



Hornsea Project Four: Environmental Statement (ES)

PINS Document Reference: A2.10
APFP Regulation: 5(2)(a)

Volume A2, Chapter 10: Seascape, Landscape and Visual Resources

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Document no. A2.10
Version B

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Glossary

Term	Definition
Commitment	A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Four.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement.
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current, whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current, whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape effects	Effects on the landscape as a resource in its own right.

Term	Definition
Mitigation	A term used interchangeably with Commitment(s) by Hornsea Four. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, PEIR, or ES).
Order Limits	The limits within which Hornsea Four (the 'authorised project') may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Visual amenity	The overall pleasantness of the views people enjoy within their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating or travelling through an area.
Visual effects	Effects on specific views and on the general visual amenity experienced by people.

Acronyms

Acronym	Definition
AfL	Agreement for Lease
AIS	Automatic Identification Systems
AONB	Area of Outstanding Natural Beauty
CAA	Civil Aviation Authority
CEA	Cumulative Effects Assessment
DCO	Development Consent Order
ECC	Export Cable Corridor
EEA	European Economic Area
EIA	Environmental Impact Assessment
ERUA	East Riding Unitary Authority
ERYC	East Riding of Yorkshire Council
ES	Environmental Statement
FHHC	Flamborough Headland Heritage Coast
GLVIA3	Guidelines for Landscape and Visual Impact Assessment 3rd Edition
HSC	Historic Seascape Character
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
IPC	Infrastructure Planning Commission (now replaced by PINS)
IPCC	Intergovernmental Panel on Climate Change
LAT	Lowest Astronomical Tide
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LI	Landscape Institute
LPA	Local Planning Authority

Acronym	Definition
LSE	Likely Significant Effect
LUC	Land Use Consultants
LVIA	Landscape and Visual Impact Assessment
MCA	Marine Character Area
MCZ	Marine Conservation Zone
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Plan Areas
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Project
OPEN	Optimised Environments Limited
OS	Ordnance Survey
OSS	Offshore Substation
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PRoW	Public Right of Way
RYA	Royal Yachting Association
SCA	Seascape Character Area
SLVR	Seascape, Landscape and Visual Resources
SNH	Scottish Natural Heritage
SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SVIA	Seascape and Visual Impact Assessment
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility

Units

Unit	Definition
km	Kilometre
m	Metre

10.1 Introduction

- 10.1.1.1 Orsted Hornsea Project Four Limited (hereafter the 'Applicant') is proposing to develop the Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km from the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone (please see [Volume A1, Chapter 1: Introduction](#) for further details on the Hornsea Zone). Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network (please see [Volume A1, Chapter 4: Project Description](#) for full details on the Project Design).
- 10.1.1.2 The Hornsea Four Agreement for Lease (AfL) area was 846 km² at the Scoping phase of project development. In the spirit of keeping with Hornsea Four's approach to Proportionate Environmental Impact Assessment (EIA), the project has given due consideration to the size and location (within the existing AfL area) of the final project that is being taken forward to Development Consent Order (DCO) application. This consideration is captured internally as the "Developable Area Process", which includes Physical, Biological and Human constraints in refining the developable area, balancing consenting and commercial considerations with technical feasibility for construction.
- 10.1.1.3 The combination of Hornsea Four's Proportionality in EIA and Developable Area Process has resulted in a marked reduction in the array area taken forward at the point of DCO application. Hornsea Four adopted a major site reduction from the array area presented at Scoping (846 km²) to the Preliminary Environmental Information Report (PEIR) boundary (600 km²), with a further reduction adopted for the Environmental Statement (ES) and DCO application (468 km²) due to the results of the PEIR, technical considerations and stakeholder feedback. The evolution of the Hornsea Four Order Limits is detailed in [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#) and [Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure](#).
- 10.1.1.4 This chapter of the Environmental Statement (ES) presents the results of the EIA for the potential impacts of Hornsea Four (namely the Hornsea Four array area and the offshore Export Cable Corridor (ECC)) on the Seascape, Landscape and Visual Resource (SLVR). Specifically, this chapter considers the potential impact of Hornsea Four seaward of Mean High Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases. A separate Landscape and Visual Impact Assessment (LVIA) ([Volume A3, Chapter 4: Landscape and Visual](#)) has been prepared for the onshore elements of Hornsea Four landward of Mean Low Water Springs (MLWS). The receptors covering the tidal range at the coast (i.e. between MLWS and MHWS) are included in both the LVIA and the SLVR assessments.
- 10.1.1.5 The effects on Historic Seascape Character (HSC) are assessed in [Chapter 9: Marine Archaeology](#). However, the SLVR includes consideration of the sea surface elements of the HSC as part of the baseline characterisation and assessment of the effects on Marine Character Areas (MCAs) set out in [Section 10.7.1](#).

10.2 Purpose

- 10.2.1.1 The primary purpose of this ES is to support the DCO application for Hornsea Four under the Planning Act 2008 (the 2008 Act).
- 10.2.1.2 The ES has been finalised following completion of pre-application consultation (see **B1.1: Consultation Report** and **Table 10.3**) and will accompany the application to the Planning Inspectorate (PINS) for Development Consent.
- 10.2.1.3 This ES chapter:
 - Summarises the existing environmental baseline established from desk studies and consultation;
 - Presents the potential environmental effects on the seascape, landscape and visual resource arising from Hornsea Four, 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 Planning and Policy Context

- 10.3.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to the seascape, landscape and visual resource, 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).
- 10.3.1.2 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** below.

Table 10.1: Summary of NPS EN-1 and EN-3 provisions relevant to seascape, landscape and visual resources.

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p>Paragraph 5.9.5 of EN-1 advises that <i>“The applicant should carry out a landscape and visual assessment and makes reference to the following documents: Landscape Institute and Institute of Environmental Management and Assessment (2002, 2nd edition): Guidelines for Landscape and Visual Impact Assessment; and Land Use Consultants (2002): Landscape Character Assessment – Guidance for England and Scotland.”</i></p>	<p>This SLVR assessment has been prepared following the updated versions of these documents.^{1,2}</p>

¹ The Guidelines for Landscape and Visual Impact Assessment' (GLVIA) (2002, 2nd edition) has been superseded by GLVIA 3rd edition.
² Landscape Character Assessment – Guidance for England and Scotland has been superseded by Natural England's 'An Approach to Landscape Character Assessment'.

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p>Paragraph 5.9.5 of EN-1 advises that <i>“The landscape and visual assessment should include reference to any landscape character assessment (LCA) and associated studies as a means of assessing landscape impacts relevant to the proposed project. The applicant’s assessment should also take account of any relevant policies based on these assessments in local development documents in England.”</i></p>	<p>Relevant published character assessments and policies are referred to in Section 10.7.1.</p>
<p>Paragraph 5.9.6 of EN-1 advises that <i>“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.”</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.7 of EN-1 advises that <i>“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.”</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.9 of EN-1 advises that <i>“National Parks, the Broads and Areas of Outstanding Natural Beauty (AONBs) have been confirmed by the Government as having the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure their continued protection and which the Infrastructure Planning Commission (IPC) [hereafter the Secretary of State (SoS)] should have regard to in its decisions. The conservation of the natural beauty of the landscape and countryside should be given substantial weight by the SoS in deciding on applications for development consent in these areas.”</i></p>	<p>No part of the Hornsea Four Order Limits coincides with any such areas. The SLVR study areas do not include any part of these designated areas.</p>
<p>Paragraph 5.9.10 of EN-1 advises that <i>“Nevertheless, the SoS may grant development consent in these areas in exceptional circumstances. The development should be demonstrated to be in the public interest and consideration of such applications should include an assessment of:</i></p> <ul style="list-style-type: none"> • <i>the need for the development, including in terms of national considerations, and the impact of consenting or not consenting it upon the local economy;</i> • <i>the cost of, and scope for, developing elsewhere outside the designated area or meeting the need for it in some other way, taking account of the policy on alternatives set out in Section 4.4; and</i> 	<p>No part of the Hornsea Four Order Limits coincides with any such areas. The SLVR study areas do not include any part of these designated areas.</p>

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<ul style="list-style-type: none"> any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.” 	
<p>Paragraph 5.9.11 of EN-1 advises that: “The SoS 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.”</p>	<p>No part of the Hornsea Four Order Limits coincides with any such areas. The SLVR study areas do not include any part of these designated areas.</p>
<p>Paragraph 2.6.201 of EN-3 advises that: “Some applications for offshore wind farms that are submitted to the SoS will be proposed at distances that mean that a project would not be visible from the shore. In these instances, the SoS is likely to be able to conclude that an Seascape and Visual Impact Assessment (SVIA) will not be required.”</p>	<p>The potential visibility of Hornsea Four from the shore is described in Section 10.5.</p>
<p>Paragraph 2.6.202 of EN-3 advises that: “Where a proposed offshore wind farm will be visible from the shore, an SVIA should be undertaken which is proportionate to the scale of the potential impacts. Impact on seascape should be addressed in addition to the landscape and visual effects discussed in EN-1”.</p>	<p>The potential visibility of the offshore wind farm from the shore is described in Section 10.5. As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 2.6.203 of EN-3 advises that: “Where necessary, assessment of the seascape should include an assessment of three principal considerations on the likely effect of offshore wind farms on the coast:</p> <ul style="list-style-type: none"> limit of visual perception from the coast; individual characteristics of the coast which affect its capacity to absorb a development; and how people perceive and interact with the seascape.” 	<p>The limit of visual perception from the coast is described in Section 10.5. The individual characteristics of the coast are described in Section 10.7.1. How people perceive and interact with the seascape is described in Section 10.7.1.</p>
<p>Paragraph 2.6.204 of EN-3 advises that: “As part of the SVIA, photomontages are likely to be required. Viewpoints to be used for the SVIA should be selected in consultation with the statutory consultees at the EIA Scoping stage”</p>	<p>Viewpoint visualisations were provided within the PEIR and were used as a basis for assessing the effects as being not significant as set out in Section 10.8.</p>
<p>Paragraph 2.6.205 of EN-3 advises that: “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.”</p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p>Paragraph 2.6.206 of EN-3 advises that: <i>“Where appropriate, cumulative SVIA should be undertaken in accordance with the policy on cumulative assessment outlined in Section 4.2 of EN-1.”</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>

10.3.1.3 NPS EN-1 and NPS EN-3 also highlight several factors relating to the determination of an application and in relation to mitigation. These are summarised in [Table 10.2](#) below.

Table 10.2: Summary of NPS EN-1 and EN-3 policy on decision making relevant to seascape, landscape and visual resources.

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p>Paragraph 5.9.8 of EN-1 advises that <i>“Landscape effects depend on the existing character of the local landscape, its current quality, how highly it is valued and its capacity to accommodate change. All of these factors need to be considered in judging the impact of a project on landscape. 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. Having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.”</i></p>	<p>The quality, value and capacity of the landscape to accommodate change are considerations of the landscape character baseline contained in Section 10.7. Reference should be made to Section 10.9 for relevant information on commitments that provide mitigation of SLVR effects. As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report). As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.12 and Paragraph 5.9.13 of EN-1 advise that <i>“The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The aim should be to avoid compromising the purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints.’ ... and paragraph 5.9.13 advises “The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent.”</i></p>	<p>The SLVR study areas for Hornsea Four do not include any areas that have been nationally designated for their landscape value. Areas mapped as Heritage Coast are not mentioned in National Policy Statements or indeed listed in Paragraph 5.9.9 of EN-1 as having the highest status of protection as is the case for National Parks, The Broads and AONBs. Heritage Coasts are not designated but are defined areas.</p>
<p>Paragraph 5.9.14 of EN-1 advises that <i>“Outside nationally designated areas, there are local landscapes that may be highly valued locally and protected by local designation. Where a local development document in England has policies based on LCA, these should be paid particular attention. However, local landscape</i></p>	<p>The baseline character of the Flamborough Headland Heritage Coast (FHHHC) has been considered in Section 10.7. This is not strictly a designated area, but an area that has been defined due to its value and characteristics.</p>

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p><i>designations should not be used in themselves to refuse consent, as this may unduly restrict acceptable development."</i></p>	<p>The Yorkshire Wolds Important Landscape has been designated by ERYC and its baseline character is considered in Section 10.7.</p> <p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p> <p>As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.15 of EN-1 advises that: <i>"The scale of such projects means that they will often be visible within many miles of the site of the proposed infrastructure. The SoS should judge whether any adverse impact on the landscape would be so damaging that it is not offset by the benefits (including need) of the project."</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p> <p>As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.16 of EN-1 advises that: <i>"In reaching a judgment, the SoS should consider whether any adverse impact is temporary, such as during construction, and/or whether any adverse impact on the landscape will be capable of being reversed in a timescale that the SoS considers reasonable."</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p> <p>As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.17 of EN-1 advises that <i>"The SoS [now the Planning Inspectorate and the Secretary of State] should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to minimise harm to the landscape, including by reasonable mitigation."</i></p>	<p>Volume A.1, Chapter 3: Site Selection and Consideration of Alternatives sets out the iterative process that has influenced the design of Hornsea Four. The mitigation of landscape and visual effects has been considered in the SLVR assessment and detailed in F2.17: HVAC Booster Station Lighting Plan, to minimise 'harm to the landscape' where possible.</p>
<p>Paragraph 5.9.18 of EN-1 advises that: <i>"All proposed energy infrastructure is likely to have visual effects for many receptors around proposed sites. The SoS will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the project. Coastal areas are particularly vulnerable to visual intrusion because of the potential high visibility of development on</i></p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p>

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p><i>the foreshore, on the skyline and affecting views along stretches of undeveloped coast."</i></p>	<p>As such, no impact assessment is presented in this chapter.</p>
<p>Paragraph 5.9.19 of EN-1 advises that: <i>"It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors. This may assist the SoS in judging the weight it should give to the assessed visual impacts of the proposed development."</i></p>	<p>Examples of existing permitted infrastructure with a similar magnitude of impact are provided in Section 10.16.</p>
<p>Paragraph 5.9.21 of EN-1 advises that: <i>"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 of a proposed energy infrastructure project may result in a significant operational constraint and reduction in function – for example, the electricity generation output. There may, however, be exceptional circumstances, where mitigation could have a very significant benefit and warrant a small reduction in function. In these circumstances, the SoS may decide that the benefits of the mitigation to reduce the landscape and/or visual effects outweigh the marginal loss of function."</i></p>	<p>Mitigation in relation to SLVR is presented in Section 10.9.</p>
<p>5.9.22 of EN-1 advises that <i>"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. Materials and designs of buildings should always be given careful consideration."</i></p>	<p>Mitigation in relation to SLVR is presented in Section 10.9.</p>
<p>Paragraph 5.9.23 of EN-1 advises that: <i>"Depending on the topography of the surrounding terrain and areas of population it may be appropriate to undertake landscaping off site. For example, filling in gaps in existing tree and hedge lines would mitigate the impact when viewed from a more distant vista."</i></p>	<p>Off-site landscape works have not been considered for the mitigation of the visibility of the offshore elements of Hornsea Four since these works are considered unlikely to be effective.</p>
<p>Paragraph 2.4.2 of EN-3 <i>"Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology."</i></p>	<p>Mitigation in relation to SLVR is presented in Section 10.9.</p>
<p>Paragraph 2.6.207 of EN-3 advises that: <i>"The SoS should assess the proposal in accordance with the policy set out in the landscape and visual impacts Section 5.9 of EN-1."</i></p>	<p>Noted.</p>
<p>Paragraph 2.6.208 of EN-3 advises that: <i>"Where a proposed offshore wind farm is within sight of the coast, there may be adverse effects. The SoS should not refuse to grant consent for a development solely on the ground of an adverse effect on the seascape or visual amenity unless:</i></p> <ul style="list-style-type: none"> <i>• 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,</i> 	<p>The visibility of Hornsea Four from the coast is described in Section 10.5.</p> <p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p> <p>As such, no impact assessment is presented in this chapter.</p>

Summary of NPS EN-1 and EN-3 provisions	How and where considered in the ES
<p><i>the harmful effects are considered to outweigh the benefits of the proposed scheme."</i></p> <p>And at paragraph 2.6.209 <i>"Where adverse effects are anticipated either during the construction or operational phases, in coming to a judgement, the SoS should take into account the extent to which the effects are temporary or reversible."</i></p>	
<p>Paragraph 2.6.210 of EN-3 advises that: <i>"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 SoS 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."</i></p>	<p>Mitigation in relation to SLVR is presented in Section 10.9.</p>

10.4 Consultation

- 10.4.1.1 Consultation is a key part of the DCO application process. Consultation regarding SLVR has been conducted through the EIA scoping process (Orsted 2018) and formal consultation on the PEIR under section 42 of the 2008 Act. An overview of the project consultation process is presented within [Volume A1, Chapter 6: Consultation](#).
- 10.4.1.2 A summary of the key issues raised during consultation specific to SLVR is outlined below in [Table 10.3](#), together with how these issues have been considered in the production of this ES.

