Hornsea Project Two Offshore Wind Farm

Decommissioning Programme

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Executive Summary

In August 2015, Ørsted Wind Power A/S ("Ørsted") acquired full ownership of Hornsea Project Two Offshore Wind Farm ("Hornsea Project Two"). Hornsea Project Two was awarded consent by the Secretary of State (SOS) on the 16th August 2016. Project Two comprises four undertakers as named in the Development Consent Order (DCO) as amended, Optimus Wind Limited, Breesea Limited, Soundmark Wind Limited and Sonningmay Wind Limited ("the Project Two Undertakers"). The Generation deemed Marine Licences are shared between the Project Two Undertakers. The Transmission deemed Marine Licence(s) are held by Optimus Wind Limited and Breesea Limited.

The Hornsea Project Two DCO grants development consent for, and authorises Ørsted to construct, operate and maintain an offshore wind farm project that will consist of up to 300 wind turbine generators (WTGs), each with an installed capacity between 6 – 15MW. These WTGs are connected via inter array cables to an Offshore Substation (OSS) from which export cables lead to a Reactive Compensation Station (RCS) before reaching the landfall near to Horseshoe Point. The wind farm array will be located approximately 89km at its closest point from the Yorkshire coast, covering an area of approximately 462km^2. The Hornsea Project Two DCO additionally grants four deemed Marine Licences (dMLs) for the marine licensable activities, including the deposit of substances and articles and the carrying out of works involved in the construction and operation of the generating station and associated development.

Onshore construction works commenced in April 2018, works in the intertidal area commenced in April 2019, and offshore construction is due to commence in 2020 with commissioning in 2022. The operational lifetime of Hornsea Project Two is expected to be at least 25 years, with the possibility to extend by up to an additional 25 years, e.g. if the project should seek and obtain consent to repower. Hornsea Project Two will be decommissioned in accordance with the legislation guiding offshore wind farm development at that time and as required by relevant provisions in some of the obtained licences.

This Decommissioning Programme will provide preliminary information on the proposed methods and approaches to decommissioning the offshore installations (as required by the Energy Act 2004, as amended). In light of changing circumstances, these proposals are subject to updates during the development and operational phases of the wind farm, and to reflect new discoveries particularly in the areas of marine environment, technological change and relevant amendments to legislation.

In addition to its legal duty to comply with all relevant legislation, the Project Two Undertakers are committed to carrying out the decommissioning works with minimal environmental impact where possible with the subsequent restoration of the site as close to the original state as is reasonably achievable. Evidence of this will be collected and presented to the relevant authorities with any post-decommissioning monitoring additionally carried out.

The proposed decommissioning measures can be summarised as: removal of the wind turbine generators, cutting off the foundations at one metre below the mudline and removal of the offshore substations. The array cables will either be left *in situ* or removed, subject to the aforementioned change in circumstances, marine

environmental discoveries, technological advances or relevant amendments to legislation. It is anticipated that either a portion or all of the scour protection at the turbine positions and cable protection (where required) will remain *in situ*, unless agreed otherwise with the relevant authorities. The export cables, the OSS and the RCS will be Offshore Transmission Owner ("OFTO") assets that will be decommissioned in line with the requirements of the relevant authorities. This could include being left *in situ* or wholly or partially removed. Care will be taken to handle waste in a hierarchy that prefers re-use, re-cycling, and leaves waste disposal or incineration as the last option. Decommissioning of all onshore assets landward of MLWS are outwith the requirements and scope of this Decommissioning Programme.

Within five to 10 years of the end of the operational lifetime of the wind farm, it will be decided whether repowering (replacing wind turbine generators) will be pursued, which could postpone the decommissioning phase by up to an additional 25 years. When it is decided that the wind farm has reached the absolute end of its operational lifetime, this Decommissioning Programme as well as the initial Environmental Statement (ES) issued in 2015 will be reviewed in light of knowledge and data gained through monitoring throughout the construction and operational phases. Consequently, the final Decommissioning Programme will be updated and issued for approval to the relevant authority (DECC 2011).

The final Decommissioning Programme will specify the technology and the methods to be used, and the timing of works to be followed, during the decommissioning phase itself.

1. Introduction

Hornsea Project Two will consist of 165 wind turbine generators (WTGs). These WTGs are connected via inter array cables to an Offshore Substation (OSS) from which export cables lead to a Reactive Compensation Station (RCS) before reaching the landfall near to Horseshoe Point. The wind farm array will be located approximately 89km at its closest point from the Yorkshire coast, covering an area of approximately 462km^2.

This Decommissioning Programme is being submitted to the Department of Business, Energy and Industrial Strategy (BEIS) for approval in accordance with Section 105 of the Energy Act 2004. Pursuant to the notice issued on behalf of the Secretary of State (SOS) for the Department of BEIS issued to Hornsea Project Two on 21st December 2018. This document will provide preliminary information on methods and approaches to decommissioning Hornsea Project Two's offshore installations (as required by the Energy Act 2004).

