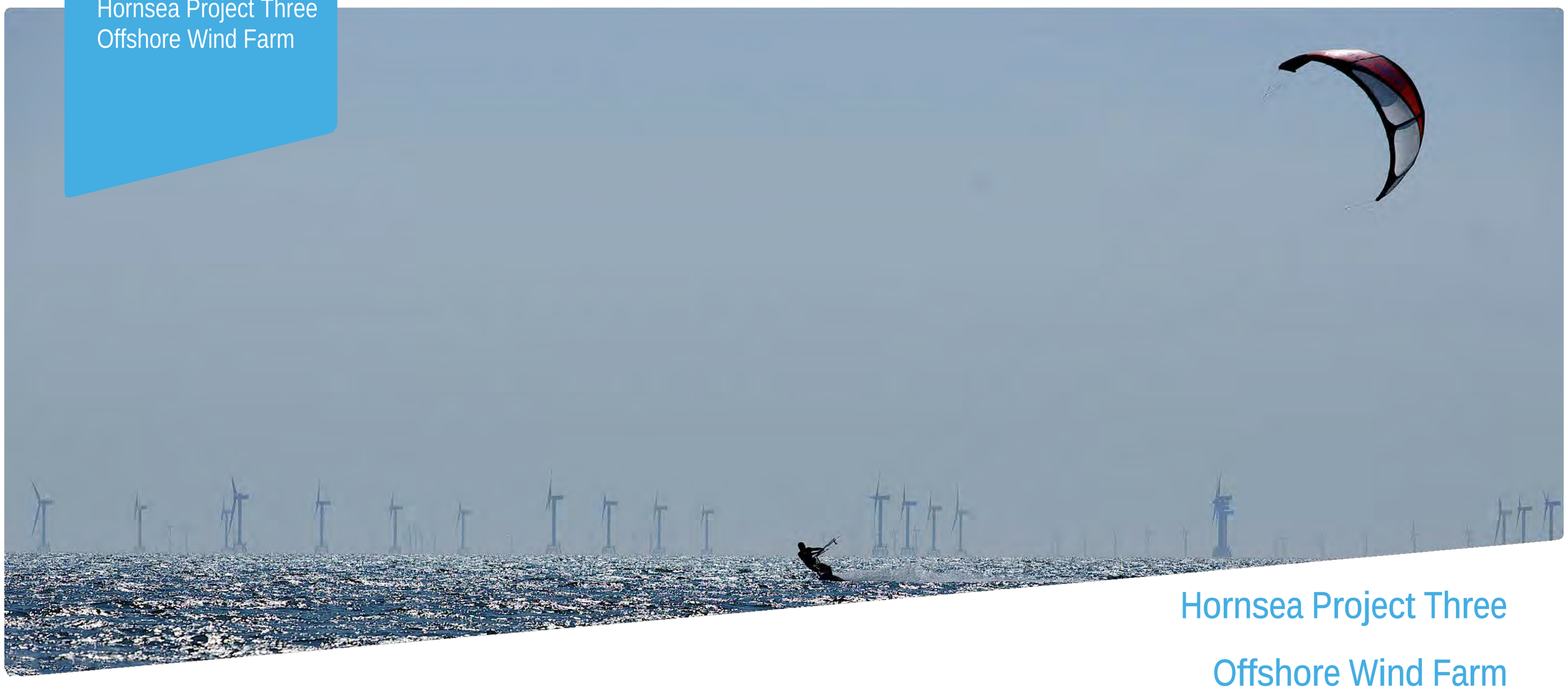
Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Preliminary Environmental Information Report: Chapter 10 – Seascape and Visual Resources

Date: July 2017

Hornsea 3
Offshore Wind Farm

DONG energy

Environmental Impact Assessment

Preliminary Environmental Information Report

Volume 2

Chapter 10 – Seascape and Visual Resources

Liability

This report has been prepared by RPS, with all reasonable skill, care and diligence within the terms of their contracts with DONG Energy Power (UK) Ltd.

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This report is also downloadable from the Hornsea Project Three offshore wind farm website at:
www.dongenergy.co.uk/hornseaproject3

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Glossary

Term	Definition
Field of View	Horizontal extent of visibility.
Heritage	Historic or cultural associations.
Historic Seascape Character type	Historic seascape types defined by a pilot study produced by the University of Newcastle on behalf of English Heritage.
Scenario	A predicted sequence of future events.
Seascape	Human perception of the sea (at or above sea level) conditioned by knowledge and identity with a place.
Seascape capacity	The degree to which a particular seascape character type or area is able to accommodate change without unacceptable adverse effects on its character. Capacity is likely to vary according to the type and nature of change being proposed.
Seascape character	The distinct and recognisable pattern of elements that occurs consistently in a particular type of seascape and how this is perceived by people and it reflects particular combinations of current sea use and human activity. It creates the particular sense of place of different areas of the seascape.
Seascape effects	Change in the elements, characteristics, character and qualities of the seascape as a result of development. These effects can be positive or negative.
Seascape evaluation	The process of attaching value (non-monetary) to a particular seascape, usually by the application of previously agreed criteria, including consultation and third party documents, for a particular purpose (for example, designation or in the context of an assessment).
Seascape feature	A prominent eye-catching element, for example, a wind farm or gas platform.
Seascape quality (or condition)	A measure based on judgements about the physical state of the seascape, and about its intactness, from visual, functional and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.
Seascape resource	The combination of elements that contribute to seascape context, character and value.
Seascape sensitivity	The extent to which a seascape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Seascape and Visual Impact Assessment	The assessment of the impacts on seascape character and visual resources, and the evaluation of the effects of those impacts.
Visual amenity	The value of a particular area or view in terms of what is seen.
Visual effect	Change in the appearance of the seascape as a result of development. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction).
Visualisation	Computer simulation, photomontage or other technique to illustrate the appearance of a development.
Zone of Theoretical Visibility	Area within which a proposed development may have an influence or effect on visual amenity.

Acronyms

Acronym	Description
AONB	Area of Outstanding Natural Beauty
BCT	(Historic Seascape) Broad Character Type
CAA	Civil Aviation Authority
DECC	Department of Energy and Climate Change
DETR	Department of the Environment, Transport and Regions
DCO	Development Consent Order
DTI	Department of Trade and Industry
EH	English Heritage
EIA	Environmental Impact Assessment
GLVIA3	'Guidelines for Landscape and Visual Impact Assessment; Third Edition' (2013) Landscape Institute and Institute for Environmental Management and Assessment
HMSO	Her Majesty's Stationery Office
HSC	Historic Seascape Characterisation
HCS	(Historic Seascape) Historic Character Subtype
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IPC	Infrastructure Planning Commission
LAT	Lowest Astronomical Tide
LVIA	Landscape and Visual Impact Assessment
MCA	Marine and Coastguard Agency
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MoLAS	Museum of London Archaeology Service
MPS	Marine Policy Statement
NSCA	National Seascape Character Area
PINS	Planning Inspectorate
NPS	National Policy Statement
RandRNAV	Research and Radionavigation Directorate of the General Lighthouse Authorities
RYA	Royal Yachting Association
SoS	Secretary of State
SVIA	Seascape and Visual Impact Assessment
ZoC	Zone Characterisation
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
GW	Gigawatt (power)
kV	Kilovolt (electrical potential)
kW	Kilowatt (power)
MW	Mega Watt
nm	Nautical Mile

10. Seascape and Visual Resources

10.1 Introduction

10.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings to date of the Environmental Impact Assessment (EIA) for the potential impacts of the Hornsea Project Three offshore wind farm (hereafter referred to as Hornsea Three) on seascape and visual resources. Specifically, this chapter considers the potential impact of Hornsea Three seaward of Mean Low Water Springs (MLWS) during its construction, operation and maintenance, and decommissioning phases.

10.1.1.2 More detailed technical information which underpins this chapter is contained within volume 5, annex 10.1: Seascape and Visual Resources Technical Report.

10.1.1.3 This chapter characterises the present day and historic seascape and visual resources within and around Hornsea Three (namely the Hornsea Three array area and the offshore cable corridor). This chapter also assesses the potential impacts of Hornsea Three on these resources, primarily within a 50 km radius of the Hornsea Three array area. Information presented in this section has been drawn from desktop studies and computer modelling.

10.1.1.4 A separate Landscape and Visual Impact Assessment (LVIA) has been prepared for the onshore and intertidal elements of Hornsea Three landward of MLWS. This can be found in volume 3, chapter 4: Landscape and Visual Resources.

10.2 Purpose of this chapter

10.2.1.1 The primary purpose of the Environmental Statement is to support the Development Consent Order (DCO) application for Hornsea Three under the Planning Act 2008 (the 2008 Act). This PEIR constitutes the Preliminary Environmental Information for Hornsea Three and sets out the findings of the EIA to date to support pre-application consultation activities required under the 2008 Act. The EIA will be finalised following completion of pre-application consultation and the Environmental Statement will accompany the application to the Secretary of State for Development Consent.

10.2.1.2 The PEIR will form the basis for Phase 2 Consultation which will commence on 27 July and conclude on 20 September 2017. At this point, comments received on the PEIR will be reviewed and incorporated (where appropriate) into the Environmental Statement, which will be submitted in support of the application for Development Consent scheduled for the second quarter of 2018.

10.2.1.3 In particular, this PEIR chapter:

- Presents the existing environmental baseline established from desk studies, and consultation;
- Presents the potential environmental effects on seascape and visual resources arising from Hornsea Three, based on the information gathered and the analysis and assessments undertaken to date;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

10.3 Study area

10.3.1.1 There are two Seascape and Visual Impact Assessment (SVIA) study areas considered within this assessment;

- Seascape and visual resources Hornsea Three array area study area - this study area covers the Hornsea Three array area (within which the turbines and associated infrastructure such as platforms and substations will be located) plus a 50 km buffer, and is hereafter referred to as the 'array SVIA study area'. This distance is considered to be the maximum extent within which a significant seascape or visual effect could occur given the maximum height of the proposed turbines. The array SVIA study area is intended to define the area within which the infrastructure located within the Hornsea Three array area may have a significant present day seascape or visual effect.
- Seascape and visual resources offshore HVAC booster stations study area – this study area covers the offshore HVAC booster stations search area (within which the offshore HVAC booster stations will be located) plus a 25 km buffer, and is hereafter referred to as the 'offshore HVAC booster SVIA study area'. This distance is considered to be the maximum extent within which a significant seascape or visual effect could occur given the maximum height of the proposed offshore HVAC booster stations. The offshore HVAC booster SVIA study area is intended to define the area within which the offshore HVAC booster stations may have a significant present day seascape or visual effect.

10.3.1.2 Collectively the array SVIA study area and the offshore HVAC booster SVIA study area are referred to throughout the PEIR as the 'SVIA study areas'.

10.3.1.3 The array SVIA study area is illustrated in Figure 10.1 below. A significant effect is very unlikely to occur towards the edges of the SVIA study areas. The recommendations for the determination of the radius of the SVIA study areas are set out in a table on page 13 of Visual Representation of Wind farms: Good Practice Guidance - Version 2 (SNH, 2017) which gives recommended initial Zone of Theoretical Visibility (ZTV) distances from the nearest turbine. These recommendations only suggest distances for turbines over 150 m to blade tip (45 km). Paragraph 52 of the document explains that *"greater distances may need to be considered for the larger turbines offshore."* Turbines for Hornsea Three could be up to 325 m above Lowest Astronomical Tide (LAT). In discussions with statutory consultees on other similar projects, the consultees (Natural England or Scottish Natural Heritage as appropriate) have recommended a 50 km distance for offshore wind farms with similar turbine heights to Hornsea Three. The 50 km buffer has also been adopted in the EIA by other Round 3 offshore wind projects such as Hornsea Project One and Hornsea Project Two, which were submitted and accepted by PINS in June 2013 and February 2015 respectively. Dogger Bank Creyke Beck A and B include turbines with blade tips over 300 m high, which are similar in terms of scale to Hornsea Three, and the EIAs also considered study areas of 50 km radius.

10.3.1.4 Depending on the final scheme design, up to four above-surface offshore HVAC booster stations may be required if HVAC transmission is chosen. The selected location for the offshore HVAC booster stations are within the offshore HVAC booster station search area, which is located mid-way along the Hornsea Three offshore cable corridor. The offshore HVAC booster stations have a 25 km radius study area, based on a height of up to 70 m above Lowest Astronomical Tide (LAT) (Figure 10.1). Part of the offshore HVAC booster station study area overlaps the array SVIA study area. Specific impacts in relation to the offshore HVAC booster stations are noted in the assessments within this chapter.

10.3.1.5 Following consultation with Historic England, the assessment of the effects of Hornsea Three on Historic Seascape Character (HSC) resources has concentrated on HSC areas where there would be a direct effect, namely the Hornsea Three array area and the offshore cable corridor (including the offshore HVAC booster stations).

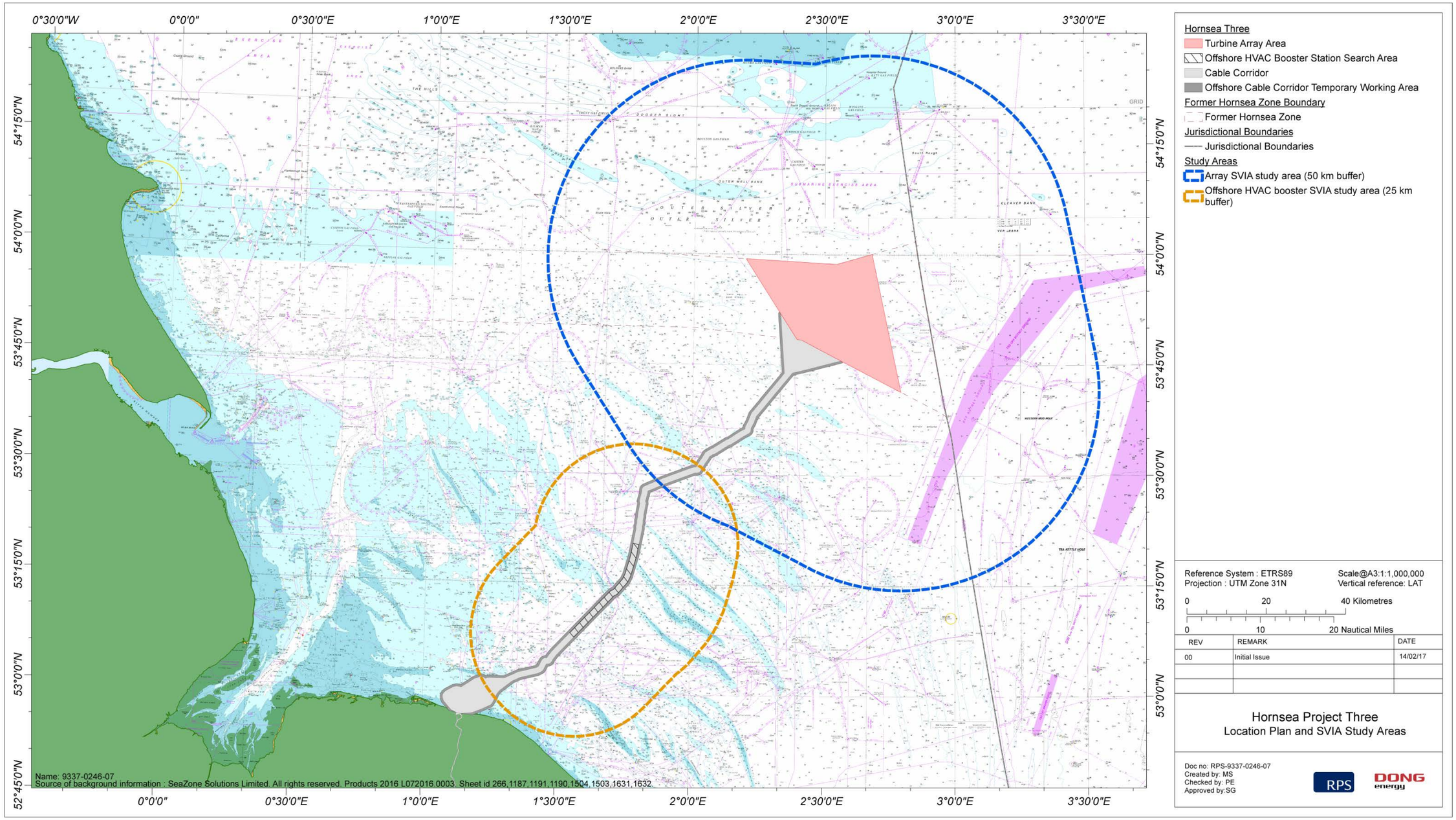

Figure 10.1: SVIA study areas showing relative locations of the Hornsea Three array area, the Hornsea Three offshore cable corridor and the offshore HVAC booster stations search area.

10.4 Planning policy context

10.4.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to seascape and visual resources, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3, DECC, 2011b).

10.4.1.2 NPS EN-1 and NPS EN-3 include guidance on what matters are to be considered in the assessment. These are summarised in Table 10.1, Table 10.2, Table 10.3 and Table 10.4 below.

10.4.1.3 Specifically, the guidance provided within NPS EN-1 was considered, paragraph 5.9.5 identifies that applicants should carry out a landscape and visual assessment and report it in the Environmental Statement. NPS EN-1 (paragraphs 5.9.5 to 5.9.7) includes guidance on what matters are to be included in an applicant's assessment. These are summarised in Table 10.1 together with a description of how these have been considered in respect of Hornsea Three.

Table 10.1: Summary of NPS EN-1 policy relevant to seascape and visual resources and consideration of the Hornsea Three assessment.

Summary of NPS EN-1 policy relevant to the assessment of Seascape and Visual Resources	How/where considered within the Hornsea Three assessment
The landscape and visual assessment should include reference to any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project (paragraph 5.9.5 of NPS EN-1).	The seascape and visual assessment baseline is presented in section 10.7.
The Applicant's assessment should also take account of any relevant policies based on these assessments in local development documents in England and local development plans in Wales (paragraph 5.9.5 of NPS EN-1).	Relevant policy and guidance documents used to inform the assessment are outlined in section 10.3.
The Applicant's assessment should include the effects during construction of the project and the effects of the completed development and its operation on landscape components and landscape character (paragraph 5.9.6 of NPS EN-1).	Assessment of effects on the seascape and seascape elements are assessed (section 10.11).
The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include light pollution effects, including on local amenity, and nature conservation (paragraph 5.9.7 of NPS EN-1).	Effects on visual resources are assessed in section 10.11. Night time effects are considered in Table 10.21 and Table 10.23.

Table 10.2: Summary of NPS EN-1 on decision making with regard to seascape and visual resources and consideration in the Hornsea Three assessment.

Summary of NPS EN-1 policy on decision making (and mitigation) in relation to Seascape and Visual Resources	How/where considered within the Hornsea Three assessment
Virtually all nationally significant energy infrastructure projects will have effects on the landscape. Projects need to be designed carefully, taking account of the potential impact on the landscape. The aim is to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate (paragraph 5.9.8 of NPS EN-1).	Section 10.7 considers the existing seascape character. Given the transitory and dynamic nature of the majority of the visual receptors and the location of the project offshore, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines (section 10.10).
The conservation of the natural beauty of the landscape and countryside should be given substantial weight by the Secretary of State in deciding on applications for development consent in these areas. Nevertheless, the Secretary of State may grant development consent in these areas in exceptional circumstances (5.9.9 and 5.9.10 of NPS EN-1).	The offshore infrastructure is not located within any designated landscapes. A ZTV exercise has been undertaken for the highest element of the offshore HVAC booster stations (section 10.9). In theory the offshore HVAC booster stations could be visible from land around the coast of Norfolk within the Norfolk Coast AONB depending upon where they are located within the offshore HVAC booster station search area, see Figure 10.3.
The Secretary of State should ensure that any projects consented in these designated areas should be carried out to high environmental standards, including through the application of appropriate requirements where necessary (paragraph 5.9.11 of NPS EN-1).	
When considering the effects of projects outside nationally designated areas which may have impacts within them, the aim should be to not compromise the purpose of a nationally designated area (paragraph 5.9.12 of NPS EN-1).	
The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent (paragraph 5.9.13 of NPS EN-1).	The offshore infrastructure is not located within any designated landscapes (section 10.7.1). In theory the offshore HVAC booster stations could be visible from land around the coast of Norfolk within the Norfolk Coast AONB, Figure 10.3.
Where a local development document in England or a local development plan in Wales has policies based on landscape character assessment, these should be paid particular attention. However, local landscape designations should not be used in themselves to refuse consent, as this may unduly restrict acceptable development (paragraph 5.9.14 of NPS EN-1).	Relevant policy and guidance documents used to inform the assessment are outlined in section 10.3 and Table 10.4.
The scale of nationally significant infrastructure projects will mean that they will often be visible within many miles of the site of the proposed infrastructure. The decision maker should judge whether any adverse impact on the landscape/seascape would be so damaging that it is not offset by the benefits (including need) of the project (paragraph 5.9.15 of NPS EN-1).	The effects of the project on Seascape and Visual Resources are assessed in section 10.11.

Summary of NPS EN-1 policy on decision making (and mitigation) in relation to Seascape and Visual Resources	How/where considered within the Hornsea Three assessment
In reaching a judgement, the decision maker should consider whether any adverse impact is temporary, such as during construction and /or whether any adverse impact on the landscape/seascape will be capable of being reversed in a timescale that the decision maker considers reasonable (paragraph 5.9.16 of NPS EN-1).	The effects of the temporary and permanent elements of the project on the seascape are assessed in section 10.11.
The decision maker should consider whether the project has been designed carefully to minimise harm to the landscape, including by reasonable mitigation (paragraph 5.9.17 of NPS EN-1).	Given the transitory and dynamic nature of the majority of the visual receptors and the location of the project offshore, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines (section 10.10).
The decision maker will have to judge whether the visual effects on sensitive receptors, outweigh the benefits of the project (paragraph 5.9.18 of NPS EN-1).	The effects of the temporary and permanent elements of the project on the visual resources are assessed in section 10.11.
Reducing the scale of a project can help to mitigate the visual and landscape effects of a proposed project. However, reducing the scale or otherwise amending the design…may result in a significant operational constraint and reduction in function – for example the electricity generation output. (paragraph 5.9.21 of NPS EN-1).	Given the transitory and dynamic nature of the majority of the visual receptors and the location of the project offshore, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines (section 10.10).
Within a defined site, adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes, depending on the size and type of the proposed project (paragraph 5.9.22 of NPS EN-1).	
It may be appropriate to undertake landscaping off site (paragraph 5.9.23 of NPS EN-1).	

10.4.1.4 Paragraphs 2.6.198 to 2.6.210 of NPS EN-3 require applicants to have regard to seascape and visual effects. The NPS (paragraphs 2.6.199 and 2.6.200) specifically highlights the following potential issues:

- "*Seascape is an additional issue for consideration. Seascape is a discrete area within which there is shared inter-visibility between land and sea. In some circumstances it may be necessary to carry out a seascape and visual impact assessment (SVIA) in accordance with the relevant offshore wind farm EIA policy.;*
- *The seascape is an important resource and an economic asset. Coastal landscapes are often recognised through statutory landscape designations*."

10.4.1.5 The NPS (paragraphs 2.6.201 to 2.6.206) includes guidance on what matters are to be included in an applicant's assessment, these being summarised in Table 10.3 along with a description of how these have been considered in respect of Hornsea Three.

Table 10.3: Summary of NPS EN-3 policy relevant to seascape and visual resources and consideration of the Hornsea Three assessment.

Summary of NPS EN-3 policy relevant to the assessment of Seascape and Visual Resources	How/where considered within the Hornsea Three assessment
Some applications for offshore wind farms that are submitted to the Secretary of State will be proposed at distances that mean that a project would not be visible from the shore. In these instances, the Secretary of State is likely to be able to conclude that an SVIA will not be required studies (paragraph 2.6.201 of NPS EN-3).	The turbines in Hornsea Three will not be visible from the shore. However, there are theoretical views of the offshore HVAC booster stations structures from land within the Norfolk Coast AONB which is located at least 27 km from the offshore HVAC booster stations (Figure 10.3). Notwithstanding paragraph 2.6.201 of NPS EN-3, this assessment has been prepared in accordance with advice received from Natural England in the Scoping Opinion (PINS, 2016). A summary of the consultation undertaken for Hornsea Three in relation to SVIA is summarised in Table 10.5.
Projects visible from the shore will be required to undertake a SVIA that is in proportion to the scale of the project (paragraph 2.6.202 of NPS EN-3).	The turbines in Hornsea Three will not be visible from the shore. However, this SVIA has been completed in accordance with the JNCC's submission on Hornsea Project One's Scoping Report (Dec 2010) as set out in volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three. An SVIA has been undertaken in relation to seascape and visual receptors within the array SVIA study area (Figure 10.1). The array SVIA study area does not extend to shore based receptors. The methodology for the SVIA has been based on present day best practice guidance (refer to paragraph 53 of Visual Representation of Wind farms: Good Practice Guidance – Version 3 (SNH, 2014)). Reference has been made both to the present day and HSC areas in section 5.7 of the Seascape Character Assessments East Inshore and East Offshore Marine Plan Areas (Marine Management Organisation and English Heritage, 2012), which cover the majority of the SVIA study areas. Wirelines have been prepared from representative viewpoints and receptors, based on consultation responses included in the Scoping Opinion (PINS, 2016).
Where necessary, assessment of the seascape should include assessment of: limit of visual perception from coast; how people perceive and interact with the seascape; and, individual characteristics of the coast's ability to absorb the development. (Paragraph 2.6.203 of NPS EN-3).	
Photomontages are likely to be required as part of the SVIA with viewpoints to be selected in consultation with statutory consultees at EIA scoping stage (paragraph 2.6.204 of NPS EN-3).	
Magnitude of change to both the identified seascape receptors (such as seascape units and designated landscapes) and visual receptors (such as viewpoints) should be assessed in accordance with the standard methodology for SVIA (paragraph 2.6.205 of NPS EN-3).	
Where appropriate, cumulative SVIA is to be undertaken in accordance with section 4.2 of NPS EN-1 (paragraph 2.6.206 of NPS EN-3).	A cumulative impact assessment has been undertaken and is presented in section 10.13.

10.4.1.6 It is recognised that much of the proposed infrastructure associated with offshore wind farms is likely to result in visual effects. The Secretary of State must judge whether the effects upon sensitive receptors outweigh the benefits of the project. NPS EN-3 highlights a number of points relating to the determination of an application and in relation to mitigation (paragraphs 2.6.207 to 2.6.210); these are summarised, in Table 10.4 along with a description of how these have been considered in respect of Hornsea Three.

Table 10.4: Summary of NPS EN-3 policy on decision making with regard to seascape and visual resources and consideration in the Hornsea Three assessment.

Summary of NPS EN-3 policy on decision making (and mitigation) in relation to Seascape and Visual Resources	How/where considered within the Hornsea Three assessment
The Secretary of State should assess the proposal in accordance with section 5.9 of NPS EN-1 (paragraph 2.6.207 of NPS EN-3).	The assessment of Hornsea Three has considered the likely significance of effects, considering each phase of the development process. The likely significance of effects has informed the design development of the scheme and is outlined in this chapter (refer to Table 10.28 for the summary of potential environmental effects). At 120 km from the nearest land, the Hornsea Three array area would not be visible, however the offshore HVAC booster stations could be visible.
Where a proposed wind farm is within sight of the coast, there may be adverse effects. The Secretary of State should not refuse to grant a consent for a development solely on the ground of an adverse effect on the seascape or visual amenity unless: it considers that an alternative layout within the identified site could be reasonably proposed which would minimise any harm, taking into account other constraints that the applicant has faced such as ecological effects, while maintaining safety or economic viability of the application; or taking account of the sensitivity of the receptor(s) as set out in EN-1 paragraph 5.9.18, the harmful effects are considered to outweigh the benefits of the proposed scheme (paragraph 2.6.208 of NPS EN-3).	
Where adverse effects are anticipated either during the construction or operational phases, the Secretary of State should take into account the extent to which the effects are temporary or reversible (paragraph 2.6.209 of NPS EN-3).	
Neither the design nor scale of individual wind turbines can be changed without significantly affecting the electricity generating output of the wind turbines. Therefore, the Secretary of State should expect it to be unlikely that mitigation in the form of reduction in scale will be feasible. However, the layout of the turbines should be designed appropriately to minimise harm, taking into account other constraints such as ecological effects, safety reasons or engineering and design parameters (paragraph 2.6.210 of NPS EN-3).	Given the transitory and dynamic nature of the majority of the visual receptors and the location of the project offshore, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines (section 10.10).

10.5 Consultation

10.5.1.1 A summary of the key issues raised during consultation specific to seascape and visual resources is outlined below, together with how these issues have been considered in the production of this PEIR. A summary of consultation specific to seascape and visual resources undertaken for Hornsea Project One and Hornsea Project Two, which are applicable to Hornsea Three, are also set out below.

10.5.2 Hornsea Project One and Hornsea Project Two consultation

10.5.2.1 Hornsea Three has similarities, both in terms of the nature of the development and its location, to Hornsea Project One and Hornsea Project Two. The matters relevant to Hornsea Three, which were raised by consultees during the pre-application and examination phases of Hornsea Project One and Hornsea Project Two on seascape and visual resources, are set out in volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three.

10.5.3 Hornsea Three consultation

10.5.3.1 Table 10.5 below summarises the issues raised relevant to seascape and visual resources, which have been identified during consultation activities undertaken to date. Table 10.5 also indicates either how these issues have been addressed within this PEIR or how the Applicant has had regard to them.

Table 10.5: Summary of key consultation issues raised during consultation activities undertaken for Hornsea Three relevant to seascape and visual resources.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
December 2016	PINS – Scoping Opinion Report	Scoping Opinion, paragraph 3.36: Tables 9.11, 9.12 and 9.13 propose to scope out elements from the SVIA for all phases of the development. The Secretary of State considers that insufficient information has been provided at this stage to support this outcome. The Secretary of State does not agree therefore to scope out; night time change in the existing visual scenario during all stages of the proposed development; change to the existing present day seascape character in relation to construction of the offshore export cable; daytime change in the existing visual scenario in relation to construction of the offshore export cable and temporary change of the existing HSC through the introduction of new or uncharacteristic elements/features during construction.	A full SVIA has been undertaken. It includes an assessment of the effects on seascape and visual resources during construction, operation and maintenance, and decommissioning phases and for all offshore elements of Hornsea Three. The assessment includes consideration of daytime and night time effects for all three phases (see section 10.11).
		Scoping Opinion, paragraph 3.106: The extent of and rationale for the selection of the three study areas described in paragraph 9.5.2 of the Scoping Report is unclear. Figure 9.15, to which cross-reference is made, also does not show all those study areas. The study areas for the seascape and visual resources assessments should be agreed with relevant consultees, clearly identified in the Environmental Statement, and the basis on which they were selected should be justified.	The PEIR includes a figure illustrating and clarifying all SVIA study areas used in the assessment. The text includes the rationale for the buffers used in the assessment (see section 10.3 and Figure 10.1).
		Scoping Opinion paragraph 3.107: Information relating to mitigation measures and residual effects is not provided in this chapter, other than in relation to measures inherent as part of the project design. The Secretary of State recommends that the Environmental Statement clearly identifies the potential effects requiring mitigation, the measures proposed to avoid or reduce the effects, and any remaining significant residual effects.	Given the transitory and dynamic nature of the majority of the visual receptors and the location of the project offshore, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines (section 10.10).
		Scoping Opinion, paragraph 3.109: It is proposed that the potential for cumulative effects is only considered in relation to the HSC assessment. The Secretary of State does not explicitly disagree with this approach but recommends that consideration is given as to whether this will capture all the potential significant cumulative effects, and whether other matters should additionally be considered.	The SVIA includes an assessment of potential present day and HSC cumulative effects. See section 10.11 and Table 10.25, Table 10.26, Table 10.27 and Table 10.28.
December 2016	English Heritage – Scoping Opinion Letter	For the purposes of effectively completing an EIA it will be necessary to commission and interpret survey data to an appropriate professional standard. Paragraph 9.5.4 (Seascape and visual resources - baseline data) includes reference to England's Historic Seascapes: Withernsea to Skegness Pilot Study (MoLAS, 2009).	The SVIA uses the most up to date available baseline information from Historic Seascapes: East Yorkshire to Norfolk (Aldred, 2013a; b and c). See section 10.7.
		It will be relevant for the Applicant to consider how further change might be accommodated given the present perception of HSC in this part of the North Sea. Similarly, cumulative impact should look beyond any claim that this project is self-contained and consider palaeolandscapes throughout the former Hornsea Zone. We acknowledge that paragraphs 9.4.26 to 9.4.28 address matters to do with potential cumulative impacts, which we see as directly relevant to the completion of the EIA for this proposed project and for inclusion within this EIA exercise.	Consideration of how further change might be accommodated given the present perception of HSC in this part of the North Sea is considered in terms of cumulative impact at section 10.13.

