



Hornsea Project Four: Environmental Statement (ES)

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Volume A6, Annex 4.1: Landscape and Visual Resources: Wireframes and Photomontages

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Glossary

Term	Definition
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing Infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
f/1.8	Refers to the maximum aperture of the camera used.
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), 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 (DC), 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.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
Maximum design scenario	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four at Creyke Beck.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The onshore limits within which Hornsea Project 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).

Acronyms

Acronym	Definition
AF	Auto focus
AGL	Above ground level
AOD	Above Ordnance Datum
E	East
EBI	Energy balancing infrastructure
ECC	Export Cable Corridor
ES	Environmental Statement
HVAC	High voltage alternating current
HVDC	High voltage direct current
LVIA	Landscape and visual impact assessment
LUC	Land Use Consultants
MDS	Maximum Design Scenario
N	N
NGET	National Grid Electricity Transmission
OnSS	Onshore substation
OS	Ordnance Survey
PRoW	Public Right of Way
S	South
W	West

Units

Unit	Definition
km	kilometre
m	metre
mm	millimetre

1 Introduction

1.1 Project Background

1.1.1.1 Orsted Hornsea Project Four Limited (the 'Applicant') is proposing to develop Hornsea Project Four Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore the East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall and on to an onshore substation (OnSS) with energy balancing infrastructure (EBI), and connection to the electricity transmission network.

1.1.1.2 Land Use Consultants (LUC) was commissioned to undertake a Landscape and Visual Impact Assessment (LVIA) for Hornsea Four. This technical annex has been produced to provide the supporting wireframes and photomontages (for that assessment), specifically within and around the Hornsea Four OnSS. This baseline data has been used to inform and support the Environmental Statement (ES) for [Volume A3, Chapter 4: Landscape and Visual](#).

1.2 Notes on the Wireframes and Photomontages

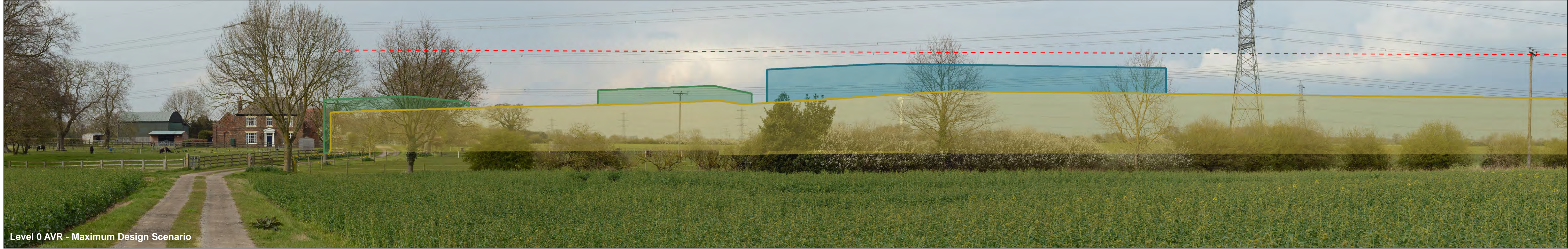
- The visualisations show the illustrative appearance of the Hornsea Four OnSS from selected representative viewpoints, at various points throughout the lifetime of the project.
- Viewpoints were listed in the Hornsea Four Landscape and Visual Impact Assessment (LVIA) Position Paper, which was circulated to stakeholders in March 2019 for agreement prior to drafting the Preliminary Environmental Information Report (PEIR). The LVIA Position Paper also stated the intended approach to presenting visualisations (photomontage or baseline photography only). Feedback from East Riding of Yorkshire Council, Hull City Council and Natural England indicated agreement to the approach presented, as set out in Table 4, [Volume A3, Chapter 4: Landscape and Visual](#) (ON-HUM-1.12).
- For each viewpoint, a visualisation is presented to show the Maximum Design Scenario (MDS) including placement of the largest buildings in the most visually prominent locations. The MDS used can be found in Table 4.12, [Volume A3, Chapter 4: Landscape and Visual](#), and in the 'Landscape and Visual' section of [Volume A4, Annex 5.1: Impacts Register](#). These 'block visualisations' represent the worst case in terms of visual obstruction and serve as a primary reference for the LVIA.
- For the four closest representative viewpoints to the OnSS site (Viewpoints 1 to 4), further photomontages have been prepared to show an illustrative 3D model of the OnSS (based on the MDS), prepared by the Applicant. These visualisations ([Figure 2](#), [Figure 3](#), [Figure 5](#), [Figure 6](#), [Figure 8](#), [Figure 9](#), [Figure 11](#) and [Figure 12](#)) present a more photorealistic impression of the OnSS than the block visualisation. The model shown in these visualisations may differ from the final design of the OnSS. Three iterations of these photomontages have been prepared, showing the illustrative model immediately

following construction (Year 1), and at Year 10 and Year 30 following completion. This is to show the likely effect of maturing mitigation planting. The depiction of landscape mitigation is similarly illustrative, and these photomontages therefore serve as a secondary reference for the LVIA.