1.1 Purpose of this document

The expected operational lifetime of the wind farm is at least 25 years, although this number may vary depending on specific conditions arising during operation. In the last 5 to 10 years of wind farm operation it will be decided whether repowering (replacing wind turbine generators and other infrastructure) will be pursued which could consequently postpone the decommissioning phase by up to 25 years. At the end of its lifetime, the wind farm will be decommissioned to restore the site as far back to its original conditions as far as reasonably practicable.

This Decommissioning Programme is prepared to discharge DCO, Schedule 1, Part 3 Requirement 10:

> *No part of the authorised development below the mean low water mark (as amended 2016) is to commence until a written decommissioning programme in compliance with any notice served upon the undertaker by the Secretary of State pursuant to section 105(2) of the 2004 Act has been submitted to the Secretary of State for approval in relation to that part.*

In accordance with this, the Hornsea Project Two Undertakers received notice under Section 105(2) of the Energy Act 2004 requiring a Decommissioning Programme to be prepared and approved before construction of the wind farm.

The wind farm will be decommissioned according to the lease conditions set out in The Crown Estate (TCE) lease. The Decommissioning Programme is informed and supported by the Environmental Statement (SMart Wind, 2015). The document may be subject to review and amendment throughout the lifecycle of the project to reflect changing circumstances and regulatory requirements, and to incorporate improvements in knowledge and understanding of the marine environment and advancements in technology and working practice. Cost and financial security information is confidential and therefore not included in Decommissioning Programme documents. Cost and financial security information is provided separately to BEIS.

2. Background Information

The Hornsea Project Two array area (referred to as Subzone 2 in the ES, and the array area hereafter) was identified as part of the Zone Characterisation process, which was carried out by SMartWind Ltd. immediately after award of the Hornsea Zone following the Crown Estate's Round 3 Offshore Wind Licencing Round. This section gives a description of the project and a brief overview of the physical, biological and human environment in the array area and the offshore cable route.

2.1 Location

The array area (see Section 2.2 below) is located approximately 89 km off the Yorkshire Coast at its closest point. In total, the offshore site occupies an area of approximately 462 km^2. The location is shown in Figure 1. Hornsea Project One Offshore Wind Farm (Hornsea Project One) is being installed adjacent to Hornsea Project Two, on its southern boundary. The export cables of Hornsea Project One follow a similar route to Hornsea Project Two back to shore.

2.2 Project Design and Background

Hornsea Project Two comprises the following:

- 165 offshore wind turbines with a rotor diameter of 167 m, a tip height of 204.37 m above LAT and a monopile foundation with a diameter of up to 9.5 m;
- One offshore substation and one reactive compensation substation;
- Array cables connecting the turbines with the offshore substation;
- Three 220 kV export cables connecting the offshore substation with the onshore substation;
- An onshore substation near North Killingholme; and,
- Two circuits (three 400 kV cables within each) connecting the onshore substation with the National Grid Substation at North Killingholme.

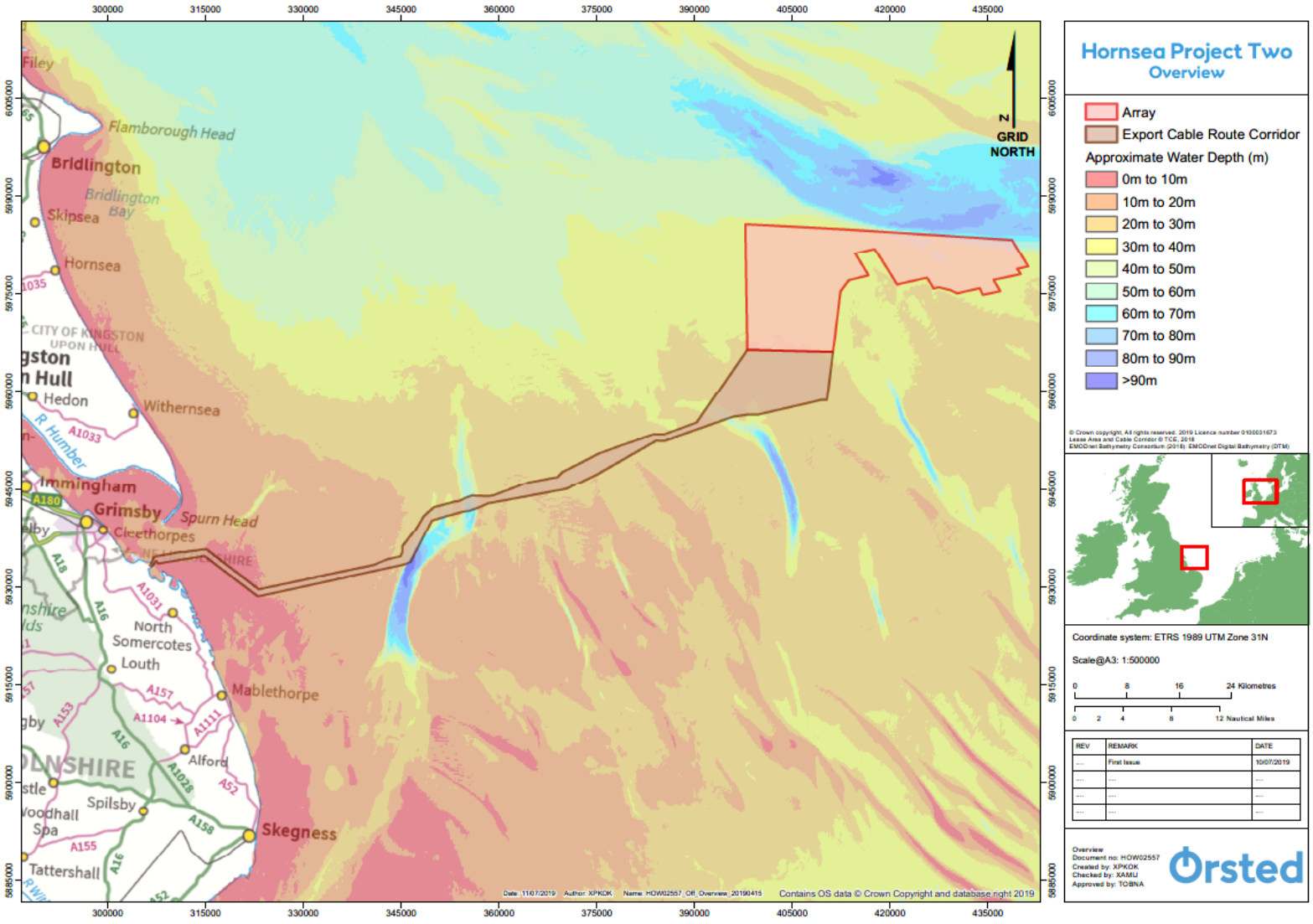
An ES was submitted with the application for a DCO to the Planning Inspectorate in 2015. The consents granted to the project related to this document are listed in Table 1. Offshore construction is scheduled to commence in 2020 and the wind farm is currently scheduled to be fully commissioned in 2022.