Table 10.3: Consultation Responses.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
PINS	26 November 2018, Scoping Opinion	PINS could not agree to scope the matter of the impacts on the Heritage Coast out of the ES without further certainty as it considered there may be significant effects on the Heritage Coast designation.	Effects on the Heritage Coast designation were assessed and presented within the PEIR and found to be not significant. Following the Section 42 consultation process, refinement of the High Voltage Alternating Current (HVAC) booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England on daytime effects and these lighting requirements, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 .

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
PINS	26 November 2018, Scoping Opinion	PINS advised that effects on seascape character should not be scoped out of the ES and that an assessment should be made where likely significant effects could occur.	<p>The effects on HSC are assessed in Chapter 9, Marine Archaeology and Volume A5, Annex 9.1: Marine Archaeology Technical Report.</p> <p>The SLVR includes consideration of the Sea Surface elements of seascape characters as part of the baseline character of the Marine Character Areas set out in Section 10.7.</p> <p>An assessment of the impact of Hornsea Four on Seascape character receptors was presented within the PEIR. Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England on these refinements, it was agreed that the effects on seascape character did not need to be considered further in the ES as set out in Section 10.8.</p> <p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p>
PINS	26 November 2018, Scoping Opinion	PINS did not agree to scope cumulative impacts on seascape and visual impacts out of the ES based on information provided at the Scoping stage.	As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).
PINS	26 November 2018, Scoping Opinion	PINS advised that they did not agree to an arbitrary radius for a study area (50 km for the array area or 25 km for the offshore substation) and advised that the	The rationale and justification for the SLVR HVAC booster stations and SLVR Hornsea Four array area study area radii is set out in Section 10.5 .

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		study area should be informed by the extent of the likely impacts.	
Natural England	26 November 2018, Scoping Opinion	Natural England considered that there was potential for indirect effects on the visual and seascape setting of FHHC., Natural England noted that the 50 km visual buffer proposed may be insufficient for Hornsea Four array area.	Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England on these refinements, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 . The rationale for the 50 km visual buffer is set out in Section 10.5 .
Natural England	26 November 2018, Scoping Opinion	Natural England requested an additional viewpoint to be located at the most easterly publicly accessible point of the FHHC and a wireframe included in the ES. Natural England also requested that the assessment considers the potential for adverse effects on the special character of the FHHC and the implications of this for visual receptors.	Viewpoint visualisations were presented within the PEIR. Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England on these refinements, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 .
ERYC	22 January 2018, Scoping Opinion	ERYC noted that the FHHC is an important consideration in terms of views offshore, and that suitable visualisations were required to scope out the potential impact.	Viewpoint visualisations were presented within the PEIR. Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England on these refinements, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 .
Historic England	26 November 2018, Scoping Opinion	Historic England advised on methodologies to inform the extent of the study area.	The rationale and justification for the SLVR HVAC booster stations and SLVR Hornsea Four array area study area radii is set out in Section 10.5 .
Historic England	26 November 2018, Scoping Opinion	Historic England advised that Hornsea Four is likely to be visible across a large area and could affect the significance of heritage assets at some distance from	The Applicant notes that whilst this may be a practical approach for onshore development, it is unlikely to be practical for offshore WTGs.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		<p>this site itself. Historic England noted that consideration should be given to undertaking a practical exercise with either a crane or balloons erected at the height of the proposed structures so that all parties are to better able to understand the landscape impact of the proposals.</p>	
<p>Natural England</p>	<p>23 September 2019, Section 42 Consultation</p>	<p>Natural England noted that whilst NPSs make no reference to Heritage Coasts, National Planning Policy Framework (NPPF) (2019) does reference Heritage Coasts and Natural England considers that paragraph 173 of NPPF (2019) is relevant to the Hornsea Four application.</p>	<p>It is the Applicant's view that the FHHC is not a national, statutory designation and it does not have the same level of protection as AONBs and National Parks, which are nationally designated by Natural England and are given the highest protection through the NPPF. Heritage Coasts are defined by agreement between the relevant maritime local authorities and Natural England and are protected by local policy through the development plan. Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8.</p>
<p>Natural England</p>	<p>23 September 2019, Section 42 Consultation</p>	<p>In relation to the FHHC, Natural England considered that the WTGs would not adversely affect the special character of the coast at this location. Natural England stated that the ES should consider the potential for HVAC offshore booster stations to adversely affect the seascape setting of the FHHC and therefore the special character of the coast in this location as a result of their visibility.</p>	<p>As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report).</p>
<p>Natural England</p>	<p>23 September 2019, Section</p>	<p>Natural England stated that dark skies are a part of the special seascape character of the FHHC and noted</p>	<p>The Applicant undertook further consultation with Natural England and ERYC (as detailed below in this</p>

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
	42 Consultation	concern about the lighting of the HVAC Booster Stations having the potential to adversely affect this.	table) specifically as to whether dark skies are a special feature of FHHC to address this point. Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements (see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 .
Natural England	8 November 2019, Additional pre-application consultation	Natural England advised on a location for a night-time visualisation.	Subsequent discussions with Natural England led to confirmation that a night-time visualisation was no longer required for Hornsea Four.
Natural England	8 November 2019, Additional pre-application consultation	Natural England acknowledged the lack of referenced documented evidence which clearly sets out the special character of FHHC and advised on a number of reference sources available in relation to the special character of FHHC.	The baseline descriptions set out in Section 10.7 include reference to the information sources provided by Natural England.
Natural England	8 November 2019, Additional pre-application consultation	Natural England disagreed with the conclusion that dark night skies are not a feature of the seascape character of the FHHC and concluded that East Riding Unitary Authority (ERUA) should provide advice on the special characteristics of the FHHC.	ERYC has been consulted on the special character of FHHC and whether this includes dark skies out to sea. ERYC (ERUA) advised that they do not consider that dark skies out to sea are part of the special character of the FHHC.
Natural England	8 November 2019, Additional pre-application consultation	Natural England considered that there could be potential significant effects on views and visual receptors located within FHHC as a result of HVAC booster station lighting.	Following the Section 42 consultation process, refinement of the HVAC booster station lighting requirements see F2.17: HVAC Booster Station Lighting Plan), and additional consultation with ERYC and Natural England, it was agreed that the effects on the FHHC did not need to be considered further in the ES as set out in Section 10.8 .
Natural England	4 May 2020, Additional pre-application consultation	After being provided with information on the refined lighting requirements for the HVAC Booster Stations, Natural England confirmed that the night-time effects of	As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		the HVAC Booster Stations would not be significant in relation to the special characteristics of the FHHC.	Scoping Opinion, or agreed to be not considered in detail in the ES (further details in Table 10.3 of this chapter and Table 1.1 and Annex 4 of B1.1 Consultation Report)
Natural England	4 May 2020, Additional pre-application consultation	Natural England confirmed that the lighting will reduce the adverse effects of night-time lighting on the special characteristics of the FHHC to the extent that these affects so that these effects are no longer significant.	Noted. The lighting requirements are detailed in the F2.17: HVAC Booster Station Lighting Plan .
Ministry of Defence (MoD)	21 August 2020, Additional pre-application consultation	The MoD confirmed they were content with the lighting requirements set out in the HVAC Booster Station Lighting Plan proposed and have no concerns.	Noted. The lighting requirements are detailed in the F2.17: HVAC Booster Station Lighting Plan .
Natural England	26 August 2020, Additional pre-application consultation	Natural England confirmed that they are content that the lighting requirements set out in F2.17: HVAC Booster Station Lighting Plan appropriately secured. Natural England also confirmed these effects do not need to be considered further in the Hornsea Four ES.	Noted. The lighting requirements are detailed in the F2.17: HVAC Booster Station Lighting Plan and secured through Co200 (see Volume A4, Annex 5.2: Commitments Register) and Condition 22 (Schedule 12) of the Transmission Assets deemed Marine Licence of the draft Development Consent Order (DCO) (see C1.1: Draft DCO including Draft DML).
Natural England	22 January 2021, Additional pre-application consultation	Upon review of the draft SLVR chapter, Natural England confirmed that they consider there to be no further outstanding matters regarding landscape, seascape and visual impacts.	Noted.
ERYC	7 July 2021 Additional pre-application consultation	Upon review of the draft SLVR chapter, ERYC confirmed that they agree with the approach set out as it accurately reflects previous discussions and takes a proportionate approach to deal with SLVR.	Noted.

10.5 Study Area

10.5.1.1 The study areas for this SLVR assessment include areas both onshore and offshore where receptors may be affected by the offshore components of Hornsea Four. These are shown on [Figure 10.1](#) and defined as follows:

- The SLVR Hornsea Four array area study area – 50 km radius study area from the array area Order Limits and including the array area itself; and

- SLVR Hornsea Four HVAC booster stations study area – to include the area lying within a 30 km buffer from the offshore HVAC booster station search area.

10.5.1.2 The rationale for the SLVR study areas is set out in the following paragraphs.

10.5.1.3 The offshore ECC is largely encompassed within the SLVR Hornsea Four array area study area and the SLVR HVAC booster station study area. The effects of the cable construction and decommissioning that would occur within the ECC are assessed in relation to the SLVR HVAC booster station and array area study areas due to their location largely within these areas. The definition of a study area is an important and established part of the SLVR assessment, which is recommended in guidance (Landscape Institute (LI) and Institute of Environmental Management and Assessment (IEMA 2013). Optimised Environments Limited (OPEN) has defined the study areas for Hornsea Four according to legislation, guidance and the Zone of Theoretical Visibility (ZTV) as well as other considerations such as of visual acuity, the limitations of visibility as a result of weather conditions and a review of other offshore wind farm SLVR assessments, with an approach based on the following steps:

- Firstly, the EIA Regulations 2017 were considered. These require a description of the 'likely significant effects of the proposed development'. The 50 km radius and 30 km radius SLVR study areas were therefore defined to extend far enough to include all areas within which significant effects could occur, using professional judgement. Although the proposed heights of the WTCs and HVAC booster stations could theoretically be visible at distances beyond 50 km and 30 km, respectively, their effect at such ranges is considered to be beyond the thresholds at which they are likely to be significant.
- Secondly, relevant guidance was consulted. IEMA Guidance (IEMA 2015 and 2017) recommends a proportionate ES focused on the significant effects and a proportionate ES topic chapter. An overly large SLVR study area may be considered disproportionate if it makes the understanding of the key impacts of the proposed development more difficult. This is supported by landscape and visual impact assessment LVIA Guidance produced by the Landscape Institute (GLVIA3) (LI and IEMA 2013) (para 3.16). This guidance recommends that '*The level of detail provided should be that which is reasonably required to assess the likely significant effects*'. Paragraph 5.2, page 70 also states that '*The study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner*'.

10.5.1.4 Other wind farm-specific guidance, such as Scottish Natural Heritage's (SNH) Visual Representation of Wind Farms Guidance (SNH 2017) recommends that ZTV distances are used for defining study area based on wind turbine height. Whilst not a wind farm the HVAC Booster Station is a large-scale development. Therefore, the ZTV distance suggested in the SNH guidance for turbines of 86-100 m is a helpful indicator of a suitable study area for the SLVR assessment for the HVAC Booster Station search area.

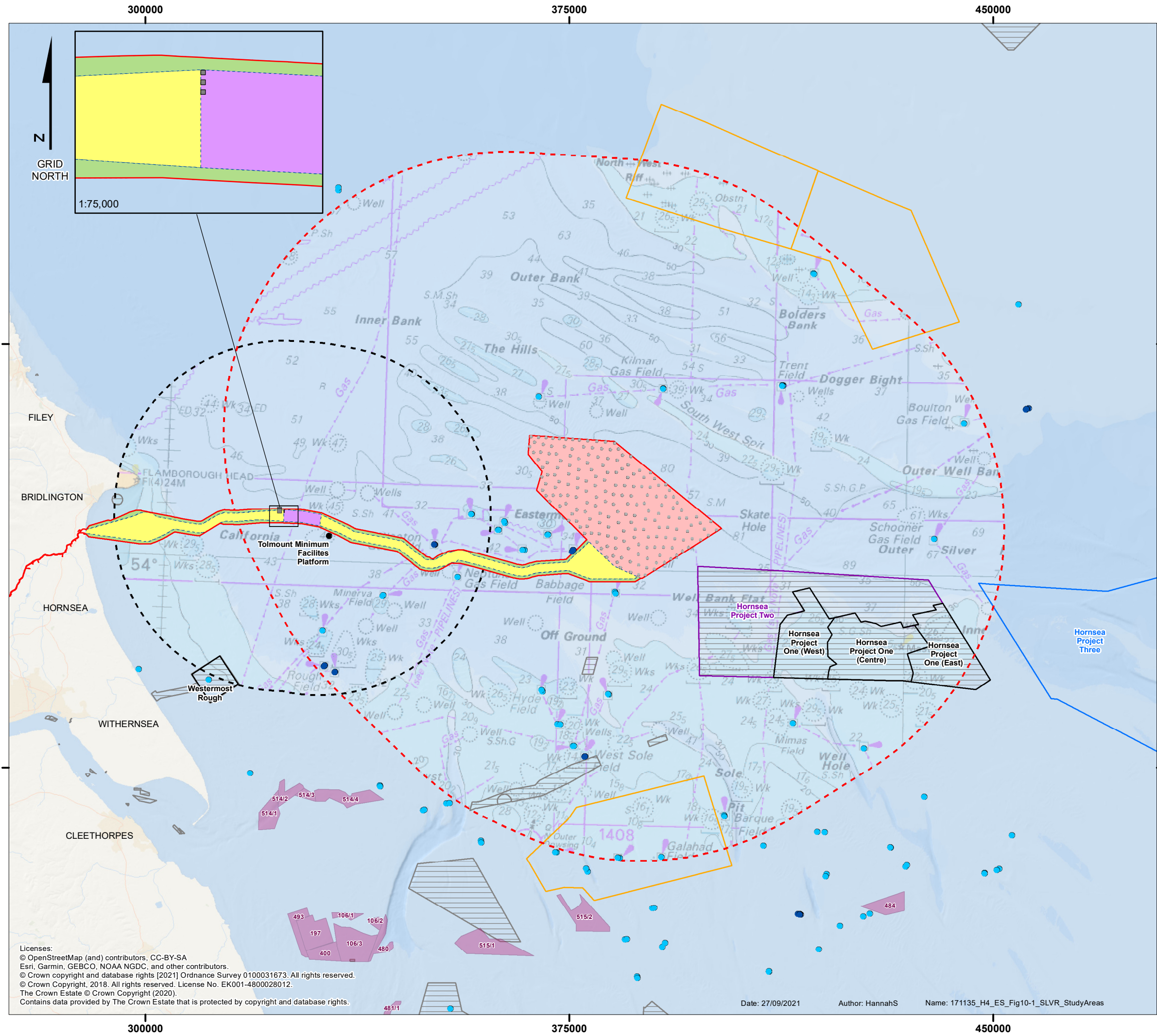
10.5.1.5 The study area for the HVAC booster stations was increased from a 25 km radius to a 30 km radius following stakeholder responses as part of the Scoping process (see Scoping Opinion in [Table 10.3](#)).