10.6 Methodology to inform baseline

10.6.1 Guidance

10.6.1.1 The assessment for present day seascape and visual resources was designed and undertaken in accordance with the following guidance documents:

- Council of Europe, The European Landscape Convention (2000, entered into force in UK in 2007) CETS No. 176;
- Countryside Council for Wales, Brady Shipman and Martin, University College Dublin, Guide to Best Practice in Seascape Assessment (2001) Maritime Ireland/Wales INTERREG Report No. 5;
- Department of Trade and Industry, Guidance on the Assessment of the Impact of Offshore Wind Farm: Seascape and Visual Impact Report (2005) (hereafter referred to as the 'DTI Guidance 2005'); and
- Landscape Institute and the Institute of Environmental Management and Assessment, Guidelines of Landscape and Visual Impact Assessment: Third Edition (2013) (hereafter referred to as the 'GLVIA3').

10.6.1.2 Guidance and standards relevant to HSC include:

- COWRIE, Oxford Archaeology, Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (2008); and
- COWRIE, Wessex Archaeology, Historic Environment Guidance for the Offshore Renewable Energy Sector (2007).

10.6.1.3 Data presented in this section are drawn from desktop study and site-specific survey from viewpoint locations.

10.6.2 Desktop study

10.6.2.1 Information on seascape and visual resources within the SVIA study areas was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 10.6 below.

Table 10.6: Summary of key desktop reports.

Title	Source	Year	Author
HSC East Yorkshire to Norfolk Section One: Background, Methodology and Results	University of Newcastle unpublished report for English Heritage	2013	Aldred
HSC East Yorkshire to Norfolk Section Two: Applications Review and Case Studies	University of Newcastle unpublished report for English Heritage	2013	Aldred
HSC East Yorkshire to Norfolk Section Three: National and Regional Perspective Character Type Texts	University of Newcastle unpublished report for English Heritage	2013	Aldred
Seascape Character Area Assessment for East Inshore and East Offshore Marine Plan Areas	Marine Management Organisation (MMO)	2012	MMO
England's Historic Seascapes: Withernsea to Skegness Pilot Study: Final Report	Museum of London Archaeology (MoLAS)	2009	MoLAS
Seascape Characterisation around the English Coast (Marine Plan Areas 3 and 4 and Part of Area 6 Pilot Study	Natural England	2012	Natural England

10.6.2.2 The following additional data sources have been used to inform this SVIA:

- Admiralty Charts:
  - 266 North Sea Offshore Charts Sheet 11, 1:200,000 scale;
  - 1187 Outer Silver Pit, 1:150,000 scale;
  - 1190, 1191 Flamborough Head to Blakeney Point, 1:150,000 scale;
  - 1503, 1504 Outer Dowsing to Smiths Knoll including Indefatigable Banks, 1:150,000 scale; and
  - 1631, 1632, 1:150,000 scale.
- Recorded visibility data from the Met Office (2016);
- Information contained within the Zone Characterisation (ZoC) prepared for the former Hornsea Zone (SMart Wind, 2011); and
- ZTV maps plotted for Hornsea Three array area and the offshore HVAC booster stations search area.

10.7 Baseline environment

10.7.1 Seascape designations

10.7.1.1 There are no national or regional seascape designations within the SVIA study areas for this assessment.

10.7.2 Seascape character

10.7.2.1 Published seascape character assessments cover the SVIA study areas. Plans showing the present day seascape character areas used in this SVIA are set out at Figure 10.2.

Present day national seascape character areas (NSCA)

10.7.2.2 A seascape character area assessment for the East Inshore and East Offshore Marine Plan areas assessment was published by the MMO in October 2012 (MMO, 2012). The MMO seascape assessment is based upon an earlier pilot study seascape assessment commissioned by Natural England from URS Scott Wilson (Natural England, 2012).

10.7.2.3 The SVIA study areas encompass marine plan areas 3 and 4 (East Inshore and East Offshore respectively) which extend as far as the median line between the UK and the Netherlands. The purpose of the MMO assessment is to provide a strategic scale seascape character assessment to inform the marine planning process.

10.7.2.4 Both the MMO and the Natural England seascape character assessments divide the East Inshore and East Offshore marine plan areas into ten national seascape character areas (NSCA). These are 'Dogger Bank', 'Dogger Deep Water Channel', 'East Midlands Offshore Gas Fields', 'East Anglian Shipping Waters', 'Holderness Coastal Waters', 'Humber Waters', 'East Midlands Coastal Waters', 'The Wash', 'Norfolk Coastal Waters' and 'Suffolk Coastal Waters' (Figure 10.2).

10.7.2.5 The MMO assessment (MMO, 2012) revises the key characteristics listed for each NSCA contained within the Natural England pilot study (Natural England, 2012). These revised key characteristics (listed in volume 5, annex 10.1: Seascape and Visual Resources Technical Report) are employed in this assessment. The more detailed Natural England pilot study is referred to for additional information on relevant seascape character areas.

10.7.2.6 The majority of the Hornsea Three array area (582 km^2, equivalent to 84% of the Hornsea Three array area) is located in the 'Dogger Deep Water Channel' NSCA and a small area (114 km^2, equivalent to 16% of the Hornsea Three array area) lies within the 'East Midlands Offshore Gas Fields' NSCA. The array SVIA study area also covers the Dogger Bank and East Anglian Shipping Waters NSCAs, and Dutch waters. (Figure 10.2). As no published seascape character studies pertaining to The Netherlands' areas of the southern North Sea could be identified, characterisation of the Netherlands' seascape has been undertaken for the specific purposes of this assessment. The offshore HVAC booster SVIA study area lie within the 'East Midlands Offshore Gas Fields' and 'Norfolk Coastal Waters' NSCA.

10.7.2.7 The majority of the Hornsea Three offshore cable corridor (183 km^2, equivalent to 59% of the Hornsea Three offshore cable corridor area) is located in the 'East Midlands Offshore Gas Fields' NSCA and a smaller area (61 km^2, equivalent to 20% of the Hornsea Three offshore cable corridor area) within the 'Norfolk Coastal Waters' NSCA. The remainder of the Hornsea Three offshore cable corridor is located within the 'Dogger Deep Water Channel' NSCA (39 km^2, equivalent to 12%) and the 'East Midlands Coastal Waters (30 km^2, equivalent to 10%).

10.7.2.8 Each of the respective seascape character descriptions of these areas are detailed in volume 5, annex 10.1: Seascape and Visual Resources Technical Report. This includes:

- 'Dogger Deep Water Channel' NSCA (MMO, 2012);
- 'Dogger Deep Water Channel' NSCA (Natural England, 2012);
- 'East Midlands Offshore Gas Fields' NSCA (MMO, 2012);
- 'East Midlands Offshore Gas Fields' NSCA (Natural England, 2012);
- 'Dogger Bank' NSCA (MMO, 2012);
- 'Dogger Bank' NSCA (Natural England, 2012);
- 'East Midlands Coastal Waters' NSCA (MMO, 2012); and
- 'East Midlands Coastal Waters' NSCA (Natural England, 2012).

10.7.2.9 Within the above character areas, details of commercial industry and other activities within those respective areas are outlined where relevant.

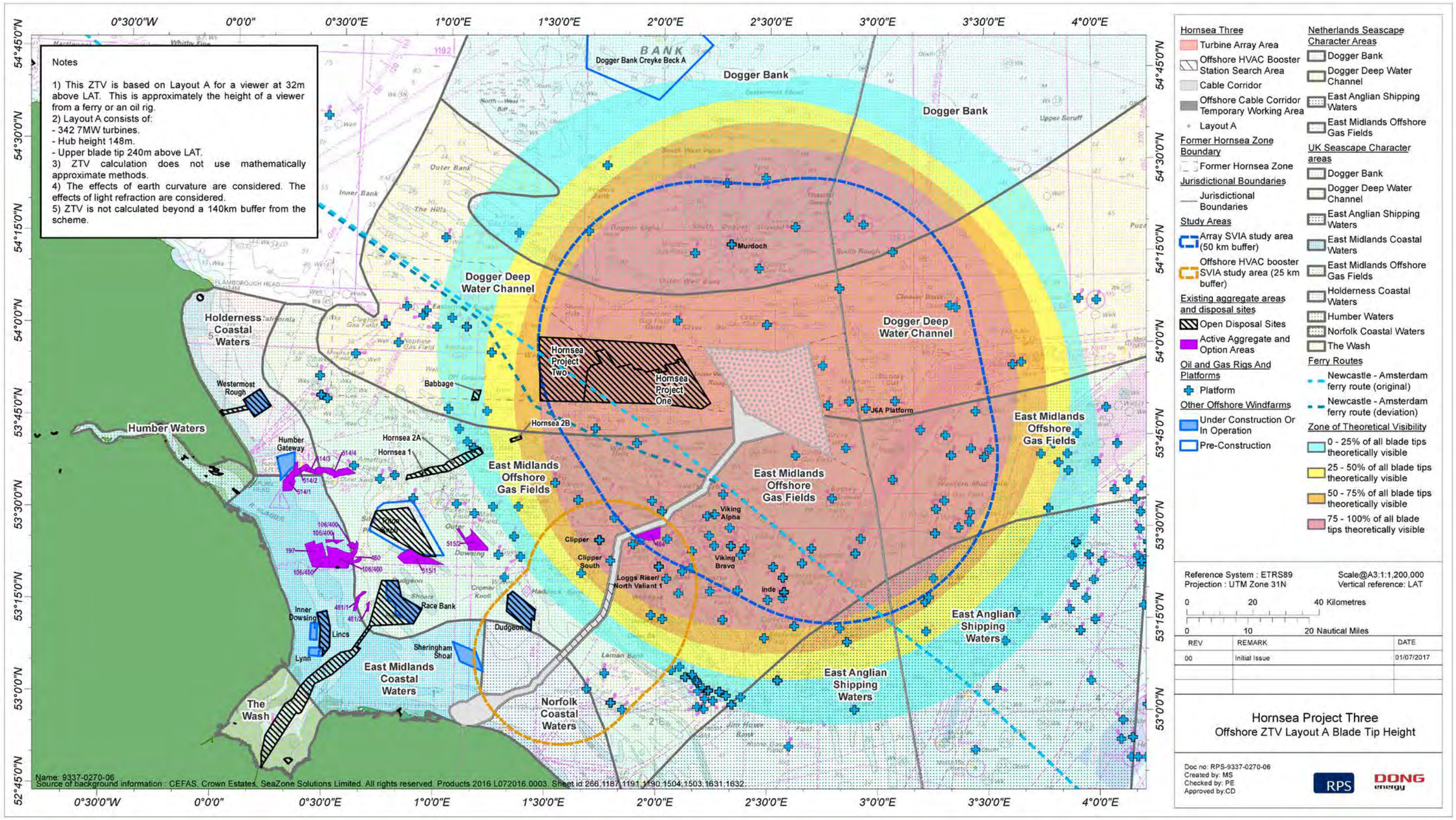

Figure 10.2: Present day seascape character areas with Layout B ZTV.

Existing structures within the array SVIA study area

10.7.2.10 Fifty four oil and gas platforms lie within the array SVIA study area, 14 of which are manned. Thirty platforms lie within the offshore HVAC booster SVIA study area, of which 10 are manned. Three platforms lie within an area of sea which coincides with both SVIA study areas.

10.7.2.11 The Murdoch manned platform lies to the north of the Hornsea Three array area within the array SVIA study area (Figure 10.2). Seven un-manned platforms and two platforms of indeterminate status also lie to the north of the Hornsea Three array area.

10.7.2.12 The J6A manned platform lies to the east of Hornsea Three in Dutch waters. Three un-manned platforms also lie to the east of the Hornsea Three array area, within the array SVIA study area.

10.7.2.13 Manned platforms within the array SVIA study area include Viking Alpha Riser, Viking Bravo Drilling, Accommodation, Compression and Production, and INDE AC, AP, AQ, AT, CD and CP lie to the south of the Hornsea Three array area.

10.7.2.14 The Coal Pit and Outer Dowsing aggregate areas lie to the south of the Hornsea Three array area within the array SVIA study area. This is an operational area with vessels undertaking dredging at the site.

Existing structures adjacent to the Hornsea Three offshore cable corridor

10.7.2.15 The manned platforms adjacent to the Hornsea Three offshore cable corridor include Clipper PM, PC, PW, PT and South. Two further unmanned platforms lie adjacent to the northern end of the offshore cable (Figure 10.2).

10.7.2.16 The Coal Pit and Outer Dowsing aggregate areas lie adjacent to the northern part of the cable corridor within the East Midlands Offshore Gas Fields character area. These are operational areas with vessels at the sites.

Existing structures within the offshore HVAC booster SVIA study area

10.7.2.17 The manned platforms within the offshore HVAC booster SVIA study area include Clipper PM, PC, PW, PT and South, Loggs Compression, Production, Riser and Accommodation, and North Valiant One lie within the northern part of the offshore HVAC booster SVIA study area (Figure 10.2).

10.7.2.18 The Coal Pit and Outer Dowsing aggregate areas lie within the northern part of the offshore HVAC booster SVIA study area and Dudgeon open disposal site lies to the west within the East Midlands Offshore Gas Fields character area. These are operational areas with vessels at the sites.

10.7.2.19 The Sherringham Shoal offshore wind farm lies on the western edge of the offshore HVAC booster SVIA study area, within the East Midlands Coastal Waters character area.

Published HSC assessment

10.7.2.20 A HSC of the area from the Humber to Norfolk was published in 2013 (Aldred 2013a; b and c). The array SVIA study area lies within the HSC East Yorkshire to Norfolk Project Area 2.

10.7.2.21 Each of the representative Broad Historic Character Types (BCT) including fishing, communications and industry and Historic Character Sub Types (HCS) are described in volume 5, annex 10.1: Seascape and Visual Resources Technical Report and illustrated in Figures 4.3 to 4.7 within that document.

10.7.3 Existing visual context

10.7.3.1 This section sets out the existing visual context of the SVIA study areas. The context is derived from desk based studies and information contained within the reports of other technical disciplines for the ZoC.

10.7.3.2 The visual characteristics of the SVIA study areas are relatively homogenous:

- Lack of inter-visibility with coastal areas due to distance from shore;
- Open seas with occasional views of offshore structures, such as gas platforms;
- Regular patterns of use by sea-going vessels for a variety of purposes, including recreational cruising, commercial 'cruise ferry' routes, commercial fishing activities, tankers and cargo vessels; and
- Air combat training takes place over the majority of the array SVIA study area.

10.7.3.3 As noted in section 10.9, the Natural England pilot study (Natural England, 2012) includes descriptions of aesthetic and perceptual qualities of the various NSCAs. All six NSCAs which fall within the SVIA study areas used for this assessment (‘Dogger Deep Water Channel’, ‘East Midlands Offshore Gas Fields’, ‘Dogger Bank’, East Anglian Shipping Waters’, Norfolk Coastal Waters and East Midlands Coastal Waters) include descriptions of available views. These can be found in volume 5, annex 10.1: Seascape and Visual Resources Technical Report.

10.7.4 Summary of present day seascape and visual resources

10.7.4.1 The list below sets out the definitive list of the seascape resources to be considered within the assessment as a result of baseline data collection within the SVIA study areas. These include the following present day seascape character resources:

- 'Dogger Bank' NSCA;
- 'Dogger Deep Water Channel' NSCA;
- 'East Midlands Offshore Gas Fields' NSCA;
- ‘East Anglian Shipping Waters’ NSCA;
- ‘Norfolk Coastal Waters’ NSCA, and
- ‘East Midlands Coastal Waters’ NSCA.

10.7.4.2 In addition seascape character areas within Netherlands waters include the following resources:

- 'Dogger Bank: Netherlands waters';
- 'Dogger Deep Water Channel: Netherlands waters';
- 'East Midlands Offshore Gas Fields: Netherlands waters'; and
- 'East Anglian Shipping Waters: Netherlands waters'.

10.7.4.3 The visual receptors known to be present within the SVIA study areas, which have been considered within this assessment, are listed at paragraph 10.7.7.11 above.

10.7.5 Summary of the HSC resources

10.7.5.1 The list below sets out the definitive list of the HSC resources to be considered within the assessment as a result of baseline data collection within the SVIA study areas. The following HSCs which have been taken forward for consideration within the assessment are listed below:

- Fishing BCT;
- Communications BCT;
- Industry BCT;
- Navigation BCT; and
- Cultural Topography BCT.

10.7.5.2 These BCTs within the Hornsea Three array area are subdivided into subsequent Historic Character Subtypes as listed below:

- 'Fishing' BCT:
  - 'Bottom Trawling'; and
  - 'Drift Netting'.
- 'Communications BCT
  - 'Submarine Telecommunications cables'.
- 'Industry' BCT:
  - 'Hydrocarbon Pipeline'; and
  - 'Hydrocarbon Installation'.
- Navigation BCT:
  - 'Buoyage'.
- 'Cultural Topography' BCT:
  - 'Fine Sediment Plains'; and
  - 'Coarse Sediment Plains'.

10.7.5.3 Within the Hornsea Three offshore cable corridor the BCTs are subdivided into subsequent HCS as listed below:

- 'Fishing' BCT:
  - 'Bottom Trawling';
  - 'Drift Netting';
  - 'Fishing Ground'; and
  - 'Potting'.
- Communications BCT
  - 'Submarine Telecommunications cables.
- 'Industry' BCT:
  - 'Hydrocarbon Pipeline';
  - 'Hydrocarbon Installation'; and
  - 'Hydrocarbon Field (Gas)'.
- Navigation BCT:
  - 'Navigation route'; and
  - 'Shoals and Flats'.
- 'Cultural Topography' BCT:
  - 'Fine Sediment Plains';
  - 'Coarse Sediment Plains;
  - 'Exposed Bedrock; and
  - 'Sand Banks with Sand Waves.

10.7.6 Future baseline scenario

Seascape and visual resources

10.7.6.1 The seascape and visual resources baseline is not static and will be subject to ongoing change to other plans and activities comprising the continued human use of the SVIA study areas. There is a general evolution of the seascape within the North Sea towards wind farm seascape character sub-types as the large arrays, including the projects located within the former Hornsea and East Anglia Zones, become defining features of this relatively featureless seascape environment (featureless when compared to coastal seascapes).

10.7.6.2 Other visible development within the SVIA study areas comprises a small number of oil and gas platforms which will increase the intensity of this type of existing infrastructure within the seascape, although this may be balanced out by the decommissioning of platforms. However, this will result in limited change to the character of the seascape due to the relatively small scale of the development in the context of many other oil and gas platforms.

10.7.6.3 The Dudgeon offshore wind farm will lie within the offshore HVAC booster SVIA study area. This scheme will add to the presence of wind energy development within this seascape, in the context of the existing Sheringham Shoal offshore wind farm. The addition of further wind farms to the seascape will increase the intensity of development within the seascape of the offshore HVAC booster stations, although theses would be too distant from the Hornsea Three array to change the future baseline for the main element of the proposed development.

HSC

10.7.6.4 The consented Hornsea Project One and Hornsea Project Two schemes will comprise the most significant alteration to the current baseline. Hornsea Project One is currently under construction and this, together with Hornsea Project Two, will add the 'Renewable Energy Installation (Wind)' HSC to the area.

Data limitations

10.7.6.5 Currently there is no perceived limitation in the data available that has informed this chapter.

10.7.7 Data limitations

Factors likely to affect visibility

10.7.7.1 The sea is often regarded as a flat surface, lacking in physical structures that could prevent distant views of remote objects. However, there are a variety of other factors that are likely to affect the ability to experience distant views at sea. These include the acuity of the human eye, the effects of curvature of the earth and refraction of light, as well as meteorological conditions.

Acuity of the eye, the effects of the curvature of the earth and refraction of light

10.7.7.2 There are limitations to the size of an object and its distance from the viewer that can be readily perceived by the human eye. These limitations are set out in the various seascape and wind farm guidance (onshore and offshore) used for this assessment. The DTI guidance and technical details are outlined in volume 5, annex 10.1: Seascape and Visual Resources Technical Report.

The influence of weather

10.7.7.3 Changing weather patterns and local climatic conditions will influence the visibility of Hornsea Three in terms of extent of view, colour and contrast of wind turbines and number of wind turbines visible, and thus the perceived visual impact. There will be periods of low visibility (sea mist, fog, low cloud and warm conditions that are accompanied by the haze of temperature inversions) as well as periods of high visibility in clear weather.

10.7.7.4 Differing weather conditions would have an effect on whether and how Hornsea Three may be seen. In some instances the turbines may be 'back-lit' (appearing darker in colour during sunset/sunrise and periods of pale or white blanket cloud) and 'up-lit' during stormy periods that combine dark clouds and bright sunshine.

10.7.7.5 Further information regarding the methodology for the data collection, the results, and interpretation for the area around Hornsea Three is outlined in volume 5, annex 10.1: Seascape and Visual Resources Technical Report.

10.7.7.6 The recorded visibility based on monthly Met Office data from between 2007 and 2016 shows that particular months have varying levels of visibility at sea. July, August and October are the clearest months when visibility is between 10,001 and 50,000 m for 80% of the time. January, March and December are the months with poorest visibility with an average of less than 10,000 m for 40% of the time.

Potential for views from coastal locations

10.7.7.7 Given that the Hornsea Three turbines are located approximately 120 km from the nearest coastal location, the effects of the curvature of the earth and refraction of light over the distances involved prevent any views of Hornsea Three turbines from onshore locations and have therefore not been considered further within the chapter.

10.7.7.8 The offshore HVAC booster stations would be located between approximately 27 km and 56 km from the shore. At these distances there would be limited views from lower lying onshore locations.

10.7.7.9 Areas of higher land on the Norfolk coastline, largely within the Norfolk Coast Area of Outstanding Natural Beauty (AONB), would enable receptors to gain views of the offshore HVAC booster stations, at least 27 km from the shore. Assuming a viewer eye level height of 1.5 m and an object 70 m high, areas of land would provide opportunities for views of the structure (see Figure 10.3). These onshore viewpoint locations are therefore considered further in volume 3, chapter 4: Landscape and Visual Resources.

10.7.7.10 The potential for coastal views of the onshore elements associated with Hornsea Three including onshore and near shore views of the cable laying activities during the construction phase are also considered in volume 3, chapter 4: Landscape and Visual Resources.

Principal visual receptors and representative viewpoints

10.7.7.11 Listed below are the types of visual receptor known to be present within the SVIA study areas:

- Sailors following the cruising routes identified by the Royal Yachting Association (RYA);
- Passengers and workers on board commercial ferries or cruise liners;
- People at their place of work on passing cargo, tanker or other commercial vessels;
- People at their place of work on manned static gas platforms or travelling to or from the platforms;
- People at their place of work on commercial fishing vessels;
- People at their place of work on aggregate dredging vessels;
- Military personnel using identified Military Practice Areas; and
- Other marine users (for example, ecologists carrying out survey work).

10.7.7.12 The RYA cruising routes, the cruise ferry routes and the locations of oil and gas platforms in relation to the ZTV of Layout B are illustrated on Figure 10.4 below.

10.7.7.13 At a coarse scale, most views from these locations are of the open sea with occasional glimpses of gas platforms or associated infrastructure and other vessels. As noted above, the extent of any available view may be limited by meteorological conditions.

10.7.7.14 Two 360 degree panoramic views taken from vessels involved in ecological surveying are set out in volume 5, annex 10.1: Seascape and Visual Resource Technical Report (360 degree panoramic view from photo location 1). The location of these viewpoints is also shown in volume 5, annex 10.1: Seascape and Visual Resources Technical Report). These panoramic photographs show an open, flat sea in clear, calm weather, with the occasional glimpse of built infrastructure in the distance. The seascape in the sample views would change with time of day, wave height, meteorological and lighting conditions, etc.

10.7.7.15 With the exception of views from gas platforms, other available views would be typically dynamic, experienced from moving vessels or other craft. Many of the people who would experience these views would be in the array SVIA study area due to their work activities or passing through the area to get to another destination.

10.7.7.16 Only one commercial passenger ferry route from Newcastle to Amsterdam is known to use the main routes through the array SVIA study area. The routes used by the Hull to Zeebrugge and Rotterdam ferries lie beyond the array SVIA study area. The Hull to Zeebrugge and Rotterdam ferry routes pass through the offshore HVAC booster SVIA study area and Hornsea Three offshore cable corridor however, due to the relatively small scale of the offshore HVAC booster stations, effects on views from the ferries have not been considered as any change in view at night when the ferries sail, is unlikely to be significant.

10.7.7.17 The large cruise ferry from Newcastle operates on a single journey per day basis, throughout the year and is operated by DFDS Ltd. who were consulted for Hornsea Project Two. The Hornsea Project Two array area would lie to the west of the Hornsea Three array area and considerably closer to the ferry route. DFDS Ltd. raised no issues about the potential for visual impacts as a result of the Hornsea Project Two array area. Based on their published departure times, their typical cruising speed and the distance from the array SVIA study area, the time taken for the ferry to reach and pass through the array SVIA study area can be estimated (i.e. with no allowance for time to manoeuvre around the port or to reach cruising speed). For the majority of the year, this would be during the hours of darkness (Table 10.7).

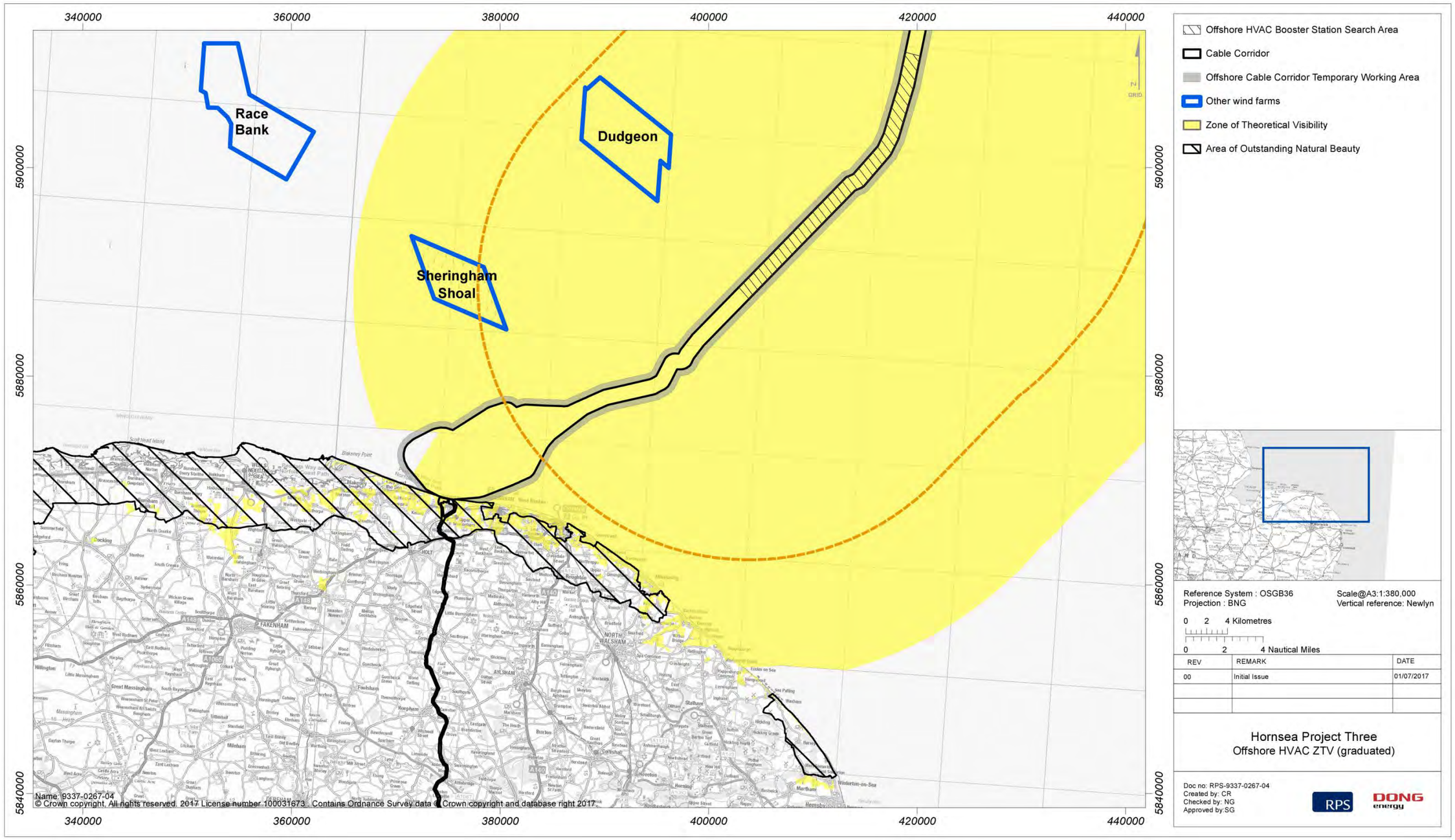

Figure 10.3: ZTV for the offshore HVAC booster stations.

