FIVE ESTUARIES OFFSHORE WIND FARM

VOLUME 5, REPORT 4.1: HABITATS REGULATIONS ASSESSMENTS SITE INTEGRITY MATRICES – REVISION ~~B~~ C (TRACKED)

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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 the purpose.

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
A	Mar-24	ES	GoBe	GoBe	VE OWFL
B	Oct-24	Deadline 2	GoBe	GoBe	VE OWFL
C	Mar-25	Deadline 7	GoBe	GoBe	VE OWFL

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MATRICES

DEFINITION OF ACRONYMS

Term	Definition
EMF	Electromagnetic Field
ECC	Export Cable Corridor
HRA	Habitats Regulations Assessment
INNS	Invasive Non-Native Species
LSE	Likely Significant Effect
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Impact Report
PINS	Planning Inspectorate
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SPA	Special Protected Area
VE	Five Estuaries
VEOWFL	Five Estuaries Offshore Windfarm Limited
WTG	Wind Turbine Generator
ZoI	Zone of Influence

UNITS

Units	Definition
km	Kilometre
cm	Centimetre
m	Metre
ha	Hectare
kg	Kilogram

1 MATRIX KEY

✓ = A potential for AEoI has been identified
X = No potential for AEoI has been identified

Evidence for, or against adverse effects on European site qualifying feature and Likely Significant Effect is detailed within the footnotes to the integrity matrices

C = construction
O = operation and maintenance
D = decommissioning

 = Screened out as effect not relevant to feature (no pathway)

2 INDEX TO MATRICES

2.1.1 This appendix presents the Integrity matrices for Five Estuaries Offshore Wind Farm (OWF, hereafter 'VE') prompted by Five Estuaries Offshore Windfarm Limited (hereafter 'the Applicant') in accordance with the structure and format specified in PINS Advice Note 10 (version 8, from November 2022).

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23	Dengie (Mid-Essex Coast Phase 1) ~~RAMSAR~~Ramsar

Matrix Number	European site included within the assessment
24	Blackwater Estuary (Mid-Essex Coast Phase 4) SPA
25	Blackwater Estuary (Mid-Essex Coast Phase 4) ~~RAMSAR~~Ramsar
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27	Farne Islands SPA
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30	Hamford Water SPA
31	Hamford Water ~~RAMSAR~~Ramsar
32	Stour and Orwell Estuaries SPA
33	Stour and Orwell Estuaries ~~RAMSAR~~Ramsar
34	Colne Estuary (Mid-Essex Coast Phase 2) SPA
35	Colne Estuary (Mid-Essex Coast Phase 2) ~~RAMSAR~~Ramsar
36	Abberton Reservoir SPA
37	Abberton Reservoir ~~RAMSAR~~Ramsar
38	Blackwater Estuary SPA
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45	Minsmere-Walberswick SPA and the PCS

HRA Integrity Matrix 1: Margate and Long Sands (SAC)

Name of European site:	**Margate and Long Sands (SAC)**																	
EU Code:	UK0030371																	
Distance to Project:	23.61 km to array																	
Likely Effects of Project																		
Effect	Physical habitat loss/ disturbance			Suspended sediment/deposition			Accidental pollution			Invasive Non-Native Species (INNS)			EMF			Changes to physical processes		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Sandbanks which are slightly covered by sea water all the time	Xa	Xb	Xc	Xa	Xa	Xa	Xd	Xd	Xd	Xe	Xe	Xe		Xf			Xb	

Evidence supporting conclusions:

Xa Given the short-term nature of the disturbance, the existing tolerance of the benthic habitats to disturbance within this area, and the predicted medium to high recoverability of the biotopes, it is considered that the site's conservation objectives will be maintained in the long-term. As highlighted in paragraphs 11.2.24 and 11.2.25 of Volume 5, Report 4: Report to Inform Appropriate Assessment (RIAA), the biotopes within this area are typical of high energy environments and are therefore naturally subject to, and tolerant of, high levels of physical disturbance. The communities that predominantly characterise these biotopes include infaunal mobile species such as polychaetes and bivalves. The likely biotopes present within the Annex 1 habitat 'sandbanks which are slightly covered by seawater all the time' are deemed to be of low vulnerability, medium to high recoverability and of national value. There is, therefore, no potential for an AEoI.

Xb Given the small area of the SAC which will undergo disturbance, the VE ECC overlaps with 1.36 km^2 of the SAC, and the total area expected to be disturbed by sandwave clearance is 0.63 km^2 (see Volume 6, Part 2, Chapter 5: Benthic and Intertidal Ecology), which equates to 0.09 % of the total SAC, the change is therefore very small compared to total area of habitat available within the SAC and therefore the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

Xc Effects are considered to be similar or less than the construction phase and therefore there is no potential for an AEoI.

Xd The primary source of the pollution risk comes from vessel movements and construction activities. These activities will be managed through the PEMP, ensuring that there are no adverse environmental effects from the works (see paragraph 11.2.50 of Volume 5, Report 4: RIAA and Volume 6, Part 2, Chapter 5: Benthic Ecology). Therefore, there is no potential for an AEoI.

Xe Through increased vessel movements during construction and decommissioning there is a risk that vessels could contribute to the potential introduction or spread of marine INNS through ballast water discharge, however the movement of commercial vessels is common throughout the region (Volume 6, Part 2, Chapter 9: Shipping and Navigation) and this provides an existing and potentially more likely method of transport for Marine INNS (due to the higher variety of ports and passage routes). Furthermore, there is a lack of evidence of any adverse effect from other offshore wind farms within the North Sea of having any adverse effect on key species and habitats through increasing the spread of marine INNS. Additionally, project level commitments to mitigate the risk such as following best practice guidelines and standard operating practices (as managed through the PEMP and biosecurity plan) will ensure the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

Xf Impacts from changes in EMFs arising from cables, are not considered to result in a significant effect on benthic ecology and intertidal receptors. EMFs are likely to be generated by subsea cables and detectable above background levels in close proximity to the cables. Although burial does not mask EMFs it increases the distance between species that may be affected by EMFs and the source. As the cable will be buried or protected, any behavioural responses are likely to be mitigated (see paragraph 11.2.78 of Volume 5, Report 4: RIAA). There is, therefore, no potential for an AEoI.

End of Matrix 1

HRA Integrity Matrix 2: Essex Estuaries SAC

Name of European site:	**Essex Estuaries SAC**																	
EU Code:	UK0013690																	
Distance to Project:	64.38 km to array																	
Likely Effects of Project																		
Effect	Physical habitat loss/ disturbance			Suspended sediment/ deposition			Accidental pollution			Invasive Non-Native Species (INNS)			EMF			Changes to physical processes		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Mudflats and sandflats not covered by seawater at low tide	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Salicornia and other annuals colonizing mud and sand	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Spartina swards	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Atlantic salt meadows	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Mediterranean and thermo-Atlantic halophilous scrubs	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	
Sandbanks which are slightly covered by sea water all the time	Xa	Xa	Xa	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc		Xd			Xa	

Evidence supporting conclusions:

Xa The Essex Estuaries SAC site sits outside the Order limits, however the benthic study area, secondary zone of influence does interact with the site. Nevertheless, given the distance of the site to potential direct interaction with construction and decommissioning activities, the site's conservation objectives will be maintained in the long-term (see paragraph 11.2.97 and 11.2.101 of Volume 5, Report 4: RIAA and Volume 6, Part 2, Chapter 5: Benthic and Intertidal Ecology). There is, therefore, no potential for an AEoI.

Xb The primary source of the pollution risk comes from vessel movements and construction activities. These activities will be managed through the PEMP, ensuring that there are no adverse environmental effects from the works (see paragraph 11.2.50 of Volume 5, Report 4: RIAA and Volume 6, Part 2, Chapter 5: Benthic Ecology). Therefore, there is no potential for an AEoI.

