FIVE ESTUARIES OFFSHORE WIND FARM

VOLUME 5, REPORT 4.5: LESSER BLACK BACKED GULL COMPENSATION SITE – HABITATS REGULATIONS ASSESSMENT (CLEAN)

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In preparation of this document Five Estuaries Wind Farm Ltd has made reasonable efforts to ensure that the content is accurate, up to date and complete for purpose.

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A	Mar-24	DCO Application	GoBe	GoBe	VE OWFL
B	Oct-24	Change Request	SLR	GoBe	VE OWFL

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DEFINITION OF ACRONYMS

Term	Definition
AEoI	Adverse Effects on Integrity
DCO	Development Consent Order
ES	Environmental Statement
ETG	Expert Topic Group
HRA	Habitats Regulations Assessment
IROPI	Imperative reasons of overriding public interest
LBBG	Lesser Black-backed Gull
NNR	National Nature Reserve
PCS	Proposed Compensation Site
PIER	Preliminary Environmental Information Report
RIAA	Report to Inform the Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNCO	Statutory Nature Conservation Organisation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
VE	Five Estuaries Offshore Wind Farm
VE OWFL	Five Estuaries Offshore Wind Farm Limited

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Five Estuaries Offshore Wind Farm (VE) is a proposed extension to the operational Galloper Offshore Wind Farm. VE will be situated approximately 37 km off the coast of Suffolk, England (at its closest point). VE is the subject of an assessment under the Habitats Regulations (a Habitats Regulations Assessment, HRA) including a Stage 1 screening assessment and a Stage 2 Appropriate Assessment (AA). These assessments can only be completed by the competent authority, in this case the Secretary of State for Energy Security and Net Zero. To support the AA, the applicant has produced a Report to Inform the Appropriate Assessment (RIAA) as part of the Development Consent Order (DCO) application. The RIAA identified that an Adverse Effect on Integrity cannot be ruled out for the lesser black-backed gull *Larus fuscus* feature of the Alde-Ore Estuary Special Protection Area (SPA). Therefore, compensatory measures are proposed to ensure the overall coherence of the National Site Network is protected.

1.2 SITE DESCRIPTION

1.2.1 To fulfil the requirement for compensatory measures, the Applicant has identified a Proposed Compensation Site (PCS) at Orford Ness, Suffolk. Orford Ness is a shingle spit which forms part of the Alde-Ore Estuary SPA and Ramsar, and Orfordness to Shingle Street SAC.

1.3 PROJECT OVERVIEW

1.3.1 There is an existing breeding colony of Lesser Black-Backed Gull (LBBG) at Orford Ness which has declined dramatically since the late 1990s. A factor which may be contributing to this decline is predation of the LBBG eggs by foxes and other predators (Davis, et al., 2018). The PCS selection process and rationale are provided separately in the LBBG Evidence, Site Selection & Roadmap document (Volume 5 Report 5, Annex 5.3.The PCS will take the form of predator exclusion fencing around an area(s) of Orford Ness (not at the location of the existing breeding colony) with the aim of excluding mammalian predators, especially foxes, providing a safe refuge for breeding LBBG, and therefore boosting productivity to compensate for losses associated with VE alone and in combination with other offshore wind farms.

1.4 PURPOSE OF THIS REPORT

1.4.1 The installation of the predator exclusion fence may also have ecological impacts on European protected habitats or species. This report provides an assessment of these potential ecological impacts in the format of a Habitats Regulations Assessment.

1.5 EVIDENCE OF TECHNICAL COMPETENCE AND EXPERIENCE

1.5.1 The report was prepared by Richard Arnold BSc Hons MRes MCIEEM CEnv, a Technical Director at SLR Consulting. Richard has 25 years of experience in ecological consultancy.

1.6 RELEVANT LEGISLATION, POLICY AND GUIDANCE

1.6.1 Relevant legislation, policy and guidance includes:

- The Conservation of Habitats and Species Regulations 2017, as amended.
- National Planning Policy Framework [for England], paragraphs 187 and 188

- East Suffolk Council - Suffolk Coastal Local Plan (Adopted September 2020) Policy SCLP10.1: Biodiversity and Geodiversity and Policy SCLP10.2: Visitor Management of European Sites
- Defra guidance Habitats Regulations Assessments: Protecting a European Site[1].

[1] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

2 METHODOLOGY

2.1 GENERAL APPROACH

2.1.1 The methodology used in this report is based on and in accordance with guidance provided by Defra. The assessment applies only to listed or proposed European and Ramsar sites. More specifically, it only applies to the qualifying interest features of such sites i.e., the features which are the reason that the site was designated.

2.2 BASELINE DATA COLLECTION

DESK STUDY

2.2.1 A desk study was undertaken to collate existing information on the designated sites and habitats present within the PCS and 2km from its boundary. This included a review of the information on MAGIC, Natural England's designated sites viewer and reports prepared by MacArthur Green and Royal Haskoning DHV with respect to similar works at Orford Ness, associated with the Norfolk Projects Offshore Wind Farms. Searches for reports on the vegetation communities and ecology of the area were undertaken on Google Scholar and the internet generally. Records of protected, locally scarce and rare species were obtained on 24th April 2024 for the Alde-Ore Ramsar site from the Suffolk Biodiversity Information Centre, including records of species listed on the Ramsar citation.

FIELD SURVEY(S)

2.2.2 A field survey was conducted on 11th January 2024. During the survey, the vegetation communities present were identified in accordance with the Annex I (EC, 2013), UKBAP priority habitats (BRIG., 2011) and vegetated shingle classification systems (Sneddon & Randall, 1993) and mapped as far as possible (see limitations). In addition, the habitats of the qualifying interest species of designated sites, insofar as these are known/ published, were also identified. Observations of any other species were also recorded. The survey was focused on the proposed perimeter of the survey area but included the whole area. The access track was excluded from the survey because it consists of concrete or bare shingle. The weather during the survey was clear, dry and cold.

LIMITATIONS

2.2.3 The survey was undertaken in January and therefore outside the optimal season for habitat and botanical surveys which clearly limits the results. Species that are present may not have been visible and the identification of others was hampered by the lack of flowers or living parts. Species and vegetation community identification is therefore putative. Invertebrate species were similarly not visible.

2.2.4 The presence of fungi, lichens and mosses was noted however these were not identified to species.

2.2.5 These limitations are being addressed through ongoing survey work however this is not completed and will be reported in a subsequent update to this HRA.

2.2.6 Finally, the PCS has been amended over time and therefore the Survey Area only partially overlaps with the PCS (and also extends beyond it), see Drawing 4.

2.3 ASSESSMENT APPROACH

STAGE ONE: AA SCREENING

2.3.1 The methodology for the screening assessment follows a series of steps and is based on the data, surveys, assessments, and information described in Section 2.2 and listed in Section 2.3.6.

2.3.2 In summary, this Stage comprises:

- Step One: ascertaining whether the Project is directly connected with or necessary to the management of a listed or proposed European or Ramsar site. Typically, this applies only to a management plan, or parts thereof, which has the purpose of maintaining or restoring the conservation interest of a European site, and which would not have a negative effect on any other European site or Ramsar site.
- Step Two: identifying the relevant elements of the Project and their likely impacts, which is subdivided into:
  - Step Two, Part 1: an outline description of the Project, including construction, operation and decommissioning, containing enough information for potential impact pathways to be understood, and the Project site and its surroundings, focussing on the habitats and species that may form part of the qualifying interest of a European site or Ramsar site.
  - Step Two, Part 2: an identification of the aspects of the project which have the potential to affect European or Ramsar sites, either alone or in combination with other Projects and Plans. This may include for example emissions to air and water, noise and increases in recreational activity (Sources).
- Step Three: identifying which (if any) European or Ramsar sites may be affected, considering the potential effects of the Project alone or in combination with other plans or projects, which is subdivided into:
  - Step Three, Part 1: generating an initial list of European and Ramsar sites to be considered in the screening process, which are those which are potentially connected (via a Pathway) to the Project site including (i) any which overlap with the Project site or are close enough to experience increased noise, vibration, light, visible human activity or invasive species; (ii) those that may have downstream connectivity via watercourses or groundwater to the Project site or transport routes; (iii) those that may receive deposition of pollutants as a result of emissions to air from the Project or transport routes; and (iv) those which may support Ramsar ort migratory or mobile species populations which may also use the Project site or its environs.
  - Step Three, Part 2: compiling basic information on the European and Ramsar sites identified in Part 1, including a list of qualifying interest features (the Receptors), their conservation objectives, the distance and direction from the Project site (including transport routes) and how it is or is not connected, using the Source-Pathway-Receptor model, to the Project site (including transport routes). Likely significant effects can be immediately excluded for any European or Ramsar sites and any qualifying features which clearly lack a pathway or where it can be demonstrated there is a very weak pathway, such that any effects would not be appreciable.
- Step Four: assessing whether likely significant effects (LSE) on all European and Ramsar sites can be ruled out, in view of their conservation objectives.

- Step Four, Part 1: assessing LSE for the project alone, determining whether there is a risk that the project could undermine the conservation objectives for the qualifying interest features for those European and Ramsar sites for which a pathway has been identified. This is a scientific determination which considers whether the maintain or restore objective applies and both direct and indirect effects. If there is any uncertainty or detailed investigation or mitigation are required, LSE are assumed.
- Step Four, Part 2: assessing LSE for the project in combination with other Projects and Plans. Along the same lines as Part 1, this considers whether the effects of the Project, if not capable of undermining the conservation objectives on their own, could do so cumulatively with other projects and plans. It also considers whether the risk of undermining conservation objective is elevated when cumulative effects are considered.

- Conclusion: stating whether likely significant effects arising from the Project, alone and in-combination with projects and plans, on European sites can excluded, and if they cannot, which European sites and which qualifying interest features/special conservation interest are at risk from significant effects, and the relevant impact sources and pathways. If the latter, an AA will be required. The conclusion will not consider any mitigation measures designed to avoid likely significant effects on a European or Ramsar site.

STAGE TWO: APPROPRIATE ASSESSMENT

2.3.3 The methodology for the Appropriate Assessment (AA) also follows a series of steps and is also based on the data, surveys, assessments and information described in Section 2.2 and listed in Section 2.3.6. The AA is more detailed assessment and includes consideration of mitigation measures.

2.3.4 In summary, this Stage comprises:

- Step One: providing information on the Project and on the European and Ramsar sites which is divided into two parts.
  - Step One, Part 1: information on the project and the project site. Whilst the project has been described in outline at Stage 1, a more detailed description is provided here at Stage 2 including construction/ decommissioning methods, relevant details of the design and timescales, providing all the details needed by the competent authority to complete its AA. The description of the project site here provides further details of the habitats and species that may form part of the qualifying interest of a European site which is at risk of significant effects and its potential effects on the qualifying /special conservation interest features, considering any scoping opinion provided by the competent authority and prescribed bodies.
  - Step One, Part 2: information on the European and Ramsar sites, provides further information on the European and Ramsar sites identified at Stage 1, including a complete list of the qualifying interest features (if not already provided), investigation into the conservation condition and distribution of qualifying habitats and populations, a description of the site and further information on the conservation objectives, including the attributes and targets that define the conservation objectives, and the main threats and pressures.
- Step Two: Assessing the implications of the project in view the site's conservation objectives, individually or in combination with other plans or projects which is again divided into three parts.

- Step Two, Part 1: Assessment of the project alone. This is an impact assessment which considers how the project could affect the identified qualifying interest features.
- Step Two, Part 2: Assessment of project 'in combination', including the confirmation of the projects and plans (from Stage 1) which could act in combination with the Project. This considers whether the other Plans and Projects might exacerbate the effects of the Project alone, considering together all those Plans and Projects which affect the same European and Ramsar Sites as the Project.
- Step Two, Part 3: Assessment of the Effects on the Conservation Objectives. An assessment of the potential of the effects of the Project, alone and in Combination with other Plans and Projects, to undermine the conservation objectives, with reference to the published attributes which define the conservation objectives. An adverse effect on any attribute would undermine the conservation objectives.

- Step Three: Ascertain the effects of the plan or project on the integrity of European and Ramsar sites. Following on from Step 2, it is determined that where a conservation objective could be undermined, there would be an effect on site integrity and vice versa, which is based on the published conservation objectives where these exist, or an assumed objective as set above.
- Step Four: Identify mitigation measures. For any effect that could have an adverse effect on the integrity of a European or Ramsar site, avoidance and mitigation measures are identified with the aim of removing the risk to the integrity of the identified European and Ramsar sites, including in combination effects with other projects and plans. Measures to compensate for adverse effects must not be considered at this Stage, and neither are actions designed to enhance biodiversity.
- Conclusion. Taking into account the mitigation identified at Step 4, determining whether the risk to the conservation objectives have been reduced or removed such that the conservation objectives will not be undermined, and adverse effects on the integrity of all European and Ramsar sites can be excluded.

CONSULTATION

2.3.5 Natural England and the RSPB have been consulted about the proposed compensation site and have provided comments. The RSPB provided comments that relate to the effects of the proposals on Orford Ness which are therefore relevant to this assessment. Other matters, such as site selection and the effectiveness of the proposed compensation are addressed elsewhere (see Section 2.3.6).

Table 2.1: Relevant Consultation Response and where addressed.

Consultee	Comment	Response
RSPB	We note, overall, a lack of detailed description of the characteristics of each [compensation site] location set out in the consultation document, as well as the factors affecting the suitability of each location. Descriptions are relatively high level at this late stage in the	A detailed description of the Survey Area is provided in Section 4.1.12 onwards. This includes a representative area of the PCS.

Consultee	Comment	Response
	pre-application process and c.7 months after the RIAA consultation.	
RSPB	Suitability of the proposed compensation sites, including the assessment of their *in situ* interest is still to be determined. Further information and assessment is required on the environmental implications of the proposed measures, in terms of possible impacts on the Alde-Ore Estuary SPA and Orfordness-Shingle Street SAC, and constituent SSSIs.	As above. An assessment of the possible impacts on the Alde-Ore Estuary SPA and Orfordness-Shingle Street SAC is in Section 4.2

2.3.6 Natural England have provided comments on the original draft of this report and the accompanying EcIA. This have been responded to separately and are reproduced here for completeness.

Consultee	Comment	Response
Natural England J4	Natural England advises that there is the potential for impacts to designated sites & features at the Lesser Black Backed Gull (LBBG) compensation site on Orford Ness**.** Natural England advises that an adequate environmental baseline for the predator exclusion fencing site on Orford Ness should be established pre-determination, to inform avoidance/mitigation measures and allow ongoing monitoring. To achieve this, seasonally appropriate baseline surveys should be carried out in summer 2024 to allow assessment of impacts to the shingle vegetation areas and invertebrates. Impacts to the shingle sediment morphology and structure need to be considered and assessed further. Geomorphological change trends should be assessed using historical and contemporary evidence of coastal retreat/advancement. Further consideration should be given to	The Applicant is currently undertaking seasonally appropriate vegetation and invertebrate surveys on Orford Ness. The order limits for the compensation site have been refined down to a required area (6ha as agreed with NE) following further engagement with local landowners and no longer includes the artificial shingle bank close to the coastline. The surveys will be used to inform the avoidance, mitigation, monitoring and management measures that are required. In the area proposed for LBBG compensation, the shingle morphology appears to have already been modified as it lacks the characteristic ridges of the unmodified habitat. This area of shingle is therefore not as vulnerable to damage as other areas of Orford Ness. Moreover, there are existing tracks leading to

Consultee	Comment	Response
	potential impacts to the saline lagoons within the compensation area over the lifetime of the project. As should to the potential for repeated damage caused by maintenance checks and works. Climate change impacts and coastal vulnerability also need to be adequately assessed. All the above should be factored into an updated assessment of potential impacts. Once an updated assessment has been carried out, appropriate mitigation should be applied to minimise impacts to the shingle morphology, sediment structure, vegetation and communities and similarly for the saline lagoons present in the compensation area.	the LBBG compensation site which can be used for access for monitoring and maintenance. It should also be noted that the works proposed (namely the installation of a fence and ongoing habitat management) are of a very minor scale and have already been approved for a neighbouring compensation site within the SAC. It is acknowledged that the Norfolk / East Anglia compensation site is not in an area containing saline lagoons, however it should be stressed that physical impacts to the saline lagoons are not expected from the Five Estuaries works. Further, the installation of fencing is prevalent in other areas of the SAC 6.8.1.3 – Lesser Black Backed Gull Ecological Impact Assessment [APP-228]). The Applicant will provide interim survey reports to NE and the ExA and provide further details of the refined 6ha compensation area in an updated Lesser Black Backed Gull Compensatory Areas Environmental Impact Assessment following Deadline 1 (Examination Library reference to be confirmed, current version is [APP-225]). Once all surveys are complete, a final version of the Lesser Black Backed Gull Compensatory Areas Environmental Impact Assessment (Examination Library reference to be confirmed) will be provided, together with supporting documents: ○ Lesser Black Backed Gull Habitats Regulations Assessment (Examination Library

Consultee	Comment	Response
		reference to be confirmed, current version is [APP-054]) ○ Lesser Black Backed Gull Flood Risk Assessment (Examination Library reference to be confirmed, current version is [APP-226]) ○ Lesser Black Backed Gull Landscape and Visual Impact Assessment (Examination Library reference to be confirmed, current version is [APP-227]) ○ Lesser Black Backed Gull Ecological Impact Assessment (Examination Library reference to be confirmed, current version is [APP-228])
Natural England J7	APP-045, Sec 2.2.2, 2.2.4, 4.2.6, & Table 4.2 Lesser Black Backed Gull Compensation Site at Orford Ness As stated in 2.2.4, January 2024 was outside the optimal season for habitat/botanical surveys which limits the results and support for the conclusions made regarding impacts to the proposed compensation site at Orford Ness. With Table 4.2 (Ramsar Plant Species) based on literature rather than survey data. Moreover, Section 4.2.6 acknowledges that the presence of uncommon species could not be ruled out along the proposed fence line.	It is acknowledged that the survey work was undertaken in January and that assessment of impacts on uncommon plants and invertebrates was based on a desk study, so far. As noted above, the Applicant is currently undertaking vegetation and invertebrate surveys over the LBBG compensation site on Orford Ness. The SAC, SSSI and Ramsar site features will be taken into account when designing the installation/ removal and maintenance of the fence, and when determining the management requirements for the vegetation within the compensation site.