10.5.1.6 These study areas are considered to be the maximum areas within which a significant effect would be likely to occur as a result of the construction, operation and decommissioning of Hornsea Four. In reality, significant seascape, landscape and visual effects are more likely to occur from locations in closer proximity to the array area and HVAC booster stations; and less likely to occur towards the outer edges of the study areas at long distances. This is due to the following factors:

- The limited horizontal and vertical field of view affected by Hornsea Four at distances greater than these;
- The distances to the coastline of the Hornsea Four array area (69 km) and the HVAC booster station search area (25.9 km);
- The effects of climatic conditions in reducing visibility at these distances;
- The large scale of the receiving seascape, which is a characteristic that is generally considered to increase its capacity to accommodate large scale wind farm development;
- The location of the offshore array adjacent to other offshore wind farm development, therefore forming a cluster rather than further distributing wind farm development over new areas of the seascape, a factor that is considered to reduce the cumulative effects; and
- The low levels of wildness or remoteness qualities of the coastal area, which might otherwise increase its sensitivity to development.

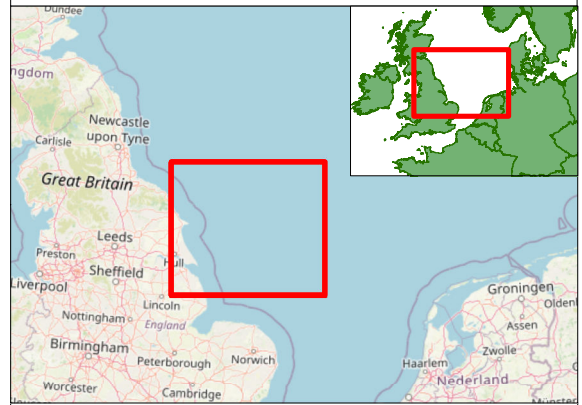
10.5.1.7 The effects of Hornsea Four beyond these SLVR study areas would be not significant. This is OPEN's professional opinion having worked on the SLVR assessments for eight other offshore wind farms around the coast of the United Kingdom and the Republic of Ireland and a further three sites where SLVR assessment was scoped out due to the distance from the coast.

10.5.1.8 Hornsea Four adopted a major site reduction from the AfL presented at Scoping (846 km²) to the PEIR boundary (600 km²), with a further reduction of the array area adopted for the ES and DCO application (468 km²) due to the results of the PEIR, technical considerations and stakeholder feedback. The evolution of the Hornsea Four Order Limits is detailed in [Volume A1, Chapter 3: Site Selection and Consideration of Alternatives](#) and [Volume A3, Annex 3.2: Selection and Refinement of Offshore Infrastructure](#).



Hornsea Four
Figure 10.1
 Location of Hornsea Four and the SLVR Study Areas

- Indicative Turbine Position
- Indicative HVAC Booster Station Position
- Order Limits
- ▨ Array Area
- ▨ HVAC Booster Station Works Area
- ▨ Offshore Temporary Works Area
- ▨ Offshore Export Cable Corridor
- ▨ Hornsea Four Array Area Study Area
- ▨ HVAC Booster Stations Study Area
- Offshore Platform
- Offshore Platform (Manned)
- Offshore Platform (Operational)
- ▨ Existing Aggregate Area: Active Aggregate and Option Area
- ▨ Open Disposal Site
- ▨ Offshore Wind Farm Status: Active/In Operation
- ▨ Under Construction
- ▨ In Planning
- ▨ Crown Estate Leasing Round 4 Preferred Projects



Coordinate system: ETRS 1989 UTM Zone 31N
 Scale@A3: 1:650,000
 0 5 10 20 Kilometres
 0 3.25 6.5 13 Nautical Miles

REV	REMARK	DATE
	First Issue for ES	10/06/2020
A	Updated to include project boundary changes	11/12/2020
B	Updated to include project boundary changes	21/07/2021

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10.6 Methodology to Inform Baseline

10.6.1 Desktop Study

10.6.1.1 A desk based study was undertaken to obtain information on the seascape, landscape and visual resource. Data were acquired within the SLVR study areas through a detailed desktop review of existing studies and datasets.

10.6.1.2 The following sources of information set out in [Table 10.4](#) were consulted although this should not be considered an exhaustive list of references.

Table 10.4: Key Sources of Information.

Source	Summary	Coverage of Hornsea Four SLVR study areas
HSC: Consolidating the National HSC Database. (Land Use Consultants, LUC 2017).	Definition of areas as well as descriptions of HSC. Sea Surface information used to inform MCA baseline descriptions.	Relevant across sea surface of SLVR study areas.
Flamborough Headland Heritage Coast Management Strategy. (Flamborough Headland Heritage Coast 2002).	A description of the FHHC, the nature conservation and heritage policies and designations covered, the purpose of the strategy and the management aims. Wider aims than 2002 study.	Within the defined area of the FHHC.
Flamborough Head Management Plan (2007).	A description of the FHHC, the purpose of the strategy and the management aims. Aims specific to Heritage Coast defined area and purpose.	Within the defined area of the FHHC.
East Riding of Yorkshire Landscape Character Assessment. (AECOM 2018).	LCA including descriptions and landscape character type (LCT) boundaries.	Within the East Riding of Yorkshire area of land contained within the SLVR Hornsea Four HVAC booster station study area.
East Riding Local Plan 2012-2029 Strategy Document. (East Riding of Yorkshire Council 2016).	Boundaries and policies relating to the Yorkshire Wolds Important Landscape and the FHHC.	Within the Yorkshire Wolds Important Landscape Area and FHHC where they coincide with the SLVR Hornsea Four HVAC booster station study area.
Marine Plan Areas (MPAs) Marine Management Organisation (MMO 2014).	Provides mapping of MPAs in England.	Full coverage of Hornsea Four SLVR study areas.
Visibility Data for Donna Nook 2008-2018. (Met Office 2019).	Visibility distance and frequency data collected from the closest representative location on the coast.	Relevant across SLVR study areas.
A Seascape Character Assessment for the North East Inshore and Offshore marine plan areas. (MMO 2012).	Seascape character boundaries and descriptions.	North East Inshore and Offshore marine plan areas within the Hornsea Four SLVR study areas.
Seascape Character Area Assessment for the East Inshore and East Offshore Marine Plan Area (MMO 2018).	Seascape character boundaries and descriptions.	East Inshore and Offshore marine plan areas within the Hornsea Four SLVR study areas.

Source	Summary	Coverage of Hornsea Four SLVR study areas
Designated Sites (www.designatedsites.naturalengland.org.uk, Natural England).	Locations of designated sites.	Full coverage of the SLVR Hornsea Four study areas.
Recorded Visibility Data (Met Office 2016) referenced from the Hornsea Three Environmental Statement.	Provides information about visibility offshore over a 10-year period.	Provides an insight across the SLVR Hornsea Four array area study area.
SeaZone Hydro View 1:75,000 raster and vector mapping.	Base mapping and information for sea area.	Full coverage of Hornsea Four SLVR study areas.
Hornsea Offshore Wind Farm Project Two ES (Smart Wind 2015).	Provides baseline information on seascape and visual receptors assessed.	Partial coverage of the SLVR Hornsea Four array area study area.
Hornsea Offshore Wind Farm Project Three ES (Orsted 2018).	Provides baseline information on seascape and visual receptors assessed.	Partial coverage of the SLVR Hornsea Four array area study area.

10.6.2 Site Specific Study

- 10.6.2.1 To inform the SLVR assessment, site-specific analysis was undertaken and ZTV analysis mapping and wireline views were prepared and included in the PEIR submission as part of the Section 42 consultation.
- 10.6.2.2 OPEN have also undertaken field work in the Flamborough Head area in order to inform this assessment. This has included walking along sections of the Public Rights of Way (PRoW) and visiting Selwick Bay beach as well as other onshore visual receptor locations. This field work has informed the baseline descriptions included in the [Section 10.7](#).

10.7 Baseline Environment

10.7.1 Existing baseline

- 10.7.1.1 The existing baseline environment of the Hornsea Four array area, HVAC booster station search area and ECC can be described as open sea with occasional offshore structures, such as oil and gas platforms and offshore wind farms, having an influence. Hornsea Project One Offshore Wind Farm (hereafter Hornsea Project One) (now operational) and Hornsea Project Two Offshore Wind Farm (hereafter Hornsea Project Two) (under construction) are a further influence to the south-east of the Hornsea Four array area, bringing large scale wind turbine and offshore platform development to part of the SLVR Hornsea Four array area study area. The operational Westernmost Rough Offshore Wind Farm is also located to the south-west of the HVAC booster station search area.
- 10.7.1.2 There is regular passage of use by sea-going vessels for a variety of purposes, including recreational and commercial fishing activities, commercial ferry routes, tankers, cargo vessels and recreational cruising with such activity introducing movement and change within the views. Overhead combat training in aeroplanes and search and rescue activities in helicopters furthers this characteristic of movement and change.
- 10.7.1.3 The SLVR Hornsea Four array area study area is within open sea with some occasional offshore structures and further offshore wind farm influence. The perimeter of the array study area is 15 km from the coast at its closest point, so there is little influence from its association with the land.

10.7.1.4 The SLVR HVAC booster station study area can largely be described as open sea with occasional offshore structures. However, it also includes a small area of land at Flamborough Head.

10.7.1.5 The Hornsea Four ECC is situated in entirely open sea with occasional offshore structures, reaching the coast to the south of Bridlington.

Landscape Planning Designations and Defined Areas

10.7.1.6 No part of the offshore components of Hornsea Four are located within a landscape planning designation or defined area of landscape. The SLVR HVAC booster station study area includes an area identified as being part of the FHHC, part of which is also within the Yorkshire Wolds Important Landscape as identified in the East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016). [Figure 10.2](#) illustrates these designated/defined areas.

Flamborough Headland Heritage Coast

10.7.1.7 The SLVR study area for the HVAC booster stations covers an area that has been defined (not designated) as the FHHC through agreement between the relevant local authorities and Natural England. This area is shown on [Figure 10.2](#). The Heritage Coast covers 19 km (12 miles) of coastline between Reighton in the north and Sewerby in the south, with an inland boundary that encloses 3265 ha (approximately 13 square miles).

10.7.1.8 The FHHC is one of 45 stretches of Heritage Coast around England and Wales. Natural England advises that the purposes of heritage coasts are as follows:

- To conserve, protect and enhance the natural beauty of the coasts; including their terrestrial, littoral and marine flora and fauna; and their heritage features of architectural, historical and archaeological interest;
- To facilitate and enhance their enjoyment, understanding and appreciation by the public by improving and extending opportunities for recreational, educational, sporting and tourist activities that draw on, and are consistent with, the conservation of their natural beauty and the protection of their heritage features;
- To maintain, and improve (where necessary) the environmental health of inshore waters affecting Heritage Coasts and their beaches through appropriate works and management measures; and
- To take account of the needs of agriculture, forestry and fishing, and of the economic and social needs of the small communities on these coasts, by promoting sustainable forms of social and economic development, which in themselves conserve and enhance natural beauty and heritage features.

10.7.1.9 Heritage Coasts are protected through development control within the planning system. Paragraph 173 of the National Planning Policy Framework (NPPF) (2019) states that: *'Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 172), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.'*

10.7.1.10 Notably the NPPF does not mention development within the wider setting of the Heritage Coast, which is what may be affected by Hornsea Four through its visibility.

- 10.7.1.11 Protection of the FHHC is provided by policies within the East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016), which was adopted in 2016. It defines Heritage Coast as: *'Areas of undeveloped coastline which are managed to conserve their natural beauty, and, where appropriate, to improve accessibility for visitors.'*
- 10.7.1.12 Within the East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016), Policy ENV2 (Promoting a high-quality landscape) advises that proposals should *'protect and enhance existing landscape character as described in the East Riding Landscape Character Assessment'*. It notes that in particular, this applies to Important Landscape Areas which include the Heritage Coast at Flamborough Head.
- 10.7.1.13 Policy A2 (Bridlington Coastal sub area) of the East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016) sets out in a section entitled 'Environment', that plans, strategies and development decisions in the Bridlington Coastal sub area should: *'Sensitively maintain the character of the undeveloped coast, particularly the Flamborough Heritage Coast, and improve public access to, and enjoyment of, the coast, ensuring that development proposals protect and enhance its distinctive landscape, conservation initiatives and the quality of the natural environment.'*
- 10.7.1.14 The East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016) notes that the Flamborough Management Plan (2007) has been prepared to ensure integrated management of wildlife, landscape and access in the area, and looks to ensure that human activities are managed in a way that is compatible with the area's natural assets. The Flamborough Management Plan (2007) is not specific to the FHHC and it was developed to fulfil a number of objectives with an overall view to ensure that human activities at Flamborough Head are managed in a way that is compatible with the natural assets of Flamborough Head and to seek opportunities to improve these assets and the human activities that depend upon them. This includes fulfilling specific requirements of Regulation 34 of The Conservation (Natural Habitats &c.) Regulations 1994 with regards to the Flamborough Head European Marine Site, which is a mandatory requirement.
- 10.7.1.15 The Flamborough Management Plan (2007) advises that the most recent management strategy for the Heritage Coast was published in 2002. It outlines the objectives and priorities for sustainable development on the headland, however over the past few years this strategy has become inactive due to having no dedicated project officer to oversee its implementation. Therefore, the rich historic value and varied natural beauty of the Heritage Coast has been recognised by the Flamborough Management Plan (2007), with actions and policies from the strategy incorporated within this reviewed Plan.
- 10.7.1.16 The Flamborough Headland Heritage Coast Management Strategy (2002) notes that *'its spectacular chalk cliffs topped with boulder clay and its unique wildlife and geological interest attract much interest from large numbers of visitors and locals alike'* and sets out a useful description of the FHHC's heritage, features and qualities that make it so distinctive as follows:
- Outstanding natural features;
 - Areas of great architectural and historical value;
 - Internationally important wildlife sites; and
 - A special interaction between people and the local environment.

10.7.1.17 It is recognised in the FHH Management Strategy (2002) that *'some elements of the headland's heritage are more visually attractive than others, but all have their interest and represent aspects of what has resulted in the rich mixture of features and activities that are found on and around the headland today. There are many other elements that go to make up the whole picture that is Flamborough Headland Heritage Coast today, however, and reflect how people use and enjoy the area.'*

10.7.1.18 Under the heading of 'Landscape', the FHH Management Strategy (2002) sets out the following:

'The coastal landscape remains the basis for Heritage Coast designation however the area's landscape and wildlife are inextricably linked. The landscape and wildlife habitats, which it contains, are a product of geology, climate, and human use and management. This is what serves to make Flamborough Headland truly special and unique.'

In landscape terms, the headland is effectively an eastward extension of the Yorkshire Wolds, although the substantial covering of glacial material compared with the Wolds gives it a distinctive character. It shows the continuation of the dip slope of the chalk from north of Bridlington in an ENE direction to Thornwick Bay, becoming more broken hillock eastwards. The scarp slope of the chalk is visible at Speeton, where it leaves the coast to form the steep northern edge of the Wolds.

The combination of hard chalk overlain by glacial material gives rise to a coastal landscape type found nowhere else in Britain. Together with the influence of the North Sea, these factors give rise to the presence of wildlife habitats and communities that have unique characteristics. The coastal landscape and wildlife is affected by influences arising both inland and at sea.'

