



# White Cross Offshore Windfarm Environmental Statement

## Chapter 27: Inter-relationships



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## Glossary of Acronyms

<b>Acronym</b>	<b>Definition</b>
<b>ALARP</b>	As Low As Reasonably Practicable
<b>BEIS</b>	Department for Business, Energy and Industrial Strategy
<b>EIA</b>	Environmental Impact Assessment
<b>ES</b>	Environmental Statement
<b>ETG</b>	Expert Topic Group
<b>INNS</b>	Invasive Non-Native Species
<b>IPC</b>	Infrastructure Planning Commission
<b>LPA</b>	Local Planning Authority
<b>m</b>	Metre
<b>MHWS</b>	Mean High Water Springs
<b>MLWS</b>	Mean Low Water Springs
<b>MMO</b>	Marine Management Organisation
<b>MoD</b>	Ministry of Defence
<b>MW</b>	Megawatts
<b>NRA</b>	Navigational Risk Assessment
<b>NPS</b>	National Policy Statement
<b>NSIP</b>	Nationally Significant Infrastructure Project
<b>NRA</b>	Navigational Risk Assessment
<b>Ofgem</b>	Office of Gas and Electricity Markets
<b>OFTO</b>	Offshore Transmission Owner
<b>OWL</b>	Offshore Wind Ltd
<b>PTS</b>	Permanent Threshold Shift
<b>TCPA</b>	Town and Country Planning Act
<b>TTS</b>	Temporary Threshold Shift
<b>UK</b>	United Kingdom
<b>UKC</b>	Under Keel Clearance
<b>UXO</b>	Unexploded Ordnance
<b>WTG</b>	Wind Turbine Generator

## Glossary of Terminology

Defined Term	Description
<b>Agreement for Lease</b>	An Agreement for Lease (AfL) is a non-binding agreement between a landlord and prospective tenant to grant and/or to accept a lease in the future. The AfL only gives the option to investigate a site for potential development. There is no obligation on the developer to execute a lease if they do not wish to.
<b>Applicant</b>	Offshore Wind Limited
<b>Cumulative effects</b>	The effect of the Project taken together with similar effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with the Project.
<b>Department for Business, Energy and Industrial Strategy (BEIS)</b>	Government department that is responsible for business, industrial strategy, science and innovation and energy and climate change policy and consent under Section 36 of the Electricity Act.
<b>Environmental Impact Assessment (EIA)</b>	Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning.
<b>Export Cable Corridor</b>	The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NG Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor.
<b>Generation Assets</b>	The infrastructure of the Project related to the generation of electricity within the windfarm site, including wind turbine generators, substructures, mooring lines, seabed anchors and inter-array cables
<b>In-combination effects</b>	In-combination effects are those effects that may arise from the development proposed in combination with other plans and projects proposed/consented but not yet built and operational.
<b>Inter-array cables</b>	Cables which link the wind turbines to each other and the Offshore Substation Platform, or at the inter-array cables junction box (if no offshore substation). Array cables will connect the wind turbines to one and other and to the Offshore Substation (if utilised). The initial section for the inter-array cables will be freely suspended in the water column below the substructure (dynamic sections) while the on seabed sections of the cables will be buried where possible.
<b>Landfall</b>	Where the offshore export cables come ashore
<b>Mean high water springs (MHWS)</b>	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.

Defined Term	Description
<b>Mean low water springs (MLWS)</b>	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
<b>Mean sea level</b>	The average tidal height over a long period of time.
<b>Mooring system</b>	The equipment (mooring lines and seabed anchors) that keeps the floating substructure in position during operation through a fixed connection to the seabed.
<b>Mitigation</b>	<p>Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels.</p> <p>For the purposes of the EIA, two types of mitigation are defined:</p> <ul style="list-style-type: none"> <li>• Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA</li> <li>• Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant impacts. Additional mitigation is therefore subsequently adopted by OWL as the EIA process progresses.</li> </ul>
<b>Offshore Development Area</b>	The Windfarm Site (including wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and Offshore Export Cable Corridor to MHWS at the Landfall. This encompasses the part of the project that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
<b>Offshore Export Cables</b>	The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall
<b>Offshore Export Cable Corridor</b>	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall
<b>Offshore Infrastructure</b>	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
<b>Offshore Junction Box</b>	If an offshore substation is not required, the inter-array cables will combine at a point where a junction box will merge them into the one export cable. The need for a substation is yet to be decided.

