

Norfolk Vanguard Offshore Wind Farm

Chapter 6

Environmental Impact Assessment Methodology

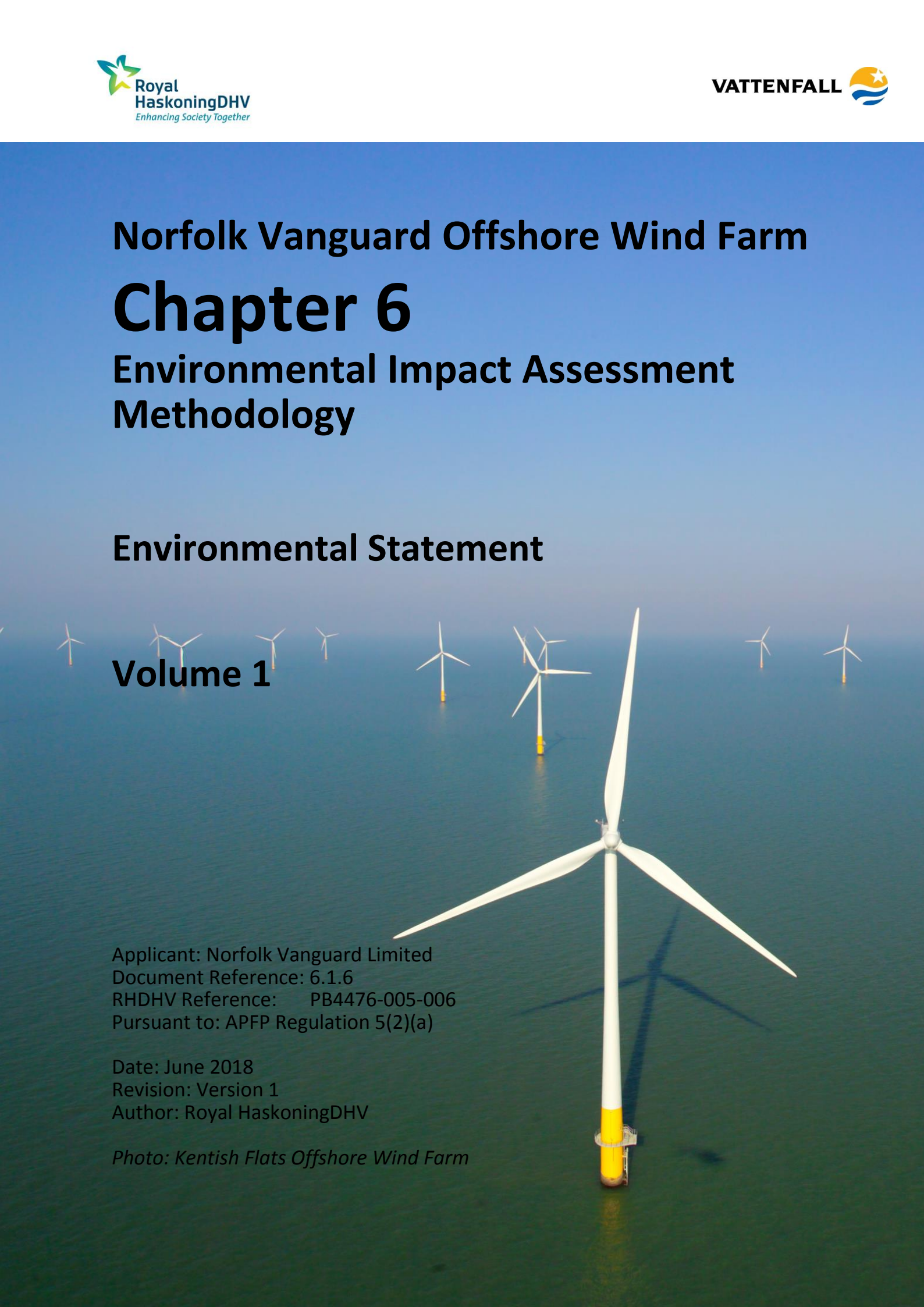
Environmental Statement

Volume 1

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Environmental Impact Assessment Environmental Statement

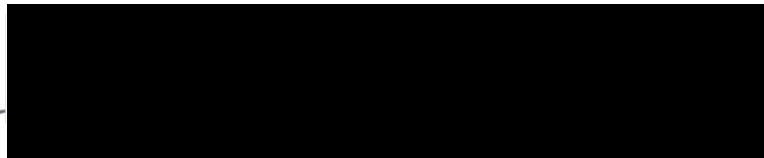
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June 2018