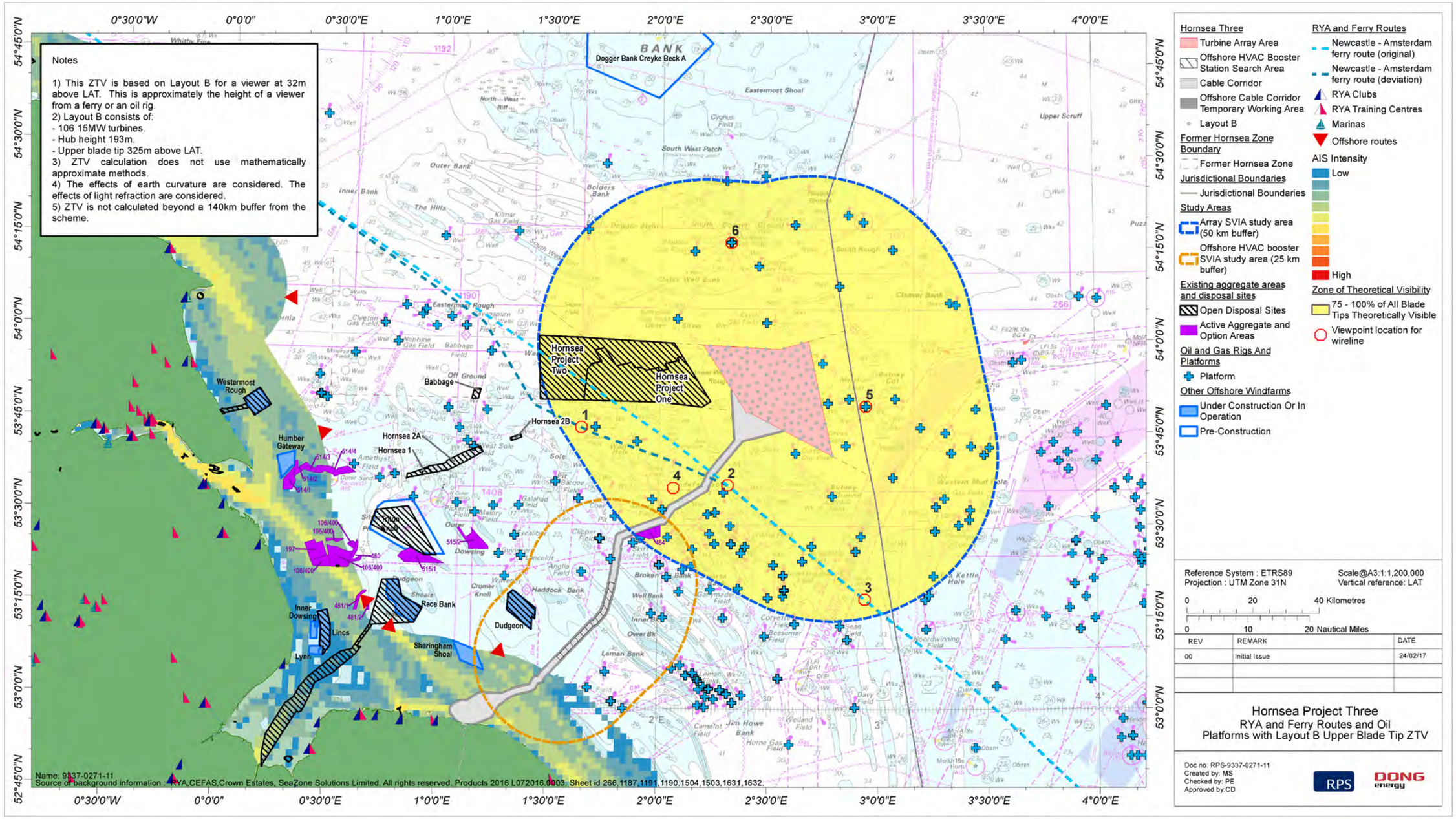

Figure 10.4: RYA and ferry routes and oil platforms with Layout B ZTV.

Table 10.7: Details of the ferry crossings within the array SVIA study area [a].

Days of the week	Depart	Arrive	Length of crossing	Time ferry will reach array SVIA study area (GMT)	Time ferry will leave array SVIA study area (GMT)
Monday-Saturday	Newcastle 17:00	Amsterdam 09:30	16.5 hours	23:00	02:00
Sunday	Newcastle 17:00	Amsterdam 09:30 (summer) 10:00 (winter)	16.5 hours (summer) 17hours (winter)	23:00	02:00 (summer) 02:30 (winter)
Monday - Saturday	Amsterdam 17:30	Newcastle 09:00	15.5 hours	20:30	23:30
Sunday	Amsterdam 17:30	Newcastle 09:00 (summer) 09:30 (winter)	15.5 hours (summer) 16 hours (winter)	20:30	23:30 summer 00:00 winter

a Based on 2017 ferry timetable

10.8 Key parameters for assessment

10.8.1 Maximum design scenario

10.8.1.1 The maximum design scenarios identified in Table 10.8 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (volume 1, chapter 3: Project Description). Effects of greater adverse significance to that assessed here are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), be taken forward in the final design scheme.

10.8.1.2 Table 10.8 below sets out the dimensions and quantities of wind turbines in each of the two indicative array layouts for Hornsea Three used for this assessment. As described in volume 1, chapter 3: Project Description, the two layouts are designed to use wind turbines of either 7 MW or 15 MW. The maximum blade tip height above MHWS is 325 m for up to 160 turbines. If 342 turbines are built they will have a maximum height of up to 240 m to blade tip. The number of wind turbine locations assessed in each layout ranges from a maximum of 342 turbines in Layout A to a minimum of 106 wind turbines in Layout B. Both scenarios have the potential to generate up to 2.4 GW of energy. It should be noted that 342 potential turbine locations were assessed as the maximum number.

10.8.1.3 For distant receptors the maximum design scenario is Layout B, as the tallest turbines will be seen for the greatest distance. Layout A is the maximum design scenario for closer receptors, as it equates to the largest quantity of wind turbines over the widest area of sea surface and therefore this leads to the greatest reduction of visual permeability due to the amount and density of turbines within the Hornsea Three array area, over the widest physical extent.

10.8.1.4 Illustrations of these layouts are shown in Figure 10.5 below and are described in full in volume 1, chapter 3: Project Description. It is noted that these layout options are for assessment purposes only. The final layout will be determined post-consent and will be dependent on the final wind turbine choice. Even once a final layout is determined, micro-siting of individual wind turbines may be required to accommodate local conditions. Detailed surveys, site investigation and project design will be carried out post-development consent. The micro-siting would not alter the seascape and visual impacts experienced by the receptors identified in this assessment.

10.8.1.5 All heights above sea level used in this assessment are in relation to LAT. This presents the maximum height of the wind turbines visible above a predictable datum. It should be noted that when quoting dimensions of the wind turbines, the MHWS is usually used as it reflects the highest water mark at sea level, hence there is a degree of difference between the LAT and MHWS. While the upper blade tip of the wind turbines will be up to 321 m above MHWS, this figure would increase up to 325 m above LAT as the LAT is lower than the MHWS.

Wind turbine colour, navigational markings and lighting

10.8.1.6 The proposed navigation markings and lighting layout schemes for each layout are based on consultation with Trinity House and the Civil Aviation Authority (CAA) as well as recommendations from the International Association of Lighthouse Authorities (IALA).

10.8.1.7 Following the initial consultee responses to the Scoping Opinion (PINS, 2016), an indicative navigation and aviation lighting plan has been prepared, as set out in Figure 10.6.

Table 10.8: Maximum design scenario considered for the assessment of potential impacts on seascape and visual resources.

Potential impact	Maximum design scenario	Justification
Construction		
The temporary change to the existing present day seascape character through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.	Layout A The installation of 342 turbines with a maximum blade tip height of 240 m relative to LAT, 148 m hub height and 185 m rotor diameter. Piling of up to 361 jacket foundations (342 turbine foundations and 19 electrical infrastructure (12 offshore HVAC collector substations, four offshore HVDC converter stations and three accommodation platforms)). The construction of the turbines, substation and accommodation platform foundations within the Hornsea Three array area would be phased over a maximum construction period of 11 years. The construction of offshore turbines and transmission infrastructure is currently scheduled to take place 24 hours per day throughout the year, subject to weather conditions, until construction is complete. Installation of piles would be through pile driving or a combination of 'drive/drill/drive', dependent on seabed conditions at each pile location. Construction lighting would be required at each of the 361 foundation locations. There would be progressive introduction of new permanent long term elements such as the wind turbines and associated support structures identified below: • The construction of up to twelve offshore HVAC collector substations (six legs with four piles per leg) with a maximum height of 70 m relative to LAT, 90 m width and 90 m length; • The construction of up to four offshore HVDC converter stations (18 legs with four piles per leg) with a maximum height of 100 m relative to LAT, 180 m width and 90 m length; and • The construction of up to three accommodation platforms (four piles per foundation) with a maximum height of 64 m relative to LAT, 60 m width and a 60 m length. Offshore construction requiring up to 60 vessels per phase, present 24 hours a day, 361 days per annum is considered to be the maximum design scenario for seascape and visual resources. Construction would involve a variety of different vessels. There would be up to four jack-up barges at any one time, accompanied by various other vessels including, support vessels/tugs, heavy lift vessels, cable laying vessels (including pre and post laying), scour/grout protection vessels, diver support vessels and safety vessels. All vessels described could be working in the Hornsea Three array area and along the Hornsea Three offshore cable corridor simultaneously. However, piling would not occur at both locations simultaneously. Twenty five vessels would be used during cable laying activities. The cable installation in the intertidal area would be undertaken over a total installation period of up to 36 months, with a maximum gap of six years between phases (i.e. nine years total). The first phase would comprise installation of up to eight cable ducts by either open cut trench method, jetting, mass flow excavator, ploughing or vertical injection.. Works in the intertidal area could take approximately two weeks per duct to dig an exit pit, transport a duct into the intertidal area, and install it into the hole.	These parameters would cause the greatest change to the existing seascape character. This draws on the longest construction times and assumes maximum vessel presence. The maximum number of turbines was selected because it would take a greater length of time to install the greatest number of turbines and associated cabling. There would be a greater intrusion from the construction lighting on the more numerous wind turbine generators.
The temporary change to the existing HSC through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.	As per the scenario set out above.	These parameters would cause the greatest intrusion on HSC. This means that the longest construction times have been selected and maximum vessel presence has been assumed. This would also cause the greatest intrusion from the construction lighting.
The temporary change in the existing visual scenario during the construction phase may cause a variety of visual receptors to experience effects.	As per the scenario set out above.	These parameters would cause the greatest intrusion on the existing visual scenario. This means that the longest construction times were selected and the maximum vessel presence has been assumed. The maximum design scenario would have the maximum number of turbines. This layout has the least visual permeability and the greatest noticeable lighting effects at night. The positioning of the associated offshore buildings set on the perimeter of the development combined with the edge weighted layout at the closest position to the place experienced by a variety of visual receptors would increase the visual prominence of these structures and further reduce visual permeability.

Potential impact	Maximum design scenario	Justification
Operation		
The existing present day seascape character may change during the operational phase through the introduction of new or uncharacteristic elements/features.	The following factors have been considered within the present day seascape character operational assessment, based on the two different array layout scenarios as follows: Layout A (the most visually dense and complex array) • The layout with the greatest number of turbines (up to 342) with a maximum blade tip height of 240 m above LAT, 148 m hub height and 185 m rotor diameter. With an indicative minimum spacing of 1 km this is the maximum design scenario for those resources that are nearer to the turbine array. Layout B (the array with the largest ZTV) • The layout with the tallest wind turbines (up to 106) with a maximum blade tip height of 325 m above LAT, 193 m hub height and 265 m rotor diameter is the maximum design scenario for those resources that are further from the turbine array. • The turbine array area would be up to 696 km^2; • The location of up to twelve offshore HVAC collector substations with a maximum height of 70 m relative to LAT, 90 m width and 90 m length (Figure 10.6); • The location of up to four offshore HVDC converter stations with a maximum height of 100 m relative to LAT, 180 m width and 90 m length (Figure 10.6); • The location of up to three accommodation platforms with a maximum height of 64 m relative to LAT, 60 m width and a 60 m length (Figure 10.6); • Regular planned, and a limited number of unplanned, maintenance visits associated with the offshore infrastructure. Marine vessels will make up to 2,832 return journeys per year during operation and maintenance (including from supply/crew vessels and jack-ups) over a design life of 25 years. There will be 25,234 helicopter return journeys per year; and • A design life of 25 years including any necessary 'like with like' replacement of turbines. There would be the likelihood of repowering after this time to the end of the 50 year Crown Lease period. If larger turbines are used further assessment will need to be undertaken.	The greater number of shorter turbines in Layout A will create a more visually dense and complex array within a seascape, but would create a smaller ZTV. The smaller number of taller turbines in Layout B will create a larger ZTV, but will be less visually dense within the seascape. These parameters would cause the greatest intrusion on the existing seascape character. This means a design life of 25 years and the maximum vessel presence has been assumed.
The existing HSC may change during the operational phase through the introduction of new or uncharacteristic elements/features.	As detailed above.	These parameters would cause the greatest intrusion on the existing HSC. This means a design life of 25 years and the maximum vessel presence has been assumed.
The day time visual scenario experienced by a variety of visual receptors during the operational phase may change.	As detailed above.	These parameters would cause the greatest intrusion on the existing visual scenario. The tallest turbines would be visible from the greater distance. Therefore Layout B is the maximum design scenario for distant receptors. The maximum number of wind turbines and the layout covering the largest area (Layout A) is the maximum design scenario for closer receptors. The denser layout affects the visual permeability through the wind turbine development. The maximum dimensions for the associated offshore infrastructure have been assumed. The positioning of the associated offshore infrastructure set on the perimeter of the development at the closest position to the place experienced by a variety of visual receptors would worsen the visual prominence and reduce permeability.

Potential impact	Maximum design scenario	Justification
The night time visual scenario experienced by a variety of visual receptors during the operational phase may change.	Layout A The layout with the greatest number of turbines (up to 342) at a height of 240 m above LAT, 148 m hub height and 185 m rotor diameter, with an indicative spacing of 1 km. Navigation and aviation warning lights will be visible at the perimeter of the turbine array. Navigation markings for the maximum number of turbines of yellow flashing (5 second frequency) attached to the tower of the wind turbine at a maximum height of 25.28 m above LAT.; significant peripheral structure lights with a minimum range of 5 nm; yellow flashing (2.5 second frequency) intermediate structure lights with a minimum range of 3 nm (Figure 10.6); and Indicative lighting plan for maximum number of turbines of flashing red medium intensity (2,000 candelas) aviation warning lights with a minimum range of 5 nm (refer to Figure 10.6) attached to the nacelle. In accordance with guidance published by the Civil Aviation Authority, Civil Aviation Authority Policy Statement – The lighting and marking of wind turbine generators and meteorological masts in the United Kingdom Territorial Waters (CAA) (November 2012). It is understood that these red lights would be synchronised to flash simultaneously. Guidance relating to marine signal lights provided by International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) (IALA, 2008) indicates that such lights would have a night time nominal range of approximately 11 nm. Navigation lighting will have a minimum range of either 3 or 5 nm depending on whether the light is on an intermediate structure or a significant peripheral structure. The luminous intensity of these lights is not known at this stage and therefore the Nominal Range cannot be deduced. For the purposes of this assessment, it is assumed that the maximum design scenario would be where all the lights are synchronised to flash simultaneously.	These parameters would cause the greatest intrusion on the existing visual scenario. Layout A presents the maximum design scenario. The Nominal Range is defined as *"the distance in nautical miles at which lights produce an illuminance at the eye of the observer"*. IALA guidance (IALA, 2008) indicates factors such as atmospheric conditions, dirt and salting of lighting which could cause the degradation of luminous intensity under service conditions. The minimum range (distance) that aviation lights are required to be visible is 5 nm. IALA guidance (IALA, 2008) indicates that a light with 2,000 candelas luminous intensity has a Nominal Range of 11 nm at night time when there is no background lighting and meteorological visibility equals 10 nm. The Nominal Range for aviation lights is therefore assumed, for the purposes of this assessment, to be the maximum range over which a light may be visible.
Decommissioning		
Decommissioning of Hornsea Three array area, the offshore cable corridor and the offshore HVAC booster stations may change seascape character and may affect visual resources.	At the end of the design life of Hornsea Three (i.e. 25 years), it is anticipated that the turbines would be removed by reversing the methods used to install them: • Piled foundations would likely be cut approximately 2 m below the seabed with due consideration of likely changes in seabed level and removed; • Gravity base foundations would be removed by taking away their ballast and either floating them or lifting them from the seabed; and • Total removal of the export, array cables and offshore platform interconnector cables. Scour protection would not be removed. The parameters/factors that have been considered would be similar to those during the construction phase.	These parameters would cause the greatest intrusion on the existing visual scenario. This means the maximum vessel presence has been assumed, the maximum number of wind turbines and the layout covering the largest area has been chosen along with the maximum dimensions for the associated offshore infrastructure. The necessity to remove cables will be reviewed at the time, after consideration of the environmental impact of the removal operation and safety of the cables left *in situ* (volume 1, chapter 3: Project Description). Therefore, the maximum design scenario has assumed the removal of all cables, although this is likely to be over precautionary.
Decommissioning of Hornsea Three array area, the offshore cable corridor and the offshore HVAC booster stations may affect visual resources.	As stated above.	As stated above.
Decommissioning of Hornsea Three array area, the offshore cable corridor and the offshore HVAC booster stations may change HSC.	As stated above.	As stated above.

a Based on 2017 ferry timetable.

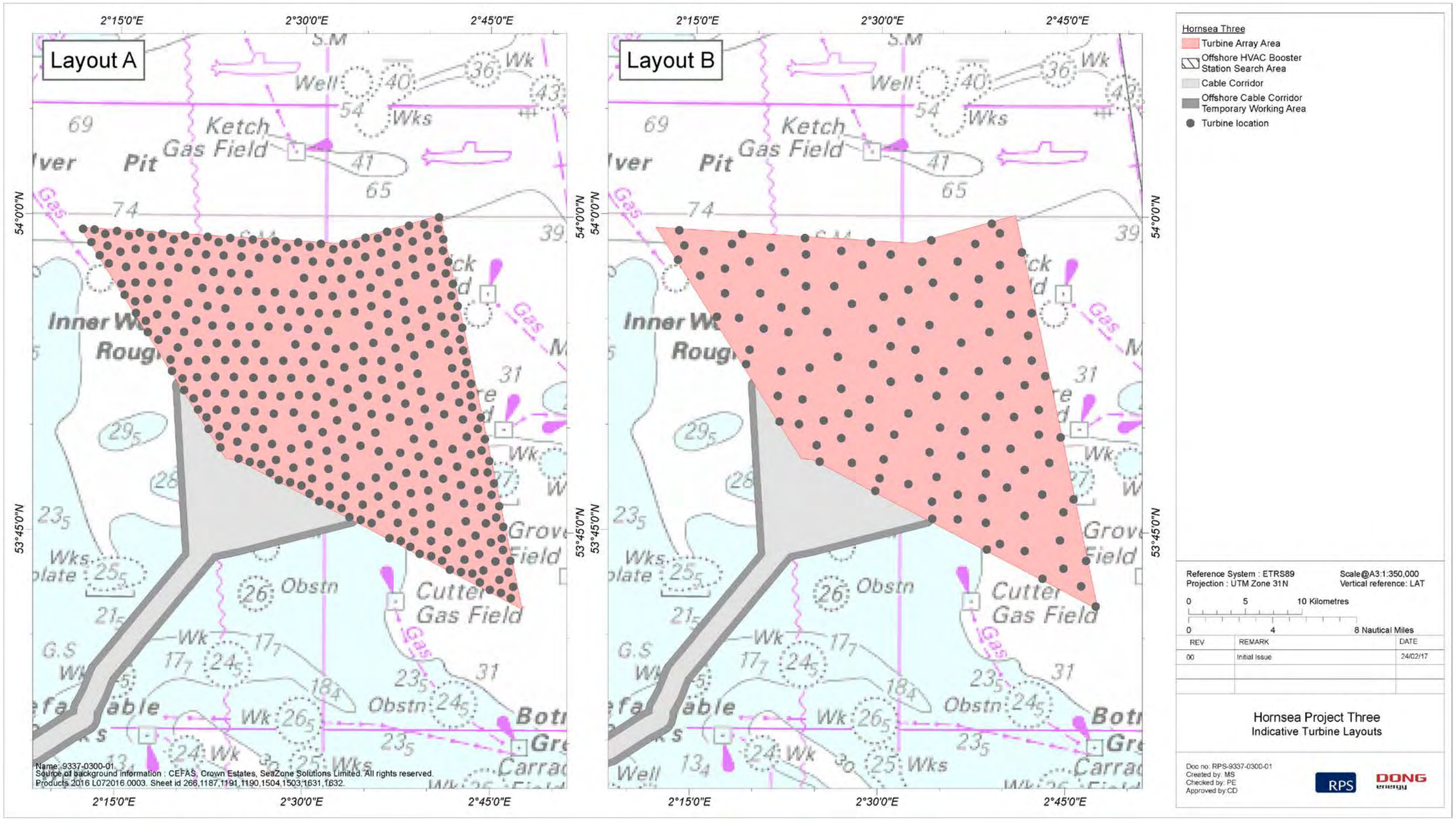

Figure 10.5: Indicative turbine layouts for the Hornsea Three array area.

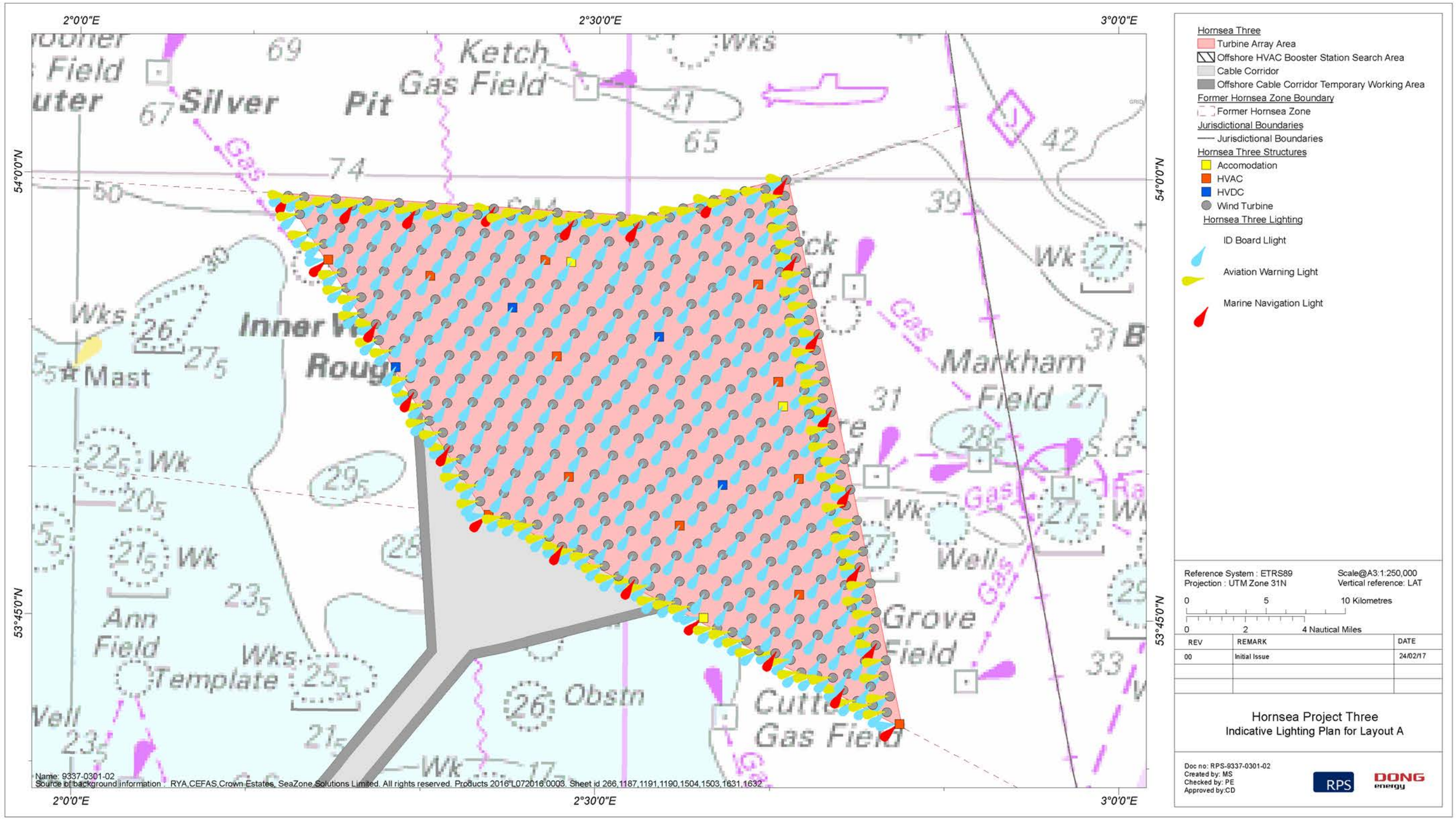

Figure 10.6: Indicative lighting plan for Layout A.

10.8.2 Impacts scoped out of the assessment

10.8.2.1 On the basis of the baseline environment and the project description outlined in volume 1, chapter 3: Project Description, a number of impacts are proposed to be scoped out of the assessment for seascape and visual resources. These impacts are outlined, together with a justification for scoping them out, in Table 10.9.

Table 10.9: Impacts scoped out of the assessment for seascape and visual resources [a].

Potential impact	Justification
Construction phase	
The day time change in the existing visual scenario for workers and passengers on ferries which have night time sailings.	The Newcastle to Amsterdam ferry only travels through the array SVIA study area at night, for the majority of the year. The Hull to Rotterdam and Hull to Zeebrugge ferry services only travel through the offshore HVAC booster SVIA study areas at night.
Operation phase	
The day time change in the existing visual scenario for workers and passengers on ferries which have night time sailings.	The Newcastle to Amsterdam ferry only travels through the array SVIA study area at night, for the majority of the year. The Hull to Rotterdam and Hull to Zeebrugge ferry services only travel through the offshore HVAC booster SVIA study areas at night.
Decommissioning phase	
The day time change in the existing visual scenario for workers and passengers on ferries which have night time sailings.	The Newcastle to Amsterdam ferry only travels through the array SVIA study area at night, for the majority of the year. The Hull to Rotterdam and Hull to Zeebrugge ferry services only travel through the offshore HVAC booster SVIA study areas at night.

a Based on 2017 ferry timetable

10.9 Impact assessment criteria

10.9.1 Present day seascape character and visual resources

Overview

10.9.1.1 The methodology used to assess the significance of effects for present day seascape character and visual resources follows the guidance listed in section 10.4 and the staged process is outlined below.

Study area

10.9.1.2 The SVIA study areas used for the assessment are defined in section 10.3.

ZTV

10.9.1.3 The ZTVs are computer generated illustrations of the areas where there is a theoretical potential to see a given structure (e.g. a wind turbine). Typically they are based on topographic modelling taking into account any intervening landform or similar features which may prevent views. The SVIA study areas lie in open sea, and therefore lack such features.

10.9.1.4 ZTVs for Hornsea Three have been run for Layouts A and B. Details of the different layout options and associated blade and hub heights are set out at Table 10.8 and Figure 10.5.

10.9.1.5 A representative viewing height of 32 m above LAT has been used to generate these ZTVs to represent a maximum design scenario. This forms the maximum likely height of a receptor on an oil and gas platform within the SVIA study areas.

10.9.1.6 A ZTV has been generated for the offshore HVAC booster stations based on structures at 5 km intervals within the offshore HVAC booster stations search area. As the North Eastern Region RYA cruising route passes through the offshore HVAC booster SVIA study area, a representative viewing height of 4 m has been used to represent a potential viewer on board a yacht and a representative viewing height of 1.5 m has been used to represent a potential viewer on land.

10.9.1.7 It should be noted that the effect of the acuity of the human eye to perceive distant objects is not factored into the calculations for the ZTVs. The ZTVs therefore represent areas from which it is theoretically possible to see the wind turbines and structures, not necessarily those areas from which they can be readily perceived in reality. Such considerations are factored into the professional judgement.

10.9.1.8 It should be noted that views of Hornsea Three will be subject to the limitations described in section 10.7.7.

Desktop study

10.9.1.9 A desktop study was carried out to establish the existing seascape and visual context for Hornsea Three. This included a review of the data sources listed in section 10.6.2.

Project description

10.9.1.10 This SVIA contains a brief description of the proposed development in relation to features of relevance to seascape and visual resources. The Hornsea Three development is described in further detail in volume 1, chapter 3: Project Description.

Selection of representative viewpoints

10.9.1.11 Given the transitory nature of the majority of visual receptors within the SVIA study areas, a series of representative viewpoints was selected to illustrate the potential effects of Hornsea Three. The selected locations, listed below, represent different types of visual receptors, viewing heights, distances and orientations from Hornsea Three (Figure 10.4):

- Viewpoint 1: is situated 45 km to the west (Newcastle to Amsterdam cruise ferry - viewpoint height 26.5 m above LAT);
- Viewpoint 2: is situated 23 km to the southwest (Newcastle to Amsterdam cruise ferry - viewpoint height 26.5 m above LAT);
- Viewpoint 3: is situated 45 km to the south (Newcastle to Amsterdam cruise ferry - viewpoint height 26.5 m above LAT);
- Viewpoint 4:) is situated 32 km to the southwest (RYA cruising route – viewpoint height 4.0 m above LAT;
- Viewpoint 5: is situated 13 km to the east (J6A platform main deck – viewpoint height 26.5 m above LAT); and
- Viewpoint 6: is situated 32 km to the north (Murdoch platform - viewpoint height 31.5 m above LAT).

10.9.1.12 Wirelines of Layout A with a 75 degree field of view (FOV) have been produced from all of the representative viewpoints. Where the 75 degree FOV does not encompass the full width of Hornsea Three, wirelines with a 180 degree FOV have also been prepared to illustrate the wider context.

10.9.1.13 Wirelines reproduced at a known scale, which should be viewed at a specified distance from the observer in order to replicate the size of the wind turbines as they would appear to a viewer at the viewpoint location, are presented in volume 5, annex 10.2: Seascape and Visual Resources Wirelines.

10.9.1.14 To aid the assessment, the wirelines show Hornsea Three (either Layout A or Layout B), other visible existing development (i.e. wind farms or oil/gas platforms) and development under construction (i.e. Hornsea Project One) that will be complete by the time work starts on Hornsea Three from representative viewpoints, have been prepared. These are included in volume 5, annex 10.2: Seascape and Visual Resources Wirelines. The technical details of the modelling and presentation are found in appendix A of volume 5, annex 10.1: Seascape and Visual Resources Technical Report.

10.9.1.15 Volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines comprises 360 degree wirelines from representative viewpoints of Hornsea Three (either Layout A or Layout B), other visible existing development (i.e. wind farms or oil/gas platforms), development under construction (i.e. Hornsea Project One), consented development or planned development that will be complete by the time Hornsea Three would be operational.

Assessment

Method statements

10.9.1.16 Appendix A of annex 10.1: Seascape and Visual Resources Technical Report contains two method statements, for ZTVs and for wirelines, used in this chapter. References for these are as follows:

- Method Statement for Wirelines (appendix A of annex 10.1: Seascape and Visual Resources Technical Report); and
- Method Statement for Zone of Theoretical Visibility (appendix B of volume 5, annex 10.1: Seascape and Visual Resources Technical Report).

Selection of present day seascape character and visual resources receptors

10.9.1.17 Present day seascape character and visual resources data obtained to inform the selection or receptors, and the study generally, have included the following:

- Seascape character areas and descriptions;
- Wireline representations;
- Assessment of meteorological data for visibility within the vicinity of Hornsea Three from January 2007 and December 2016; and
- Identification of visual receptors.

Present day seascape character and visual resources impact assessment methodology

10.9.1.18 The effects on present day seascape resources or visual receptors (people) are assessed by considering the proposed change in the baseline conditions (the impact of the proposal) against the type of seascape resource or visual receptor (including the importance and sensitivity of that resource or receptor). This methodology is summarised in Figure 10.7.

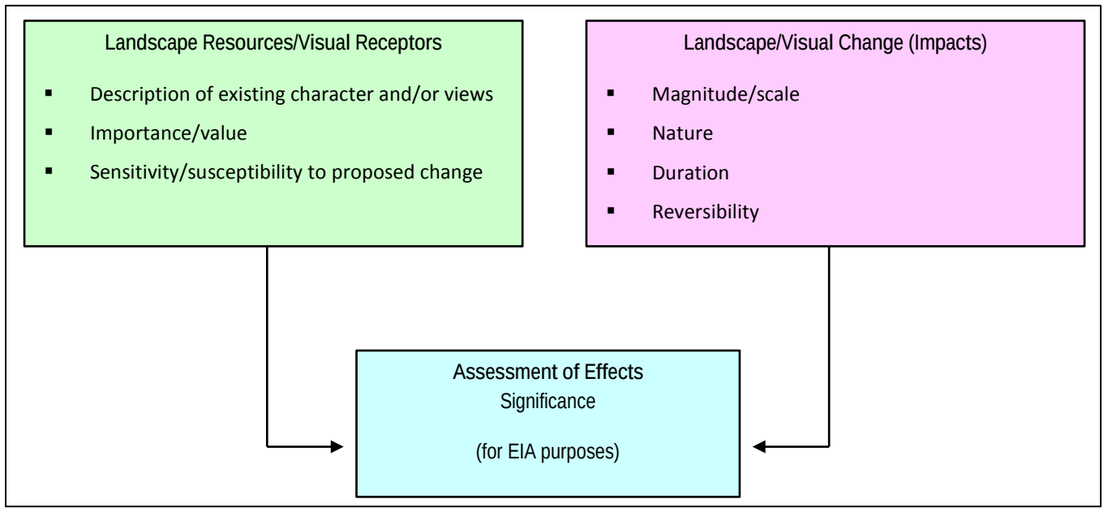

Figure 10.7: Summary of current seascape character and visual resources assessment methodology.

