused by transport of large machinery or other construction activities in close proximity to any of the setts found on site.</p> <p>Indirect disturbance could result from noise, light and dust if works are carried out in close proximity to sett entrances. All of these disturbances will be temporary, while construction is undertaken in the vicinity of badger habitat.</p>	Medium	Negligible	<p>A pre-construction badger survey will be undertaken across the entire onshore project area to confirm the status of badgers.</p> <p>As part of embedded mitigation, the site selection work will seek to avoid micro-siting of the Project infrastructure within 30m of confirmed badger setts.</p> <p>If construction works do need to affect a sett or be conducted close by, a Natural England licence would be obtained to close the sett.</p> <p>Dust emissions managed through best practice measures set out in Chapter 20 Onshore Air Quality (Volume I).</p> <p>Embedded measures to manage light spill and noise emissions are set out in Table 23.5.</p>	Minor adverse



#### 23.6.1.11 *Impact 11: Permanent and temporary impacts on bats*

323. The potential impacts assessed on bats are as follows:

- Direct mortality or injury of roosting bats during tree removal;
- Direct habitat loss due to hedgerow removal; and
- Indirect effects from light spill.

324. All bat species in the UK are EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and are also protected under the Wildlife and Countryside Act 1981 (as amended). In addition, barbastelle, Bechstein's, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat are all UK species of principal importance.

#### Roosting bats

325. There are 54 features (i.e., tree and structures) within the onshore project area identified to be of moderate to high suitability for roosting bats (Figure 23.5, Volume II). Of these, seven have been found to support roosting bats. The category of the roosts is not yet known at the time of writing (this information will be available within the Project ES). A further nine confirmed roosts have been recorded within 50m of the onshore project and therefore within the possible range of indirect effects.

326. Eighty-eight features were classified as having low suitability for roosting bats within the onshore project area. These features may also contribute to bat activity on site (Figure 23.5, Volume II).

#### Commuting and foraging bats

327. Fifty commuting and foraging features within the onshore project area were considered to provide moderate suitability for commuting and foraging bats (Figure 23.5, Volume II). Commuting and foraging can take place for extensive distances from key roost sites (up to 10km) therefore, bats roosting outside the onshore project area are potentially commuting and foraging along linear features affected by the Project. Bat activity surveys are being reported on and the final results will be available for the ES. For the purpose of this impact assessment, it will be assumed that all 50 bat commuting and foraging features identified in the Extended Phase 1 Habitat Survey have ecological value for local bat species of high importance.

328. Nineteen features were classified as having low suitability to support bat foraging or commuting. These features may also contribute to bat activity within the onshore project area and have therefore been assumed to be of value for local bat species of high importance (Figure 23.5, Volume II).

329. Without mitigation, a risk of killing or injuring roosting bats during tree removal to facilitate construction exists for the seven active roosts.

330. As part of the Project embedded mitigation, wherever practicable sensitive hedgerows will be crossed using HDD techniques to avoid the need for hedgerow removal. In the worst case scenario (as detailed in Appendix 5.1, Volume III), 58 of the total 110 hedgerows within the onshore project area may

be crossed using open cut trenching. Trenching would result in 30m being lost per hedgerow for, at most, these 58 hedgerows. In addition, a 6m loss per hedgerow would be required at a further 26 of the remaining hedgerows to facilitate construction of a haul road only. However, this gap is not large enough to inhibit commuting bat use of the remaining hedgerow (JNCC, 2001). In the realistic worst case scenario set out in Table 23.4, 1.87km of hedgerows may need to be removed from the crossed for cable duct installation, relevant trenching and haul road construction.

331. Construction of the onshore substation may require the permanent removal of up to 30m of hedgerow identified as providing moderate suitability for supporting commuting / foraging bats.
332. As noted under Impact 7, embedded mitigation in relation to hedgerows includes:
- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable corridor working width at hedgerow crossings;
  - Haul roads will be micro-sited to use existing hedgerow gaps where practicable during the Project's detailed design;
  - Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally important and native species as advised by Essex Wildlife Trust and following the Essex Hedgerow LBAP. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS.
333. In addition, construction of the cable corridor and onshore substation works have the potential to give rise to indirect effects upon commuting, foraging, and roosting bats as a result of light disturbance during construction. However, standard construction hours (07:00-19:00) means there is a low risk of disturbance to bats during the summer months when they are active between dusk and dawn. All indirect effects associated with cable corridor and substation construction will be temporary and only occur while works are being undertaken in the vicinity of the features. Embedded mitigation set out in Table 23.5 will ensure that any security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and ILP, 2018).

#### 23.6.1.11.1 Magnitude of impact

334. There is a potential for a short-term negligible magnitude of impact upon roosting bats, as a small number of isolated tree roosts are potentially directly affected during construction. With the implementation of embedded mitigation, removal of these roosts would be undertaken under licence and only once bat boxes had been installed in advance as replacement habitat.
335. There are no confirmed roosts within the onshore substation zone, and as such impacts are restricted to the onshore cable route and landfall only.
336. There is potential for short term medium magnitude of impact on commuting/ foraging bats due to hedgerow removal and the time period required for replanted hedgerows to establish. Such impacts relate specifically to 1.87km of

hedgerow being removed across 58 features, which when replanted would require 3 – 7 years to reach full maturity (Royal Horticultural Society, 2022). However, bats will use the hedgerows as commuting routes before full maturity. Once matured, the reinstated hedgerows should provide improved biodiversity value due to the increased diversity of hedgerow species and this impact will be medium beneficial.

#### 23.6.1.11.2 Importance of receptor

337. Bats are of high importance due to their legal status as EPS.

#### 23.6.1.11.3 Significance of effect

338. The significance of effect is considered to be major adverse in the short term, however, once the hedgerows grow up the effect will become moderate beneficial with the proposed embedded mitigation measures being put in place. This is significant in EIA terms.

#### 23.6.1.11.4 Additional mitigation

339. Hedgerow removal will be programmed for winter to give bats time to adjust to the change prior to the maternity period. Hedgerows will be removed in the preceding winter as close to the onset of works as practicable, and works will not commence after nights of poor weather (in case of bad weather roosts being used).
340. Hedgerow replanting will follow in the first winter after construction, with the exception of the 6m gap required for the haul road, which will be replanted following the completion of onshore construction (i.e., after at most 18 months). Replanting will follow guidance to encourage insect biomass (BCT, 2016a). Future hedgerow management will include allowing standard trees to develop during the period of aftercare (up to 10 years) to improve quality of the hedgerow as a foraging resource.
341. The Project will seek to retain as many mature trees as practicable given the benefits they provide within linear commuting / foraging features.
342. Additionally, if any new features identified as supporting bats require removal this will be completed under a Natural England EPS mitigation licence.
343. Confirmed roosting sites that cannot be retained will be removed pre-construction, in line with the EPS mitigation licence method statement and BCT best practice guidelines: gently taking down the structure in sections and leaving them on the ground for 24 hours to allow any bats to vacate the feature(s).
344. Where roosts of low conservation significance are lost to the Project, bat boxes will be installed as mitigation (BCT, 2016a). The type of bat box needed will depend on the species found in the onshore project area, and these will be determined once bat field surveys have been concluded.

#### 23.6.1.11.5 Residual significance of effect

345. With the above additional mitigation measures undertaken, the magnitude of impact is reduced to low in the short term, and therefore the significance of effect is moderate adverse, which is still significant in EIA terms. However, in the long term (3-7 years) the effect will become moderate beneficial with the proposed

embedded mitigation measures being put in place. This is significant in EIA terms.

**Table 23.42 Impact 11: Impacts on bats - summary**

Receptors	Potential impacts	Importance	Embedded / additional mitigation	Magnitude of impact	Significance of effect
Roosting bats	<p>A risk of killing or injuring roosting bats during tree removal to facilitate construction exists should the features identified support roosting bats.</p> <p>Construction of the cable corridor and onshore substation works have the low potential to give rise to temporary indirect effects upon roosting bats as a result of light disturbance.</p>	High	<p>Confirmed roosting sites will need to be removed pre-construction, in line with the EPS mitigation licence and they will be removed following BCT best practice guidelines: gently taking down the structure in sections question and leaving it on the ground for 24 hours to allow any bats to vacate the feature(s).</p> <p>Security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and ILP, 2018).</p>	Negligible	Minor adverse
Commuting/ foraging bats	<p>Hedgerow and linear feature removal as part of construction may reduce available foraging and commuting resources for local bat species.</p> <p>Construction of the cable corridor and onshore substation works have the low potential to give rise to temporary indirect effects upon foraging and commuting bats as a result of light spill.</p>	High	<p>Where practicable sensitive hedgerows will be crossed using HDD techniques to avoid the need for hedgerow removal.</p> <p>Hedgerow removal will be programmed for winter, to give bats time to adjust to the change prior to the maternity period. Hedgerows will be removed in the preceding winter as close to the onset of works as practicable, and works will not commence after nights of poor weather (in case of bad weather roosts being used).</p> <p>Hedgerow habitats removed during construction will be reinstated post-construction.</p> <p>Replacement of any failed hedgerow plants for up to 10 years post-construction.</p>	<p>Low adverse (short term)</p> <p>Low beneficial (short term)</p>	<p>Moderate adverse (short term)</p> <p>Moderate beneficial (long term)</p>

Receptors	Potential impacts	Importance	Embedded / additional mitigation	Magnitude of impact	Significance of effect
			Security lighting used during construction adheres as far as practicable to accepted lighting guidance (BCT and ILP, 2018).		