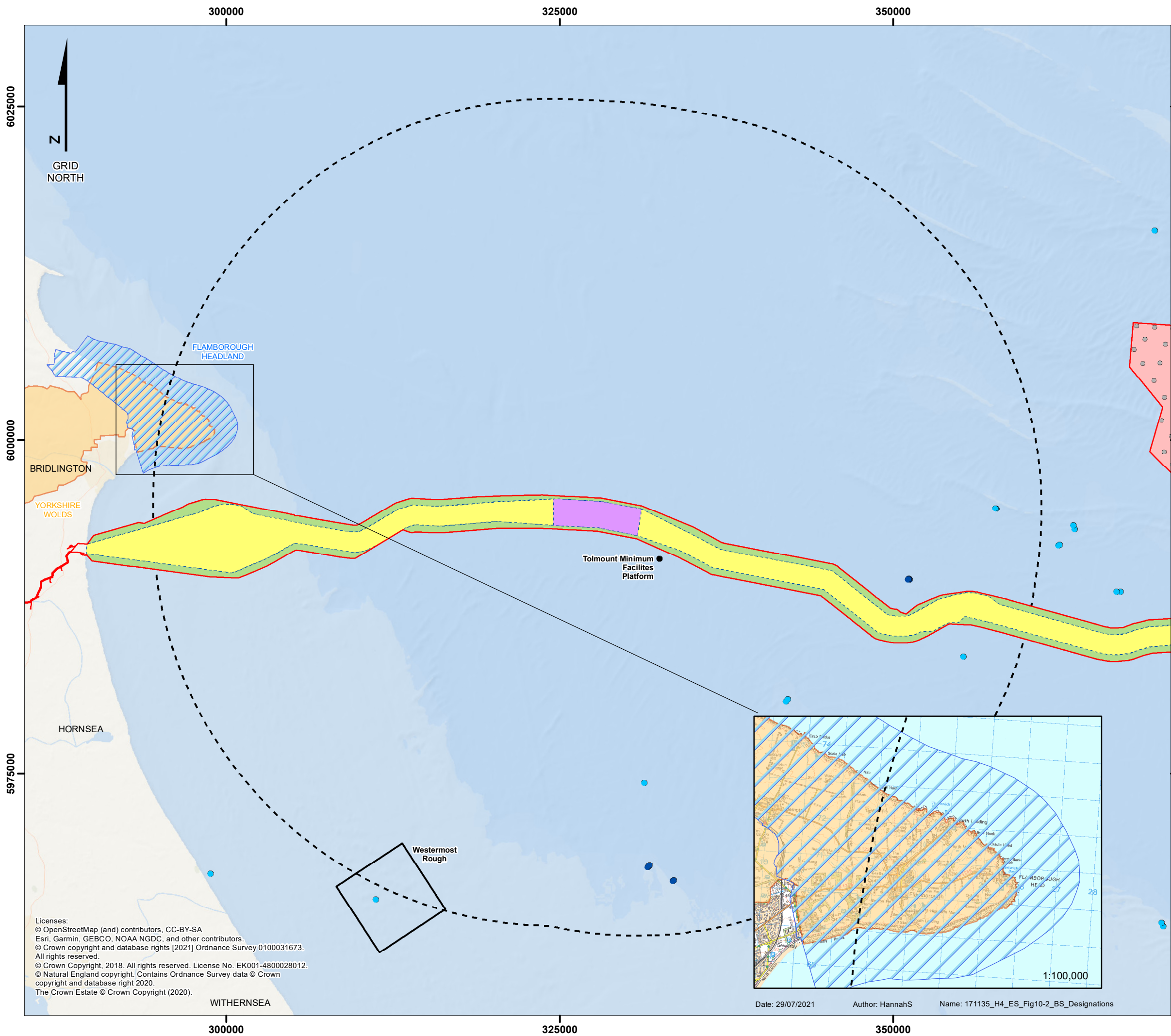
10.7.1.19 The FHH Management Strategy (2002) sets out a number of policies that relate to landscape. However, these address development within the Heritage Coast itself with no policies associated with development beyond its boundary or in views to the North Sea. It is noted in the background section that *'The coastal landscape and wildlife is affected by influences arising both inland and at sea'*.

10.7.1.20 The Flamborough Management Plan (2007) does include some information about the future management of energy industries, however this relates only to oil and gas projects as offshore wind farm development was not considered to be an issue at that time.

10.7.1.21 As confirmed by ERYC (see [Table 10.3](#)), none of the aforementioned plans reference a 'dark skies out to sea' policy or special characteristic of the FHH so this is not considered to form a special character of the FHH landscape or its setting.

Yorkshire Wolds Important Landscape Area

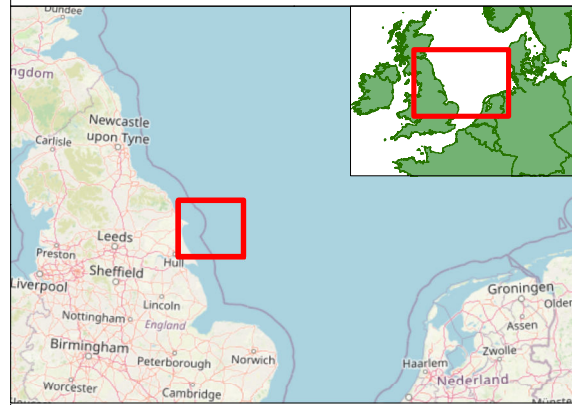
10.7.1.22 Within the SLVR HVAC booster station study area, the FHH coincides with an area identified in the East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016) as the Yorkshire Wolds Important Landscape Area, which is also protected by Policy ENV2 and is shown on [Figure 10.2](#).



Hornsea Four

Figure 10.2
HVAC Booster Station Study Area
with Landscape Designations
and Defined Areas

- Indicative Turbine Position
- Order Limits
- ▨ Array Area
- ▨ HVAC Booster Station Works Area
- ▨ Offshore Temporary Works Area
- ▨ Offshore Export Cable Corridor
- ⋯ HVAC Booster Stations Study Area
- Oil and Gas Platform:
 - Offshore Platform
 - Offshore Platform (Manned)
 - Offshore Platform (Operational)
- Offshore Wind Farm Status:
 - Active/In Operation
- Landscape / Seascape Designation:
 - ▨ Heritage Coast
 - ▨ Important Landscape Area



Coordinate system: ETRS 1989 UTM Zone 31N
 Scale@A3: 1:275,000
 0 2.25 4.5 9 Kilometres
 0 1 2 4 Nautical Miles

REV	REMARK	DATE
	First Issue for ES	10/06/2020
A	Updated to include project boundary changes	11/12/2020
B	Updated to include project boundary changes	21/07/2021

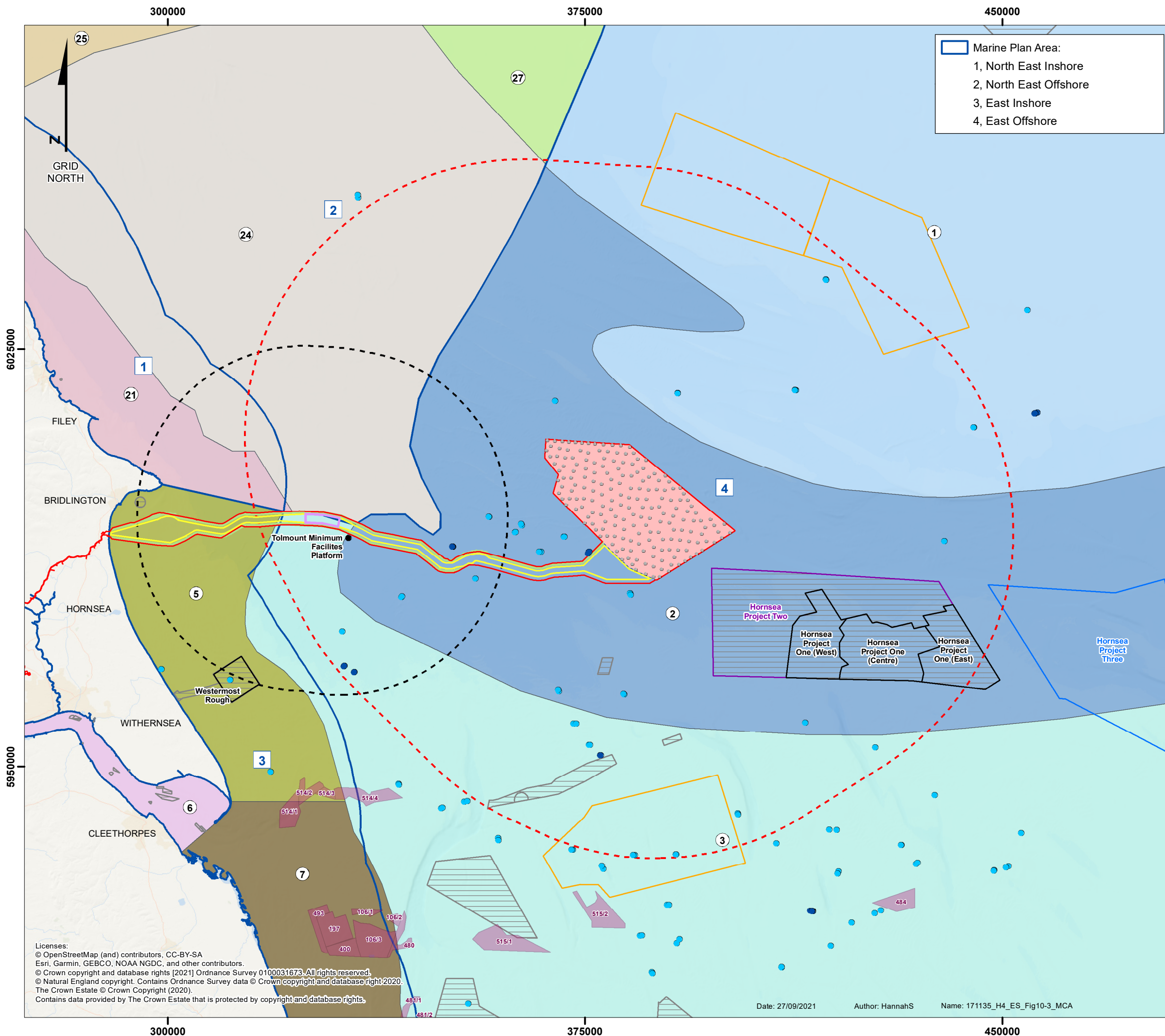
HVAC Booster Station Study Area with Landscape Designations and Defined Areas
 Document no: H4ES_SV02
 Created by: LA
 Checked by: LT
 Approved by: LK



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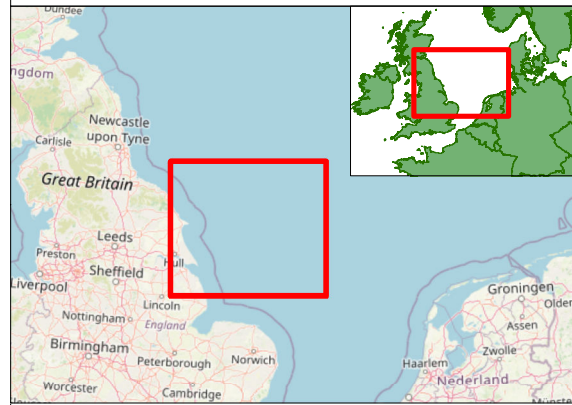
Seascape Character

- 10.7.1.23 The SLVR study areas have identified seascape characteristics. These are defined and described in the MMO's 'Seascape Character Assessment for the North East Inshore and Offshore marine plan areas (2018) and 'Seascape Character Area Assessment for the East Inshore and East Offshore Marine Plan Areas (2012). **Figure 10.3** illustrates the identified MCAs.
- 10.7.1.24 Seascape character effects will be assessed within the two defined SLVR study areas which together encompass all offshore components of Hornsea Four. Such effects will be considered only during the day as it is only then that the baseline seascape character is apparent.
- 10.7.1.25 The SLVR study areas are located within four MPAs - East Inshore (MPA 3), East Offshore (MPA 4), North East Inshore (MPA 1) and North East Offshore (MPA 2) as illustrated on **Figure 10.3**.
- 10.7.1.26 A seascape character area assessment covering MPAs 3 and 4 was published by the MMO in July 2012 (MMO 2012) and MPAs 1 and 2 in September 2018 (MMO 2018). The purpose of the MMO assessments is to provide a strategic scale seascape character assessment to inform the marine planning process. It is these documents that have been used to inform the key characteristics included in **Table 10.5**. The MMO seascape assessment for the eastern areas is based upon an earlier pilot study seascape assessment commissioned by Natural England (Natural England 2012).
- 10.7.1.27 The MMO's seascape character assessments divide the MPAs into smaller Seascape Character Areas (SCAs) and MCAs. As described in the more recent study, (MMO 2018) these are essentially different names for the same thing and are the names given to '*an area of marine space has its own individual character and identity*'. Hereafter within this SLVR assessment, they are described as MCAs. These are shown on **Figure 10.3**.
- 10.7.1.28 The baseline character of each of the MCAs that may be altered physically or through visibility of Hornsea Four is set out in **Table 10.5**. This refers also to the HSC – Sea Surface components. The final column describes the changes in character associated with offshore wind farm development unaccounted for in the MMO MCA descriptions as part of the predicted future baseline character.



Hornsea Four
Figure 10.3
SLVR Study Areas with
Seascape Character

- Indicative Turbine Position
- Order Limits
- HVAC Booster Station Works Area
- Offshore Export Cable Corridor
- Offshore Temporary Works Area
- Array Area
- Hornsea Four Array Area Study Area
- HVAC Booster Stations Study Area
- Offshore Platform (Operational)
- Offshore Platform (Manned)
- Offshore Platform
- Existing Aggregate Area
- Active Aggregate and Option Area
- Open Disposal Site
- Offshore Wind Farm Status:
 - Active/In Operation
 - Under Construction
 - In Planning
 - Crown Estate
 - Leasing Round 4 Preferred Projects
- Marine Character Areas:
 - 1. Dogger Bank
 - 2. Dogger Deep Water Channel
 - 3. East Midlands Offshore Gas Fields
 - 5. Holderness Coastal Waters
 - 6. Humber Waters
 - 7. East Midlands Coastal Waters
 - 21. North Yorkshire Coastal Waters
 - 24. Breagh Oil and Gas Field
 - 25. Farne Deep
 - 27. Dogger Bank Edge



Coordinate system: ETRS 1989 UTM Zone 31N
 Scale@A3: 1:660,401
 0 5 10 20 Kilometres
 0 3.25 6.5 13 Nautical Miles

REV	REMARK	DATE
	First Issue for ES	10/06/2020
A	Updated to include project boundary changes	11/12/2020
B	Updated to include project boundary changes	21/07/2021

SLVR Study Areas with Seascape Character
 Document no: H4ES_SV03
 Created by: LA
 Checked by: LT
 Approved by: LK



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Table 10.5: Baseline character of MCAs within the SLVR study areas.