Value

10.9.1.19 Landscape value is defined in GLVIA3 at paragraph 5.44 as *"the value of any Landscape Character Type or Area that may be affected, based on review of any designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value"* and "*the value of individual contributors to landscape character, especially the key characteristics, which may include elements of the landscape, particularly landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of these contributors."*

10.9.1.20 The value of certain landscapes has been recognised, e.g. the national designation of AONB and Registered Parks and Gardens (RPaG). Some landscapes are locally designated, e.g. Special Landscape Area (SLA) or Area of Great Landscape Value (AGLV).

10.9.1.21 How that value might be affected by a development is classified on a four point scale (low, medium, high and very high) as set out in Table 10.10. The table can only illustrate general categories, as the effects on an area or element of landscape or seascape is specific to the development proposed and that particular aspect affected.

Table 10.10: Definition of terms relating to resource value (as expressed through designation).

Landscape/seascape resource value		
Value	Resource	Rationale
Very High	Nationally or internationally designated/valued landscape, or key elements or features of nationally designated landscapes.	Little or no tolerance to change
High	Regionally or nationally designated/valued countryside and landscape features.	Low tolerance to change
Medium	Locally or regionally designated/valued countryside and landscape features.	Medium tolerance to change
Low	Undesignated seascape/countryside and landscape features.	High tolerance to change

10.9.1.22 The criteria for determining the significance of effects is a two stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. The terms used to define sensitivity and magnitude are based on those used in the DMRB methodology, which is described in further detail in volume 1, chapter 5: Environmental Impact Assessment Methodology.

Sensitivity

10.9.1.23 The sensitivity of present day seascape resources and visual receptors to a development is dependent upon a range of factors and is classified on a four point scale (low, medium, high and very high). The criteria for defining sensitivity in this chapter are outlined in Table 10.11 below.

Table 10.11: Definition of terms relating to the sensitivity of present day seascape resource.

Seascape resource sensitivity		
Sensitivity	Resource	Rationale
Very High	Exceptional seascape quality, no or limited potential for substitution. Key elements/features well known to the wider public.	Little or no tolerance to change
High	Strong/distinctive seascape character; absence of seascape detractors.	Low tolerance to change
Medium	Some distinctive seascape characteristics; few seascape detractors.	Medium tolerance to change
Low	Absence of distinctive seascape characteristics; presence of seascape detractors.	High tolerance to change

Sensitivity of visual receptors

10.9.1.24 For the purposes of this assessment, the sensitivity of the visual receptors is based on a combination of the suggested sensitivities provided in the DTI Guidance (Box 4: Guide to visual receptor sensitivity, page 37) (DTI, 2005) and in GLVIA3 (paragraphs 6.31 to 6.36) (LI and IEMA, 2013).

10.9.1.25 Table 10.12 draws on the GLVIA3 paragraphs 6.32 to 6.34 for these categories. However, it should be noted that paragraph 7.31 of the GLVIA3 notes that sensitivity is dependent on location, context, the expectation, occupation or activity of the receptor, or the importance of the view (which may be determined by popularity/reference in guidebooks, maps, in art or literature).

Table 10.12: Sensitivity of visual resource receptors.

Sensitivity	Receptor	Rationale
Medium	Sailors following the offshore cruising routes identified by the RYA.	Observers enjoying the seascape from established cruising routes crossing the undesignated open sea are more sensitive to visual change.
Low to Medium	Passengers and workers on board commercial ferries or cruise liners.	The cruise ferries which regularly cross the array SVIA study area do so during the hours of darkness, when there would be little expectation of enjoying sea views.
Low	People at their place of work on passing cargo, tanker or other commercial vessels.	People at their place of work - observers in vessels or people involved in daily activities are less sensitive to visual change.
	People at their place of work on manned static oil and gas platforms or travelling to the platforms.	People at their place of work - observers in vessels or people involved in daily activities are less sensitive to visual change.
	People at their place of work on commercial fishing vessels.	People at their place of work - observers in vessels or people involved in daily activities are less sensitive to visual change.
	People at their place of work on aggregate dredging vessels.	People at their place of work - observers in vessels or people involved in daily activities are less sensitive to visual change.
	Military personnel using identified military practice areas.	People at their place of work - observers in vessels or people involved in daily activities are less sensitive to visual change.
	People carrying out ecological or other types of marine based survey.	People whose attention is likely to be focused on their work or activities are less sensitive to visual change.

10.9.1.26 These factors are determined by a combination of quantitative assessment and qualitative assessment using professional judgement. The methodology makes use of magnitude of impact and sensitivity of receptor as described below.

Magnitude of impact

10.9.1.27 The magnitude of impact of a particular proposal depends on:

- Nature of proposed development and change to existing baseline;
- Magnitude/scale of proposed change;
- Duration of change; and
- Reversibility.

10.9.1.28 The criteria for defining magnitude for present day seascape resources and visual resources in this chapter are outlined in Table 10.13 and Table 10.14, respectively. The definitions of magnitude used for the visual resources assessment have been tailored so as to fit with GLVIA3 guidance.

10.9.1.29 The scale of the impact on individual resources/receptors will vary with the distance that those resources/receptors are from Hornsea Three. This cannot be divided into bands, but is a graded effect. Those receptors closer to the turbine array, offshore HVAC booster stations or construction activities will experience greater effects, than those which are further away.

Table 10.13: Definition of terms relating to the magnitude of impact – present day seascape resource.

Magnitude of impact	Example
High	Total or very substantial loss of key elements/features/patterns of the baseline, i.e. pre-development seascape, and/or introduction of dominant elements with the attributes of the receiving seascape.
Medium	Partial loss or a moderate alteration to one or more key elements/features/patterns of the baseline, i.e. pre-development seascape, and/or introduction of elements that may be prominent but may not necessarily be substantially uncharacteristic with the attributes of the receiving seascape.
Low	Minor loss or alteration to one or more key elements/features/patterns of the baseline, i.e. pre-development seascape, and/or introduction of elements that may not be uncharacteristic with the surrounding seascape.
Negligible	Very minor loss or alteration to one or more key elements/features/patterns of the baseline, i.e. pre-development seascape, and/or introduction of elements that are not uncharacteristic with the surrounding seascape approximating to a 'no-change' situation.
No Change	No loss or alteration to the receiving seascape resource.

Table 10.14: Definition of terms relating to the magnitude of impact - visual resources.

Magnitude of impact	Example
High	Complete or very substantial change in view. Change dominant involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g. through removal of key elements.
Medium	Moderate change in view which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e. pre-development view, through the introduction of new elements or removal of existing elements. Change may be prominent, but will not substantially alter scale and character of the surroundings and the wider setting. Composition of the view will alter. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant.
Low	Minor change in baseline, i.e. pre-development view. Change will be distinguishable from the surroundings whilst composition and character will be similar to the pre change circumstances.
Negligible	Very slight change in baseline, i.e. pre-development view. Change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.
No change	No alteration to the existing view.

Significance of effect

10.9.1.30 The significance of the effect upon seascape and visual resources is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 10.15. Where a range of significance of effect is presented in Table 10.15, the final assessment for each effect is based upon expert judgement. It is accepted that, due to the nature and scale of development, a proposed wind farm would potentially give rise to some significant visual and seascape effects. However, it should be stressed that any significant effects does not necessarily mean that the effect is unacceptable in planning terms.

10.9.1.31 The significance of effects on present day seascape and visual receptors have been evaluated according to the matrix in Table 10.15 using a combination of the magnitude of impact and sensitivity of receptors and using a six-point scale (none, negligible, minor, moderate, major and substantial) as set out in Table 10.16 below. To ensure consistency, the same methodology has been applied to both the onshore and offshore landscape/seascape and visual assessments. All definitions of significance used in the assessment are adverse unless expressly stated otherwise.

10.9.1.32 Where the matrix (Table 10.15) provides a choice of level of effects (e.g. minor or moderate), the assessor has exercised professional judgement in determining which of the levels is more appropriate.

Table 10.15: Matrix used for assessment of significance of effects showing the combinations of receptor/resource sensitivity and the magnitude of impact for present day seascape assessment.

Sensitivity	Magnitude of impact				
	No change	*Negligible*	*Low*	*Medium*	*High*
Negligible	None	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	None	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	None	Minor	Moderate or Major	Major or Substantial	Substantial

10.9.1.33 The significance of effects varies depending on the receptors' sensitivity and their proximity to the turbines, offshore HVAC booster stations or cable laying activities. Consequently, there will be a gradation of significance of effect. Receptors closer to the turbine array experiencing greater effects than those that are more distant from it.

10.9.1.34 Paragraph 5.55 of GLVIA3 states that a sequential approach can be adopted when assessing landscape significance "susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale, geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance."

10.9.1.35 For the purposes of this assessment, those effects indicated as being of major or substantial significance are regarded as significant in terms of the SVIA methodology. This is a typical approach for landscape, seascape and visual impact assessments adapted from GLVIA3, which may differ from other environmental disciplines. Effects of less than major significance have been identified in the assessment but are not considered significant, although they remain worthy of consideration throughout the decision making process and are therefore also noted in the assessment.

10.9.1.36 Temporary changes (i.e. those during construction and decommissioning) may have a high magnitude of impact, as they involve much activity, but as these are temporary in nature, the overall significance may be lower than for a long term, operational impact.

Table 10.16: Definition of terms relating to the significance criteria for seascape, historic seascape and visual effects.

Significance of effect	Landscape/seascape resource	Visual resource/amenity	HSC
None	Where proposals would not alter the seascape character of the area.	Where proposals would retain existing views.	Where proposals would not affect the perception of any HCS.
Negligible	Where proposed changes would have barely discernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.	Where proposed changes are such that the perception of any HCS would not be discernibly altered.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.	Where proposed changes would slightly alter the perception of one or more HCSs.
Moderate	Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.	Where proposed changes would alter the perception of HCSs, although the relevant levels of dominance would not be affected.
Major	Where the proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape/seascape.	Where the proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.	Where proposed changes would alter the perception of HCSs to the extent that the relevant levels of dominance would change.
Substantial	Where proposed, changes would be uncharacteristic and/or would significantly alter a seascape/landscape of exceptional quality, (e.g. key elements known to the wider public of nationally designated landscapes/seascapes - where there is no or limited potential for substitution).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, of and within internationally designated landscapes/seascape or key features or elements of nationally designated landscapes/seascapes that are well known to the wider public.	Where proposed changes would greatly alter the perception of HCSs to the extent that one or more HCSs would no longer be present within the area.

Historic seascape resources impact assessment methodology

10.9.1.37 There is no published methodology for the assessment of the impacts of development on HSC. The assessment of historic seascape effects for Hornsea Three has however followed a recognised process as set out below:

- Identify the baseline resources (i.e. HSC) and their values;
- Evaluate the sensitivity of the historic seascape resource to the type of development proposed;
- Identify the scale or magnitude of predicted impacts; and
- Assess the significance of effects of Hornsea Three on historic seascape.

10.9.1.38 The overall sensitivity of HSC to an impact is identified from a five point scale as presented in Table 10.17. The overall magnitude of the impact is identified from a five point scale, the criteria of which are set out in Table 10.18. The significance of the effect is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 10.19. Table 10.20 defines the terms relating to the level of effect.

10.9.1.39 For the purposes of the historic seascape assessment, those effects indicated as being of moderate, major or substantial significance, as shaded in Table 10.19 are regarded as significant. All significance definitions used in the assessment are adverse unless expressly stated otherwise.

Table 10.17: Definition of terms to the HSC sensitivity.

Sensitivity	Definition
Very High	A Historic Character (HCS) subtype extremely sensitive to the proposed change, which would result in significant effects on the character type.
High	An HCS particularly sensitive to the proposed change, which would result in many effects on the character type.
Medium	An HCS capable of accepting limited proposed change with some effects on the character type.
Low	An HCS capable of accommodating considerable proposed change with some limited effects on the character type.
Negligible	An HCS capable of accommodating considerable proposed change without significant effects on the character type.

Table 10.18: Definition of terms relating to the magnitude of impact on HSC type.

Magnitude	Definition
High	Substantial change within all or most of a defined area of an HCS, such that the perception of the HSC is fundamentally changed.
Medium	Substantial change within a large part of a defined area of an HCS, such that the perception of the HSC is changed. Insubstantial change within all or most of a defined area of an HCS, such that the perception of the HSC is changed.
Low	Substantial change within a small part of a defined area of HCS, such that the perception of the HSC could be changed. Insubstantial change within a large part of a defined area of an HCS, such that the perception of the HSC could be changed.
Negligible	Insubstantial change within a small part of a defined area of HCS, such that the perception of the HSC is unlikely to be changed.
No Change	No changes to any HCS.

Table 10.19: Matrix used for assessment of significance showing the combinations of receptor sensitivity and the magnitude of impact for historic seascape assessment.

Sensitivity	Magnitude of impact				
	No change	*Negligible*	*Low*	*Medium*	*High*
Negligible	None	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	None	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	None	Minor	Moderate or Major	Major or Substantial	Substantial

Positive and negative effects

10.9.1.40 Offshore wind energy development, wherever it occurs, is usually visible in some form. Hornsea Three would have the following general attributes typical of most wind farms: engineered, large scale, simple in form, smooth texture, monochrome/muted colour and strong vertical form. Responses by people to wind farms can vary from 'beautiful' to 'offensive', with respondents perceiving wind turbines as potentially rhythmic, unusual, safe, interesting, invigorating, majestic and spiritual on the one hand and degrading, jarring, overbearing, industrial, clashing and ugly on the other. Wind energy development thus gives rise to a spectrum of responses from individuals and organisations who perceive its effects ranging from strongly adverse to strongly beneficial.

10.9.1.41 The likely significant effects should be described covering type (i.e. direct, indirect or cumulative), temporal nature (short, medium and long term, permanent or temporary), and valency (beneficial or positive and adverse or negative). Accordingly, judgements as to valency of the effect should be given and justified in an explicit and transparent manner since they are inevitably subjective.

10.9.1.42 The heading 'valency', originally used in the Durham County Council Impact Assessment Matrices (unpublished, 1996) but now much more widely recognised, is an important one and provides scope to recognise that change of whatever type and scale within a landscape or seascape can be viewed positively or negatively by different individuals. For the purposes of this assessment, effects have been defined based on the scenario of an individual who may perceive the array as a negative addition to the seascape or view. Effects are therefore defined as adverse throughout the assessment; but may in fact be seen as beneficial or positive by large numbers of viewers. An individual who perceives offshore wind farms as a positive addition to the seascape or view may consider the same effects to be beneficial or neutral in nature.

10.10 Measures adopted as part of Hornsea Three

10.10.1.1 Given the transitory and dynamic nature of the majority of the visual receptors, no additional measures are proposed specifically in relation to the location or arrangement of the wind turbines. The installation of Hornsea Three will directly alter the existing open character of the seascape through the introduction of multiple structures and associated lighting. Therefore, no mitigation measures are proposed in relation to seascape character.

10.11 Assessment of significance

10.11.1 Construction phase

10.11.1.1 The impacts of the offshore construction of Hornsea Three have been assessed on seascape and visual resources. The environmental impacts arising from the construction of Hornsea Three are listed in Table 10.8 above along with the maximum design scenario against which each construction phase impact has been assessed.

10.11.1.2 A description of the potential effect on Seascape and Visual Resource receptors caused by each identified impact is given below.

The temporary change to the existing present day seascape character through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.

10.11.1.3 The effects of the construction of Hornsea Three may cause direct or indirect changes, but they will be temporary and most effects would be fully reversible during decommissioning.

Magnitude of impact

10.11.1.4 The magnitude of the impact on the NSCAs is considered to be **negligible** where the impact is indirect to **medium** where the impact would be direct (Table 10.20).

Sensitivity

10.11.1.5 The seascape resources are deemed to be of medium vulnerability, high recoverability and local value. The sensitivity of the resources is considered to be **low**.

Significance of effect

10.11.1.6 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible to medium**. The effect will, therefore, be of **negligible** to **minor** adverse significance, which is not significant in terms of the SVIA methodology.

Table 10.20: Summary of construction effects on present day seascape character areas as a result of Hornsea Three associated offshore infrastructure including Hornsea Three offshore cable corridor and offshore HVAC booster stations.

Present day seascape character area	Sensitivity to proposed change	Nature of impact and frequency	Description of impact	Magnitude of change during construction	Significance of effect on character area as a whole (Layout A)
'Dogger Deep Water Channel'	Low	Direct Intermittent	Construction of Hornsea Three, ancillary structures and part of subsea cable corridor within the seascape character area.	Medium	Minor
'East Midlands Offshore Gas Fields'	Low	Direct Intermittent	Construction of Hornsea Three, ancillary structures and part of subsea cable corridor within the seascape character area.	Medium	Minor
Norfolk Coastal Waters	Low	Direct Intermittent	Construction of part of subsea cable corridor and offshore HVAC booster stations within the seascape character area.	Medium	Minor
'Dogger Bank'	Low	Indirect Intermittent	Visual impact of distant construction activities.	Negligible	Negligible
East Anglian Shipping Waters	Low	Indirect Intermittent	Visual impact of distant construction activities.	Negligible	Negligible
East Midlands Coastal Waters	Low	Indirect Intermittent	Visual impact of distant construction activities.	Negligible	Negligible

The temporary change to the existing HSC through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.

10.11.1.7 Most of the likely effects on HSC during the construction phase would be time-limited and fully reversible following decommissioning.

Hornsea Three array area

10.11.1.8 The installation of foundations and subsea cables will involve the frequent movement and anchoring of barges as well as the disturbance of the seabed. Direct physical impacts arising from the construction of Hornsea Three on any individual heritage assets associated with the subsea floor region (including palaeo-landscapes) are addressed in chapter 9: Marine Archaeology.

10.11.1.9 Within the Hornsea Three array area, the turbines would extend from the seabed or below it through to the surface. On this basis each level of the marine tier is assessed.

Sea Surface

10.11.1.10 The offshore construction of the Hornsea Three array area would affect a small proportion of the 'Bottom Trawling' and 'Drift Netting' HCSs which are both extensively distributed in the wider area. The 'Hydrocarbon Pipeline' and 'Hydrocarbon Installation' HCSs would also be affected but these are modern industrial activities. The impact of the Hornsea Three array area would be broadly in keeping with the overall 'Industry' BCT but the character of the area would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

10.11.1.11 At the sea surface, area of the Submarine Telecommunications Cables HCS (part of the Communications BCT) would be affected. These are modern activities and although not directly related to the 'Industry' BCT, the impact of the Hornsea Three array area would be broadly in keeping with their overall characterisation. The character of the area would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

Water Column

10.11.1.12 Within the Water Column, the offshore construction of the Hornsea Three array area would affect small proportions of the 'Drift Netting' and 'Bottom Trawling' HCSs (subtypes of the 'Fishing' BCT) which both cover wide areas. Small areas of the 'Hydrocarbon Installation' HCS would also be affected although these are modern activities and the impact of the Hornsea Three array area would be broadly in keeping with the 'Industry BCT'. In terms of Industry the character of the area would be altered to include the Renewable Energy Installation (Wind) HCS.

Sea Floor

10.11.1.13 On the Sea Floor, the offshore construction of the Hornsea Three array area would affect the 'Fishing' BCT. The 'Bottom Trawling' HCS which is unlikely to be compatible with the preservation of earlier cultural landscapes, sites and artefacts located on the sea floor, dominates the southern half and much of the northeastern part of the array area.

10.11.1.14 With respect to the 'Cultural Topography' BCT, the 'Fine Sediment Plains' in the centre and north of the Hornsea Three array area will also be affected. 'Fine Sediment Plains' in particular, and to a slightly lesser extent 'Coarse Sediment Plains', cover a very large part of the array SVIA study area. The impact of the Hornsea Three array area would only affect a small part of these HCSs.

10.11.1.15 Small areas of the 'Hydrocarbon Installation' HCS in the west (subtypes of the 'Industry' BCT) will also be affected but these are modern activities and the impact of the Hornsea Three array area would be broadly in keeping with the BCT. In terms of Industry the character of the area would be altered to include the Renewable Energy Installation (Wind) HCS.

Subsea Floor

10.11.1.16 On the Subsea Floor, the offshore construction of the Hornsea Three array area would primarily affect the 'Fine Sediment Plains' HCS, located primarily in the centre and north of the array and the 'Coarse Sediment Plains' HCS in the south, centre and northeast (both 'Cultural Topography' BCT). Both HCSs, and in particular the 'Fine Sediment Plains', are widely distributed in the array SVIA study area. The impact of the Hornsea Three array area would be on a very small part of these HCSs.

10.11.1.17 The Hornsea Three array area would also impact the 'Hydrocarbon Field (Gas) and Hydrocarbon Installation' HCSs (Industry BCT), but these are modern activities and the impact of Hornsea Three would be broadly in keeping with the BCT. In terms of Industry the character of the area would be altered to include the Renewable Energy Installation (Wind) HCS.

Magnitude of impact

10.11.1.18 The Hornsea Three array area will affect present day seascape character by introducing a new type of HCS, namely Renewable Energy Installation (wind). The impact of the turbines and other infrastructure within the Hornsea Three array area is predicted to be of regional spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the HSC BCTs and HCSs directly. The Hornsea Three array area would only affect a small part of these HCSs. Therefore, the magnitude of impact on each character area as a whole is considered to be **low**.

Sensitivity

10.11.1.19 Most of the HSC BCTs and HCSs are deemed to be of low vulnerability, high recoverability and of less than regional value. The 'Fine Sediment Plains' and 'Coarse Sediment Plains' HCS are of low vulnerability, high recoverability and regional value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.1.20 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is also deemed to be **low**. The effect will, therefore, be of **minor** adverse significance, which is not significant in terms of the SVIA methodology.

Hornsea Three offshore cable corridor

Sea Surface

10.11.1.21 At the Sea Surface, the installation of the offshore cable corridor and the offshore HVAC booster stations would affected the 'Bottom Trawling', 'Fishing Ground' and 'Potting' ('Fishing' BCT) HCSs, the 'Hydrocarbon Pipeline' and 'Hydrocarbon Installation' ('Industry' BCT) HCSs and the 'Navigation Route' ('Navigation' BCT) HCS.

10.11.1.22 Each of the fishing HCSs, in particular the 'Bottom Trawling' HCS covers a wide area and the impact of the Hornsea Three offshore cable corridor would be on a small part of these HCSs. The 'Industry' BCT HCSs, 'Hydrocarbon Pipeline' and 'Hydrocarbon Installation', are modern activities and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be broadly in keeping with the 'Industry' BCT.

10.11.1.23 With respect to the 'Navigation Route' HCS, these routes are modern, although probably part of a much earlier network of shipping routes (Aldred 2013b: 25). The 'Navigation' BCT and the HCS covers a wide area and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of them.

Water Column

10.11.1.24 Within the Water Column, the installation of the Hornsea Three offshore cable corridor and the offshore HVAC booster stations would affect small proportions of the 'Fishing' BCT which comprises the 'Bottom Trawling' 'Drift Netting' and 'Potting' HCSs. Small areas of the 'Hydrocarbon Installation' HCS (Industry BCT) would also be affected.

10.11.1.25 Each of the fishing HCSs, in particular the 'Bottom Trawling' HCS covers a wide area, with large stretches of the 'Potting' HCS along the coast and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of these HCSs. The 'Industry' BCT HCS, 'Hydrocarbon Installation', is a modern activity and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be broadly in keeping with the BCT.

Sea Floor

10.11.1.26 On the Sea Floor, the installation of the Hornsea Three offshore cable corridor and the offshore HVAC booster stations would affect the 'Bottom Trawling' HCSs ('Fishing' BCT). The 'Coarse Sediment Plains' ('Cultural Topography' BCT) and to a lesser extent 'Fine Sediment Plains' ('Cultural Topography' BCT) HCSs, including the offshore HVAC booster stations search area and to the northeast of this area, the 'Hydrocarbon Field (Gas)' HCS would also be affected, as would several areas of the 'Sand Banks with Sand Waves' ('Cultural Topography' BCT) HCS.

10.11.1.27 Close to the shore is an area of the 'Shoals and Flats' ('Navigation' BCT) HCS.

10.11.1.28 The 'Bottom Trawling' HCS covers a wide area and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of this HCS. 'Fine Sediment Plains', in particular in the east of the offshore HVAC booster SVIA study area, and 'Coarse Sediment Plains' in the west of the offshore HVAC booster SVIA study area cover a very large part of this study area. The impact of the Hornsea Three offshore cable corridor would be on a very small part of these HCSs.

10.11.1.29 The 'Industry' BCT HCS, 'Hydrocarbon Field (Gas)' represents modern activity and the impact of the Hornsea Three offshore cable corridor would be broadly in keeping with the BCT. The Hornsea Three offshore cable corridor would impact upon a small area of the 'Sand Banks with Sand Waves' ('Cultural Topography' BCT) HCS. This HCS covers a relatively large part of the offshore HVAC booster SVIA study area. The impact of the Hornsea Three offshore cable corridor would be on a very small part of this HCS. The 'Shoals and Flats' ('Navigation' BCT) HCS follows much of the coastline in the wider area and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of this HCS.

Subsea Floor

10.11.1.30 On the Subsea Floor, the installation of the offshore cable corridor and the offshore HVAC booster stations would affect the 'Coarse Sediment Plains', 'Fine Sediment Plains' ('Cultural Topography' BCT) HCSs, small areas of the 'Hydrocarbon Field (Gas) and Hydrocarbon Installation' ('Industry' BCT) HCSs and a small area of the 'Exposed Bedrock' ('Cultural Topography' BCT) HCS.

10.11.1.31 'Fine Sediment Plains', in particular in the east of the offshore HVAC booster SVIA study area, and 'Coarse Sediment Plains' in the west of the offshore HVAC booster SVIA study area cover a very large part of the HSC study area. The impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a very small part of these HCSs.

10.11.1.32 The 'Industry' BCT HCSs, 'Hydrocarbon Field (Gas) and Hydrocarbon Installation', are modern activities and the impact of the Hornsea Three offshore cable corridor would be broadly in keeping with the BCT.

Magnitude of impact

10.11.1.33 Within the Hornsea Three offshore cable corridor, the impact will be derived largely from subsea operations. The Hornsea Three offshore cable corridor will add the 'Submarine power cable' HCS. The impact is predicted to be of regional spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the receptor directly. Hornsea Three offshore cable corridor would only affect a small part of the HCSs described above. Therefore, the magnitude of impact on each character area as a whole is considered to be **low**.

Sensitivity

10.11.1.34 Most of the HSC BCTs and HCSs are deemed to be of low vulnerability, high recoverability and of less than regional value. The 'Fine Sediment Plains' and 'Coarse Sediment Plains' HCS are of low vulnerability, high recoverability, regional value and **medium** sensitivity. The sensitivity of the remaining resource is considered to be **low**.

Significance of effect

10.11.1.35 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is also deemed to be **low**. The effect will, therefore, be of **minor** adverse significance, which is not significant in terms of the SVIA methodology.

The temporary change in the existing visual scenario during the construction phase may cause effects experienced by a variety of visual receptors.

10.11.1.36 Visual effects would potentially result from construction activity, with its associated vessels, during the installation of the foundations and erection of towers, nacelles and blades, cable laying and other ancillary structures. The visible construction activities would be subtly different for Layouts A and B however, the level of effect identified applies to both array scenarios.

10.11.1.37 Construction effects on receptors will vary temporally and spatially across the SVIA study areas according to the nature of the construction activity. Based on the indicative programme outlined in the Project Description (volume 1, chapter 3: Project Description), construction will be continuous with activities running concurrently, although not necessarily in all areas at the same time.

10.11.1.38 The SVIA study areas are crossed by a variety of vessels, both commercial and recreational. The construction activities would be seen in this context.

10.11.1.39 Construction visual impacts would be temporary and of varying duration, which will influence the level of magnitude of impact.

Magnitude of impact

10.11.1.40 The impact is predicted to be of local spatial extent, short term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to range from **negligible** to **high**, dependent on the receptor's distance from the construction works. Those receptors closer to the activities will experience a greater magnitude of impact than those further away.

Sensitivity

10.11.1.41 The variety of visual receptors (as specified in section 10.7.4.2) are deemed to be of medium vulnerability, high recoverability and local value. The sensitivity of the receptor is considered to be **low** to **medium**.

Significance of effect

10.11.1.42 The temporary effects will range from **negligible** to **moderate** significance (Table 10.21). The significance varies, largely depending on the receptor's proximity to the turbine array. Those receptors of medium sensitivity and closest to the Hornsea Three array area, where the majority of activities will take place, will experience moderate effects, which are not considered to be significant in terms of the SVIA methodology.

Night time effects

10.11.1.43 During the construction phase there will be temporary navigation and aviation warning lighting visible on structures. The lights on the construction vessels will also form a temporary visual focus for receptors traversing the SVIA study areas. However, the lighting would be seen in the context of existing lit oil and gas platforms, as well as existing offshore wind farms. It is anticipated that effects would be experienced by people on board the cruise ferries and by people using one of the RYA cruising routes specifically where they pass close to the construction vessels.

Magnitude of impact

10.11.1.44 The magnitude of change in view would range from **negligible** to **high**. The impact varies due to the receptors proximity to the construction works (Table 10.21).

Sensitivity

10.11.1.45 Receptors are of **low** to **medium** sensitivity to construction activities of this nature.

Significance of effect

10.11.1.46 The visual effect experienced during construction will be temporary in duration and will vary from **negligible** to **moderate**, depending on the receptor's sensitivity and distance from the construction works. Where the receptor passes in close proximity to construction works they have the potential to experience **moderate** effects, which are not considered to be significant in terms of the SVIA methodology.

10.11.1.47 A summary of the visual effects on specific groups of visual receptors during the construction phase is set out at Table 10.21. For each visual receptor the first row (grey row) represents the overall assessment. Subsequent rows (white rows), where applicable, represent the assessment at different viewpoints.

Future monitoring

10.11.1.48 No future monitoring of effects on seascape and visual receptors or the historic seascape is proposed for the construction phase.

Table 10.21: Summary of temporary construction effects on the visual resources as a result of Hornsea Three, offshore cable corridor and offshore HVAC booster stations [a,b].