#### 23.6.1.12 *Impact 12: Permanent and temporary impacts on water voles and otters*

346. The potential impacts assessed for water voles and otters are:

- Indirect effects from HDD breakout;
- Indirect effects from noise; and
- Indirect effects from light spill.

347. Otters are legally protected under The Conservation of Habitats and Species Regulations 2017 (as amended). Water voles are legally protected under the Wildlife and Countryside Act 1981 (as amended). Water voles and otters are also both listed as UK species of principal importance.

348. Out of a total of 35 watercourses, five watercourses were found to be suitable to support water voles and one watercourse was found to be suitable to support otters within the onshore project area during the Extended Phase 1 Habitat Survey.

349. The water vole surveys conducted in 2022 (see Appendix 23.3, Volume III) concluded that three watercourses had signs of water vole presence including latrines, feeding remains, burrow entrances and prints. Of these three watercourses, one is located outside of the onshore project area (WV004), and the other two: Tendring Brook (WV003) and Holland Brook and its tributaries at Holland Haven Marshes SSSI (TN017 are to be crossed using trenchless techniques (see also Figure 23.6, Volume II and Table 23.22). No watercourses supported signs of otter within the onshore project area.

350. During the drilling process there is the potential for the release of inert drilling fluids which has a small risk of affecting water voles within watercourses WV003 and TN017 through localised, short term smothering of foraging habitat. The embedded mitigation set out previously regarding HDD design and the implementation of breakout contingency planning in the unlikely event of a release into a watercourse, will minimise any effects upon watercourses that support water voles (and otters).

351. Construction of the onshore cable route and landfall works create a small risk of indirect effects upon otters as a result of light and noise disturbance during construction. All indirect effects associated with construction will be temporary and only occur while works are being undertaken in the vicinity of the features. Embedded mitigation measures to manage light spill, dust and noise emissions are set out in Table 23.5.

##### 23.6.1.12.1 *Magnitude of impact*

352. The magnitude of effect is considered to be negligible, as watercourses associated water voles are avoided using HDD during the construction phase and the implementation of embedded mitigation manages the small risk of indirect effects.

353. As no signs of otter were recorded during surveys there is no impact recorded on the otter population. However, the absence of records does not necessarily mean the absence of otters from the onshore project area, as otter home ranges are large and they live solitarily or in small family groups. Notwithstanding this, the embedded mitigation measures for water vole are considered equally

applicable to otters, there is therefore confidence in the evaluation of 'no impact' on otter populations as a result of the works.

#### 23.6.1.12.2 Importance of receptor

354. Water voles and otters are of high importance due to their legal protection and listing as UK species of principal importance.

#### 23.6.1.12.3 Significance of effect

355. The significance of effect is minor adverse without mitigation measures, which is not significant in EIA terms.

#### 23.6.1.12.4 Additional mitigation

356. It is considered that the least impactful option for water voles would be to manage the risk of HDD breakout through the Contingency Plan, rather than to displace water voles unnecessarily. Therefore, licensing will not be needed for water vole mitigation where HDD is proposed under watercourses.
357. A pre-construction survey will be undertaken prior to construction to confirm the presence/absence of water voles and otters within the onshore project area. If no field signs of water voles or otters are found within 50m of the construction footprint, no specific water vole or otter mitigation will be required. If the presence of water voles or otter holts is confirmed, then mitigation under the appropriate licence regime will be agreed with Natural England.
358. Post-construction monitoring of locations where water voles have been directly affected by construction would be undertaken during the breeding season one year after completion of construction and in line with any licence conditions, to determine the continued presence of the water vole populations.
359. Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on otters.
360. Exit ramps from excavations will be provided at night near watercourses with confirmed presence of otters, to provide them with a means of escape.

#### 23.6.1.12.5 Residual significance of effect

361. The residual significance of effect remains minor adverse, which is not significant in EIA terms.



**Table 23.43 Impact 12: Impacts on water voles and otters- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Water vole	<p>Three watercourses had signs of water vole presence including latrines, feeding remains, burrow entrances and prints, however none of these watercourses will be directly impacted by construction.</p> <p>Indirect effects from HDD break-out could affect water vole and otters.</p>	High	Negligible	<p>Watercourses crossed using HDD, and risk of break-out managed through a HDD Break-out Contingency Plan.</p> <p>Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on water voles.</p>	Minor adverse
Otter	<p>None of the watercourses surveyed found signs of otter presence within the onshore project area. Therefore, direct and indirect impacts are unlikely to occur.</p>	High	None	<p>Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on otters.</p> <p>The embedded mitigation measures of HDD crossings and controls to manage indirect impacts from light spill and noise emissions are considered sufficient should any unrecorded otters use the watercourses in the onshore project area</p>	No effect

#### 23.6.1.13 Impact 13: Permanent and temporary impacts on great crested newts

362. The potential impacts assessed for great crested newts are:

- Direct disturbance or mortality of great crested newts from construction activities and equipment; and
- Direct effects from terrestrial habitat loss.

363. Great crested newts are an EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and also protected under the Wildlife and Countryside Act 1981 (as amended). They are listed as a UK species of principal importance.

364. During the 2022 environmental DNA (eDNA) survey (see Appendix 23.2, Volume III), great crested newt presence was confirmed within 13 water bodies (Figure 23.7, Volume II). All 13 water bodies are located outside of the onshore project area and will not be directly affected by the works. As part of embedded mitigation during ongoing Project design and refinement, the Project has sought to avoid standing water bodies as far as practicable. A further 11 water bodies were inaccessible during eDNA sampling and HSI assessment. All of these water bodies are also located outside of the onshore project area. The potential impacts presented below assume as a worst case that great crested newts are present in those water bodies that could not be assessed. Further information on great crested newt presence and activity in the onshore project area are detailed in Appendix 23.2 (Volume III).

365. Thirteen ponds with confirmed great crested newt presence were located within 250m of the onshore project area. In addition, as outlined above, great crested newt presence has been assumed in the 11 ponds that were inaccessible for sampling. It is considered that great crested newts associated with any of these ponds may be using suitable terrestrial habitats within the onshore project area. Therefore, they may be adversely affected by heavy machinery and habitat clearance, as well as general construction activities on site. Refugia, rough grassland, and hedgerows that could be utilised by great crested newts when not breeding in ponds may be removed if located within the construction footprint and therefore would need to be appropriately mitigated. As outlined in Table 23.5, all suitable terrestrial habitats will be reinstated following completion of construction, as part of embedded mitigation for the Project. Habitat reinstatement for great crested newts, where required, would be detailed within the Project's EMP.

##### 23.6.1.13.1 Magnitude of impact

366. The magnitude of impact on great crested newts is negligible with embedded mitigation, as breeding ponds have been avoided.

##### 23.6.1.13.2 Importance of receptor

367. Great crested newts are of high importance, due to their legal status as an EPS.

##### 23.6.1.13.3 Significance of effect

368. The significance of effect on great crested newts is minor adverse, which is not significant in EIA terms.

#### 23.6.1.13.4 Additional mitigation

369. North Falls propose to ensure appropriate mitigation for impacts upon great crested newts through Natural England's District Level Licensing (DLL) scheme for Essex. This scheme is designed to allow developers to pay for off-site compensation as an alternative to undertaking detailed on-site surveys and applying for a mitigation licence. This ensures that money which would have been spent on costly mitigation is better spent in targeted improvement to the district great crested newt population. Consultation with Natural England regarding the proposal and the viability of using the scheme for North Falls has taken place to date. It is proposed that NFOW will enter into the scheme in advance of DCO submission, with a formal submission for a DLL being made post-consent.

#### 23.6.1.13.5 Residual significance of effect

370. The application of the DLL scheme will maintain the negligible magnitude, resulting in the residual significance of effect with additional mitigation to be minor adverse. This is not significant in EIA terms.

**Table 23.44 Impact 13: Impacts on great crested newts- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Great crested newts	<p>All ponds with confirmed great crested newt presence will be avoided during construction and cable routing.</p> <p>Great crested newts also using suitable terrestrial habitats may be adversely affected by heavy machinery and habitat clearance, as well as general construction activities on site.</p>	High	Negligible	<p>All ponds with confirmed great crested newt presence will be avoided during construction.</p> <p>North Falls propose to ensure appropriate mitigation for impacts upon great crested newts through Natural England's District Level Licensing (DLL) scheme for Essex. It is proposed that NFOW will enter into the scheme in advance of DCO submission, with a formal submission for a DLL being made post-consent.</p>	Minor adverse

#### 23.6.1.14 Impact 14: Permanent and temporary impacts on reptiles

371. The potential impacts assessed for reptiles are as follows:

- Direct effects from habitat loss;
- Direct disturbance or mortality of reptiles from construction activities and equipment; and
- Direct effects from potential refugia removal.

372. All common reptile species in the UK are given partial legal protection under the Wildlife and Countryside Act 1981 (as amended). All common reptile species are listed as UK species of principal importance.

373. Within the onshore project area, 11 habitat mosaics were recorded as being suitable for supporting large populations of reptiles (Figure 23.8, Volume II).