Consultee	Comment	Response
	Natural England is therefore concerned that the potential for Orford Ness – Shingle Street Special Area of Conservation (SAC), Alde-Ore Estuary Site of Special Scientific Interest (SSSI) and Alde-Ore Estuary Ramsar site features (including rare plants or invertebrates) could be impacted by installation/removal of the predator fencing which has not been adequately quantified. In turn, this means that Natural England cannot confirm that the proposed mitigation measures will reduce potential impacts to designated site features to acceptable levels.	
Natural England J8	APP-045 Coastal recession/advancement trends at the LBBG compensation site(s) should be adequately assessed using available evidence. Historical and contemporary geomorphological trends should be assessed to understand future site evolution in response to contemporary and future processes. This is relevant not only to site vulnerability over the lifetime of the project, but also to the sensitivities of the protected features and supporting habitats/processes. For example, at Orford Ness, the shingle habitats are likely to be highly sensitive to potential climate change impacts including sea level rise, and increased storminess, wave heights, temperatures and drought). The Applicant needs to fully consider, pre-determination, site vulnerability and sensitivities of protected features and supporting habitat/processes through the lifetime of the development. Historical and contemporary geomorphological trends should be assessed (e.g. historical trend analysis, LiDAR	An examination of aerial photographs indicates that the seaward side of Orford Ness at the position of the LBBG compensation area has advanced seaward since 1945, while the position of the River Alde (landward side) has remained stable. The LBBG compensation area is protected on the seaward side by a very substantial (~10m in height), shingle ridge however the presence of saline lagoons indicates that sea water is able to percolate under the shingle. The greatest change that has happened in this area since 1945 is the installation of the Cobra Mist AN/FPS-95 antenna, when the shingle and saltmarsh habitat was highly modified, with the area apparently levelled and largely cleared of vegetation, and new ditches, concrete roads and fences were constructed. For these reasons the shingle habitat on the chosen site is not considered to be highly sensitive. Further, the proposed works will

Consultee	Comment	Response
	surveys etc). Climate change impacts should be adequately considered.	not impact the habitat's resilience to climate change and therefore does not require an impact assessment.
Natural England J10	APP-225 Natural England advises that further consideration is needed regarding appropriate mitigation measures for impacts on the Orford Ness – Shingle Street SAC from the LBBG compensation site(s) once more a more robust baseline characterisation (and pre-determination surveys) has been undertaken. Natural England advises that mitigation measures may need to be updated following updating of baseline characterisation and survey data.	Based upon current survey and assessments, mitigation measures for impacts on Orford Ness – Shingle Street SAC have been proposed, as set out in 5.4.5 Lesser Black Backed Gull Compensation Site – Habitats Regulations Assessment [APP-045] and 6.8.1.3 Lesser Black Backed Gull Ecological Impact Assessment [APP-228]. As set out above, the Applicant is currently undertaking vegetation and invertebrate surveys over the LBBG compensation site on Orford Ness. Should these, on assessment, reveal significant effects not already identified, then additional mitigation measures will be proposed.
Natural England J11	APP-225, Sec 1.11.54-56 Natural England does not agree with the EIA conclusions for construction and management/monitoring/maintenance/ impacts to habitat within and adjacent to the fence line at the LBBG compensation site at Orford Ness. It is concluded that 'no significant effects are likely on perennial vegetation on coastal shingle'. Vegetated shingle communities are highly dependent upon factors relating to the sediment structure. If installation is not carried out sensitively, destabilisation of the sediment profile has the potential to cause a long-term, if not permanent, shift towards a secondary form of vegetation. Please refer to NE Ref J7 above and J12 below. Natural England advises that seasonally appropriate baseline vegetation and	As set out in 5.4.5 Lesser Black Backed Gull Compensation Site – Habitats Regulations Assessment [APP-045] and 6.8.1.3: Lesser Black Backed Gull Ecological Impact Assessment [APP-228], the area within the LBBG Compensation Site meets with the definition of the Annex I habitat of 'H1220 Perennial vegetation of stony banks' which is rather broad. However, the area has been disturbed (levelled) in the past, being largely flat and lacking the characteristic wave-formed shingle ridges of the unmodified habitat. This modification occurred prior to the designation of the site as an SAC apparently at the time of the construction of the construction of the Cobra Mist AN/FPS-95

Consultee	Comment	Response
	invertebrate surveys need to be carried out prior to determination and the impact assessment updated. Appropriate mitigation should be applied, and every effort made to avoid damage to the coastal shingle and vegetation features of the designated sites in this area.	antenna; aerial images from 1972 appear to show extensive vehicle tracks over the area and a lack of vegetation. The vegetation at the LBBG compensation site is now dominated by sea couch and other coarse grasses. Nevertheless, mitigation is proposed to ensure the fence is installed sensitively, with the minimum disturbance possible and where possible following lines of existing ditches and fence lines where there is evidence of past ground disturbance. Based on observations on the same site of ground previously disturbed for fence installation, the vegetation is expected to quickly recover to the same plant communities found there now. Therefore, the conclusion within the EIA is valid.
Natural England J12	APP-225 Natural England notes that the EIA does not consider impacts to the shingle morphology and sediment structure. Recoverability of damaged shingle is slow, particularly where it is more static and active geomorphological processes no longer have a major role in shaping shingle morphology. Typically, shingle morphology land ward of the seaward ridge never fully recovers. There is also the risk of further repeated damage occurring through regular maintenance/monitoring/ management of the fence line. Natural England advises that the EIA should be updated to include an assessment of impacts to the shingle morphology and sediment structure.	As set out in our response to J11, the shingle morphology (and therefore sediment structure) has been modified in the past (prior to the designation of the SAC) and is now largely flat with no prospect of recovering what may have been its original wave-formed ridge morphology. Mitigation measures included within Lesser Black Backed Gull Compensation Site – Habitats Regulations Assessment [APP-045] and Lesser Black Backed Gull Ecological Impact Assessment [APP-228] will limit damage during construction and prevent it during maintenance, monitoring and management. These measures will be secured in an updated 5.5.6 Lesser Black Backed Gull Implementation and Monitoring

Consultee	Comment	Response
		Plans [APP-052], which will be submitted at a later Deadline.
Natural England J13	APP-225 Natural England notes that the EIA has not considered impacts to the Saline lagoons at the Orford Ness compensation site due to the presence of the fence through the lifetime of the project in terms of blockage to overtopping events and the transfer of new shingle to their eastern edge and subsequent implications to the lagoon biodiversity. Furthermore, the impacts of climate-related changes (including water levels and coastal stability) need to be further considered. The Applicant needs to fully consider impacts to the saline lagoons over the lifetime of the project for the compensation site on Orford Ness and update the EIA, with mitigation measures brought forward and secured where a need is identified.	The fence line will avoid saline lagoons and therefore no direct impacts could occur. The saline lagoons appear to be seepage lagoons – fed by sea water percolating under the large ridge on the seaward side. Seepage is the primary recharge mechanism for the lagoons rather than direct input from over-topping or overland flow. However, a flooding event occurred in the last decade which appears to have been a result over-topping on that landward side; the Alde Estuary. Given the size of the shingle ridge, there is no possibility of wave action moving shingle from the seaward (eastern) side towards or into the lagoons, and so no process with which the fence could interfere. Changes in shingle morphology as a result of climate change etc will be assessed further, as set out in our response to J12.
Natural England J22	APP-225, Sec 4.4 Whilst Natural England considers the mitigation for vegetation maintenance for the LBBG compensation site to be broadly acceptable, we advise that best practice should be employed for maintaining vegetation community and diversity. Natural England would welcome the opportunity to discuss this further with the Applicant. Existing trackways should be used for access to the compensation site during construction and maintenance/ management, to minimise disturbance and further damage to affected	The management of the vegetation within the LBBG compensation site will aim to maintain vegetation communities and diversity; Natural England's input will be welcome. Existing trackways have been included in the Order Limits and will be used for access to the compensation site during construction and maintenance/ management, to minimise disturbance and further damage to affected shingle sediment and vegetation.

Consultee	Comment	Response
	shingle sediment, morphology and vegetation. Natural England advises that best practice should be employed for maintaining vegetation community and diversity. Further details to be provided in the Lesser Black Backed Gull Implementation and Monitoring Plan (LIMP).	
Natural England J23	App-225, Sec 4.4.6 & 4.1.9 Natural England notes that it is stated that if increased nutrients arise due to a gull colony being established (at the Orford Ness compensation site), that affect features within the site, then consideration may be given to removing cut vegetation from the compensation site and the designated site. The aim being to help reduce potential additional nutrients arising from nesting LBBG. It is also stated that this will be detailed in the LBBG IMP. However, this is laid out in the Monitoring, Management, and Maintenance section (4.1.9), as part of 'Habitat Management'. This states that it 'will comprise cutting vegetation with a strimmer and removing the arisings to create a mosaic of short and long sward heights, to create optimum nesting habitat for LBBG'. Thus, this would not be additional mitigation to compensate for nutrient increases. Natural England advises that this should be clarified. And further details should be provided in the outline LIMP.	The Applicant will clarify the approach to vegetation clearance in an updated 5.5.6 Lesser Black Backed Gull Implementation and Monitoring Plans [APP-052] submitted at Deadline 2.
Natural England J24	APP-225, Table 4.18 Natural England does not agree with the assessment conclusions for the LBBG compensation site on Orford Ness with regards to impacts to the shingle morphology due to construction/removal and	As set out in our response to J11, the shingle morphology (and therefore sediment structure) has been modified in the past (prior to the designation of the SAC) and is now largely flat with no prospect of recovering what may have been its

Consultee	Comment	Response
	maintenance of the predator exclusion fencing. It is stated that “the Project could change the shingle morphology along the fence alignment [if excavated material is not returned to its original location].” We advise that recoverability of damaged shingle is slow, particularly where it is more static and active geomorphological processes no longer have a major role in shaping the shingle morphology. In addition, machinery and plant will need to be transported from the boat landing to the site which will cause compaction of the substrate and physical damage to vegetation (c. 0.13ha). Undisturbed vegetated shingle communities are dependent on a precise matrix of coarse sediment infilled with fine sediment, which in many cases have developed over long periods of time. These communities could be damaged through the installation of fence posts. Furthermore, unless conducted sensitively and in line with a mitigation strategy, vegetation control could result in a permanent loss of the Annex I habitat, whilst repeated damage is likely to occur through regular maintenance checks and works. Natural England advises that the Applicant needs to establish a more robust baseline in terms of the shingle morphology and habitats/species present at the proposed compensation site prior to determination, in order to fully consider and assess impacts to the site through installation/removal and maintenance of predator fencing, Future site evolution should also be considered fully in terms of climate change and the sensitivities of the priority habitats.	original wave-formed ridge morphology. The vegetation now comprises mostly dense Sea Couch, although more open vegetation exists, mostly along the spoil from ditches which were apparently dug in the 1970s. Based on observations along other fence lines, the former is likely to quickly recover, and the second is not reliant on a natural sediment mix. No undisturbed vegetated shingle communities will be affected by the works. The limited construction equipment required will be brought to site by boat and existing concrete roads, included within the Order Limits, to reach the LBBG compensation site. The Annex I habitat has a broad definition and would not be lost; the quality of the habitat would not be diminished by the works except in the very short term. Mitigation measures will limit damage during construction and prevent it during maintenance, monitoring and management.

Consultee	Comment	Response
Natural England J25	APP-225, Table 4.16 Natural England is unable to agree with the HRA conclusions for coastal lagoons at Orfordness-Shingle Street SAC. The HRA has not considered whether the presence of the predator exclusion fence over the lifetime of the project could interfere with overtopping and sediment transfer processes, which may in turn alter the flora and fauna in the saline lagoons present within the compensation area for LBBG. Furthermore, climate change-related impacts (including to water level and coastal stability) need to be considered over the lifetime of the project. Natural England advises that the Applicant needs to fully consider all potential impacts to the coastal lagoons within the Orford Ness LBBG compensation site, over the lifetime of the project and the HRA should be updated accordingly.	As set out in our response to J13, the lagoons are seepage lagoons primarily recharged by seawater seeping under the large shingle ridge on the seaward (eastern side). The fence could not interfere with this process, or any other natural process supporting the lagoons. Since the impact pathway does not exist, there was no need to consider it in the HRA.

2.3.7 Since the comments were provided by the RSPB and Natural England, the position of the PCS has changed and now most of the saline lagoons recorded during the survey are outside the PCS and are located on its seaward side.

2.3.8 A further change is that need for a ditch crossing has been identified at the southern end of the PCS to allow access for the installation of the fence, annual maintenance of the fence and the management of the vegetation.

2.4 SOURCES OF INFORMATION

FOR THE PROJECT ALONE

DESK STUDY

- Information Sheet on Ramsar Wetlands: Alde-Ore Estuary Ramsar
- Natural England Conservation Advice for Marine Protected Areas: Alde-Ore Estuary SPA
- Natural England Conservation Advice for Marine Protected Areas Orfordness - Shingle Street SAC
- Natural England Conservation Advice for Marine Protected Areas: Alde, Ore and Butley Estuaries SAC
- Site Improvement Plan Alde-Ore Estuaries
- British Trust for Ornithology Wetland Bird Survey Online Reports
- Suffolk Bird Report

SURVEYS & ASSESSMENTS

- Five Estuaries Offshore Wind Farm EIA Volume 6, Part 8, Report 1.1: Lesser Black Back Gull Compensation Site - Ecological Impact Assessment
- Five Estuaries Offshore Wind Farm Volume 5, Report 5.9: Lesser Black-Backed Gull Compensation Site Suitability Report.
- Five Estuaries Offshore Wind Farm Environmental Statement Volume 5, Report 5.6: Lesser Black-Backed Gull Implementation and Monitoring Plan.
- Five Estuaries Offshore Wind Farm Environmental Statement Volume 5, Report 5: Habitats Regulations Assessment 'Without Prejudice' Derogation Case.
- Five Estuaries Offshore Wind Farm Environmental Statement Volume 5, Report 5.3 Lesser Black-Backed Gull Compensation – Evidence, Site Selection & Roadmap.

LEGISLATION

- The Conservation of Habitats and Species Regulations 2017, as amended.

GUIDANCE DOCUMENTS

- Defra guidance Habitats Regulations Assessments: Protecting a European Site[2].

FOR THE PROJECT 'IN COMBINATION'

PROJECTS

- Norfolk Projects Offshore Wind Farms Norfolk Projects HRA Lesser Black Backed Gull Compensation at the Alde-Ore Estuary: Fence Construction and Maintenance, completed by Royal Haskoning
- East Suffolk Council Project Level Habitats Regulations Assessment Record for Norfolk Vanguard and Norfolk Boreas Offshore Wind Farms (collectively known as the Norfolk Projects).

[2] https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

PLANS

- East Suffolk Council - Suffolk Coastal Local Plan (Adopted September 2020)
- Site Improvement Plan Alde-Ore Estuaries

3 STAGE ONE: SCREENING

3.1 STEP ONE: MANAGEMENT OF ANY EUROPEAN SITE

3.1.1 The project is compensation for predicted effects on the Lesser Black-Backed Gull population and therefore not directly connected with, or necessary for the management, of any listed or proposed European or Ramsar site. i.e. it is not management plan with aim of furthering the conservation objectives of such a site.

3.2 STEP TWO: PROJECT DESCRIPTION & IMPACT FACTORS

STEP TWO, PART 1: PROJECT DESCRIPTION

THE PROJECT

3.2.1 The Project is the installation of a predator-proof fencing on a site at Orford Ness as compensation for predicted effects on the Lesser Black-backed Gull qualifying interest feature of the Alde-Ore Estuary SPA. This compensation is in connection with the development of the Five Estuaries Offshore Wind Farm. The predator-proof fence will be installed by a team of people using light machinery. It will be partially dug into the ground. The works to install the fence are expected to take two to three weeks. The fence will be in place for the operational life of the wind farm. Inspections, routine maintenance, and repair of the fence will take place during this time. At the end of the operational lifetime of the wind farm, the fencing will either be removed (with approval from the Secretary of State) or maintained either by the Applicant or a third party. Access will be primarily along existing tracks however a ditch crossing point will be required for vehicle access to the PCS.

THE PROJECT SITE

ECOLOGICAL CONNECTIONS SUMMARY

3.2.2 The PCS lies within an area with the following designations:

- Alde-Ore Estuary Ramsar (UK11002)
- Alde-Ore Estuary SPA (UK9009112); and
- Orfordness - Shingle Street SAC (UK0014780)

The Alde-Ore & Butley Estuaries SAC (UK0030076) is adjacent and may be connected hydrologically to the PCS.

HABITATS (ANNEX I) SUMMARY

3.2.3 The PCS includes the following Annex I habitats:

- H1150 Coastal lagoons*
- H1220 Perennial vegetation of stony banks

3.2.4 Ditches are also present.

SPECIES (ANNEX I BIRDS, ANNEX II OTHERS & RAMSAR) SUMMARY

3.2.5 The PCS supports Redshank *Tringa totanus* and Marsh Harrier *Circus aeruginosus*, both of which were observed during the survey. The saline lagoons nearby (within the Survey Area) provide suitable habitat for foraging Avocet *Recurvirostra avosetta*, Common Greenshank *Tringa nebularia*, Spotted Redshank *Tringa erythropus* and, possibly, Little Tern *Sternula albifrons*.

3.2.6 The PCS potentially provides habitat for several Red Data Book plant species including:

- Bur Meddick Medicago minima
- Curved Hard-grass *Parapholis incurva*
- Perennial glasswort *Sarcocornia perennis*
- Suffocated clover Trifolium suffocatum
- Rough Clover Trifolium scabrum
- Yellow-vetch *Vicia lutea*

3.2.7 The PCS potentially provides habitat for several Red Data Book invertebrates including:

- Shingle Yellow-face Bee Hylaeus euryscapu syn Hylaeus annularis
- The spider Haplodrassus minor
- The spider Trichoncus affinis

3.2.8 The saline lagoons nearby (within the Survey Area) may provide habitat for Red Data Book invertebrates including:

- Starlet sea anemone Nematolstella vectensis
- Lagoon sand shrimp Gammarus insnensibili

STEP TWO, PART 2: POTENTIAL IMPACT FACTORS

3.2.9 The ways in which the Project could give rise to effects on European and Ramsar sites and their qualifying interest features, could include:

- Factor 1: Damage to qualifying interest habitats, including topography, during fence installation, maintenance and removal, during the installation of a ditch crossing, and during the management of vegetation.
- Factor 2: Direct mortality of qualifying interest animals and plants during fence installation and removal, and during the installation of a ditch crossing.
- Factor 3: Disturbance of qualifying interest birds due to the presence of workers during fence installation and removal and when undertaking management and maintenance.
- Factor 4: Release of suspended solids and other pollution into waterways during fence installation and removal, during the installation of a ditch crossing, and when undertaking management and maintenance.
- Factor 5: Spread of non-native invasive species by bringing these on to site on construction and maintenance machinery and materials.
- Factor 6: Removal of gazing animals affecting vegetation composition.
- Factor 7: Increases in nutrients from bird faeces affecting vegetation composition and water quality.
- Factor 8: Changes in water flows caused by fence lines across ditches.

3.3 STEP THREE: IDENTIFICATION OF EUROPEAN AND RAMSAR SITES

STEP THREE, PART 1: INITIAL LIST OF EUROPEAN & RAMSAR SITES

3.3.1 An initial list of European sites for consideration, comprising those which are in an arbitrary search area of 10km. This list is provided in the first column of Table 3.1.

STEP THREE, PART 2: BASIC INFORMATION ON EUROPEAN & RAMSAR SITES

3.3.2 Basic information on the European & Ramsar sites identified is provided in columns 2 and 3 of Table 3.1.

Table 3.1 European Sites Initially considered for Source – Pathway – Receptor links

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
Alde-Ore Estuary Ramsar (UK11002)	The Alde-Ore Estuary Ramsar comprises the estuaries of the Rivers Alde, Butley and Ore, including Havergate Island and the shingle spit of Orford Ness. It is 2534ha in size, The qualifying interest of the Ramsar are: **Plants:** Marsh mallow *Althaea officinalis* Sea heath *Frankania laevis* Sea pea *Lathyrus japonicus* Dittander *Lepidum latifolium* Bur meddick *Medicago minima* Curved hard-grass *Parapholis incurve* Borrer's saltmarsh grass *Puccinellia fasciuculata* Spiral tasselweed *Ruppia cirrhosa* Perennial glasswort *Sarcocornia perennis*	0m, 100% overlap	Yes. **Source 1: Construction & Maintenance Activity** Pathway 1: Habitat damage (Factor 1), mortality (Factor 2) Possible receptors: Bur Meddick, Curved Hard-grass, Perennial Glasswort, Suffocated clover, Yellow-vetch, Shingle Yellow-face Bee, *Haplodrassus minor* and *Trichoncus affinis*. Pathway 2: Disturbance (Factor 3) Possible Receptors: Little tern, Marsh harrier, Avocet, Redshank, Spotted redshank, Black-tailed godwit, Shelduck, Shoveler and Teal Pathway 3: Aquatic pollution (Factor 4) Possible receptors: Starlet sea anemone, Lagoon sand shrimp, Little	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	Marsh sowthistle *Sonchus palustris* Suffocated clover *Trifolium suffocatum* Yellow-vetch *Vicia lutea* Narrow-leaved Eelgrass *Zostera angustifolia* **Invertebrates:** Ground Lackey *Malacosoma castrensis* Fancy-legged fly *Campsicnemus magius* *Cheilosia velutina* a hoverfly *Empis prodomus* a fly *Dixella attica* a fly *Shingle* Yellow-face Bee *Hylaeus euryscapu* *Pseudamnicola confuse* a snail Starlet sea anemone *Nematolstella vectensis* Lagoon sand shrimp *Gammarus insnensibili* *Euophrys browning* a jumping spider		tern, Avocet, Redshank, Spotted Redshank, Common Greenshank Pathway 4: Introduction of INNS (Factor 5) Possible receptors: all listed plants and invertebrates. **Source 2: Presence of exclusion fence** Pathway 1: Removal of Grazing (Factor 6) Possible receptors: the same plants and animals listed for Pathway 1. Pathway 2: Increase in nutrients from nesting gulls (Factor 7). Possible receptors: the same plants and invertebrates listed for Pathway 1 plus Starlet sea anemone, Lagoon sand shrimp Pathway 3: Changes in hydrology causing habitat damage (Factor 8) Possible receptors: Bur Meddick, Curved Hard-grass, Perennial Glasswort, Suffocated clover, Yellow-	

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	Duffy's Bell-headed Spider *Baryphyma duffeyi* *Haplodrassus minor a spider* *Trichoncus affinis a spider* **Birds – Breeding:** Lesser black-backed gull *Larus fuscus* Avocet *Recurvirostra avosetta* Little tern *Sternula albifrons* Sandwich tern *Thalasseus sandvicensis* Marsh harrier *Circus aeruginosus* **Birds - Non-breeding:** Avocet *Recurvirostra avosetta* Common Greenshank *Tringa nebularia* Redshank *Tringa totanus* Black-tailed godwit *Limosa limosa islandica* Shelduck *Taodorna tadorna* Shoveler *Anas clypeata* Spotted redshank *Tringa erythropus*		vetch, Shingle Yellow-face Bee, *Haplodrassus minor* and *Trichoncus affinis*.	