Xc Through increased vessel movements during construction and decommissioning there is a risk that vessels could contribute to the potential introduction or spread of marine INNS through ballast water discharge, however the movement of commercial vessels is common throughout the region (Volume 6, Part 2, Chapter 9: Shipping and Navigation) and this provides an existing and potentially more likely method of transport for Marine INNS (due to the higher variety of ports and passage routes). Furthermore, there is a lack of evidence of any adverse effect from other offshore wind farms within the North Sea of having any adverse effect on key species and habitats through increasing the spread of marine INNS. Additionally, project level commitments to mitigate the risk such as following best practice guidelines and standard operating practices (as managed through the PEMP (Volume 9, Report 18) and biosecurity plan) will ensure the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

Xd Considering the distance of the site from potential direct EMF exposure during O&M activities and ensuring the preservation of the site's conservation objectives over the long term, there is consequently no anticipated occurrence for an AEoI.

End of Matrix 2

HRA Integrity Matrix 3: Berwickshire and North Northumberland Coast SAC

Name of European site:	**Berwickshire and North Northumberland Coast SAC**														
EU Code:	UK0017072														
Distance to Project:	445.9 km to array														
Likely Effects of Project															
Effect	Underwater noise			Vessel collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction, operation and decommissioning. These are addressed for marine mammals, including Grey Seal, in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) to bring disturbance levels down and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for AEoI arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of grey seal diet (i.e., grey seal are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of the grey seal feature. There is, therefore, no AEoI.

Xd Given the highly mobile nature of the species, the low number of seals in the vicinity of VE, the widely available comparable habitat, the relatively small area of habitat loss/disturbed, and the generalist/opportunist nature of grey seals (Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on grey seals.

End of Matrix 3

HRA Integrity Matrix 4: Humber Estuary SAC

Name of European site:	**Humber Estuary SAC**														
EU Code:	UK0030170														
Distance to Project:	203.32 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction, operation and decommissioning. These are addressed for marine mammals, including Grey Seal, in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) to bring disturbance levels down and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for AEoI arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall, it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of grey seals diet (i.e., grey seal are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of the grey seal feature. There is, therefore, no AEoI.

Xd Given the highly mobile nature of the species, the low number of seals in the vicinity of VE, the widely available comparable habitat, the relatively small area of habitat loss/disturbed, and the generalist/ opportunist nature of grey seals (Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on grey seals.

End of Matrix 4

HRA Integrity Matrix 5: Humber Estuary ~~RAMSAR~~Ramsar

Name of European site:	**Humber Estuary ~~RAMSAR~~Ramsar**														
EU Code:	663														
Distance to Project:	197.29 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Grey seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions:

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction, operation and decommissioning. These are addressed for marine mammals, including Grey Seal, in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) to bring disturbance levels down and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for AEoI arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall, it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of grey seals diet (i.e., grey seal are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of the grey seal feature. There is, therefore, no AEoI.

Xd Given the highly mobile nature of the species, the low number of seals in the vicinity of VE, the widely available comparable habitat, the relatively small area of habitat loss/disturbed, and the generalist/opportunist nature of grey seals (Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on grey seals.

End of Matrix 5

HRA Integrity Matrix 6: Southern North Sea SAC

Name of European site:	**Southern North Sea SAC**														
EU Code:	UK0030395														
Distance to Project:	0 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Accidental pollution and changes in water quality			Physical habitat loss/ disturbance		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour porpoise	Xa	Xa	Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xe	Xe	Xe

Evidence supporting conclusions:

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction, operation and decommissioning. These are addressed for marine mammals in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) bring disturbance levels to below seasonal thresholds and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for adverse effects on integrity (AEoI) arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall, it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of harbour porpoises' diet (i.e., harbour porpoise are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of the harbour porpoise feature. There is, therefore, no AEoI.

Xd An Outline PEMP (Volume 9, Report 18) has been provided in the DCO application to ensure that the potential for contaminant release is strictly controlled. The PEMP will include a Marine Pollution Contingency Plan (MPCP), and enables the conclusion that there is, therefore, no AEoI.

Xe Given the highly mobile nature of the species, the widely available comparable habitat, the relatively small area of habitat loss/ disturbed, and the generalist/ opportunist nature of harbour porpoise (Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on harbour porpoise.

End of Matrix 6

HRA Integrity Matrix 7: Wash and North Norfolk Coast SAC

Name of European site:	**Wash and North Norfolk Coast SAC**														
EU Code:	UK0017075														
Distance to Project:	126.45 km to array														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Harbour seal	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb

Evidence supporting conclusions

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction, operation and decommissioning. These are addressed for marine mammals in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) to bring disturbance levels down and reduce the risk of injury to negligible levels. As a result, there will be no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for adverse effects on integrity (AEoI) arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI. With regards to disturbance at haul out sites during construction, operation and decommissioning it is considered that the effect (in terms of disturbance) is of negligible significance for harbour seals, and there is therefore no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of harbour seals diet (i.e., harbour seal are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of the harbour seal feature. There is, therefore, no AEoI.

Xd Given the highly mobile nature of the species, the low number of seals in the vicinity of VE, the widely available comparable habitat, the relatively small area of habitat loss/disturbed, and the generalist/opportunist nature of harbour seals (Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on harbour seals.

End of Matrix 7

HRA Integrity Matrix 8: Transboundary Sites for Seals

Name of European site:	**Transboundary sites for seals (Harbour seal; and Grey seal)**														
EU Code:	Various														
Distance to Project:	Various														
Likely Effects of Project															
Effect	Underwater noise			Collision risk			Changes to prey			Physical habitat loss/ disturbance			Disturbance at haul out		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Bancs des Flandres SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Vlaamse Banken SAC	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Doggersbank (Netherlands) SAC	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Klaverbank SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Noordzeekustone SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 1 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 2 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
SBZ 3 SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Vlakte van de Raan SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Voordelta SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Waddenzee SCI	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
Westerschelde & Saeftinghe	Xa		Xa	Xb	Xb	Xb	Xc	Xc	Xc	Xd		Xd	Xb	Xb	Xb
*Note that some sites may be considered separately for other feature(s), notably seals															

Evidence supporting conclusions:

Xa There are a number of sources of underwater noise associated with Five Estuaries during construction and decommissioning. These are addressed for marine mammals in Volume 6, Part 2, Chapter 7: Marine Mammals and Section 11.3 of Volume 5, Report 4: RIAA. Overall, the impact of underwater noise will be negligible due to the implementation of the SIP (Volume 9, Report 15: Outline SNS SAC Site Integrity Plan) and MMMP (Volume 9, Report 14.1 and Report 14.2: MMMP – Piling and MMMP – UXO, respectively) to bring disturbance levels down and reduce the risk of injury to negligible levels. Furthermore, there is predicted to be a low number of seals to be impacted and the proportion of the population this represents. As a result, there will be

no adverse effects on marine species or ecosystems, and the conservation objectives related to underwater noise levels will not be compromised. Therefore, there is no potential for adverse effects on integrity (AEoI) arising from underwater noise pollution.

Xb Volume 6, Part 2, Chapter 7: Marine Mammals and paragraphs 11.3.132 and 11.3.154 of Volume 5, Report 4: RIAA provides an assessment of vessel collision risk with marine mammals. Volume 6, Part 2, Chapter 9: Shipping and Navigation also provides an assessment of the level of vessel traffic within the areas surrounding VE, which already experiences high levels of vessel traffic. Therefore, it is considered increased vessel traffic associated with activities is insufficient to result in an increase in the risk of mortality or injury to marine mammals through vessel collisions. Furthermore, the adoption of a Working in Proximity to Wildlife protocol (see Volume 9, Report 18.1) would minimise any risk of collision further. There is, therefore, no AEoI. With regards to disturbance at haul out sites during construction, operation and decommissioning it is considered that the effect (in terms of disturbance) is of negligible significance for harbour seals, and there is therefore no AEoI.