MCA	Baseline Characteristics	Predicted future baseline character
Dogger Bank	<p>Extensive and remote areas of relatively shallow waters. Visually unified and expansive open water character. Widespread sand bank habitat. Significant fisheries area because of important fish spawning and nursery habitats. Expansive seascape with few surface features. Important archaeological features present.</p> <p>The sea surface is used extensively by vessels. It is traversed by numerous navigational routes and is used extensively for bottom trawling and seine netting as well as for general fishing. There are numerous hydrocarbon installations.</p> <p>Hornsea Project One (operational) and Hornsea Project Two (under construction) are located to the south of this MCA and have introduced relatively close-range offshore wind farm visibility to the perceived character as part of the context.</p>	<p>Hornsea Project Two (under construction) and Hornsea Project Three Offshore Wind Farm (hereafter Hornsea Three) would be located beyond the boundary to the south of this MCA and would further alter the perceived character of this MCA through their visibility, as part of the wider context, during their construction and operation.</p>
Dogger Deep Water Channel	<p>West-to-east deep channel which cuts across the south of Dogger Bank, known as the Outer Silver Pit. Broad channel at its widest part is 125 to 175 km (75 to 105 miles) with waters deepening to between 60 and 70 m in places. Expansive seascape with small concentrations of gas platforms. Significant fisheries area because of important fish spawning and nursery habitats. Once a lake with tributaries of melt-water supplied from glaciers to north of Dogger Bank. Designated as a military practice area. Major North Sea navigation route. Important archaeological features present.</p> <p>The sea surface is used extensively by vessels. It is traversed by numerous navigational routes and is used extensively for bottom trawling and drift netting, in the eastern sector, as well as for general fishing and areas of long lining.</p> <p>Hornsea Project One (operational), Hornsea Project Two (under construction) and Tolmount Platform are located within this MCA and alter the character of the MCA through their physical presence and visibility from the wider area.</p>	<p>Hornsea Project Two (under construction) is located within this MCA and Hornsea Three would be located largely within this MCA. They would alter its character during construction and operation through their physical presence and visibility from the wider area as and if they proceed respectively.</p>
East Midlands Offshore Gas Fields	<p>Concentrations of offshore gas extraction and aggregate extraction activities. Extensive shallow offshore waters generally below 30 m. Represents some of the UK's most extensive stores of shallow subtidal sediments.</p>	<p>Hornsea Three is located partially within this MCA and will alter its character during its construction</p>

MCA	Baseline Characteristics	Predicted future baseline character
	<p>Series of submerged long straight sand banks and tidal sand ridges which pose navigational difficulties.</p> <p>Widespread sand bank habitats that support large fish spawning and fish nursery grounds.</p> <p>Commercial offshore activities such as fishing, dredging and dumping have a localised influence on benthic and pelagic environments.</p> <p>Significant fisheries areas.</p> <p>Important archaeological features present.</p> <p>There are numerous navigational routes crossing this MCA. There is a large fishing ground as well as areas where longlining and seine netting fishing practices are followed. There are numerous hydrocarbon installations.</p> <p>Tolmount Platform, Hornsea Project One (operational) and Hornsea Project Two (under construction) are located relatively close to the northern boundary of this MCA and will alter its visual context through their visibility to the north.</p>	<p>and operation if it proceeds due to physical alterations and views as part of the wider context.</p> <p>Hornsea Project Two (under construction) is located close to the northern boundary of this MCA and will alter its visual context visibility to the north during further construction and operation.</p>
<p>Holderness Coastal Waters</p>	<p>Expansive, sweeping coastline undergoing dynamic natural coastal processes of erosion.</p> <p>Extensive soft glacial till cliffs.</p> <p>Heritage Coasts of Flamborough Head and Spurn Head to the northern and southern extents.</p> <p>Open, exposed character by merit of low-lying coastal topography and an absence of vegetation.</p> <p>Large and featureless seaward horizon.</p> <p>Flat topography results in the views of the seascape from land being generally restricted to coastal towns and immediate cliff edges.</p> <p>Heavily potted coastal waters with strong fishing heritage.</p> <p>Generally shallow waters which preclude commercial shipping.</p> <p>Submerged gas pipelines and Easington Gas refinery.</p> <p>Military practice area.</p> <p>Extensive WW1 and WW2 coastal defences, subject to coastal erosion.</p> <p>Variety of roosting and feeding seabirds dispersing from nesting areas.</p> <p>This MCA has large area around the Bridlington coast used extensively for leisure sailing. A navigational route cuts across the outer edge of this MCA. The inner coastal waters are part of an extensive fishing ground with some area of longlining further out. There is a limited number of hydrocarbon installations close to the shore and numerous wreck hazards with some popular as dive sites. There is also an area of water turbulence to the west of the Westernmost Rough offshore wind farm.</p>	<p>No substantial change anticipated within the study areas.</p>

MCA	Baseline Characteristics	Predicted future baseline character
	<p>The Westernmost Rough and Humber Gateway offshore wind farms are located within the southern part of this MCA and have altered its character (since the 2012 study was undertaken) through physical and visual changes to it through the introduction of large scale, moving structures.</p>	
<p>North Yorkshire Coastal Waters</p>	<p>Gently shelving coastal waters off the rugged coast of North Yorkshire between Flamborough Head and Saltburn-by-the-Sea.</p> <p>Flamborough Head, a prominent headland, is the northernmost coastal outcrop of chalk in Europe, forming a complex coastline of cliffs with numerous caves, arches and platforms.</p> <p>Low-lying coast south of Scarborough, including the broad and shallow crescent-shaped Filey Bay, contrasting with the high cliffs to the north.</p> <p>Unique combination of coastal and seabed limestone geology, with exposures of internationally important Jurassic and Cretaceous strata along the coast and evident in associated plant and animal fossil sites.</p> <p>Underlying seabed geology of chalk below Flamborough Head, and mudstones and limestones elsewhere.</p> <p>'Aggressive' North Sea currents and tides actively erode the coastline, particularly at Scarborough and Runswick Bay, requiring intervention with extensive man-made sea defences.</p> <p>Important vegetated sea cliffs, chalk reef and sea cave communities around Flamborough Head Special Area of Conservation (SAC). The area is also internationally important for its seabird populations (designated as a part of the Flamborough Head and Bempton Cliffs Special Protection Area (SPA) with nesting colonies of kittiwake, guillemot, fulmar, razorbill and puffins.</p> <p>Offshore, the Runswick Bay Marine Conservation Zone (MCZ) recognises diverse rocky and sediment seabed and sea cave habitats.</p> <p>Complex tidal patterns associated with Flamborough Head and Filey Point, as well as submerged rocks form hazards to navigation.</p> <p>This area was formerly part of Doggerland: dry land connecting the UK with Europe during Paleolithic times – inundated after the last Ice Age.</p> <p>Lighthouses (Flamborough Head and Whitby) provide prominent navigation marks, as do the ruined Whitby Abbey and Scarborough Castle which are prominent landmarks in views to and along the cliffs.</p> <p>Large number of wrecked merchant and fishing vessels, and minor warships – casualties of WWI and WWII or lost are testament to hazardous sea conditions. The protected site of the Filey Bay Wreck, Bonhomme Richard, an American privateer, dates from the late 18th century.</p>	<p>No substantial change anticipated within the study areas.</p>

MCA	Baseline Characteristics	Predicted future baseline character
	<p>Major historic fishing ports include Scarborough and Whitby as well as smaller ports at Filey, Flamborough, Straithes and Robin Hood’s Bay where large quantities of shellfish (crab and lobster) are landed. Brightly painted vernacular open coble fishing boats are still in use along parts of this coast.</p> <p>Historic importance of fishing to the local communities along the coast including whaling from Whitby, the great herring fleets of the 19th and early 20th century and sport fishing for tuna out of Scarborough in the 1930s.</p> <p>War Channels of the East Coast (WWI & WWII), essential routes for the maritime traffic of coal and civilian shipping via mine-free channels connect the Tyne to the Thames, and beyond. The coast at Scarborough and Whitby was subject to bombardment by German warships in 1914.</p> <p>Important industrial heritage associated with coastal mining of both of Alum and ironstone. A number of quarries are designated Scheduled Monuments; Boulby mine being one of the best national examples of a technically advanced alum quarrying complex. A railway tunnel and harbour at Port Mulgrave are reminders of the area’s important ironstone industry and links to coastal trade/shipping.</p> <p>Hilda of Whitby, Christian saint and founding abbess of the Whitby monastery, played a significant role in establishing Christianity in the North East, along with religious centres at Lindisfarne (MCA23) and Wearmouth-Jarrow (MCA22), all linked by waterborne route ways.</p> <p>Whitby, Filey and Scarborough are important historic ports/harbours and key religious/military sites and centres of trade, recognised in their built heritage and character. A long heritage as popular tourist destinations: today, the area continues to attract visitors to explore the local history, literary heritage or natural environment, with whale watching tours operating from Whitby.</p> <p>Popular walking route – the Cleveland Way National Trail forms part of the Filey Brigg to Newport Bridge section of the England Coast Path.</p> <p>Expansive views from the coast across undeveloped North Sea horizons, frequently marked by cargo ships, tankers and fishing vessels. Vistas along the coastline to settlements clinging to the cliffs such as to Robin Hood’s Bay and Runswick Bay, as well as views back from the sea to the rugged coast with distinctive landmarks.</p> <p>The smooth elevated moorlands of the North York Moors National Park provide a remote and dramatic backdrop to the MCA, in turn this largely undeveloped seascape forms part of its setting, particularly views north of Flamborough.</p> <p>North Yorkshire and Cleveland Heritage Coast defines stretches of undeveloped coast, characterised by ‘dark skies’ and ‘elevated levels of tranquillity.’</p> <p>There is an area to the north of Flamborough Head that is popular for leisure fishing and further north the inner coastal waters are extensively used for leisure sailing. A navigational route cuts across the outer edge of this MCA. There is a limited</p>	

MCA	Baseline Characteristics	Predicted future baseline character
	<p>number of hydrocarbon installations close to the shore and numerous wreck hazards as well as areas of water turbulence and some submerged rocks close to the shore.</p>	
Breagh Oil and Gas Field	<p>Undulating marine plain of approximately 50-70 m depth, the deepest waters associated with Whitby Fine Ground in the north.</p> <p>Area formerly part of the Palaeolithic landscape of Doggerland – dry land connecting the UK with Europe, subsequently inundated following the last Ice Age. Peat and remains of a mammoth dredged up by fishing trawlers, are evidence for Doggerland’s ancient location above sea level.</p> <p>Chalk seabed beneath Flamborough Head Ground; a band extending from the coast to Dogger Bank and running beneath the eastern part of the MCA. The remainder is underlain by mudstones. Seafloor topped by sand and gravel sediments.</p> <p>The area experiences moderate wave action with weak tidal currents. Low wave heights are characteristic across the MCA. Stable environment and uniform sea temperatures of the North Sea allow spring and autumn phytoplankton blooms.</p> <p>Area influenced by the Flamborough Front, an upwelling of nutrients where the cooler northern and warmer southern waters of the North Sea mix, providing an important food source for marine mammals. Southern North Sea SAC (SAC), covering a vast area (36,951 km²), is important for its harbour porpoise population. Atlantic white-sided dolphins are also present.</p> <p>Historically important as part of the wider North Sea: early Roman explorations recorded in 12 BC; Viking raiding for two centuries from 793 AD; and maritime trade between the North East and Scandinavia and the Baltic from the medieval period onwards.</p> <p>WWI naval engagements, including the First Battle of the Atlantic, marking the first submarine war patrols in history when German U-boats attacked the Royal Navy, and the later Battle of Dogger Bank – Blucher sunk by British battlecruisers in the North Sea.</p> <p>The East Coast War Channels were vital for transporting coal and other goods from the Tyne to the Thames and France, during WWI and WWII.</p> <p>The Greater North Sea is one of the busiest sea areas in the world, important for marine transport with busy shipping lanes linking ports in Europe with the North East.</p> <p>Relatively small number of recorded wrecks due to the vast open, deep seas and calmer waters.</p> <p>Popular fishing area, despite part of the area being known as ‘Heartbreak Ridge’ due to the unpredictable fish catches in this area. The wider MCA is also exploited for stocks of Queen scallops, deep water prawns and whelks.</p> <p>Important spawning area for commercially fished cod and plaice across Flamborough Head Ground, with herring, lemon sole, sand eel and sprat also spawning in the MCA.</p> <p>Breagh oil and gas field is located in the centre of the MCA, with additional wells associated with Flamborough Head Ground. These sites are connected to the mainland by submerged pipelines crossing the seafloor.</p>	<p>No substantial change anticipated within the study areas.</p>

MCA	Baseline Characteristics	Predicted future baseline character
	<p>Busy waters for shipping, with major routes crossing from the Port of Tyne and Teesport, connecting to mainland Europe or southern English ports.</p> <p>Waters licensed for military use, including air-to-air firing practice at Staxton and submarine exercise areas at Castle and Scarborough Grounds.</p> <p>Uniform, open waters with high levels of tranquillity and remoteness in spite of the range of dynamic human activities present.</p> <p>MCA forms part of the wider, remote maritime setting to the eastern edge of North York Moors National Park and FHHC.</p> <p>There are numerous navigational routes crossing this MCA. There are large areas where longlining and seine netting fishing practices are followed. There is a limited number of hydrocarbon installations.</p>	

Landscape Character

- 10.7.1.29 The SLVR Hornsea Four HVAC booster station study area includes an area of landscape that has a diverse range of identified characteristics across both the Yorkshire Wolds and the Holderness National Character Areas (Natural England 2015). The landscape is further defined into 23 Character Types and these are described, and their value assessed in the East Riding of Yorkshire Landscape Character Assessment Update 2018 (ERYC 2018). The LCT are shown on [Figure 10.4](#).
- 10.7.1.30 [Figure 10.4](#) illustrates that the vast majority of the HVAC booster station study area landscape is located within the 13F: Flamborough Headland Farmland, which is a sub-type of LCT 13: Open High Rolling Farmland.
- 10.7.1.31 The key characteristics of the Open High Rolling Farmland LCT 13 are listed in East Riding of Yorkshire Landscape Character Assessment Update 2018 (AECOM 2018) as follows:
- Elevated rolling landform of the Yorkshire Wolds dip slope falling east;
 - Large scale open landscape with long distance views and dominated by the sky;
 - Sparsely populated area with scattered villages and farmsteads;
 - Large and very large rectilinear regular arable fields;
 - Fragmented hedgerows that are severely clipped;
 - Very few trees resulting in an open landscape;
 - Shelterbelts around farmsteads on the hill tops are a prominent feature;
 - Pockets of parkland and estate land to the east on the lower slopes provide diversity;
 - Enclosure roads that conform to the enclosure field pattern alongside older routes are well spaced;
 - Numerous Public Rights of Way; and
 - South Dalton Church spire is a prominent landmark in the relatively featureless landscape.
- 10.7.1.32 Also of note within the descriptions of the LCT are that 'Turbine developments, communications masts and pylons are the main detractors in this LCT'.
- 10.7.1.33 Under the headings of 'Evaluation' and 'Quality', it is noted in the East Riding of Yorkshire Landscape Character Assessment Update 2018 (ERYC 2018) that *'This LCT is part of the distinctive chalk lands of the Wolds and contributes to the diversity of the Yorkshire Wolds from the escarpment landform to the steep sided dry vales and the rolling arable farmland. The coastal landscape is also a highly valued recreation and landscape resource that is recognised in the Heritage Coast designation at Flamborough Head. The LCT is assessed to be high quality.'*
- 10.7.1.34 Positive landscape features of the Open High Rolling Farmland LCT have been identified by AECOM in the evaluation section of the East Riding of Yorkshire Landscape Character Assessment Update 2018 (ERYC 2018) as follows:
- Varied rolling landform offering extensive views;
 - Views east over Holderness and to the North Sea at Flamborough;
 - Scattered farmsteads with shelterbelts;
 - Large rectilinear parliamentary enclosure fields; and
 - Views of South Dalton Church Spire and Flamborough Lighthouse.

- 10.7.1.35 Of note in relation to this assessment are the references to views within and from this landscape.
- 10.7.1.36 The LCT is also described as containing a large number of areas of conservation interest (wildlife, earth science, archaeological, historic, cultural).
- 10.7.1.37 The description for LCA 13F: Flamborough Headland Farmland is set out below:

'This LCA comprises elevated farmland overlooking the coastline to the east around Flamborough. The influence of the coast and views of the North Sea make this area distinctive from the other farmland in this LCT. The area is also distinctive as a result of its geology. The headland is covered with glacial till from the Devensian period.

Although dominated by agriculture, like adjoining LCA, there are a number of developments associated with the tourism and recreation industries that distinguish this LCA. These are predominantly caravan parks and camping areas which are generally situated close to the coastline.

The only village within the LCA is Flamborough, approximately 2 miles northeast of Bridlington, which has a Conservation Area designation. Scattered farmsteads are also present within the LCA.

Inland from the cliff tops, the land consists of a considerable area of permanent grassland, with fields bound by hedgerows and fencing. Fields are large and rectilinear becoming smaller approaching the coast, in a structured pattern.

Tree cover is very low with very few small groups scattered over the LCA and a notable strip of woodland along Danes Dyke which extends across the headland west of Flamborough.

Flamborough was a significant port in the Middle Ages but fell into decay in the 16th Century. It contains the ruins of a fortified manor house surrounded by earthworks. Danes Dyke is an ancient linear earthwork which crosses the Flamborough Headland from north to south. A designated scheduled monument, it is thought to have been constructed in the Iron Age as a defence. World War II pill boxes are located in the LCA as modern defence features.