Defined Term	Description
<b>the Offshore Project</b>	The Offshore Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the windfarm site (e.g. wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required).
<b>Offshore Substation Platform</b>	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore
<b>Offshore Transmission Assets</b>	The aspects of the project related to the transmission of electricity from the generation assets including the Offshore Substation Platform (as applicable)) or offshore junction box, Offshore Cable Corridor to MHWS at the landfall
<b>the Onshore Project</b>	The Onshore Project for the onshore TCPA application includes all elements onshore of MLWS. This includes the infrastructure associated with the offshore export cable (from MLWS), landfall, onshore export cable and associated infrastructure and new onshore substation (if required).
<b>Offshore Wind Limited</b>	Offshore Wind Ltd (OWL) is a joint venture between Cobra Instalaciones Servicios, S.A., and Flotation Energy Ltd
<b>the Project</b>	the Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100MW. It encompasses the project as a whole i.e. all onshore and offshore infrastructure and activities associated with the Project
<b>Project Design Envelope</b>	A description of the range of possible elements that make up the Project design options under consideration. The Project Design Envelope, or 'Rochdale Envelope' is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect.
<b>White Cross Offshore Windfarm</b>	100MW capacity offshore windfarm including associated onshore and offshore infrastructure
<b>Wind Turbine Generators (WTG)</b>	The wind turbine generators convert wind energy into electrical power. Key components include the rotor blades, nacelle (housing for electrical generator and other electrical and control equipment) and tower. The final selection of project wind turbine model will be made post-consent application
<b>Windfarm Site</b>	The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present
<b>Works completion date</b>	Date at which construction works are deemed to be complete and the windfarm is handed to the operations team. In reality, this may take place over a period of time.

## 27. Inter-relationships

### 27.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the inter-relationships identified during the Environmental Impact Assessment (EIA) process for the White Cross Offshore Windfarm Project (the Offshore Project). Specifically, this chapter considers the potential impact of the Offshore Project seaward of Mean High-Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases.
2. The ES has been finalised with due consideration of pre-application consultation to date (see **Chapter 7: Consultation**) and the ES will accompany the application to the Marine Management Organisation (MMO) on behalf of the Secretary of State for Business for The Department for Business, Energy and Industrial Strategy (BEIS) for Section 36 Consent and relevant Marine Licences under the Marine and Coastal Access Act (2009).
3. This ES chapter summarises the inter-relationships that have been identified on each receptor or receptor group by the technical chapters contained within this ES. These include:
  - **Chapter 8: Marine Geology, Oceanography and Physical Processes**
  - **Chapter 9: Marine Water and Sediment Quality**
  - **Chapter 10: Benthic and Intertidal Ecology**
  - **Chapter 11: Fish and Shellfish Ecology**
  - **Chapter 12: Marine Mammal and Marine Turtle Ecology**
  - **Chapter 13: Offshore Ornithology**
  - **Chapter 14: Commercial Fisheries**
  - **Chapter 15: Shipping and Navigation**
  - **Chapter 16: Marine Archaeology and Cultural Heritage**
  - **Chapter 17: Civil and Military Aviation**
  - **Chapter 18: Infrastructure and Other Users**
  - **Chapter 19: Offshore Seascape, Landscape and Visual Amenity**
  - **Chapter 20: Onshore Ecology and Ornithology**
  - **Chapter 21: Noise and Vibration**
  - **Chapter 22: Traffic and Transport**
  - **Chapter 23: Socio-Economics (including Tourism and Recreation)**
  - **Chapter 24: Human Health**
  - **Chapter 25: Climate Change**
  - **Chapter 26: Accidents and Disasters.**



4. Inter-relationships have been described taking into account all of the impacts that have been identified upon specific receptors. Both beneficial and adverse impacts have been considered in this process. Where appropriate to do so, a combined impact from all of the sources affecting a receptor has been identified.
5. When considering the potential for inter-relationships to occur, it is assumed that an effect determined as having no impact on a receptor will not result in an inter-relationship when combined with other effects on the same receptor. However, where a series of negligible or greater residual impacts are identified, they are taken forward for further consideration.