For and on behalf of Norfolk Vanguard Ltd

Approved by: Ruari Lean and Rebecca Sherwood

Signed: -



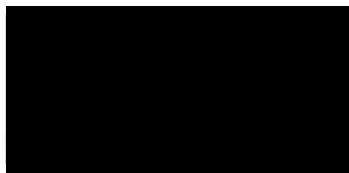
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Appendix 6.1 Statement of Competency

Glossary

CIA	Cumulative Impact Assessment
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
EIA	Environmental Impact Assessment
ES	Environmental Statement
ETG	Expert Topic Group
EPP	Evidence Plan Process
EU	European Union
IEMA	Institute of Environmental Management and Assessment
UNECE	United Nations Economic Commission for Europe
VWPL	Vattenfall Wind Power Ltd.

6 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

6.1 Introduction

1. This chapter describes the methodology used throughout the Environmental Statement (ES) assessment chapters for the Norfolk Vanguard Offshore Wind Farm (herein 'Norfolk Vanguard' or 'the project').
2. The Environmental Impact Assessment (EIA) considers all relevant topics covered under the three general areas of physical environment, biological environment and human environment.
3. The EIA will be carried out in accordance with the Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations) and the Planning Act 2008 (as amended by the Localism Act 2011) (see Chapter 3 Policy and Legislative Context). Furthermore, the approach to the EIA and the production of the ES closely follow relevant guidance including:
 - National Infrastructure Advice Notes in relation to the Planning Act 2008 process (as amended);
 - Assessment of the environmental impact of offshore wind-farms (OSPAR Commission, 2008)
 - Planning Inspectorate Advice Notes (the Planning Inspectorate, 2012; 2015a; 2015b; 2017a; 2017b; 2017c)
 - Overarching National Policy Statements for Energy EN-1, Renewable Energy Infrastructure EN-3, and Electricity Networks Infrastructure EN-5 (Department of Energy and Climate Change (DECC), 2011);
 - Relevant guidance issued by other government and non-governmental organisations; and
 - Receptor-specific guidance documents.
4. The EIA also gives due regard to the requirements of the Habitats and Species Regulations 2017, the Conservation of Offshore Marine Habitats and Species Regulations 2017 and the Marine and Coastal Access Act 2009.
5. As explained in Chapter 3 Policy and Legislative Context, it is considered that the project benefits from the EIA transitional provisions and that the 2009 EIA Regulations apply. However, as a matter of good practice and in order to ensure as robust an EIA as possible the requirements of the 2017 EIA Regulations (discussed in section 3.1.1 of Chapter 3 Policy and Legislative Context) were applied in the preparation of this ES.

6.2 Requirement for EIA

6. EIA is a procedure required under the terms of European Union (EU) Directive 85/337/EEC, as amended. The EIA process includes collation of data required to identify and assess the potential effects of a development on the environment, the identification of any likely significant adverse impacts and proposals for measures where possible to avoid, reduce or remedy any adverse impacts.
7. The primary objective of an EIA, as described in Article 2 of the Directive, is that *“Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects”*.
8. The EIA process and its preliminary findings were reported within a Preliminary Environmental Information Report (PEIR), which was produced to support consultation under Section 42 of the Planning Act 2008. Feedback from this consultation has been used to inform the design and impact assessment of the project, detailed in this ES as part of the Development Consent Order (DCO) application which has been submitted to the Planning Inspectorate.
9. The purpose of the ES is to inform the decision-maker, stakeholders and all interested parties of any significant environmental issues that may result from the project during its construction, operation and (where relevant) decommissioning.

6.3 Characterisation of the Existing Environment

10. Characterisation (a description) of the existing environment has been undertaken in order to determine, and agree, the baseline conditions in the area covered by the project and relevant surrounding study areas. This characterisation has followed the steps listed below. These steps are detailed further within each relevant technical chapter (Chapters 8 – 31):
 - Study areas defined for each receptor based on the relevant characteristics of the receptor (e.g. mobility/range);
 - Review of available information;
 - Review of likely or potential impacts that might be expected to arise from the project;
 - Determine if sufficient data is available to make the EIA judgements with sufficient confidence;

- If further data is required, ensure data gathered are targeted and directed at answering the key question and filling key data gaps; and
 - Review information gathered to ensure the environment can be characterised in sufficient detail, and the data is suitable, to make the EIA judgements with sufficient confidence.
11. Norfolk Vanguard Ltd. has collated a significant amount of existing data from a number of sources. These data sources are detailed in each technical chapter.
 12. The specific approach to establishing a robust baseline (upon which impacts can be assessed) is set out within each relevant chapter within this ES. This approach is based on feedback on the Scoping Opinion, consultation with the Planning Inspectorate and subsequent consultation with statutory bodies. The approach has also been evolved and adapted as new data have been collected and the design of the project has advanced.