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	Teal *Anas crecca* White-fronted goose *Anser albifrons albifrons* Wigeon *Anas Penelope* There are no published conservation objectives (COs) for the Ramsar site. The COs for the Ramsar site are the same as for the SPA for the bird species.			
Alde-Ore Estuary SPA (UK9009112)	The Alde-Ore SPA 2403.63 ha has the same boundary as the Ramsar except the SPA excludes the southern 6.8km of the Ordfordness shingle spit (130.4ha). Breeding Avocet Lesser black-backed gull Little tern Sandwich tern Marsh harrier Non-breeding	0m, 100% overlap	Yes. **Source 1: Construction & Maintenance Activity** Pathway: Disturbance (Factor 3) Possible Receptors: Little tern, Marsh Harrier, Avocet, Redshank, Common Greenshank, Spotted redshank. **Source 2: Presence of exclusion fence** Pathway 1: Changes in water quality (Factor 4) Possible receptors: same species listed above.	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	Avocet Redshank Ruff *Calidris pugnax* The conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: > the extent and distribution of the habitats of the qualifying features > the structure and function of the habitats of the qualifying features > the supporting processes on which the habitats of the qualifying features rely > the populations of each of the qualifying features > the distribution of qualifying features within the site		Pathway 2: Changes in vegetation (Factor 6) Possible receptors: same species listed above.	
Orfordness - Shingle Street	Orfordness - Shingle Street SAC encompasses the whole shingle spit	0m, 100% overlap	Yes.	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
SAC (UK0014780)	888.01 ha. The qualifying interest features are: 1150 Coastal lagoons* (Priority feature) 1210 Annual vegetation of drift lines 1220 Perennial vegetation of stony banks The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; > The extent and distribution of qualifying natural habitats > The structure and function (including typical species) of qualifying natural habitats, and > The supporting processes on which qualifying natural habitats rely		**Source 1: Construction & Maintenance Activity** Pathway 1: Habitat damage (Factor 1) Possible Receptors: 1150 Coastal lagoons* (Priority feature), 1220 Perennial vegetation of stony banks Pathway 2: Changes in water quality (Factor 4) Possible Receptors: 1150 Coastal lagoons* (Priority feature Pathway 3: Introduction of INNS (Factor 5) Possible receptors: all qualifying habitats. **Source 2: Presence of exclusion fence** Pathway 1: Removal of Grazing causing changes in vegetation (Factor 6) Possible Receptors: 1150 Coastal lagoons* (Priority feature), 1220 Perennial vegetation of stony banks	

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
			Pathway 2: Increase in Nutrients causing changes in vegetation and water quality (Factor 7). Possible Receptors: 1150 Coastal lagoons* (Priority feature), 1220 Perennial vegetation of stony banks Pathway 3: Changes in hydrology (Factor 8) Possible Receptors: 1150 Coastal lagoons* (Priority feature), 1220 Perennial vegetation of stony banks.	
Outer Thames Estuary SPA (UK9020309)	A very large area of the sea 392,451.66 ha to protect wintering red-throated diver and the feeding habitat of two tern species from speficv breeding colonies. The qualifying interest features are: Red-throated diver *Gavia stellata* (Non-breeding) Common tern *Sterna hirundo* (Breeding) Little tern *Sternula albifrons*; (Breeding)	72.4m east	The named tern colonies on the SPA citation do not include any at Orford Ness, and the divers are entirely marine, so there are no ecological pathways, and the SPA is so large the pathways for aquatic pollution are so weak they can be discounted.	No

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; > The extent and distribution of the habitats of the qualifying features > The structure and function of the habitats of the qualifying features > The supporting processes on which the habitats of the qualifying features rely > The population of each of the qualifying features, and, > The distribution of the qualifying features within the site			
Alde-Ore & Butley Estuaries SAC (UK0030076)	Alde-Ore & Butley Estuaries SAC 1 comprises the estuaries of the Rivers Alde, Butley and Ore (1632.72 ha), and adjoins the Orfordness - Shingle Street SAC. The two SACs combined cover approximately the same area as the Alde-Ore Estuary Ramsar. The qualifying interest features are:	0m, west (adjacent to access track)	Only a weak connection along access route. **Source 1: Construction & Maintenance Activity** Pathway 1: Release of suspended solids into surface water which drains into the estuary (Factor 4)	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; > The extent and distribution of qualifying natural habitats > The structure and function (including typical species) of qualifying natural habitats, and > The supporting processes on which qualifying natural habitats rely		Possible receptors: 1130 Estuaries, 1140 Mudflats and sandflats not covered by seawater at low tide. Pathway 2: Introduction of INNS (Factor 5) Possible receptors: all qualifying habitats.	
Southern North Sea SAC UK0030395	Very large area of marine habitat 3,698,885.14 ha with one Qualifying Interest feature:	2,809m, north	No ecological connections and although the surface water from the PCS will ultimately enter the North Sea this is a very weak impact	No.

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	1351 Harbour porpoise *Phocoena Phocoena* The conservation objectives are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters in the context of natural change, this will be achieved by ensuring that: 1. Harbour porpoise is a viable component of the site; 2. There is no significant disturbance of the species; and 3. The condition of supporting habitats and processes, and the availability of prey is maintained.		pathway and due to the scale of the works can be discounted.	
Sandlings SPA UK9020286	Lowland heathland, acid grassland and forestry plantations on sandy soils which once supported extensive heathland; 3408.37ha A224 *Caprimulgus europaeus*; European nightjar (Breeding)	2,620m, west	There are no ecological or hydrological connections between this SPA and the PCS. The qualifying interest bird species are heathland species which do not breed at Orford Ness.	No

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	A246 *Lullula arborea*; Woodlark (Breeding) The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; > The extent and distribution of the habitats of the qualifying features > The structure and function of the habitats of the qualifying features > The supporting processes on which the habitats of the qualifying features rely > The population of each of the qualifying features, and, > The distribution of the qualifying features within the site			
Staverton Park & The Thicks Wantisden SAC UK0012741	Woodland, 80.83ha, 9190 Old acidophilous oak woods with *Quercus robur* on sandy plains	6,491m west	No ecological or hydrological connections. The qualifying habitat type does not occur within the PCS or at Orford Ness.	No

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	The conservation objectives are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; > The extent and distribution of qualifying natural habitats > The structure and function (including typical species) of qualifying natural habitats, and > The supporting processes on which qualifying natural habitats rely			
Minsmere - Walberswick Ramsar UK11044	A mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water. 1995.84ha nine nationally scarce plants and at least 26 red data book invertebrates.	13,065m	Shares two qualifying interest features with the Alde-Ore Estuary SPA and which also occur or may occur within the PCS. These populations may exchange individuals between the two sites. For there to be an effect, on these the QI population at Minsmere -Walberswick there must first be an effect at the Alde-Ore Estuary.	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	An important assemblage of rare breeding birds associated with marshland and reedbeds including: *Botaurus stellaris*, Great bittern *Anas strepera*, Gadwall *Anas crecca*, Eurasian teal *Anas clypeata*, Northern shoveler *Circus aeruginosus*, Marsh Harrier *Recurvirostra avosetta*, Pied avocet *Panurus biarmicus*, Bearded Tit There are no published conservation objectives (COs) for the Ramsar site. The COs for the Ramsar site are the same as for the SPA for the bird species and the SAC for the habitats.		Source 1: Construction & Maintenance Activity Pathway: Disturbance (Factor 3) Possible Receptors: Marsh harrier and Avocet.	
Minsmere-Walberswick SPA UK9009101	See description for Ramsar site. 1997.67ha. A052(B) *Anas crecca*: Eurasian teal A021(B) *Botaurus stellaris*: Great bittern A081(B) *Circus aeruginosus*: Eurasian marsh harrier	13,065m	As for the Minsmere-Walberswick Ramsar site, but including Little Tern	Yes

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	A082(NB) *Circus cyaneus*: Hen harrier A224(B) *Caprimulgus europaeus*: European nightjar A056(B) *Anas clypeata*: Northern shoveler A056(NB) *Anas clypeata*: Northern shoveler A051(B) *Anas strepera*: Gadwall A051(NB) *Anas strepera*: Gadwall A132(B) *Recurvirostra avosetta*: Pied avocet A195(B) *Sterna albifrons*: Little tern A394(NB) *Anser albifrons albifrons*: Greater white-fronted goose The conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring: > the extent and distribution of the habitats of the qualifying features			

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	> the structure and function of the habitats of the qualifying features > the supporting processes on which the habitats of the qualifying features rely > the populations of each of the qualifying features > the distribution of qualifying features within the site			
Minsmere to Walberswick Heaths & Marshes SAC UK0012809	See description for Ramsar site. 1238.25ha. 1210 Annual vegetation of drift lines 1220 Perennial vegetation of stony banks 4030 European dry heaths Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;	13,065m	Shares two qualifying interest features with Orfordness - Shingle Street SAC however too distant to have anything but a very weak connection through occasional exchange of plants by seed dispersal (air or sea).	No

Site and Code	Brief Description, Qualifying Interest and Conservation Objectives	Distance from Project	Potential Connections (Source-Pathway-Receptor)	Considered further in screening Y/N
	> The extent and distribution of qualifying natural habitats and habitats > The structure and function (including typical species) of qualifying natural habitats, and > The supporting processes on which qualifying natural habitats rely			

3.3.3 Potential Impact Pathways are identified in Column 4 in Table 3.1.

3.3.4 For five of the designated sites listed in Table 3.1, no or a very weak pathway was identified. These are:

- Outer Thames Estuary SPA UK9020309
- Southern North Sea SAC UK0030395
- Sandlings SPA UK9020286
- Staverton Park & The Thicks Wantisden SAC UK0012741
- Minsmere to Walberswick Heaths & Marshes SAC UK0012809

3.3.5 The PCS shares a qualifying interest feature with the Outer Thames Estuary SPA; Little Tern however the (former) Little Tern Colony is at Orford Ness is not listed on the citation for the Outer Thames Estuary SPA and therefore the Orford Ness colony is not relevant to the Conservation Objectives of this SPA.

3.3.6 The PCS is hydrologically linked to the Outer Thames Estuary SPA and the Southern North Sea SAC but the very small scale of the works relative to the size and nature of the SPA and SAC means that there is no risk of undermining the conservation objectives of the SPA and SAC via water pollution.

3.3.7 The PCS is on Orford Ness which (i) is separated from the inland sites listed in Table 3.1 by the Alde-Ore Estuary, (ii) comprises a rare type of coastal habitat with distinct plant and invertebrate communities, and (iii) has qualifying interest bird species are wetland or coastal species.

3.3.8 Sandlings SPA and the Staverton Park & The Thicks Wantisden SAC are both more than 3km inland and do not share qualifying interest features with the designated sites at Orford Ness. Therefore, there is no hydrological or ecological link between the PCS and Staverton Park & The Thicks Wantisden SAC and no risk that the Project could undermine the conservation objectives for the Sandlings SPA and Staverton Park & The Thicks Wantisden SAC.

3.3.9 Minsmere-Walberswick Ramsar and SPA share qualifying interest features with the Orford Ness designated sites which are all mobile species of birds and may be linked populations in some way. For there to be an effect on the populations at Minsmere, there must first be an effect at the Orford Ness designated sites. So, while it is not possible to exclude effects that could undermine the conservation objectives Minsmere-Walberswick Ramsar and SPA at this stage, detailed assessment is only necessary if adverse effects on the populations at Orford Ness cannot be excluded. Minsmere-Walberswick SAC also shares qualifying interest features with the Orford Ness designated sites however these are habitats with only a very weak connection.

3.4 STEP FOUR: LIKELY SIGNIFICANT EFFECTS

STEP FOUR, PART 1: FOR THE PROJECT ALONE

ALDE-ORE ESTUARY RAMSAR (UK11002)

3.4.1 There are no published conservation objectives for the Ramsar features. For those features which are also the same as the Alde-Ore SPA, the conservation objectives are the same. For the others, it is assumed that the conservation objectives are the same as for a bird species which is a qualifying interest feature of an SPA or the same as Annex II species which is a qualifying interest feature of an SAC.

3.4.2 The breeding colonies for Lesser black-backed gull at Orford Ness are at Havergate Island and Lantern Marshes (although birds may also nest elsewhere occasionally) (Davis, et al., 2018). At their closest point, these are c. 3.9km and 0.3km from the PCS respectively, and neither is alongside the access route from Orford. Although birds may be present occasionally, the PCS does not provide good foraging habitat for this species, hydrological links between the PCS and these areas are very weak and, given the distances, there is no scope for works undertaken at the PCS to disturb birds nesting at the two colonies. Moreover, the PCS is designed to provide a benefit for this species.

3.4.3 The Sandwich Tern colony at Orford Ness was on Havergate Island but it was more or less abandoned in 1997, with nesting occurring only in some years with a maximum of 15 pairs in 2003. Given the location of the colony on Havergate Island, the works at the PCS could not hinder any efforts to restore the colony.

3.4.4 The habitat within the PCS includes ditches and small saline lagoons however these are shallow and support mainly annual vegetation which is not green in winter. Therefore, the ditches and lagoons are not suitable habitat for Wigeon and White-fronted Goose which require green vegetation for foraging in winter and prefer deep, open water for roosting. The works at the PCS would therefore not affect these species.

3.4.5 As set out in Table 3.1, the PCS is within the Alde-Ore Estuary Ramsar and has hydrological connections via surface water and groundwater to other parts of the Ramsar, and there are several species listed on the Ramsar citation which may occur within the PCS or nearby. There are clear impact pathways between construction and maintenance activity and these features.

3.4.6 The habitat with or near the PCS or access route is potentially suitable for:

- All qualifying species of plants and invertebrates
- Avocet
- Little tern
- Marsh harrier
- Redshank
- Black-tailed godwit
- Shelduck
- Shoveler
- Common Greenshank

- Spotted Redshank
- Teal

3.4.7 There is a risk that these species are affected by the Project.

ALDE-ORE ESTUARY SPA (UK9009112)

3.4.8 There are published conservation objectives for the Alde-Ore Estuary SPA including a set of attributes and targets which define the conservation objectives and the condition of each feature.

3.4.9 As set out for the Ramsar site, there are no risks arising from the Project for Lesser Black-backed Gull and Sandwich Tern, and cannot be excluded for Avocet, Little tern Marsh Harrier and Redshank.

3.4.10 Ruff, which occurs with the SPA in low numbers c. 2 birds per year (BTO Webs), is more likely to be found in freshwater water habitats and marshes than in estuaries, and within the SPA at Havergate Island and the freshwater marshes within and adjoining the SPA. It is very unlikely to occur within or near the PCS or in proximity to the access route however this cannot be entirely discounted.

ORFORDNESS - SHINGLE STREET SAC (UK0014780)

3.4.11 Two of the qualifying interest habitats 1150 Coastal lagoons* (Priority feature) and 1220 Perennial vegetation of stony banks occur within the PCS and nearby and are therefore at risk of direct and indirect effects arising from the Project. The third, 1210 Annual vegetation of drift lines does not occur within or near the PCS or the access route, however there is a low risk that this habitat would be affected by invasive non-native plant species brought onto the site on construction or maintenance machinery.

ALDE-ORE & BUTLEY ESTUARIES SAC (UK0030076)

3.4.12 The PCS will be accessed for construction and maintenance by crossing the River Ore, using the existing ferry route. This ferry operates frequently in the summer without detriment to the European and Ramsar sites.

3.4.13 The first impact pathway identified is the introduction of non-native species into the SAC. Since there will be no construction activity within this SAC or contact with construction machinery, any invasive non-native species brought onto site must first colonise Orford Ness to Shingle Street SAC and spread from there. The risk is therefore very low but cannot be fully discounted without mitigation.

3.4.14 The second impact pathway is the release of suspended solids (and other pollution) into ditches. However, a review of OS mapping reveals that there are no clear links between the ditches on site and the estuary. Moreover, the PCS is shingle and therefore has low content of particles which could be suspended in water. Therefore, this pathway can be discounted.

STEP FOUR, PART 2: FOR THE PROJECT 'IN COMBINATION'

3.4.15 As set out above, it is clear that the unmitigated Project poses a risk to more than one European or Ramsar site when considered alone. The predator fence already constructed for the Norfolk Projects is the other project which is most likely to act in combination with the Project, with elevated risks for the same designated sites.

3.4.16 Since there is no impact pathway between the Project any other European and Ramsar sites, there is no risk of in-combination effects on any other such site.

3.5 CONCLUSION

3.5.1 Since no impact pathways exist, Likely Significant Effects (LSE) for the Project Alone and in combination with other Projects and Plans **can** be excluded for the following sites (and all other European and Ramsar Sites not listed below):

- Outer Thames Estuary SPA (UK9020309)
- Southern North Sea SAC (UK0030395)
- Sandlings SPA (UK9020286)
- Staverton Park & The Thicks Wantisden SAC (UK0012741)
- Minsmere to Walberswick Heaths & Marshes SAC (UK0012809)

3.5.2 Without further assessment or mitigation, and as a result of the risks identified above, Likely Significant Effects for the Project Alone and in combination with other Projects and Plans **cannot** be excluded for the following sites:

- Alde-Ore Estuary Ramsar (UK11002)
- Alde-Ore Estuary SPA (UK9009112)
- Orfordness - Shingle Street SAC (UK0014780)
- Alde-Ore & Butley Estuaries SAC (UK0030076)

3.5.3 For the Alde-Ore Estuary Ramsar, LSE can be excluded for four of the qualifying features (LBBG, Sandwich Tern, Wigeon and White-fronted Goose). For the Alde-Ore Estuary SPA, LSE can again be excluded for LBBG and Sandwich Tern.

3.5.4 Should on further analysis, adverse effects which cannot be mitigated be identified for Marsh harrier, Avocet and Little Tern then the effect on Minsmere -Walberswick Ramsar and SPA should also be considered.

4 STAGE TWO: APPROPRIATE ASSESSMENT

4.1 STEP ONE: INFORMATION ON THE PROJECT & EUROPEAN/RAMSAR SITES

STEP ONE, PART 1: INFORMATION ON THE PROJECT & PROJECT SITE

4.1.1 An area of approximately 5.96 hectares will be enclosed with a fence of up to approximately 1350m in length. The fence is designed to deter foxes and other mammalian predators and therefore create a predator free area within which the birds can breed.