Baseline photograph

This image provides landscape and visual context only



Level 0 AVR - Maximum Design Scenario

Figure: 1
Viewpoint 1: PRow South of Burn Park Farm

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 503721 E 434760 N
 AOD: 14.99 m
 Direction of view: 25°
 Distance to site: 0.24 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 03/04/2019 13:50



Figure: 1
Viewpoint 1: PRow South of Burn Park Farm

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 503721 E 434760 N
 AOD: 14.99 m
 Direction of view: 70°
 Distance to site: 0.24 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 03/04/2019 13:50



Figure: 2
Viewpoint 1: PRow South of Burn Park Farm

OS reference:	503721 E 434760 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.99 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	25°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.24 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 13:50



Baseline photograph

This image provides landscape and visual context only



Illustrative Photomontage - Year 1

Figure: 2
Viewpoint 1: PRow South of Burn Park Farm

OS reference:	503721 E 434760 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.99 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	70°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.24 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 13:50



Figure 3
Viewpoint 1: PRow South of Burn Park Farm

OS reference:	503721 E 434760 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.99 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	25°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.24 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 13:50



Figure: 3
Viewpoint 1: PRow South of Burn Park Farm

OS reference:	503721 E 434760 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.99 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	70°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.24 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 13:50



Figure 4
Viewpoint 2: Park Lane Cottingham

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 504069 E 434252 N
 AOD: 14.92 m
 Direction of view: 350°
 Distance to site: 0.66 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 03/04/2019 12:10



Figure: 5
Viewpoint 2: Park Lane Cottingham

OS reference:	504069 E 434252 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.92 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	350°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.66 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 12:10



Illustrative Photomontage - Year 10



Illustrative Photomontage - Year 30

Figure: 6
Viewpoint 2: Park Lane Cottingham

OS reference:	504069 E 434252 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	14.92 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	350°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.66 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 12:10



Baseline photograph

This image provides landscape and visual context only



Level 0 AVR - Maximum Design Scenario

Figure 7
Viewpoint 3: Footbridge over A1079

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 503831 E 435980 N
 AOD: 17.00 m
 Direction of view: 175°
 Distance to site: 0.67 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 08:15



Baseline photograph

This image provides landscape and visual context only



Illustrative Photomontage - Year 1

Figure: 8
Viewpoint 3: Footbridge over A1079

OS reference:	503831 E 435980 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	17.00 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	175°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.67 km	Correct printed image size:	820 x 260 mm	Date and time:	04/04/2019 08:15



Illustrative Photomontage - Year 10



Illustrative Photomontage - Year 30

Figure: 9
Viewpoint 3: Footbridge over A1079

OS reference:	503831 E 435980 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	17.00 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	175°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	0.67 km	Correct printed image size:	820 x 260 mm	Date and time:	04/04/2019 08:15



Figure: 10
Viewpoint 4: PRow East of A164

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 502255 E 434521 N
 AOD: 35 m
 Direction of view: 70°
 Distance to site: 1.36 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 03/04/2019 14:30



Baseline photograph

This image provides landscape and visual context only



Illustrative Photomontage - Year 1

Figure: 11
Viewpoint 4: PRoW East of A164

OS reference:	502255 E 434521 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	35 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	70°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	1.36 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 14:30



Illustrative Photomontage - Year 10



Illustrative Photomontage - Year 30

Figure: 12
Viewpoint 4: PRoW East of A164

OS reference:	502255 E 434521 N	Horizontal field of view:	90° (cylindrical projection)	Camera:	Nikon D600
AOD:	35 m	Principal distance:	522 mm	Lens:	AF 50mm f/1.8D
Direction of view:	70°	Paper size:	841 x 297 mm (half A1)	Camera height:	1.5 m AGL
Distance to site:	1.36 km	Correct printed image size:	820 x 260 mm	Date and time:	03/04/2019 14:30



Figure: 13
Viewpoint 5: A164 layby near Bentley

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 502191 E 433609 N
 AOD: 28.89 m
 Direction of view: 110°
 Distance to site: 1.36 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 11:45



Figure: 14
Viewpoint 6: Fishpond Wood, Risby Hall

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 501454 E 435403 N
 AOD: 45 m
 Direction of view: 95°
 Distance to site: 2.02 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 13:00



Figure: 15
Viewpoint 7: Little Weighton Road

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 499859 E 433991 N
 AOD: 83.60 m
 Direction of view: 80°
 Distance to site: 3.79 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 03/04/2019 14:50



Figure: 16
Viewpoint 8: Minster Way

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 503396 E 437490N
 AOD: 13.66 m
 Direction of view: 170°
 Distance to site: 2.21 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 08:50



Baseline photograph

This image provides landscape and visual context only



Level 0 AVR - Maximum Design Scenario

Figure: 17
Viewpoint 9: Beverley Minster Tower

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 503712 E 439248 N
 AOD: 50.39 m
 Direction of view: 180°
 Distance to site: 3.93 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 09:55



Baseline photograph

This image provides landscape and visual context only



Level 0 AVR - Maximum Design Scenario

Figure: 18
Viewpoint 10: St Mary's Church Cottingham

EBI and Substation Area (15m Height)
 EBI Buildings (20m Height)
 Substation Buildings (25m Height)
 Lightning Protection (30m Height)

OS reference: 504763 E 432938 N
 AOD: 27.51 m
 Direction of view: 340°
 Distance to site: 2.1 km

Horizontal field of view: 90° (cylindrical projection)
 Principal distance: 522 mm
 Paper size: 841 x 297 mm (half A1)
 Correct printed image size: 820 x 260 mm

Camera: Nikon D600
 Lens: AF 50mm f/1.8D
 Camera height: 1.5 m AGL
 Date and time: 04/04/2019 12:15