6.4 The Project Design Envelope

13. The Norfolk Vanguard EIA will be based on a project envelope approach, also known as a 'Rochdale Envelope' approach. The Planning Inspectorate Advice Note Nine (the Planning Inspectorate, 2012) recognises 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. This is due to a number of factors such as the evolution of technology, the need for flexibility in key commercial project decisions and the need for further detailed surveys (especially geotechnical surveys) which are required before a final design and layout can be determined. It is therefore important that a design envelope is used to provide flexibility. Where necessary, a range of parameters for each aspect of the project has been defined and subsequently, the worst case scenario associated with each parameter and dependent on the receptor has been used in each impact assessment. This provides confidence that the EIA process is robustly considering the likely impact of the project, whilst also allowing the project to be optimised and refined at the time of construction, noting that this may be several years after the DCO application is made. The project design envelope therefore provides the maximum extent of the consent sought. The detailed design of the project can then be developed, refined and procured within this consented envelope prior to construction.
14. The general principle of the EIA assessment is that for each receptor and potential impact, the impact assessment will be based on assessing a range of project design parameters. If a combination of design parameters leads to a

scenario that cannot realistically occur then the worst case scenario will be reconsidered, and a realistic set of worst case parameters will be assessed. The end result will be an EIA based on clearly defined environmental parameters that will define the range of development possibilities and hence the likely environmental impacts that could result from the project.

6.5 Assessment of Impacts

15. The approach to making balanced assessments for the project has been guided by the Royal HaskoningDHV EIA team and technical specialists using available data, new data, experience and expert judgement. In order to provide a consistent framework and system of common tools and terms, a matrix approach has been used to frame and present the judgements made. For each topic of the EIA, the most relevant and latest guidance or best practice has been used and therefore definitions of sensitivity and magnitude of impact are tailored to each receptor. These definitions are detailed fully in each technical chapter. The impact assessment considers the potential for impacts during the construction, operation and maintenance, and decommissioning phases of the project.
16. Impacts can be classified as follows:
 - Direct impacts: these may arise from impacts associated with the construction, operation and maintenance, or decommissioning of the project;
 - Indirect impacts: these may be experienced by a receptor that is removed (e.g. in space or time) from the direct impact (e.g. noise impacts upon fish which are a prey resource for fish or mammals).
 - Inter-relationships between impacts, as highlighted by the Planning Inspectorate guidance (Advice Note 17); or
 - Cumulative impacts: these may occur as a result of the project in conjunction with other existing or planned projects within the study area for each receptor.

6.5.1 Royal HaskoningDHV as Competent Experts

17. Royal HaskoningDHV is the UK's leading EIA consultant working in the offshore wind sector, successfully leading the EIA and consent process for over 10GW of UK offshore wind projects, including six successful DCO applications. Royal HaskoningDHV has taken a significant role in providing environmental, EIA and consenting technical consultancy services to over 20 UK offshore wind farm

projects. In addition, Royal HaskoningDHV holds the EIA quality mark from the Institute of Environmental Management and Assessment.