DESIGN

4.1.2 The installed fence is planned to be 1.8m above ground level and comprised of mesh fencing supported by steel posts. It will be part buried in the ground, extending vertically downwards by 50mm-100mm and then horizontally to form a skirt. The top of the fence will be angled at 45^0 away from the enclosure interior. The mesh will be support on steel posts and inserted into the ground. The design of the fence will be in accordance with RSPB guidance on mammal exclusion fencing (White & Hirons, 2019) and is subject to approval by the Secretary of State as part of the LBBG Implementation and Monitoring Plan. Access gates will be installed in the fence to allow for management of the vegetation within the exclusion area.

DITCH CROSSING

4.1.3 To enable access to the PCS, a ditch crossing will be required at the southern end and close to an existing concrete track. This would either be a temporary bridge or a culvert (which is permanent).

INSTALLATION

4.1.4 The fencing materials and plant would be transported to the location of the proposed fencing using standard low-loaders along existing trackways as far as possible. These materials are planned to be delivered by vessel from Orford quay to the boat landing across the Ore Estuary.

4.1.5 The proposed installation would involve, an excavator will would scrape back the top 50-100mm of vegetation and shingle along the alignment of the fencing to create a shallow trench up to 1,000mm wide. A dump truck may also be required to assist with earth moving.

4.1.6 Along the side of the trench closest to the enclosure, the steel fence posts would be inserted into the ground at approximately 3m intervals using a specialised tool attached to the bucket of the excavator. The tool is placed on top of each post and the bucket would be slowly lowered pushing the post into the ground to the required depth. Using this method means that the posts will not be hammered into the ground and there would be no post hole excavations or use of concrete.

4.1.7 The mesh fencing would then be rolled out and clipped to each fence post with the lower portion laid into the trench and pegged into place to create the skirt. The scrapped back shingle and prices of vegetation will then be pushed back into place, covering the skirt.

4.1.8 The installation of the fencing would take place outside the bird nesting period (not within April to August, inclusive). The works to install the fence are expected to take two to three weeks with approximately six personnel on site undertaking the fence installation. An area of hard standing is present adjacent to the proposed fence alignment which may be used for a temporary laydown and placing temporary welfare for the duration of the fence installation works, alternatively a temporary laydown area may be formed elsewhere within the PCS. The temporary laydown and placing temporary welfare will be removed after completion of the construction phase.

MONITORING, MANAGEMENT AND MAINTENANCE

4.1.9 The fence will be maintained for the lifetime of wind farm (assumed to be 40 years). Inspections, routine maintenance, and repair of the fence will be conducted as required and as set out the in the LBBG Implementation and Monitoring Plan (LIMP) (Volume 5, Report 5, Annex 5.6).

4.1.10 Habitat management will be undertaken as required within the enclosure. This will comprise cutting vegetation with a strimmer and removing the arisings to create a mosaic of short and long sward heights, to create optimum nesting habitat for LBBG. It is likely to take up to 10 days per year, depending on the quantity of vegetation to be removed. Further details are provided in the LIMP.

DECOMMISSIONING

4.1.11 At the end of the operational lifetime of the wind farm, the fencing will either be removed (with approval from the Secretary of State) or maintained either by the Applicant or a third party.

THE PROJECT SITE

HABITATS (ANNEX I)

1150 COASTAL LAGOONS* (PRIORITY FEATURE)

4.1.12 There is one larger and at least one small 1150 Coastal Lagoon present within the PCS, plus others in the sider Survey Area, which vary in size. The definition of the Annex I habitat type encompasses all types of shallow, salt-water lagoons, with or without vegetation (EC, 2013). Those within the Survey Area are apparently percolation lagoons, comprised of sea water which has seeped under the shingle spit. The benthic substrate is shingle, which is gently sloping, and the water is estimated to be less than 0.5m deep at the deepest. The marginal vegetation comprises a glasswort *Salicornia* sp. and annual sea blite *Suaeda maritima*, which gives way to open water where it is deeper. Sea rush *Juncus maritimus* is present in patches around the margins. See Figure 4.1.

Figure 4.1: T2g5 Saline Lagoons (H1150)

1220 PERENNIAL VEGETATION OF STONY BANKS

4.1.13 The predominant habitat with the Survey Area and PCS is the Annex I habitat 1220 'Perennial vegetation of stony banks'. The definition of this Annex I habitat type encompasses all types of perennial vegetation; the unifying factor is that the vegetation occurs on coastal shingle (EC, 2013).

4.1.14 The vegetation within the PCS and Survey Area is all on coastal shingle. It is primarily perennial grasses, although the structure and composition of the vegetation varies. Three distinct types were recognisable which following the classification of Sneddon and Randall (1993) as far as possible are described below. In addition, there were occasional patches of short vegetation, apparently the result of grazing.

4.1.15 Importantly, the shingle within the PCS is mostly level, with shallow hollows supporting the saline lagoons (described above) and artificial banks along the ditches (described below); it does not contain an obvious sequence of wave-formed ridges. These ridges, when vegetated, are the most important and delicate variation of the Annex I type. The ridges have apparently been lost from this part of Orford Ness due to past human activity (Warrington, Lohoar, & Mason, 2013)

SH71 *ARRHENATHERUM ELATIUS* GRASSLAND COMMUNITY.

4.1.16 The SH71 False oat-grass *Arrhenatherum elatius* grassland community is found in the eastern part of the Survey Area and in proximity to the lower slopes of the main shingle embankment. The plant species recorded here included False oat-grass *Arrhenatherum elatius,* Red Fescue *Festuca rubra*, Common Mouse-ear *Cerastium fontanum,* Ragwort *Jacobea vulgaris,* Weld *Reseda luteola,* Sheep's Sorrel *Rumex acetosella,* a clover *Trifolium* sp., and Yellow Horned Poppy *Glaucium flavum*. Crustose, Fruticose and Cladoniform lichens were also present. This community was prevalent along the eastern alignment of the proposed fence, and the eastern part of the PCS. There is a defunct fence running north-south through this area with just the upright fence posts remaining, see Figure 4.2.

Figure 4.2: SH71 *Arrhenatherum elatius* grassland community

SH78 *ELYMUS ATHERICUS* GRASSLAND COMMUNITY.

4.1.17 The SH78 sea couch *Elymus athericus* (syn *E pungens* and *E. pycnanthus*) grassland community is the dominant community within the Survey Area. Sea couch *Elymus athericus* is the dominant species, with Common Bent *Agrostis capillaris*, Yorkshire-fog *Holcus lanatus*, Cock's-foot *Dactylis glomerata,* Red Fescue, Common Mouse-ear, Ragwort, Sheep's Sorrel, Spear Thistle *Cirsium vulgare*, a geranium *Geranium* sp., a bitter-cress *Cardamine* sp., Teasel *Dipsacus fullonum* and bramble *Rubus fruticosus.* Sea couch is a coarse and tall grass, and the sward is generally thick with occasional thinner patches where the other species are more prevalent. There are old railway sleepers amongst the vegetation which support lichens and mosses. This community was prevalent within the Survey Area outside the saline lagoons and especially within the PCS. See Figure 4.3.

Figure 4.3: SH78 *Elymus athericus* grassland community.

OPEN SHINGLE COMMUNITY

4.1.18 Alongside and amongst the SH78 community, there are also more open areas which have a much-reduced abundance of Sea Couch, or it is absent. These support low growing herbs, lichens and mosses amongst bare shingle. Plant species present include Common Mouse-ear, a geranium, Common Cats-ear *Hypochaeris radicata*, Sheep's Sorrel, Ragwort and a vetch *Vicia* sp.. In some areas Sea-purslane *Atriplex portulacoides* is abundant and a species of stonecrop (*Sedum* sp.) is occasional. Crustose, Fruticose, Foliose and Cladoniform lichens and Common Puffball fungus *Lycoperdon perlatum* are also present. This community is present along ditch banks in the south-western edges of the Survey Area, within the PCS, and in patches elsewhere. See Figure 4.4.

Figure 4.4: Open shingle community on ditch banks.

4.1.19 Areas of bare shingle with patchy vegetation are also prevalent in the eastern part of the Survey Area outside the PCS. Species here include Sea Couch, False-oat grass, Common bent, Yellow Horned Poppy, Sea Beet *Beta vulgaris* subsp. *maritma.* Crustose and Fruticose lichens and mosses are also present, growing on the shingle.

DITCHES

4.1.20 The Survey Area is divided into two parts by a ditch running from the northeast to the southwest (with the PCS to the west and the remainder of the Survey Area to the east). Further ditches lie outside the PCS to the south, west and north. All ditches were similar; apparently brackish, c1m to 2.5m wide and up to c1m deep. There was no visible vegetation within the ditches (in January). See Figure 4.5.

Figure 4.5: R1 Ditch

SPECIES

BIRDS

4.1.21 During the survey, relatively few bird species were seen using the Survey Area; Grey Heron, Little Egret, Redshank and Marsh Harrier. A review of the potential of the PCS to support the qualifying interest bird species is provided in Table 4.1.

Table 4.1: Qualifying Interest Bird Species

Scientific Name	Common Name	Habitat, taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature
Birds - Breeding					
Larus fuscus	Lesser black-backed gull	*Most of the Orford Ness gulls currently breed in Lantern Marshes, an area of saltmarsh towards the north of the spit, dominated by the tall grass* Elytrigia atherica*. The colony is on small islands within a network of ditches and creeks, which are each approximately 2-3 m wide…. Although gulls benefit from the shelter provided by some vegetation, gulls avoid nesting in very dense vegetation*	The Survey Area is shingle rather than salt marsh but large areas are dominated by dense *Elytrigia atherica* It is divided by ditches but there is access on land to all areas. LBBG does not breed here currently.	✓	✓
Recurvirostra avosetta	Avocet	*…breeds in flat open areas with islands, ridges, spits or margins of bare sand, clay or mud and sparse short vegetation including coastal lagoons….. inhabits coastal and inland saline lakes and mudflats lagoons, pools, saltpans…*	The Survey Area includes saline lagoons which are potentially suitable nesting and foraging habitat for this species although there was no evidence of either and this species is not known to breed here.	✓	✓
Sternula albifrons	Little tern	*..breeds on barren or sparsely vegetated beaches, islands and spits of sand, shingle, shell fragments, pebbles, rocks or coral fragments on seashores or in estuaries….fishes in very shallow water only a few centimetres deep, often over the advancing tideline or in brackish lagoons and saltmarsh creeks*	The Survey Area does not include suitable nesting habitat, but it does include brackish lagoons and ditches, the latter apparently supports fish as evidenced by a hunting common seal.	✓	✓

Scientific Name	Common Name	Habitat, taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature
Thalasseus sandvicensis	Sandwich tern	*forms colonies on sandy islands, rocky calcareous islets, sand-spits, sand-dunes, shingle beaches and extensive deltas* (BirdLife International, 2024)	The Survey Area does not include suitable nesting or foraging habitat for Sandwich Tern.	✓	✓
Circus aeruginosus	Marsh harrier	*Nests are normally found in freshwater or brackish reed beds, in other wetlands with tall emergent vegetation and few or no trees, or in tall crops adjacent to a wetland* (Hardey, et al., 2013) *….inhabits extensive areas of dense marsh vegetation, in fresh or brackish water, generally in lowlands*	One or two Marsh Harrier were present during the survey. The habitat within the Survey Area does not include reed bed and is therefore not optimal nesting habitat for this species, it is suitable hunting habitat for this species.	✓	✓
Bird - Non-breeding					
Recurvirostra avosetta	Avocet	*inhabits coastal and inland saline lakes and mudflats lagoons, pools, saltpans…*	The saline lagoons within the Survey Area may provide suitable foraging habitat for this species although none were present during the survey. This species was observed in the Ore Estuary.	✓	✓
Calidris pugnax	Ruff	*muddy margins of brackish, saline and alkaline lakes, ponds, pools, rivers, marshes and food-plains, as well as freshly mown or grazed short-sward and wheat…fields, usually roosting at night in the shallow waters of lake shores*	The Survey Area mainly comprises dense perennial grasses which is likely to deter this species, while the saline lagoons may provide suitable foraging habitat for this species.		✓

Scientific Name	Common Name	Habitat, taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature
Tringa totanus	Redshank	*largely coastal occupying rocky, muddy and sandy beaches, saltmarshes, tidal mudflats, saline and freshwater coastal lagoons, tidal estuaries*	One or two were observed during the survey making use of ditches and saline lagoons for foraging; these habitats within the Survey Area is suitable foraging habitat for this species while the perennial grass vegetation on shingle is unsuitable.	✓	✓
Limosa limosa islandica	Black-tailed godwit	*sheltered estuaries and lagoons with large intertidal mudflats, sandy beaches, salt-marshes and salt-flats*	More likely to be found foraging in the soft sediments of the estuary than among the saline lagoons with shingle substrate found in the Survey Area. The tall perennial grass vegetation on the shingle is not suitable habitat for this species.	✓	
Taodorna tadorna	Shelduck	*preference for saline habitats and frequents mudflats and muddy or sandy estuaries in coastal regions…*	More likely to be found in the estuary than among the shingle found in the Survey Area. The tall perennial grass vegetation on the shingle is not suitable habitat for this species	✓	
Anas clypeata	Shoveler	*permanent shallow freshwater wetland …. coastal brackish lagoons, tidal mudflats, estuaries, coastal shorelines, fresh and*	The saline lagoons within the Survey Area are probably too shallow to provide suitable foraging habitat for this species.	✓	

Scientific Name	Common Name	Habitat, taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature
		brackish estuarine marshes, inland seas and brackish or saline inland waters	The tall perennial grass vegetation on the shingle is not suitable habitat for this species.		
Tringa erythropus	Spotted redshank	*a variety of freshwater and brackish wetlands …brackish lagoons, saltmarshes, saltpans, sheltered muddy coastal shores and mudflats…*	The saline lagoons within the Survey Area may provide suitable foraging habitat for this species although none were present during the survey. The tall perennial grass vegetation on the shingle is not suitable habitat for this species	✓	
Anas crecca	Teal	*flooded gravel pits, reservoirs and floodplain meadows*	The Survey Area mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	✓	
Anser albifrons albifrons	White-fronted goose	*in open country on improved grassland, stubble fields … wet meadows… in brackish and freshwater marshy habitats*	The Survey Area mainly comprises dense perennial grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.	✓	
Anas penelope	Wigeon	*…coastal salt-marshes, freshwater, brackish and saline lagoons, flooded*	The Survey Area mainly comprises dense perennial	✓	

Scientific Name	Common Name	Habitat, taken from (BirdLife International, 2024)	Review	Ramsar feature	SPA Feature
		grasslands, estuaries, intertidal mudflats, and other sheltered marine habitats	grasses which is likely to deter this species, while the vegetation of the saline lagoons was annual and provides little forage for this species in winter.		

PLANTS

4.1.22 As the survey was undertaken in January, when many plants are not in evidence, a review of their ecology of the Ramsar plant species and potential for these to be present is provided in Table 4.2.

Table 4.2 Ramsar Plant Species

Scientific Name	Common Name	**Habitat (taken from Plant Atlas 2020** (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023)**)**	Review
Althaea officinalis	Marsh mallow	*A perennial herb of coastal habitats, growing on the banks of ditches containing brackish water, in brackish pastures, and in the transition zone between the upper saltmarsh and freshwater habitats.*	Suitable habitat may be present along the brackish ditches within the Survey Area. This species may have been detectable in January but was not recorded.
Frankania laevis	Sea heath	*A mat-forming perennial herb of saltmarshes and saltmarsh-sand dune transitions, especially amongst Suaeda vera Shrubby Sea-blite where firm sand or silt overlies coarser-grained material; also rarely on shingle beaches and sea-cliffs.*	The habitat in the Survey Area is not the typical habitat of this species and it is therefore likely to be absent.
Lathyrus japonicus	Sea pea	*A long-lived perennial herb, forming large and conspicuous patches on shingle beaches, or rarely, in smaller quantities on blown sand.*	The grassland with the Survey Area is probably too dense for this species and none was found in the more open shingle areas during the survey.
Lepidum latifolium	Dittander	*A rhizomatous, patch-forming perennial herb, restricted as a native to coastal creek-sides, coastal ditches, sea-walls, open brackish grassland and the upper fringes of estuarine saltmarshes.*	The ditches within the Survey Area have the potential to support this species.
Medicago minima	Bur Meddick	*A winter-annual herb of dry, open, well-drained, sandy or gravelly places, in short open turf and in disturbed ground; also occasionally found as a casual*	The short-grazed vegetation which is infrequent within the Survey Area has the potential to support this species.

Scientific Name	Common Name	**Habitat (taken from Plant Atlas 2020** (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023)**)**	Review
Parapholis incurva	Curved Hard-grass	*An annual of bare places by the sea, including gravelly mud banks, shingle ridges, rock ledges and cliff-tops, and the uppermost parts of saltmarshes; also in artificial habitats such as sea-walls and wooden mooring stays.*	The open shingle community within the Survey Area has the potential to support this species.
Puccinellia fasciuculata	Borrer's saltmarsh grass	*A tufted short-lived perennial grass of bare places by the sea, in grazing marshes around cattle-poached pools and depressions, on earthen sea-walls, vehicle tracks and the mud dredged from ditches.*	The habitat in the Survey Area is not the typical habitat of this species and it is therefore likely to be absent.
Ruppia cirrhosa	Spiral tasselweed	*A perennial aquatic which occurs in similar habitats to R. maritima, including coastal lakes, tidal inlets, creeks and brackish ditches. It usually grows in deeper water than that species and tolerates more saline conditions, even growing with Zostera species*	The ditches within the Survey Area have the potential to support this species.
Sarcocornia perennis	Perennial glasswort	*A woody perennial subshrub of saltmarshes, especially in bare or sparsely vegetated areas on firm, muddy sand and gravel. S. perennis occurs on eroding lower parts of saltmarshes, at higher elevations on saltmarsh drift-lines and on shell and shingle banks; sometimes also on bare ground behind sea-walls.*	The shingle within the Survey Area has the potential to support this species.

Scientific Name	Common Name	**Habitat (taken from Plant Atlas 2020** (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023)**)**	Review
Sonchus palustris	Marsh Sowthistle	*A perennial herb of tall vegetation beside rivers on damp peaty or silty soils rich in nitrogen. It is also moderately tolerant of saline conditions, and can grow near tidal river mouths.*	The habitat in the Survey Area is not suitable for this species.
Trifolium suffocatum	Suffocated clover	*A winter-annual herb of thin, dry soils on rocky coasts or on acidic compacted sand and shingle, either in open turf or on bare ground, and often part of a species-rich mosaic of annuals or bulbous plants. It occasionally grows on moister soils, but only in situations that are baked dry in summer.*	A small clover without flowers was found within the Survey Area which could have been this species. However, the vegetation within the Survey Area is mostly too dense for this species except in small patches which apparently been grazed.
Trifolium glomeratum	Clustered Clover	*A winter-annual herb of short, open communities on light, drought-prone often somewhat acidic sandy or stony soils near the coast. Habitats include pathside banks, seafront lawns and cliff-slopes….*	The habitat in the Survey Area is not the typical habitat of this species and it is therefore likely to be absent.
Trifolium striatum	Knotted Clover	*A winter-annual herb of short, open communities around rock outcrops and on thin, relatively infertile drought-prone soils. Habitats include well-drained pastures, grassy banks and road verges.*	The habitat in the Survey Area is not the typical habitat of this species and it is therefore likely to be absent.
Trifolium scabrum	Rough Clover	*A winter-annual herb of thin, infertile, drought-prone soils over limestone, sand and gravel; by the sea also in summer-parched cliff-top grasslands. It grows in similar habitats to T. striatum, and frequently grows with it, but tends to occupy*	A small clover without flowers was found within the Survey Area which could have been this species. However, the vegetation within the Survey Area is mostly too dense for

Scientific Name	Common Name	**Habitat (taken from Plant Atlas 2020** (Stroh, Walker, Humphrey, Pescott, & Burkmar, 2023)**)**	Review
		rockier, drier and more strongly leached (acidic) microsites.	this species except in small patches which apparently been grazed.
Vicia lutea	Yellow-vetch	*An annual herb of a variety of coastal habitats where it is presumed to be native, including scrubby grassland and cliffs, and on open yet consolidated shingle. In southern Scotland it is confined to sheltered sea-cliffs.*	The habitat with the Survey Area is apparently suitable for this species however it is unlikely that it would be detected in January.
Zostera angustifolia	Narrow-leaved Eelgrass	*Although a coastal species, this rhizomatous perennial is found at higher levels of the shore than Z. marina. It grows in the inter-tidal zone in sheltered estuaries, bays and harbours, where it is found on mixed substrates of sand and mud. Plants are often concentrated in pools or runnels on the shore.*	The Survey Area does not include intertidal habitats and it is therefore unsuitable for this species.