## 27.2 Policy, Legislation and Guidance

6. **Chapter 3: Policy and Legislative Context** describes the wider policy and legislative context for the Offshore Project. The principal policy and legislation used to inform the assessment of potential impacts on inter-relationships for the Offshore Project are outlined in this section.

### 27.2.1 National Policy Statement

7. Specific assessment requirements for inter-relationships are set out within the overarching National Policy Statement (NPS) for Energy (EN-1) are summarised in **Table 27.1**. National Policy Statements (NPS) are statutory documents which set out the government's policy on specific types of Nationally Significant Infrastructure Projects (NSIPs) and are published in accordance with the Planning Act 2008. Although the Offshore Project is not an NSIP, it is recognised that due to its size of 100MW and its location in English waters, certain NPS are considered relevant to the Offshore Project and decision-making and are referred to in this ES.

*Table 27.1 Summary of NPS EN-1 and EN-3 provisions relevant to inter-relationships*

Summary	How and where this is considered in the ES
<p>"The Infrastructure Planning Commission (IPC) (now the Planning Inspectorate) should consider how the accumulation of, and inter-relationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place." - <b>EN-1 paragraph 4.2.6</b></p>	<p>This is considered throughout <b>Section 27.3</b>.</p>

#### 27.2.1.1 Other relevant guidance

8. The Offshore Project is based on a project design envelope (or 'Rochdale Envelope') approach. The advice note nine 'Rochdale Envelope' approach has been employed

under the Planning Act 2008. It is recognised by consenting authorities that, at the time of submitting an application, offshore wind developers may not know the precise nature and arrangement of infrastructure and associated infrastructure that make up the proposed development.

9. The general principle of the assessment, under the project design envelope approach, is that for each receptor the impact assessment will be based on assessing project design parameters likely to result in the maximum adverse effect (i.e. the worst-case scenario) for each potential impact. The Rochdale Envelope for a project outlines the realistic worst-case scenario for each individual impact, so that it can be safely assumed that all lesser options will have less impact.
10. Using the project design envelope approach means that receptor-specific potential impacts draw on the options from within the wider envelope that represent the most realistic worst-case-scenario. It is also worth noting that under this approach the combination of project options constituting the realistic worst-case scenario may differ from one receptor to another and from one impact to another.
11. In accordance with the accepted industry approach, the impact assessments have been undertaken based on a realistic worst-case scenario of predicted impacts, which are set out within each topic chapter. The project design envelope for the proposed White Cross Wind Farm project is detailed in **Chapter 5: Project Description**.

### 27.2.2 Study Area

12. The inter-relationships study area is defined by the distance over which all potential impacts from the Offshore Project (i.e. Offshore Substation Platform, Offshore Export Cable Corridor, Landfall and Taw Estuary Crossing) may occur and by the location of any receptors that may be affected by those potential impacts.
13. Details of the location of the Offshore Project and offshore infrastructure are set out within **Chapter 5: Project description**.

### 27.2.3 Approach to Assessment

14. The assessment methodology for inter-relationships is consistent with that presented in **Chapter 6: EIA Methodology**. The methodology used to identify potential inter relationship impacts may differ depending on which topic identified the impact. Environmental topics may have used different assessment approaches and the methodology each used will be detailed within their respective chapters.
15. Inter-relationship impacts are covered as part of the assessment and consider impacts from the construction, operation or decommissioning of the Offshore Project

on the same receptor (or group). A description of the process to identify and assess these effects is presented in **Chapter 6: EIA Methodology**. The potential inter-relationship effects that could arise include both:

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

## 27.3 Assessment of Impacts

### 27.3.1 Inter-relationships that affect Marine and Physical Processes

16. Potential inter-relationship impacts that are relevant to marine geology, oceanography and physical processes are:

- Construction impacts on coastal morphology. Disruption to coastal morphology could potentially impact on these receptors through a change to the existing shoreline environment which could have implications for the receptors associated with these chapters.
- Construction impacts on seabed morphology. Disruption to seabed morphology and sediment composition could affect these receptors by altering the existing sedimentary environment. However, this is unlikely to be to levels which are significant.
- Construction impacts on suspended sediment concentrations and deposition. Suspended sediment could be contaminated and could cause disturbance to fish and benthic species through smothering.
- Operational impacts on waves, tidal currents, bedload sediment transport and seabed morphological change. Disruption to seabed morphology and sediment composition could affect these receptors by altering the existing sedimentary environment. However, this is unlikely to be to levels which are significant.
- Operational impacts on suspended sediment concentrations and transport. Suspended sediment could be contaminated and could cause disturbance to fish and benthic species through smothering.

17. Inter-relationships for effects during the decommissioning phase will be the same as those outlined above for the construction phase.
18. Although the effects assessed on marine physical processes have the potential to impact a number of other receptors, no inter-relationships have been identified where an accumulation of residual effects on marine physical processes and the relationship between those effects give rise to additional impacts or impacts of greater significance. When assessed individually, all impacts were assessed as negligible or had no effect. Impacts were not significant due to the low magnitude of effects and low sensitivity of the receptors. For the impacts assessed, no mitigation was required, therefore there is no need for additional mitigation. For further details see **Chapter 8: Marine Geology, Oceanography and Physical Processes**.

### 27.3.2 Inter-relationships that affect Marine Water and Sediment Quality

19. Potential inter-relationship effects that could arise in relation to Marine Water and Sediment Quality include:
- Construction effects on suspended sediment concentrations and potential mobilisation of contaminants. Suspended sediment could cause disturbance to fish and turtles by causing a barrier to movement and benthic species through smothering. Sediments may also be contaminated which could harm fish, turtles and benthic species. Marine mammals may be affected through changes in prey availability.
  - Operational effects on suspended sediment concentrations and potential mobilisation of contaminants. Suspended sediments (which may also contain contamination) may affect beach users during construction or during maintenance of the cable in the inshore area.
20. Inter-relationships for impacts during the decommissioning phase will be the same as those outlined above for the construction phase.
21. All potential impacts have been assessed in **Chapter 9: Marine Water and Sediment Quality** as negligible with residual impacts also being negligible. This is due to the low sensitivity of the water quality in the offshore area and the negligible magnitude of impacts. No inter-relationships have been identified where an accumulation of residual impacts on marine water and sediment quality and the relationships between those impacts give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### **27.3.3 Inter-relationships that affect Benthic and Intertidal Ecology**

22. Potential inter-relationship effects that could arise in relation to benthic and intertidal ecology include:

- Temporary habitat loss/physical disturbance and permanent habitat loss.
  - Habitat loss through temporary or permanent alteration of the seabed could potentially disturb the form and function of the seabed (e.g. sand waves). Loss of habitat may also have knock-on effects on predator species, which may affect marine mammal populations, or populations of commercially important fishes.
- Changes in suspended sediment concentrations and associated sediment deposition could have potential impacts on benthic habitats and species.
- Re-mobilisation of contaminated sediments and associated deposition could have potential impacts on benthic habitats and species.
- The benthic environment represents a habitat for many fish and shellfish species. Additionally, a number of benthic species are prey for fish and shellfish. Therefore, impacts on benthic ecology can lead to indirect impacts on fish and shellfish.

23. Inter-relationships for impacts during the decommissioning phase will be the same as those outlined above for the construction phase.

24. The magnitude of potential effects on benthic and intertidal ecology arising from all impacts identified during the construction, operation and decommissioning of the Offshore Project was negligible. Impacts were assessed as negligible, due to the resilience of majority of receptors being high and having a low sensitivity to impacts. Many of the impacts assessed are also temporary and highly localised, leading to less of a significant effect.