18. All Royal HaskoningDHV's lead authors are senior and chartered professionals with a significant track record in undertaking technical assessment and EIA in their discipline. The team undertaking the EIA for Norfolk Vanguard are predominantly Royal HaskoningDHV professional consultants. The team is comprised of a dedicated core team of EIA professionals who take the lead role in the co-ordination and management of the EIA and the preparation of the ES. The core team is then supported by a wider team of technical specialists taking responsibility of the data collection, data analysis and technical impact assessment. Further details are included within a Statement of Competence provided as Appendix 6.1.
19. Some of the technical assessment and associated ES chapters are undertaken by specialist consultancies outside Royal HaskoningDHV. These include Shipping and Navigation, Landscape and Visual, Commercial Fisheries, Offshore Ornithology and Aviation. Further details are included within a Statement of Competence provided as Appendix 6.1.
20. In all cases the assessment has a lead technical author who is a recognised expert in their field, is a member of a relevant professional body and has significant experience of impact assessments. The lead author takes responsibility for the quality and veracity of the data gathered and used in the assessment, the impact assessment methodology to be undertaken, the impact assessments made and any proposed mitigation and monitoring measures proposed. The lead author is usually supported by a team and their work is subject to both technical and consistency review by a Technical Director and the EIA core team.
21. The Norfolk Vanguard EIA team is committed to wide and open consultation with stakeholders and community. A key part of this consultation effort is targeted engagement with regulators and interested stakeholders through Expert Topic Groups (ETG) as part of the Evidence Plan Process (EPP). Under this EPP leading subject matter experts from both Regulators and a wider group of interested stakeholders have been brought together to discuss, comment upon and wherever possible agree the approach being taken by the Norfolk Vanguard EIA at key stages in the EIA process. This process has allowed a consensus to be reached on the scope and approach to the impacts included within the EIA, and the comprehensiveness and suitability of data used.

6.5.2 Determining Receptor Value and Sensitivity

22. The characterisation of the existing environment helps to determine the receptor sensitivity in order to assess the potential impacts upon it.
23. Receptor value considers whether, for example, the receptor is rare, has protected or threatened status, has importance at a local, regional, national or international scale, and in the case of biological receptors whether the receptor has a key role in the ecosystem function.
24. The ability of a receptor to adapt to change, tolerate, and/or recover from potential impacts is key in assessing its sensitivity to the impact under consideration. For ecological receptors, tolerance could relate to short term changes in the physical environment; for human environment receptors, tolerance could relate to impacts upon socio-economics or health impacts. The time required for recovery is an important consideration in determining receptor sensitivity.
25. The overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability. This is achieved through applying known research and information on the status and sensitivity of the feature under consideration coupled with professional judgement and past experience.
26. Expert judgement is particularly important when determining the sensitivity of receptors. For example, an Annex II species (under the Habitats Directive) would have a high inherent value, but may be tolerant to an impact or have high recoverability. In this case, sensitivity should reflect the ecological robustness of the species and not necessarily default to its protected status.

6.5.3 Predicting the Magnitude of Impacts

27. In order to predict the significance of an impact, it is fundamental to establish the magnitude and probability of an impact occurring through a consideration of:
 - Scale or spatial extent (small scale to large scale or a few individuals to most of the population);
 - Duration (short term to long term);
 - Likelihood of impact occurring;
 - Frequency; and
 - Nature of change relative to the baseline.

6.5.4 Evaluation of Significance

28. Subsequent to establishing the sensitivity and magnitude, the impact significance is predicted by using quantitative or qualitative criteria, as appropriate, to ensure a robust assessment. Where possible the matrix presented in Table 6.1 has been used to aid assessment of impact significance, combined with the application of expert judgement, to facilitate a consistent approach throughout the EIA. For each topic within the EIA, best practice methodology (based on the latest available guidance) has been followed and hence, when more appropriate, an alternative approach to the use of a matrix may be used.

Table 6.1 Significance of an impact resulting from each combination of receptor sensitivity and the magnitude of the effect

		Negative magnitude				Beneficial magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

29. Table 6.2 provides an indication of the significance definitions used in the assessment process for the majority of parameters. Any exceptions to these definitions are due to the application of best practice methodologies for a particular topic, as described above. In general, impacts which are of major or moderate significance are considered to be significant under the EIA Regulations. It is possible that a moderate impact may not be considered significant under the EIA regulations however; in these cases, a justification and rationale is provided in the impact assessment text.
30. A description of the approach to impact assessment and the interpretation of significance levels are provided within each chapter of this ES. This approach ensures that the definition of impacts is transparent and relevant to each topic under consideration.

Table 6.2 Impact significance definitions

Impact Significance	Definition
Major adverse	Very large or large changes in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level as they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and/or breaches of legislation.
Moderate adverse	Intermediate changes in receptor condition, which are likely to be important considerations at a local level.
Minor adverse	Small changes in receptor condition, which may be raised as local issues but are unlikely to be important in the decision making process.
Negligible	No discernible change in receptor condition.
Minor beneficial	The impact is of minor significance, but has been assessed as having some environmental benefit.
Moderate beneficial	The impact is assessed as providing a moderate gain to the environment.
Major beneficial	The impact is assessed as providing a significant positive gain to the environment.