INVERTEBRATES

4.1.23 An assessment of the potential for invertebrate species listed as special interest on the Ramsar citation is provided in Table 4.3.

Table 4.3: Ramsar Invertebrate Species

Scientific Name	Common Name	Habitat	Review
Malacosoma castrensis	Ground Lackey Moth	Feeds on a range of saltmarsh plants such as sea wormwood *Artemisia maritima* and sea-lavender *Limonium vulgare*).	The habitat with the Survey Area is apparently **not** suitable for this species.
Campsicnemus magius	Fancy-legged fly	Occurs on bare mud in coastal levels and upper saltmarsh where there is an intermediate level of salinity and does not normally occur on the tidal parts of a saltmarsh.	The habitat with the Survey Area is apparently **not** suitable for this species.
Cheilosia velutina	A hoverfly	Recent records are from the chalk pits and adjacent areas.	The habitat with the Survey Area is apparently **not** suitable for this species.
Empis prodomus	A species of fly	Associated with dry sandy heathlands with trees. Typically, the Brecklands in East Anglia.	The habitat with the Survey Area is apparently **not** suitable for this species.
Dixella attica	A species of fly	Unknown	Unknown
Hylaeus euryscapu syn Hylaeus annularis	Shingle Yellow-face Bee	Restricted to coastal shingle in south and south-eastern England where it nests in hollow plant stems and forages on Sea Kale, Sea Spurge, umbellifers, ragworts, hawkbits, and bramble.	Habitat with the Survey Area may be suitable for this species.

Scientific Name	Common Name	Habitat	Review
Pseudamnicola confusa	A snail	Freshwater	The habitat with the Survey Area is apparently **not** suitable for this species.
Nematolstella vectensis	Starlet sea anemone	Lives in isolated or semi-isolated brackish pools in saltmarsh and lagoons, in ditches and on mudflats in saltmarshes and shallow estuaries at or above high water, typically in mud, muddy sand and muddy shingle but is also found on vegetation	The saline lagoons within the Survey Area may be suitable for this species.
Gammarus insnensibili	Lagoon sand shrimp	limited to sheltered, shallow, brackish water habitats with a variety of sediments ranging from organic muds to shingle with various admixtures of sand and silt-clay. Gammarus insensibilis appears to be associated with the alga Chaetomorpha linum, which may form extensive floating mats	The saline lagoons within the Survey Area may be suitable for this species.
Euophrys browningi	a jumping spider	Described by JNCC as Nationally Scarce and is a Section 41 species. Confined to a few shingle beaches in eastern and south-eastern England	The habitat with the Survey Area is apparently **not** suitable for this species.

Scientific Name	Common Name	Habitat	Review
		where it can be found in tide litter and inside empty whelk shells.	
Baryphyma duffeyi	Duffy's Bell-headed Spider	Described by JNCC as Endangered and is a Section 41 species. Known in the UK only from the coasts of Suffolk and Essex and Kent where it can be found in tidal litter or on mud beneath vegetation in saltmarshes and brackish marshes. The only recent records are from Orford Ness. Development and habitat degradation may have adversely affected previously known sites.	The habitat with the Survey Area is apparently **not** suitable for this species.
Haplodrassus minor	A spider	Among tide litter and sparse vegetation and shingle on the seashore.	The vegetation with the western Survey Area is probably too dense for this species however habitat suitable is suitable in the eastern part.
Trichoncus affinis	A spider	Among the roots of sparse vegetation on shingle,	The vegetation with the western Survey Area is probably too dense for this species however habitat suitable is suitable in the eastern part.

ECOLOGICAL CONNECTIONS

4.1.24 As set out at Stage 1, the PCS lies within, and is therefore an integral part of, the following designations:

- Alde-Ore Estuary Ramsar (UK11002)
- Alde-Ore Estuary SPA (UK9009112); and
- Orfordness - Shingle Street SAC (UK0014780)

4.1.25 In addition, the site access route crosses and is adjacent to the Alde-Ore & Butley Estuaries SAC (UK0030076).

ENVIRONMENTAL CONNECTIONS

4.1.26 Also as set out at Stage 1, The Alde-Ore & Butley Estuaries SAC (UK0030076) is adjacent and may be connected hydrologically to the PCS however there are no clear surface water connections between the PCS and this SAC, and any connection is likely to be via groundwater only.

STEP ONE, PART 2: INFORMATION ON EUROPEAN AND RAMSAR SITES

ALDE-ORE ESTUARY RAMSAR (UK11002)

BRIEF DESCRIPTION

4.1.27 The Alde-Ore Estuary Ramsar comprises the estuary complex of the Rivers Alde, Butley and Ore, plus Havergate Island, all of Orford Ness shingle spit and the coast at Shingle Street as far south as Bawdsey. It was designated as a Ramsar site in 1996.

QUALIFYING FEATURES

4.1.28 Further information on the qualifying features of the Alde-Ore Estuary Ramsar for which LSE could not be excluded at Stage 1 Screening is provided in Table 4.4. This includes, where possible, their population size and distribution at the time of designation and more recently, whether the feature is apparently in favourable or unfavourable condition and whether the overarching conservation objective is ‘maintain’ or ‘restore’. The baseline reference value is the population in 1991-1995 for Little Tern and the population in the years 1998/9 to 2002/3 for the other bird species.

Table 4.4: Alde-Ore Estuary Ramsar Qualifying Interest Features Condition & Overall Objectives

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
Marsh mallow	N.D.	N.D.	Unknown	Remains present at Orford Ness.
Sea heath	N.D.	N.D.	Unknown	Distribution has reduced at Orford Ness, perhaps now only present at the southern end of the Spit.
Sea pea	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Dittander	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Bur meddick	N.D.	N.D.	Unknown	Remains present at Orford Ness
Curved hard-grass	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Borrer's saltmarsh grass	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Spiral tasselweed	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Perennial glasswort	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Marsh sowthistle	N.D.	N.D.	Unknown	Remains present at Orford Ness, although range appears to have contracted.
Suffocated clover	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.
Yellow-vetch	N.D.	N.D.	Unknown	Remains widely distributed on Orford Ness.

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
Narrow-leaved Eelgrass	N.D.	N.D.	Unknown	Remains present at Orford Ness, although range appears to have contracted.
Ground Lackey Malacosoma castrensis	N.D.	N.D.	Unknown	Present at Orford Ness in 2019
Fancy-legged fly Campsicnemus magius	N.D.	N.D.	Unknown	No recent records at Orford Ness
Cheilosia velutina a hoverfly	N.D.	N.D.	Unknown	No recent records at Orford Ness
Empis prodomus a fly	N.D.	N.D.	Unknown	Recorded at Orford Ness in the last 10 years
Dixella attica a fly	N.D.	N.D.	Unknown	No recent records at Orford Ness
Shingle Yellow-face Bee Hylaeus euryscapus	N.D.	N.D.	Unknown	No recent records at Orford Ness
Pseudamnicola confusa a snail	N.D.	N.D.	Unknown	No recent records at Orford Ness
Starlet sea anemone Nematolstella vectensis	N.D.	N.D.	Unknown	Recorded at Orford Ness in the last 10 years
Lagoon sand shrimp Gammarus insensibilis	N.D.	N.D.	Unknown	No recent records at Orford Ness
Euophrys browningi a jumping spider	N.D.	N.D.	Unknown	No recent records at Orford Ness
Duffy's Bell-headed Spider Baryphyma duffeyi	N.D.	N.D.	Unknown	Recorded at Orford Ness in the last 10 years

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
Haplodrassus minor a spider	N.D.	N.D.	Unknown	No recent records
Trichoncus affinis a spider	N.D.	N.D.	Unknown	No recent records
Avocet (Non-Breeding)	1187 individuals	1,552 individuals 5-year peak mean 17/18-21/22 (WeBS) for the Alde Estuary	Favourable/ Maintain	Occurs at Havergate Island and elsewhere in the Estuary. Important feeding habitats within the site include the intertidal mudflats located in the Upper Alde Estuary and along the estuary from Snape to North Weir Point.
Little Tern	88 pairs	0 breeding pairs in 2019, 2020, 2021	Unfavourable/ Restore	In 2019, four were at Orfordness Lagoon and two at the River Ore by Havergate Island, these being the most recent records, the next most recent being from 2016 when there were three pairs at Shingle Street which did not stay to breed, and in 2013, just 4 breeding pairs attempted to breed on the site
Marsh Harrier	3 pairs	3 pairs in 2019, 2 in 2020, 3 in 2021	Favourable/ Maintain	This species is present year-round at Orford Ness. The saltmarsh at Havergate Island, Orford Ness and along the Butley and Alde rivers, is important for nesting
Redshank	2368 individuals	2,134 individuals5-year peak mean 17/18-21/22 (WeBS) for the Alde Estuary	Unfavourable/ Restore	Reported from Havergate Island in winter and is likely to occur widely in the Ramsar site. Important feeding habitats within the site include the intertidal mudflats located in the Upper Alde Estuary

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
				and along the estuary from Snape to North Weir Point. In addition, 42 pairs bred at Orford Ness in 2019 which may contribute to the non-breeding population.
Black-tailed Godwit	283 individuals	1123 individuals	Favourable/ Maintain	No recent distribution information; likely to forage widely on exposed mudflats in the Estuary. .
Shelduck	1398 individuals	1124 individuals	Unfavourable/ Restore	Reported from Boyton Marshes Havergate Island and Orford Ness
Shoveler	224 individuals	400 individuals	Favourable/ Maintain	Breeds at Boyton Marshes Havergate Island and Orford Ness, and reported from Orford Ness during the winter.
Common Greenshank	29 individuals	5 individuals	Unfavourable/ Restore	Reported from Orford Ness, the Alde Estuary, including at Iken, and Havergate Island.
Spotted Redshank	44 individuals	3 individuals	Unfavourable/ Restore	Reported from Orford Ness and Havergate Island.
Teal	2447 individuals	3163 individuals	Favourable/ Maintain	Reported from Boyton Marshes, Orford Ness, the Alde Estuary, including at Iken, and Havergate Island.

N.D. = no data.

CONSERVATION OBJECTIVES

4.1.29 There are no published conservation objectives for the Ramsar site qualifying features. Therefore, these are assumed to be the same as for an SAC for the plant and invertebrate species and the same as an SPA for the bird species.

4.1.30 On that basis the assumed conservation objectives are:

- For plants and invertebrates: to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site

contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:

- the extent and distribution of habitats of the qualifying species
- the structure and function of the habitats of the qualifying species
- the supporting processes on which the habitats of qualifying species rely
- the populations of each of the qualifying species
- the distribution of qualifying species within the site

- For birds: ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
  - the extent and distribution of the habitats of the qualifying features
  - the structure and function of the habitats of the qualifying features
  - the supporting processes on which the habitats of the qualifying features rely
  - the populations of each of the qualifying features
  - the distribution of qualifying features within the site.

4.1.31 Similarly, there are no defined attributes or targets for the Ramsar features unless these are also birds which are also qualifying features of the SPA.

ALDE-ORE ESTUARY SPA (UK9009112)

BRIEF DESCRIPTION

4.1.32 The Alde-Ore Estuary SPA overlaps with the Ramsar site and has the same boundary, except the SPA excludes the southern part of Orford Ness spit. The SPA was designated in 1996, the same year that it was designated a Ramsar.

QUALIFYING FEATURES

4.1.33 Further information on the qualifying features of the Alde-Ore Estuary SPA for which LSE could not be excluded at Stage 1 Screening is provided in Table 4.5. Whilst the year of designation is the same for the SPA and Ramsar, the baseline years are different, being 1989/90 to 1993/94 for the SPA, and therefore the baseline reference value differs between the SPA and the Ramsar for the same feature, which can lead to different outcomes for the conservation condition and overall conservation objective (for example, see Redshank).

Table 4.5: Alde-Ore Estuary SPA Qualifying Features Condition & Overall Objectives

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
Avocet (Breeding)	104 pairs	72 pairs in 2019, 47 in 2022 and 45 pairs in 2021 (Suffolk Bird Group, 2022)	Unfavourable/ Restore	Breeding sites are at Havergate Island and Orford Ness including new habitat created in the Airfield.
Avocet (Non-Breeding)	824 individuals	1,552 individuals 5-year peak mean 17/18-21/22 (WeBS) for the Alde Estuary	Favourable/ Maintain, except for disturbance from human activity and certain contaminants in the estuary sediment.	Occurs at Havergate Island and elsewhere in the Estuary.
Little Tern	48 pairs	0 breeding pairs in 2019, 2020, 2021	Unfavourable/ Restore	In 2019, four were at Orfod Ness Lagoon and two at the River Ore by Havergate Island, these being the most recent records, the next most recent being from 2016 when there were three pairs at Shingle Street which did not stay to breed, and in In 2013, just 4 breeding pairs attempted to breed on the site. The estuary was important in providing feeding habitat for Little Tern, which also foraged offshore.
Redshank	1,662 individuals	2,134 individuals5-year peak mean 17/18-21/22 (WeBS) for	Favourable/ Maintain, except for disturbance from human activity and certain	Reported from Havergate Island in winter and is likely to occur widely in the SPA. In addition, 42 pairs bred at Orfordness in 2019 which may contribute to

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
		the Alde Estuary	contaminants in the estuary sediment.	the non-breeding population.
Ruff	13 individuals	2 individuals	Unfavourable/ Restore	Five were recorded at Havergate Island and eight at Butley (River?) in 2019, and one at Aldeburgh Marshes (adjacent to the Ramsar) in 2020.

CONSERVATION OBJECTIVES

4.1.34 The conservation objectives are to *"ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*

- the extent and distribution of the habitats of the qualifying features
- the structure and function of the habitats of the qualifying features
- the supporting processes on which the habitats of the qualifying features rely
- the populations of each of the qualifying features
- the distribution of qualifying features within the site".

4.1.35 The conservation objectives are further defined by Supplementary Advice on Conservation Objectives (SACOs). These provide attributes and targets for each qualifying feature. These are feature specific however typically include the following attributes:

- Population abundance.
- Connectivity with supporting habitats.
- Disturbance caused by human activity.
- Supporting habitat: Extent, distribution, and availability of supporting habitat.
- Supporting habitat: Conservation measures.
- Supporting habitat: Air quality.
- Supporting habitat: Food availability.
- Supporting habitat: Hydrology.
- Supporting habitat: Landform & Landscape.
- Supporting habitat: Vegetation characteristics.
- Supporting habitat: Water depth.
- Supporting habitat: Water quality (contaminants, dissolved oxygen, nutrients, turbidity, salinity).

4.1.36 Natural England guidance states that "*Any proposals or operations which may affect the site or its features should be designed so they do not adversely affect any of the attributes in the SACO or achievement of the conservation objectives*".

ORFORDNESS - SHINGLE STREET SAC (UK0014780)

BRIEF DESCRIPTION

4.1.37 The Orfordness to Shingle Street SAC also overlaps with the Alde-Ore Estuary Ramsar. It encompasses the Orford Ness shingle spit and the coast at Shingle Street as far south as Bawdsey. The SAC was proposed in 1996 and formerly designated as an SAC in 2005.

QUALIFYING INTEREST

4.1.38 4.2.5 Further information on the qualifying features of the Orfordness to Shingle Street SAC for which LSE could not be excluded at Stage 1 Screening is provided in Table 4.6. The Baseline Reference Value is from the Standard Data Form and the condition assessment is based on an assessment undertaken by Natural England for the underpinning SSSI or the SACOs.

Table 4.6: Orfordness to Shingle Street SAC Qualifying Features Condition & Overall Objectives

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
1150 Coastal lagoons * Priority feature	26.64 ha	57.83ha	Unfavourable/ restore	Parts are unfavourable due to high levels of nutrients causing algal blooms, some of this may be attributable to sheep grazing.
1210 Annual vegetation of drift lines	9.77ha	N.D.	Unfavourable / Restore	Parts are unfavourable due to species composition and recreational pressure
1220 Perennial vegetation of stony banks	535.46 ha	535.86ha	Unfavourable / Restore	Parts are unfavourable due to species composition and recreational pressure

N.D. = no data

4.1.39 The site is 888.01ha in total; the main other habitats are coastal saltmarsh and coastal grazing marsh.

CONSERVATION OBJECTIVES

4.1.40 The conservation objectives are to *"ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;*

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which qualifying natural habitats rely."

4.1.41 The conservation objectives are further defined by the SACOs. These provide attributes for each qualifying feature however no targets have yet been set for 1210 Annual vegetation of drift lines and 1220 Perennial vegetation of stony banks.

4.1.42 The attributes for 1150 Coastal lagoons * Priority feature are:

- Distribution: presence and spatial distribution of biological communities
- Extent and distribution
- Extent of water
- Structure and function: presence and abundance of key structural and influential species
- Structure: isolating barrier - presence, nature and integrity
- Structure: non-native species and pathogens (habitat)
- Structure: sediment composition and distribution
- Structure: species composition of component communities
- Structure: structure and integrity of lagoon banks
- Structure: water depth
- Supporting processes: eutrophication of sediments
- Supporting processes: physico-chemical properties (habitat)
- Supporting processes: sediment contaminants
- Supporting processes: water quality - contaminants (habitat)
- Supporting processes: water quality - nutrients (habitat)
- Supporting processes: water quality - turbidity (habitat)

4.1.43 The attributes for 1210 Annual vegetation of drift lines are:

- Distribution of the feature, including associated transitional habitats, within the site
- Extent of the feature within the site
- Future extent of habitat within the site and ability to respond to seasonal changes
- Structure and function (including its typical species): key structural, influential and distinctive species
- Structure and function: niches for seedling establishment
- Structure and function: nutrient availability
- Structure and function: sediment size range and type
- Structure and function: vegetation - undesirable species

- Structure and function: vegetation community composition
- Structure and function: vegetation structure - zonation and transitions
- Supporting processes: aeolian (wind-blown) processes
- Supporting processes: beach morphology and structure
- Supporting processes: conservation measures (habitat)
- Supporting processes: functionality and sediment supply including connectivity with the wider coastal sediment system
- Supporting processes: water quality (habitat)

4.1.44 The attributes for 1220 Perennial vegetation of stony banks are:

- Distribution of the feature, including associated transitional habitats, within the site
- Extent of the feature within the site
- Future extent of habitat within the site and ability to respond to seasonal changes
- Structure and function (including its typical species): key structural, influential and distinctive species
- Structure and function: functionality and sediment supply including connectivity with the wider coastal sediment system
- Structure and function: nutrient availability
- Structure and function: sediment size range and type
- Structure and function: vegetation - undesirable species
- Structure and function: vegetation community composition
- Structure and function: vegetation structure - patterns of vegetation with naturally bare ground
- Structure and function: vegetation structure - zonation and transitions
- Supporting processes: air quality (habitat)
- Supporting processes: conservation measures (habitat)
- Supporting processes: hydrology (habitat)
- Supporting processes: sedimentary processes
- Supporting processes: shingle morphology
- Supporting processes: water quality (habitat)

ALDE-ORE & BUTLEY ESTUARIES SAC (UK0030076)

BRIEF DESCRIPTION

4.1.45 The Alde-Ore & Butley Estuaries SAC also overlaps with the Alde-Ore Estuary Ramsar. It encompasses the estuaries and Havergate Island. The SAC was proposed in 1996 and formerly designated as an SAC in 2005.