374. During the 2022 reptile surveys a total of 35 common lizards, one adder, and three grass snakes were observed, with presence recorded at seven habitat mosaics. Four sites (TN448, TN525, TN583 and TN584) had estimated 'good' populations of common lizard according to FrogLife (1999) guidance.

375. Further information on reptile assemblages within the onshore project area are detailed in Appendix 23.4 (Volume III) and field survey results are summarised in Table 23.28. Locations of suitable reptile habitat are illustrated in Figure 23.8 (Volume II).

376. Loss of suitable reptile habitat such as rough grassland and vegetation clearance in advance of construction poses a small risk of reptile mortality or disturbance without appropriate mitigation measures.

377. Removal of debris (e.g., concrete, roofing materials, corrugated sheets) could also affect reptiles, as they often use such materials to bask. Suitable replacement materials will be provided as mitigation where required.

##### 23.6.1.14.1 Magnitude of impact

378. The magnitude of impact for reptiles is low, as any impacts will be localised but will potentially involve disturbance to series of locally valuable 'good' sized populations for the duration of construction (i.e. one breeding season) in any one area. As detailed in Table 23.5, a Precautionary Method of Works (PMoW) will be put in place for all suitable reptile habitat within the onshore project area and this will be detailed and agreed through the Project's EMP.

##### 23.6.1.14.2 Importance of receptor

379. The reptile species found during surveys are listed as UK species of principal importance and are therefore considered to be of high importance.

##### 23.6.1.14.3 Significance of effect

380. With the implementation of embedded mitigation, the overall significance of effect is moderate adverse, due to short term temporary adverse effects occurring upon a high importance receptor. This is significant in EIA terms.

##### 23.6.1.14.4 Additional mitigation

381. For those habitat mosaics which support 'good' populations of reptiles, which are directly affected during construction, a reptile translocation programme will

be undertaken where necessary. This will be included in the EMP and supervised by an Ecological Clerk of Works (ECoW). The translocation programme will follow Natural England's *Reptiles: advice for making planning decisions* (2022) and *Herpetofauna Worker's Manual* (Gent and Gibson, 2003). It will involve undertaking pre-construction surveys to understand the current population size / distribution, identifying a suitable translocation site which provides the correct habitat features for the population to be translocated and undertaking an appropriate duration of trapping days (to be specified following the pre-construction surveys). Once trapping is complete the site will be cleared using a precautionary method of working to minimise potential impacts upon any remaining individuals.

#### 23.6.1.14.5 Residual significance of effect

382. The residual significance of effect is minor adverse with implementation of additional mitigation measures, this is not significant in EIA terms.

**Table 23.45 Impact 14: Impacts on reptiles- summary**

Receptors	Potential impacts	Importance	Embedded / Additional mitigation	Magnitude of impact	Significance of effect
Reptiles	<p>Loss of suitable habitat e.g., rough grassland and removal of vegetation in advance of construction poses a small risk of reptile mortality without appropriate mitigation measures.</p> <p>Removal of debris (e.g., concrete, roofing materials, corrugated sheets) could affect reptiles, as they often use such materials to bask. Suitable replacement materials will be provided where required.</p>	High	<p>Implementation of a PMoW in areas of suitable habitat, which will be detailed in the Project's EMP</p> <p>For those habitat mosaics which support 'good' populations and are directly affected during construction, a reptile translocation programme will be undertaken where necessary in line with Natural England guidance.</p>	Negligible	Minor adverse

#### 23.6.1.15 *Impact 15: Permanent and temporary impacts on hazel dormice*

383. The potential impacts assessed for hazel dormice are as follows:

- Direct habitat loss due to hedgerow removal;
- Indirect effects from noise; and
- Indirect effects from light spill.

384. Hazel dormice are EPS under The Conservation of Habitats and Species Regulations 2017 (as amended) and are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) as well as being listed as UK species of principal importance and on the Essex BAP.

385. The Extended Phase 1 Habitat Survey found 13 hedgerows and two woodland areas suitable for supporting hazel dormice within the onshore project area (Figure 23.9, Volume II), and a further two woodland areas located within the habitats and species study area. Of these, the 2022 hazel dormice surveys found likely presence of dormice on all but one of the features surveyed.

386. All woodland areas will be avoided through the use of trenchless crossing techniques during construction. All hedgerows which have confirmed hazel dormouse presence will be subject to HDD to avoid direct impacts on these features.

387. For seven of the 13 hedgerows where dormouse presence was recorded, the option of creating a 6m wide haul road within the hedgerow has been retained at this stage, should there not be an existing gap/gateway in the hedgerow that can be used. Approximately 6m of hedgerow would be removed prior to construction at these locations and reinstated following construction. Dormice are likely to avoid crossing hedgerow gaps >3m (Bright, Morris and Mitchell-Jones, 2006; Bright 1998), and as such creation of 6m gaps is likely to give rise to habitat fragmentation prior to reinstatement. A low risk of killing or in injuring individual dormice also exists during hedgerow removal itself. These effects are small-scale and localised; however, they have the potentially to adversely affect the habitat resource for the species' population at a local scale. Following the habitat reinstatement (see below), the local habitat resource is expected to improve in the long term.

388. As noted under Impact 7, embedded mitigation in relation to hedgerows includes:

- Commitment to reduce the onshore cable route working width to 30m at hedgerow crossings where open cut trenching is proposed, to minimise the amount of hedgerow removal required. This will be achieved by not including the topsoil/subsoil storage bunds in the cable corridor working width at hedgerow crossings;
- Haul roads will be micrositied to use existing hedgerow gaps where practicable during the Project's detailed design;
- Hedgerow replanting will be undertaken in the first season following the completion of construction. Hedgerows will be replanted using locally important and native species as advised by Essex Wildlife Trust and



following the Essex Hedgerow LBAP. Further details on replanting are set out in Table 23.5, and will be set out in the OLEMS.

389. Indirect impacts from lighting and noise could potentially cause temporary localised disturbance effects on hazel dormice, by increasing their risk of predation and causing increased stress levels, increasing the risk of mortality. Embedded mitigation measures set out in out in Table 23.5 include minimising the use of construction lighting and only using targeted lighting around sensitive habitats.

#### 23.6.1.15.1 Magnitude of Impact

390. The magnitude of impact on the hazel dormice population is low, as impacts are restricted to small-scale direct impacts on six features and indirect, reversible impacts from construction activities.

#### 23.6.1.15.2 Importance of receptor

391. The importance of hazel dormice as ecological receptors is high, due to their status as EPS, as well as their status as a species of principal importance.

#### 23.6.1.15.3 Significance of effect

392. The significance of effect for hazel dormice is moderate adverse in the short term with embedded mitigation, this is significant in EIA terms. However, in the long term (3-7 years) the effect will become moderate beneficial with the proposed embedded mitigation measures being put in place. This is significant in EIA terms.

#### 23.6.1.15.4 Additional mitigation

393. For the six hedgerows where small-scale hedgerow removal is required, the hedgerow is recommended to be cleared as part of a 'persuasion' methodology (i.e., to persuade any dormice present to leave the area of their own accord): clearance in summer is acceptable, with small amounts taken out each day to allow individuals time to escape, and a search should be made for nests during clearance works. The best times for this work are May and late September, when there is less likelihood of young being present in nests (Bright, Morris and Mitchell-Jones, 2006). These will be undertaken under a EPS licence and under an agreed method statement in advance of works, and then subject to hedgerow reinstatement and enhancement following works (see Table 23.5).
394. Where practicable, additional feeding sites and nesting boxes would be installed in hedgerows and woodland edges outside of the onshore project area, to accommodate for any hazel dormice disturbed by noise (Bright, Morris and Mitchell-Jones, 2006).

#### 23.6.1.15.5 Residual significance of effect

395. The residual significance of effect would remain moderate adverse in the short term and moderate beneficial in the long term (3-7 years). This is significant in EIA terms.

**Table 23.46 Impact 15: Impacts on hazel dormice- summary**

Receptors	Potential impacts	Importance	Embedded / Additional mitigation	Magnitude of impact	Significance of effect
Hazel dormice	<p>Direct impacts may occur on up to six hedgerows, for a 6m swathe in order to construct a haul road if no existing gaps are available.</p> <p>Indirect impacts from lighting and noise could potentially give rise to temporary disturbance effects upon hazel dormice.</p>	High	<p>HDD will be used under all hedgerows which have confirmed dormice presence. and where practicable also under those identified as suitable to support dormice.</p> <p>Any small scale hedgerow removal to facilitate construction of a haul road will be completed under an EPS licence from Natural England and in accordance with an agreed method statement. The Dormouse Conservation Handbook (Bright, Morris and Mitchell-Jones, 2006) recommends 'persuasion' as a method for encouraging dormice to relocate of their own accord into adjacent undisturbed habitat.</p> <p>Where practicable, additional nesting boxes should be installed in hedgerows and woodland edges outside of the onshore project area, to accommodate for any hazel dormice disturbed by noise (English Nature, 2006).</p>	Negligible	<p>Moderate adverse (short term)</p> <p>Moderate beneficial (long term)</p>

#### 23.6.1.16 *Impact 16: Permanent and temporary impacts on fish*

396. The potential impacts assessed on fish are:

- Direct effects from temporary habitat loss during open cut trenching; and
- Indirect effects on habitat and food sources from mud breakout during HDD operations.