Table 1. Consents and licences for Hornsea Project Two relevant for this Decommissioning Programme

Regulation	Achieved Consents	Authority	Status
The Planning Act 2008	Development Consent Order (DCO)	BEIS	Granted 16th August 2016
The Planning Act 2008	DCO (Correction)	BEIS	Granted 16th November 2016
The Planning Act 2008	DCO (Amendment)	BEIS	Granted 14th March 2018
Marine Coastal Act 2009	Deemed Marine Licences (dML)	Marine Management Organisation (MMO)	Issued 16th August 2016
Energy Act 2004	Decommissioning Programme	BEIS	*This document*

The Project Two Undertakers are required to apply for a Marine Licence closer to the time that decommissioning is scheduled to take place, to cover decommissioning activities not consented under Hornsea Project Two's current Marine Licences.

Figure 1. Overview of Hornsea Project Two



2.3 Site Characteristics

The ES assessed the potential impacts of the proposed project on respective environmental characteristics and proposed mitigation measures where relevant. A summary of these characteristics of the entire offshore project site is presented in this section. More detailed information about each of the sub-topics is available in the ES (SMart Wind 2015).

2.3.1 Offshore Physical Characteristics

2.3.1.1 Marine Processes

Water depths within the Hornsea Project Two array area (the array area) range from approximately 25m to 67m below lowest astronomical tide (LAT). The maximum water depths in the array area are observed along the northern margin at the base of a ridge, whilst the shallowest areas in the Subzone occur at the top of sandwave crests throughout the site. In terms of the cable route corridor, from the landfall at Horseshoe Point, water depths gradually increase to around 30 m with slight undulations, as shown in Figure 1. Water depths increase to a maximum of 63 m where the cable route corridor crosses the northern extent of Silver Pit.

The hydrographic regimes across the array area, and the offshore sections of the cable route corridor, are tidally dominated. On the east coast, as in many other parts of the UK, westerly and south-westerly winds are the most frequent. However, during the winter and spring, winds from the northeast and east sectors are common. The wave regime is highly episodic and exhibits strong seasonal variation.

The seabed sediment type varies across the array area. Towards the northwest, the seabed sediment type is largely sand. Toward the southeast of the array area, the seabed sediments gradually coarsen to gravelly sand and gravel. Measurements of suspended sediment taken within the Hornsea Zone were typically between 0 - 20 mg/L, with generally higher concentrations closer to the shore (The Wash and the Humber).

2.3.2 Offshore Biological Environment

2.3.2.1 Nature Conservation

Nature conservation refers to internationally, nationally, regionally and locally designated sites which aim to protect key habitats and/or species of conservation importance. In the context of this Decommissioning Plan it refers to marine habitats and / or species. There are five sites present in the Hornsea Project Two area relevant to this decommissioning programme. These include the Humber Estuary Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), Ramsar Site (all of which partially or fully overlap) and the Southern North Sea SAC (with details on its designation outlined below).