Xc Volume 6, Part, Chapter 6: Fish and Shellfish Ecology provides an assessment of the impacts on marine mammals as a result of changes to prey. Overall, it is not predicted that there will be any impacts on marine mammals as a result of changes to the populations or general distributions of fish species within the vicinity of VE. This, coupled with the fact that there may be certain fish species that comprise the main part of seals diet (i.e., seals are considered to be generalist feeders and are thus not reliant on a single prey species) means that there is low risk of changes in prey abundance and distribution affecting the distribution of any seal feature. There is, therefore, no AEoI.

Xd Given the highly mobile nature of seals, the low number of seals in the vicinity of VE, the widely available comparable habitat, the relatively small area of habitat loss/disturbed, and the generalist/opportunist nature of harbour seals (ES Volume 6, Part 2, Chapter 7: Marine Mammal Ecology) it is considered that there is no adverse effect from a loss of available supporting habitat on seals.

End of Matrix 8

HRA Integrity Matrix 9: Outer Thames Estuary SPA

Name of European site:	**Outer Thames Estuary SPA**		
EU Code:	UK9020309A		
Distance to Project:	17.24 km to array		
Likely Effects of Project			
Effect	Disturbance and displacement due to work activity and vessel movements within the ECC only		
Stage of Development	C	O	D
Red-throated diver	Xa		Xa

Evidence supporting conclusions:

Xa Volume 6, Part 2, Chapter 4: Offshore Ornithology and paragraph 11.4.50 onwards in Volume 5, Report 4: RIAA assess the potential impact upon the Outer Thames Estuary SPA and the feature Red Throated Diver. Overall, based on available evidence regarding red-throated diver displacement by operational OWFs, it is suggested that there will be little or no impact on adult survival as a result of displacement, and that any impact would probably be undetectable at the population level. Furthermore, following Natural England's advice a best practice protocol to minimise disturbance on red-throated divers will be adopted and can be found in Volume 9, Report 18.1: Working in Proximity to Wildlife in the Marine Environment. Additionally, export cable installatiomn will not be carried out within the Outer Thames Estuary between 1 November to 31 March inclusive. As a result, there is, therefore no potential for an AEoI.

End of Matrix 9

HRA Integrity Matrix 10: Alde-Ore Estuary SPA

Name of European site:	**Alde-Ore Estuary SPA**		
EU Code:	UK9009112		
Distance to Project:	37.44 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Lesser black-backed gull		✓a	
Avocet		Xb	
Redshank		Xb	
Ruff		Xb	

Evidence supporting conclusions:

✓a Paragraphs 12.4.97 of Volume 5, Report 4: RIAA considers the impacts from collision of Lesser Black-Backed Gull (LBBG) as a feature of the Alde-Ore Estuary SPA, in-combination with other projects. The total in-combination number of lesser black-backed gulls from the Alde-Ore SPA predicted to be subject to collision resultant mortality from the assessed OWFs, including VE, is 57 (56.2) breeding adults. Considering the potential impact of this loss to the Alde-Ore SPA, with a citation population of 28,140 breeding adults and annual background mortality of 3,236 breeding adults per annum, the addition of 57 breeding adults suffering collision consequent mortality would represent a 1.736% increase in baseline mortality, of which VE contributes five (5.48) individuals, representing a 0.169% increase in baseline mortality. Taking into account the ongoing declines at this population, the potential for an AEoI on the conservation objectives for lesser black-backed gull at the Alde Ore Estuary SPA cannot be ruled out. As a result, a derogation case has been conceded for this site and the LBBG feature in-combination. Therefore, a LBBG Compensation – Evidence, Site Selection and Roadmap document (Volume 5, Report 5.3) and LBBG Implementation and Monitoring Plan (Volume 5, Report 5.6) have been submitted as part of the DCO application.

Xb Avocet, Redshank and Ruff were screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling, assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 10

HRA Integrity Matrix 11: Alde-Ore Estuary ~~RAMSAR~~Ramsar

Name of European site:	**Alde-Ore Estuary ~~RAMSAR~~Ramsar**		
EU Code:	UK9009112		
Distance to Project:	37.44 km to array		
Likely Effects of Project			
Effect	Collision risk		
Stage of Development	C	O	D
Lesser black-backed gull		✓a	
Avocet		Xb	
Redshank		Xb	

Evidence supporting conclusions:

✓a Paragraphs 12.4.97 of Volume 5, Report 4: RIAA considers the impacts from collision of Lesser Black-Backed Gull (LBBG) as a feature of the Alde-Ore Estuary SPA and Ramsar, in-combination with other projects. The total in-combination number of lesser black-backed gulls from the Alde-Ore SPA and Ramsar predicted to be subject to collision resultant mortality from the assessed OWFs, including VE, is 57 (56.2) breeding adults. Considering the potential impact of this loss to the Alde-Ore SPA and Ramsar, with a citation population of 28,140 breeding adults and annual background mortality of 3,236 breeding adults per annum, the addition of 57 breeding adults suffering collision consequent mortality would represent a 1.736% increase in baseline mortality, of which VE contributes five (5.48) individuals, representing a 0.169% increase in baseline mortality. Taking into account the ongoing declines at this population, the potential for an AEoI on the conservation objectives for lesser black-backed gull at the Alde Ore Estuary SPA cannot be ruled out in-combination with other plans and projects. As a result, a derogation case has been conceded for this site and the LBBG feature in-combination. Therefore, a LBBG Compensation – Evidence, Site Selection and Roadmap document (Volume 5, Report 5.3) and LBBG Implementation and Monitoring Plan (Volume 5, Report 5.6) have been produced.

Xb Avocet and Redshank were screened due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 11

HRA Integrity Matrix 12: Minsmere-Walberswick SPA

Name of European site:	**Minsmere-Walberswick SPA**		
EU Code:	UK9009101		
Distance to Project:	41.88 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Avocet		Xa	
Bittern		Xa	
Gadwall		Xa	
Greater white-fronted goose		Xa	
Hen harrier		Xa	
Shoveler		Xa	
Teal		Xa	

Evidence supporting conclusions:

Xa Avocet, Bittern, Gadwall, Greater white-fronted goose, Hen harrier, Shoveler and Teal were screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 12

HRA Integrity Matrix 13: Minsmere-Walberswick ~~RAMSAR~~Ramsar

Name of European site:	**Minsmere-Walberswick ~~RAMSAR~~Ramsar**		
EU Code:	UK1044		
Distance to Project:	41.88 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Avocet		Xa	
Bittern		Xa	
Gadwall		Xa	
Marsh harrier		Xa	
Shoveler		Xa	
Teal		Xa	
Bearded tit		Xa	

Evidence supporting conclusions:

Xa Avocet, Bittern, Gadwall, Marsh harrier, Shoveler, Teal and Bearded tit were screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 13

HRA Integrity Matrix 14: Deben Estuary SPA

Name of European site:	Deben Estuary SPA		
EU Code:	UK9009261		
Distance to Project:	48.45 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Avocet		Xa	

Evidence supporting conclusions:

Xa Dark-bellied brent goose and Avocet were screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 14

HRA Integrity Matrix 15: Deben Estuary ~~RAMSAR~~Ramsar

Name of European site:	Deben Estuary ~~RAMSAR~~Ramsar		
EU Code:	UK9009261		
Distance to Project:	48.45 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	

Evidence supporting conclusions:

Xa Dark-bellied brent goose is screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 15

HRA Integrity Matrix 16: Hamford Water SPA

Name of European site:	**Hamford Water SPA**		
EU Code:	UK0030377		
Distance to Project:	51.17 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Avocet		Xa	
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Redshank		Xa	
Ringed plover		Xa	
Shelduck		Xa	
Teal		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 16

HRA Integrity Matrix 17: Hamford Water ~~RAMSAR~~Ramsar

Name of European site:	Hamford Water ~~RAMSAR~~Ramsar		
EU Code:	UK11028		
Distance to Project:	52.89 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Redshank		Xa	
Ringed plover		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 17