6.5.4.1 Confidence

31. Once an assessment of a potential impact has been made, it is necessary to assign a confidence value to the assessment to assist in the understanding of the judgement. This is undertaken on a simple scale of high-medium-low, where high confidence assessments are made on the basis of robust evidence, with lower confidence assessments being based, for example, on extrapolation and use of proxies.

6.5.4.2 Mitigation

32. Where an impact assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts, mitigation measures have been proposed and discussed with the statutory consultees in order to avoid impacts or reduce them to acceptable levels and, if possible, to enhance the environment.
33. For the purposes of the EIA, two types of mitigation have been defined:
- Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and are included and assessed in the EIA; and
 - 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 Norfolk Vanguard Ltd. as project commitments.

34. All mitigation associated with the project is identified and described in more detail in the relevant chapters of the ES (Chapters 8 – 31).

6.5.4.3 Assessing residual impacts

35. Following identification of mitigation measures, impacts have been re-assessed and all residual impacts are described. Where no mitigation measure is proposed, a discussion explains why the impact cannot be reduced.

6.5.4.4 Inter-relationships

36. The impact assessment also considers the inter-relationship of impacts on individual receptors. For example, a landscape and visual effect and noise impact may cumulatively impact on a receptor.

6.5.4.5 Cumulative impacts

37. Cumulative Impact Assessment (CIA) is undertaken as part of each technical chapter Impact assessment. Cumulative impact summary chapters are also provided as Chapters 33 and 34, Offshore Cumulative and Transboundary Impact Assessment and Onshore Cumulative Impact Assessment respectively. The scope of the CIA (in terms of relevant issues and projects) has been established with consultees (including other developers) as the EIA has progressed. In addition, Norfolk Vanguard Ltd. has looked at the experience from other projects located within either the same former offshore Zone as the project, the wider Southern North Sea, and other UK projects as well as incorporating continuing work from industry-wide initiatives with regard to cumulative impact.
38. The Planning Inspectorate Advice Note Nine and its complementary guidance in Advice Note 17 provide guidance on plans and projects that should be considered in the CIA including:
- Projects that are under construction;
 - Permitted applications, not yet implemented;
 - Submitted applications not yet determined;
 - Projects on the Planning Inspectorate's Programme of Projects;
 - Development identified in relevant Development Plans, with weight being given as they move closer to adoption and recognising that much information on any relevant proposals will be limited; and
 - Sites identified in other policy documents as development reasonably likely to come forward.

39. Where it is helpful to do so ‘Tiers’ of these other projects’ development statuses have been defined as well as the availability of information to be used within the CIA. This approach is based on the three tier system proposed in Planning Inspectorate Advice Note 17. In some offshore chapters, a more refined tiering system based on the guidance issued by JNCC and Natural England in September 2013 is employed and involves six tiers presented below:
- Tier 1: built and operational projects;
 - Tier 2: projects under construction plus Tier 1 projects;
 - Tier 3: projects that have been consented (but construction has not yet commenced) plus Tiers 1 and 2;
 - Tier 4: projects that have an application submitted to the appropriate regulatory body that have not yet been determined, plus Tiers 1-3;
 - Tier 5: projects that the regulatory body are expecting to be submitted for determination (e.g. projects listed under the Planning Inspectorate programme of projects), plus Tiers 1-4; and
 - Tier 6: projects that have been identified in relevant strategic plans or programmes plus Tiers 1-5.
40. The CIA is a two part process in which an initial list of projects with the potential to interact with Norfolk Vanguard is identified, based on the potential mechanism of interaction. Where it is helpful to do so, the tiered approach may be adopted, based on the availability of information for each project to enable further assessment.
41. In line with the RenewableUK CIA Guidelines for offshore wind farms (RenewableUK, 2013), the approach to CIA attempts to incorporate an appropriate level of pragmatism. This is demonstrated in the confidence levels applied to various developments, particularly those that are known but currently lack detailed project application documentation, such as those projects at the scoping stage only. These projects have been considered for CIA only in those chapters where it is considered that the Scoping Reports contain sufficient detail with which to undertake a meaningful assessment. Where there is a lack of specific information in the public domain, such as how and when (or if) projects will be built, it is not always possible to undertake a meaningful CIA. Vattenfall Wind Power Ltd. (VWPL) submitted a request for a Scoping Opinion for Norfolk Boreas, the sister project to Norfolk Vanguard on 9th May 2017; therefore, this project is considered in the CIA for Norfolk Vanguard in line with the above approach.
42. Availability of sufficient information within the public domain also arises with projects which are further developed. For example, in the case of the Hornsea Project Three, which is being promoted by Orsted, this has been included in the CIA as a Tier 5 development, following JNCC and Natural England 2013 guidance. The