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during construction	Magnitude of change during construction (Layout A and Layout B)	Significance of visual effect (Relevant to both Layout A and Layout B, where there would be no discernible difference in the level of effect)
Sailors following the offshore cruising routes identified by the RYA	Varies from outer edge of array SVIA study area to approx. 32 km from array SVIA study area at closest point.	Medium	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed View* - Varying extent of construction activity and associated increased quantities of vessels visible in views, during the day and at night, depending on relative distance of location along cruising route. The RYA North Eastern Region Route which lies within the array SVIA study area also passes through the offshore HVAC booster SVIA study area. Construction activities would be seen in the context of existing gas platforms in the surrounding area which also lie close to the cruising route.	Negligible to Low (varies with distance from Hornsea Three array area). Negligible (North Eastern Region Route only where it passes closest to the offshore HVAC booster stations search area).	Negligible to Minor The range of significance varies depending primarily on the receptor's proximity to the Hornsea Three array area.
1a) Person on board yacht at sample location along North Eastern Region RYA route: Viewpoint 4	53°36.000N, 2°3.892E: 32 km to the south of the Hornsea Three array area.	Medium	Temporary, medium term, Intermittent	Construction activities within array visible within a wide field of view to the northeast, during the day and at night. Construction activities for the offshore HVAC booster stations and at the Hornsea Three offshore cable corridor will be visible in a narrow field of view to the southwest, during the day and at night.	Low	Minor
Passengers and workers on board commercial ferries or cruise liners.	Varies from outer edge of array SVIA study area to approximately 23 km from the Hornsea Three array area.	Low to Medium	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed View* - Ferry passes through array SVIA study area during hours of darkness for most of the year therefore, both daily trips (outgoing and return) are likely to be in darkness. Lights associated with 24 hour construction work potentially visible (for details of ferry crossing times, see Table 10.7).	Negligible to Low (varies with distance from Hornsea Three array area).	Negligible to Minor The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area activities.
2a) Person on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 1.	53°45.680N, 1°38.506E: 45 km to the west of the Hornsea Three array area.	Low or Medium	Temporary, medium term, Intermittent	Distant night time views only for most of year - lighting effects associated with construction works are likely to be barely discernible at this distance. Potential for moonlit views of increasing number of wind turbines as construction phase progresses under suitable conditions.	Negligible	Negligible to Minor The range of significance varies depending on the sensitivity of receptor's and distance to the Hornsea Three array area. Those receptors of medium sensitivity and closer to the Hornsea Three array area, will experience minor effects.
2b) Person on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 2.	53°36.494N, 2°18.875E: 23 km to the southwest of the Hornsea Three array area.	Low or Medium	Temporary, medium term, Intermittent	Mid-distance night time views only for most of year - lighting effects associated with construction works are likely to be perceived at this distance. Potential for moonlit views of increasing number of wind turbines as construction phase progresses under suitable conditions.	Low	Negligible to Minor The range of significance varies depending on the sensitivity of receptor's and distance to the Hornsea Three array area. Those receptors of medium sensitivity and closest to the Hornsea Three array area, will experience minor effects.

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during construction	Magnitude of change during construction (Layout A and Layout B)	Significance of visual effect (Relevant to both Layout A and Layout B, where there would be no discernible difference in the level of effect)
2c) Person on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 3.	53°17.962N, 2°56.452E: 45 km to the south of the Hornsea Three array area.	Low or Medium	Temporary, medium term, Intermittent	Distant night time views only for the majority of the year. Lighting effects associated with construction works are likely to be barely discernible elements within views at this distance.	Negligible	Negligible to Minor The range of significance varies depending on the sensitivity of receptor's and proximity to the Hornsea Three array area activities. Those receptors of medium sensitivity, will experience minor effects, which are not significant in terms of the SVIA methodology.
People at their place of work on passing cargo, tanker or other commercial vessels.	Varies from outer edge of area study area to locations close to the Hornsea Three array area.	Low	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Construction activities at the Hornsea Three array area, offshore HVAC booster stations search area and Hornsea Three offshore cable corridor will be visible, during the day and at night, from some sections of some commercial shipping routes.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending largely on the receptor's proximity to the turbine array activities. Those receptors closer to the Hornsea Three array area, will experience moderate effects, which are not significant in terms of the SVIA methodology.
People at their place of work on manned static oil and gas platforms or travelling to the platforms.	Varies from outer edge of array SVIA study area to mid-range locations in relation to array SVIA study area.	Low	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Of the 81 oil and gas platforms in the SVIA study areas, 24 are known to be manned. These are generally located towards the outer reaches of the SVIA study areas from where construction activities associated with Hornsea Three are unlikely to be readily perceived. There would be views of construction offshore activities associated with the Hornsea Three offshore cable corridor and the offshore HVAC booster stations, during the day and at night.	Low to Medium	Negligible to Minor The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area activities.
4a) Person at sample location: J6A oil and gas platform main deck: Viewpoint 5.	53°49.448N, 2° 56.717E: 13 km to the east of the Hornsea Three array area.	Low	Temporary, medium term, Intermittent	Close range construction activities within array visible within a wide field of view to the west, during the day and at night.	Medium	Minor
4b) Person at sample location: Murdoch oil and gas platform main deck: Viewpoint 6.	54°16.094N, 2°19.378E: 32 km to the north of the Hornsea Three array area.	Low	Temporary, medium term, Intermittent	Construction activities within array visible in the distance within a medium field of view to the south, during the day and at night.	Low	Negligible

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during construction	Magnitude of change during construction (Layout A and Layout B)	Significance of visual effect (Relevant to both Layout A and Layout B, where there would be no discernible difference in the level of effect)
People at their place of work on commercial fishing vessels.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Construction activities at the Hornsea Three array area, offshore HVAC booster stations search area and Hornsea Three offshore cable corridor will be visible, during the day and at night, from some fishing vessels as they pass through the SVIA study areas.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area activities. Those receptors closer to the Hornsea Three array area, will experience moderate effects, which are not significant in terms of the SVIA methodology.
People at their place of work on aggregate dredging or disposal vessels.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Construction activities at the Hornsea Three array area, offshore HVAC booster stations search area and Hornsea Three offshore cable corridor will be visible, during the day and at night, from some dredging vessels as they pass through the SVIA study areas.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area activities. Those receptors closer to the Hornsea Three array area, will experience moderate effects, which are not significant in terms of the SVIA methodology.
Military personnel using identified military practice areas.	Varies from outer edge of 50 km radius study area to locations close to Array SVIA study area.	Low	Temporary, medium term, Intermittent	(The location of military practice areas are illustrated in chapter 8: Aviation, Military and Communications) *Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Construction activities will be visible from the air combat training craft which fly over the SVIA study areas.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area. Those receptors closer to the Hornsea Three array area, will experience moderate effects, which are not significant in terms of the SVIA methodology.
People carrying out ecological or other types of marine based survey.	Varies from outer edge of 50 km radius study area to locations close to Array SVIA study area.	Low	Temporary, medium term, Intermittent	*Existing view* – Open seascape with occasional views of oil and gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. *Proposed view* - Construction activities at the Hornsea Three array area, offshore HVAC booster stations search area and Hornsea Three offshore cable corridor will be visible, during the day and at night, from some survey vessels as they pass through the SVIA study areas.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending largely on the receptor's proximity to the Hornsea Three array area activities. Those receptors closer to the Hornsea Three array area, will experience moderate effects, which are not significant in terms of the SVIA methodology.

a For each visual receptor the first row (grey row) represents the overall assessment. Subsequent rows (white rows), where applicable, represent the assessment at different viewpoints.

b The visible construction activities would be subtly different for Layouts A and B however, the level of effect identified applies to both array layout scenarios.

10.11.2 Operational and maintenance phase

10.11.2.1 The impacts of the offshore operation and maintenance of Hornsea Three have been assessed on Seascape and Visual Resources. The environmental impacts arising from the operation and maintenance of Hornsea Three are listed in Table 10.8 along with the maximum design scenario against which each operation and maintenance phase impact has been assessed.

10.11.2.2 A description of the potential effect on Seascape and Visual Resource receptors caused by each identified impact is given below.

The existing present day seascape character may change during the operational phase through the introduction of new or uncharacteristic elements/features.

10.11.2.3 During the operational phase, the offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area and the offshore HVAC booster stations (if HVAC transmission is selected), will directly impact the 'Dogger Deep Water Channel', 'East Midlands Offshore Gas Fields' and 'Norfolk Coastal Waters' NSCAs. The offshore cable corridor will be subsurface therefore it will not have any impact on the present day seascape character at or above sea level. These impacts are summarised in Table 10.22.

10.11.2.4 All operational present day seascape character effects are capable of being reversed through the removal of the above sea level elements of Hornsea Three.

'Dogger Deep Water Channel' NSCA

10.11.2.5 The Natural England seascape character assessment (Natural England, 2012) states that the 'Dogger Deep Water Channel' NSCA has "*consistent horizons across extensive and unchanging tracts of open water*" ... "*a sense of disorientation due to lack of visual clues*" and "*a typically monochrome and monotonous seascape character*" whilst noting that "*Views of gas platforms create an industrial and sometimes ethereal character, though the built intervention is typically at odds with the wild and natural qualities of the open sea. Despite the focus of activity they provide, they also amplify the contrast with the isolation and sense of remoteness which otherwise typifies the area*".

Magnitude of impact

10.11.2.6 The impact of the Hornsea Three array area is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the resource directly. The magnitude is considered to be **medium**.

Sensitivity

10.11.2.7 The seascape resource is deemed to be of medium vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.8 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **medium**. The effect will, therefore, be **minor**, which is not significant in terms of the SVIA methodology.

10.11.2.9 Hornsea Three will form an extension to the wind farm seascape character area that will be created by the Hornsea Project One and Hornsea Project Two array areas within the 'Dogger Deep Water Channel' present day NSCA.

'East Midlands Offshore Gas Fields' NSCA

10.11.2.10 The Natural England seascape character assessment (Natural England, 2012) states that the 'East Midlands Offshore Gas Fields' NSCA is "*visually unified by merit of consistent horizons across extensive and unchanging tracts of open water*" and that "*Views of gas platforms create an industrial and sometimes ethereal character, though the built intervention is typically at odds with the wild and natural qualities of the open sea*" and that "*Platforms become visually imposing features within 5 km of their location*" whilst noting that "*Despite the increased occurrence of offshore structures views are panoramic in nature and the seascape becomes monochrome and monotonous in character.*"

Magnitude of impact

10.11.2.11 The impact of the Hornsea Three array area is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the resource directly. The magnitude is considered to be **medium**.

Sensitivity

10.11.2.12 The seascape resource is deemed to be of medium vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.13 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **medium**. The effect will, therefore, be **minor**, which is not significant in terms of the SVIA methodology.

10.11.2.14 Hornsea Three will form a new wind farm seascape character area within the 'East Midlands Offshore Gas Fields' NSCA as an extension to the wind farm seascape character area that will be created by the Hornsea Project One and Hornsea Project Two array areas within the adjacent 'Dogger Deep Water Channel' NSCA.

'Norfolk Coastal Waters' NSCA

10.11.2.15 The Natural England seascape character assessment (Natural England, 2012) states that the 'Norfolk Coastal Waters' NSCA "*has a powerful sense of place, largely attributable to the unique and varied coastal interfaces produced by dynamic and destructive coastal forces. The highly dynamic and temporal nature of the marine character is evident in the erosion processes and dominating sea defences along the coastline. Large slumped cliffs met by low sand dune systems create a natural, wild and untamed character to the coastal edge and a largely featureless horizon evokes feelings of remoteness and loneliness. The exposed nature of the coastline coupled with the temperamental marine character creates an unsettling and uninviting quality*".

10.11.2.16 It is anticipated that the offshore HVAC booster stations will add to the existing occurrence of gas platforms within the concentration of platforms in the surrounding part of this seascape character area.

Magnitude of impact

10.11.2.17 The impact is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource directly. The magnitude is considered to be **low**.

Sensitivity

10.11.2.18 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.19 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **low**. The effect will, therefore, be **minor**, which is not significant in terms of the SVIA methodology.

'East Midlands Coastal Waters' NSCA

10.11.2.20 The Natural England seascape character assessment (Natural England, 2012) states that the 'East Midlands Coastal Waters' NSCA "*is dramatic and evocative and has a temporal and dynamic character, heavily influenced by coastal sedimentary and erosion processes and the rising and falling tides. In concentrated locations where human activity and development are imposing, such as where wind farms have been constructed, coastal resorts and during military training, the feeling of wilderness and remoteness is challenged and a managed and tamed quality is imposed on the seascape character*".

10.11.2.21 It is anticipated that the offshore HVAC booster stations will form a distant, barely perceptible influence over the character area, adding to the existing occurrence of off shore wind turbines and the more distant influence of gas platforms in the surrounding seascape of this character area.

Magnitude of impact

10.11.2.22 The impact is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly and would be barely perceptible. The magnitude is considered to be **negligible**.

Sensitivity

10.11.2.23 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **negligible**.

Significance of effect

10.11.2.24 Overall, it is predicted that the sensitivity of the receptor is considered to be **negligible** and the magnitude is also deemed to be **negligible**. The effect will, therefore, be **negligible**, which is not significant in terms of the SVIA methodology.

'Dogger Deep Water Channel: Netherlands Waters' SCA

10.11.2.25 The key characteristics of this seascape character area would be the same as described above for the 'Dogger Deep Water Channel' NSCA and would form a continuation of this seascape. Hornsea Three will be visible in varying degrees across parts of the seascape character area and will exert an indirect visual influence on its character.

Magnitude of impact

10.11.2.26 The impact is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly. The magnitude is considered to be **low**.

Sensitivity

10.11.2.27 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.28 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is also deemed to be **low**. The effect will, therefore, be **minor**, which is not significant in terms of the SVIA methodology.

'East Midlands Offshore Gas Fields: Netherlands Waters' SCA

10.11.2.29 The key characteristics of this seascape character area would be the same as described above for the 'East Midlands Offshore Gas Fields' NSCA and would form a continuation of this seascape. Hornsea Three will be visible in varying degrees across parts of the seascape character area and will exert an indirect visual influence on its character.

Magnitude

10.11.2.30 The impact is predicted to be of local spatial extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly. The magnitude is considered to be **low**.

Sensitivity

10.11.2.31 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.32 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is also deemed to be **low**. The effect will, therefore, be **minor**, which is not significant in terms of the SVIA methodology.

'Dogger Bank' NSCA

10.11.2.33 The Natural England seascape character study (Natural England, 2012) also observes the "*sense of disorientation due to a lack of visual cues*" and the "*monochrome and monotonous*" character of the 'Dogger Bank' NSCA. Hornsea Three will be visible in varying degrees across parts of the seascape character area and will exert an indirect visual influence on its character.

Magnitude of impact

10.11.2.34 The impact is predicted to be of local extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly. The magnitude is considered to be **negligible**.

Sensitivity

10.11.2.35 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.36 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is also deemed to be **negligible**. The effect will be of **negligible** to **minor** significance, which is not significant in terms of the SVIA methodology. The range of significance varies depending on the resource's distance to the Hornsea Three array area. Those seascape resources closest to the Hornsea Three array area, will experience **minor** effects, which are not considered to be significant in terms of the SVIA methodology.

'Dogger Bank: Netherlands Waters' SCA

10.11.2.37 The key characteristics of this seascape character area would be the same as described above for the 'Dogger Bank' NSCA and would form a continuation of this seascape. Hornsea Three will be visible in varying degrees across parts of the seascape character area and will exert an indirect visual influence on its character.

Magnitude

10.11.2.38 The impact is predicted to be of local extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly. The magnitude is considered to be **negligible**.

Sensitivity

10.11.2.39 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.40 The effect will be of **negligible** to **minor** significance. The range of significance varies depending on the resource's distance to the turbine array. Those seascape resources closest to the Hornsea Three array area, will experience **minor** effects, which are not considered to be significant in terms of the SVIA methodology.

'East Anglian Shipping Waters' NSCA

10.11.2.41 The Natural England seascape character assessment (Natural England, 2012) states that within the 'East Anglian Shipping Waters' NSCA "*there is typically a sense of disorientation due to a lack of visual cues, unlike the shallower coastal waters where tidal dynamics, prevailing weather conditions and land based orientating landmarks are perceptible. Despite the increased occurrence of offshore structures views are panoramic in nature and the seascape becomes monochrome and monotonous in character. Wind farm developments are significant features within the perceived seascape and their scale and form contrasts with the vast featureless seascape context*".

Magnitude

10.11.2.42 The impact is predicted to be of local extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly and would be barely perceptible at over 40 km from the Hornsea Three array area. The magnitude is considered to be **negligible**.

Sensitivity

10.11.2.43 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.44 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible**. The effect will, therefore, be **negligible**, which is not significant in terms of the SVIA methodology.

'East Anglian Shipping Waters: Netherlands Waters' SCA

10.11.2.45 The key characteristics of this seascape character area would be the same as described above for the 'East Anglian Shipping Waters' NSCA and would form a continuation of this seascape. Hornsea Three will be barely discernible from the edge of this character area and will exert an indirect visual influence on its character.

Magnitude

10.11.2.46 The impact is predicted to be of local extent, continuous and low reversibility. It is predicted that the impact will affect the seascape resource indirectly and would be barely perceptible at over 40 km from the Hornsea Three array area. The magnitude is considered to be **negligible**.

Sensitivity

10.11.2.47 The seascape resource is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the resource is considered to be **low**.

Significance of effect

10.11.2.1 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible**. The effect will, therefore, be **negligible**, which is not significant in terms of the SVIA methodology.

The existing HSC may change during the operational phase through the introduction of new or uncharacteristic elements/features.

10.11.2.2 Most of the likely effects on HSC would be time-limited and fully reversible. Permanent effects may occur with regard to the subsea floor and sea floor regions resulting from physical impacts.

10.11.2.3 During operation there will be no further impacts on the HSC of the affected areas except as a result of occasional maintenance or repair, the main visible manifestation of which will be the movement of vessels.

Hornsea Three array area

10.11.2.4 Within the Hornsea Three array area, the turbines would extend from on top of the seabed, or below the sea bed through the surface. On this basis, each level of the marine tier is assessed.

Sea Surface

10.11.2.5 At the Sea Surface, construction maintenance or repair within the Hornsea Three array area would affect three BCTs: 'Fishing', 'Industry' and 'Communications'. These HCSs would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

10.11.2.6 The 'Fishing' BCT is further divided into two HCSs. 'Bottom Trawling' and 'Drift Netting'. Each of these HCSs covers a wide area and the impact of the operation of the Hornsea Three array area would be on a small part of these HCSs.

10.11.2.7 The 'Industry' BCT is further divided into two HCSs, 'Hydrocarbon Pipeline' and 'Hydrocarbon Installation'. These are modern activities and the impact of the operation of the Hornsea Three array area would be broadly in keeping with the BCT.

10.11.2.8 In addition, the 'Communication' BCT contains the 'Submarine Telecommunication Cables' HCS. These are modern activities and although not directly related to the 'Industry' BCT, the impact of the Hornsea Three array area would be broadly in keeping with their overall characterisation. This BCT and HCS cover a wide area and the impact of the Hornsea Three array area would be on a small part of them.

Water Column

10.11.2.9 Within the 'Water Column', construction maintenance or repair within the Hornsea Three array area would affect two BCTs: 'Fishing' and 'Industry'. The character of the Hornsea Three array area would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

10.11.2.10 The 'Fishing' BCT is further divided into two HCSs: 'Drift Netting' and 'Bottom Trawling'. Each of these HCSs covers a wide area and the impact of the Hornsea Three array area would be on a small part of these HCSs.

10.11.2.11 The 'Industry' BCT comprises small areas of hydrocarbon installation. These are modern activities and the impact of the Hornsea Three array area would be broadly in keeping with the BCT.

Table 10.22: Summary of operation and maintenance effects on present day seascape character areas a result of Hornsea Three array area, offshore cable corridor and offshore HVAC booster stations.

Present day seascape character area	Sensitivity to proposed change	Nature of impact and frequency	Description of impact	Magnitude of change during operation and maintenance phase	Significance of effect on character area as a whole (Layout A and Layout B)
'Dogger Deep Water Channel'	Low	Direct Continuous	During the operational period, there will be views of offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area, as well as the visual impact of maintenance activities (e.g. vessel and helicopter movements).	Medium	Minor
'East Midlands Offshore Gas Fields'	Low	Direct Continuous	During the operational period, there will be views of the offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area and offshore HVAC booster stations within the seascape character area, as well as the visual impact of maintenance activities (e.g. vessel and helicopter movements).	Medium	Minor
'Norfolk Coastal Waters'	Low	Direct Continuous	During the operational period, there will be views of the offshore HVAC booster stations within the seascape character area, as well as the visual impact of maintenance activities (e.g. vessel and helicopter movements).	Low	Minor
'Dogger Deep Water Channel: Netherlands Waters'	Low	Indirect Continuous	Visual influence of offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area, as well as maintenance activities (e.g. vessel and helicopter movements).	Low	Minor
'East Midlands Offshore Gas Fields: Netherlands Waters'	Low	Indirect Continuous	Visual influence of offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area, as well as maintenance activities (e.g. vessel and helicopter movements).	Low	Minor
'Dogger Bank'	Low	Indirect Continuous	Visual influence of offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area, as well as maintenance activities (e.g. vessel and helicopter movements).	Negligible	Negligible to Minor
'Dogger Bank: Netherlands Waters'	Negligible	Indirect Continuous	Visual influence of offshore infrastructure (wind turbines and ancillary structures) sited within the Hornsea Three array area, as well as maintenance activities (e.g. vessel and helicopter movements).	Low	Negligible to Minor
'East Anglian Shipping Waters'	Negligible	Indirect Continuous	Visual influence of wind turbines sited within the Hornsea Three array area, as well as maintenance activities (e.g. helicopter movements).	Low	Negligible
'East Anglian Shipping Waters: Netherlands Waters'	Negligible	Indirect Continuous	Visual influence of wind turbines sited within the Hornsea Three array area, as well as maintenance activities (e.g. helicopter movements).	Low	Negligible
'East Midlands Coastal Waters'	Negligible	Indirect Continuous	Visual influence of the offshore HVAC booster stations within adjacent seascape character area, as well as the visual impact of maintenance activities (e.g. vessel and helicopter movements).	Negligible	Negligible

Sea Floor

10.11.2.12 On the 'Sea Floor', construction, maintenance or repair within the Hornsea Three array area would affect three BCTs: 'Fishing', 'Industry' and 'Cultural Topography'. The character of the Hornsea Three array area would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

10.11.2.13 The 'Fishing' BCT comprises 'Bottom Trawling', which is unlikely to be compatible with the preservation of earlier cultural landscapes, sites and artefacts located on the sea floor. In addition, bottom trawling covers a wide area and the impact of the Hornsea Three array area would be on a small part of this HCS.

10.11.2.14 The 'Industry' BCT comprises the 'Hydrocarbon Installation' HCS. This consists of modern activities and the impact of the Hornsea Three array area would be broadly in keeping with the BCT.

10.11.2.15 The 'Cultural Topography' BCT is further divided into two HCSs, 'Fine Sediment Plains' and 'Coarse Sediment Plains'. 'Fine Sediment Plains' in particular and to a slightly lesser extent, 'Coarse Sediment Plains' cover a very large part of the array SVIA study area. The impact of the Hornsea Three array area would be on a small part of these HCSs.

Subsea Floor

10.11.2.16 On the 'Subsea Floor', construction, maintenance or repair within the Hornsea Three array area would affect two BCTs, 'Cultural Topography' and 'Industry'. The character of the Hornsea Three array area would be altered to include the 'Renewable Energy Installation (Wind)' HCS.

10.11.2.17 The 'Cultural Topography' BCT is further divided into two HCSs, 'Fine Sediment Plains' and the 'Coarse Sediment Plains' HCS. 'The Fine Sediment Plains' HCS in the centre and north of the Hornsea Three array area and the 'Coarse Sediment Plains' HCS in the east, centre and south (both 'Cultural Topography' BCT). Both HCSs, and in particular the 'Fine Sediment Plains', are widely distributed in the array SVIA study area. The impact of the Hornsea Three array area would be on a very small part of these HCSs.

10.11.2.18 In addition there are 'Hydrocarbon Pipelines' and Hydrocarbon Field (Gas) ('Industry' BCT). These are modern activities and the impact of Hornsea Three would be broadly in keeping with the BCT.

Magnitude of impact

10.11.2.19 Operation, maintenance or repair within the Hornsea Three array area will affect the seascape character by introducing a new type; namely 'Renewable Energy Installation (Wind)'. The impact of the turbines and other infrastructure within the Hornsea Three array area is predicted to be of regional spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the HSC BCTs and HCSs directly. The impact would affect only a small part of the HCSs. Therefore, the magnitude of impact on each character area as a whole is considered to be low.

Sensitivity

10.11.2.20 Most of the BCTs and HCSs are deemed to be of low vulnerability, high recoverability and of less than regional value. The 'Fine Sediment Plains' and 'Coarse Sediment Plains' HCS are of low vulnerability, high recoverability and regional value. The sensitivity of the resource is considered to be low.

Significance of effect

10.11.2.1 Overall, it is predicted that the sensitivity of the receptor is considered to be low and the magnitude is deemed to be low. The effect will, therefore, be minor, which is not significant in EIA terms.

Hornsea Three offshore cable corridor

10.11.2.2 Within the Hornsea Three offshore cable corridor, operations would primarily take place on or below the sea bed, with the exception of the offshore HVAC booster stations, which are unlikely to have a significant effect at the seascape level. On this basis only the subsea floor and sea floor level of the marine tier are assessed. In addition, the magnitude of impact, sensitivity of resource and significance of effect on each of the HCSs within the offshore cable corridor will be similar and as indicated below.

Sea Floor

10.11.2.3 On the sea floor, operation, maintenance or repair at the Hornsea Three offshore cable corridor and/or the offshore HVAC booster stations would affect the 'Fishing' 'Cultural Topography', Navigation and Industry BCTs. These can be further subdivided into 'Bottom Trawling' HCSs ('Fishing' BCT), 'Coarse Sediment Plains' and 'Fine Sediment Plains' ('Cultural Topography' BCT) HCSs, the 'Hydrocarbon Field (Gas)', HCS (Industry BCT), the 'Sand Banks with Sand Waves' ('Cultural Topography' BCT) HCS and close to the shore an area of the 'Shoals and Flats' ('Navigation' BCT) HCS.

10.11.2.4 The 'Bottom Trawling' HCS covers a wide area and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of this HCS. 'Fine Sediment Plains', in particular in the east of the offshore HVAC booster SVIA study area, and 'Coarse Sediment Plains' in the west of the offshore HVAC booster SVIA study area cover a very large part of the offshore HVAC booster SVIA study area. The impact of the Hornsea Three offshore cable corridor would be on a very small part of these HCSs.

10.11.2.5 The 'Industry' BCT HCS, 'Hydrocarbon Field (Gas)' represents modern activity and the impact of the Hornsea Three offshore cable corridor would be broadly in keeping with the BCT. The Hornsea Three offshore cable corridor would impact upon a small area of the 'Sand Banks with Sand Waves' ('Cultural Topography' BCT) HCS. This HCS covers a relatively large part of the offshore HVAC booster SVIA study area. The impact of the Hornsea Three offshore cable corridor would be on a very small part of this HCS. The 'Shoals and Flats' ('Navigation' BCT) HCS follows much of the coastline in the wider area and the impact of the Hornsea Three offshore cable corridor and offshore HVAC booster stations would be on a small part of this HCS.

Subsea Floor

10.11.2.6 On the Subsea Floor, the operation, maintenance or repair at the Hornsea Three offshore cable corridor and/or the offshore HVAC booster stations would affect the 'Cultural Topography' BCT, small areas of the 'Industry' BCT and a small area of the 'Cultural Topography' BCT.

10.11.2.7 These can be further subdivided into the 'Coarse Sediment Plains', 'Fine Sediment Plains' ('Cultural Topography' BCT) HCSs, small areas of the 'Hydrocarbon Field (Gas) and Hydrocarbon Installation' ('Industry' BCT) HCSs and a small area of the 'Exposed Bedrock' ('Cultural Topography' BCT) HCS.

10.11.2.8 'Fine Sediment Plains', in particular in the east of the offshore HVAC booster SVIA study area, and 'Coarse Sediment Plains' in the west of the offshore HVAC booster SVIA study area cover a very large part of the offshore HVAC booster SVIA study area. The impact of the Hornsea Three offshore cable corridor and offshore HVAC booster SVIA would be on a very small part of these HCSs.

10.11.2.9 The 'Industry' BCT HCSs, 'Hydrocarbon Field (Gas) and Hydrocarbon Installation', are modern activities and the impact of the offshore cable corridor route would be broadly in keeping with the BCT.

Magnitude of impact

10.11.2.10 Within the Hornsea Three offshore cable corridor any impact will be derived largely from undersea operations. The Hornsea Three offshore cable corridor will add the Submarine power cable HCS. The impact is predicted to be of regional spatial extent, long term duration, continuous and medium reversibility. It is predicted that the impact will affect the resource directly. The impact would affect only a small part of the HCSs therefore, the magnitude of impact on each character area as a whole is considered to be low.

Sensitivity

10.11.2.11 Most of the HSC BCTs and HCSs are deemed to be of low vulnerability, high recoverability and of less that regional value. The 'Fine Sediment Plains' and 'Coarse Sediment Plains' HCS are of low vulnerability, high recoverability, regional value and medium sensitivity. The sensitivity of the remaining resource is considered to be low.

Significance of effect

10.11.2.12 Overall, it is predicted that the sensitivity of the receptor is considered to be low and the magnitude is deemed to be low. The effect will, therefore, be minor, which is not significant in EIA terms.

The day time visual scenario experienced by a variety of visual receptors during the operational phase may change

10.11.2.13 Visual effects would result from the fully operational wind turbine array and the permanent ancillary structures, including the offshore HVAC booster stations.

10.11.2.14 All operational visual effects are capable of being reversed through the removal of the above sea level elements of Hornsea Three.

10.11.2.15 The speed of movement of the wind turbine blades across the Hornsea Three array area would necessarily be dependent on the available wind resource.

10.11.2.16 The two indicative ZTVs of the blade tip and hub heights prepared for this assessment (Figure 10.8, Figure 10.9, Figure 10.10 and Figure 10.11) show that between 81% and 100% of the upper tips of the proposed wind turbines (both 240 m and 325 m above LAT) will be theoretically visible over the vast majority of the array SVIA study area. This is due mainly to relative wind turbine and viewer height.

10.11.2.17 The ZTVs of the blade tip and hub heights illustrate the theoretical visibility of the wind turbines. However, differing lighting and meteorological conditions would also affect the perception of the wind turbines.

10.11.2.18 The ZTV for the offshore HVAC booster stations indicates that views of it will be gained from areas of land around the Norfolk coast. An assessment of effects on land based visual receptors is contained within volume 3, chapter 4: Landscape and Visual Resources.

10.11.2.19 It is noted that operational effects of Hornsea Three may be experienced both during the day and at night for all visual receptors with the exception of people on board the cruise ferry routes who are only likely to experience night time effects if the ferry timetable remains unchanged. This is because the cruise ferries typically only pass through the SVIA study areas during the hours of darkness (paragraph 10.11.1.43). Other receptors have the potential to be within the SVIA study areas either during the daytime or at night.

10.11.2.20 Operational visual impacts would be of varying duration. These impacts are summarised in Table 10.23. For each visual receptor type the first row (grey row) represents the overall assessment. Subsequent rows (white rows), where applicable, represent the assessment at specific viewpoints.