397. Whilst no baseline fish surveys will be undertaken, a desk study undertaken using the Environment Agency National Fish Population Database, returned records of brown/ sea trout in Holland Brook. This is a UK species of principal importance.

398. Holland Brook will be avoided by using HDD techniques at the landfall. The embedded mitigation set out previously regarding HDD design and the implementation of a breakout contingency plan (in the unlikely event of a release into a watercourse) will minimise any potential effects on watercourses that support fish.

399. Six watercourses within the onshore project area may be subject to open cut trenching, which could affect the flow and integrity of the watercourse and potentially the fish assemblages they support. The construction techniques at these locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable (see Table 23.5 for embedded mitigation measures to be employed during open cut trenching of watercourses). Reinstatement and monitoring of habitat will take place post-construction (if required).

400. Further detail of the potential impacts on water resources and flood risk, which are potentially associated with fish species, are detailed in Chapter 21 Water Resources and Flood Risk (Volume I).

##### 23.6.1.16.1 *Magnitude of impact*

401. The magnitude of impact on fish species is low, as Holland Brook will be avoided through the use of trenchless techniques.

##### 23.6.1.16.2 *Importance of receptor*

402. As a result of the presence of brown/ sea trout, the importance of the fish in the watercourse of the onshore project area (specifically Holland Brook) is medium.

##### 23.6.1.16.3 *Significance of effect*

403. The significance of effect on fish as a receptor is therefore minor adverse, this is not significant in EIA terms.

**Table 23.47 Impact 16: Impacts on fish- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Fish	Up to six watercourses within the onshore project area may be subject to open cut trenching, which could affect the flow and integrity of the watercourse and potentially the fish assemblages they support.	Medium	Low	<p>Holland Brook (where brown/sea trout have been recorded) will be avoided through the use of HDD methodologies.</p> <p>Construction techniques at trenching locations will ensure that water flow is maintained, and that risk of release of pollutants and sediment is minimised as far as practicable.</p> <p>Reinstatement and monitoring of habitat will take place post-construction.</p>	Minor adverse

#### 23.6.1.17 *Impact 17: Spread of invasive non-native species*

404. Invasive non-native species (INNS) listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) are those that pose a risk to biodiversity and conservation of native species in the UK.
405. INNS were recorded in desk studies and as part of the Extended Phase 1 Habitat Survey.
406. The desk study identified several INNS within 2km on the onshore project area:
- American mink;
  - Butterfly bush; and
  - Japanese knotweed.
407. The field surveys noted additional invasive non-native species within the onshore project area, namely giant hogweed, water fern, Nuttall's waterweed and New Zealand pigmyweed. Evidence of American mink was recorded during the water vole and otter survey.
408. No INNS were found within the onshore substation zone during field surveys.
409. Known locations of INNS should be avoided by construction works in order to limit their spread. Where avoidance is not feasible they will be removed and disposed of appropriately (e.g., as part of pre-construction vegetation removal works). The implementation of control measures will be detailed in the Code of Construction Practice (CoCP), an outline version of which will be submitted with the DCO application, including species specific removal methodologies.
410. Other ways INNS could be spread during construction are through inadvertent introduction from elsewhere via vehicles, plant or personnel; and via seeds, planting stock or substrate.

##### 23.6.1.17.1 *Magnitude of impact*

411. The risk of the spread of INNS during construction is low due to the implementation of mitigation and control measures as outlined in the CoCP.

##### 23.6.1.17.2 *Importance of receptor*

412. If invasive non-native species were to be spread during construction, there is potential for harm to be caused to native habitats and species by out-competition of habitat (e.g. Himalayan balsam) and predation (e.g. American mink on water vole). As a result, the importance of this receptor is medium.

##### 23.6.1.17.3 *Significance of effect*

413. Control measures will be included in the CoCP to avoid the introduction of INNS and for safe management and disposal, should they be found on site. Control measures could include:
- Spraying with chemicals;
  - Pulling or digging out plants;
  - Burying plants;
  - Burning plants; and

- Disposing of plants off site.

414. With the implementation of the measures within the CoCP, the significance of effect will be minor adverse. This is not significant in EIA terms.

**Table 23.48 Impact 17: Impacts from invasive non-native species- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Invasive non-native species	There is the potential for the presence of invasive non-native species to be encountered during construction related activities.	Medium	Low	<p>Measures setting out the prevention of introduction and control of INNS will be included within the project's CoCP.</p> <p>Known areas of invasive non-native species on site should be avoided by construction works in order to limit spread. Where avoidance is not feasible and such species are encountered during construction, they will be removed and disposed of appropriately.</p>	Minor adverse

### 23.6.2 Potential effects during operation

415. Once constructed, there is the potential for adverse effects arising from general operation of the Project in the context of onshore ecological receptors. Those impacts that may occur are detailed below.

#### 23.6.2.1 *Impact 1: Temporary disturbance to habitats and species during maintenance activities*

416. The potential impacts on habitats and species assessed during maintenance activities are:

- Direct effects from localised habitat loss;
- Indirect effects from dust emissions;
- Indirect effects from excess noise;
- Indirect effects from excess light spill.

417. The onshore substation will be unmanned but will require regular visits from staff for routine maintenance. However, these will be within the operational substation area and will have no direct effect on ecological receptors. Any effects on onshore ecology receptors will be limited to temporary indirect disturbance to the adjacent habitats and species.

418. There may be a need to access the buried cables via the link boxes for maintenance or repair purposes. Any reactive repairs will have fewer potential impacts to those of construction (Section 23.6.1), as they would be localised, of small scale and temporary in nature.

419. There is a small potential for temporary disturbance to localised pockets of habitat as well as potential disturbance of protected and notable species.

#### 23.6.2.1.1 Magnitude of impact

420. As a result of the disturbance being localised and temporary, the magnitude of the impact is considered to be negligible.

#### 23.6.2.1.2 Importance of receptor

421. The onshore project area includes several areas of deciduous woodland, coastal and floodplain grazing marsh and good quality semi-improved grassland.

#### 23.6.2.1.3 Significance of effect

422. The overall significance of this effect is minor adverse, as the potential disturbance is both temporary and indirect. This is not significant in EIA terms.

**Table 23.49 Impact 1: Impacts on habitats and species from maintenance activities- summary**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Habitats	Localised disturbance of terrestrial habitats may occur during onshore cable maintenance activities.	High	Negligible	<p>Embedded mitigation measures to manage dust and emissions are set out in Table 23.5.</p> <p>Embedded mitigation measures to minimise habitat disturbance are set out in Table 23.5.</p>	Minor adverse
Protected and notable species	Disturbance from noise and/or temporary construction lighting may cause localised and temporary displacement of faunal species	High	Negligible	<p>Embedded mitigation measures to manage light spill, dust and noise emissions are set out in Table 23.5.</p> <p>Should any maintenance works effect licensable species, consultation with relevant statutory nature conservation bodies will take place prior to works commencing.</p>	Minor adverse



### 23.6.2.2 *Impact 2: Disturbance to species from onshore substation operational noise and light*

423. During the operation of the onshore substation, there is a low risk that operational noise and lighting may result in disturbance and/or illumination of adjacent habitats and species.
424. An Operational Lighting Plan will be developed in line with current guidance including produced by the BCT and ILP (2018) and Exmoor National Park (2011). Operational lighting will be directional and for security purposes only and it is expected that there would be no light spill beyond the substation operational boundary.
425. Details of operational noise levels are set out in Chapter 26 Noise and Vibration. No important populations of protected or notable species have been identified in or near the onshore substation zone. It is therefore considered unlikely that operational noise will significantly affect any ecological features such as bats.

#### 23.6.2.2.1 *Magnitude of impact*

426. As the noise and light disturbance is localised to the onshore substation, the magnitude of this impact is considered to be low.

#### 23.6.2.2.2 *Importance of receptor*

427. The onshore substation zone has not been identified as supporting any habitat or species populations of value that can be affected by light and/or noise, therefore the importance of this impact is negligible.

#### 23.6.2.2.3 *Significance of effect*

428. The significance of the effect for operational light and noise from the onshore substation is considered to be negligible. This is not significant in EIA terms.

**Table 23.50 Impact 2: Impacts and species disturbance from onshore substation operational noise and light- summary.**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Protected and notable species	During the operation of the onshore substation, there is a low risk that potential operational noise and lighting may result in disturbance and/or illumination of adjacent habitats and species.	Negligible	Negligible	Operational light spill will be mitigated by sensitive design measures captured in an Operational Lighting Plan.  Operational noise levels will be limited by design as set out in Chapter 26 Noise and Vibration (Volume I).	Negligible

#### 23.6.2.3 *Impact 3: Habitat improvements arising from biodiversity enhancements*

429. Biodiversity enhancements such as management of watercourses for water voles, planting additional hedgerows and woodland, grassland creation and management for birds (e.g., grey partridge) and creation of new waterbodies which may be included as part of potential landscaping and screening proposals at the onshore substation should result in a beneficial impact.
430. Such enhancements could contribute to the goal of delivering BNG for the onshore elements of the Project. Current information on the BNG baseline for the onshore project area are detailed in Appendix 23.1, Annex 7 (Volume III).
431. Final details of the Project's habitat creation will be agreed post-consent. Further information will be provided within the OLEMS, submitted alongside the Project DCO application.