application for development consent was submitted in May 2018 and therefore the pre-application stage is running almost concurrently with Norfolk Vanguard. At the time of writing it has not always been the case that the data necessary for Norfolk Vanguard to undertake a meaningful CIA taking into account Hornsea Project Three (and vice versa) has been publicly available (typically that presented in the PEIR for the project). Therefore, details from Hornsea Project Three's application have not been included. However, Norfolk Vanguard Ltd and Orsted are in regular dialogue and will continue to work closely together, and with statutory consultees, to ensure the CIA is as accurate as possible. If necessary, Norfolk Vanguard Ltd will update the CIA within its Environmental Statement during examination to take into account any new data which has been made available following the submission of the Hornsea Project Three application to the Secretary of State. This approach complies with the relevant EIA Regulations and is consistent with that taken for other applications, where relevant environmental information has become available after the point of application submission.

43. Projects which are sufficiently implemented during the site characterisation for the project are considered as part of the baseline for the EIA.
44. Offshore cumulative impacts may arise from interactions with the following activities and industries:
 - Other offshore wind farms;
 - Aggregate extraction and dredging;
 - Licensed disposal sites;
 - Sub-sea cables and pipelines;
 - Potential port/harbour development; and
 - Oil and gas activities.
45. Onshore plans or projects to be taken into consideration include (but not limited to):
 - Other offshore wind farm infrastructure;
 - Other energy generation infrastructure;
 - Building/housing developments;
 - Installation or upgrade of roads;
 - Installation or upgrade of cables and pipelines;
 - Coastal protection works; and
 - National Grid works.
46. The full list of plans or projects to be included in the CIA has been developed as part of on-going consultation with technical consultees and is detailed in Chapters 33 and 34.

6.5.4.6 Transboundary impacts

47. The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context (referred to as the Espoo Convention) requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts.
48. Regulation 32 of the EIA regulations sets procedures to address issues associated with a development that might have a significant impact on the environment in another European Member State.
49. The procedures involve providing information to the Member State and for the Planning Inspectorate to enter into consultation with that State regarding the significant impacts of the development and the associated mitigation measures. Further advice on transboundary issues, in particular with regard to consultation is given in the Planning Inspectorate Advice Note 12.
50. On 16th February 2017, following the request for a Scoping Opinion for Norfolk Vanguard, the Planning Inspectorate issued a Transboundary Impacts Screening Matrix in accordance with Regulation 24 of the EIA Regulations. The Planning Inspectorate also published a notification in the London Gazette on 22nd February 2017 inviting relevant European Economic Area (EEA) Member States to notify the Planning Inspectorate if they wished to be consulted on the proposed development. Five EEA States confirmed that they wish to participate in the procedure for examining the application: Denmark, Netherlands, Germany, France and Belgium.
51. In addition to this pre-application consultation, statutory transboundary consultation will be undertaken by the Planning Inspectorate in accordance with Regulation 32 of the EIA Regulations, if and when it accepts Norfolk Vanguard Limited's application for a DCO.
52. Potential transboundary impacts have been approached in a similar way to other cumulative impacts, with a clear audit trail provided to demonstrate why projects have been included or excluded. In accordance with the advice detailed above, relevant EEA member states have been consulted through targeted consultation including meetings with transboundary commercial fishermen and statutory consultees; and through the consultation on the EIA. Full details of potential transboundary impacts are presented in Chapter 32.

6.6 Information for Inclusion in Environmental Statement

53. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 make a number of important changes and in particular include additional

requirements on the EIA process for Nationally Significant Infrastructure Projects. Schedule 4 of the 2017 Regulations presents the information to be included within Environmental Statements undertaken in accordance with the 2017 EIA Regulations. Table 6.3 summarises the information requirements and where these can be found within the Norfolk Vanguard Environmental Statement.