The headland is bound by tall chalk cliffs and the area is a Designated Heritage Coast and is part of the Flamborough Heritage Coast Important Landscape Area.

Flamborough Head is also designated Special Area of Conservation (SAC), Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) due to its conservational and ecological importance.'

- 10.7.1.38 A Wind turbine Sensitivity and Capacity Study is included as part of the Landscape Character Area Update 2018 (ERYC 2018). The LCTs are used to inform the study and to identify 'areas of significant constraint', 'areas of potential constraint' and 'areas of search' for onshore wind energy developments. However, the study relates only to onshore wind energy and the only reference to offshore wind energy developments is a reference to views of existing offshore wind energy developments being influential from within the Coastal Farmland LCT, which extends along the coast from south of Bridlington to the Humber Estuary.

10.7.1.39 The East Riding Local Plan 2012-2029 Strategy Document (ERYC 2016) sets out its intentions for promoting a high quality landscape. It has set out the following policy (ENV2: Promoting a high quality landscape) relating to this matter:

A. Development proposals should be sensitively integrated into the existing landscape, demonstrate an understanding of the intrinsic qualities of the landscape setting and, where possible, seek to make the most of the opportunities to protect and enhance landscape characteristics and features. To achieve this, development should:

- 1. Protect the character and individual identity of settlements by maintaining their physical separation, including through the maintenance of the Key open Areas identified in Policies A1-A6, where there is a risk of settlement coalescence.*
- 2. Protect and enhance important open spaces within settlements which contribute to their character.*
- 3. Ensure important hedgerows and trees are retained unless their removal can be justified in the wider public interest. Where important hedgerows and trees are lost replacements will usually be required.*
- 4. Maintain or enhance the character and management of woodland where appropriate.*
- 5. Retain, not detract from, and enhance wetland and water feature characteristics.*
- 6. Protect and enhance views across valued landscape features, including flood meadows, chalk grassland, lowland heath, mudflats and salt marsh, sand dunes and chalk cliffs.*
- 7. Protect and enhance the undeveloped coast.*

B. Proposals should protect and enhance existing landscape character as described in the East Riding Landscape Character Assessment, in particular, within the following Important Landscape Areas as shown on the Policies Map:

- 1. The Yorkshire Wolds, with special attention to ensuring developments are of an appropriately high quality and will not adversely affect the historic and special character, appearance or natural conservation value.*
- 2. The Heritage Coast designations at Flamborough and Spurn Head.*
- 3. The Lower Derwent Valley, which includes the River Derwent Corridor and Pocklington Canal.*
- 4. The Thorne, Crowle and Goole Moors.*

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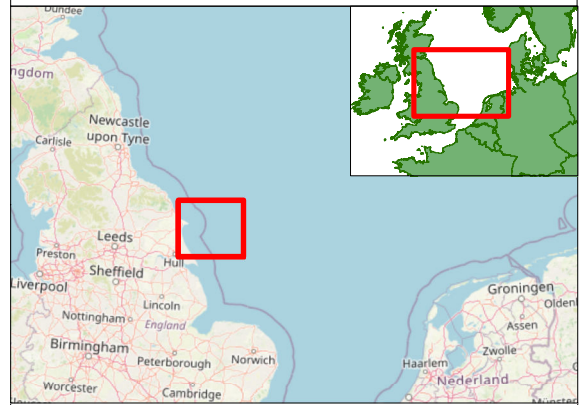
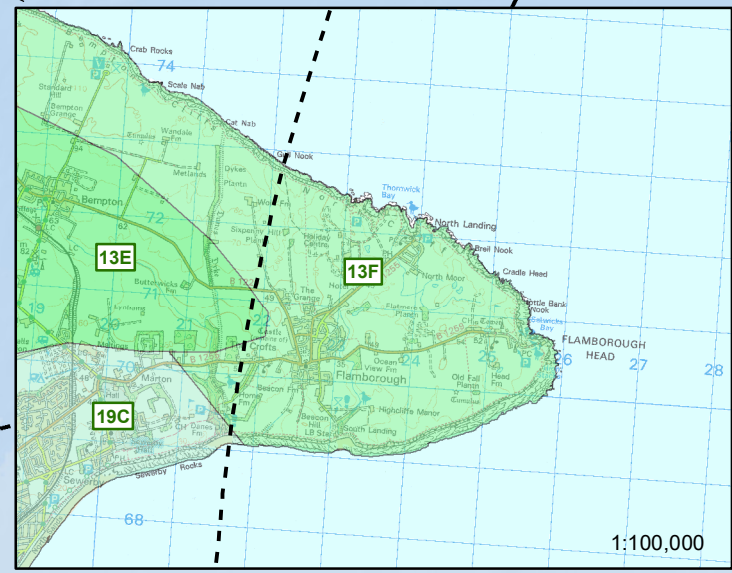
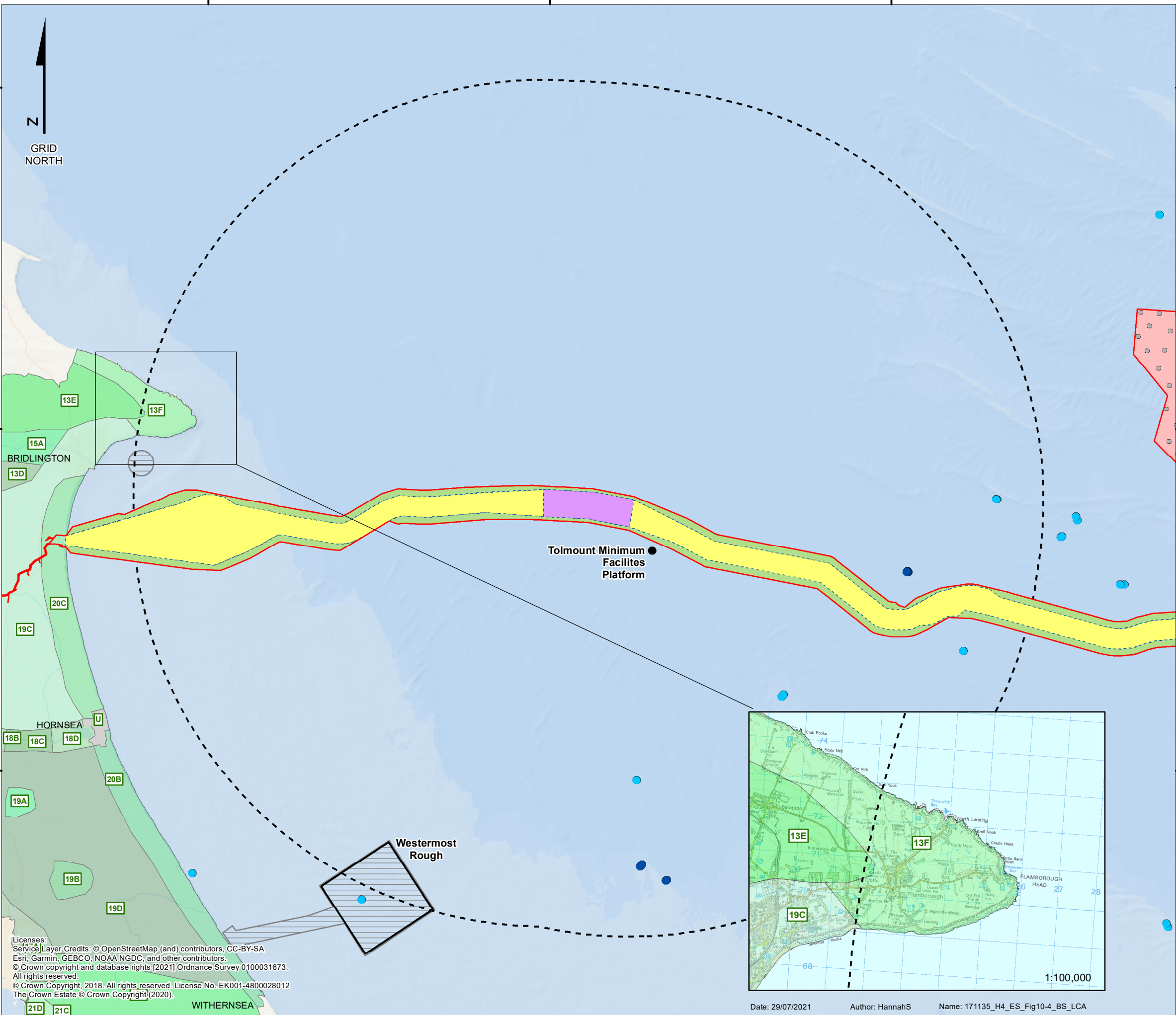
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Hornsea Four

Figure 10.4

SLVR HVAC Booster Station Study Area with Landscape Character

- Indicative Turbine Position
- Order Limits
- Array Area
- HVAC Booster Station Works Area
- Offshore Temporary Works Area
- Offshore Export Cable Corridor
- HVAC Booster Stations Study Area
- Oil and Gas Platform:
 - Offshore Platform
 - Offshore Platform (Manned)
 - Offshore Platform (Operational)
- Existing Aggregate Area:
 - Open Disposal Site
- Offshore Wind Farm Status:
 - Active/In Operation
- Landscape Character:
 - 13D - North Wolds Plateau Farmland
 - 13E - Bempton, Grindal and Wold Newton Farmland
 - 13F - Flamborough Headland Farmland
 - 15A - Gypsy Race Corridor Rudston to Bridlington
 - 17A - Hedon, Preston and Bilton Farmland
 - 18B - Quarry Farmland
 - 18C - Catfoss Dyke
 - 18D - Hornsea Mere
 - 19A - Rise Parkland
 - 19B - Burton Constable Farmland and Parkland
 - 19C - North Holderness Open Farmland
 - 19D - Central Holderness Open Farmland
 - 19E - Burstwick to Withernsea Coast
 - 20B - Hornsea to Withernsea Coast
 - 20C - Bridlington To Hornsea Coast
 - 21C - South Patrington, Ottringham and Keyingham Farmland
 - 21D - Paull Farmland
 - U - Urban




Coordinate system: ETRS 1989 UTM Zone 31N
 Scale@A3: 1:275,000
 0 2 4 8 Kilometres
 0 1 2 4 Nautical Miles

REV	REMARK	DATE
	First Issue for ES	10/06/2020
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SLVR HVAC Booster Station Study Area with Landscape Character
 Document no: H4ES_SV04
 Created by: LA
 Checked by: LT
 Approved by: LK



Special Character of FHHC

10.7.1.40 Drawing on the information and descriptions set out above, the FHHC includes the following elements and features that are considered to combine to create its Special Character:

- Outstanding natural features;
- A coastal landscape of spectacular chalk cliffs topped with boulder clay;
- The interaction of geology, climate, human use and management has created a unique and special landscape and associated habitat for wildlife - affected by influences arising both inland and at sea;
- Internationally important and protected wildlife sites;
- Inland elevated farmland influenced by the coast and views of the North Sea;
- Farmland mostly pasture with large, regular fields bound by hedgerows and fences and a low incidence of woodland apart from along Danes Dyke;
- Areas of great architectural and historical value;
- Settlement pattern limited to small villages and scattered farmsteads;
- The rich mixture of features, wildlife and activities found around the headland are enjoyed by a large numbers of visitors;
- Numerous, largely coastal, developments and routes supporting the tourism and recreation industries; and
- People using the coast influenced by interaction with and expansive views out to sea that are undeveloped but active with boating.

Visual receptors

10.7.1.41 The visual receptors that may experience effects as a result of the development are largely located offshore. However, there are also people located within the Flamborough Head coastal area that may have views of Hornsea Four.

10.7.1.42 The visual characteristics of the Hornsea Four array area study area could be described as relatively homogenous due to the distance of the Hornsea Four array area to the coast. Views consist mainly of open seas with occasional views of offshore structures, such as platforms. There is regular passage of use by sea-going vessels for a variety of purposes, including recreational cruising, commercial ferry routes, commercial fishing activities, tankers and cargo vessels with such activity introducing movement and change within the views. Overhead combat training in aeroplanes furthers this characteristic of movement and change.

10.7.1.43 **Figure 10.5** and **Figure 10.6** illustrate the likely potential locations of visual receptors (people) within the SLVR array area and HVAC booster stations study areas respectively.

10.7.1.44 Visual receptors within the Hornsea Four array area study area can be broadly defined as people that are undertaking recreational travel and those that are working.

10.7.1.45 People undertaking recreational travel include those on yachts and other vessels who are doing so partly with the intention of enjoyment of their surroundings. The pattern of the Royal Yachting Association (RYA) cruising routes shows that vessels may pass into the array area study area from the west close to the HVAC booster station search area.

- 10.7.1.46 Other recreational travellers may be on a day cruise or travelling on a ferry, which may be as part of a holiday, where they will pass from the shore to the open sea. The majority of the views obtained by these people are of the open sea with occasional glimpses of gas platforms or associated infrastructure and other vessels. In the future they may also gain close range views of the operational and under construction offshore wind farms.
- 10.7.1.47 Ferries carry many people that are working. Air combat training also takes place over the study areas. Fishing of many types occurs extensively. There are also numerous manned oil and gas platforms within the study areas and a number of aggregate areas and open disposal areas, in the south west of the Hornsea Four array area study area.
- 10.7.1.48 The types of visual receptors known to be present within the array area study area can therefore be described as follows:
- Sailors following the cruising routes identified by the RYA, which are largely located close to the coast;
 - 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 oil and gas or OWF accommodation platforms or travelling to the platforms;
 - People at their place of work on commercial fishing vessels;
 - People at their place of work on aggregate vessels; and
 - Military personnel using identified Military Practice Areas.
- 10.7.1.49 The main ferry routes through the SLVR array area study area are used by the Newcastle to Amsterdam Cruise Ferries which generally pass through the study area twice each day. The cruise ferry departs Newcastle daily at 17:00 and the return journey arrives back at Newcastle at 09:00 or 09:30. Based on the published departure times and a cruising speed of 21 knots, it is possible to estimate the approximate times the ferries will pass through the SLVR array area study area.
- 10.7.1.50 Based on average cruising speeds and the scheduled 17:00 daily departure time of the cruise ferry from Newcastle, this suggests that the cruise ferry would pass through the Hornsea Four array area study area during the hours of darkness for much of the year i.e. arriving at the northern edge of the study area at 20.15 and leaving the southern edge at 00.25.
- 10.7.1.51 On the scheduled journey leaving Amsterdam at 17:30, for the majority of the year, the cruise ferry will pass through the study area during the hours of darkness i.e. arriving at the southern edge of the study area at 22.50 and leaving the northern edge at 03.00.
- 10.7.1.52 The HVAC booster stations study area is more visually influenced by coastal views and a higher density of recreational vessels and smaller fishing boats using the inshore waters. The location of the General Boating Areas ([Figure 10.5](#)) indicates that most leisure boating would occur close to the shore. The leisure and recreational boating intensity information has been prepared by the RYA UK from Automatic Identification Systems (AIS) data and indicates higher levels of activity close to the shore to the north of Flamborough Head and extending south-eastwards away from the headland. The character of the views from these locations will be defined both by the landscape of the coast and the open sea.