##### 23.6.2.3.1 *Magnitude of impact*

432. The magnitude of impact is considered to be medium, as habitat and biodiversity improvement has the potential to improve the conservation status at a local scale.

##### 23.6.2.3.2 *Importance of receptor*

433. Reinstatement and creation of habitats will likely be beneficial to a range of species in the local area, including potentially those with legal protection. Therefore, the importance of creating, conserving, and improving habitats is high.

##### 23.6.2.3.3 *Significance of effect*

434. The significance of effect is anticipated to be moderate beneficial, based on the assumption that habitat creation is carried out and maintained during site operation. This is significant in EIA terms.

**Table 23.51 Impact 3: Impacts from biodiversity enhancements**

Receptors	Potential impacts	Importance	Magnitude of impact	Embedded mitigation	Significance of effect
Grassland	Grassland creation is being considered in the onshore project area as part of habitat restoration and BNG targets.	Medium	Low	Habitat restoration and enhancements as part of reaching BNG targets.	Moderate beneficial
Hedgerows	Additional hedgerow planting (which are a UKHPI) are being considered in the onshore project area as part of habitat restoration and BNG targets.	High	Low	Habitat restoration and enhancements as part of reaching BNG targets.	Moderate beneficial
Woodland	Creation of lowland deciduous woodland (which is a UKHPI) is being considered in the onshore project area as part of habitat restoration and BNG targets.	High	Low	Habitat restoration and enhancements as part of reaching BNG targets.	Moderate beneficial

### 23.6.3 Potential effects during decommissioning

435. No decision has been made regarding the final decommissioning policy for the substation, as it is recognised that industry best practice, rules and legislation change over time. However, the substation station equipment will likely be removed and reused or recycled.
436. It is expected the onshore cables will be removed from ducts and recycled, with the transition pits and ducts left in situ.
437. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan would be provided.
438. It is anticipated that the decommissioning impacts will be similar in nature to those identified during construction (Section 23.6.1). Namely this includes:
- Impacts on Holland Haven Marshes SSSI and LNR;
  - Impacts on statutory and non-statutory designated sites;
  - Permanent and temporary loss of saltmarsh;
  - Permanent and temporary loss of coastal and floodplain marshes;
  - Permanent and temporary loss of woodland habitats and veteran trees;
  - Permanent and temporary loss of good quality semi-improved grassland habitats;
  - Permanent and temporary loss of hedgerows;
  - Permanent and temporary loss of rivers, ponds, reedbeds and lowland fen;
  - Loss or damage to arable field margins;
  - Permanent and temporary impacts on badgers;
  - Permanent and temporary impacts on bats;
  - Permanent and temporary impacts on water voles and otters;
  - Permanent and temporary impacts on great crested newts;
  - Permanent and temporary impacts on reptiles;
  - Permanent and temporary impacts on hazel dormice;
  - Permanent and temporary impacts on fish; and
  - Spread of invasive non-native species.

### 23.7 Potential monitoring requirements

439. Monitoring of populations of protected and notable species may be required to ensure there is no significant effects on local populations or conservation status. Such species may include, but not be limited to, water vole, badger, hazel dormice and great crested newts.

440. Monitoring of habitat creation and enhancement proposals, particularly around the substation, will be set out in the OLEMS.

## 23.8 Cumulative effects

### 23.8.1 Identification of potential cumulative effects

441. The first step in the CEA process is the identification of which effects assessed for North Falls on their own have the potential for cumulative effects with other plans, projects, and activities. This information is set out in Table 23.52. Only potential effects assessed in Section 23.6 as negligible or above are included in the CEA (i.e., those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

**Table 23.52 Potential cumulative effects**

Impact	Potential for cumulative effect	Rationale
<b>Construction</b>		
Impacts on Holland Haven Marshes SSSI and LNR	Yes	Cumulative direct impacts arising from two or more projects are possible on statutory and non-statutory designated sites. Such impacts have the potential to affect the qualifying features (habitats/species) associated with these sites.
Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)	Yes	Cumulative direct impacts arising from two or more projects are possible on statutory and non-statutory designated sites. Such impacts have the potential to affect the qualifying features (habitats/species) associated with these sites.
Permanent and temporary loss of coastal and floodplain marshes	Yes	Impacts to this habitat from activities such as HDD could act cumulatively with other plans or projects in the nearby area particularly if there is a temporal overlap in construction.
Permanent and temporary loss of woodland habitats and veteran trees	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.
Permanent and temporary loss of good quality semi-improved grassland habitats	Yes	Impacts to this habitat from activities such as vegetation removal could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.
Permanent and temporary loss of rivers, ponds and reedbed	Yes	Impacts to this habitat from activities such as open cut trenching could act cumulatively with other plans or projects in the same area if these also cause impacts to it, particularly if there is a temporal overlap in construction.

Impact	Potential for cumulative effect	Rationale
Permanent and temporary impacts on badgers	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact badgers, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on bats	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact bats, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on water voles and otters	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact water voles and otters, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on great crested newts	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact great crested newts, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on hazel dormice	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also affect hazel dormice, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on reptiles	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact reptiles, particularly if there is a temporal overlap in construction.
Permanent and temporary impacts on fish	Yes	Impacts to this species could act cumulatively with other plans or projects in the same area if these also impact fish species, particularly if there is a temporal overlap in construction.
Spread of invasive non-native species	No	Standardised procedure and protocol will be followed during construction to minimise the risk of spreading invasive non-native species. Therefore, with the EMP in place, cumulative effects will not occur.
<b>Operation</b>		
Maintenance activities post project completion	Yes	Potential for cumulative effects to occur with other projects where they are located immediately adjacent to the onshore substation or adjacent cable repair activities.
Onshore substation operational noise and light	Yes	Potential for cumulative effects to occur with other projects where they are located immediately adjacent to the onshore substation.
<b>Decommissioning</b>		
Decommissioning strategies have not yet been finalised; however, the cumulative impacts are expected to be the same as those of the initial construction phase.		

### 23.8.2 Other plans, projects, and activities

442. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative effects for inclusion

in the CEA (described as 'project screening'). This information is set out in Table 23.53 below, together with a consideration of the relevant details of each, including current status (e.g., under construction), planned construction period, closest distance to the onshore project area, status of available data and rationale for including or excluding from the assessment.

443. The Project screening has been informed by the development of a CEA project list which forms an exhaustive list of plans, projects, and activities within the study area (Section 23.3.1) relevant to North Falls. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects, and activities to be screened in or out.

**Table 23.53 Summary of projects considered for the CEA in relation to onshore ecology (project screening)**

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
<b>National Infrastructure Planning</b>						
Five Estuaries Offshore Wind Farm	Pre-application	2028 - 2030	Scoping area directly overlaps with North Falls onshore project area.	High	Yes	The onshore project area for Five Estuaries Offshore Wind Farm covers largely the same area as NFOW. There is also a possibility that both projects could be constructed at around the same time, therefore, cumulative effects may occur.
East Anglia GREEN	Pre-application	2027 - 2031	Scoping area directly overlaps with North Falls onshore project area.	Low	Yes	The proposed substation area for East Anglia GREEN is in close proximity to North Falls proposed substation zone. Therefore, cumulative impacts could occur.
East Anglia TWO Offshore Windfarm	Approved (DCO Issued 2022)	Mid 2020s	47	High	No	The onshore infrastructure for this project is not in close proximity to the onshore project area so will not likely have



Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						a cumulative effect on onshore ecology.
Bradwell B new nuclear power station	Pre-application	Predicted 9 – 12 years	21	High	No	The project is not in close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.
Ipswich Rail Chord	Approved (DCO issued 2012)	Built	17	High	No	Ipswich Rail Chord has already concluded construction and will therefore not contribute to cumulative effects during North Falls construction or decommissioning periods. Cumulative impacts are not expected during operation as Ipswich Rail Chord does not have operational effects that could contribute to effects from North Falls.
Sizewell C Project	Approved (DCO issued 2022)	2022 – 2034	49	High	No	Sizewell C Project is located over 40km from the onshore

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						project area and so will not likely have a cumulative effect on onshore ecology.
Nautilus Interconnector	Pre-application	Information unavailable	44	Medium	No	The location of onshore infrastructure associated with this project is not known, however, it is highly unlikely to be within close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.
Lake Lothing Third Crossing	Approved (DCO issued 2020)	Over 2 years	76	High	No	The project is over 75km away from the onshore project area so will not likely have a cumulative effect on onshore ecology.
Richborough Connection Project	Approved (DCO issued 2017)	Built	55	High	No	This project has already been built and is therefore now part of the existing baseline.
Manston Airport	Information unavailable	Information unavailable	53	N/A	No	Operation of Manston Airport over time will cause species

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						impacted by noise and light disturbance to become accustomed to general operation, therefore not providing potential for cumulative effects. The airport is also over 50km from the onshore project area.
Kentish Flats Extension	Approved (DCO issued 2013)	Built	46	High	No	This project has already been built and is therefore now part of the existing baseline.
Sea Link	Pre-application	Information unavailable	20	N/A	No	The location of any onshore infrastructure associated with this project is not known, however, it is highly unlikely to be within close proximity to the onshore project area so will not likely have a cumulative effect on onshore ecology.
Galloper Offshore Windfarm	Approved	Built	15	High	No	This project has already been built and any onshore