Table 6.3 2017 EIA Regulations: Information for Inclusion in Environmental Statements

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
<p>A description of the development, including in particular—</p> <ul style="list-style-type: none"> • a description of the location of the development; • a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases; • a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; • an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases. 	<p>Chapter 5 Project Description of the Environmental Statement (ES) provides a detailed description of the project including its location and physical characteristics onshore and offshore. This chapter also describes the main characteristics of the tasks required during the construction, operation and decommissioning phases of the project, setting out estimated durations of tasks, materials required and equipment likely to be used. The chapter also considers approaches to waste management and use of natural resources.</p> <p>Further details of impacts such as potential impacts on noise (Chapter 25 Noise and Vibration), air quality (Chapter 26 Air Quality), landscape (Chapter 29 Landscape and Visual Impact Assessment), land use (chapter 21 Land Use and Agriculture), water (Chapter 20 Water resources and Flood Risk) and other natural resources (Chapter 22 Onshore Ecology) are provided in dedicated technical impact assessment chapters and their technical appendices.</p>
<p>A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.</p>	<p>The reasonable alternatives considered in the development of the proposed project design are discussed and presented in Chapter 4 Site Selection and Assessment of Alternatives of the ES and its technical appendices. The process of the design development for the project, the consultation undertaken and how the views expressed during consultation have influenced the design development decisions and final project design are summarised within Chapter 4.</p> <p>The comparative environmental effects of key design</p>

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
	decisions and options considered are also presented as part of Chapter 4.
A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	<p>For each of the technical assessment chapters within the ES, a detailed baseline environment is described, as agreed through the scoping and EPP processes. In many cases this uses survey information gathered specifically to support the robust EIA for Norfolk Vanguard Offshore Wind Farm.</p> <p>In all relevant technical assessment chapters, the likely evolution of the baseline without the implementation of the project is also presented.</p>
A description of the factors specified in regulation 5(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	<p>This requirement is fulfilled in the following impact assessment chapters within the ES.</p> <p>Population and Human Health</p> <ul style="list-style-type: none"> Chapter 27 – Human Health Impact Assessment <p>Biodiversity</p> <ul style="list-style-type: none"> Chapter 10 Benthic and Intertidal Ecology Chapter 11 Fish and Shellfish Ecology Chapter 12 Marine Mammals Chapter 13 Offshore Ornithology Chapter 22 Onshore Ecology Chapter 23 Onshore Ornithology <p>Land</p> <ul style="list-style-type: none"> Chapter 20 Water Resources and Flood Risk Chapter 21 Land Use and Agriculture <p>Water</p> <ul style="list-style-type: none"> Chapter 20 Water Resources and Flood Risk <p>Soil</p> <ul style="list-style-type: none"> Chapter 19 Ground Conditions and Contamination Chapter 21 Land Use and Agriculture <p>Air</p> <ul style="list-style-type: none"> Chapter 26 Air Quality

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
	<p>Climate</p> <p>The project will be a significant contributor to meeting national and international targets for CO₂ reduction. As such any effects related to greenhouse gas emissions are considered to be beneficial and are set out in the following chapters:</p> <ul style="list-style-type: none"> • Chapter 2 Need for the Project • Chapter 3 Policy and Legislative Context <p>Where there is the potential for significant impacts related to vulnerability and resilience to climate change, an assessment has also been made. Potentially significant impacts are considered in the following technical chapters:</p> <ul style="list-style-type: none"> • Chapter 8 Marine Geology, Oceanography and Physical Processes • Chapter 20 Water Resources and Flood Risk <p>Material assets</p> <ul style="list-style-type: none"> • Chapter 8 Marine Geology, Oceanography and Physical Processes • Chapter 19 Ground Conditions and Contamination • Chapter 20 Water Resources and Flood Risk • Chapter 21 Land Use and Agriculture • Chapter 24 Traffic and Transport • Chapter 30 Tourism and Recreation • Chapter 31 Socio-economics <p>Cultural heritage, including architectural and archaeological aspects</p> <ul style="list-style-type: none"> • Chapter 17 Offshore and Intertidal Archaeology and Cultural Heritage • Chapter 28 Onshore Archaeology and Cultural Heritage <p>Landscape</p> <ul style="list-style-type: none"> • Chapter 29 Landscape and Visual Impact Assessment
A description of the likely significant effects of the development on the environment	The significant effects arising from the proposed development alone and cumulatively with other relevant