QUALIFYING INTEREST

4.2.5 Further information on the qualifying features of the Alde-Ore & Butley Estuaries SAC for which LSE could not be excluded at Stage 1 Screening is provided in Table 4.7.

Table 4.7: Alde-Ore & Butley Estuaries SAC Qualifying Features Condition & Overall Objectives

Qualifying Feature	Baseline Reference Value	Current	Summary Condition/ Objective	Comments
1130 Estuaries	1142.84ha	N.D.	N.D.	
1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	408.16ha	402.36ha	Favourable/ Maintain	There may have been some losses of saltmarsh however the difference between the BRV and the most recent mapping may be due to map accuracy as it is slight.

CONSERVATION OBJECTIVES

4.1.46 The conservation objectives are to "ensure that the integrity of the site is maintained or restored as appropriate, and to ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which qualifying natural habitats rely."

4.1.47 The conservation objectives are further defined by the SACOs. These provide attributes for each qualifying feature.

4.1.48 For 1130 Estuaries the attributes are:

- Distribution: presence and spatial distribution of biological communities
- Extent and distribution
- Function: connectivity
- Structure and function: presence and abundance of key structural and influential species
- Structure: freshwater sources
- Structure: habitat zonation
- Structure: morphology
- Structure: non-native species and pathogens (habitat)
- Structure: sediment movement, sources and sinks
- Structure: species composition of component communities
- Structure: substrate composition and distribution
- Structure: tidal regime
- Structure: topography

- Structure: water density
- Supporting processes: energy / exposure
- Supporting processes: sediment contaminants
- Supporting processes: water quality - dissolved oxygen (habitat)
- Supporting processes: water quality - nutrients (habitat)
- Supporting processes: water quality - turbidity (habitat)

4.1.49 For 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) the attributes are:

- Distribution of the feature, including associated transitional habitats, within the site
- Extent of the feature within the site
- Future extent of habitat within the site and ability to respond to seasonal changes
- Structure and function (including its typical species): key structural, influential and distinctive species
- Structure and function: presence and patterning of creeks and salt pans
- Structure and function: presence of unvegetated surfaces
- Structure and function: sediment size and availability
- Structure and function: surface elevation and topography
- Structure and function: vegetation - undesirable species
- Structure and function: vegetation community composition
- Structure and function: vegetation structure - zonation of salt marsh vegetation
- Supporting processes: adaptation and resilience (habitat)
- Supporting processes: air quality (habitat)
- Supporting processes: conservation measures (habitat)
- Supporting processes: functional connectivity with wider coastal sedimentary system
- Supporting processes: morphological setting
- Supporting processes: sediment nutrient status and nutrient cycling
- Supporting processes: sedimentary processes
- Supporting processes: tidal processes
- Supporting processes: water quality (habitat)

4.2 STEP TWO: EFFECTS OF THE PROJECT ALONE AND IN COMBIMATION

STEP TWO, PART 1: EFFECTS OF THE PROJECT ALONE

FACTOR 1: DAMAGE TO QUALIFYING INTEREST HABITATS, INCLUDING TOPOGRAPHY, DURING FENCE INSTALLATION, MAINTENANCE AND REMOVAL, DURING THE INSTALLATION OF A DITCH CROSSING, AND DURING THE MANAGEMENT OF VEGETATION.

1150 COASTAL LAGOONS* (PRIORITY FEATURE)

4.2.1 T2g5 Saline Lagoons (H1150) lagoons are not along the fence line, access tracks or within temporary works areas and therefore will not be damaged during the installation and maintenance of the fence or the ditch crossing. However, the banks along the ditches within the PCS in which the fence will be installed and in proximity to the ditch crossing may have a function in retaining water within some of the smaller coastal lagoons, see Figure 4.4. Therefore, damage to these banks could affect water levels within these lagoons.

1220 PERENNIAL VEGETATION OF STONY BANKS

4.2.2 The installation of the fence will result in disturbance and then reinstatement of 1m x 1350m of S3b5 Perennial vegetation on coastal shingle (H1220), giving a total 0.14ha (of 520ha at Orford Ness). The installation of the ditch crossing will mainly affect the ditch, however a small amount of shingle habitat on the ditch banks could also be affected (c. 6m^2).

4.2.3 The alignment of the fence on the eastern boundary and much of the western boundary is alongside ditches where it appears that material excavated from the ditch was placed. These areas have therefore been disturbed in the past[3] and have recovered to support the shingle communities described above. The northern part of the western boundary and the northern boundary have not been surveyed however it can be seen from aerial imagery that these cross areas of densely vegetated shingle which has also been disturbed by past human activity[4].

4.2.4 Importantly, the fence would not cross natural shingle ridges (as these have already been lost from the PCS location) and the perennial grass vegetation along the fence line would be expected to recover quickly, as it has along the fence line of Norfolk Projects enclosure which is located in the same habitat type (see Figure 4.6). However, lichens would take longer to re-establish their current extent on the re-disturbed shingle.

[3] The southern ditch is evident on maps dating from 1881, while the western (and central) ditch appears to date from the construction of the Cobra Mist AN/FPS-95 antenna in the last half of the1960s. The old fence line was probably installed at the same time; it is visible on aerial imagery from 2000 but not visible on aerial imagery from 1945.

[4] Aerial imagery from the 1970s shows total clearance of vegetation and vehicle tracks throughout this area; the tracks are still visible on modern aerial imagery. The area was apparently cleared and levelled during the construction of the Cobra Mist antenna, and then it recolonised with vegetation.

4.2.5 Vehicular access during construction, maintenance and management tasks also has the potential to damage shingle habitats. There are existing access tracks which lead directly to the PCS and therefore vehicles will access the PCS using these as far as possible. Any vehicles entering the PCS would then leave this track and traverse the shingle to enter the PCS via the new ditch crossing. As previously noted, the shingle here does not exhibit the natural ridges, having been levelled in the past, and the vehicle access would be infrequent, which much reduces the risk of damage.

Figure 4.6: Vegetation along existing predator fence.

BIRDS

4.2.6 Other than Marsh Harrier, the habitat along the fence line is not suitable for the qualifying feature birds. The area affected by the fence line installation is a very small fraction of a Marsh Harrier home range and the temporary disturbance to this area could not affect the Marsh Harrier population.

SCARCE/UNCOMMON PLANTS

4.2.7 There were no uncommon plants recorded during the survey. However, the survey was undertaken in January and so the presence of a few of these species (such as Bur Meddick, Curved hard-grass, Suffocated Clover, Rough Clover, Yellow-vetch) cannot be excluded, see Table 4.2. These are all annuals and therefore less vulnerable than perennials to temporary disturbance of the shingle through fence installation in the location of the PCS, especially after setting seed.

SCARCE/UNCOMMON INVERTEBRATES

4.2.8 There is suitable habitat for uncommon invertebrates along the fence line including the two spiders *Haplodrassus minor* and *Trichoncus affinis*. However, given the localised and temporary nature if the works, populations of invertebrates are unlikely to be affected.

FACTOR 2: DIRECT MORTALITY OF QUALIFYING INTEREST ANIMALS AND PLANTS DURING FENCE INSTALLATION AND REMOVAL, AND DURING THE INSTALLATION OF A DITCH CROSSING.

SCARCE/UNCOMMON PLANTS & INVERTEBRATES

4.2.9 During the installation and removal of the fence, and the installation of the ditch crossing, there is a risk that scarce/uncommon plants and invertebrates suffer direct mortality. However, this is very unlikely to affect the overall population of these species.

FACTOR 3: DISTURBANCE OF QUALIFYING INTEREST BIRDS DUE TO THE PRESENCE OF WORKERS DURING FENCE INSTALLATION AND REMOVAL AND WHEN UNDERTAKING MANAGEMENT AND MAINTENANCE.

BREEDING BIRDS

4.2.10 It is intended that the works to install and remove the fence (and the ditch crossing), and undertake vegetation management, take place during the winter. If these activities occurred during the summer, there is a risk of disturbing breeding birds. Of those listed as qualifying features, as set out in Table 4.4 and Table 4.5, only Marsh Harrier is likely to breed near the PCS although the available data suggests this species prefers nesting in the saltmarsh habitat.

WINTERING BIRDS

4.2.11 It is intended that installation of the fence and ditch crossing will involve the presence of workers and plant for six weeks during the winter. The workforce will disturb birds during the works; Redshank (two or three), Grey Heron (one), Little Egret (one) were all disturbed during the survey work in January. Marsh Harrier was also observed however this species did not appear to respond to our presence. A similar level of disturbance would be expected during each day of fence installation however this is unlikely to result in significant disturbance for any of these species[5] (or any other bird species) because the disturbance will be localised and of short duration. The same applies for monitoring, management and maintenance activities, as well as removal of the fence when it is no longer required.

FACTOR 4: RELEASE OF SUSPENDED SOLIDS AND OTHER POLLUTION INTO WATERWAYS DURING FENCE INSTALLATION AND REMOVAL, DURING THE INSTALLATION OF A DITCH CROSSING, AND WHEN UNDERTAKING MANAGEMENT AND MAINTENANCE.

4.2.12 Disturbance of the ground when installing the fence and ditch crossing could release organic matter buried in the ground and construction and maintenance machinery may leak oils and other contaminants. In both cases the amounts will be tiny and unlikely to have an appreciable effect on any of the qualifying features.

[5] Defined as disturbance which will cause impacts on populations of a species through either (i) changed local distribution on a continuing basis; and/or (ii) changed local abundance on a sustained basis; and/or (iii) the reduction of ability of any significant group of birds to survive, breed, or rear their young.

FACTOR 5: SPREAD OF NON-NATIVE INVASIVE SPECIES BY BRINGING THESE ON TO SITE ON CONSTRUCTION AND MAINTANANCE MACHINERY OR MATERIALS.

4.2.13 There is a low risk that machinery and materials brought onto the PCS for the works is contaminated with invasive non-native species which then become established and spread, with negative effects on Orford Ness, especially its flora including scarce/uncommon plant species.

FACTOR 6: REMOVAL OF GAZING ANIMALS AFFECTING VEGETATION COMPOSITION.

H1220 1150 COASTAL LAGOONS* (PRIORITY FEATURE)

4.2.14 The vegetation within the saline lagoons does not appear to be grazed or dependent on grazing to maintain its community structure and composition, while the ditches generally lack vegetation.

1220 PERENNIAL VEGETATION OF STONY BANKS

4.2.15 The enclosure will exclude two or three species of gazing animals as well as the intended predator (although Chinese Water Deer may fit into both categories as there is evidence that this species eats the eggs of ground nesting birds). The grazing animals appear to have a moderate effect on the vegetation, creating variability in sward height and species composition. Removal of grazing may promote a denser sward of tall perennial grasses at the expense of more open areas and associated flora and lichens, with the open areas being of greater conservation importance.

BIRDS

4.2.16 Other the Marsh Harrier, the grassland areas are not favourable to the bird species that are of special interest and therefore these species are unlikely to be affected by the removal of grazing; the saline water apparently keeps areas in and around the lagoons clear of dense perennial vegetation without the need for grazing. Marsh Harrier hunts over dense vegetation and therefore it is also unlikely to be affected.

SCARCE/UNCOMMON PLANTS

4.2.17 The scarce and uncommon plants are smaller species which may benefit from light grazing; removal of grazing could result in a decline of these species if present, e.g. the small clovers.

SCARCE/UNCOMMON INVERTEBRATES

4.2.18 The spiders *Haplodrassus minor* and *Trichoncus affinis*, if present, may be affected by cessation of grazing as these prefer open habitats. The species associated with lagoons would not be affected, however.

FACTOR 7: INCREASES IN NUTRIENTS FROM BIRD FAECES AFFECTING VEGETATION COMPOSITION AND WATER QUALITY.

1150 COASTAL LAGOONS* (PRIORITY FEATURE)

4.2.19 The introduction of breeding gulls into the PCS will increase nutrients within the saline lagoons and potentially lead to changes in the plant and animal communities present.

1220 PERENNIAL VEGETATION OF STONY BANKS

4.2.20 Similarly, the introduction of breeding gulls into the PCS will increase nutrients within the shingle due to bird droppings; this may favour coarse grasses at the expense of smaller flowering plants and therefore change the vegetation community composition or relative abundance. Although there was historically 25,000 LBBG nesting on Orford Ness, this was in a different location.

SCARCE/UNCOMMON PLANTS & INVERTEBRATES

4.2.21 Any change in vegetation structure and composition arising from increased nutrients, may affect the other ecological features with some potentially benefitting and others potentially declining, such as scarce/uncommon plants and invertebrates.

FACTOR 8: CHANGES IN HYDROLOGY CAUSED BY FENCE LINES ACROSS DITCHES.

4.2.22 Surface water drainage for the site will not change as there will be no new impermeable surface areas added as a result of the development proposals.

4.2.23 Design of the proposed predator proof fencing may include the crossing of existing drainage channels within the PCS. These channels are likely to be tidally influenced and depending on the design of the mesh used on the fencing, have the potential to become blinded by debris. Any build-up of debris within an existing channel will restrict flow and increase the risk of erosion at the wetted perimeter of the channel. If completely blocked, water would pass over or around the sides of the blockage in order to maintain flow to the downstream reach. This change in channel hydrology would be localised, however prolonged erosion could lead to degradation of the fence integrity and damage to '1220 Perennial Vegetation of Stony Banks' habitats at the ditch crossing point.

STEP TWO, PART 2: EFFECTS OF THE PROJECT IN COMBINATION

4.2.24 The Norfolk Projects compensation area is an existing area enclosed by predator control fencing at Orford Ness. This has the potential to give rise to the same effects during operation as the PCS, namely changes in the vegetation and ecology of the enclosed areas through cessation of grazing and increase in nutrients. It is understood that in the 2023 breeding season gulls have not bred within the Norfolk Projects compensation area and therefore not resulted in nutrient increases. The changes in the vegetation through excluding grazing animals are evident at the Norfolk Projects compensation area, despite the commitment to manage the vegetation therein.

4.2.25 The addition of the PCS would increase the area of Orford Ness with reduced grazing intensity (and potentially) increases in nutrients with possible negative effects on the flora, unless managed.

4.2.26 No other projects have been identified which could affect the same ecological features as the PCS.

ALDE-ORE ESTUARY RAMSAR (UK11002)

4.2.27 An assessment of the potential of the Project to undermine the implied conservation objectives of the Alde-Ore Estuary Ramsar is presented in Table 4.8, Table 4.9 and Table 4.10, considering only those features for which LSE could not be excluded at Stage 1 Screening. The relevant impact factor is given in brackets.

Table 4.8: Risks of Undermining the Implied Conservation Objectives for Scarce Plants

Implied Conservation Objective	For the Project 'Alone'	For the Project 'In Combination
The extent and distribution of habitats of the qualifying species	No risk; the project would not change the distribution of the habitats of the qualifying species of plants.	-
The structure and function of the habitats of the qualifying species	Medium risk; the removal of grazing could allow coarser vegetation to predominate (Impact Factor 6), an additional risk is posed by invasive non-native species (Impact Factor 5)	Additional risk associated with the Norfolk Projects area.
The populations of each of the qualifying species	Coarse vegetation could outcompete some of the scarce species. This could affect Bur Meddick, Curved Hard-grass, Perennial Glasswort, Suffocated clover and Yellow-vetch, if these occur within the PCS. Invasive species could affect any of the qualifying species inside and outside the PCS.	Additional risk associated with the Norfolk Projects area.
The distribution of qualifying species within the site	In the worst case, the effects outlined above could result in losses of these species within the PCS.	Additional risk associated with the Norfolk Projects area.

Table 4.9: Risks of Undermining the Implied Conservation Objectives for Scarce Invertebrates

Implied Conservation Objective	For the Project 'Alone'	For the Project 'In Combination
The extent and distribution of habitats of the qualifying species	No risk; the project would not change the distribution of the habitats of the qualifying species of invertebrates.	-
The structure and function of the habitats of the qualifying species	Medium risk; the removal of grazing could allow coarser vegetation to predominate within the PCS (6). An additional risk is posed by invasive non-native species of plants which could also change the vegetation structure in terrestrial habitats within the PCS and elsewhere (5). A further risk is posed by changes in water quality arising from increased nutrients from bird faeces should a gull colony become established (7).	Additional risk associated with the Norfolk Projects area.
The populations of each of the qualifying species	Changes in the vegetation structure could affect the populations of Shingle Yellow-face Bee, and the spiders *Haplodrassus minor* and *Trichoncus affinis.* Changes in water quality could affect Starlet sea anemone and the Lagoon sand shrimp.	Additional risk associated with the Norfolk Projects area.
The distribution of qualifying species within the site	In the worst case, any populations of these species could be lost within the PCS.	Additional risk associated with the Norfolk Projects area.

Table 4.10 Risks of Undermining the Implied Conservation Objectives for Birds

Implied Conservation Objective	For the Project 'Alone'	For the Project 'In Combination
The extent and distribution of the habitats of the qualifying features	No risk; the project would not change the extent distribution of the habitats of the qualifying species of bird.	-
The structure and function of the habitats of the qualifying features	Low risk arising from changes in water quality due to increases in nutrients (7) and changes in the vegetation surrounding the saline lagoons in the PCS due to removal of grazers (6), for non-breeding Avocet, Common Greenshank Redshank and Spotted Redshank. Other species are much less likely to be affected by these factors (Shelduck, Shoveler, Teal) or could not (Black-tailed Godwit) as the habitat within the PCS is not favourable or unsuitable.	No additional risk as the Norfolk Projects area does not include saline lagoons or other habitat that could be used as roosting and feeding sites for these species.
The supporting processes on which the habitats of the qualifying features rely	No risk; the project would not change the supporting processes on which the habitats of the qualifying features rely.	-
The populations of each of the qualifying features	Very low risk of significant disturbance affecting breeding populations of Marsh Harrier or Little Tern (3).	Elevated risk when considered with other activity at Orford Ness, but still low.
The distribution of qualifying features within the site.	In the worst case, non-breeding Avocet, Common Greenshank Redshank and Spotted Redshank would cease using the saline lagoons within the PCS. The distribution of the other species could not be affected.	No additional risk as the Norfolk Projects area does not include saline lagoons or other habitat that could be used as roosting and feeding sites for these species.

4.2.28 An assessment of the potential of the Project to have an adverse impact on the Attributes and therefore undermine the conservation objectives of the Alde-Ore Estuary SPA is presented in Table 4.11, Table 4.12, Table 4.13, Table 4.14 and Table 4.15.