HRA Integrity Matrix 18: Stour and Orwell Estuaries SPA

Name of European site:	**Stour and Orwell Estuaries SPA**		
EU Code:	UK9009121		
Distance to Project:	54.81 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	
Knot		Xa	
Pintail		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 18

HRA Integrity Matrix 19: Stour and Orwell Estuaries ~~RAMSAR~~Ramsar

Name of European site:	Stour and Orwell Estuaries ~~RAMSAR~~Ramsar		
EU Code:	UK9009121		
Distance to Project:	54.81 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	
Knot		Xa	
Pintail		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 19

HRA Integrity Matrix 20: Colne Estuary (Mid-Essex Coast Phase 2) SPA

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) SPA**		
EU Code:	UK9009243		
Distance to Project:	66.51 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Pochard		Xa	
Redshank		Xa	
Ringed Plover		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 20

HRA Integrity Matrix 21: Colne Estuary (Mid-Essex Coast Phase 2) ~~RAMSAR~~Ramsar

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) ~~RAMSAR~~Ramsar**		
EU Code:	UK9015022		
Distance to Project:	66.63 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Redshank		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 21

HRA Integrity Matrix 22: Dengie (Mid-Essex Coast Phase 1) SPA

Name of European site:	**Dengie (Mid-Essex Coast Phase 1) SPA**		
EU Code:	UK9009242		
Distance to Project:	73.63 km to array area		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Knot		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 22

HRA Integrity Matrix 23: Dengie (Mid-Essex Coast Phase 1) ~~RAMSAR~~Ramsar

Name of European site:	**Dengie (Mid-Essex Coast Phase 1) ~~RAMSAR~~Ramsar**		
EU Code:	UK9009242		
Distance to Project:	73.63 km to array area		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Dark-bellied brent goose		Xa	
Grey plover		Xa	
Knot		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 23

HRA Integrity Matrix 24: Blackwater Estuary (Mid-Essex Coast Phase 4) SPA

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) SPA**		
EU Code:	UK9009245		
Distance to Project:	77.69 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied Brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this SPA can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 24

HRA Integrity Matrix 25: Blackwater Estuary (Mid-Essex Coast Phase 4) ~~RAMSAR~~Ramsar

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) ~~RAMSAR~~Ramsar**		
EU Code:	UK9009245		
Distance to Project:	77.81 km to array		
Likely Effects of Project			
Effect	Collision risk (migration)		
Stage of Development	C	O	D
Black-tailed godwit		Xa	
Dark-bellied Brent goose		Xa	
Dunlin		Xa	
Grey plover		Xa	

Evidence supporting conclusions:

Xa The above species are screened in due to the potential risk of collision during migration. Paragraph 11.4.226 onwards within Volume 5, Report 4: RIAA and Volume 6, Part 5, Annex 14.4: Migratory Collision Risk Modelling assesses the potential impact of collision upon these species, utilising MigroPath analyses. Overall and considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at this Ramsar can be considered to be minimal and make no material contribution to any changes in population or baseline mortality. There is, therefore, no potential for an AEoI.

End of Matrix 25

HRA Integrity Matrix 26: Flamborough and Filey Coast SPA

Name of European site:	Flamborough and Filey Coast SPA					
EU Code:	UK9006101					
Distance to Project:	275.50 km to array					
Likely Effects of Project						
Effect	Collision risk			Direct disturbance and displacement		
Stage of Development	C	O	D	C	O	D
Kittiwake		Xa				
Gannet		Xa		Xb		Xb
Guillemot				Xb	Xb	Xb
Razorbill				Xb	Xb	Xb

Evidence supporting conclusions:

Xa As highlighted for Gannet in Paragraphs 11.4.174 onwards, of Volume 5, Report 4: RIAA for the effect of collision risk, the addition of less than two possible additional breeding adult mortality per annum equates to less than a 1% increase in baseline mortality, when considering either the citation or the latest colony count. This level of impact would be indistinguishable from natural fluctuations in the baseline mortality rate of breeding adults from this population per annum. Similarly, as highlighted for Kittiwake in Paragraphs 11.4.188 onwards, the addition of one additional adult mortality in the non-breeding equates to less than 1% (0.006%) increase in baseline mortality, when considering either the citation or the latest colony count. Considering the level of impact is <0.01% increase in baseline mortality it would be indistinguishable from natural fluctuations in the baseline mortality rate of breeding adults from this population per annum and is considered to be no material contribution to the natural baseline mortality rates of the colony. Therefore, for both species, there is no potential for an AEoI.

Xb As highlighted in Paragraph 11.4.144 and 11.4.145 of Volume 5, Report 4: RIAA, across all bio-seasons the number of **gannets** estimated to occur in the array area and a 2 km buffer is 940 (939.8) individuals. The total predicted displacement consequent mortality from these birds is estimated at 7 (6.58) individuals per annum. The impact attributed to FFC SPA throughout the operational life of VE is under two (1.51) breeding adult from FFC SPA per annum across all bio-seasons. This prediction of this total consequential additional mortality represents an increase of 0.085% when considering the citation population or an increase of 0.047% when considering the recent colony count across all bio-seasons per annum. This level of impact would be indistinguishable from natural fluctuations in the population. As highlighted in Paragraph 11.4.149 onwards of Volume 5, Report 4: RIAA, in the non-breeding bio-season the number of **guillemots** estimated to occur in the array area and 2 km buffer is 3,698 (3,698.0) individuals. The total predicted consequent mortality of birds within the array from displacement (based on 50% displacement, 1% mortality) is estimated at less than 19 (18.49) individuals. On the assumption that 4.41% of these guillemots are deemed to be breeding adults from the FFC SPA during the non-breeding bio-season (presented in Volume 6, Part 5, Annex 4.15: Apportioning Note), then the consequent mortality from being displaced is estimated at less than one (0.82) breeding adult. Displacement consequent mortalities are based on the range advocated by Natural England (30% to 70% displacement, 1% to 2% mortality). Based on a citation population of 83,214 breeding adults and an annual background mortality of 5,076 breeding adults per annum, the addition of less than one predicted breeding adult mortality would represent an increase in baseline mortality of 0.016%. As the population of guillemot has increased significantly since the citation population count the potential impact on the population is more reasonably assessed against the latest population count undertaken in 2022, consisting of 149,980 individuals and an annual background mortality of 9,149 individuals. On this basis, this would represent a 0.009% increase in baseline mortality in the non-breeding bio-season. As highlighted in Paragraph 11.4.157 onwards of Volume 5, Report 4: RIAA, in the non-breeding bio-seasons, the number of **razorbills** estimated to occur in the array area and 2 km buffer is 757 (756.5) individuals during the return migration, 284 (283.6) during the post-breeding migration, and 1,046 (1046.0) in the migration free winter bio-season. The total predicted consequent mortality of birds within the array area and 2 km buffer from displacement is four (3.8) individuals in the return migration bio-season, less than two (1.4) individuals in the post-breeding migration bio-season and five (5.2) individuals in the migration-free winter bio-season (based on 50% displacement, 1% mortality). On the assumption that 3.38% of the razorbills are deemed to be breeding adults from the FFC SPA during the return migration bio-season (presented in Volume 6, Part 5, Annex 4.15: Apportioning Note), then the consequent mortality from being displaced is estimated at less than one (0.13) breeding adult per annum. During the post-breeding migration bio-season, it is considered that 3.38% of the razorbills are breeding adults from the FFC SPA (presented in Volume 6, Part 5, Annex 4.15: Apportioning Note). Therefore, the consequent mortality of adult birds from FFC SPA from being displaced is estimated at <0.1 (0.05) breeding adult per annum. During the migration-free winter bio-season, it is considered that

0.91% of the razorbills are breeding adults from the FFC SPA (presented in Volume 6, Part 5, Annex 4.15: Apportioning Note). Therefore, the consequent mortality of adult birds from FFC SPA from being displaced is estimated at <0.1 (0.05) breeding adult per annum. This equates to a total consequent mortality from displacement across the entire non-breeding bio-season of less than one (0.22) breeding adults per annum. Based on the citation count of 21,140 breeding adults and a baseline mortality of 2,220 breeding adults per annum, the addition of less than one predicted breeding adult mortality would represent a 0.010% increase in baseline mortality during the non-breeding bio-season. As the population of razorbills has increased significantly since the citation population count the potential impact on the population is more reasonably assessed against the latest population count undertaken in 2022, consisting of 61,346 breeding adults and an annual background mortality of 6,441 breeding adults per annum. On this basis, this would represent a 0.004% increase in baseline mortality during the non-breeding bio-season. Overall, it is considered that there is no potential for an AEoI to the conservation objectives of the gannet, guillemot and razorbill feature of the Flamborough and Filey Coast SPA.