- 10.7.1.53 On the land at Flamborough Head, there are a number of PRow along the coast around the headland and connecting inland to the small settlement of Flamborough. The coastal footpath is known as the "Headland Way", forming part of the "East Riding Heritage Way" which runs 80 miles from Hull to Filey Brigg. There are also numerous paths through and around the Nature Reserves with a bird hide also located close to Flamborough Head lighthouse.
- 10.7.1.54 Beaches are accessible to pedestrians via steps at Selwicks Bay, Thornwick Bay, via minor roads or tracks at Danes Dyke and South Landing, and via a steep concrete ramp at North Landing. There are car parks and facilities at Thornwick Bay, North Landing, Selwicks Bay, South Landing and Danes Farm as well as various facilities such as cafes and benches as well as the lighthouse, which is sometimes open to the public, at Flamborough Head. However, some parts of the headland have only limited access to the public.
- 10.7.1.55 The Flamborough Head Management Plan (2007) notes that 'The majority of visitors to the Heritage Coast come simply to enjoy the scenery and sea air; many go for short walks or visit the beach although a fair number may not leave the car park at all. There are, however, a number of other activities that relate to the special characteristic of this area. Large numbers of bird-watchers visit each year, many to see the spectacular seabird colonies on the north side of the headland, but also because the headland is very well known as an area for observing migrant birds in spring and autumn.'
- 10.7.1.56 The current baseline description above provides an accurate reflection of the current state of the existing environment. The earliest possible date for the start of construction is 2024 with a single phase of offshore construction over approximately three years, and an expected operational life of 35 years, and therefore there exists the potential for the baseline to evolve between the time of assessment and point of impact. Changes to the baseline in relation to SLVIA can occur over the long term (considered in [Section 10.7.2](#)) or short to medium term. The current baseline described above gives an accurate portrayal of the existing environment based on the most recent available data, and the baseline at the point of impact is expected to be broadly similar to this in most respects. However, it is reasonably foreseeable that the baseline will evolve between the time of assessment and the point of impact in terms of the following aspects:
- Hornsea Project Two will be fully constructed and operational; and
 - Hornsea Project Three may be under construction or operational.

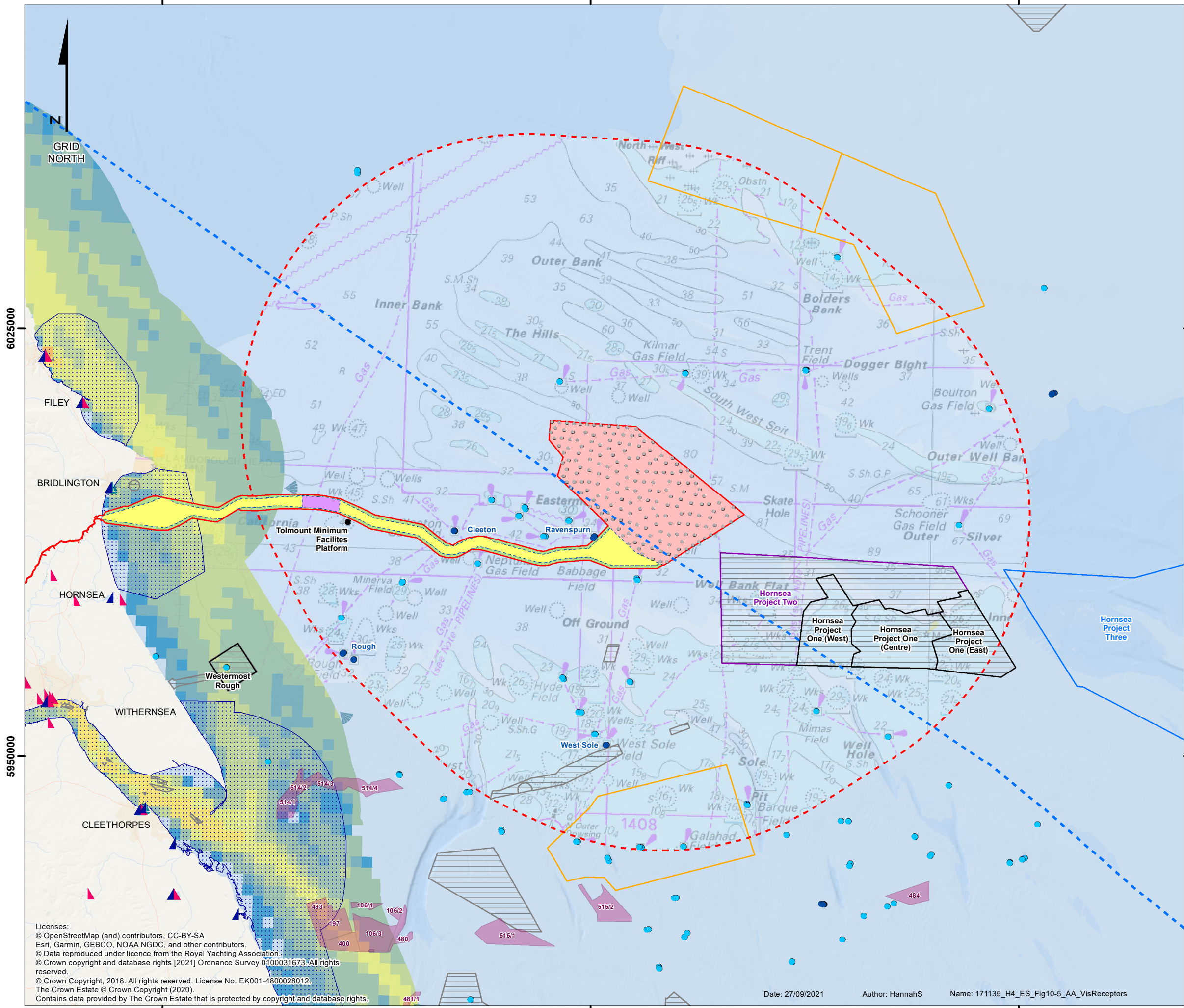
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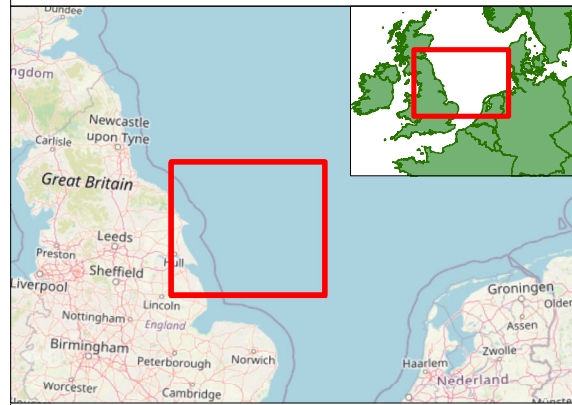
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Hornsea Four

Figure 10.5 SLVR Hornsea Four Array Area with Visual Receptors



- Indicative Turbine Position
- Order Limits
- Array Area
- HVAC Booster Station Works Area
- Offshore Temporary Works Area
- Offshore Export Cable Corridor
- Hornsea Four Array Area Study Area
- Offshore Platform
- Offshore Platform (Manned)
- Offshore Platform (Operational)
- Existing Aggregate Area
- Open Disposal Site
- Active/In Operation
- Under Construction
- In Planning
- Crown Estate Leasing Round 4 Preferred Projects
- RYA and Ferry Routes: Newcastle - Amsterdam
- RYA Clubs
- RYA Training Centres
- Marinas
- Offshore Routes
- General Boating Areas



Coordinate system: ETRS 1989 UTM Zone 31N
 Scale@A3: 1:650,000
 0 5 10 20 Kilometres
 0 3 6 12 Nautical Miles

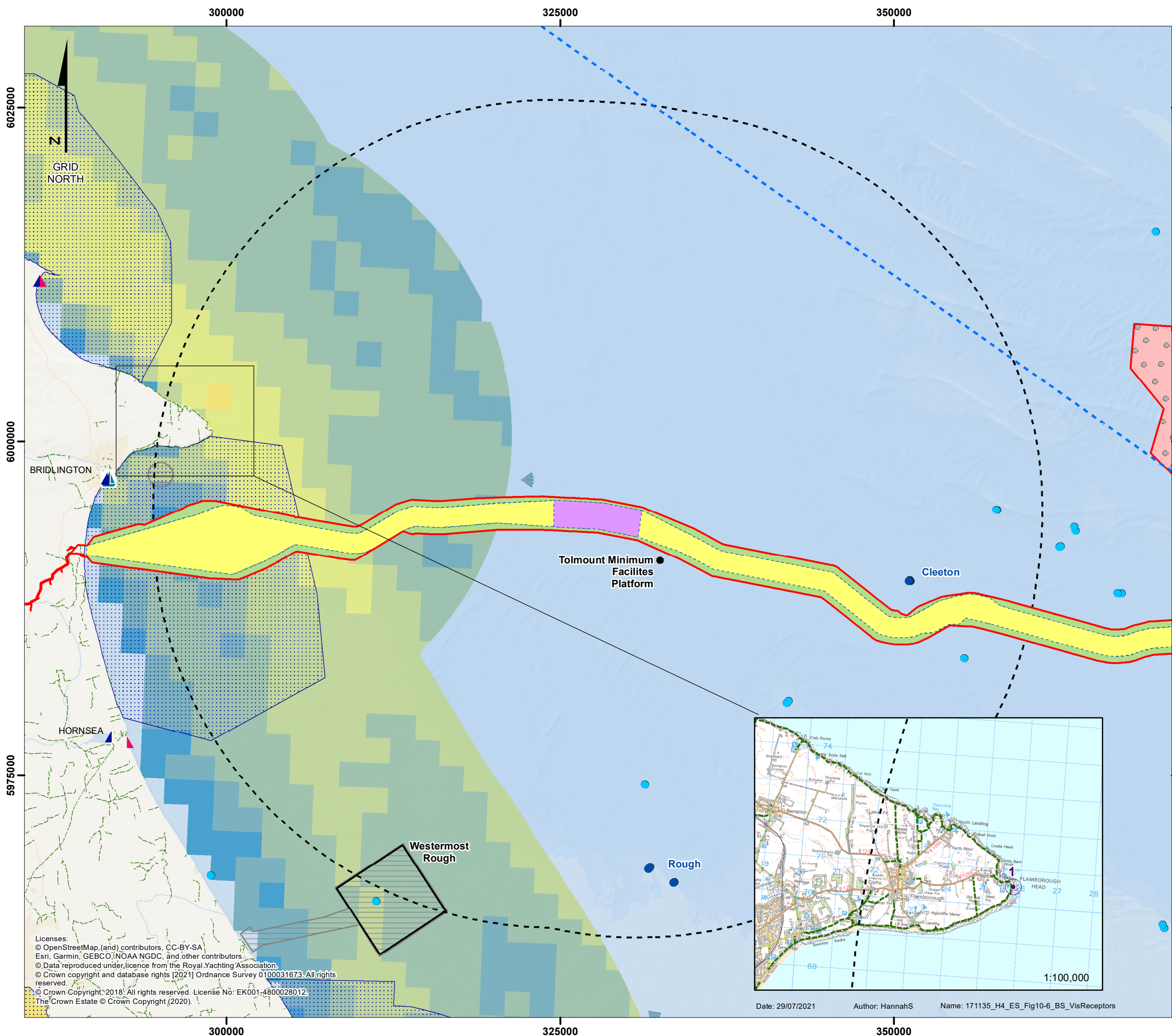
REV	REMARK	DATE
	First Issue for ES	10/06/2020
A	Updated to include project boundary changes	11/12/2020
B	Updated to include project boundary changes	21/07/2021

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Hornsea Four

Figure 10.6

SLVR HVAC Booster Station Study Area with Visual Receptors



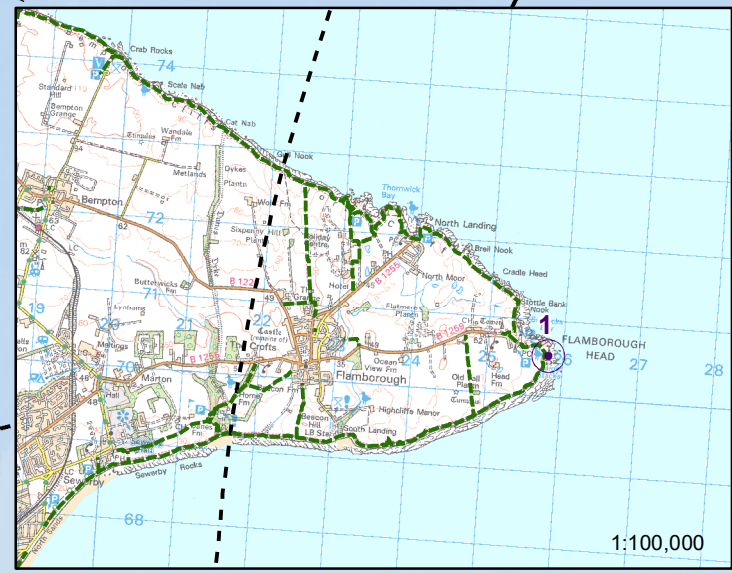
- Indicative Turbine Position
- ◻ Order Limits
- ◻ Array Area
- ◻ HVAC Booster Station Works Area
- ◻ Offshore Temporary Works Area
- ◻ Offshore Export Cable Corridor
- ◻ HVAC Booster Stations Study Area
- Offshore Platform
- Offshore Platform (Manned)
- Offshore Platform (Operational)
- ◻ Existing Aggregate Area: Open Disposal Site
- ◻ Offshore Wind Farm Status: Active/In Operation
- Walking Route: Public Right of Way
- RYA and Ferry Routes: Newcastle - Amsterdam
- ▲ RYA Clubs
- ▲ RYA Training Centres
- ▲ Marinas
- ▲ Offshore Routes
- ◻ General Boating Areas
- AIS Boating Intensity: Low, High



Coordinate system: ETRS 1989 UTM Zone 31N
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 0 2 4 8 Kilometres
 0 1 2 4 Nautical Miles

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10.7.2 Evolution of the Baseline

- 10.7.2.1 The baseline character of the seascape, landscape and visual resource in the Hornsea Four SLVR study areas is likely to change in the future as a result of the effects of climate change, land use policy, environmental improvements and development pressures, regardless of whether Hornsea Four progresses to construction and operation or not.
- 10.7.2.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require that “an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge” is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of Hornsea Four (operational lifetime anticipated to be 35 years), long-term trends mean that the condition of the baseline environment is expected to evolve. This section provides a qualitative description of the evolution of the baseline environment, on the assumption that Hornsea Four is not constructed, using available information and scientific knowledge of SLVIA.
- 10.7.2.3 A range of policies and legislation impact on the management of the seascape, landscape and visual resource, ranging from European Directive, national policy and regulation, through to community strategies and development frameworks, including the Flamborough Head Management Plan (2007). The effects of these are evident in the wider landscape through the introduction of renewable energy development, agricultural management practices which has resulted in very large field sizes and infrastructure for recreation and nature conservation evidenced by path networks and nature reserve access and facilities for watching wildlife. The Flamborough Head Management Plan document sets out a range of policies which generally seek to conserve and enhance nature conservation and marine environments but also the natural beauty of the area and cultural heritage assets, while recognising the need to accommodate human needs and adapt to inevitable change over time. Further details of the Flamborough Head Management Plan and its aims are set out in [Section 10.7.1](#). There is overwhelming evidence that global climate change, influenced by the human use of fossil fuels, raw materials and intensive agriculture, is occurring (IPCC 2014). Any notable change in climate is likely to present potential changes to the coastline and landscape of the study area in a variety of ways such as through coastal erosion or the construction of flood/erosion protection measures. The legislative framework already exists to ensure that no net loss of internationally important habitat occurs, but there remains a need to increase understanding of the potential effects of climate change on the characteristic landscapes of the study area and to develop longer term strategies that will mitigate any adverse effects of climate change.
- 10.7.2.4 Recent development management decisions/planning decision precedent has established and accepted landscape change from offshore wind farm developments in the seascape of the SLVR study areas. Several large-scale offshore wind farms are operating and visible in the seascape of the SLVR study areas and wider area, including Westernmost Rough in the Holderness Coastal Waters near Withernsea and Hornsea Project One (now operational) in the offshore waters of the eastern part of the study area. The baseline conditions are likely to change as a result of further offshore wind energy development in this seascape.