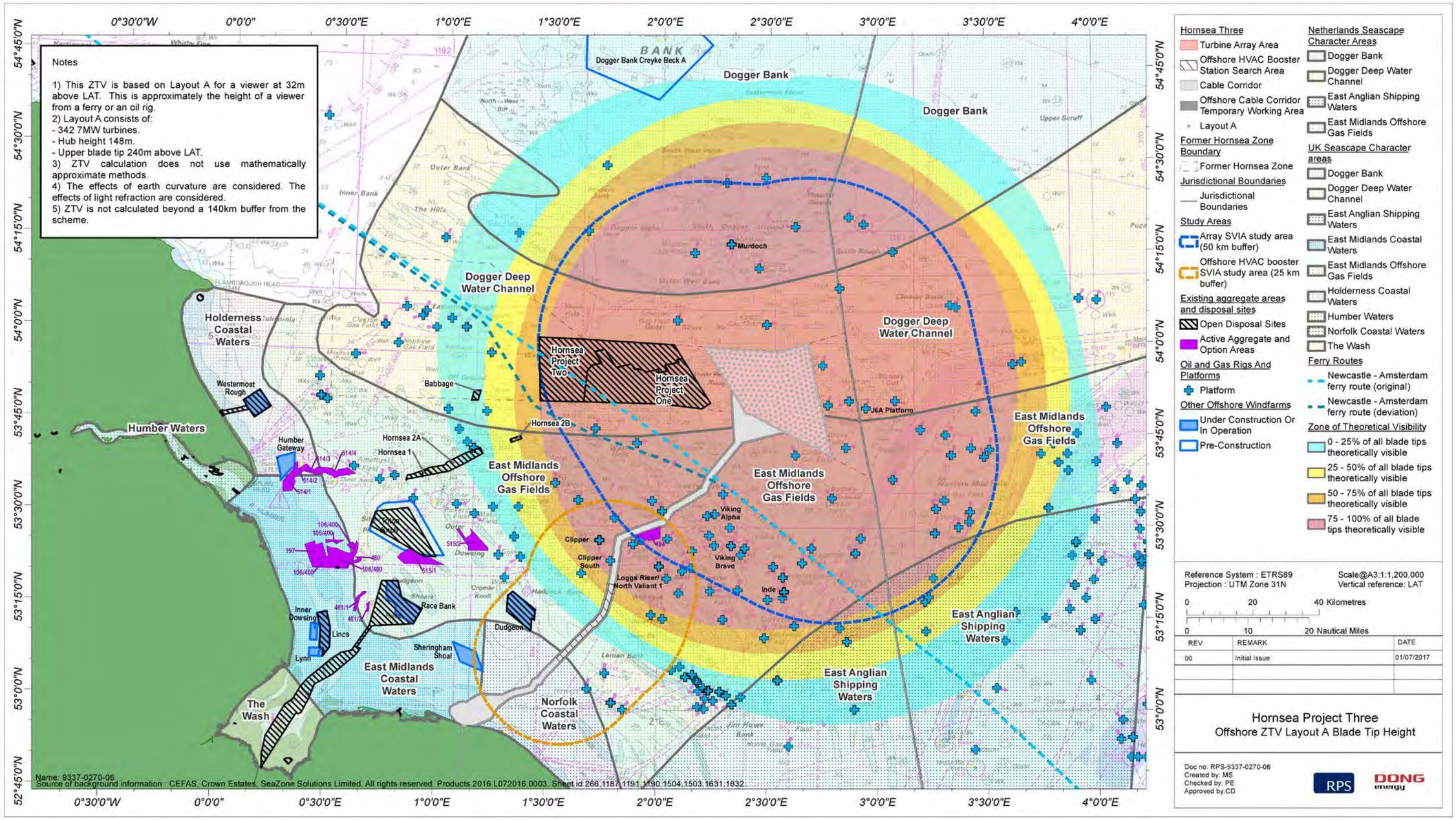

Figure 10.8: Offshore ZTV Layout A blade tip height.

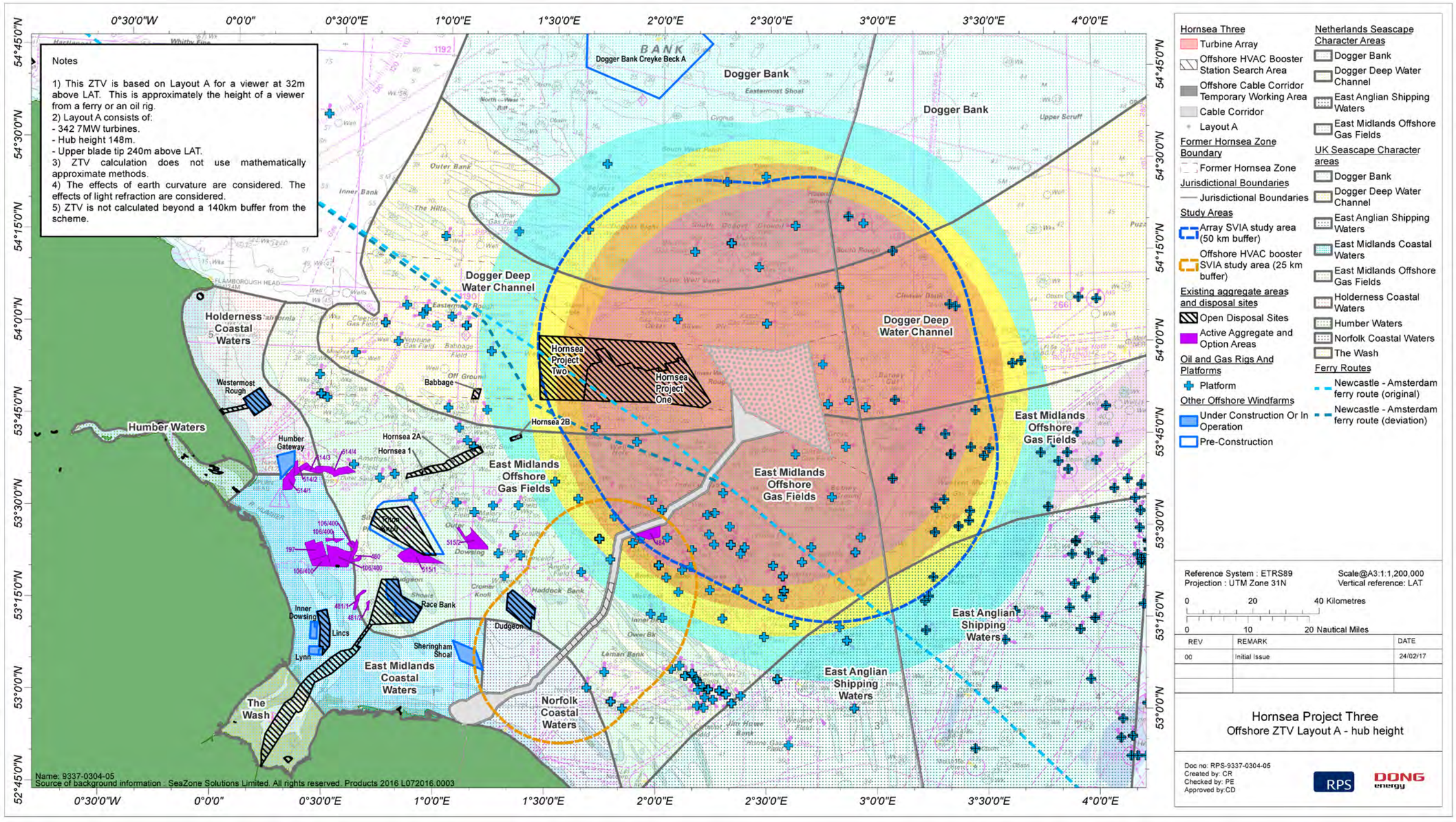

Figure 10.9: Offshore ZTV Layout A - hub height.

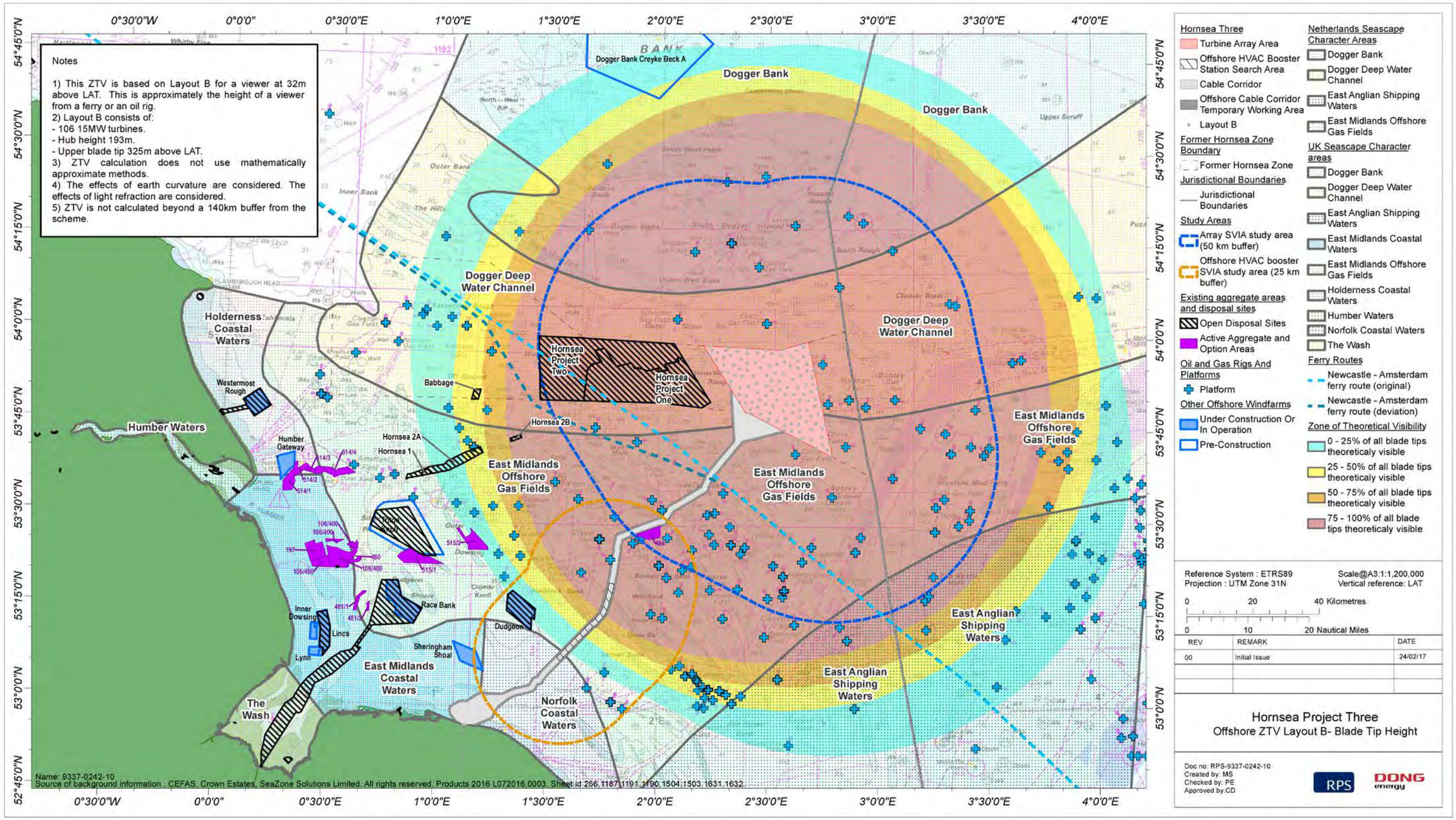

Figure 10.10: Offshore ZTV Layout B – blade tip height.

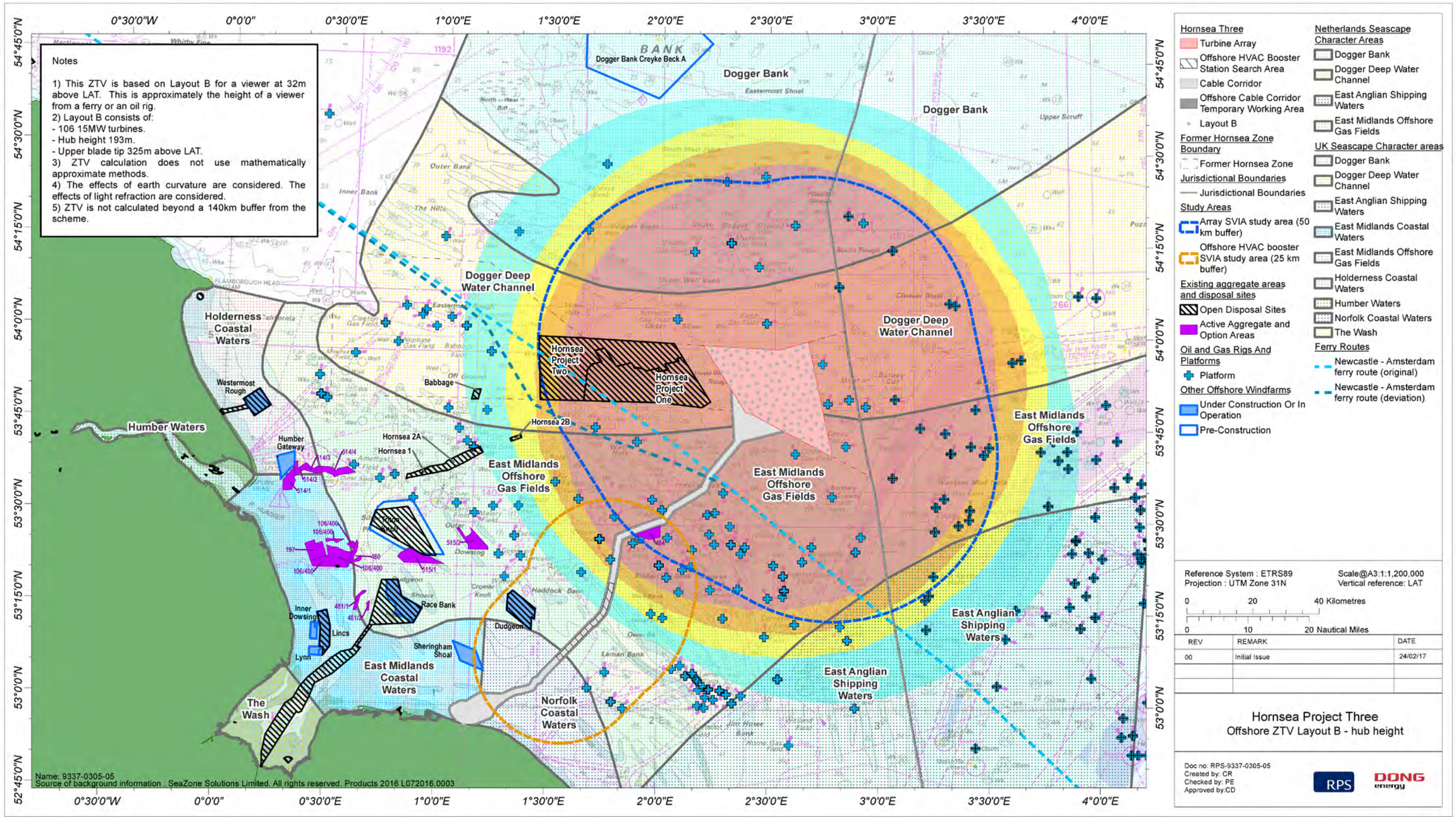

Figure 10.11: Offshore ZTV Layout B - hub height.

Table 10.23: Summary of maximum design scenario for operation and maintenance effects on visual resources as a result of Hornsea Three, offshore cable corridor and offshore HVAC booster stations [a,b].

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during operation (incorporating both day and night time effects – assessment made on maximum design scenario as defined in accompanying text above)	Magnitude of change during operation (Layout A)	Significance of visual effect (Layout A)
Sailors following the offshore cruising routes identified by the RYA.	Varies from outer edge of array SVIA study area to approximately 32 km from the Hornsea Three array area at closest point.	Medium	Long term Continuous	Existing view – Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view – Hornsea Three occupies varying extents of the view depending on the location of receptors along the route. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). The RYA North Eastern Region Route which lies within the array array SVIA study area also passes through the offshore HVAC booster SVIA study area. This would be seen in the context of existing gas platforms in the surrounding area which also lie close to the cruising route.	Negligible to Low (varies with distance from the Hornsea Three array area). Negligible (North Eastern Region Route only where it passes closest to the offshore HVAC booster stations search area).	Negligible to Minor The range of significance varies depending on the receptor's proximity to the Hornsea Three array area.
1a) Person on board yacht at sample location along North East Region RYA route: Viewpoint 4.	53°36.000N, 2°3.892E: 32 km to the southwest of the Hornsea Three array area.	Medium	Long term Continuous	The wind turbine array would form a noticeable but distant series of elements on a large horizontal extent of the horizon, as a new type of seascape element in the open view. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). The offshore HVAC booster stations will be visible during appropriate meteorological conditions, but they would be seen in the context of gas platforms in the surrounding area.	Low	Minor
Passengers and workers on board commercial ferries or cruise liners.	Varies from outer edge of array SVIA study area to approximately 23 km from the Hornsea Three array area.	Low for workers and Medium for passengers.	Long term Continuous	Existing view – Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view – Hornsea Three occupies varying extents of the view depending on location. The ferry passes through the array SVIA study area during hours of darkness for the majority of the year. Navigation and aviation lights would be seen as distant development.	Negligible to Low (varies with distance from the Hornsea Three array area).	Negligible to Minor The range of significance varies depending on the receptor's proximity to the Hornsea Three array area and sensitivity of the receptor.
2a) Person on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 1.	53°45.680N, 1°38.506E: 45 km to the west of the Hornsea Three array area.	Low to Medium	Long term Continuous	Night time effects only. Red aviation lighting associated with Hornsea Three is assumed to have a Nominal Range of up to 20 km (11 nm) and will therefore not to be visible from this viewpoint. Yellow navigation lighting would also not be visible (based on curvature of the earth calculations). On moonlit nights, the form of the wind turbines may be visible as barely discernible elements.	Negligible	Negligible to Minor The range of significance varies depending on the receptor's sensitivity.
2b) Person on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 2.	53°36.494N, 2°18.857E: 23 km to the southwest of the Hornsea Three array area.	Low to Medium	Long term Continuous	Night time effects only. Red aviation lighting associated with Hornsea Project Two is assumed to have a Nominal Range of up to 20 km (11 nm) and will therefore not be visible. Yellow navigation lighting would be visible. However, other factors such as weather conditions and intensity of the proposed light sources may limit or prevent views. On moonlit nights it will be possible to see the form of the wind turbines as barely discernible elements.	Low	Negligible to Minor The range of significance varies depending on receptor's sensitivity.
2c) Passenger on board ferry at sample location along route of Newcastle to Amsterdam cruise ferry: Viewpoint 3.	53°17.9620N, 2°56.452E: 45 km to the southeast of the Hornsea Three array area.	Low to Medium	Long term Continuous	Night time effects only. Red aviation lighting associated with Hornsea Three is assumed to have a Nominal Range of up to 20 km (11 nm) and will therefore not to be visible from this viewpoint. Yellow navigation lighting would be theoretically visible (based on curvature of the earth calculations). However other factors such as weather conditions and intensity of the proposed light sources may limit or prevent views. On moonlit nights, the form of the wind turbines may be visible as barely discernible elements.	Negligible	Negligible

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during operation (incorporating both day and night time effects – assessment made on maximum design scenario as defined in accompanying text above)	Magnitude of change during operation (Layout A)	Significance of visual effect (Layout A)
People at their place of work on passing cargo, tanker or other commercial vessels.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view – The Hornsea Three array area occupies varying extents of the view depending on the location of receptors. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Commercial vessels currently pass within and close to the Hornsea Three array area. It is assumed that any diverted routes would continue to pass close to the Hornsea Three array area.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending on the receptor's proximity to the Hornsea Three array area. Moderate effects are not considered to be significant in EIA terms.
People at their place of work on manned static oil and gas platforms or travelling to or from the platforms.	Varies from outer edge of array SVIA study area to closer, but still mid to long range views in relation to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view – The Hornsea Three array area occupies varying extents of the view depending on the proximity and location of receptors. Views of intermittent maintenance activities (e.g. vessel and helicopter movements).	Low to Medium	Negligible to Minor The range of significance varies depending on the receptor's distance to the Hornsea Three array area.
4a) Person at sample location: J6A oil and gas platform main deck: Viewpoint 5.	53°49.448N, 2°56.717E: 13 km to the east of the Hornsea Three array area	Low	Long term Continuous	The Hornsea Three array area will form a prominent new feature visible over a large expanse of the horizon. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation lighting and yellow navigation lighting would be visible in views at night. On moonlit nights, the form of the turbines would also be visible.	Medium	Minor
4b) Person at sample location: Murdoch oil and gas platform main deck: Viewpoint 6.	54°16.094N, 2°19.378E: 32 km to the north.	Low	Long term Continuous	The Hornsea Three array area will form a prominent although distant new feature visible over a large expanse of the horizon. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation warning lights would not be visible at this distance. Yellow navigation lighting would be theoretically visible (based on curvature of the earth calculations). However other factors such as weather conditions and intensity of the proposed light sources may limit or prevent views. On moonlit nights, the form of the turbines may be visible as barely discernible elements.	Low	Negligible

Visual receptor1	OS grid reference	Sensitivity to proposed change	Duration of impact and frequency	Description of visual effects during operation (incorporating both day and night time effects – assessment made on maximum design scenario as defined in accompanying text above)	Magnitude of change during operation (Layout A)	Significance of visual effect (Layout A)
People at their place of work on commercial fishing vessels.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Dynamic and changing views from moving vessels. Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Some commercial fishing currently carried out within the area to be occupied by the Hornsea Three Hornsea Three. Proposed view - Dynamic and changing views from moving vessels. The Hornsea Three array area occupies varying extents of the view depending on the proximity and location of receptors. Some commercial fishing may continue to be carried out within the area to be occupied by the Hornsea Three array area depending on final layout and spacing. In close range views and views from within the Hornsea Three array area, the turbines and structures would form dominant new features in the seascape. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation warning lighting and yellow navigation lighting would be prominent in near views at night. On moonlit nights, the form of the turbines would also be visible.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending on the receptor's proximity to the Hornsea Three array area.
People at their place of work on aggregate dredging and disposal vessels.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Dynamic and changing views from moving vessels. Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view - Dynamic and changing views from moving vessels. The Hornsea Three array area would occupy varying extents of the view depending on the location and proximity of receptors. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation warning lighting and yellow navigation lighting would be prominent in near views at night. On moonlit nights, the form of the turbines would also be visible.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending on the receptor's proximity to the Hornsea Three array area.
Military personnel using identified military practice areas.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Dynamic and changing views from moving vessels. Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view - Dynamic and changing views from moving vessels. The Hornsea Three array area would occupy varying extents of the view depending on the location of receptors. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation warning lighting and yellow navigation lighting would be prominent in near views at night. On moonlit nights, the form of the turbines would also be visible. Air combat training activities would take place directly over the Hornsea Three array area.	Negligible to High (varies with distance from the Hornsea Three array area).	Negligible to Moderate The range of significance varies depending on the receptor's proximity to the turbine array. Those receptors closest to the Hornsea Three array area, will experience moderate effects, which are not considered to be significant in terms of the SVIA methodology.
People carrying out ecological or other types of marine based survey.	Varies from outer edge of array SVIA study area to locations close to the Hornsea Three array area.	Low	Long term Continuous	Existing view – Dynamic and changing views from moving vessels. Open seascape with occasional views of gas platforms, commercial cargo, fishing and other vessels, plus navigation aids such as flashing light sources. Proposed view - Dynamic and changing views from moving vessels. The Hornsea Three Hornsea Three would occupy varying extents of the view depending on the location and proximity of receptors. It is assumed that surveys could take place at any location within the array SVIA study area. Views of intermittent maintenance activities (e.g. vessel and helicopter movements). Red aviation warning lighting and yellow navigation lighting would be prominent in near views at night. On moonlit nights, the form of the turbines would also be visible.	Negligible to High (varies with distance from the Hornsea Three array area.	Negligible to Moderate The range of significance varies depending on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area, will experience moderate effects, which are not considered to be significant in terms of the SVIA methodology.

a For each visual receptor type the first row (grey row) represents the overall assessment. Subsequent rows (white rows), where applicable, represent the assessment at specific viewpoints.

b The visible construction activities would be subtly different for Layouts A and B however, the level of effect identified applies to both array scenarios.

Sailors following the offshore cruising routes identified by the Royal Yachting Association

10.11.2.21 The scale of Hornsea Three perceived by people aboard cruising yachts will necessarily vary with their location within the array SVIA study area. The closest point on a specific cruising route to the Hornsea Three array area is approximately 32 km from the southwest corner.

10.11.2.22 From the sample RYA cruising route location 32 km to the southwest of the Hornsea Three array area, wirelines haves been prepared at both 75 degree and 180 degree FOV (Wireline Location Plan figure, volume 5, annex 10.2: Seascape and Visual Resources Wirelines). Layout A and Layout B would both occupy approximately half of a 75 degree FOV. There would also potentially be views of the offshore HVAC booster stations more than 25 km to the southwest during appropriate meteorological conditions, but these structures would be seen in the context of gas platforms in the surrounding area.

Magnitude of impact

10.11.2.23 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **negligible** to **low**, dependent on the distance from the turbine array.

Sensitivity

10.11.2.24 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **medium**.

Significance of effect

10.11.2.25 The potential effects experienced by sailors will range from **negligible** to **low** significance. The significance varies depending primarily on the receptor's proximity to the turbine array. The effects upon the sailors following the RYA routes are transitory, although could be for a relatively long period of the overall journey.

Passengers and workers on board commercial ferries or cruise liners

10.11.2.26 The existing and proposed diverted routes for the cruise ferries from Newcastle to Amsterdam pass through the edge of the array SVIA study area to within about 23 km of the Hornsea Three array area. As explained in paragraph 10.7.7.17, this journey within the array SVIA study area is restricted to the hours of darkness for most of the year, and this is anticipated to restrict most views to those of navigation warning lights. However, on occasions, there may be sufficient moonlight to enable the turbines to be dimly seen against the dark skies within distant views.

10.11.2.27 From sample cruise ferry route viewpoint 1 (deviated as currently proposed, 45 km to the west of the Hornsea Three array area) it is anticipated that the Hornsea Three array area will be scarcely visible at this distance and views will be affected by meteorological conditions.

10.11.2.28 Sample cruise ferry route viewpoint 2 (23 km to the southwest of the Hornsea Three array area) Layout A and Layout B will fill the 75 degree field of view.

10.11.2.29 From sample cruise ferry route viewpoint 3 (45 km to the south of the Hornsea Three array area) it is anticipated that the Hornsea Three array area will be scarcely visible at this distance and views will be affected by meteorological conditions.

Magnitude of impact

10.11.2.30 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from Hornsea Three and is considered to be **negligible** to **low** dependent on the distance from the Hornsea Three array area. Impacts would generally be experienced at night.

Sensitivity

10.11.2.31 Passengers are deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor to the proposed wind farm is considered to be **medium**. Workers are deemed to be of low vulnerability, high recoverability and regional value. The sensitivity of the receptor to the proposed wind farm is considered to be **low**.

Significance of effect

10.11.2.32 The significance of effects experienced by passengers on board commercial ferries or cruise liners during the night will range from **negligible** to **minor** and workers would be **negligible**. The range of significance varies depending primarily on the receptors' proximity to the Hornsea Three array area. Those receptors of medium sensitivity that are closest to the Hornsea Three array area will experience **minor** effects, which are not significant in terms of the SVIA methodology. These effects would be transient in nature, although would be experienced for a relatively long period of the overall journey.

People at their place of work on passing cargo, tanker or other commercial vessels

10.11.2.33 Commercial vessels currently pass through the majority of the SVIA study areas. The scale of Hornsea Three perceived by workers on board commercial vessels will necessarily vary with the ships' location within the SVIA study areas.

10.11.2.34 Operational visual impacts will vary from barely perceptible views from the outer edges of the SVIA study areas, to close range views, with a consequent range in the significance of the visual effects.

Magnitude of impact

10.11.2.35 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from Hornsea Three and is considered to be **negligible** to **high** dependent on the distance from the turbine array.

Sensitivity

10.11.2.36 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.37 The effect will be of **negligible** to **moderate** significance. The range of significance varies depending on the receptor's distance to the turbine array. Those receptors closest to the turbine array will experience **moderate** effects for a relatively short duration of the overall journey, which are not considered to be significant in in terms of the SVIA methodology.

People at their place of work on manned static gas platforms or travelling to and from the platforms

10.11.2.38 Manned platform J6A is located approximately 13 km to the east of the Hornsea Three array area in Netherlands' waters, otherwise manned gas platforms within the array SVIA study area are located towards its periphery.

10.11.2.39 From platform J6A the Hornsea Three array area would form a prominent new feature within the seascape, visible over a large expanse of the horizon. Layout A and Layout B would both occupy the whole of a 75 degree FOV.

10.11.2.40 From the Murdoch oil/gas platform (32 km to the north of the Hornsea Three array area) Hornsea Three would form a prominent, but distant feature on the horizon. Layout A and Layout B would both occupy the majority of a 75 degree FOV. At this distance, views towards the Hornsea Three array area will be affected by meteorological conditions.

Magnitude of impact

10.11.2.41 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from the Hornsea Three array area and is considered to be **low** to **medium** dependent on the distance from the Hornsea Three array area.

Sensitivity

10.11.2.42 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.43 The effect will be of **negligible** to **minor** significance. The range of significance varies depending on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area on the J6A platform, will experience minor effects, which are not considered to be significant in in terms of the SVIA methodology.

People at their place of work on commercial fishing vessels

10.11.2.44 Commercial fishing may take place across the SVIA study areas. The visual impacts of Hornsea Three would be within the same range as for workers on commercial vessels, such as tankers.

Magnitude of impact

10.11.2.45 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from Hornsea Three and is considered to be **negligible** to **high** dependent on the distance from the Hornsea Three array area.

Sensitivity

10.11.2.46 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.47 The effect will be of **negligible** to **moderate** significance. The range of significance varies depending primarily on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area, will experience **moderate** effects for a relatively short duration of the overall journey, which are not considered to be significant in in terms of the SVIA methodology.

People at their place of work on aggregate dredging and disposal vessels

10.11.2.48 Current and prospective aggregate dredging activity takes place largely to the southwest of the Hornsea Three array area. Disposal activity takes place to the west of the Hornsea Three array area. The significance of visual effects will vary with distance from Hornsea Three and it is anticipated that it would be within the same range as for workers on commercial vessels, such as tankers.

Magnitude of impact

10.11.2.49 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from the Hornsea Three array area and is considered to be **negligible** to **high**.

Sensitivity

10.11.2.50 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.51 The effect will be of **negligible** to **moderate** significance. The range of significance varies depending on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area will experience **moderate** effects for a relatively short duration of the overall journey, which are not considered to be significant in in terms of the SVIA methodology.

Military personnel using identified military practice areas

10.11.2.52 The Ministry of Defence uses all uncontrolled UK airspace and waters for Air Force, Navy and Army training so armed forces activity could take place across the array SVIA study area, including within aerial locations. Necessarily, the significance of visual effects will vary with distance from the Hornsea Three array area and it is anticipated that it would be within the same range as for other people at their place of work within the array SVIA study area.

Magnitude of impact

10.11.2.53 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from the Hornsea Three array area and is considered to be **negligible** to **high** dependent on the distance from the Hornsea Three array area.

Sensitivity

10.11.2.54 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.55 The effect will be of **negligible to moderate** significance. The range of significance varies depending primarily on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area, will experience **moderate** effects for a relatively short duration of the overall journey, which are not considered to be significant in in terms of the SVIA methodology.

Other marine users (e.g. people carrying out ecological or other types of marine based survey)

10.11.2.56 There is other marine activity taking place by people carrying out ecological or other types of marine based surveys. This largely takes place along the RYA routes as found on Figure 10.4 across the array SVIA study area and the offshore HVAC booster SVIA study area. The significance of effect will vary with distance from the Hornsea Three array area and offshore HVAC booster station search area.

Magnitude of impact

10.11.2.57 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from the Hornsea Three array area and is considered to be **negligible** to **high** dependent on the distance from the Hornsea Three array area.

Sensitivity

10.11.2.58 The receptor is deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.2.59 The anticipated significance of effects will vary between **negligible** and **moderate**. The range of significance varies depending on the receptor's distance to the Hornsea Three array area. Those receptors closest to the Hornsea Three array area will experience **moderate** effects for a relatively short duration of the overall journey, which are not considered to be significant in in terms of the SVIA methodology.

The night time visual scenario experienced by a variety of visual receptors during the operational phase may change.