Impacts on the nature conservation sites will be considered at the time of decommissioning and the guidance in place for the site adhered to. As stated in Section 5, the ES will be reviewed at the time of decommissioning. The construction, operation, and decommissioning phases of Hornsea Project Two are predicted to result in no significant effects on any UK designated sites.

2.3.2.2 Benthic Subtidal and Intertidal Ecology

Site-specific surveys undertaken as part of the ES revealed that the seabed within Hornsea Project Two's boundary supports a variety of animal communities that are typical of this part of the southern North Sea. Key habitats recorded included fine sand habitats characterised by marine worms, shallow coarse sediment supporting a range of species such as catworms, sea urchins and amphipods and closer to shore, mixed sand and gravel habitats with diverse animal communities. Overlying these sediment-based communities, were animal assemblages comprised of larger, more mobile species, such as brown shrimp, hermit crab, common starfish and brittlestars. The intertidal area where the export cables will make landfall contains habitats that are all features of the Humber Estuary SAC.

2.3.2.3 Fish and Shellfish Ecology

Fish and shellfish communities recorded within Project Two are typical of the southern North Sea. Some of the key species recorded in abundance in the offshore parts of Project Two included whiting, sprat, dab, plaice, gurnard and solenette. At the landfall site, the communities were dominated by juvenile fish, in particular sandeels.

Spawning and nursery habitats were identified for a range of species including herring, plaice, lemon sole, dab, common sole, cod, whiting, sandeel, sprat, brown crab and *Nephrops*. The Humber Estuary represents a particularly important nursery habitat for many of these species. The Humber Estuary was also identified as being important for migratory fish species including sea and river lamprey, Atlantic salmon, sea trout, allis and twaite shad, European smelt and European eel.

2.3.2.4 Marine Mammals

Site-specific boat-based surveys revealed that within the Hornsea Project Two site, harbour porpoise were the most frequently occurring species of marine mammal, with minke whale, white-beaked dolphin, grey seal and harbour (common) seal also being common. The grey seal is listed as a feature of the Humber Estuary SAC, the harbour seal as a primary reason for designation of The Wash and North Norfolk SAC (situated ≈ 50km away from Hornsea Project Two's landfall), and the harbour porpoise as the sole designation of the Southern North Sea SAC.

2.3.2.5 Ornithology

A total of 72 seabird species were recorded over the two years of ornithological surveying. 'True' seabird species of the skua, small gull, large gull and auk species dominate. Also present are some species which spend part of their annual life cycle at sea (e.g., divers and seaducks), and migratory species such as waterfowl, waders and passerines. In both survey years; guillemot was the most frequently encountered species and kittiwake were the second most abundant species.

Abundances of the most frequently recorded species tended to peak during late summer and the post-breeding dispersal period (roughly August to November), which is likely to be reflective of the Southern North Sea migratory corridor for birds moving through the site and wider Southern North Sea towards wintering areas.

2.3.3 Offshore Human Environment

2.3.3.1 Commercial Fisheries

Within the array area, UK and Dutch beam trawl vessels dominate the fishery, targeting plaice and sole. There is also a distinct sandeel ground, which is historically important to Danish trawlers. A small number of UK potting vessels also target the array area as part of an offshore brown crab and lobster fishery. Other nationalities that fish across the array area to a lesser extent include Belgian, French, German, Norwegian and Swedish vessels trawling for various species of fish. Fishing grounds north of the array area are fished by UK trawlers that target *Nephrops*. Fishing operations within the array area occur throughout the year. Across the offshore export cable route corridor, UK potting vessels dominate in a brown crab and lobster targeted fishery.

2.3.3.2 Shipping and Navigation

Vessel survey data collected as part of the ES included a total of 42 days of Automatic Identification System (AIS) and radar survey data collated from survey vessels within the study area for the array area, and 28 days of AIS data recorded from survey vessels in proximity to the cable route corridor. The 42 days of site-specific data for the array area indicated that there was an average of up to 35 unique vessels per day passing within 10 NM of the array area, with an average of 12 per day actually intersecting the array area. The majority of these vessels were cargo vessels, followed by tankers.

The baseline review identified that there were no International Maritime Organisation routeing measures in close proximity to the array area although the proposed offshore cable route corridor does enter the Humber near the Humber Traffic Separation Scheme. There are no Marine Environment High Risk Areas within the array area or the cable route corridor.

2.3.3.3 Aviation, Military and Communications

There are a number of aviation, military and communications related interests in the vicinity of the array area and the offshore cable route corridor. This includes MOD Managed Danger Areas, Military Low Flying Areas, and the Donna Nook Danger Area (D307). In addition, three Helicopter Main Routes cross the array area, and the boundary of the array area extends into the 9 NM consultation zones surrounding the Mimas, Schooner A, Babbage and Hoton offshore gas platforms.

The array area is located within the operational range of the National Air Traffic Services Claxby and Cromer Primary Surveillance Radars (PSRs) and is also within the operational range of the MOD's Air Surveillance and Control Systems Air Defence PSRs located at Staxton Wold and Trimingham. There are networks of microwave links in the vicinity of the array area; however, there are no microwave links which pass through the array area and no permanent structures from Project Two will obscure the line of sight of any existing links.