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						infrastructure is now part of the baseline.
A12 Chelmsford to A120 widening scheme	Pre-examination	Information unavailable	27	Medium	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Rivenhall IWMF and Energy Centre	Pre-application	Information unavailable	27	Medium	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
<b>Essex County Council</b>						
Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
St. George's Infant School and Nursery, Barrington Road, Colchester, Essex, CO2 7RW	Approved	Information unavailable	9	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Wilson Marriage Centre, Barrack Street, Colchester, Essex, CO1 2LR	Approved	Information unavailable	9	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Wivenhoe Quarry Alresford Road, Wivenhoe, Essex, CO7 9JU	Report being prepared	Information unavailable	7	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex, CO7 7AT	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex, CO7 7AT	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
Old Heath County Primary School, Old Heath Road,	Approved	Information unavailable.	8	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Colchester, Essex, CO2 8DD						cumulative effect on onshore ecology, especially when considering the works' localised nature.
Crown Quarry (Wick Farm), Old Ipswich Road, Ardleigh, CO7 7QR	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
Wivenhoe Quarry, Alresford Road Wivenhoe, Essex CO7 9JU	Approved	Information unavailable.	7	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
Martell's Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU	Out for consultation	Information unavailable	3	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Land at: Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						cumulative effect on onshore ecology.
Land at Martells Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
Land to the south of Colchester Main Road, Alresford, Colchester, CO7 8DB	Report being prepared	Information unavailable	6	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Land at: Martells Quarry, Slough Lane, Ardleigh, Essex, CO7 7RU	Approved	Information unavailable	3	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Tendring Education Centre, Jaywick Lane, Clacton on Sea, Essex, CO16 8BE	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Tendring Education Centre, Jaywick Lane, Clacton on Sea, Essex, CO16 8BE	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.
Land At Martells's Quarry, Slough Lane, Ardleigh, Essex CO7 7RU	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.
Land At Martells's Quarry, Slough Lane, Ardleigh, Essex CO7 7RU	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.
Crown Quarry (Ardleigh Reservoir Extension), Wick Farm, Old Ipswich Road, Tendring, Colchester, CO7 7QR	Approved	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have



Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
						a cumulative effect on onshore ecology.
Ardleigh Waste Transfer Station, A120, Ardleigh, Colchester, CO7 7SL	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for the Project, so will not likely have a cumulative effect on onshore ecology.
35 Roach Vale, Colchester, CO4 3YN	Approved	Information unavailable.	4	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.
Boxted Bridge, Boxted, Essex, CO4 5TB	Report being prepared	Information unavailable	9	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for the Project so will not likely have a cumulative effect on onshore ecology.

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Lufkins Farm, Great Bentley Road, Frating CO7 7HN	EIA not required	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Lufkins Farm, Great Bentley Road, Frating CO7 7HN	Resolution made/ awaiting legal agreement	Information unavailable.	6	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Elmstead Hall, Elmstead, Colchester, CO7 7EX	Approved	Information unavailable.	5	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
<b>Tendring District Council</b>						
Land Between the A120 and A133, To The East of	Awaiting decision	Information unavailable.	3	N/A	No	The project is outside of the onshore project area for NFOW so will

Project	Status	Construction period	Closest distance from the onshore project area (km)	Confidence in data	Included in the CEA (Y/N)	Rationale
Colchester and of Elmstead Market						not likely have a cumulative effect on onshore ecology.
Hamilton Lodge Parsons Hill Great Bromley Colchester Essex CO7 7JB	Approval- outline	Information unavailable.	2	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology.
Land adjacent to Lawford Grid Substation Ardleigh Road Little Bromley Essex CO11 2QB	Approved	Information unavailable.	0.3	N/A	No	The project is outside of the onshore project area for NFOW so will not likely have a cumulative effect on onshore ecology; in addition, it will have been constructed and operational by the time of the Project's construction.

### 23.8.3 Assessment of cumulative effects

- 444. Based on the project screening in Table 23.53, two of the listed projects will be included in the CEA for further assessment: Five Estuaries Offshore Wind Farm and East Anglia GREEN.
- 445. Further details about both these projects are given in Chapter 4 Site Selection and Assessment of Alternatives (Volume I). Limited details for both projects are currently available to inform this PEIR, however these will be updated for the ES.

#### 23.8.3.1 *During construction*

- 446. Cumulative effects from other projects during construction are shown in Table 23.54.

**Table 23.54 Cumulative effects from other projects during construction**

Project	Cumulative effect 1: Impacts on designated statutory and non-statutory sites	Cumulative effect 2: Impacts on habitats	Cumulative effect 3: impacts on protected and notable species
Five Estuaries Offshore Wind Farm	<p>The overlapping nature of both North Falls and Five Estuaries Offshore Wind Farm onshore project areas means that the Five Estuaries construction activities will very likely affect the same designated sites as described in Section 23.6.1.1. Namely, potential indirect effects to Holland Haven Marshes (SSSI) and Holland Haven (LNR).</p> <p>In the Five Estuaries Scoping Report, there is a commitment to using trenchless techniques at landfall, crossing Holland Haven Marshes (SSSI) and LNR. The potential for adverse cumulative effects is therefore considered to be limited even if there is temporal overlap in construction activities (North Falls is planned for construction from 2026, compared to 2028 to 2030 for Five Estuaries). Cumulative effects therefore are not anticipated to be significant in EIA terms.</p>	<p>As a result of the similar geographical scope of both projects, similar habitats could be affected by construction activities, namely: coastal floodplain and grazing marsh; hedgerows; and rivers, ponds and reedbeds. Even though there is limited information available for the construction techniques to be used by Five Estuaries, it is assumed HDD will be used to cross important habitats where practicable, limiting the potential for cumulative effects to occur.</p> <p>In the worst-case scenario, 1.87km of hedgerow will be removed for North Falls which was considered significant in EIA terms. If Five Estuaries were to also require additional hedgerow removal, there would be a greater loss of this habitat on a local scale and therefore an increased risk of cumulative effects. If open cut trenching is used to cross rivers, ponds or reedbeds as part of Five Estuaries, there is also the potential for cumulative effects on the receptors, whether works are carried out concurrently or sequentially. Such effects have the potential to be significant in EIA terms.</p>	<p>As a result of the geographical scope of both projects, similar species will likely be affected by construction, namely: bats; water vole; and hazel dormice. Use of HDD to cross the majority of watercourses utilised by water voles, limits any adverse cumulative effects. If open cut trenching is used to cross these watercourses there remains the potential for cumulative effects on water voles, whether works are carried out concurrently or sequentially.</p> <p>Hedgerows within the onshore project area have been assessed as valuable for commuting and foraging bats in the local area. If Five Estuaries require additional hedgerow removal, there may be effects at the local scale which could result in cumulative effects for bat species, particularly if there is a temporal overlap in construction. Such effects have the potential to be significant in EIA terms.</p>
East Anglia GREEN	A new onshore substation is proposed to be built as part of the East Anglia GREEN proposals by National Grid, close to the preferred location for the North Falls onshore substation. No statutory	The North Falls onshore substation zone primarily consists of arable land of limited ecological value. The East Anglia GREEN substation area also comprises arable land and	No watercourses suitable for supporting water vole, otter or fish have been identified in close proximity to the North Falls substation zone,

Project	Cumulative effect 1: Impacts on designated statutory and non-statutory sites	Cumulative effect 2: Impacts on habitats	Cumulative effect 3: impacts on protected and notable species
	<p>designated sites are in close proximity to the North Falls substation zone. Manning Grove (LWS and ancient woodland) is the only non-statutory site within 0.5km of the North Falls proposed substation zone. The land proposed for East Anglia GREEN also does not include any designated sites. Due to the lack of designated sites within close proximity, there is no potential for cumulative effects associated with the direct disturbance of designated sites. Cumulative effects therefore are not anticipated to significant in EIA terms.</p>	<p>therefore cumulative effects upon sensitive ecological habitats would be unlikely.</p> <p>Cumulative effects from both projects could occur to arable field margins, which are UKHPI, however. North Falls has committed to reinstating and improving any habitats lost in construction, including these arable field margins. Any cumulative effects therefore would be short-term due to the short period of time require to reinstate arable field margin habitat. Cumulative effects therefore are not anticipated to significant in EIA terms.</p>	<p>therefore no cumulative effects on otters, water vole or fish will occur.</p> <p>In the worst-case scenario, 1.87km of hedgerow will be removed during construction of North Falls which was considered significant in EIA terms. Hedgerows within the onshore project area have been assessed as valuable for commuting and foraging bats in the local area. If East Anglia GREEN requires additional hedgerow removal, there may be cumulative effects at the local scale.</p> <p>North Falls onshore substation construction has the potential to have indirect effects on bats (roosting and commuting/ foraging) as a result of light disturbance. As part of the embedded mitigation, North Falls will ensure security lighting used during construction adheres to accepted lighting guidance (BCT and ILP, 2018) therefore reducing cumulative impacts to acceptable levels. Cumulative effects therefore are not anticipated to significant in EIA terms.</p>

### 23.8.3.2 During operation

447. Cumulative effects from other projects during operation are shown in Table 23.55.

**Table 23.55 Cumulative effects from other projects during operation.**

Project	Cumulative effect 1: Onshore substation operation
Five Estuaries Offshore Wind Farm	Due to the potential close proximity of both projects' substations, there is potential for cumulative effects to ecological receptors, particularly on notable species and their habitats from operational noise and light impacts. These were assessed to be negligible for North Falls, due to mitigation measures outlined above. Even though little information is available on the operation of the Five Estuaries onshore substation, if similar light and noise emissions are produced (even with mitigation) displacement of species could occur. These cumulative effects are likely to be temporary and localised, as displacement of species to other surrounding habitats will be minimal. Cumulative effects therefore are not anticipated to significant in EIA terms.
East Anglia GREEN	Due to the potential close proximity of both projects' substations, there is potential for cumulative effects ecological receptors, particularly on notable species and their habitats from operational noise and light impacts. These were assessed to be negligible for North Falls, due to mitigation measures outlined above. Even though little information is available on the operation of East Anglia GREEN, if similar light and noise emissions are produced (even with mitigation) displacement of species could occur. These cumulative effects are likely to be temporary and localised, as displacement of species to other surrounding habitats will be minimal. Cumulative effects therefore are not anticipated to significant in EIA terms.