25. All potential impacts assessed had a negligible impact, other than Invasive Non-Native Species (INNS) which had a minor adverse impact. For the impact of INNS, employment of biosecurity measures in accordance with the relevant regulations and guidance will be carried out. There are no residual impacts therefore it is not likely for there to be any potential inter-relationship impacts.

### **27.3.4 Inter-relationships that affect Fish and Shellfish ecology**

26. Potential inter-relationship effects that could arise in relation to Fish and Shellfish Ecology include:

- Habitat loss through temporary or permanent alteration of the seabed could potentially disturb the form and function of the seabed (e.g. sand waves). Loss of habitat may also have knock-on effects on predator species, which may affect marine mammal populations, or populations of commercially important fishes.
- An increase in suspended sediment concentration could affect foraging success of predatory mammals and fishes. Similarly, sediment deposition has the potential to smother larval/egg stages or benthic species, with negative implications for commercial fishing that targets these species.
- Underwater noise from unexploded ordnance (UXO) clearance, impact piling or other construction/operation activities has the potential to cause temporary threshold shift (TTS), permanent threshold shift (PTS), or mortality in some species of marine mammals or commercial fish species in worst-case scenarios.
- The presence of the windfarm infrastructure (e.g. turbines and substructures) during the operational phase has the potential for barrier effects for marine mammals accessing or transiting through the area.
- There is a potential risk of indirect entanglement with marine mammal species if ghost fishing gear becomes attached to structures within the Windfarm Site.

27. Potential impacts considered within **Chapter 11: Fish and Shellfish Ecology** were assessed as negligible or minor adverse, with no residual impacts. Conclusions of potential impacts being negligible were as a result of the low sensitivity for all receptors and low magnitude level across all potential impacts.

28. As a result, no inter-relationships have been identified where an accumulation of residual impacts on fish and shellfish ecology give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### **27.3.5 Inter-relationships that affect Marine Mammal and Marine Turtle Ecology**

29. Potential inter-relationship effects that could arise in relation to marine mammals and marine turtle ecosystems include:

- Increased vessel traffic underwater noise associated with the Offshore Project could affect the level of disturbance for marine mammals.
- Increased vessel traffic associated with the Offshore Projects could affect the level of collision risk for marine mammals.
- Potential impacts on fish species could affect the prey resource for marine mammals.
- Potential changes to water quality, could affect marine mammals directly or indirectly a result of impacts on prey species.

30. When assessing potential impacts during construction, operation, maintenance and decommissioning all impacts were assessed as minor adverse in **Chapter 12: Marine Mammal and Marine Turtle Ecology**. Interaction Impacts were assessed as no greater than when individually assessed. No inter-relationships have been identified where an accumulation of residual impacts on marine mammals give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### 27.3.6 Inter-relationships that affect Offshore Ornithology

31. The construction, operation and decommissioning phases of the Offshore Project may cause a range of effects on offshore ornithological receptors. The magnitude of these effects has been assessed individually using expert judgement, drawing from a wide science base that includes project-specific surveys and previously acquired knowledge of the bird ecology of western waters.

32. These effects have the potential to form an inter-relationship, directly impacting the seabird receptors. They also have the potential to manifest as sources for impacts upon receptors other than those considered within the context of offshore ornithology.

33. Potential inter-relationship effects include indirect impacts through impacts on prey during construction, operation and maintenance and decommissioning.

34. However, as none of the offshore impacts on birds were assessed individually to have any greater than a **minor adverse** effect, it is considered highly unlikely that they will inter-relate to form an overall significant effect on offshore ornithology receptors.

35. Therefore, mitigation as described within **Chapter 13: Offshore Ornithology** will be sufficient and no additional mitigation is required for inter-relationship impacts.