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
<p>resulting from, inter alia—</p> <ul style="list-style-type: none"> (a) the construction and existence of the development, including, where relevant, demolition works; (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources; (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) the technologies and the substances used. <p>The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the</p>	<p>developments have been comprehensively assessed within each technical assessment; Chapters 8 – 31 within this ES.</p> <p>Potential impacts from major accidents or disasters are discussed in Chapter 5 Project Description.</p> <p>Potential implications of climate change are discussed within relevant technical chapters and are addressed specifically in Chapter 2 Need for the Project.</p> <p>Technologies and materials likely to be deployed in the project are discussed in Chapter 5 and throughout the technical assessment chapters.</p> <p>Chapter 6 EIA Methodology sets out the generalised EIA methodology including cumulative impact assessment and interrelationships used in this ES to ensure a consistency of approach. Each technical chapter presents the detailed and specific assessment data analysis, and impact assessment methodologies applied to assess each potential impact identified. Each technical chapter also considers the potential cumulative impacts of the project taken together with other relevant projects and the potential interrelationships between impacts.</p>

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
development. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(a) and Directive 2009/147/EC(b).	
A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Forecasting methods used to identify and assess significant effects on the environment are discussed in the overall EIA methodology in Chapter 6 and are also covered in more specific detail in each technical chapter EIA methodology and impact assessment.
A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	<p>Mitigation measures include embedded mitigation, which are design decisions taken to reduce environmental impact of the project as part of the design development and additional mitigation measures which are proposed as ways of further reducing the assessed likely significant environmental impacts. Each technical assessment chapter includes an explanation of the embedded mitigation measures and where appropriate additional mitigations proposed.</p> <p>Monitoring arrangements are proposed and discussed in outline within the relevant technical chapters. Offshore monitoring proposals are included within an In-Principle Monitoring Plan (document reference 8.12) to be submitted as part of the DCO application.</p> <p>Onshore monitoring is limited to the establishment and maintenance of the landscaping scheme, secured through DCO Requirement 18.</p>
A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European	<p>Potential impacts from major accidents or disasters are discussed in Chapter 5 Project Description.</p> <p>A Navigational Risk Assessment has also been prepared as is included as Appendix 15.1 to Chapter 15 Shipping and Navigation.</p>

Schedule 4 Information for Inclusion in Environmental Statements	How is this information been provided within the Norfolk Vanguard Environmental Statement?
Parliament and of the Council(c) or Council Directive 2009/71/Euratom(d) or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	
A non-technical summary of the information provided under paragraphs 1 to 8.	A suitable non-technical summary is provided as part of the DCO application (document reference 6.3).
A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	A suitable reference list is provided at the end of each chapter. Where important documents are cited or are not available as references they are provided as technical appendices to each chapter.
<p>Competent Expert</p> <p>Article 14 (4) In order to ensure the completeness and quality of the environmental statement—</p> <ul style="list-style-type: none"> (a) the applicant must ensure that the environmental statement is prepared by competent experts; and (b) the environmental statement must be accompanied by a statement from the applicant outlining the relevant expertise or qualifications of such experts 	The competency of the EIA team and experts is discussed in Chapter 6 EIA methodology (section 6.7) and Appendix 6.1.

6.7 Conclusion

54. This chapter outlines the approach that has been used to frame and present the expert judgements used in assessing the potential impacts during the construction, operation and decommissioning of Norfolk Vanguard.
55. For each topic of the EIA, the most relevant and latest guidance and/or best practice has been used. Therefore, where appropriate, the approach to each impact assessment (including definitions of sensitivity and magnitude of impact) is tailored to each receptor and these are detailed in Chapters 8 to 31.

56. The EIA methodology employed has been discussed and agreed with expert stakeholders for those topics covered by the Evidence Plan Process (see Chapter 7 Technical Consultation). Throughout the ES, topic assessments seek to apply the requirements of the 2017 EIA Regulations.

6.8 References

Department of Energy and Climate Change (DECC) (2011). Overarching National Policy Statement for Energy (EN-1). July 2011
JNCC and Natural England (2013) JNCC and Natural England interim advice on Habitats Regulations Assessment (HRA) screening for seabirds in the non-breeding season. February 2013.
The Planning Inspectorate (2012) Advice Note Nine: Rochdale Envelope
The Planning Inspectorate (2017a). Advice Note Three: EIA consultation and notification
The Planning Inspectorate (2017b). Advice Note Seven: Environmental Impact Assessment, Preliminary Environmental Information, Screening and Scoping
The Planning Inspectorate (2015a) Advice Note Twelve: Development with significant transboundary impacts consultation
The Planning Inspectorate (2015b) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects
The Planning Inspectorate (2017c). Advice Note Ten: Habitat Regulations Assessment
OSPAR Commission (2008). Assessment of the environmental impact of offshore wind-farms