### 23.8.3.3 During decommissioning

448. Decommissioning strategies have not yet been finalised for North Falls, Five Estuaries Offshore Wind Farm or East Anglia GREEN; however, the cumulative impacts are expected to be the same as those of the initial construction phase.

## 23.9 Interactions

449. The effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic effects as a result of that interaction. Most onshore ecological receptors are intrinsically linked to hydrology, soils, and air quality. Noise, lighting and traffic movements can also effect protected and notable species.

**Table 23.56 Onshore ecology interactions**

Topic and description	Related chapter	Where addressed in this chapter	Rationale
<b>Construction</b>			
Impacts on water-dependent habitats and designated sites	Chapter 21 Water Resources and Flood Risk (Volume I)	Sections 23.6.1.1, 23.6.1.2, 23.6.1.12 and 23.6.1.16.	Potential changes to ground conditions (including chemical quality and physical properties) during construction could affect the quality and quantity

Topic and description	Related chapter	Where addressed in this chapter	Rationale
			of groundwater and hydrologically-connected surface water receptors. This could in turn affect ecological receptors which rely on these water resources, including habitats and species such as otters and water voles. and
Impacts on habitats through increased acid and nitrogen deposition from road traffic during the construction phase	Chapter 20 Air Quality (Volume I)	Section 23.6.1.2	Potential changes to air quality (e.g., from road traffic emissions) have the potential to affect habitats, as outlined in Section 23.6.1.2.
Impacts on protected and/or notable species from increases in noise and traffic movements during construction	Chapter 26 Noise and Vibration (Volume I)	Section 23.6.1.10, 23.6.1.11, 23.6.1.12 and 23.6.1.15	Noise disturbance from construction activities has the potential to effect nearby wildlife such as badgers, hazel dormice and water voles.
<b>Operation</b>			
None identified.			
<b>Decommissioning</b>			
Impacts associated with the decommissioning phase are currently unknown but would be no greater than those identified for the construction phase.			

## 23.10 Inter-relationships

450. The effects identified and assessed in this chapter have the potential to interrelate with each other. The areas of potential inter-relationships between effects are presented in Table 23.57. This provides a screening tool for which effects have the potential to interrelate. Table 23.58 provides an assessment for each receptor (or receptor group) as related to these effects.
451. Within Table 23.58 the effects are assessed relative to each development phase (i.e., construction, operation, or decommissioning) to see if (for example) multiple construction effects affecting the same receptor could increase the significance of effect upon that receptor. Following this, a lifetime assessment is undertaken which considers the potential for effects to affect receptors across all development phases.



**Table 23.57 Inter-relationships between effects - screening**

Potential inter-relationships between impacts						
	Construction Impact 1 - 2: Impacts to statutory and non-statutory designated sites	Construction Impacts 3 – 9: Permanent and temporary loss or damage of valuable habitats	Impacts 10 – 16: Permanent and temporary impacts on protected and notable species	Construction Impact 17: Spread of Invasive non-native species	Operation Impacts 1 - 2: Operational and maintenance practices	Operation Impact 3: Biodiversity enhancements
Construction Impact 1 - 2: Impacts to statutory and non-statutory designated sites		Yes –there are multiple ecological connections between statutory designated sites and nearby important habitats (e.g., hedgerows and coastal floodplain and grazing marsh).	Yes –statutory designated nature conservation sites support a range of protected and notable species, so impacts to the designated site will likely affect protected and notable species present.	Yes –there is potential for the spread of invasive non-nature species such as water fern or giant hogweed to statutory designated sites.	Yes- there is potential for maintenance and emergency cable repairs being needed close to Holland Haven Marshes (SSSI) as the cable route directly goes through the site.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby designated sites as a by providing a resource for mobile species.
Construction Impacts 3 – 9: Permanent and temporary loss or damage of valuable habitats	Yes –there are multiple ecological connections between statutory designated sites and nearby important habitats (e.g., hedgerows and coastal floodplain and grazing marsh).		Yes –all protected and notable species are reliant on various habitats so impacts on habitats will also affect the species.	Yes –there is potential for the spread of invasive non-nature species such as water fern or giant hogweed to valuable habitats.	Yes- there is potential for maintenance and emergency cable repairs being needed within or close to valuable habitats.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby valuable habitats as a result of mobile species.
Construction Impacts 10 – 16: Permanent and temporary impacts on protected and notable species	Yes –many statutory designated nature conservation sites will support a range of protected and notable species, so impacts to the designated site	Yes –all protected and notable species are reliant on various habitats so impacts on habitats will also affect the species.		Yes –some native protected and notable species could be negatively impacted by the spread of	Yes- there is potential for maintenance and emergency cable repairs being needed which could disturb notable species. Operational light from	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of protected and notable

Potential inter-relationships between impacts						
	will likely impact protected and notable species present here.			invasive non-nature species.	the onshore substation could also disturb such species.	species as there are more ecological resources available for them to utilise.
Construction Impact 17: Spread of Invasive non-native species	Yes –there is potential for the spread of invasive non-nature species such as water fern or giant hogweed to statutory designated sites.	Yes –there is potential for the spread of invasive non-nature species such as water fern or giant hogweed to valuable habitats.	Yes –some native protected and notable species could be negatively impacted by the spread of invasive non-nature species.		Yes – there is potential for invasive non-nature species to be spread by maintenance activities similar to that of construction.	Yes- there is potential biodiversity enhancements could improve conditions for invasive non-nature species not just native species.
Operation Impacts 1 - 2: Operational and maintenance practices	Yes- there is potential for maintenance and emergency cable repairs being needed close to Holland Haven Marshes (SSSI) as the cable route directly goes through the site.	Yes- there is potential for maintenance and emergency cable repairs being needed within or close to valuable habitats.	Yes- there is potential for maintenance and emergency cable repairs being needed which could disturb notable species. Operational noise and light from the onshore substation could also disturb such species.	Yes – there is potential for invasive non-nature species to be spread by maintenance activities similar to that of construction.		Yes- there is potential for maintenance and emergency cable repairs being needed within or close to areas targeted by biodiversity enhancements.
Operation Impact 3: Biodiversity enhancements	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby designated sites as a by providing a resource for mobile species.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of nearby valuable habitats as a result of mobile species.	Yes- enhancing biodiversity within the onshore project area could potentially enhance the biodiversity of protected and notable species as there are more ecological resources available for them to utilise.	Yes- there is potential biodiversity enhancements could improve conditions for invasive non-nature species not just native species.	Yes- there is potential for maintenance and emergency cable repairs being needed within or close to areas targeted by biodiversity enhancements.	