End of Matrix 26

HRA Integrity Matrix 27: Farne Islands SPA

Name of European site:	Farne Islands SPA		
EU Code:	UK9006021		
Distance to Project:	472.54 km to array		
Likely Effects of Project			
Effect	Direct disturbance and displacement		
Stage of Development	C	O	D
Guillemot	Xa	Xa	Xa

Evidence supporting conclusions:

Xa As highlighted in Paragraph 11.4.168 onwards of Volume 5, Report 4: RIAA, in the non-breeding bio-season the number **of guillemots** estimated to occur in the array area and 2 km buffer is 3,698 (3,697.98) individuals. The total predicted consequent mortality of birds within the array from displacement (based on 50% displacement, 1% mortality) is estimated at less than 19 (18.49) individuals. On the assumption that 3.73% of the guillemots are deemed to be breeding adults from the Farne Islands SPA during the non-breeding bio-season (presented in Volume 6, Part 5, Annex 4.15: Apportioning Note), then the consequent mortality from being displaced is estimated at less than one (0.69) breeding adult. Based on the citation population of 65,750 breeding adults and a baseline mortality of 4,011 breeding adults per annum, the addition of less than one mortality would represent a 0.017% increase in baseline mortality. As the population of guillemot has changed since the citation population count the potential impact on the population is more reasonably assessed against the latest population count undertaken in 2017, consisting of 64,042 breeding adults and an annual background mortality of 3,907 breeding adults per annum. On this basis, this would represent a 0.018% increase in baseline mortality in the nonbreeding bio-season. This level of impact would be indistinguishable from natural fluctuations in the population. Therefore, there is no potential for an AEoI.

End of Matrix 27

HRA Integrity Matrix 28: Vlaamse Banken (Special Area of Conservation (SAC)

Name of European site:	**Vlaamse Banken SAC**		
EU Code:	BEMNZ000		
Distance to Project:	34.75 km to array		
Likely Effects of Project			
Effect	Underwater noise		
Stage of Development	C	O	D
Twaite shad	Xa		Xa

Evidence supporting conclusions:

Xa Although Group 3 fish species are considered to be the most sensitive to underwater noise, due to their mobile nature Twaite shad are considered a fleeing/ mobile receptor in the assessment presented in Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology; as they are expected to transit an impacted area (unlike some spawning receptors that exhibit site fidelity such as herring and sandeel). Therefore, twaite shad are expected to recover quickly, returning to normal behaviours and recolonise areas shortly after an impact. Furthermore, Group 3 species are broadly distributed and present in abundance within the southern North Sea region with the small impact range potentially affecting only a small proportion of the regional population, according to Volume 6, Part 2, Chapter 6: Fish and Shellfish Ecology. Therefore, given that any impacts from underwater noise are expected to be of local scale and the intermittent nature of the noisy activities, the maximum magnitude of impact from mortality, potential mortal injury and recoverable injury is reported to be negligible, with an overall impact conclusion of minor adverse. If it is assumed that effects on a designated site generally reduce with increasing distance from an impact source, considering the distance of Vlaamse Banken SAC to VE (34.75 km to array area), the likelihood of exposure to lethal or injurious sounds levels (i.e., limited to within <100 m of the array for mortality, mortal injury and recoverable injury for both the temporal and spatial MDS) is expected to be low and limited to sporadic, low numbers of twaite shad associated with Vlaamse Banken SAC. As such, mortalities and or recoverable injuries due to exposure to underwater noise are not expected to manifest at levels that could compromise the maintenance of the twaite shad population. There is, therefore, no potential for an AEoI.

End of Matrix 28

HRA Integrity Matrix 29: Hamford Water SAC

Name of European site:	**Hamford Water SAC**																	
EU Code:	UK0030377																	
Distance to Project:	0 km to onshore ECC																	
Likely Effects of Project																		
Effect	Impacts on supporting populations, food plant and potential habitat outside the SAC			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity			Decrease in air quality			Increase in lighting			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Fisher's estuarine moth	Xa		Xa	Xb		Xb	Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa The effects of construction and decommissioning activities on the site are expected to be minor as Fisher's estuarine moths are limited to the areas outside of the project site and therefore their habitat is expected to remain intact and undisturbed. As highlighted, within Paragraph 11.6.54 of Volume 5, Report 4: RIAA, there would be de minimis risk (for unscheduled maintenance only, no risk for scheduled maintenance) of undermining the conservation objectives for Fisher's estuarine moth. As with the outlined mitigation in Volume 5, Report 4: RIAA, hog's fennel plants would remain in place, available for the larval stage of the moth, leading to population outside of the SAC being maintained. Such populations will support the restoration of the Fisher's estuarine moth population within the SAC via immigration. There is, therefore, no potential for AEoI.

Xb As highlighted in Paragraph 11.6.61 of Volume 5, Report 4: RIAA onwards, and with the actions outline in the Code of Construction Practice, there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xc As highlighted in Paragraph 11.6.60 of Volume 5, Report 4: RIAA, as construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. There is, therefore, no potential for AEoI.

Xd Whilst the period of illuminated construction partially overlaps with the flight period during a maximum of two years, there is little possibility for it to interact with the individuals that form part of the population of Fisher's Estuarine Moth for which the SAC is designated and limited interaction with a supporting population outside the SAC and therefore would not affect the population of moths. Therefore, lighting will not undermine the conservation objectives of Hamford Water SAC when considering the Project alone.

Xe With the low likelihood of hog's fennel/ Fisher's estuarine moth being present in the vicinity of the VE onshore ECC, due to its rarity, despite the lack of information appertaining to North Falls, the situation is likely to be similar to that of VE. There is, therefore, no potential for AEoI, in-combination.

End of Matrix 29

HRA Integrity Matrix 30: Hamford Water SPA

Name of European site:	**HAMFORD WATER SPA**														
EU Code:	UK9009131														
Distance to Project:	51.04 km to array														
Likely Effects of Project															
Effect	Habitat loss			Disturbance of birds outside the SPA			Pollution (air quality)			Decreases in water quantity			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Avocet	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xd		Xd
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Shelduck	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Teal	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc				Xd		Xd

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd Qualifying avian interest features will not be affected by any hydrological changes and there will be no adverse effect on Hamford Water SPA. With the actions outlined in the Code of Construction Practice (Volume 9, Report 21), there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

End of Matrix 30

HRA Integrity Matrix 31: Hamford Water Ramsar

Name of European site:	**Hamford Water Ramsar**																	
EU Code:	UK11028																	
Distance to Project:	0.72 km to array																	
Likely Effects of Project																		
Effect	Disturbance of birds outside the Ramsar			Decrease in air quality			Habitat loss			Water quality: pollution from site run-off affecting prey availability			Decreases in water quantity			Loss of foraging and roosting habitat outside the Ramsar		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Dark-bellied brent goose	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Redshank	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe
Ringed plover	Xa	Xa	Xa	Xb		Xb	Xc		Xc	Xd		Xd	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xb As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xd Qualifying avian interest features will not be affected by any hydrological changes and there will be no adverse effect on Hamford Water Ramsar. With the actions outlined in the Code of Construction Practice (Volume 9, Report 21), there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