2.3.3.4 Marine Archaeology and Ordnance

The array area lies on the southern side of Outer Silver Pit. In the Early Holocene this was a major lake, and subsequently a marine estuary, forming the focus of drainage from the surrounding landscape, including a series of ‘Botney Cut’ palaeochannels, running across both the array area and the Project Two offshore cable

route corridor. These palaeochannels were sampled by geotechnical investigations in 2018 as they are likely to contain preserved ancient land surfaces, covered and protected by fluvial alluvium deposited in the Early Holocene period. A desk-based assessment identified eight cores from these investigations for Stage 2 geoarchaeology testing, as these core sections have the potential to provide valuable new insights into the nature of marine transgression in this area of the North Sea. Fewer palaeochannels were identified within the cable route corridor, although a second group were identified draining into Inner Sliver Pit from the west and east. A large geoarchaeological feature was also identified extending 5 km seawards from the landfall at Horseshoe Point. This is believed to be the remains of later Mesolithic/Neolithic wetland associated with the prehistoric course of the Humber.

In terms of maritime and aviation wrecks, records suggest that these become much more common within 60 km of the coast. Particularly high numbers of World War I and II wrecks are recorded in this area, many of which had been sunk by mines. Substantial numbers of aircraft, mostly Beaufighters, are recorded as having being lost during World War II close to the strategically important World War II airfield at North Cotes, beside the cable landfall, and it is possible that some of these may lie within the offshore export cable route corridor. Data collected as part of the ES identified 46 confirmed (A1) anomalies, 22 recorded but unconfirmed (A3) anomalies and 1,966 unconfirmed (A2) anomalies were identified within the array area and the offshore export cable route corridor. Assessment of the 2018 export cable route geophysical data led to 270 recommended Archaeological Exclusion Zones (AEZ), with 265 medium potential contacts and seven high potential contacts. At the time of writing this document, the geophysical data collected at the array area in 2019 is yet to be assessed. Of note is that these anomalies and any associated Archaeological Exclusion Zones are being continually reviewed as more investigative and survey work is carried out.

2.3.3.5 Seascape and Visual Resources

The visual characteristics of the array area and the offshore cable route corridor are relatively homogenous, with a lack of visibility to coastal areas, due to the distance from the shore. the array area lies within two broad Historic Seascape Character types; Navigation and Offshore Industry. Similarly, the offshore cable route corridor passes largely through areas with Navigation or Offshore Industry broad character designations. The only exception to this is close to the shore, which is identified as Military and Coastal Industry.

2.3.3.6 Infrastructure and Other Users

The potential impacts identified with the lifetime of Hornsea Project Two include displacement of recreational vessels and recreational fishing vessels, disturbance to cables, pipelines and aggregate areas, disruption to oil and gas operations including reduced area for oil and gas exploration and development, and interference with Radar Early Warning Systems on offshore gas platforms and increased airborne noise.

3. Description of Items to be Decommissioned

The wind farm components are constructed and installed in a way so that they can be decommissioned at the end of its operational lifetime. This may involve decommissioning of the entire wind farm or removal and decommissioning of selected components.

It is currently anticipated that foundations will be removed to 1m below the seabed and that scour protection is wholly/partially left *in situ*. All structures above the seabed (WTGs, offshore substations) are planned to be completely removed. There is potential for offshore cables to either be removed or left *in situ* subject to stakeholder/regulator approval and minimal risk of structure exposure. This option is being included as removing these components may result in a greater environmental impact than leaving them in place, although at the time of decommissioning technological advancements may provide solutions to minimise this impact.

3.1 Generation Assets

3.1.1 Wind turbines

A total of 165 Siemens 8MW (rated to 8.4MW) WTGs will be installed in the array area. Each WTG broadly comprises the components detailed in Table 2, which will either be removed in sections or as a whole section and dismantled onshore.

Table 2. WTG Components and Approximate Weights

Component	Description	Approximate weight per component (tonnes)
Nacelle (inc. hub and generator)	Sits on top of tower housing the transformer	370 +/- 5%
Blade	3 blades per turbine forming a rotor (167m diameter)	33.5 +/- 3%
Tower	Tubular steel tower	460 +/- 5%

3.1.2 Foundations

Each turbine will be erected and installed on top of a monopile foundation as described in Table 3. A transition piece (TP) fixed to the top of the monopile will allow personnel access to enter the turbine tower for maintenance via a boat landing.