10.11.2.60 Navigation and aviation warning lights will be visible at the edges and corners of the Hornsea Three array area (refer to Table 10.22 and Table 10.23, which summarise the operational effects on visual receptors).

10.11.2.61 The Research and Radionavigation Directorate (part of the General Lighthouse Authority) notes (R and RNAV, 2012) that the conspicuousness of a light source is affected by many parameters including: intensity and colour of the light; atmospheric visibility/weather conditions; flash character, shape and repetition rate; contrast of light with background lighting; shape of light source and distance from light to observer.

10.11.2.62 The proposed flashing red aviation lighting would be visible over an anticipated nominal range of 11 nm, which is equivalent to approximately 20 km. These synchronised flashing lights would therefore be potentially visible to receptors within this distance range. People on board the cruise ferry would be greater than 20 km from the closest point of the Hornsea Three array area and users of the closest RYA cruising route would be more than 30 km from the Hornsea Three array area. As previously stated, other marine users have the potential to be located anywhere within the SVIA study areas.

10.11.2.63 However, it is noted that existing guidance (CAA, 2012) requires a reduction in intensity of the red light below the horizontal plane of the light fitment. It is also anticipated that varying meteorological conditions may reduce the actual distance over which the light is visible. However, for the purposes of this assessment, the maximum design scenario of maximum visibility within the Nominal Range is assumed, namely that the lights would be visible up to 11 nm.

10.11.2.64 The proposed flashing yellow navigation lighting would be visible over a minimum range of either 3 or 5 nm (dependent on position and type of light). At present, the luminous intensity of the light source has not been defined. However, ZTV calculations based on the maximum proposed height of the light sources (25.28 m above LAT), indicate that the effects of curvature of the earth would limit the theoretical visibility of these yellow flashing lights to 27 km for observers 4 m above sea level (representative height for people on board yachts) and 39 km for observers 26.5 m above sea level (representative height for people on board the Newcastle to Amsterdam cruise ferry). Therefore it can be assumed that the proposed navigation lighting would be visible to users of a short section of the cruise ferry, however users of the RYA cruising routes within the SVIA study areas would be located to far from the lighting for it to be visible. As previously stated, other marine users have the potential to be anywhere within the SVIA study areas.

10.11.2.65 As with the red aviation warning lights, meteorological visibility may affect the actual distance over which these yellow flashing lights are visible. The luminous intensity of the proposed light source is not defined at this stage and so the potential theoretical visibility may reduce further, based on a calculated Nominal Range.

10.11.2.66 For the purposes of this assessment, the maximum design scenario has been assumed (i.e. that the yellow flashing lights would be synchronised to flash together and that they would be theoretically visible over a distance solely influenced by their height above sea level and the relative height of the observer).

Magnitude of impact

10.11.2.67 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptors directly. The magnitude varies with distance from the Hornsea Three array area and is considered to be **negligible** to **medium** dependent on the distance from the Hornsea Three array area.

Sensitivity of receptor

10.11.2.68 The receptors are deemed to be of low to medium vulnerability, high recoverability and regional value. The sensitivity of the receptor to the proposed wind farm is considered to be **low** to **medium**.

Significance of effect

10.11.2.69 The effect will be of **negligible** to **moderate** significance. The range of significance varies depending on the receptors' proximity to the Hornsea Three array area and the sensitivity of the receptor. Those medium sensitivity receptors closest to the Hornsea Three array area will experience **moderate** effects, which are not considered to be significant in in terms of the SVIA methodology.

Future monitoring

10.11.2.70 No future monitoring of effects on seascape and visual receptors or the historic seascape is proposed for the operation and maintenance phase.

10.11.3 Decommissioning phase

10.11.3.1 The impacts of the offshore decommissioning of Hornsea Three have been assessed on seascape and visual resources. The environmental effects arising from the decommissioning of Hornsea Three are listed in Table 10.8 along with the maximum design scenario against which each decommissioning phase impact has been assessed.

10.11.3.2 A description of the potential effect on seascape and visual resources receptors caused by each identified impact is given below.

Decommissioning of the Hornsea Three array area, the offshore cable corridor and the offshore HVAC booster stations may change seascape character and may affect visual resources.

10.11.3.3 Information provided in volume 1, chapter 3: Project Description sets out the high level decommissioning activities that are currently being considered. The main difference between construction and decommissioning, both of which are temporary phases, is that whilst the scale of effects progressively increases during construction as the turbines and ancillary features are installed, during decommissioning the scale of effects decreases with time as more structures are removed. The seascape and visual effects during the decommissioning phase are assessed as being the same during the construction phase.

Present Day Seascape Character

10.11.3.4 The effects of the decommissioning of Hornsea Three will cause direct and indirect temporary changes to the seascape character, as it would introduce the presence of additional and different vessels into the seascape. The seascape character would change from an offshore wind farm seascape and return to the original seascape character (prior to the construction of Hornsea Project One, Hornsea Project Two and Hornsea Three).

Magnitude of impact

10.11.3.5 The seascape character resources predicted impact is likely to be of local extent, continuous and low reversibility. It is predicted that the impact will affect the receptor indirectly. The magnitude is considered to be **negligible to medium**.

Sensitivity of resource

10.11.3.6 The receptor is deemed to be of low vulnerability, high recoverability and local value. The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.3.7 The effect will be of **negligible** to **minor** significance. The range of significance varies depending on the receptor's distance to the Hornsea Three array area. Those receptors within or closest to the Hornsea Three array area, will experience **minor** effects, which are not considered to be significant in in terms of the SVIA methodology.

Present Day Seascape Visual Resources

10.11.3.8 The decommissioning phase visual effects would be similar to those experienced during the construction phase. There would be direct effects caused by the presence of vessels removing the turbines and cables, as well as the offshore HVAC booster stations. The effects would be temporary, but the remaining structures such as the piled foundations, would not be visible post decommissioning.

Magnitude of impact

10.11.3.9 The impact is predicted to be of local spatial extent, short term duration, continuous and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **negligible** to **high**. Those receptors closer to the decommissioning will experience greater magnitude of impacts than those further away.

Sensitivity of receptor

10.11.3.10 The range of visual receptors are deemed to be of medium vulnerability, high recoverability and local value. The sensitivity of the receptors is considered to be **low to medium**.

Significance of effect

10.11.3.11 The temporary significance of effects will range from **negligible to moderate** significance (Table 10.21). Where the receptor passes close to decommissioning works they have the potential to experience effects of a **moderate** significance, which are not considered to be significant in in terms of the SVIA methodology.

HSC

10.11.3.12 With regard to HSC, the presence of a large offshore wind farm would cause the character of the area to be altered to include the Renewable Energy Installation (Wind) HCS. Decommissioning may well result in the reversal of this characterisation, but that would depend on whether or not any additional energy industry facilities had been established in the area prior to the decommissioning of Hornsea Three.

Magnitude of impact

10.11.3.13 The decommissioning process would affect areas already disturbed by the construction process and few physical impacts are expected. On the basis that the decommissioning of the wind farm would reduce the turbines to approximately the level of the seabed the magnitude of impact would be **low**

Sensitivity of receptor

10.11.3.14 The sensitivity of the receptor is considered to be **low**.

Significance of effect

10.11.3.15 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **low**. The effect will, therefore, be **minor**, which is not significant in EIA terms.

Future monitoring

10.11.3.16 No future monitoring of effects on seascape and visual receptors or the historic seascape is proposed for the decommissioning phase.

10.12 Cumulative Effect Assessment methodology

10.12.1 Screening of other projects and plans into the Cumulative Effect Assessment

10.12.1.1 A cumulative effect is the additional effect of the project in conjunction with other developments of the same type and other major developments. These should include those that "*arise as an indirect consequence of the main project under consideration*" (GLVIA3, paragraph 7.11).

10.12.1.2 The Cumulative Effect Assessment (CEA) takes into account the impact associated with Hornsea Three together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of the 'CEA long list' of projects (see annex 4.5: Cumulative Effects Screening Matrix and Location of Schemes). Each project on the CEA long list has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

10.12.1.3 In undertaking the CEA for Hornsea Three, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside Hornsea Three. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with Hornsea Three (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors. For this reason, all relevant projects and plans considered cumulatively alongside Hornsea Three have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the CEA to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each Tier in the decision making process when considering the potential cumulative impact associated with Hornsea Three (e.g. it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2). An explanation of each tier is included below:

- Tier 1: Hornsea Three considered alongside other project/plans currently under construction and/or those consented but not yet implemented, and/or those submitted but not yet determined and/or those currently operational that were not operational when baseline data was collected, and/or those that are operational but have an on-going impact;
- Tier 2: All projects/plans considered in Tier 1, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has submitted a Scoping Report; and
- Tier 3: All projects/plans considered in Tier 2, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has advised PINS in writing that they intend to submit an application in the future but have not submitted a Scoping Report.

10.12.1.4 It is noted that Tier 1 includes projects, plans and activities that are operational, under construction, consented but not yet implemented and submitted but not yet determined. The certainty associated with other projects, plans and activities, in terms of the scale of the development and the likely impacts, increase as they progress from submitted applications to operational projects. In particular, offshore wind farms seek consent for a maximum design scenario and the as built offshore wind farm will be selected from the range of consented scenarios. In addition, the maximum design scenario quoted in the application (and the associated Environmental Statement) are often refined during the determination period of the application. For example, it is noted that the Applicant for Hornsea Project One has gained consent for an overall maximum number of turbines of 240, as opposed to 332 considered in the Environmental Statement. Similarly, Hornsea Project Two has gained consent for an overall maximum number of turbines of 300, as opposed to 360 considered in the Environmental Statement.

10.12.1.5 It should be noted that the CEA presented in this seascape and visual resources chapter has been undertaken on the basis of information presented in the Environmental Statements for the other projects, plans and activities. The level of impact on seascape and visual resources would likely be reduced from those presented here. In addition, Hornsea Three is currently considering how the different levels of certainty associated with projects in Tier 1 can be reflected in the CEA and an update, in terms to the approach to tiering, will be presented in the Environmental Statement.

10.12.1.6 The specific projects scoped into this CEA and the Tiers into which they have been allocated, are outlined in Table 10.24. The projects included as operational in this assessment have been commissioned since the baseline studies for this project were undertaken and as such were excluded from the baseline assessment.

10.12.1.7 Other wind farms considered in the CEA have been defined by their distance from Hornsea Three and their potential to combine and interact with Hornsea Three. Given that all of the existing and proposed wind farms in the vicinity of Hornsea Three are, or will be, located offshore, there are no land forms or other physical structures to interrupt views. Consequently, a standard study area has been assigned to each wind farm broadly according to size. Using current established practice, Round 2 wind farms have been assumed to have a study area of 35 km, with the exception of Triton Knoll which has been assigned a 50 km study area due to the proposed height of turbines. Round 3 wind farms, which typically propose taller wind turbines than those in Round 2, have been assumed to have a study area of 50 km.

10.12.1.8 Only wind farms whose study areas overlap with the study area of Hornsea Three have been considered within this CEA. Table 10.24 below sets out the details of those wind farms which have been included in the CEA. Where potential hub and blade tip heights are yet to be finalised, the tallest available proposed blade tip heights have been used for the assessment, in line with the maximum design scenario approach employed throughout this PEIR.

10.12.1.9 A similar approach has been taken for the other projects within the SVIA study areas. However, as the other types of developments have considerably smaller structures, or use vessels that are much smaller in size than the offshore wind turbines, no ZTVs have been generated for these, barring the offshore HVAC booster stations. Aggregate sites have been allocated a 15 km buffer as these are attended by smaller vessels. The buffer size for these smaller structures is based on SNH's guidance on Visual Representation of Windfarms – Version 2 (SNH, 2017) where it recommends ZTVs distance from turbines/structures of up to 50 m high to have a 15 km radius. The vessels using the aggregate sites would not be perceptible beyond this distance. The assessment of significance has been made on proximity of receptor and whether or not there is a direct/indirect effect on the seascape character area within which Hornsea Three is located.

10.12.1.10 With the exception of Hornsea Project One and Hornsea Project Two, all other offshore wind farms considered in the cumulative assessment lie beyond the array SVIA study area for Hornsea Three. With the exception of Dudgeon all other offshore wind farms considered in the cumulative assessment lie beyond the offshore HVAC booster SVIA study area. The cumulative offshore wind farms with turbines above 130 m to tip have been allocated a 50 km radius study area from their outer turbines. The cumulative offshore wind farms with turbines less than 130 m to tip have been allocated a 35 km radius study area from their outer turbines. Where the SVIA study areas for Hornsea Three overlaps other offshore wind farms' study areas the projects have been included within this assessment. The study areas of Hornsea Project One, Hornsea Project Two, Triton Knoll, Race Bank, Dudgeon and Dogger Bank Creyke Beck A overlap the SVIA study areas of Hornsea Three.

10.12.2 Maximum design scenario

10.12.2.1 The maximum design scenarios identified in Table 10.25 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative impact presented and assessed in this section have been selected from the details provided in the Hornsea Three project description (volume 1, chapter 3: Project Description), as well as the information available on other projects and plans, in order to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), to that assessed here be taken forward in the final design scheme.

10.12.2.2 As part of this assessment recommendations within relevant guidelines have been adopted. These include GLVIA3, which identifies three types of cumulative effect (paragraph 7.3):

- *"Cumulative effects as 'the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together' (SNH, 2012:4);*
- *"Cumulative landscape effects as effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (SNH, 2012:10); and*
- *"Cumulative visual effects as effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint and/or sequential effects which occur when the observer has to move to another viewpoint to see different developments' (SNH, 2012:11)."*

10.12.2.3 Other guidance (DTI, 2005) identifies three main types of potential cumulative visual effect:

- Simultaneous visibility – where two or more schemes are visible from a fixed viewpoint in the same arc of view;
- Successive visibility – where two or more schemes are visible from a fixed viewpoint, but the observer is required to turn to see the different schemes; and
- Sequential visibility – where two or more schemes are not visible at one location, but would be seen as the observer moves along a linear route, for example, a ferry route.

10.12.2.4 The above terms have been applied throughout the assessment.

10.12.2.5 The locations and associated study areas for the offshore wind farms listed in Table 10.24 are illustrated on Figure 10.12 below. The CEA assumes that all the wind farms and other projects/plans listed in Table 10.24 will be present in the seascape together with Hornsea Three, although not all have been approved or construction started at the time of this assessment.

10.12.2.6 Visual effects experienced during the construction and decommissioning phases of the various cumulative schemes would be limited to views of construction/ decommissioning vessels, lights and other temporary infrastructure. The lack of certainty of the construction/decommissioning activities and programmes for the cumulative schemes which are currently within the planning system, limits the ability to carry out an accurate assessment. Cessation of disposal and aggregate operations will have no cumulative effects.

10.12.2.7 In assessing the cumulative impact of the proposals on both the NSCAs and the HSC areas it has also been necessary to take into account a wide range of cumulative projects, including planned oil and gas operations and applications for aggregate extraction. The locations of the oil and gas industry platforms and aggregates extraction infrastructure are illustrated in Figure 10.12 to Figure 10.14.

10.12.2.8 The addition of the offshore wind farms and the planned oil, gas and aggregate extraction operations, listed in Table 10.24, will, for the period of their existence, change this pattern, extending the offshore industry character into a number of areas that are currently designated as navigation.

Table 10.24: List of other projects and plans considered within the CEA.

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase
1	*Marine Aggregate Disposal*						
	Open	Humber 3 – 484	43 km	Aggregate Production Area operated by DEME Building Materials Ltd	N/A	No	Yes
	Open	Humber 4 – 490	19 km	Aggregate Production Area operated by DEME Building Materials Ltd	N/A	No	Yes
	Open	Humber 7 – 491	4 km	Aggregate Production Area operated by DEME Building Materials Ltd	N/A	No	Yes
	Open	Babbage	69 km	Disposal Site	N/A	No	No
	Open	Humber 4 and 7 – 506	13 km	Aggregate Production Area operated by DEME Building Materials Ltd	N/A	No	No
	Open	Humber 5 - 483	14 km	Aggregate Production Area operated by DEME Building Materials Ltd	N/A	No	No
	Energy						
	Approved	Dogger Bank Creyke Beck A	89 km	Up to 1,200 MW. (Up to 200 turbines of up to 10MW capacity).	2021 to 2024	Yes	Yes
	Under Construction	Dudgeon	87 km	20 miles off the coast of Cromer, N North Norfolk. 560 MW. 67 WTGs 402 MW.	2017	No	Yes
	Planned	East Anglia Four / Norfolk Vanguard	94 km	Up to 1,800 MW. (between 120 and 257 turbines of up to 7 to 15 MW capacity)	2020 to 2022	Yes	Yes
	Approved	Hornsea Project One	14 km	Up to 1,200 MW. Up to 240 5 to 8 MW turbines.	2017to- 2018	No	Yes
	Approved	Hornsea Project Two	20 km	Up to 300 6 to 15 MW turbines.	2017 to 2019	No	Yes
	Under Construction	Race Bank	114 km	Up to 580 MW	2017	No	Yes
	Operational	Scroby Sands	132 km	60 MW (30x2 MW turbines)	N/A	No	Yes
	Operational	Sheringham Shoal	109 km	316.8 MW (88x3.6 MW) Sheringham, Greater Wash 17 to 23 km off North Norfolk	N/A	No	Yes
	Consented	Triton Knoll	100 km	750-900 MW (113 to 288 8 MW turbines) Greater Wash. 20 miles off the coast of Lincolnshire and 28 miles from the coast of N Norfolk	2017 to 2021	Yes	Yes

Tier	Phase	Project/Plan	Distance from Hornsea Three	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase
	Oil and Gas						
	Discovery	44/28 – 3 Gas Field	17 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A
	Discovery	48/22 – 1 Oil Field	90 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A
	Discovery	48/22 – 4 Gas Field	89 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A
	Discovery	49/16 – 15 Gas Field	41 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A
	Discovery	49/18 – 5Z Gas Field	31 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A
	Discovery	49/21 – 10A Gas Field	65 km	Gas Discovery Well - Undeveloped	N/A	N/A	N/A

Table 10.25: Maximum design scenario considered for the assessment of potential cumulative impacts on SVIA.

Potential impact	Maximum design scenario	Justification
Construction phase		
As per Table 10.8. The cumulative impact upon present day seascape character, HSC and visual receptors when the construction of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations, cables and pipelines and applications for aggregate extraction.	*Tier 1* • Offshore wind farms (Hornsea Project One, Hornsea Project Two, Triton Knoll, Dogger Bank Creyke Beck A, Dudgeon, Race Bank, Scroby Sands, Sheringham Shoal and Norfolk Vanguard; • Aggregate extraction areas (483, 484, 490, 491, 506, 515/1/2 and Babbage); and • Oil and Gas (44/22, 44/28, 48/22, 49/16, 49/18 and 49/21).	Projects with overlapping construction and/or operation phases with Hornsea Three construction phase, resulting in maximum potential for impacts on the existing seascape character and HSC to interact cumulatively within the SVIA study areas and for direct effects on visual receptors. The longest construction times were selected and the maximum vessel presence has been assumed. The maximum number of turbines was selected because it would take a greater length of time to install the most numerous amounts of turbines and associated cabling. There would be a greater intrusion from the construction lighting from the greatest number of turbines.
Operation phase		
As per Table 10.8. The cumulative impact upon seascape character, HSC and visual receptors when the operation phase of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations, cables and pipelines and applications for aggregate extraction.	*Tier 1* • Offshore wind farms (Hornsea Project One, Hornsea Project Two, Triton Knoll, Dogger Bank Creyke Beck A and B, Dudgeon, Race Bank, Scroby Sands, Norfolk Vanguard and Sheringham Shoal; • Aggregate extraction areas (483, 484, 490, 491, 506, 515/1/2 and Babbage; and • Oil and Gas (44/22, 44/28, 48/22, 49/16, 49/18 and 49/21).	Projects with overlapping construction and/or operation phases with Hornsea Three, resulting in maximum potential for intrusion on the seascape character and HSC to interact cumulatively within the SVIA study areas and for direct effects on visual receptors. The maximum number of turbines was selected with the maximum number of warning lights. The maximum number of maintenance vessels and helicopters has been assumed.
Decommissioning phase		
As per Table 10.8. The cumulative impact upon seascape character, HSC and visual receptors when the decommissioning of Hornsea Three is considered together with the construction and operation of other planned nearby offshore wind farm projects, planned oil and gas operations, cables and pipelines and applications for aggregate extraction.	*Tier 1* • Offshore wind farms (Hornsea Project One, Hornsea Project Two, Triton Knoll, Dogger Bank Creyke Beck A, Dudgeon, Race Bank, Scroby Sands, Sheringham Shoal and Norfolk Vanguard; • Aggregate extraction areas (483, 484, 490, 491, 506, 515/1/2 and Babbage); and • Oil and Gas (44/22, 44/28, 48/22, 49/16, 49/18 and 49/21).	Projects with overlapping construction and/or operation phases with Hornsea Three decommissioning, resulting in maximum potential for impact on the existing seascape character and HSC to interact cumulatively within the SVIA study areas and for direct effects on visual receptors. The longest decommissioning times were selected, the maximum vessel presence has been assumed and the greatest noticeable lighting effect at night has been chosen.

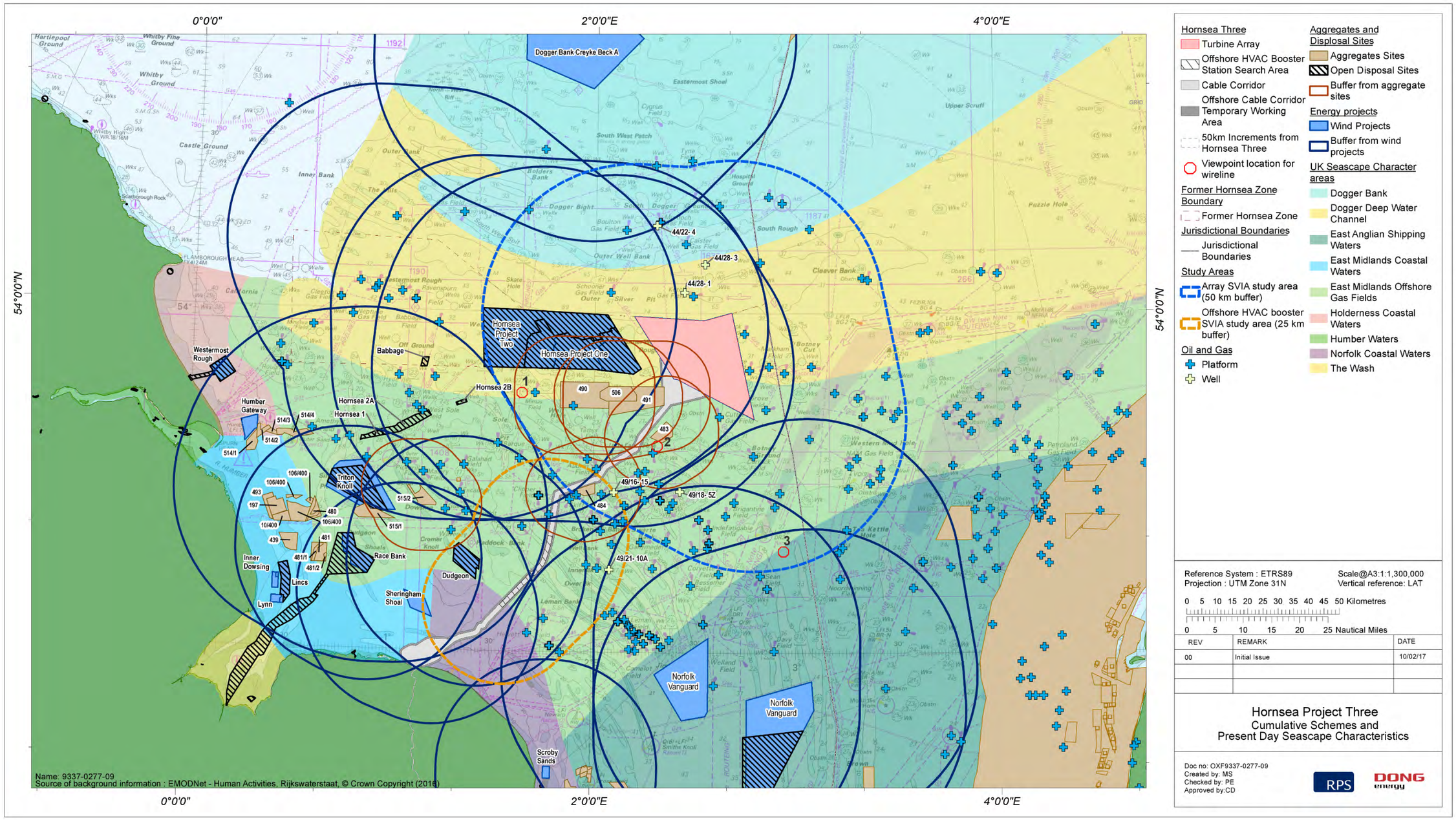

Figure 10.12: Other projects, plans and activities considered in the CEA and present day seascape characterisation.

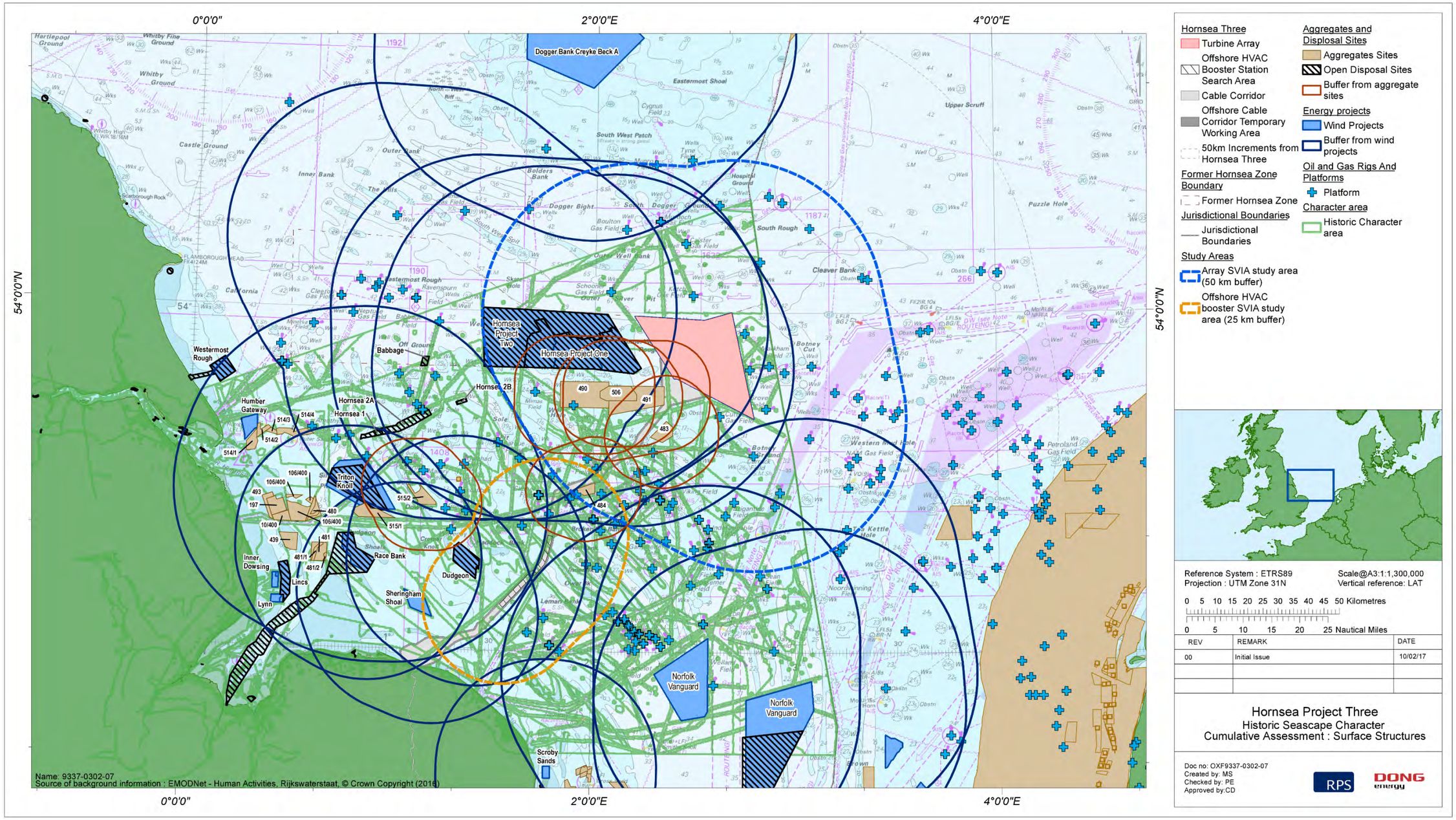

Figure 10.13: Other projects, plans and activities considered in the CEA and HSC: surface structures.

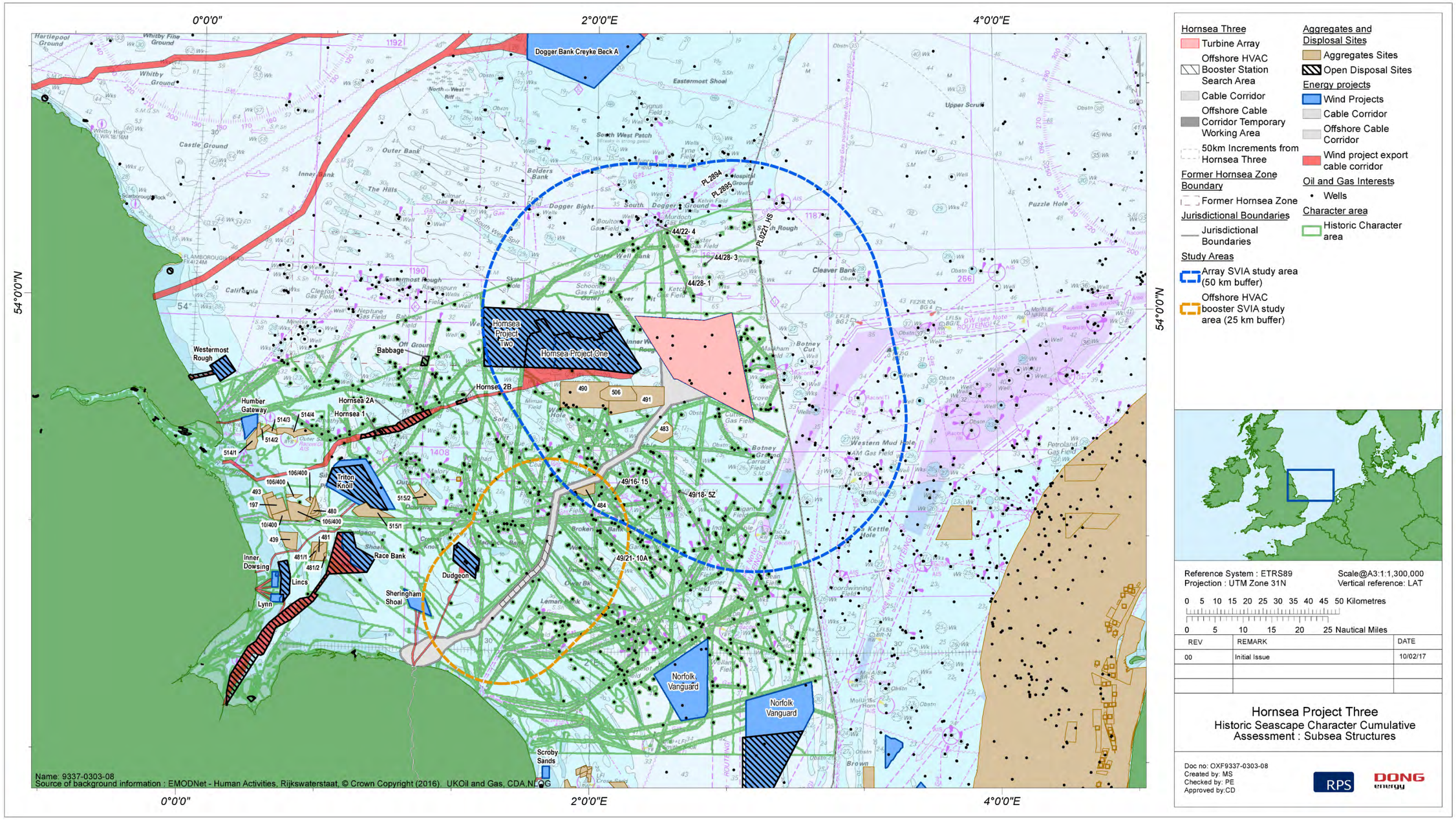

Figure 10.14: Other projects, plans and activities considered in the CEA and HSC: subsea structures.