Table 4.11: Risk of Adverse Effects on the Attributes for Avocet (breeding)

Attribute	For the Project 'Alone'	For the Project 'In Combination
Breeding population: abundance	The project is located away from the known avocet breeding colonies however any degradation of supporting habitats could ultimately affect the breeding population, for which see below.	Low risk based derived from the risks identified below.
Connectivity with supporting habitats	No risk; the Project would not affect the safe passage of birds moving between nesting, roosting and feeding areas	-
Disturbance caused by human activity	Low risk of increased disturbance due to presence of site workers to install and maintain the fence, however it is unlikely to result in significant disturbance (3).	Elevated risk when considered with other activity at Orford Ness, but still low.
Predation - all habitats	As there are no existing nesting colonies within the PCS, there is no risk that predators will be diverted to the avocet colony once excluded from the PCS.	-
Productivity	The project is located away from the known avocet breeding colonies however degradation of supporting habitats could ultimately affect the productivity of the breeding colony, for which see below.	No additional risk as the Norfolk Projects area does not include saline lagoons and the fence is already installed.
Supporting habitat: air quality	No risk; the Project will have no appreciable risk for air quality.	-
Supporting habitat: conservation measures	No risk; the Project will not hinder the ability to undertake habitat management within the SPA.	-

Attribute	For the Project 'Alone'	For the Project 'In Combination
Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season	No risk; the Project will not affect the extent, distribution and availability of supporting habitat for the breeding season.	-
Supporting habitat: food availability	Low risk which is derived from the risk to water quality from construction activity (4) and bird faeces should a gull colony establish (7).	No additional risk as the Norfolk Projects predator fence is already installed.
Supporting habitat: hydrology/ flow within standing water	No risk; as only localised effects at the ditch crossing points could occur which would not affect Avocet breeding habitat.	-
Supporting habitat: landform	No risk of affecting the availability of shallow sloping nesting sites, as the PCS is located away from the known breeding sites for avocet	-
Supporting habitat: landscape	Low risk due to changes in grazing around the lagoons within the PCS (6), potentially affecting the area of open and unobstructed terrain around roosting and feeding sites.	No additional risk as the Norfolk Projects area does not include saline lagoons which could be used as roosting and feeding sites for avocet.
Supporting habitat: salinity	No risk; the Project could not affect the salinity in the saline lagoons within the PCS or elsewhere.	-
Supporting habitat: vegetation characteristics for nesting	No risk; the project could not affect the vegetation around the known nesting sites for avocet.	-
Supporting habitat: water depth	No risk; as only localised effects at the ditch crossing points could occur which would not affect Avocet breeding habitat.	-
Supporting habitat: water quality - contaminants	Very low risk from leaks from construction and maintenance machinery (4).	Additional risk from maintenance machinery used at the Norfolk Projects area

Attribute	For the Project 'Alone'	For the Project 'In Combination
Supporting habitat: water quality - dissolved oxygen	Very low risk as a result of suspended solid pollution arising from construction activity affecting saline lagoons within the PCS (4). Additional risk arising from bird faeces should a gull colony become established within the PCS (7).	Additional risk should a gull colony establish in the Norfolk Projects area.
Supporting habitat: water quality - nutrients	As for dissolved oxygen.	As for dissolved oxygen.
Supporting habitat: water quality - turbidity	As for dissolved oxygen.	As for dissolved oxygen.

Table 4.12: Risk of Adverse Effects on the Attributes for Avocet (Non- Breeding)

Attribute	For the Project 'Alone'	For the Project 'In Combination
Non-breeding population: abundance	Low risk based derived from the risks identified below.	Low risk based derived from the risks identified below.
Connectivity with supporting habitats	No risk; the Project would not affect the safe passage of birds moving between roosting and feeding areas.	-
Disturbance caused by human activity	Low risk of increased disturbance due to presence of site workers to install and maintain the fence (3), however it is unlikely to result in significant disturbance.	Elevated risk when considered with other activity at Orford Ness, but still low.
Supporting habitat: air quality	No risk; the Project will have no appreciable risk for air quality.	-
Supporting habitat: conservation measures	No risk; the Project will not hinder the ability to undertake habitat management within the SPA.	-
Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	No risk; the Project will not affect the extent, distribution and availability of supporting habitat for the non-breeding season.	-
Supporting habitat: food availability (bird)	Low risk which is derived from the risk to water quality from construction activity.	No additional risk as the Norfolk Projects predator fence is already installed.
Supporting habitat: hydrology/flow within intertidal	No risk; the Project could not affect the hydrology of the intertidal zone	-
Supporting habitat: hydrology/flow within standing water	No risk; as only localised effects at the ditch crossing points could occur which would not affect Avocet foraging habitat.	-
Supporting habitat: landform	No risk; as only localised effects at the ditch crossing points could occur which would not affect Avocet foraging habitat.	-
Supporting habitat: landscape	Low risk due to changes in grazing around the lagoons within the PCS, potentially affecting the area of open	No additional risk as the Norfolk Projects area does not include saline lagoons which could be

Attribute	For the Project 'Alone'	For the Project 'In Combination
	and unobstructed terrain around roosting and feeding sites (6).	used as roosting and feeding sites for avocet.
Supporting habitat: salinity	No risk; the Project could not affect the salinity in the saline lagoons within the PCS or elsewhere.	-
Supporting habitat: vegetation characteristics for nesting	No risk; the project could not affect the vegetation around the known nesting sites for avocet.	-
Supporting habitat: water depth	No risk; as only localised effects at the ditch crossing points could occur which would not affect Avocet foraging habitat.	-
Supporting habitat: water quality - contaminants	Very low risk from leaks from construction and maintenance machinery (4).	Additional risk from maintenance machinery used at the Norfolk Projects area
Supporting habitat: water quality - dissolved oxygen	Very low risk as a result of suspended solid pollution arising from construction activity affecting saline lagoons within the PCS (4). Additional risk arising from bird faeces should a gull colony become established within the PCS.	Additional risk should a gull colony establish in the Norfolk Projects area.
Supporting habitat: water quality - nutrients	As for dissolved oxygen.	As for dissolved oxygen.
Supporting habitat: water quality - turbidity	As for dissolved oxygen.	As for dissolved oxygen.

Table 4.13: Risk of Adverse Effects on the Attributes for Little Tern

Attribute	For the Project 'Alone'	For the Project 'In Combination
Breeding population: abundance	Very low risk that the project would hinder the ability to restore the breeding colony at Orfordness, derived from the other risks identified, noting that there is currently no Little Tern colony within the SPA.	-

Attribute	For the Project 'Alone'	For the Project 'In Combination
Connectivity with supporting habitats	No risk; the Project would not affect the passage of birds moving between nesting and feeding areas.	-
Disturbance caused by human activity	Very low risk; possibility that workers put off birds prospecting for nest sites within the SPA during construction and maintenance activities (3).	Elevated risk when considered with other activity at Orford Ness, but still low.
Predation - all habitats	As there are no existing nesting colonies within the PCS, there is no risk that predators will be diverted to any Little Tern colony once excluded from the PCS.	-
Productivity	Low risk, derived from the other risks identified, noting that there is currently no Little Tern colony within the SPA.	Elevated risk when considered with other activity at Orford Ness, but still low.
Supporting habitat: air quality	No risk; the Project will have no appreciable risk for air quality.	-
Supporting habitat: conservation measures	No risk; the Project will not hinder the ability to undertake habitat management within the SPA.	-
Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season	No risk; the Project would not affect beaches which are typically used by Little Tern for nesting or the estuarine and marine habitats that are typically used for hunting fish.	-
Supporting habitat: food availability (bird)	No risk; the Project would not affect the availability of food for Little Tern, which was recorded foraging in the estuary and offshore.	-
Supporting habitat: landform	No risk; the Project would not affect the gradient of -beaches which are typically used by Little Tern for nesting.	-
Supporting habitat: vegetation	No risk; the Project would not affect the vegetation on beaches	-

Attribute	For the Project 'Alone'	For the Project 'In Combination
characteristics for nesting	which are typically used by Little Tern for nesting.	
Supporting habitat: water quality - contaminants	Very low risk from leaks from construction and maintenance machinery (4).	Additional risk from maintenance machinery used at the Norfolk Projects area
Supporting habitat: water quality - dissolved oxygen	Very low risk; the lagoons within the PCS are probably too shallow for this species which catches food by plunge diving and therefore water quality within these lagoons should not affect this species.	No additional risk as the Norfolk Projects predator fence is already installed.
Supporting habitat: water quality - nutrients	Very low risk; the lagoons within the PCS are probably too shallow for this species which catches food by plunge diving and therefore water quality within these lagoons should not affect this species.	No additional risk as the Norfolk Projects predator fence is already installed.
Supporting habitat: water quality - turbidity	Very low risk; the lagoons within the PCS are probably too shallow for this species which catches food by plunge diving and therefore water quality within these lagoons should not affect this species.	No additional risk as the Norfolk Projects predator fence is already installed.

Table 4.14: Risk of Adverse Effects on the Attributes for Redshank

Attribute	For the Project 'Alone'	For the Project 'In Combination
Non-breeding population: abundance	Low risk; the low risks set out below for the attributes are unlikely to affect the non-breeding population of redshank.	Elevated risk when considered with other activity at Orford Ness, but still low.
Connectivity with supporting habitats	No risk; the Project would not affect the passage of birds moving between roosting and feeding areas.	-
Disturbance caused by human activity	Low risk; as Redshank are known to occur within the PCS, disturbance of a few individuals during construction and	Elevated risk when considered with other activity at Orford Ness, but still low.

Attribute	For the Project 'Alone'	For the Project 'In Combination
	maintenance activity (3) is likely however this is unlikely to result in significant disturbance.	
Supporting habitat: air quality	No risk; the Project will have no appreciable risk for air quality.	-
Supporting habitat: conservation measures	No risk; the Project will not hinder the ability to undertake habitat management within the SPA.	-
Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	No risk; the Project will not affect the extent, distribution and availability of supporting habitat for the non-breeding season.	-
Supporting habitat: food availability (bird)	Low risk which is derived from the risk to water quality from construction activity (4) and bird faeces should a gull colony become established (7).	No additional risk as the Norfolk Projects predator fence is already installed.
Supporting habitat: hydrology/flow within grassland (marsh)	No risk, the Project will not affect the hydrology of freshwater marsh.	-
Supporting habitat: hydrology/flow within intertidal	No risk; the Project will not affect the hydrology of the intertidal.	-
Supporting habitat: landform	No risk; the Project would not affect the availability of channel networks within intertidal feeding areas and shallow slope gradients to the length/perimeter of ditches, drains, pools and scrapes.	
Supporting habitat: landscape	Low risk; removal of grazing within the PCS could reduce the openness of the terrain around the saline lagoons within the PCS (6).	No additional risk as the Norfolk Projects area does not include saline lagoons.
Supporting habitat: vegetation characteristics for nesting	Low risk; removal of grazing within the PCS could affect the vegetation structure (6).	Additional risk as grazers are also excluded from the Norfolk Projects area.

Attribute	For the Project 'Alone'	For the Project 'In Combination
Supporting habitat: vegetation characteristics for roosting	No risk; the PCS is not a known roosting site for Redshank.	-
Supporting habitat: water depth	No risk; as only localised effects at the ditch crossing points could occur which would not affect Redshank foraging habitat.	-
Supporting habitat: water quality - contaminants	Very low risk from leaks from construction and maintenance machinery.	Additional risk from maintenance machinery used at the Norfolk Projects area
Supporting habitat: water quality - dissolved oxygen	Very low risk as a result of suspended solid pollution arising from construction activity affecting saline lagoons within the PCS (4). Additional risk arising from bird faeces should a gull colony become established within the PCS (7).	Additional risk should a gull colony establish in the Norfolk Projects area.
Supporting habitat: water quality - nutrients	As for dissolved oxygen.	As for dissolved oxygen.
Supporting habitat: water quality - turbidity	As for dissolved oxygen.	As for dissolved oxygen.

Table 4.15: Risk of Adverse Effects on the Attributes for Ruff

Attribute	For the Project 'Alone'	For the Project 'In Combination
Non-breeding population: abundance	No risk	-
Connectivity with supporting habitats	No risk; the Project would not affect the passage of birds moving between roosting and feeding areas.	-
Disturbance caused by human activity	No risk; the PCS and access route are not used by Ruff.	-
Supporting habitat: air quality	No risk	-

Attribute	For the Project 'Alone'	For the Project 'In Combination
Supporting habitat: conservation measures	No risk	-
Supporting habitat: extent, distribution and availability of supporting habitat for the non-breeding season	No risk	-
Supporting habitat: food availability (bird)	No risk	-
Supporting habitat: hydrology/flow within grassland (marsh)	No risk	-
Supporting habitat: landform	No risk	-
Supporting habitat: landscape	No risk	-
Supporting habitat: vegetation characteristics for feeding	No risk	-
Supporting habitat: vegetation characteristics for nesting	No risk	-
Supporting habitat: vegetation characteristics for roosting	No risk	-
Supporting habitat: water depth	No risk	-
Supporting habitat: water quality - contaminants	No risk	-
Supporting habitat: water quality - dissolved oxygen	No risk	-

Attribute	For the Project 'Alone'	For the Project 'In Combination
Supporting habitat: water quality - nutrients	No risk	-
Supporting habitat: water quality - turbidity	No risk	-

ORFORDNESS - SHINGLE STREET SAC (UK0014780)

4.2.29 An assessment of the potential of the Project to have an adverse impact on the Attributes and therefore undermine the conservation objectives of the Ordfordness to Shingle Street SAC is presented in Table 4.16, Table 4.17 and Table 4.18.

Table 4.16: Risk of Adverse Effects on the Attributes for 1150 Coastal lagoons

Attributes	For the Project 'Alone'	For the Project 'In Combination
Distribution: presence and spatial distribution of biological communities	Low risk related to water quality, for which see below.	No additional risk as the Norfolk Projects area does not include saline lagoons.
Extent and distribution	Low risk; the Project will not change the extent and distribution of saline lagoons unless lagoon banks are impacted (1) (see below).	No additional risk as the Norfolk Projects area does not include saline lagoons.
Extent of water	Low risk; the Project will not change the extent of water within the saline lagoons, nor affect the any changes caused by the tidal cycle. unless lagoon banks are impacted (1) (see below).	No additional risk as the Norfolk Projects area does not include saline lagoons.
Structure and function: presence and abundance of key structural and influential species	There are no key structural and influential species listed in the SACO; however, these could be the starlet sea anemone and the lagoon sand shrimp. Low risk associated with water quality if these species are present in the PCS (4, 7).	No additional risk as the Norfolk Projects area does not include saline lagoons.
Structure: isolating barrier - presence, nature and integrity	No risk; the saline lagoons within the PCS are percolation lagoons without an isolating barrier.	-

Attributes	For the Project 'Alone'	For the Project 'In Combination
Structure: non-native species and pathogens (habitat)	Low risk associated with non-native species brought onto site on construction and maintenance equipment (5). The SACO lists New Zealand pigmyweed *Crassula helmsii*, pacific oyster *Crassostrea gigas*, slipper limpet *Crepidula fornicata* and the New Zealand mud snail *Potamopyrgus antipodarum* as possible invaders. Low risk associated with pathogens associated with bird faeces should a gull nesting colony establish within the PCS (7).	Additional risk associated maintenance of the Norfolk Projects area.
Structure: sediment composition and distribution	No risk; the project will not affect sediment composition and distribution within the lagoons.	-
Structure: species composition of component communities	Low risk related to water quality, for which see below.	Additional risk as the Norfolk Projects area also displaces grazers and may result in the establishment of a gull colony.
Structure: structure and integrity of lagoon banks	Low risk; the lagoons within the PCS lie in depressions generally without a bank however the artificial banks along the sides of the ditches within the PCS may have a function in maintaining the lagoons; these will be reinstated following fence installation however there is a residual risk of loss of function (1).	No additional risk as the Norfolk Projects area does not include saline lagoons.
Structure: water depth	Low risk, only if lagoon banks are impacted (1).	Additional risk as the Norfolk Projects area includes fences across drainage ditches.
Supporting processes: eutrophication of sediments	Low risk, associated with both the exclusion of grazing animals (6) and the establishment of a gull colony (7), potentially resulting in nutrient levels that are too high or too low. Aerial imagery indicates that one of the lagoons in the	Additional risk as the Norfolk Projects area also displaces grazers and may result in the establishment of a gull colony.

Attributes	For the Project 'Alone'	For the Project 'In Combination
	PCS may be suffering from excess nutrients and algal blooms.	
Supporting processes: physico-chemical properties (habitat)	No risk, the fence would not affect salinity, pH or temperature levels of the saline lagoons in the PCS.	-
Supporting processes: sediment contaminants	Very low risk from leaks from construction and maintenance machinery (4).	Additional risk from maintenance machinery used at the Norfolk Projects area
Supporting processes: water quality - contaminants (habitat)	Very low risk from leaks from construction and maintenance machinery (4).	Additional risk from maintenance machinery used at the Norfolk Projects area
Supporting processes: water quality - nutrients (habitat)	As for eutrophication.	As for eutrophication.
Supporting processes: water quality - turbidity (habitat)	Very low risk as a result of suspended solid pollution arising from construction activity affecting saline lagoons within the PCS (4). Additional risk arising from bird faeces should a gull colony become established within the PCS (7).	Additional risk should a gull colony establish in the Norfolk Projects area.

Table 4.17: Risk of Adverse Effects on the Attributes for 1210 Annual vegetation of drift lines

Attributes	For the Project 'Alone'	For the Project 'In Combination
Distribution of the feature, including associated transitional habitats, within the site	No risk	-
Extent of the feature within the site	No risk	-

Attributes	For the Project 'Alone'	For the Project 'In Combination
Future extent of habitat within the site and ability to respond to seasonal changes	No risk	-
Structure and function (including its typical species): key structural, influential and distinctive species	No risk	-
Structure and function: niches for seedling establishment	No risk	-
Structure and function: nutrient availability	No risk; the nutrients for this habitat are derived from the sea (tidal litter).	-
Structure and function: sediment size range and type	No risk	-
Structure and function: vegetation - undesirable species	Low risk; invasive non-native species could be imported to the site on construction and maintenance machinery (5).	Slightly elevated risk due to use of maintenance machinery in the Norfolk Projects area.
Structure and function: vegetation community composition	Low risk; arising from possible introduction of invasive non-native species (5).	Slightly elevated risk due to use of maintenance machinery in the Norfolk Projects area.
Structure and function: vegetation structure - zonation and transitions	No risk	-
Supporting processes:	No risk	-

Attributes	For the Project 'Alone'	For the Project 'In Combination
aeolian (wind-blown) processes		
Supporting processes: beach morphology and structure	No risk	-
Supporting processes: conservation measures (habitat)	No risk	-
Supporting processes: functionality and sediment supply including connectivity with the wider coastal sediment system	No risk	-
Supporting processes: water quality (habitat)	No risk	-

Table 4.18: Risk of Adverse Effects on the Attributes for 1220 Perennial vegetation of stony banks.

Attributes	For the Project 'Alone'	For the Project 'In Combination
Distribution of the feature, including associated transitional habitats, within the site	No risk; the Project will not change the distribution of the habitat.	-
Extent of the feature within the site	No risk; the project will not change the extent of the habitat.	-
Future extent of habitat within the site and ability to respond to seasonal changes	No risk, the Project will not influence the future extent or seasonable changes for this habitat.	-

Attributes	For the Project 'Alone'	For the Project 'In Combination
Structure and function (including its typical species): key structural, influential and distinctive species	Low risk; due to changes in species composition within the PCS due access by vehicles (1) and to removal of grazers (6).	Elevated risk as the Norfolk Projects area also requires the use of vehicles and excludes grazers.
Structure and function: functionality and sediment supply including connectivity with the wider coastal sediment system	No risk; the shingle with the PCS is stable and not directly connected to the wider coastal sediment system.	-
Structure and function: nutrient availability	No risk; the Project will not change nutrient availability	-
Structure and function: sediment size range and type	No risk; the Project will not change the sediment range and type.	-
Structure and function: vegetation - undesirable species	Low risk; invasive non-native species could be imported to the site on construction and maintenance machinery (5).	Slightly elevated risk due to use of maintenance machinery in the Norfolk Projects area.
Structure and function: vegetation community composition	**Medium risk within the PCS only**; arising from access by vehicles (1) the exclusion of grazers (6) and the possible introduction of invasive non-native species (5).	Slightly elevated risk due to access by vehicles, the exclusion of grazers and use of maintenance machinery in the Norfolk Projects area.
Structure and function: vegetation structure - patterns of vegetation with naturally bare ground	**Medium risk within the PCS only**; arising from access by vehicles (1) and the exclusion of grazers (6).	Slightly elevated risk due to the use of vehicles and exclusion of grazers from the Norfolk Projects area.