End of Matrix 31

HRA Integrity Matrix 32: Stour and Orwell Estuaries SPA

Name of European site:	**Stour and Orwell Estuaries SPA**																	
EU Code:	UK9009121																	
Distance to Project:	54.81 km to array																	
Likely Effects of Project																		
Effect	Disturbance of birds outside the SPA			Decreases in water quantity			Decrease in air quality			Habitat loss			Pollution from site run-off affecting prey availability			Loss of foraging and roosting habitat outside the SPA		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dark-bellied brent goose	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dunlin	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Grey plover	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Knot										Xc		Xc	Xd		Xd	Xe		Xe
Pintail	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Redshank	Xa	Xa	Xa				Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Avocet	Xa	Xa	Xa	Xd	Xd	Xd	Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe
Waterbird assemblage	Xa	Xa	Xa	Xd	Xd	Xd	Xb		Xb	Xc		Xc	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xb As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xd Qualifying avian interest features will not be affected by any hydrological changes and there will be no adverse effect on the Stour and Orwell Estuaries SPA. With the actions outlined in the Code of Construction Practice (Volume 9, Report 21), there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe Habitat loss will be limited and will not undermine conservation objectives and therefore will have no adverse effects on the integrity of the designated site identified. There is, therefore, no AEoI.

End of Matrix 32

HRA Integrity Matrix 33: Stour and Orwell Estuaries ~~RAMSAR~~Ramsar

Name of European site:	**Stour and Orwell Estuaries ~~RAMSAR~~Ramsar**																	
EU Code:	UK9009121																	
Distance to Project:	54.80 km to array																	
Likely Effects of Project																		
Effect	Disturbance / displacement of birds outside of Ramsar			Decrease in air quality			Loss of foraging and roosting habitat outside the SPA			Decreases in water quantity.			Pollution from site run-off affective prey availability			Collision Risk		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Dark-bellied brent goose	Xg	Xg	Xg	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Dunlin	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Grey plover	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Knot	Xa	Xa	Xa				Xc			Xd		Xd	Xe		Xe		Xf	
Pintail	Xh	Xh	Xh	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Redshank	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Waterbird assemblage	Xa	Xa	Xa	Xb		Xb	Xc			Xd		Xd	Xe		Xe		Xf	
Wetland invertebrate assemblage				Xb		Xb				Xd		Xd						
Wetland plant assemblage				Xb		Xb				Xd		Xd						

Evidence supporting conclusions:

Xa Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xb As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xd Qualifying avian interest features will not be affected by any hydrological changes and there will be no adverse effect on the Stour and Orwell Estuaries SPA. With the actions outlined in the Code of Construction Practice (Volume 9, Report 21), there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

Xf Considering the highly precautionary nature of the outputs of the MigroPath analyses, impacts to migrating birds at the scoped in SPAs and ~~RAMSAR~~Ramsars can be considered minimal and make no material contribution to any changes in population or baseline mortality. Therefore, there is no potential for an AEoI.

Xg With consideration of the mitigation being implemented (timing of works/maintenance, vibro-piling technology, fencing for visual and acoustic screening, suspending works during very cold periods, construction lighting at HDD locations would be at the lowest, safest permissible level and with light spill minimised and on-site measures overseen by an ECoW), the predicted potential disturbance to the species is reduced to negligible levels, and therefore there is no potential for AEoI.

Xh With consideration of the distance from any construction this species was recorded and the infrequency of observations, we conclude that the conservation objectives will not be undermined by this effect and there is no potential for AEoI.

End of Matrix 33

HRA Integrity Matrix 34: Colne Estuary (Mid-Essex Coast Phase 2) SPA

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) SPA**														
EU Code:	UK9009243														
Distance to Project:	66.51 km to array														
Likely Effects of Project															
Effect	Habitat loss			Direct disturbance and displacement			Pollution (air quality)			Decreases in water quantity			Pollution from site run-off affecting prey availability		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Hen harrier	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd Qualifying avian interest features will not be affected by any hydrological changes and there will be no adverse effect on the Stour and Orwell Estuaries SPA. With the actions outlined in the Code of Construction Practice (Volume 9, Report 21), there will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xe The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 34

HRA Integrity Matrix 35: Colne Estuary (Mid-Essex Coast Phase 2) ~~RAMSAR~~Ramsar

Name of European site:	**Colne Estuary (Mid-Essex Coast Phase 2) ~~RAMSAR~~Ramsar**														
EU Code:	UK9015022														
Distance to Project:	66.63 km to array														
Likely Effects of Project															
Effect	Loss of foraging and roosting habitat outside the SPA			Disturbance/displacement of birds outside of Ramsar			Pollution (air quality)			Invasive Non-Native Species (INNS)			Pollution from site run-off affecting prey availability		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Redshank	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd	Xe	Xe	Xe
Wetland invertebrate assemblage										Xd	Xd	Xd			
Wetland plant assemblage										Xd	Xd	Xd			
Saltmarsh										Xd	Xd	Xd			

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity.

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd Through increased vessel movements during construction and decommissioning there is a risk that vessels could contribute to the potential introduction or spread of marine INNS through ballast water discharge, however the movement of commercial vessels is common throughout the region (Volume 6, Part 2, Chapter 9: Shipping and Navigation) and this provides an existing and potentially more likely method of transport for Marine INNS (due to the higher variety of ports and passage routes). Furthermore, there is a lack of evidence of any adverse effect from other offshore wind farms within the North Sea of having any adverse effect on key species and habitats through increasing the spread of marine INNS. Additionally, project level commitments to mitigate the risk such as following best practice guidelines and standard operating practices (as managed through the PEMP and biosecurity plan) will ensure the site's conservation objectives will be maintained in the long-term. There is, therefore, no potential for an AEoI.

Xe The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 35

HRA Integrity Matrix 36: Abberton Reservoir SPA

Name of European site:	**Abberton Reservoir SPA**											
EU Code:	UK9009141											
Distance to Project:	11.4 km to onshore EEC											
Likely Effects of Project												
Effect	Habitat loss			Disturbance of birds outside the SPA			Decrease in air quality			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Cormorant	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Coot	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Gadwall	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Great crested grebe	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Mute swan	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Shoveler	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Widgeon	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Teal	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Tufted Duck	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb The conservation objectives would not be undermined for the identified sites in relation to important wintering populations of the designated species during construction, operation and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 36

HRA Integrity Matrix 37: Abberton Reservoir ~~RAMSAR~~Ramsar

Name of European site:	**Abberton Reservoir ~~RAMSAR~~Ramsar**											
EU Code:	UK9009141											
Distance to Project:	11.4 km to ECC											
Likely Effects of Project												
Effect	Habitat loss			Disturbance of birds outside the Ramsar			Decrease in air quality			Water quality: pollution from site run-off affecting habitat quality		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D
Gadwall	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Shoveler	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Widgeon	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd	Xd	Xd

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb The conservation objectives would not be undermined for the identified sites in relation to important wintering populations of the designated species during construction, operation and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

End of Matrix 37

HRA Integrity Matrix 38: Blackwater Estuary SPA

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) SPA**														
EU Code:	UK9009245														
Distance to Project:	77.69 km to array														
Likely Effects of Project															
Effect	Habitat loss			Disturbance / displacement of birds outside SPA			Pollution (air quality)			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dark-bellied Brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Dunlin	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Hen harrier	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Little tern	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Pochard	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe
Ringed plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

Xe There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

End of Matrix 38

HRA Integrity Matrix 39: Blackwater Estuary ~~RAMSAR~~Ramsar

Name of European site:	**Blackwater Estuary (Mid-Essex Coast Phase 4) ~~RAMSAR~~Ramsar**																	
EU Code:	UK11007																	
Distance to Project:	77.81 km to array																	
Likely Effects of Project																		
Effect	Habitat loss			Disturbance / displacement of birds outside SPA			Decreases in air quality			Water quality: pollution from site run-off affecting habitat quality			Decreases in water quantity			Impacts on supporting populations of plants and invertebrates outside the Ramsar		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Black-tailed godwit	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Dark-bellied brent goose	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Dunlin	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Grey plover	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf
Waterbird assemblage	Xa		Xa	Xb	Xb	Xb	Xc		Xc	Xd		Xd	Xe		Xe	Xf	Xf	Xf

Evidence supporting conclusions:

Xa See paragraph 11.6.76 onwards of Volume 5, Report 4: RIAA which highlights the potential impact upon avian features. The majority of habitat loss will be temporary, only during construction. With permanent habitat loss limited to only the footprint of TJBs, junction boxes and the OnSS. There will be no permanent intertidal habitat loss. Any permanent habitat loss will be minimal (refer to Volume 6, Part 3, Chapter 1: Onshore Project description) and could not undermine the conservation objectives. There is, therefore, no AEoI.