**Table 23.58 Inter-relationship between impacts – phase and lifetime assessment**

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
Statutory and non-statutory designated sites	Moderate adverse	No change	TBC	<p>No greater than individually assessed impact.</p> <p>Effect significances judged at no more than moderate adverse during construction only. Given the avoidance/ mitigation measures due to be adopted, and the anticipated absence of/limited potential for impacts during operation or decommissioning, it is considered that there would either be no interactions between the phases, or that these would not result in greater impacts than are assessed individually.</p>	<p>No greater than individually assessed impact.</p> <p>Effects on designated nature conservation sites during operation are expected to be negligible, and during decommissioning effects are expected to be equivalent or less than those predicted/ assessed during construction. It is therefore considered that effects to designated sites would not combine over the lifetime of NFOW to increase the significance level of any effects.</p>
Notable habitats	Moderate adverse	No change	TBC	<p>No greater than individually assessed impact.</p> <p>The construction phase is expected to have the most significant effects on notable habitats due to the larger footprint and longer timeframes than other phases. In contrast, operational impacts are expected to have negligible effects on protected and notable habitats, and decommissioning works (which would be of a smaller scale and shorter timeframe than construction) would not be expected to have impacts of greater magnitudes or effects of greater significance than construction. Furthermore, it is anticipated that relevant</p>	<p>No greater than individually assessed impact.</p> <p>Effects on notable habitats are only predicted during the construction and possibly during the decommissioning phases. Given the time delay between these two phases and the fact that the most notable /sensitive habitats should be avoided during decommissioning, there is no realistic potential for impacts to combine over the lifetime of the Project and lead to levels of significance which would be</p>

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
				mitigation measures will be adopted during decommissioning, which further reduces the potential for inter-related impacted across multiple phases of NFOW.	<p>greater than those assessed at individual (i.e., construction) phases.</p> <p>The most notable habitats (woodlands, hedgerows, grasslands, and wetlands/ watercourses, for example) are not expected to be impacted by decommissioning works because cabling/ducting is due to be extracted from in-situ jointing bays/ inspection pits, rather than require extensive open-trench removal.</p> <p>Effect significances throughout the lifetime of NFOW are therefore judged to be of no greater significances than are predicted during any one phase.</p>
Protected and notable species	Major adverse	No change	TBC	<p>No greater than individually assessed impact.</p> <p>The construction phase is expected to have the most significant effects on protected and notable species due to the larger footprint and the length of time works that could cause a disturbance will last. In contrast, operational impacts are expected to have negligible effects on protected or</p>	<p>No greater than individually assessed impact.</p> <p>Given the anticipated small footprint and short timeframe of decommissioning works relative to construction, there is considered to be no realistic potential for effects to protected and notable</p>

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
				<p>notable species, and decommissioning works (which would be of a smaller scale and shorter timeframe than construction) would not be expected to have impacts of greater magnitudes or effects of greater significance than construction.</p> <p>Furthermore, it is anticipated that relevant mitigation measures will be adopted during decommissioning, which further reduces the potential for inter-related impacts across multiple phases of NFOW.</p>	species to cumulate over the lifetime of NFOW.
Invasive non-native species (INNS)	Minor adverse	No change	TBC	<p>No greater than individually assessed impact.</p> <p>The same preventative measures relating to INNS would be taken at decommissioning stage as will be adopted during construction. Decommissioning works are expected to involve relatively minor works compared with construction, meaning the risk of spreading invasive non-nature species should also be lower. However, it is possible that INNS will have spread or become more established relative to their status at construction phase, in which case the pre-mitigation impact during decommissioning could increase. Assuming appropriate mitigation measures are adopted (in line with measures due to be adopted at the construction phase) there would be no</p>	<p>No greater than individually assessed impact.</p> <p>The same preventative measures relating to INNS would be taken at decommissioning stage as will be adopted during construction. Decommissioning works are expected to involve relatively minor works compared with construction meaning the risk of spreading invasive non-nature species should also be lower. However, it is possible that INNS will have spread or become more established relative to their status at construction phase, in which case the pre-mitigation impact during decommissioning could increase. Assuming appropriate mitigation measures are adopted (in line with measures due to be</p>

Receptor	Highest significance level			Phase assessment	Lifetime assessment
	Construction	Operation	Decommissioning		
				realistic potential for interaction between effects in various stages of NFOW.	adopted at the construction phase) there would be no realistic potential for cumulative effects through the lifetime of NFOW.

### 23.11 Summary

452. This chapter has provided a characterisation of the existing environment for onshore ecology based on both existing (e.g., Defra, JNCC, Natural England, Forestry Commission and Essex Field Club datasets) and site-specific survey data (e.g., Extended Phase 1 Habitat Survey and species-specific surveys).
453. The EclA has established that onshore ecological receptors could be affected as a result of direct and indirect effects during the construction and decommissioning phases. The residual effects on the majority of receptors during these phases would be negligible or minor adverse. However, it should be noted that the results of certain onshore ecological surveys have not yet been reported on in full and therefore there is an inherent level of uncertainty within some areas of the ecological assessment presented, which will be updated for the ES. These potential impacts as identified in this PEIR are summarised below.
454. Where there are multiple possible outcomes depending on, for example, whether construction works would involve trenchless or open-trench installation in a relevant area, the worst-case scenario (which involves the greater magnitude of impact) is listed in the summary Table 23.59.

**Table 23.59 Summary of potential likely significant effects on onshore ecology**

Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
<b>Construction</b>						
Impacts on Holland Haven Marshes SSSI and LNR	Ditch network, adjoining grasslands, aquatic invertebrate assemblage and terrestrial invertebrate assemblage of Holland Haven marshes SSI and LNR	Low - High <sup>10</sup>	Negligible – Low <sup>10</sup>	Minor adverse	N/A	Minor adverse
Impacts on statutory and non-statutory designated sites (excluding Holland Haven Marshes SSSI and LNR)	Interest features of sites highlighted in Table 23.12	High	Negligible	Minor adverse	N/A	Minor adverse
Permanent and temporary loss of saltmarsh	Saltmarsh habitat	High	Negligible	Minor adverse	N/A	Minor adverse

<sup>10</sup> Depending on receptor.



Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
Permanent and temporary loss of coastal floodplain and grazing marshes	Coastal floodplain and grazing marsh habitats	High	Negligible	Minor adverse	N/A	Minor adverse
Permanent and temporary loss of woodland habitats including veteran trees	Broad-leaved deciduous woodland; ancient woodland; and veteran trees	High	Negligible	Minor adverse	N/A	Minor adverse
Permanent and temporary loss of good quality semi-improved grassland	Good quality semi-improved grassland	High	Negligible	Minor adverse	N/A	Minor adverse
Permanent and temporary loss of hedgerows	Hedgerows	High	Low adverse (short term) Low beneficial (long term)	Moderate adverse (short term) Moderate beneficial (long term)	N/A	Moderate adverse (short term) Moderate beneficial (long term)
Permanent and temporary losses of rivers, ponds and reedbeds	Rivers, ponds and reedbeds	High	Negligible	Minor adverse	N/A	Minor adverse

Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
Loss or damage to arable field margins	Arable field margins	High	Negligible	Minor adverse	N/A	Minor adverse
Permanent or temporary impacts on badgers	Badgers	Medium	Negligible	Minor adverse	N/A	Minor adverse
Permanent or temporary impacts on bats	Bats	High	Moderate adverse (short term) Low beneficial (short term)	Major adverse (short term) Moderate beneficial (long term)	Hedgerow removal and replanting to take place in winter to allow bats to become accustomed to habitat changes before breeding season. Hedgerow planting will be designed to encourage insect biomass. The Project will avoid veteran trees within hedgerows. Roosts requiring removal will be removed under EPS licence, and where appropriate will be replaced by bat boxes.	Moderate adverse (short term) Moderate beneficial (long term)
Permanent or temporary impacts on water voles and otters	Water voles and otters	High	Negligible	Minor adverse	A pre-construction survey will be undertaken prior to work to identify the current distribution of water voles and otters within the onshore project area.  Wherever practicable, night-time working near watercourses will be avoided or else minimised to reduce indirect impacts of light and noise on water voles and otters.  Exit ramps from excavations will be provided at night near watercourses with confirmed presence, to provide otters and water voles with a means of escape.	Minor adverse

Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
					If no field signs of water voles or otters are found within 50m of the Project, no further mitigation is required.	
Permanent or temporary impacts on great crested newts	Great crested newts	High	Negligible	Minor adverse	DLL will be sought to ensure that potential indirect effects upon great crested newts are appropriately mitigated.	Minor adverse
Permanent or temporary impacts on reptiles	Reptiles	High	Low	Moderate adverse	<p>A translocation programme will be agreed for areas with 'good' population of reptiles, and will be agreed through the EMP.</p> <p>Above ground vegetation removed during the reptile active period must be done so whilst adhering to a precautionary method of working (PMoW) for reptiles, supervised by a suitably qualified ecologist.</p>	Minor adverse
Permanent or temporary impacts on hazel dormice	Hazel dormice	High	Low	Moderate adverse	<p>HDD will be used to pass under all hedgerows which have confirmed dormice presence and where practicable will also HDD under those identified as suitable to support dormice.</p> <p>Six dormice hedgerows will require a 6m swathe to be removed (if an existing gap/gateway in the hedgerow cannot be found) in order to install the haul road. These will be subject to a dormouse</p>	<p>Moderate adverse (short term)</p> <p>Moderate beneficial (long term)</p>

Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
					translocation programme under licence in advance of works, and then subject to hedgerow reinstatement and enhancement following works (see Table 23.5).  Where practicable, additional feeding sites and nesting boxes should be installed in hedgerows and woodland edges outside of the onshore project area, to accommodate for any hazel dormice disturbed by noise (English Nature, 2006).	
Permanent and temporary impacts on fish	Fish species	Medium	Low	Minor adverse	N/A	Minor adverse
Spread of invasive non-native species	Native floral and faunal species, as well as local habitats	Medium	Low	Minor adverse	N/A	Minor adverse
<b>Operation</b>						
Maintenance activities post project completion	Floral and faunal species, as well as local habitats	High	Negligible	Minor adverse	N/A	Minor adverse
Onshore substation operational light and noise	Faunal species	Negligible	Negligible	Negligible	N/A	Negligible

Potential impact	Receptor	Importance	Magnitude of impact	Pre-mitigation effect	Additional mitigation measures proposed	Residual effect
Biodiversity enhancements	Floral and faunal species, as well as local habitats	High	Low	Moderate beneficial	N/A	Moderate beneficial

## 23.12 References

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