Attributes	For the Project 'Alone'	For the Project 'In Combination
Structure and function: vegetation structure - zonation and transitions	**Medium risk within the PCS only**; arising from the exclusion of grazers (6).	Slightly elevated risk due to the exclusion of grazers from the Norfolk Projects area.
Supporting processes: air quality (habitat)	No risk	-
Supporting processes: conservation measures (habitat)	No risk; the Project will not affect the ability to manage the SAC.	-
Supporting processes: hydrology (habitat)	Low risk due to fence lines crossing ditches at the PCS and potential for these erode shingle habitats at the location of the fence (8)	Additional risk as the Norfolk Projects fence also crosses ditches.
Supporting processes: sedimentary processes	No risk; the Project will not affect sedimentary processes as it is within an area of stable shingle.	-
Supporting processes: shingle morphology	Low risk; no natural shingle ridges will be damaged during construction or maintenance however the Project could change the shingle morphology along the fence alignment if excavated material is not returned to its original location, and at the ditch crossing. Vehicular access also has the potential to change shingle morphology.	Possible additional risk, depending on reinstatement of shingle at the Norfolk Projects area, and the use of vehicles.
Supporting processes: water quality (habitat)	No risk; this habitat is a 'dry' habitat feed by rainwater.	-

ALDE-ORE & BUTLEY ESTUARIES SAC (UK0030076)

4.2.30 The introduction of invasive non-native species is the only impact pathway arising from the Project with the potential for adverse effects on the Alde-Ore and Butley Estuaries SAC. This could have an adverse effect on the following attributes of the Qualifying features.

- Atlantic salt meadows (Glauco-Puccinellietalia maritimae): Structure and function: vegetation - undesirable species
- Estuaries: Structure: non-native species and pathogens (habitat)

4.2.31 However, these attributes relate to specific species and groups which are already present within the estuarine component of the SAC. These are:

- Common cordgrass *Spartina anglica*.
- Pacific oyster Crassostrea gigas.
- Slipper limpet Crepidula fornicate.
- Benthic ostracod Eusarsiella zostericola.
- Bacterial pathogens from faecal contamination including from birds

4.2.32 There is no risk that the Project would cause the further introduction or spread of these species within the SAC as these only occur in the marine environment, or increase the risk of pathogens beyond any efforts to restore bird populations within the SPA.

4.3 STEP THREE: EFFECTS ON INTEGRITY

ALDE-ORE ESTUARY RAMSAR (UK11002)

4.3.1 Following on from the assessments set out in Section 4.1 and 4.2, the risks that the unmitigated Project would undermine the implied conservation objectives for the Alde-Ore Estuary Ramsar are low. However, without mitigation, adverse effects on the integrity of the Alde-Ore Estuary Ramsar cannot be fully excluded for the following impact factors:

- Factor 3: Disturbance of qualifying interest birds due to the presence of workers during fence installation and removal and when undertaking management and maintenance.
- Factor 5: Spread of non-native invasive species by bringing these on to site on construction and maintenance machinery and materials.
- Factor 6: Removal of gazing animals affecting vegetation composition.
- Factor 7: Increases in nutrients from bird faeces affecting vegetation composition and water quality.

ALDE-ORE ESTUARY SPA (UK9009112)

4.3.2 Similarly, for the Alde-Ore Estuary SPA, the risks are low but adverse effects on site integrity cannot be fully excluded without mitigation for the following impact factors:

- Factor 3: Disturbance of qualifying interest birds due to the presence of workers during fence installation and removal and when undertaking management and maintenance.
- Factor 4: Release of suspended solids and other pollution into waterways during fence installation and removal and when undertaking management and maintenance.
- Factor 6: Removal of gazing animals affecting vegetation composition.
- Factor 7: Increases in nutrients from bird faeces affecting vegetation composition and water quality.

ORFORDNESS - SHINGLE STREET SAC (UK0014780)

4.3.3 For Orfordness - Shingle Street SAC risks are again low but adverse effects on site integrity cannot be fully excluded without mitigation for the following impact factors:

- Factor 1: Damage to qualifying interest habitats, including topography, during fence installation, maintenance and removal, during the installation of a ditch crossing, and during the management of vegetation.
- Factor 4: Release of suspended solids and other pollution into waterways during fence installation and removal, during the installation of a ditch crossing, and when undertaking management and maintenance.
- Factor 5: Spread of non-native invasive species by bringing these on to site on construction and maintenance machinery and materials.
- Factor 6: Removal of gazing animals affecting vegetation composition.
- Factor 7: Increases in nutrients from bird faeces affecting vegetation composition and water quality.
- Factor 8: Changes in hydrology caused by fence lines across ditches.

ALDE-ORE & BUTLEY ESTUARIES SAC (UK0030076)

4.3.4 For Alde-Ore and Butley Estuaries SAC there is no risk that the project would undermine the conservation objectives and therefore adverse effects on the integrity of this SAC can be excluded without mitigation.

4.4 STEP FOUR: MITIGATION MEASURES

FACTOR 1: DAMAGE TO QUALIFYING INTEREST HABITATS, INCLUDING TOPOGRAPHY, DURING FENCE INSTALLATION, MAINTENANCE AND REMOVAL, DURING THE INSTALLATION OF A DITCH CROSSING, AND DURING THE MANAGEMENT OF VEGETATION

4.4.1 The ground disturbance will be the minimum necessary for the installation of fence to minimise damage to the shingle habitat. As far as possible, reinstatement will match the existing topography, preserving any banks which may influence saline lagoons.

4.4.2 The place for the crossing point of the ditch in the south of the PCS will be selected to avoid open shingle banks with a lichen flora. The design of the crossing would result in no permanent loss (i.e. minor and temporary disturbance at most) of shingle habitat. Either a temporary bridge will be used, or a culvert will be installed. The culvert would be covered with shingle which is locally sourced but not from within any Annex I habitat. The final details of the ditch crossing will be set out in the final LIMP and the construction method statement for approval by the Secretary of State and LPA respectively.

4.4.3 Vehicles will travel along existing access tracks as far as possible. Only if necessary, will the vehicles be driven off the existing access tracks and into the PCS. Any vehicles used off the tracks will, where required, use an appropriately agreed method, e.g. low ground pressure rubber tyres or tracks (not steel), such as softrak vehicle, which will not change the shingle morphology.

FACTOR 3: DISTURBANCE OF QUALIFYING INTEREST BIRDS DUE TO THE PRESENCE OF WORKERS DURING FENCE INSTALLATION AND REMOVAL AND WHEN UNDERTAKING MANAGEMENT AND MAINTENANCE.

4.4.4 The installation of the fencing will take place outside the bird nesting period (not between April and August). The works will take less than four weeks and with a maximum of three gangs (three teams of two) working at any one time.

FACTOR 4: RELEASE OF SUSPENDED SOLIDS AND OTHER POLLUTION INTO WATERWAYS DURING FENCE INSTALLATION AND REMOVAL, DURING THE INSTALLATION OF A DITCH CROSSING, AND WHEN UNDERTAKING MANAGEMENT AND MAINTENANCE.

4.4.5 A construction method statement (CMS)will be prepared setting out measures to prevent and reduce aquatic pollution during fence and ditch crossing installation/ removal and the LBBG Implementation and Monitoring Plan will set out similar measures to be implemented during management and maintenance works.

FACTOR 5: SPREAD OF NON-NATIVE INVASIVE SPECIES BY BRINGING THESE ON TO SITE ON CONSTRUCTION AND MAINTENANCE MACHINERY AND MATERIALS.

4.4.6 All machinery, materials and equipment to be brought onto site will be clean and checked for the presence of INNS and mud (which could contain INNS). Detailed measures will be set out in the CMS and LBBG Implementation and Monitoring Plan.

FACTOR 6: REMOVAL OF GAZING ANIMALS AFFECTING VEGETATION COMPOSITION.

4.4.7 To create or maintain open areas, patches of Sea Couch will be cut and outside the breeding season for LBBG. These measures have a dual purpose, firstly to create open areas suitable for nesting LBBG and secondly to minimise negative changes in the vegetation from the removal of grazing. The details will be set out in the LBBG Implementation and Monitoring Plan for the PCS.

FACTOR 7: INCREASES IN NUTRIENTS FROM BIRD FAECES AFFECTING VEGETATION COMPOSITION AND WATER QUALITY

4.4.8 In the event that a gull colony is established within the PCS, and increased nutrients are noted to be affecting features within the site, consideration may be given to removing cut vegetation from the PCS and the designated site, which would therefore help reduce the potential additional nutrients arising from nesting LBBG. The balance of nutrients will be determined by the numbers of nesting birds, which is as yet unknown, however it will be no more than would occur with the restoration of the LBBG population in accordance with the site's conservation objectives. The details will be set out in the LBBG Implementation and Monitoring Plan for the PCS.

FACTOR 8: CHANGES IN HYDROLOGY BY CAUSED BY FENCE LINES ACROSS DITCHES

4.4.9 The fence line may result in change in hydrology should the fence across ditches affect the flow or water should it entrap debris. Therefore, it will be routinely inspected and cleared of debris.

4.4.10 Regular checks will be carried out at all points where the fence crosses an existing drainage channel. Any debris within the channel or trapped on the fence will be removed. Any damage to the channel or the fence will be remediated or scheduled for repair/ replacement. The checks will be carried out at any crossing points at least twice per year when other monitoring is taking place. Additional checks will be scheduled for the complete length of the fencing following a flood event on site. These checks should include for debris removal and integrity checks of the fencing.

4.5 CONCLUSION

4.5.1 With the implementation of the mitigation set out in Section 4.4, it can be ascertained, beyond reasonable doubt, that the Project would not have an adverse effect on the integrity of the following or any other European and Ramsar sites:

- Alde-Ore Estuary Ramsar (UK11002)
- Alde-Ore Estuary SPA (UK9009112)
- Orfordness - Shingle Street SAC (UK0014780)
- Alde-Ore & Butley Estuaries SAC (UK0030076)

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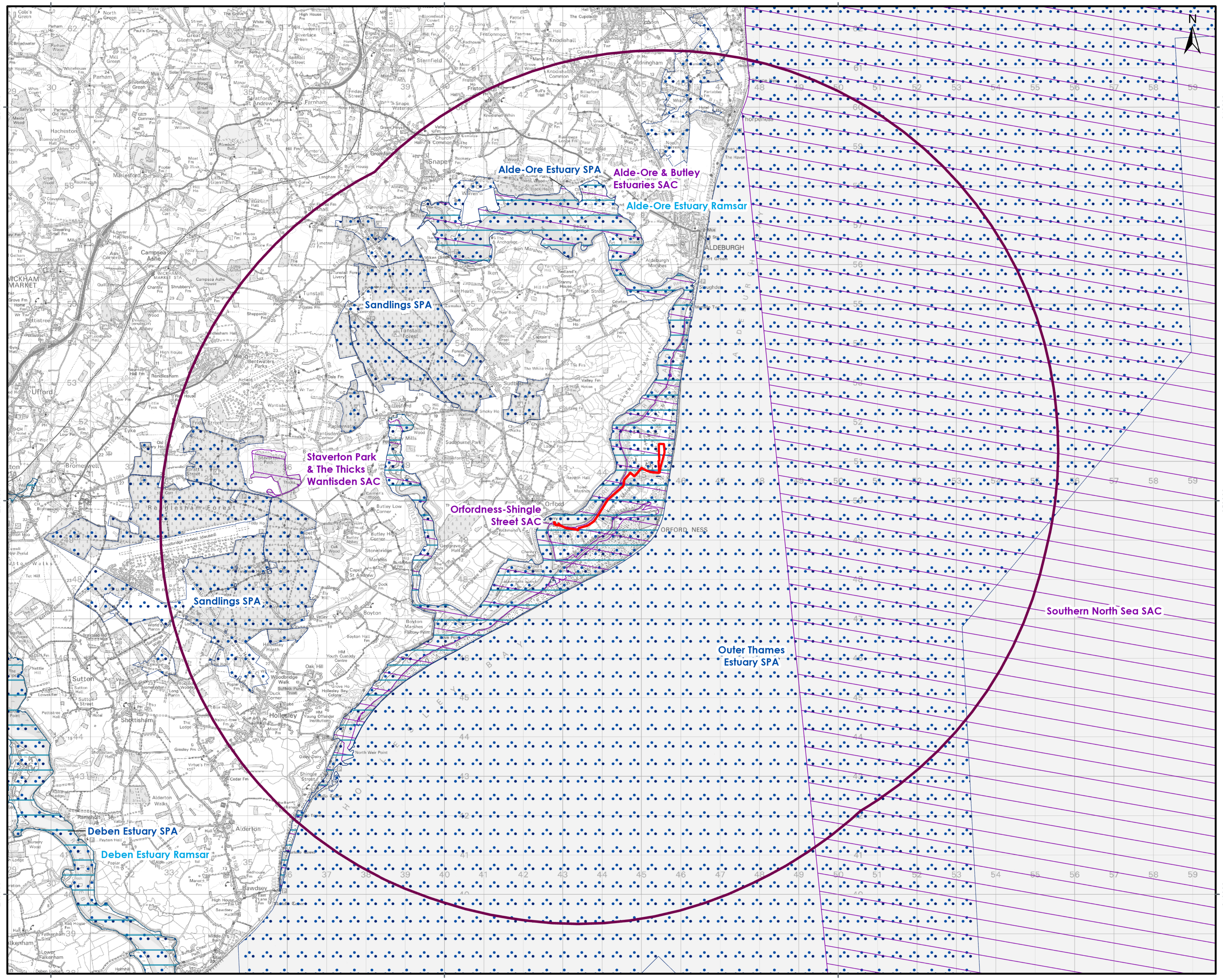


LEGEND

- Lesser Black-backed Gull (LBBG) Compensation Area
- Lesser Black-backed Gull (LBBG) Compensation Area 10 km Buffer
- Ramsar
- Special Protection Area (SPA)
- Special Area of Conservation (SAC)

0 2 4
Kilometres

Data Source:

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

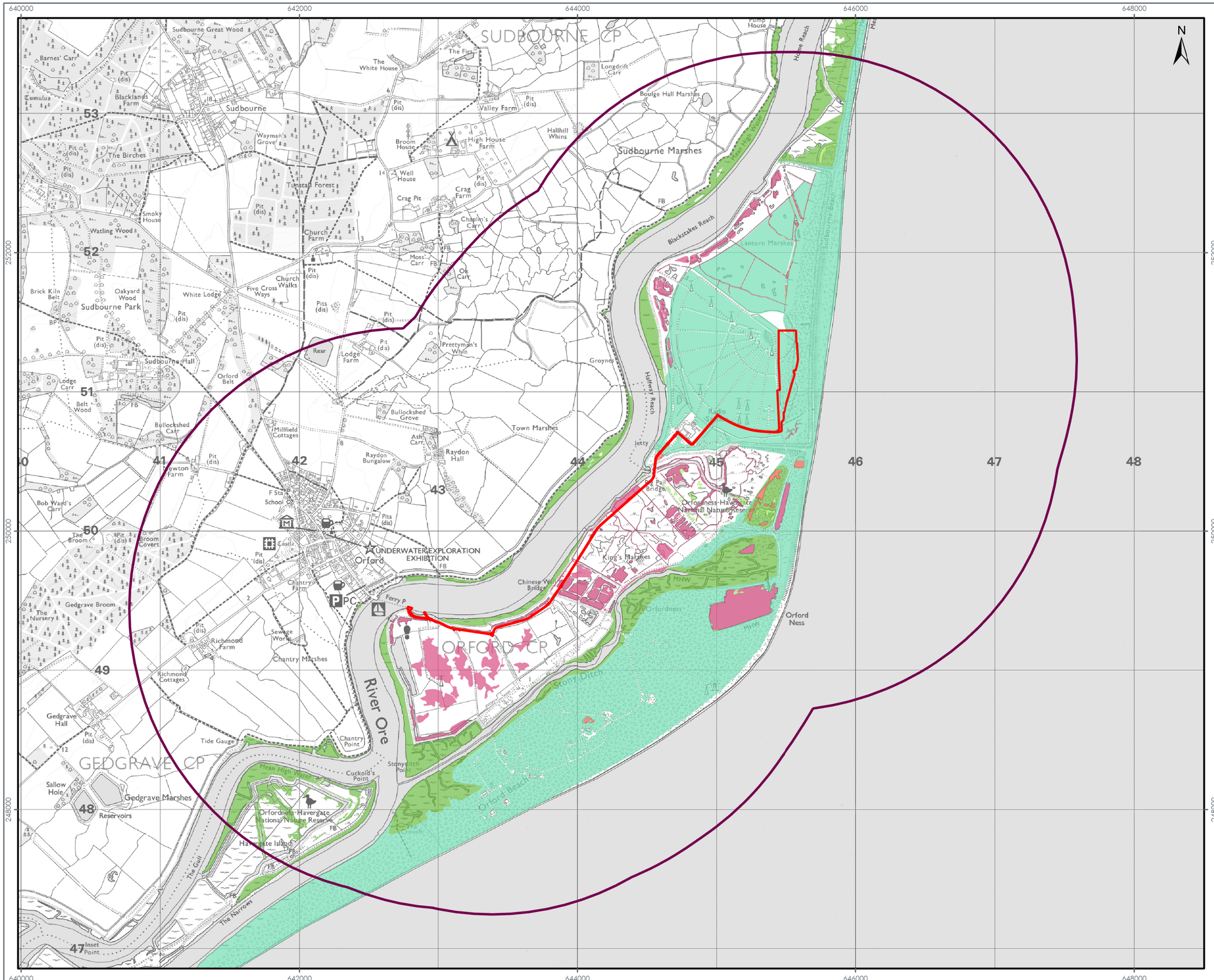
EUROPEAN AND RAMSAR SITES

VER	DATE	REMARKS	Drawn	Checked
1	21/03/2024	ES Submission	QF	JRS
2	02/10/2024	Order Limit Update	JO	JRS

DRAWING NUMBER: 1

SCALE: 1:90,000	PLOT SIZE: A3	DATUM: OSGB 1936	PROJECTION: British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM



LEGEND

- Lesser Black-backed Gull (LBBG) Compensation Area
- Lesser Black-backed Gull (LBBG) Compensation Area 2 km Buffer

Annex I Habitats

- 1330 Atlantic Salt Meadows (Glauco-Puccinellietalia maritimae)
- 1330 Atlantic Salt Meadows (Glauco-Puccinellietalia maritimae)/ 1150 Coastal Lagoons*
- H1220 Perennial Vegetation of Stony Banks
- 1220 Perennial Vegetation of Stony Banks/ 1150 Coastal lagoons*
- H1150 Coastal Lagoons*

Note: * is a priority habitat

0 0.5 1
Kilometres

PROJECT TITLE:

FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:

ANNEX I HABITATS

VER	DATE	REMARKS	Drawn	Checked
1	21/03/2024	ES Submission	QF	JRS
2	02/10/2024	Order Limit Update	JO	JRS

DRAWING NUMBER: 2

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:25,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

645000
645200
645400
645600
645800
251400
251200
251000
250800
N
1150
1220
1150
1150
1150
1150
INSET MAP
Valley Fm
High House Fm
Sudbourne
Crag Fm
Blackstakes Reach
RIVER ORE
Lantern Marshes
Raydon Hall
Town Marshes
King's Marshes
rford
erry P
ORFORD NESS
43
44
45
46
47
48
LEGEND
Lesser Black-backed Gull (LBBG) Compensation Area
Survey Area
Proposed Fence Line
UK Habitat Classification
Ditch
Annex 1 Habitats
1150 Coastal Lagoons*
1220 Perennial Vegetation of Stony Banks
Note
The compensation site has been revised and therefore the Survey Area and Compensation Area the now differ.
* is a priority habitat.
0
50
100
Metres

PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM
DRAWING TITLE:
ANNEX I HABITATS WITHIN PROPOSED COMPENSATION SITE

VER	DATE	REMARKS	Drawn	Checked
1	21/03/2024	ES Submission	QF	JRS
2	02/10/2024	Order Limit Update	JO	JRS

DRAWING NUMBER: 3

SCALE:	PLOT SIZE:	DATUM:	PROJECTION:
1:3,000	A3	OSGB 1936	British National Grid

FIVE ESTUARIES
OFFSHORE WIND FARM

FIVE ESTUARIES
OFFSHORE WIND FARM

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