Table 3. The Approximate Dimensions of the Monopile Foundations

Component dimensions		Approximate measurements
Monopile	Diameter (planned – max)	8.9 – 9.5 m
	Length (planned – max)	68 – 77.6 m
	Seabed penetration (m) (planned – max)	26.2 - 31.2 m

Component dimensions		Approximate measurements
	Weight (planned – max)	970.6 - 1284 tonnes
Transition piece	Diameter	6.0 (at top) - 6.5m (at bottom)
	Height	18.8 m
	Weight (planned – max)	355.8 – 357.8 tonnes

3.1.3 Drill Arisings

A number of the wind turbine and the offshore substation foundations may require drilling in the event that it is not possible to complete installation via piling hammer. It is expected that if foundation drilling is required, the material arisings from the drilling, which may remain on the seabed during and following construction as set out in Schedule 8, Part 1, Section 2 of the deemed Marine Licences, are expected to have dispersed over the lifetime of the project.

3.1.4 Scour protection

It is currently anticipated that scour protection will be required at 89 of the 165 turbine positions described in Table 4 however, the final number of positions may change. Scour protection materials are likely become inhabited by marine organisms over the lifetime of the wind farm. As such, it is anticipated that depending on the potential environmental impact at the time of decommissioning, a portion/all the scour protection will be left *in situ*, unless otherwise agreed with the relevant authorities.

Table 4: Turbine Scour Protection Dimensions

Number of positions	89
Maximum base diameter (m)	39.2 m (max 44.4m)
Maximum layer thickness (m)	1.35 (+0.25/-0.25)

3.1.5 Inter-Array Cables

The length of the inter-array cables will be no more than 374 km (diameters of 150mm, 450mm and 630mm) with the current proposal to be removed or left in situ if the risk of the cable becoming exposed is minimal (the associated financial security document assumes a worst-case cost implication that cables will be removed). The cables do not contain any material which could adversely affect the environment and the ends will be weighted down and buried (potentially using an ROV). At cable or pipeline crossings, the cables will either be removed or remain in place depending on the risk to the integrity of a third-party asset.

3.2 Offshore Transmission Assets

3.2.1 Export cables

The export cables will be approximately 300mm in diameter, no more than 423km in length and split between three cables between the OSS to the RCS and another three from the RCS to the landfall. Interlink cables are not required due to there being only one OSS.

The base assumption is that the offshore cables (and any required cable protection) will be removed or left *in situ* if the risk of the cable becoming exposed is minimal (the financial security document assumes a worst-case cost implication that cables will be removed). The cables do not contain any material that will impact the environment and the ends will be weighted down and buried (probably using an ROV). At cable or pipeline crossings the cables are likely to remain in place as well to avoid unnecessary risk to the integrity of the third-party cable or pipeline.

3.2.2 Offshore substations (OSS and RCS)

The purpose of an offshore substation platform is to transform the voltage of the electricity generated at the wind turbine (at 33 kV) to a higher voltage (220 kV) suitable for power transmission to shore. There will be one OSS located within the wind farm array and one RCS approximately halfway along the export cable route. Both the OSS and RCS have piled jacket foundations onto which a topside is installed. The topside structure houses the required electrical equipment. Both the OSS and RCS are normally unattended, save for service and repair work, with day-to-day control carried out from the onshore control station.

Scour protection is only planned for the RCS but is not expected to be required for the OSS. Details of this scour protection are provided in Table 5.

Table 5. Indicative Offshore Substation Component Dimensions

Offshore substation type	Component	Approximate measurements
OSS	Topside	7540 (max 8220) tonnes
		75m x 60m x 28m (max 80m x 65m x 35m)
	Jacket	7150 (max 7430) tonnes
		68.2m x 46.4m x 61.6m (max 70m x 50m x 65m)
RCS	Topside	2083 (max 2270) tonnes
		38m x 34m x 19m (max 45m x 40m x 25m)
	Jacket	2480 (max 2550) tonnes
		35.6m x 31.6m x 46.1m (max 40m x 35m x 50m)
	Scour protection	28.58m x 26.58m x 0.70m

The OSS topside structure will provide space for power transformers with oil spillage facility, utility transformers with oil spillage facility, High Voltage (HV) switchgears, Medium Voltage (MV) switchgears, protection, control and instrumentation systems, diesel generators, Uninterruptible Power Supply systems, cable ducts and J tubes, HV internal platform cables, MV internal platform cables, a Helicopter Deck and helicopter fuel system.

The RCS topside structure will provide space for power transformers with oil spillage facility, utility transformers with oil spillage facility, HV switchgears, MV switchgears, LV switchgear rooms, protection, control and instrumentation systems, diesel generators, Uninterruptible Power Supply systems, cable ducts and J tubes, HV internal platform cables and MV internal platform cables.

4. Description of Proposed Decommissioning Approach

This section gives an overview of legislation and guidance relevant to decommissioning activities and further outlines in more detail how decommissioning of individual parts of the development will be carried out, respectively, the wind turbines, the foundations, transition pieces and scour protection, the offshore substations (OSS and RCS) and the array and export cables.

It is not possible to describe the precise technology and methods of decommissioning works that will likely be available nearer the time of decommissioning. These will develop over the operational lifetime of the wind farm and should therefore be reviewed with a detailed Decommissioning Programme submitted for approval at least four months before the decommissioning phase starts in accordance with Schedules 8-11, Part 2, Condition 16 of the Project Consent.