10.13 Cumulative effect assessment

10.13.1.1 A description of the significance of cumulative effects upon seascape and visual resource receptors arising from each identified impact is given below.

10.13.2 Construction phase

The cumulative impact upon present day seascape character when the construction of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations and applications for aggregate extraction.

10.13.2.1 No significant adverse effects on seascape character and visual resources are predicted during the construction phase of Hornsea Three and therefore no detailed breakdown of individual receptors is presented within this chapter. This judgement is based on the outcome of the operational phase assessment which follows, where no significant effects have been identified.

Future Monitoring

10.13.2.2 No future monitoring of cumulative effects on seascape and visual receptors and visual receptors or the historic seascape is proposed for the construction phase.

10.13.3 Operation and maintenance phase

The cumulative impact upon present day seascape character when the operation and maintenance of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations and applications for aggregate extraction.

Tier 1

'Dogger Deep Water Channel' NSCA

10.13.3.1 Hornsea Three would be located adjacent to the west of Hornsea Project One and Hornsea Project Two, predominantly within the 'Dogger Deep Water Channel' NSCA. Hornsea Three has the potential to have a direct cumulative effect on this seascape character area (Figure 10.12).

10.13.3.2 Hornsea Project One and Hornsea Project Two, when complete, would introduce a new type of development into the 'Dogger Deep Water Channel' NSCA that would have an impact on the character area. The development of Hornsea Three would result in the intensification of this type of development within the 'Dogger Deep Water Channel' NSCA. The increased extent of development would be sufficient to create a new 'Dogger Deep Water Channel Offshore Wind Energy' seascape character sub-area. This would lead to an increased visual influence of built form within this currently *"monotonous and monochrome seascape character"* with *"a sense of disorientation due to lack of visual cues"*. These additional cumulative changes which would arise as a result of Hornsea Three would not have a significant effect on the 'Dogger Deep Water Channel' NSCA (Table 10.26).

10.13.3.3 The study areas of the Triton Knoll and Dogger Bank Creyke Beck A offshore wind farm developments overlap the Hornsea Three SVIA study areas within 'Dogger Deep Water Channel' NSCA. These cumulative wind farm schemes have the potential to have an indirect cumulative effect on this character area due to their distant influence. However, as these developments are all over 50 km from the Hornsea Three array area (Figure 10.12) the potential cumulative effect is not considered to be significant.

10.13.3.4 The study areas of the Dudgeon and Race Bank developments do not overlap the 'Dogger Deep Water Channel' NSCA. These developments are all over 50 km from the Hornsea Three array area (Figure 10.12) and Dudgeon and Race Bank have smaller turbines. It is not predicted that there will be any cumulative effects from these developments.

10.13.3.5 Oil and gas wells at 44/28 1 and 3 are planned in this character area to the north of Hornsea Three and would add to the existing cluster of infrastructure in this part of the character area. These would not be of sufficient scale to have a significant adverse effect on the character area.

10.13.3.6 There are three applications for aggregate extraction to the southwest of the Hornsea Three array area that have been made within this character area (Area 490, 491 and 506). As these are relatively large application areas, adjacent to each other and the closest to the Hornsea Three array area, there will be a higher level of effect than other aggregate extraction areas, but these are not considered to be significant, due to the intermittent nature of the extraction and the relatively low key nature of the activities.

10.13.3.7 Table 10.26 details the cumulative effects upon present day seascape character areas (NSCA).

Magnitude of Impact

10.13.3.8 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to range from **negligible to medium**.

Sensitivity of Receptor

10.13.3.9 The Dogger Deep Water Channel NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.10 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible to medium**. The effect will, therefore, be of **negligible to minor** adverse significance, which is not significant in terms of the SVIA methodology.

'East Midlands Offshore Gas Fields' NSCA

10.13.3.11 The Hornsea Three array area would be located partly within the 'East Midlands Offshore Gas Fields' NSCA and has the potential to have a direct cumulative effect on this seascape character area (Figure 10.12).

10.13.3.12 Triton Knoll, Race Bank and Dudgeon offshore wind farms, when complete, would introduce a new type of development into the southwest corner of the 'East Midlands Offshore Gas Fields' NSCA. The developments would be located much closer to the coastline than the Hornsea Three array area however, this would have an impact on the overall character area. Due to the considerable separation distance between the three cumulative schemes and the Hornsea Three array area and the relatively small scale of the offshore HVAC booster stations, the additional cumulative effect of adding Hornsea Three into the 'East Midlands Offshore Gas Fields' NSCA would not result in significant effects on the character area.

10.13.3.13 The export cables from Dudgeon, Race Bank and Triton Knoll offshore wind farms lie within this seascape character area. However, as the cumulative impact would be for the short period of the construction of the export cable only, the effects will not be significant.

10.13.3.14 The two applications for aggregate extraction to the southwest of the Hornsea Three array area comprise Area 490 and 491 and would have a direct impact on the 'East Midlands Offshore Gas Fields' NSCA. Other aggregate extraction areas to the southwest of the Hornsea Three array area include Area 483, 484, 492 and 515/1/2. The relatively low key nature of the activities within the overall large extent of seascape would result in a minimal intensification of development in the character area. The Hornsea Three array area would be located in the northeast corner of the character area. The Hornsea Three array area, during both construction and operation, would form a large new development within the character area, within the context of the intermittent aggregate extraction activities. Activities at these locations would not be of sufficient scale to result in significant cumulative effects when combined with the Hornsea Three array area, offshore HVAC booster stations or Hornsea Three offshore cable corridor.

10.13.3.15 Oil and gas wells at 49/16, 49/18 and 49/21 are planned in this character area to the southwest of Hornsea Three array area and in the northern part of the offshore HVAC booster SVIA study area, and would add to the existing concentration of infrastructure in this part of the character area. These would not be of sufficient scale to have a significant adverse effect on the character area.

10.13.3.16 Table 10.26 details the cumulative effects upon present day seascape character areas (NSCA).

Magnitude of Impact

10.13.3.17 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to range from **negligible to medium**.

Sensitivity of Receptor

10.13.3.18 The East Midlands Offshore Gas Fields NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.19 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible to medium**. The effect will, therefore, be of **negligible to minor** adverse significance, which is not significant in terms of the SVIA methodology.

'Norfolk Coastal Waters' NSCA

10.13.3.20 The Dudgeon offshore wind farm, when complete, would introduce a new type of development into the northern edge of the 'Norfolk Coastal Waters' NSCA. The existing Sherringham Shoal offshore wind farm is of a similar scale and lies on the western edge of the character area. These wind energy schemes would have a direct effect and influence over the character area. The offshore HVAC booster stations and Hornsea Three offshore cable corridor would be located in the 'Norfolk Coastal Waters' NSCA. The limited scale and extent of the Hornsea Three construction activities and infrastructure during the operational phase would result in negligible additional direct effects on the character area and would not be sufficient to result in significant cumulative effects on seascape character.

Magnitude of Impact

10.13.3.21 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to range from **negligible to low**.

Sensitivity of Receptor

10.13.3.22 The Norfolk Coastal Waters NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.23 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible to low**. The effect will, therefore, be of **negligible to minor** adverse significance, which is not significant in terms of the SVIA methodology.

'East Midlands Coastal Waters' NSCA

10.13.3.24 Extensions to offshore wind farms at Inner Dowsing and Lynn, as well as the existing wind farms at Lincs and Sherringham Shoal would form the main cumulative development context within this character area. Aggregate extraction Areas 106/400, 197, 439, 480, 481/1/2, 493 and 514/1 lie within the northern half of this character area. The Hornsea Three offshore cable corridor construction activities would be located in the 'East Midlands Coastal Waters' NSCA. The additional direct, temporary effects arising from construction activities would be relatively low key and intermittent in the northeastern corner of this character area and would not be sufficient to result in significant cumulative effects. There would be no Hornsea Three operational phase direct effects on this character area.

10.13.3.25 The Hornsea Project Two offshore cable corridor construction activities would be located in the northern part of the 'East Midlands Coastal Waters' NSCA. The additional direct, temporary effects arising from Hornsea Three offshore cable corridor construction activities would be relatively low key and intermittent in the south-eastern corner of this character area and would not be sufficient to result in significant cumulative effects.

Magnitude of Impact

10.13.3.26 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to range from **negligible to low**.

Sensitivity of Receptor

10.13.3.27 The East Midlands Coastal Waters NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.28 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible to low**. The effect will, therefore, be of **negligible to minor** adverse significance, which is not significant in terms of the SVIA methodology.

'Dogger Bank' NSCA

10.13.3.29 Dogger Bank Creyke Beck A offshore wind farm is situated within the 'Dogger Bank' NSCA and would comprise a large scale development within the seascape. Hornsea Project One and Hornsea Project Two array areas would lie approximately 20 km south of the NSCA, further influencing the context of this seascape. The study area of the wind farms overlaps with that of the array SVIA study area, within the 'Dogger Bank' NSCA. Indirect cumulative effects on the character of the seascape would occur within a large expanse of the southern part of the character area. However, due to the distance between the Dogger Bank projects and Hornsea Three (over 70 km), the addition of the Hornsea Three array area to the cumulative baseline would not result in significant cumulative effects on the NSCA.

10.13.3.30 The Oil well at 44/22 is planned in this character area to the north of the Hornsea Three array area and would add to the existing cluster of infrastructure in this part of the character area. These would not be of sufficient scale to have a significant adverse effect on the character area.

Magnitude of Impact

10.13.3.31 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of Receptor

10.13.3.32 The Dogger Bank NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.33 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible** adverse significance, which is not significant in terms of the SVIA methodology.

10.13.3.34 Table 10.26 details the cumulative effects upon present day seascape character areas (NSCA).

'East Anglia Shipping Waters' NSCA

10.13.3.35 Norfolk Vanguard offshore wind farm is situated within the 'East Anglia Shipping Waters' NSCA and would comprise a large scale development within the seascape. The study areas of the wind farms overlaps with that of the array SVIA study area, within the 'East Anglia Shipping Waters' NSCA. Indirect cumulative effects on the character of the seascape would occur within a large expanse of the northern part of the character area. However, due to the distance between the Norfolk Vanguard project and Hornsea Three (over 50 km), the addition of the Hornsea Three array area to the cumulative baseline would not result in significant cumulative effects on the NSCA.

Magnitude of Impact

10.13.3.36 The impact is predicted to be of national spatial extent, long term duration, continuous or intermittent and high reversibility. It is predicted that the impact will affect the receptor directly or indirectly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of Receptor

10.13.3.37 The East Anglia Shipping Waters NSCA is deemed to be of low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of Effect

10.13.3.38 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **negligible**. The effect will, therefore, be of **negligible** adverse significance, which is not significant in terms of the SVIA methodology.

Future Monitoring

10.13.3.39 No future monitoring of cumulative effects on seascape and visual receptors and visual receptors or the historic seascape is proposed for the operation and maintenance phase.

10.13.3.40 Table 10.26 details the cumulative effects upon present day seascape character area (NSCA).

10.13.4 Decommissioning phase

10.13.4.1 The cumulative impact upon present day seascape character when the decommissioning of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations, applications for aggregate extraction and construction of pipelines and cables.

10.13.4.2 No significant adverse effects on seascape character and visual resources are predicted during the decommissioning phase of Hornsea Three and therefore no detailed breakdown of individual receptors is presented within this chapter. This judgement is based on the outcome of the operational phase assessment above, where no significant effects have been identified.

Future monitoring

10.13.4.3 No future monitoring of cumulative effects on seascape and visual receptors or the historic seascape is proposed for the decommissioning phase.

The cumulative impact upon HSC when the construction and operation of Hornsea Three is considered together with the construction and operation of other planned nearby wind farm projects, planned oil and gas operations and applications for aggregate extraction.

10.13.4.4 A substantial proportion of the 'East Yorkshire to Norfolk' HSC Area 2 is classified as having a BCT of 'Fishing'. The remaining portions of the offshore area retain 'Navigation' and 'Industry' BCTs, notwithstanding the presence of aggregates extraction, cables, pipelines, oil and gas platforms and disposal sites. The proposed offshore wind developments in the area have the potential to enlarge the proportion of the area that will be perceived as 'Industry'. This includes the nearby Hornsea Project One and Hornsea Project Two, where the character of the array areas and the offshore cable corridor is dominated by 'Navigation' and 'Fishing' and where the 'Renewable Energy Installation (Wind)' HCS will be introduced. Hornsea Three would have a broadly similar character, although the Hornsea Three offshore cable corridor passes through a different part of the North Sea, to the south of those for Hornsea Project One and Hornsea Project Two.

10.13.4.5 The cumulative effect of construction and operation of Hornsea Three will therefore result in a further change to the HSC of the region at a time when a number of other such impacts from offshore developments are taking place. The long term effects of these changes, in particular wind farms are, to a large extent, reversible given the time-limited nature of these developments.

10.13.4.6 On this basis the magnitude of operational change would be **medium** on receptors of low vulnerability, high recoverability and regional value. The sensitivity of the receptors is considered to be **low**. The effect will be of **minor** significance in terms of the overall effect of these developments on the HSC of the area, the cumulative effects are not considered to be significant.

Table 10.26: Cumulative effects upon present day national seascape character areas.

Present day seascape character area (NSCA)	Sensitivity to proposed change	Nature of impact and frequency	Description of cumulative impact	Additional magnitude of cumulative operational change	Additional significance of cumulative effect on character area
'Dogger Deep Water Channel'	Low	Direct Continuous and intermittent	Offshore wind farms: Hornsea Project One and Hornsea Project Two. Planned oil and gas operations: 44/28 is planned for this character area. Aggregate extraction application areas: Application Areas 490, 491 and 506 are planned for this character area and the Babbage Area will continue to be active. Cables and pipelines: None of relevance planned in this character area.	Medium	Combined effect Minor
		Indirect Continuous and intermittent	Offshore wind farms: Areas of influence of Triton Knoll and Dogger Bank Creyke Beck A offshore wind farms overlap with that of the array SVIA study area within this character area. Aggregate extraction application areas: Areas of influence of aggregate extraction application Area 483 overlaps that of Hornsea Three in this seascape character area.	Negligible	Combined effect Negligible
'East Midlands Offshore Gas Fields'	Low	Direct Continuous and intermittent	Offshore wind farms: Triton Knoll, Race Bank and Dudgeon. Planned oil and gas operations: 49/16, 49/18 and 49/21 are planned for this character area. Aggregate extraction application areas: Application Areas 480, 481, 483, 484, 490, 491, 492, 515/1 and 515/2, are planned for this character area. Cables and pipelines: None of relevance planned in this character area.	Medium	Combined effect Minor
		Indirect Continuous and intermittent	Offshore wind farms: The study areas of Hornsea Project One and Hornsea Project Two overlap with that of the array SVIA study area within this NSCA. Aggregate extraction application areas: Areas 506 and Babbage study areas overlap with this character area, although there would be no direct intervisibility with the offshore HVAC booster SVIA study areas.	Negligible	Combined effect Negligible
'Norfolk Coastal Waters' *NSCA*	Low	Direct Continuous and intermittent	Offshore wind farms: Dudgeon. Planned oil and gas operations: None of relevance planned in character area. Aggregate extraction application areas: None of relevance planned in character area. Cables and pipelines: None of relevance planned in character area.	Low	Combined effect Minor
		Indirect Continuous and intermittent	Offshore wind farms: The study areas of Triton Knoll and Race Bank overlap with that of the array SVIA study area within this NSCA. Sherringham Shoal and Scroby Sands will continue to be operational. Aggregate extraction application areas: Area 515/2 study area overlaps with this character area.	Negligible	Combined effect Negligible

Present day seascape character area (NSCA)	Sensitivity to proposed change	Nature of impact and frequency	Description of cumulative impact	Additional magnitude of cumulative operational change	Additional significance of cumulative effect on character area
'East Midlands Coastal Waters' NSCA	Low	Direct Continuous and intermittent	Offshore wind farms: Extensions to Inner Dowsing and Lynn, and Lincs and Sherringham Shoal will continue to be operational. Planned oil and gas operations: None planned in character area. Aggregate extraction application areas: Areas 106/1/2/3, 197, 400, 439, 480, 481/1/2, 493 and 514/1 lie within the character area. Cables and pipelines: None of relevance planned in character area.	Low	Combined effect Minor
		Indirect Continuous and intermittent	Offshore wind farms: The study areas of Triton Knoll, Race Bank and Dudgeon overlap with that of the array SVIA study area within this NSCA. Aggregate extraction application areas: Area 514/1/2/3 and 515/1 study areas overlap with this character area, although there would be no direct intervisibility with the offshore HVAC booster SVIA study areas.	Negligible	Combined effect Negligible
'Dogger Bank'	Low	Indirect Continuous and intermittent	Offshore wind farms: The study areas of Hornsea Project One, Hornsea Project Two and Dogger Bank Creyke Beck A and B and Dogger Bank Teesside A and B overlap that of the array SVIA study area in this character area. Planned oil and gas operations: 44/22 planned in character area. Aggregate extraction application areas: Application Areas 485/1 and 485/2 are planned for this character area, although there would be no direct intervisibility with the array SVIA study area. Cables and pipelines: None of relevance planned in this character area.	Negligible	Combined effect Negligible
East Anglia Shipping Waters	Low	Indirect Continuous and intermittent	Offshore wind farms: The study area of Norfolk Vanguard overlaps that of the array SVIA study area in this character area. Planned oil and gas operations: None or relevance planned in character area. Aggregate extraction application areas: None of relevance planned in character area. Cables and pipelines: None of relevance planned in character area.	Negligible	Combined effect Negligible

The cumulative impact upon visual receptors when the construction and operation of Hornsea Three is considered together with the construction and operation of other planned nearby offshore wind farm projects, planned oil and gas operations and applications for aggregate extraction.

10.13.4.7 The assessment of cumulative impacts upon visual receptors was informed by the preparation of cumulative wirelines from three selected viewpoints along the Newcastle to Amsterdam ferry route and the proposed deviated route:

- Viewpoint 1: Located 45 km to the west of the Hornsea Three array area;
- Viewpoint 2: Located 23 km to the southwest of the Hornsea Three array area; and
- Viewpoint 3: Located 45 km to the south of the Hornsea Three array area.

10.13.4.8 The locations of these sample viewpoints are illustrated on Figure 10.12 Viewpoints 2 and 3 are located along the existing cruise ferry route, whilst the location of Viewpoint 1 allows for the proposed diversion south of Hornsea Project Two (see Figure 10.12).

10.13.4.9 These sample viewpoints were selected as representative of cumulative views likely to be experienced at different distances and with different directions of view from the Hornsea Three array area by receptors of up to medium sensitivity. The height of the deck (26.5 m above LAT) on the principal viewing deck of the cruise ferry is more elevated than that likely to be available for smaller vessels, for example those using the more distant RYA cruising routes. This greater elevation increases the potential visibility of the Hornsea Three array area and other developments.

10.13.4.10 There are two sailings between Newcastle and Amsterdam each day. Table 10.7 gives the times of the crossings and the estimated times when they would pass through the array SVIA study area. The Newcastle to Amsterdam crossing will pass through the array SVIA study area during hours of darkness, except during high summer when the first part of the crossing from Amsterdam of the array SVIA study area will be undertaken at dusk.

10.13.4.11 During the hours of darkness the principal visual effect would be that of the lighting associated with the turbines. In order to fully represent the range of likely cumulative visual effects from a range of visual receptors which could be passing these sample locations (e.g. fishing or commercial vessels), a description is provided in Table 10.27 of the available views during daylight hours.

10.13.4.12 Four wirelines from each of the three sample viewpoints have been prepared, each covering a 90 degree FOV (north, east, south and west) to cover the full 360 degree arc of views (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).

10.13.4.13 Table 10.27 describes the simultaneous and successive effects for each of the three sample viewpoints during both the day and night. The daytime cumulative effects on the sample viewpoints are assessed as not significant. The night time cumulative effects on the sample viewpoints are also assessed as not being significant.

10.13.4.14 Planned oil and gas operations and applications for aggregate extraction have been considered, where relevant, as part of the assessment of impacts on visual receptors at Viewpoints 1, 2 and 3, (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines), however these were concluded to be too distant to give rise to a cumulative impact with Hornsea Three.

10.13.4.15 In addition to the three sample views discussed in Table 10.27 above, passengers and workers on the cruise ferry would have continuous night time views, from within a large part of the array SVIA study area, of some or all of the lights associated with Hornsea Three. The magnitude and extent of the view would necessarily vary with the relative location of the vessel to the wind turbines and the final specification of aviation and navigation lighting.

10.13.4.16 For most locations along the ferry route, views of wind farm development within the Hornsea Three array area would be limited to a proportion of the 360 degree view.

10.13.4.17 Passengers and workers on the ferry would not, for the most part, experience a sequential impact (where individual wind farms are viewed separately) rather they would experience a continuous visual effect spread over the journey throughout most of the array SVIA study area. As an indication of how long this effect could be experienced, the time taken to travel through the whole of the array SVIA study area by the cruise ferries at cruising speed is calculated to be three hours. To put this in context, the total typical length of the ferry journey from Newcastle to Amsterdam is around 15 hours and 30 minutes. These views would be experienced during the hours of darkness for most of the year (Table 10.6).

Magnitude of impact

10.13.4.18 The impact is predicted to be of regional extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude varies with distance from Hornsea Three and is considered to be **negligible** to **medium** dependent on the distance from the Hornsea Three array area, in combination with other wind farms and developments. Impacts would generally be experienced at night, with very limited opportunities for daytime views in mid-summer.

Sensitivity

10.13.4.19 Passengers are deemed to be of medium vulnerability, high recoverability and regional value. The sensitivity of the receptor to the proposed wind farm, in combination with other wind farms and developments, is considered to be **medium**. Workers are deemed to be of low vulnerability, high recoverability and regional value. The sensitivity of the receptor to the proposed wind farm is considered to be **low**.

Table 10.27: Simultaneous and successive cumulative effects from permanent surface structures on receptors on ferries at sample viewpoints [a].

Viewpoint location (Figure 10.4)1	Sensitivity to proposed change	Cumulative and operational wind farms theoretically visible	Description of cumulative visual impacts with other offshore wind farms	Magnitude of change	Simultaneous visibility from viewpoint	Successive visibility from viewpoint	Significance of night time visual effect at the viewpoint	Significance of daytime cumulative visual effect at the viewpoint
Sample Viewpoint 1 - 45 km to the west of Hornsea Three (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One, Hornsea Project Two, Triton Knoll and Dudgeon.	Hornsea Project One and Hornsea Project Two would be features predominantly in the northern and/or eastern aspect of the views. The flashing red aviation and flashing yellow navigation lights of the Hornsea Three array area may be visible in clear conditions.	N/A (daytime) Negligible to Low (night time).	Yes. Across the northern and part of the eastern quadrants.	No. Views are simultaneous forming one continuous sweep of wind turbines across part of the 360 degree view.	Negligible to Minor	Negligible or N/A (where night time views only)
1a) Northern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One and Hornsea Project Two	Hornsea Project One and Hornsea Project Two prominent across whole quadrant of view. Dogger Bank Creyke Beck A wind turbines too distant to be perceptible. Hornsea Three array area not in view.	None	N/A	N/A	N/A	N/A (Night time views only)
1b) Eastern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One	Hornsea Project One occupies part of this view. The majority of the Hornsea Three array area would be distantly visible.	N/A (daytime) Negligible (night time).	Yes.	No	Negligible	N/A (Night time views only)
1c) Southern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Dudgeon.	Dudgeon would be barely perceptible. Hornsea Three array area not in view.	None	N/A	N/A	N/A	N/A (Night time views only)
1d) Western quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Triton Knoll.	Babbage would be prominent in view. Triton Knoll would be barely perceptible. Hornsea Three array area not in view.	None	N/A	N/A	N/A	N/A (Night time views only)
Sample Viewpoint 2 – 23 km to the southwest of Hornsea Three (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One and Hornsea Project Two.	The turbines of Hornsea Project One and Project Two would form prominent features across the northern section of the view and part of the eastern and western quadrants. The flashing red aviation and flashing yellow navigation lights of the Hornsea Three array area may be visible in clear conditions. However, weather conditions and intensity of the proposed light sources may limit or prevent views.	N/A (daytime) None to Medium (night time)	Yes. Across the northern and part of the eastern quadrants.	No. Views are simultaneous forming one continuous sweep of wind turbines across part of the 360 degree view.	None to Moderate	N/A (Night time views only)
4a) Northern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One and Hornsea Project Two.	The turbines of Hornsea Project One and Hornsea Project Two would form prominent although distant features across part of this quadrant of the view. Hornsea Three array area would be visible and prominent across the majority of this view.	N/A (daytime) Medium (night time)	Yes. Across the whole of the northern quadrant.	No. Views are simultaneous forming one continuous sweep of wind turbines across the whole of the 90 degree view.	Moderate	N/A (Night time views only)

Viewpoint location (Figure 10.4)1	Sensitivity to proposed change	Cumulative and operational wind farms theoretically visible	Description of cumulative visual impacts with other offshore wind farms	Magnitude of change	Simultaneous visibility from viewpoint	Successive visibility from viewpoint	Significance of night time visual effect at the viewpoint	Significance of daytime cumulative visual effect at the viewpoint
4b) Eastern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	The western part of the Hornsea Three array area would be visible across part of this quadrant of view.	None	No. Not in this quadrant.	No. Not in this quadrant.	N/A	N/A
4c) Southern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	No wind farms would be visible.	None	No. Not in this quadrant.	No. Not in this quadrant.	N/A	N/A
4d) Western quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	Hornsea Project One and Hornsea Project Two.	The turbines of Hornsea Project One and Hornsea Project Two would form prominent although distant features across part of this quadrant of the view.	None	No. Not in this quadrant.	No. Not in this quadrant.	N/A	N/A
Sample viewpoint 3 – 45 km to the south of Hornsea Three (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	The flashing yellow navigation lights of the Hornsea Three array area may be visible in clear conditions. No cumulative schemes would be visible.	Negligible (daytime) Negligible (night time).	No.	No.	N/A	N/A
6a) Northern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	The majority of the Hornsea Three array area would theoretically be distantly visible at dusk during the summer and at night.	Negligible (daytime) Negligible (night time).	No.	No.	N/A	N/A
6b) Eastern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	No turbines visible.	N/A	N/A	N/A	N/A	N/A
6c) Southern quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	No turbines visible.	N/A	N/A	N/A	N/A	N/A
6d) Western quadrant - (volume 5, annex 10.3: Seascape and Visual Resources Cumulative Wirelines).	Low (workers) or Medium (passengers)	None.	No turbines visible.	N/A	N/A	N/A	N/A	N/A

a For each viewpoint location (1, 2 and 3) the first row (grey row) represents the overall cumulative impact assessment for receptors at the viewpoint. Subsequent rows (white rows) represent the cumulative impact assessment for the northern, eastern, southern and western quadrants of the 360 degree view.

Significance of effect

10.13.4.20 The significance of effects experienced by passengers on board commercial ferries or cruise liners, generally during the night will range from **negligible** to **moderate** and workers would be **negligible**. The range of significance varies depending primarily on the receptors' proximity to the turbine array. Those receptors of medium sensitivity that are closest to the turbine array, will experience moderate effects on views, which are not significant. These effects would be transient in nature, although would be experienced for a relatively long period of the overall journey.

10.14 Transboundary Effects

10.14.1.1 A screening of transboundary impacts has been carried out and is presented in annex 5.5: Transboundary Impacts Screening Note. This screening exercise identified that there was no potential for significant transboundary effects with regard to seascape and visual receptors or the historic seascape from Hornsea Three upon the interests of other EEA States.

10.15 Inter-related Impacts

10.15.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the project (construction, operational and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. visual impact from construction activities, the operational presence of turbines and decommissioning activities); and
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on seascape and visual resources, such as direct impacts of seascape character areas, may interact to produce a different or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

10.15.1.2 A description of the likely inter-related effects arising from Hornsea Three on seascape and visual resources is provided in chapter 11: Inter-Related Effects (Offshore).

10.16 Conclusion and summary

10.16.1.1 The above assessment found that all effects arising from the development of Hornsea Three are unlikely to be greater than moderate, which is not significant in EIA terms. Any close range views of Hornsea Three would be transitory and would be for a relatively small proportion of the overall length of the likely journey and experienced in the context of other wind turbines within the seascape. The Hornsea Three array area would be seen in the context of oil and gas platforms as well as commercial cargo, fishing and other vessels. The combined impact of a series of moderate level effects are not considered sufficient to result in a significant sequential visual effect for any of the receptor identified. At night the lights of the Hornsea Three array area would be seen in the context of existing light sources, such as navigation aids. It is considered unlikely that there would be significant effects during the construction and the decommissioning phases of the project.

10.17 Next Steps

10.17.1.1 Currently there are no foreseeable requirements to undertake further baseline or assessment work that would inform the findings within this chapter.

Table 10.28: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Construction Phase							
The temporary change to the existing present day seascape character through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.	N/A	Negligible to Medium	Low	Negligible to Minor (not significant in terms of SVIA methodology)	None	N/A	None
The temporary change to the existing HSC through the introduction of new or uncharacteristic elements/features during the construction phase may cause direct or indirect effects.	N/A	Low	Low	Minor (not significant in terms of SVIA methodology).	None	N/A	None
The day time temporary change in the existing visual resource during the construction phase may cause effects experienced by a variety of visual receptors.	N/A	Negligible to high	Low of medium	Negligible to Moderate (not significant in terms of SVIA methodology)	None	N/A	None
The night time temporary change in the existing visual resource during the construction phase may cause effects experienced by a variety of visual receptors.	N/A	Negligible to high	Low of medium	Negligible to Moderate (not significant in terms of SVIA methodology)	None	N/A	None
Operation Phase							
The existing present day seascape character may change during the operational phase through the introduction of new or uncharacteristic elements/features.	N/A	Negligible to medium	Low	Negligible to Minor (not significant in terms of SVIA methodology).	None	N/A	None
The existing HSC may change during the operational phase through the introduction of new or uncharacteristic elements/features.	N/A	Low	Low	Minor (not significant in terms of SVIA methodology).	None	N/A	None
The day time long term change in the existing visual resource during the operational phase may cause effects experienced by a variety of visual receptors.	N/A	Negligible to high	Low to medium	Negligible to Moderate (not significant in terms of SVIA methodology)	None	N/A	None
The night time long term change in the existing visual resource during the operational phase may cause effects experienced by a variety of visual receptors.	N/A	Negligible to high	Low to medium	Negligible to Moderate (not significant in terms of SVIA methodology)	None	N/A	None
Decommissioning Phase							
Decommissioning of Hornsea Three array area, the offshore cable corridor and the offshore HVAC booster stations may change seascape character and HSC. It may also affect visual receptors.	N/A	Negligible to high	Low to medium	Negligible to Moderate (not significant in terms of SVIA methodology)	None	N/A	None

10.18 References

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