Xb Disturbance and displacement of a predicted small number of individuals will not result in the conservation objectives of the site being undermined in relation to the important wintering populations of the designated species during construction, operation, and decommissioning for the Project alone or in combination. Therefore, there would be no adverse effect on integrity

Xc As construction air quality level changes were below threshold, maintenance levels will be considerably below threshold and will not undermine the conservation objectives for species with similar thresholds. Air quality impacts during operation will not have an adverse effect on the relevant designated sites, in relation to air quality during operation for VE alone. Overall, the conservation objectives would not be undermined by any changes in air quality associated with the Project either alone or in combination. Therefore, there would be no adverse effect on integrity and no potential for AEoI.

Xd The impact of pollution from site run-off on prey availability will be minimal and will not significantly affect the ecological balance of the area. The conservation objectives related to prey populations and their availability for the designated species will remain intact throughout the project's lifecycle, including construction, O&M, and decommissioning phases. Therefore, there will be no adverse effect on the integrity of the ecosystem, ensuring the continued sustainability of the site and its ecological functions.

Xe There will be no impact on water quality or quantity, in relation to the construction or decommissioning of the Project. There is, therefore, no potential for AEoI.

Xf The effects of construction and decommissioning activities on the site are expected to be minor as Fisher’s estuarine moths are limited to the areas outside of the project site and therefore their habitat is expected to remain intact and undisturbed. There is, therefore, no potential for AEoI.

End of Matrix 39

HRA Integrity Matrix 40: Alde-Ore Estuary Ramsar and the PCS

Name of European site:	**Alde-Ore Estuary Ramsar**																							
EU Code:	UK0030076																							
Distance to Project:	0m to Proposed Compensation Site, overlaps																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Rare plants	Xa	Xa	Xa	Xb	Xb	Xb				Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Rare invertebrates	Xa	Xa	Xa	Xc	Xc	Xc				Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Avocet (breeding)	Xa	Xa	Xa	Xd	Xd	Xd	Xd	Xd	Xd	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Lesser black-backed gull (breeding)		Xa	Xa		Xd	Xd		Xd	Xd	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Little tern (breeding)	Xa	Xa	Xa				Xd	Xd	Xd	Xg	Xg	Xg	Xh	Xh	Xh					Xi			Xj	
Marsh harrier (breeding)	Xa	Xa	Xa	Xd	Xd	Xd	Xd	Xd	Xd				Xh	Xh	Xh		Xi						Xj	
Mediterranean Gull (Breeding)													Xh	Xh	Xh									
Sandwich tern (breeding)													Xh	Xh	Xh									
Avocet (non-breeding)	Xa	Xa	Xa				Xd	Xd	Xd	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Common greenshank (non-breeding)	Xa	Xa	Xa				Xe	Xe	Xe	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Black tailed godwit (non-breeding)	Xa	Xa	Xa				Xe	Xe	Xe	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	

Name of European site:	Alde-Ore Estuary Ramsar																						
Shelduck (non-breeding)	Xa	Xa	Xa				Xe	Xe	Xe	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Shoveler (non-breeding)	Xa	Xa	Xa				Xe	Xe	Xe	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Spotted redshank (non-breeding)	Xa	Xa	Xa				Xe	Xe	Xe	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Redshank (non-breeding)	Xa	Xa	Xa				Xf	Xf	Xf	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
Teal (non-breeding)	Xa	Xa	Xa				Xf	Xf	Xf	Xg	Xg	Xg	Xh	Xh	Xh		Xi			Xi			Xj	
White fronted goose (non-breeding)																								
Wigeon (non-breeding)																								

Evidence supporting conclusions:

Xa The shingle excavated install and remove the fence will be reinstated, maintaining existing contours and levels, taking particular care where embankments along the ditches may retain standing water. Wooden objects will be retained in situ or relocated nearby, not removed. Vehicular access will be along existing tracks and only vehicles with low ground pressure will be used off the tracks. With these measures in places, the assumed conservation objectives for the qualifying could not be undermined and there will be no adverse effect on the integrity of the Ramsar site.

Xb No rare plant species have been recorded in or near the PCS and they are not expected to be present along the fence line which is dominated by coarse grass. This most likely species are 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. Nevertheless, a pre-installation survey will be undertaken along the fence line and any rare plants will be retained as far as possible.

Xc Rare and scarce invertebrates have been recorded in the PCS. These are associated with wooden objects, open habitats and water, whereas much of the fence would be installed in areas dominated by dense sea couch. Any mortality associated with installing and removing the fence would be within natural fluctuations and could not have lasting effects on the abundance of these species. Management will benefit the invertebrate populations by creating open areas.

Xd The installation and removal of the fencing will take place outside the bird nesting period (not between April and August). Management and routine maintenance will also take place outside the bird breeding season.

Xe The habitat within the PCS is largely unsuitable for this species however the lagoon and other nearby lagoons could be used occasionally. The works to install and remove the fence will take less than four weeks and with a maximum of three gangs (three teams of two) working at any one time. This could not result in significant disturbance of this species population.

Xf The habitat within the PCS is largely unsuitable for this species and but it has been recorded using nearby lagoons. The works to install and remove the fence will take less than four weeks and with a maximum of three gangs (three teams of two) working at any one time, with monitoring and maintenance works will be fewer gangs and a similar period of time. There will be much less human activity at this time than during the summer when Orford Ness is open to visitors. The works could not result in significant disturbance of this species population.

Xg The amounts of any pollution will be tiny and unlikely to have an appreciable effect on any of the qualifying features. Nevertheless, 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.

Xh 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). The fence line will be surveyed for existing invasive non-native plant species in advance of the works. Any found will be removed and appropriately disposed of. Detailed measures will be set out in the CMS and LBBG Implementation and Monitoring Plan. Biosecurity measures will be employed to reduce the risks of spreading Avian Influenza.

Xi 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 by Chinese Water Deer and Brown Hare (which will be excluded from the PCS by the fence). The details will be set out in the LBBG Implementation and Monitoring Plan for the PCS. 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 details will be set out in the LBBG Implementation and Monitoring Plan for the PCS.

Xj The fence line will be routinely inspected and cleared of debris where it crosses ditches.

End of Matrix 40

HRA Integrity Matrix 41: Alde-Ore Estuary SPA and the PCS

Name of European site:	**Alde-Ore Estuary SPA**																							
EU Code:	UK9009112																							
Distance to Project:	0m to Proposed Compensation Site, overlaps																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Avocet (Breeding)	Xa	Xa	Xa	Xb	Xb	Xb	Xb	Xb	Xb	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	
Lesser black-backed gull (Breeding)		Xa	Xa		Xb	Xb		Xb	Xb	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	
Little tern (Breeding)	Xa	Xa	Xa				Xb	Xb	Xb	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	
Sandwich tern (Breeding)													Xf	Xf	Xf		Xg			Xg			Xh	
Marsh harrier (Breeding)	Xa	Xa	Xa	Xb	Xb	Xb	Xb	Xb	Xb				Xf	Xf	Xf		Xg						Xh	
Avocet (non-breeding)	Xa	Xa	Xa				Xc	Xc	Xc	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	
Redshank (non-breeding)	Xa	Xa	Xa				Xd	Xd	Xd	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	
Ruff (non-breeding)	Xa	Xa	Xa				Xc	Xc	Xc	Xe	Xe	Xe	Xf	Xf	Xf		Xg			Xg			Xh	

Evidence supporting conclusions:

Xa The shingle excavated install and remove the fence will be reinstated, maintaining existing contours and levels, taking particular care where embankments along the ditches may retain standing water. Vehicular access will be along existing tracks and only vehicles with low ground pressure will be used off the tracks. With these measures in places, the conservation objectives for the qualifying could not be undermined and there will be no adverse effect on the integrity of the Ramsar site.