The decommissioning measures are based on today's known techniques and have been proposed with regard to:

- The Best Practicable Environmental Option (BPEO);
- Safety of surface and subsurface navigation;
- Other users of the sea, and
- Health and safety considerations.

Components to be left *in situ* following decommissioning will be in accordance with the standards set out by the International Maritime Organisation (IMO) that specify an installation or structure need not be entirely removed if:

- It is no longer technically feasible (however, the design and construction should be such that entire removal would be feasible);
- It would involve extreme cost;
- It would involve an unacceptable risk to personnel; and
- It would involve an unacceptable risk to the marine environment.

4.1 Adherence to Relevant Legislation and Guidance

The decommissioning measures will aim to comply with the following key UK and international legislation and guidance notes:

- Decommissioning of Offshore Renewable Energy Installations under the Energy Act 2004: Guidance notes for Industry, BEIS, March 2019
- Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone, International Maritime Organisation (IMO), 19th October 1989;
- OSPAR guidance documents on offshore wind farms;
- Guidelines for Environmental Risk Assessment and Management, Defra, November 2011; and
- United Nations Convention on the Law of the Sea (UNCLOS), 1982.

Other relevant legislation includes:

- Hazardous Waste Regulations 2005;
- Marine and Coastal Access Act 2009;
- The Water Resources Act 1991;
- The Conservation of Habitats and Species Regulations 2017;
- The disposal or recovery of waste on land, principally under Part II of the Environmental Protection Act 1990, other legislation relating to the carriage and transfer of waste and other relevant health and safety legislation;
- London Convention 1972 and the 1996 Protocol, relating to the prevention of marine pollution by dumping of wastes;
- Construction (Design and Management) Regulations (CDM) 2015; and
- Guidance Notes for Industry: Decommissioning of Offshore Installations and Pipelines under the Petroleum Act 1998, DECC;
- Appropriate H&S Regulations.

4.2 Phasing and Co-ordination of Decommissioning

The phasing and detailed programme for decommissioning will be defined and submitted to BEIS in advance of decommissioning. Where it is considered appropriate that infrastructure may be left *in situ,* subject to the conditions set out in Section 3, detail is provided as to why this is considered the best option.

4.2.1 Wind Turbine Generators

The dismantling and removal of turbine components (blades, nacelle, tower etc.) will largely be a reversal of the installation process and subject to the same constraints. Using today's resources, dismantling of the turbines require a jack-up vessel to ensure adequate control and to cope with the relatively high lifts and high crane hook loads. Decommissioning will be undertaken in the same controlled manner and in accordance with a risk management plan to ensure the same or higher level of safety.

Several months in advance of the task beginning, it will be necessary to secure a suitable jack up vessel or other, depending on technology advancements. The most important specifications required to carry out the works will be the crane and storage capacity, to ensure stability throughout operations with an appropriate deck layout.

The first phase of decommissioning is to prepare the site. This is anticipated to include the following actions:

- In advance of any onsite operations, development of an approved lift plan and safe system of work for the decommissioning of the main components will take place;
- Inspection of hook on points and any other safety related equipment that could be required during decommissioning e.g. fire extinguishers and Carbon Monoxide meters;
- When de-energisation works are planned, due account shall be taken to the fact that it will be required to pitch the blades, spin the hub and yaw the nacelle during decommissioning works;

- Removal of all loose items from the structure;
- Installation/certification of lifting points, completed in parallel to the first action in this list;
- Hot bolting key bolts to aid unbolting process or decreasing the torque and tension of components could potentially be carried out one WTG ahead of the installation vessel. However, hot bolting should only be carried out with high level of certainty over the weather conditions and sufficient weather window to return the WTG to a safe state if the installation vessel is delayed for some reason.

Once this is complete, the structure will be disassembled in the following steps, some of which may be carried out simultaneously to minimise overall time:

1. Prepare decommissioning teams - ensure all personnel are adequately trained and competent to carry out assigned tasks, ensure personnel are familiar with working procedures, established safety management system, scope of work, carry out tool box talks etc.
2. Position the decommissioning vessel (jack-up or similar) close to the turbine position, pre-load and jack up to working height. Once the vessel is elevated, attach gangway to the TP.
3. Technicians enter the WTG, complete safety checks and prepare for lifting.
4. De-energise the WTG from the export array and isolate the switch gear and earth.
5. Route power supply from the decommissioning vessel to the TP / WTG tower base.
6. Prepare the crane.
7. Prepare lifting tools, sea fastenings, bolts, slings, tag lines etc.
8. Handover crane to the lifting team.
9. Install portable turning gear, yaw-box, etc (if required).
10. Check that nacelle systems required for dismantling are operational on temporary power supply.
11. Rotate the hub to bring the first blade in to the required removal position.
12. Remove rotor blades one-by-one and lower to blade storage rack on deck of the transportation vessel or barge.
13. Disconnect power and signal cables between the nacelle and tower
14. Remove nacelle and sea fasten on the transportation vessel or barge.
15. Disconnect the power and signal cables that cross the tower to the TP joint as well as the lift system. Store the lift in the tower section.
16. Remove tower either in one piece or in sections (subs to decommissioning vessel setup).
17. Vertical or horizontal stowage of the towers on the vessel shall be planned in advance. The second option will require tailing crane on board.
18. The turbine parts will be placed into engineered sea fastenings approved by the Marine Warranty Surveyor (MWS) on the vessel and transported to the selected harbour. Alternatively, the components could be placed onto a transport barge, however this will be severely weather restricted (~1.0m Hs) and therefore is not optimal.
19. Backload the components / parts by the vessel's main crane, auxiliary cranes / and land cranes to optimise the program
20. Parts will be processed for reuse, recycle or disposal.