### 27.3.7 Inter-relationships that affect Commercial Fisheries

36. Potential inter-relationship effects that could arise in relation to Commercial Fisheries include:

- Impacts on commercially important fish and shellfish species could indirectly affect the fisheries that target them.
- Potential increases in steaming distances and times to fishing grounds may occur due to fishing vessels having to divert around the windfarm site and the export cable corridor.
- Increases in vessel activity and presence in the area due to the Offshore Project may interfere with commercial fishing activity.

37. When assessing the potential impacts in **Chapter 14: Commercial Fisheries** between interactions, it was found the impacts were of no greater significance than when individually assessed. Due to location and small size of the Offshore Project relative to the locations and extent of fishing grounds, it has been assessed that, at national fleet level, none of the potential impacts would be at levels of significance that would require direct mitigation. However, it is considered that a limited number of local vessels whose static gears would require relocation from the offshore export cable corridor during the installation phases of the export cable would require direct mitigation. Therefore, mitigation as described within **Chapter 14: Commercial Fisheries** will be sufficient and no additional mitigation is required for inter-relationship impacts.

### 27.3.8 Inter-relationships that affect Shipping and Navigation

38. Potential inter-relationship effects that could arise in relation to Shipping and Navigation include:

- Safety implications to fishing vessels, including snagging and a reduction in Under Keel Clearance (UKC). These impacts may lead to displacement. The commercial implications of displacement are assessed in **Chapter 14: Commercial Fisheries**.
- The presence of the wind farm site has the potential to displace recreational activities. Displacement may impact access to recreational routes and tourism. Impacts to recreational vessel safety and displacement are assessed within this chapter. Impacts associated with loss of access are addressed in **Chapter 18: Infrastructure and Other Users**.
- Impacts to communications and emergency response, including helicopter access. Aviation impacts, including low flying operations is assessed in **Chapter 17: Civil and Military Aviation**.

39. Assessment of potential impacts within **Chapter 15: Shipping and Navigation** suggest all impacts are not significant within EIA terms with the embedded mitigation.

40. Assessment of the impacts throughout the Offshore Project lifecycle has established that while there will be some residual impacts during the construction, operation and decommissioning phases, they are not considered significant since they are assessed as low as reasonably practicable (ALARP) or lower in the Navigational risk assessment (NRA). Justification for why they are considered ALARP is given in the relevant impacts in **Sections 15.5, 15.6 and 15.7**.



41. The Windfarm Site is located in an area of low vessel intensity and is not predicted to have an appreciable impact on vessel routes and no appreciable increase in collision risk is anticipated. Impacts on Under Keel Clearance and snagging risk are not considered significant with embedded mitigation in place.
42. No inter-relationships have been identified where an accumulation of residual impacts on shipping and navigation give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### **27.3.9 Inter-relationships that affect Marine Archaeology and Cultural Heritage**

43. There are potential inter-relationship effects that could arise in relation to Marine Archaeology and Cultural Heritage. An inter-relationship effect from the construction, operation and maintenance phases is the potential for indirect impact to heritage assets from changes to physical processes. Significant changes to physical processes may impact the preservation/survival of buried/exposed heritage assets.
44. In **Chapter 16: Marine Archaeology and Cultural Heritage**, potential mitigation is described for the potential impacts linked to this receptor. Assessments looking into the potential interaction impacts suggest impacts are of no greater significance than when individually assessed. No inter-relationships have been identified where an accumulation of residual impacts on marine and coastal archaeology give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### **27.3.10 Inter-relationships that affect Civil and Military Aviation**

45. Potential inter-relationship effects that could arise in relation to Civil and Military Aviation include aviation lighting. Any lighting requirements for maritime and aviation navigation will be proposed accordingly with the requirements defined through consultation.
46. Assessments within the **Chapter 17: Civil and Military Aviation** conclude potential negligible to moderate impacts and negligible residual impacts. These conclusions are due to the sensitivity of the receptors is considered to be low, and the magnitude of cumulative effects is deemed to be low.
47. No inter-relationships have been identified where an accumulation of residual impacts on military activities and civil aviation give rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation.