Xb The installation and removal of the fencing will take place outside the bird nesting period (not between April and August). Management and routine maintenance will also take place outside the bird breeding season.

Xc The habitat within the PCS is largely unsuitable for this species however the lagoon and other nearby lagoons could be used occasionally. The works to install and remove the fence will take less than four weeks and with a maximum of three gangs (three teams of two) working at any one time. This could not result in significant disturbance of this species population.

Xd The habitat within the PCS is largely unsuitable for this species and but it has been recorded using nearby lagoons. The works to install and remove the fence will take less than four weeks and with a maximum of three gangs (three teams of two) working at any one time, with monitoring and maintenance works will be fewer gangs and a similar period of time. There will be much less human activity at this time than during the summer when Orford Ness is open to visitors. The works could not result in significant disturbance of this species population.

Xe The amounts of any pollution will be tiny and unlikely to have an appreciable effect on any of the qualifying features. Nevertheless, 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.

Xf 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). The fence line will be surveyed for existing invasive non-native plant species in advance of the works. Any found will be removed and appropriately disposed of. Detailed measures will be set out in the CMS and LBBG Implementation and Monitoring Plan. Biosecurity measures will be employed to reduce the risks of spreading Avian Influenza.

Xg 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 by Chinese Water Deer and Brown Hare (which will be excluded from the PCS by the fence). The details will be set out in the LBBG Implementation and Monitoring Plan for the PCS. 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 details will be set out in the LBBG Implementation and Monitoring Plan for the PCS.

Xh The fence line will be routinely inspected and cleared of debris where it crosses ditches.

End of Matrix 41

HRA Integrity Matrix 42: Orfordness - Shingle Street SAC and the PCS

Name of European site:	**Orfordness - Shingle Street SAC**																							
EU Code:	UK0014780																							
Distance to Project:	0m to Proposed Compensation Site, overlaps																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Coastal lagoons	Xa	Xa	Xa							Xc	Xc	Xc	Xd	Xd	Xd		Xe			Xe			Xf	
Annual vegetation drift lines													Xd	Xd	Xd									
Perrenial vegetation of stony banks	Xb	Xb	Xb										Xd	Xd	Xd		Xe			Xe			Xf	

Evidence supporting conclusions:

Xa Coastal Lagoons are not along the fence line, access tracks or within temporary works areas and therefore will not be damaged during fence installation, maintenance and removal, nor during the installation of a ditch crossing, nor during the management of vegetation. Reinstatement of shingle will match the existing topography, preserving any banks which may influence saline lagoons.

Xb The PCS is within an area of shingle habitat which has been modified, lacking natural ridges. 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. 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. 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).

Xc The amounts of any pollution will be tiny and unlikely to have an appreciable effect on any of the qualifying features. Nevertheless, 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.

Xd 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). The fence line will be surveyed for existing invasive non-native plant species in advance of the works. Any found will be removed and appropriately disposed of. Detailed measures will be set out in the CMS and LBBG Implementation and Monitoring Plan.

Xe 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 by Chinese Water Deer and Brown Hare (which will be excluded from the PCS by the

fence). The details will be set out in the LBBG Implementation and Monitoring Plan for the PCS. 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 details will be set out in the LBBG Implementation and Monitoring Plan for the PCS.

Xf The fence line will be routinely inspected and cleared of debris where it crosses ditches.

End of Matrix 42

HRA Integrity Matrix 43: Alde-Ore & Butley Estuaries SAC and the PCS

Name of European site:	**Alde-Ore & Butley Estuaries SAC**																							
EU Code:	UK0030076																							
Distance to Project:	0m to Proposed Compensation Site, adjacent to the access track																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Estuaries										Xa	Xa	Xa	Xb	Xb	Xb					Xa				
Mudflats and sandflats not covered by seawater at low tide										Xa	Xa	Xa	Xb	Xb	Xb					Xa				
Atlantic salt meadows													Xb	Xb	Xb					Xa				

Evidence supporting conclusions:

Xa There are no clear surface water connections between the PCS and this SAC, and any connection is likely to be via groundwater only.

Xb The conservation objectives relate to specific species and groups which are already present within the estuarine component of the SAC. There is no risk that the Project would cause the further introduction or spread of these species within the SAC.

End of Matrix 43

HRA Integrity Matrix 44: Minsmere - Walberswick Ramsar and the PCS

Name of European site:	**Minsmere – Walberswick Ramsar**																							
EU Code:	UK11044																							
Distance to Project:	13,065m to Proposed Compensation Site																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Great Bittern (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Gadwall (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Eurasian teal (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Northern shoveler (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Marsh harrier (breeding)	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa				Xa	Xa	Xa		Xa						Xa	
Pied avocet (breeding)	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Bearded tit (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	

Evidence supporting conclusions:

Xa With mitigation, effects which could undermine the conservation objectives of the same or equivalent qualifying interest features of the Alde-Ore SPA and Ramsar can be excluded. Therefore, there is no possibility of direct (disturbance) or indirect effects (all other effects) on the populations of these species at Minsmere-Walberswick Ramsar.

End of Matrix 44

HRA Integrity Matrix 45: Minsmere-Walberswick SPA and the PCS

Name of European site:	**Minsmere – Walberswick SPA**																							
EU Code:	UK9009101																							
Distance to Project:	13,065m to Proposed Compensation Site																							
Likely Effects of Project																								
Effect	Damage to qualifying interest habitats or the habitats of the qualifying interest species			Direct mortality of qualifying interest animals and plants			Disturbance of qualifying interest birds due to the presence of workers			Release of suspended solids and other pollution into waterways			Spread of non-native invasive species			Removal of gazing animals affecting vegetation composition			Increases in nutrients from bird faeces affecting vegetation composition and water quality			Changes in water flows caused by fence lines across ditches		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Eurasian teal (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Great Bittern (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
European nightjar (breeding)																								
Northern shoveler (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Gadwall (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Pied avocet (breeding)	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Little tern (breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	

Name of European site:	Minsmere – Walberswick SPA																							
Eurasian marsh harrier (non-breeding)	Xa	Xa	Xa				Xa	Xa	Xa				Xa	Xa	Xa					Xa			Xa	
Northern shoveler (non-breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Gadwall (non-breeding)	Xa	Xa	Xa				Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa	Xa		Xa			Xa			Xa	
Great white-fronted goose (non-breeding)																								
Hen Harrier (non-breeding)	Xa	Xa	Xa				Xa	Xa	Xa				Xa	Xa	Xa					Xa			Xa	

Evidence supporting conclusions:

Xa With mitigation, effects which could undermine the conservation objectives of the same or equivalent qualifying interest features of the Alde-Ore SPA and Ramsar can be excluded. Therefore, there is no possibility of direct (disturbance) or indirect effects (all other effects) on the populations of these species at Minsmere-Walberswick SPA.

End of Matrix 45

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FIVE ESTUARIES
OFFSHORE WIND FARM

PHONE 0333 880 5306
EMAIL fiveestuaries@rwe.com
WEBSITE www.fiveestuaries.co.uk
ADDRESS Five Estuaries Offshore Wind Farm Ltd
Windmill Hill Business Park
Whitehill Way, Swindon, SN5 6PB
COMPANY NO Registered in England and Wales
company number 12292474