10.7.3 Data Limitations

- 10.7.3.1 The key data limitation with the baseline data and their ability to materially influence the outcome of the EIA are the representativeness of the Donna Nook Met Office visibility data to establish the potential frequency of visibility of the Hornsea Four WTGs and Hornsea Four HVAC booster stations from locations within the SLVR study areas. The appropriateness and rationale for the use of the Donna Nook Met Office visibility data is set out below.
- 10.7.3.2 Both GLVIA3 (LI & IEMA 2013) and SNH guidance (SNH 2017, para 39) refer to the use of Met Office visibility data to assess typical visibility conditions within an area. Most synoptic observing stations have sensors which provide a measurement of visibility. Visibility sensors measure the meteorological optical range which is defined as the length of atmosphere over which a beam of light travels before its luminous flux is reduced to 5% of its original value. The use of light within the visible spectrum allows the sensor to most accurately simulate human perception of visibility. Reasonably accurate measurements are possible over a range of visibility extending from a few tens of metres to a few tens of kilometres.
- 10.7.3.3 Although there are limitations to how this data can be applied to judgements about wind farm or HVAC booster station visibility, the 'visibility' data provides some understanding and evidence basis for evaluating the actual visibility of the structures against their background.
- 10.7.3.4 The closest coastal Met Office location with a synoptic observing station is 74 km to the south of the Humber estuary at Donna Nook. The observing station is located within the same climatic zone (cold winters, cool summers) and has the same polar continental prevailing wind (cold and dry)³ as Flamborough Head and the coastal area to the south of there. This is considered sufficiently close and representative for it to provide an indication of the likely visibility frequency offshore within this area.
- 10.7.3.5 The information derived from the Donna Nook Met Office visibility data indicates that from locations on the coast visibility of the array area and HVAC booster stations is likely to occur broadly in line with the visibility monitored over the 10 years up to end 2018 and as set out in [Table 10.6](#).
- 10.7.3.6 It is considered that these limitations are not of such a level that they would materially alter the findings of the SLVR assessment.

³ <https://www.bbc.com/bitesize/guides/zjk7hyc/revision/1>

Table 10.6: Summary of visibility from the coast at distances from the array area and HVAC booster stations.

Distance	Visibility measured over 10 year period (%)	Total time per annum (approximately)
<i>Array Area</i>		
68.7 km (to closest point on Flamborough Head)	0.27%	< 1 day
75.3 km (to coast around Bridlington)	0.05%	< 5 hours
<i>HVAC booster stations</i>		
25.9km (to closest point on Flamborough Head)	33%	122 days
30 km (to coast around Bridlington)	12%	43 days

10.8 Project Basis for Assessment

10.8.1 Impact register and impacts not considered in detail in this ES

10.8.1.1 Upon consideration of the baseline environment, the project description outlined in [Volume A1, Chapter 4: Project Description](#), the Hornsea Four Commitments detailed within [Volume A4, Annex 5.2: Commitments Register](#), in response to formal consultation on the PEIR and additional consultation following consideration of Section 42 responses, a number of impacts are “not considered in detail” in the ES. These impacts are outlined, together with appropriate justification for this, in [Table 10.7](#) alongside impacts that were scoped out during the Scoping process. Further detail is provided in the [Volume A4, Annex 5.1: Impacts Register](#).

10.8.1.2 In relation to concerns over the potential effects of the HVAC booster station lighting on the dark skies out to sea following PEIR consultation, which Natural England considers form part of the special character of the FHHC, Hornsea Four has defined HVAC Booster Station maximum height to include the masts and other structures (rather than these being additional height) as well as the lighting requirements, in agreement with the CAA and MoD (see [Table 10.3](#)). A commitment has been made by Hornsea Four (Co200 – see [Table 10.8](#)) to take this into account. It has been agreed following further consultation with Natural England and ERYC that this commitment and the design refinements satisfactorily mitigate the potential effect on the lighting of the HVAC booster stations so that the potential effects on the dark skies out to sea which Natural England considers to be part of the Special Character’ of the FHHC would be not significant and can therefore be scoped out of the EIA. In addition, the search area for the HVAC Booster Stations has moved slightly back from the coast by approximately 0.85 km since PEIR, so the closest possible distance to the coast at Flamborough Head is now 25.85 km. This increased distance also results in parts of the FHHC being excluded from the subsequently revised HVAC booster station 30 km radius study area.

Table 10.7: Impacts scoped out of assessment and justification.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Offshore construction activities of array area visible by day and night from offshore visual receptors (SVR-C-1A).	No likely significant effect	Scoped Out	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.11.1). The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.
Offshore construction activities of HVAC booster stations visible by day and night from offshore visual receptors (SVR-C-1B).	No likely significant effect	Not considered in detail in the ES	Impact not considered in PEIR. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on landscape character of FHHC as a result of views of HVAC booster station and cable construction (SVR-C-2)	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on the views and visual receptors located within the FHHC as a result of views of HVAC booster station and cable construction (SVR-C-3)	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on landscape character, views and visual receptors located within FHHC as a result of HVAC booster stations and cable corridor construction lighting (SVR-C-4).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on seascape character of MCAs as a result of physical presence and views of all offshore project elements during construction (SVR-C-5).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
Offshore array area, offshore export cables and HVAC booster stations night-time impacts on seascape character (SVR-O-13).	No likely significant effect	Scoped Out	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.11.4). The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.
Impact on seascape and landscape character of MCAs as a result of physical presence and views of the array area and HVAC booster stations (SVR-O-5).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on the views and visual receptors located within the FHHC as a result of views of HVAC booster stations (SVR-O-6).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on landscape character, views and visual receptors located within FHHC as a result of HVAC booster station lighting (SVR-O-7).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on seascape of MCAs as a result of physical presence and views of the array area and HVAC booster stations being decommissioned (SVR-D-9).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on landscape character of FHHC as a result of views of HVAC booster stations being decommissioned (SVR-D-10).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on the views and visual receptors located within the FHHC as a result of views of HVAC booster stations being decommissioned (SVR-D-11).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.
Impact on landscape character, views and visual receptors located within FHHC as a result of HVAC booster station decommissioning lighting (SVR-D-12).	No likely significant effect	Not considered in detail in the ES	Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.

Project activity and impact	Likely significance of effect	Approach to assessment	Justification
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Notes:

Grey – Scoped out - Agreement reached between Hornsea Four and the Planning Inspectorate at Scoping.

Purple – Impact not considered in detail in the ES. No likely significant effect at PEIR.

10.8.1.3 It is important to note that as agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion or agreed to be not considered in detail in the ES (further details in [Table 10.3](#) and [Volume A1, Chapter 6: Consultation](#)). As such, no impact assessment is presented in this chapter.

10.9 Commitments

10.9.1.1 Hornsea Four has adopted commitments (primary design principles inherent as part of Hornsea Four, installation techniques and engineering designs/modifications) as part of their pre-application phase), to eliminate and/or reduce the likely significant effect (LSE) arising from a number of impacts. These are outlined in [Volume A4, Annex 5.2 Commitments Register](#). Further commitments (adoption of best practice guidance), referred to as tertiary commitments are embedded as an inherent aspect of the EIA process. Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are reduced to environmentally acceptable levels.

10.9.1.2 The commitments adopted by Hornsea Four in relation to SLVR are presented in [Table 10.8](#).

Table 10.8: Relevant SLVR commitments.

Commitment ID	Measure Proposed	How the measure will be secured
Co200	Secondary: Lighting at the HVAC Booster Station(s) will accord with the design set out in the HVAC Booster Station Lighting Plan to ensure that the night-time effects of the HVAC Booster Station lighting on the special characteristics of the Flamborough Head Heritage Coast will be not significant.	DCO Schedule 12, Part 2 - Condition 22 (HVAC Booster Station Lighting Plan)

10.10 Maximum Design Scenario (MDS)

10.10.1.1 The Maximum Design Scenario (MDS) is the parameters which are judged to give rise to the maximum levels of effect for the assessment undertaken, as set out in [Volume A1, Chapter 4: Project Description](#). As all potential impacts associated with the Seascape, Landscape and Visual Resource have either been scoped out through the Scoping process or are not considered in detail within the ES (as no LSE identified), no MDS have been presented within this chapter.

10.11 Assessment Methodology

10.11.1.1 As all potential impacts associated with the Seascape, Landscape and Visual Resource have either been scoped out through the Scoping process or are not considered in detail within the ES (as no LSE identified), no assessment methodology has been presented within the chapter. [Volume A1, Chapter 5: Environmental Impact Assessment Methodology](#) sets out the general methodology used in the ES.

10.12 Impact Assessment

10.12.1 Construction

10.12.1.1 Following the scoping for seascape, landscape and visual resources, the assessment presented in the PEIR, agreement of mitigation and commitments and further consultation with Natural England and ERYC, potential impacts of offshore construction activities (SVR-C-1A, SVR-C-1B, SVR-C-2, SVR-C-3, SVR-C-4, and SVR-C-5) are considered likely to be not significant in EIA terms due to project commitments and therefore have not been considered in detail in this ES, as summarised in [Table 10.7](#). Further details are provided in the 'Seascape, Landscape and Visual Resources' section of [Volume A4, Annex 5.1: Impacts Register](#).

10.12.2 Operation and Maintenance

10.12.2.1 Following the scoping for seascape, landscape and visual resources, the assessment presented in the PEIR, and further consultation with Natural England and ERYC, potential impacts of offshore operation and maintenance activities (SVR-O-13, SVR-O-5, SVR-O-6, and SVR-O-7) are considered likely to be not significant in EIA terms due to project commitments and therefore have not been considered in detail in this ES, as summarised in [Table 10.7](#). Further details are provided in the 'Seascape, Landscape and Visual Resources' section of [Volume A4, Annex 5.1: Impacts Register](#).

10.12.3 Decommissioning

10.12.3.1 Following the scoping for seascape, landscape and visual resources, the assessment presented in the PEIR, and further consultation with Natural England and ERYC, potential impacts of decommissioning activities (SVR-D-9, SVR-D-10, SVR-D-11, and SVR-D-12) are considered likely to be not significant in EIA terms due to project commitments and therefore have not been considered in detail in this ES, as summarised in [Table 10.7](#). Further details are provided in the 'Seascape, Landscape and Visual Resources' section of [Volume A4, Annex 5.1: Impacts Register](#).

10.13 Cumulative Effect Assessment (CEA)

10.13.1.1 Cumulative effects can be defined as effects upon a single receptor from Hornsea Four when considered alongside other proposed and reasonably foreseeable projects and developments. This includes all projects that result in a comparative effect that is not intrinsically considered as part of the existing baseline environment and is not limited to offshore wind projects.

10.13.1.2 A screening process has identified a number of reasonably foreseeable projects and developments which may act cumulatively with Hornsea Four. Offshore Wind Leasing Round 4 projects have recently been awarded by the Crown Estate with some of these located within the SLVR study area as shown on [Figure 10.1](#). However, there is insufficient information available in the public domain to allow any meaningful assessment to be included. The full list of such projects that have been identified in relation to the offshore environment is set out in [Volume A4, Annex 5.3: Offshore Cumulative Effects](#) and the projects are presented in a series of maps within [Volume A4, Annex 5.4: Location of Offshore Cumulative Schemes](#).

10.13.1.3 As agreed with the relevant stakeholders (ERYC, Natural England and PINS), all SLVR impacts have either been scoped out based on PINS Scoping Opinion, or agreed to be not considered in detail in the ES (further details in [Table 10.3](#) of this chapter and Table 1.1 and Annex 4 of [B1.1 Consultation Report](#)). As such, no CEA has been undertaken as there is no pathway to lead to a significant cumulative effect.

10.14 Transboundary Effects

10.14.1.1 Transboundary effects are defined as those effects upon the receiving environment of other European Economic Area (EEA) states, whether occurring from Hornsea Four alone, or cumulatively with other projects in the wider area. A transboundary screening exercise was undertaken at Scoping and updated for the ES ([Volume A4, Annex 5.7: Transboundary Screening Report](#)), which identified that there was no potential for significant transboundary effects to occur in relation to SLVR.

10.15 Inter-Related Effects

10.15.1.1 Inter-related effects consider impacts from the construction, operation or decommissioning of Hornsea Four on the same receptor (or group). The potential inter-related effects that could arise in relation to SLVR are presented in [Table 10.9](#). Such inter-related effects include both:

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

10.15.1.2 A description of the process to identify and assess these effects is presented in Section 5.8 of [Volume A1, Chapter 5: Environmental Impact Assessment Methodology](#).

Table 10.9: Inter-related effects assessment for SLVR.

Project phase(s)	Nature of inter-related effect	Assessment alone	Inter-related effects assessment
<i>Project-lifetime effects</i>			
Construction, Operation and, decommissioning	Effects on seascape character across all three phases.	Seascape character impacts were assessed as being of medium to negligible magnitude across the MCAs. The effects on the MCAs were assessed as not significant.	The duration of the not significant effects would occur over a period of over 40 years, which is longer than the other phases considered individually. It is therefore considered that impacts in the operation phase will not materially contribute to inter-related effects, and that the construction and decommissioning phases are significantly temporally separate such that there will be no interaction between the two. There will therefore be no inter-related effects of greater significance compared to the impacts considered alone.
Construction, Operation and, decommissioning	Effects on landscape character receptors across all three phases.	Impacts on landscape character receptors were assessed as being of low magnitude. The effects on the MCAs were assessed as not significant.	The duration of the not significant effects would occur over a period of over 40 years, which is longer than the other phases considered separately. It is therefore considered that impacts in the operation phase will not materially contribute to inter-related effects, and that the construction and decommissioning phases are significantly temporally separate such that there will be no interaction between the two. There will therefore be no inter-related effects of greater significance compared to the impacts considered alone.
Construction, Operation and, decommissioning	Effects on onshore visual receptors across all three phases.	Impacts on onshore visual receptors were assessed as being of medium to low magnitude. The effects on the MCAs were assessed as not significant.	The duration of the not significant effects would occur over a period of over 40 years, which is longer than the other phases considered separately. It is therefore considered that impacts in the operation phase will not materially contribute to inter-related effects, and that the construction and decommissioning phases are significantly temporally separate such that there will be no interaction between the two. There will therefore be no inter-related effects of greater significance compared to the impacts considered alone.

10.15.1.3 There is no potential for inter-related effects on SLVR to be of a higher magnitude or effect than those assessed for each phase individually. There may be inter-related impacts on the settings of cultural heritage assets both onshore and offshore. Reference should be made to [Chapter 9: Marine Archaeology](#) and [Volume A5, Annex 9.1: Marine Archaeology Technical Report](#).

10.16 Conclusion and Summary

- 10.16.1.1 Simple assessment of the seascape, landscape and visual effects of Hornsea Four included in the PEIR concluded that there would be no likely significant effects.
- 10.16.1.2 In relation to concerns over the potential effects of the HVAC Booster Station lighting on the dark skies out to sea, which Natural England considers form part of the special character of the FHHC, Hornsea Four has defined the HVAC Booster Station height as including all structures such as masts etc and lighting requirements following consultation and agreement with the CAA. Commitments have been made by Hornsea Four which have allowed the MDS for the SLVR assessment to take this into account. It has been agreed following further consultation with Natural England and ERYC that this commitment (secured by the [F2.17 HVAC Booster Station Lighting Plan](#)), satisfactorily mitigates the potential effect on the lighting of the HVAC Booster Stations so that the effects on the dark skies out to sea Special Character of the FHHC would be not significant and can therefore be scoped out of the EIA.
- 10.16.1.3 Consultation was undertaken with relevant stakeholders (ERYC and Natural England) who agreed that due to the distance of the HVAC Booster Stations from the FHHC this impact was not required to be considered in the ES.
- 10.16.1.4 Paragraph 5.9.19 of EN-1 advises that: *"It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors. This may assist the SoS in judging the weight it should give to the assessed visual impacts of the proposed development."*
- 10.16.1.5 Galloper and Greater Gabbard offshore wind farms are located at distances of 27.5 km and 23.4 km respectively from the Suffolk Heritage Coast. The WTGs of Galloper are 180.5 m to blade tip and those of Greater Gabbard are 170 m to blade tip. These offshore wind farms have been found to be acceptable at these distances to onshore Heritage Coast and the visual receptors such as residents and users of the coastal paths therein. In addition, the Greater Gabbard offshore wind farm is located 25 km from the nationally designated Suffolk Coast and Heath AONB.
- 10.16.1.6 Following consideration of the above examples of large-scale offshore development, in accordance with the policy statement, it is perceived that the magnitude of the seascape, landscape and visual resource impacts of Hornsea Four are similar or less than the impacts of these existing developments.

10.17 References

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