### 27.3.11 Inter-relationships that affect Infrastructure and Other Users

48. The potential inter-relationship effects that could arise in relation to infrastructure and other users include:

- Potential interference with other wind farms:
  - Vessels in transit and helicopter operations are considered to feed into the overall assessment of the asset.
- Physical impacts on subsea cables:
- Impacts on disposal and aggregate sites:
  - Vessels in transit are considered to feed into the overall assessment of the asset.
- Impacts on Ministry of Defence (MoD) activities:
  - Vessels in transit are considered to feed into the overall assessment of the asset.
- Potential effects on tourism and recreation:
  - The displacement to activities is identified in the chapter and inform the associated socio-economic assessment.

49. **Chapter 18: Infrastructure and Other Users** assessments indicate all potential impacts are either negligible or minor adverse and concluded there is no potential for interactions between impacts on the difference infrastructure and other users described in the chapter. The assessments also showed how residual impacts were either negligible or minor adverse due to the proposed embedded mitigation.

50. No inter-relationships have been identified where an accumulation of residual impacts on Infrastructure and Other Users give rise to additional impacts or impacts of greater significance. Therefore, due to the embedded mitigation that has been proposed, there is no need for additional mitigation.

### 27.3.12 Inter-relationships that affect Offshore Seascape, Landscape and Visual Amenity

51. The potential inter-relationship effects that could arise in relation to infrastructure and other users include:

- Potential construction and decommissioning inter-relationships:

- Marine Archaeology and Cultural Heritage:
  - Potential for temporary, short-term, and reversible changes due to the addition of the generation assets of the Offshore Project, resulting in effects on the setting of cultural heritage assets, including Registered Parks and Gardens, and Heritage Coasts.
- Socio-Economics, and Tourism and Recreation:
  - Potential for temporary, short-term, and reversible changes due to the addition of the generation assets of the Offshore Project resulting in indirect effect to visitor and tourist use of the coast including receptors such as beaches, recreational routes, golf courses and visitor attractions.
- Potential operation and maintenance inter-relationships:
  - Marine Archaeology and Cultural Heritage:
    - Potential for temporary, long-term, and reversible changes due to the addition of the generation assets of the Offshore Project, resulting in effects on the setting of cultural heritage assets, including Registered Parks and Gardens, and Heritage Coasts.
  - Socio-Economics, and Tourism and Recreation
    - Potential for temporary, long-term, and reversible changes due to the addition of the generation assets of the Offshore Project resulting in indirect effect to visitor and tourist use of the coast including receptors such as beaches, recreational routes, golf courses and visitor attractions.

52. All potential interaction impacts assessed within **Chapter 19: Offshore Seascape, Landscape and Visual Amenity** were found to be no greater than individually assessed impacts.

53. The assessment undertaken for offshore seascape, landscape and visual amenity has included a wide range of viewpoints and receptors. The potential for inter-relationships (during all phases of the development) is predominantly associated with the linkages between impacts on the seascape and visual amenity and other human receptors (captured as tourism, heritage and recreation). The assessment described in **Chapter 19: Offshore Seascape, Landscape and Visual Amenity** provides a

fully comprehensive and representative assessment and is inherently inclusive of inter-relationships from the most sensitive of these receptor locations.

## 27.4 Summary

54. This chapter has summarised the potential effects on inter-relationship receptors arising from the Offshore Project during construction, operation, maintenance and decommissioning. The range of potential impacts and associated effects considered has been informed by the Scoping Opinion, consultation, and agreed through Export Topic Group (ETG) Meetings, as well as reference to existing policy and guidance. The impacts considered include those brought about directly as well as indirectly.
55. The specific aim of the inter-relationships assessment has been to identify where the accumulation of residual impacts on a single receptor, and the relationship between those impacts, gives rise to additional impacts or impacts of greater significance. Therefore, there is no need for additional mitigation. In doing so, this has ensured that the environmental impacts of the proposal as a whole have been addressed.
56. A number of inter-relationships have been identified. Where appropriate, the inter-related impact on a given receptor has been found to be assessed in detail in the relevant ES chapter and none of the inter-relationships identified suggest the need for additional mitigation over and above that which is already identified within the assessment chapter.