Foundations will be removed after the turbine has been removed. This will be carried out according to the best practice at the time of decommissioning. The following section outlines the anticipated removal methods if it were carried out using today's technology and assuming it is required.

4.2.2 Monopiles

For decommissioning of monopile foundations, it is anticipated that the monopile will be cut below the seabed level to a depth whereby the remaining foundation is unlikely to become exposed. This is likely to be approximately one metre below the natural seabed although the exact depth will depend upon the seabed conditions, e.g. dynamics, and site characteristics at the time of decommissioning.

The sequence for removal of a monopile foundation and TP is anticipated to be:

1. Mobilise suitable vessel (likely to be a jack-up vessel or heavy-lift vessel).
2. Unbolt or cut the TP using a mechanical cutter or otherwise and lift onto the decommissioning vessel or transport barge.
3. Deploy ROVs to inspect the foundation and reinstate lifting attachment if required. The use of divers will be avoided and only deployed if highly necessary.
4. Excavate around outside of monopile to approximately 0.5m below anticipated level of cutting (this will include removing any scour protection or debris around the base of the foundation). Excavated material will be disposed of on the seabed adjacent to the foundation base.
5. Cut the monopile approximately 1m below seabed level using either a mechanical cutter, a water jet or abrasive cutter or controlled directional explosive cutting. Method chosen will be BATNEEC (Best Available Technique Not Entailing Excessive Costs) and according to legislation at the time of decommissioning.
6. Lift monopile onto the decommissioning vessel or transport barge. The foundation parts will be placed into engineered sea-fastenings approved by the MWS on the vessel.
7. Transport removed foundation to the selected harbour.
8. Removed foundation will be processed for reuse, recycle or disposal.

4.2.3 Scour/Cable Protection

It may be preferable to leave the scour/cable protection *in situ* as the environmental impacts from removal may be greater than it remaining in place as it is likely the substratum will be rapidly colonised by marine fauna. If removal is deemed necessary, the removal sequence is anticipated to be:

1. For rock armour, the boulders are likely to be recovered using a grab vessel and transferred to a suitable barge for transport to an approved onshore site for appropriate disposal or re-use.
2. The filter layer (the first layer of scour protection, typically weighted down with additional layers of larger rocks) is likely to be dredged and transported to be disposed of at a licensed disposal area (this could be offshore or onshore).

4.2.4 Array and Export Cables

The offshore cables will either be removed or left *in situ*, depending on if the risk of the cable becoming exposed is minimal. If left *in situ,* the ends will be weighted down and buried (e.g. using an ROV) to ensure they do not interfere with vessels etc. At cable or pipeline crossings the cables are also likely to remain in place to avoid unnecessary risk to the integrity of the third-party cable or pipeline.

If the cables are to be removed, the sequence for removal of the cables is anticipated to be:

1. Identify the location of the cables that need to be removed
2. Buried cables will be located using mass or controlled flow excavation or some other form of jetting tool or a grapnel to lift them from the seabed. Alternatively, or in addition, it may be necessary to use an ROV to cut and/or attach a lifting attachment to the cable so that it can be recovered to the vessel
3. The recovery vessel will either 'peel out' the cable as it moves backwards along the cable route whilst picking it up onto the vessel, or, if the seabed is very stiff/hard, a separate vessel may first under-run the cable with a sheave tool to lift the cable from the seabed.
4. The recovery vessel will either spool the recovered cable into a carousel or chop it into lengths as it is brought on board the vessel before transport to shore.
5. Cable removed will be processed for reuse, recycle or disposal.

4.2.5 Offshore substations (OSS and RCS)

The decommissioning of the OSS and RCS will comprise the dismantling and removal of the topside and the jacket foundation (substructure). The operation will follow a reverse installation process subjected to the same constraints as the installation operation. Decommissioning will be undertaken in the same controlled manner and in accordance with a risk management plan to ensure the same or higher level of safety. The logical (and more cost-effective option) would be to do a combined decommissioning operation campaign. This is the base case for the budget calculation.

Both the surface and underwater preparation works can be performed using a suitable support vessel, with sufficient crane capacity to operate in the field all year round. All underwater activities associated with the deployment of cutting tools and removal of jacket sections can be performed by ROVs without diver intervention. This approach enhances the safety of the overall project by eliminating the need for divers to be in the water during these hazardous operations. However, some diving activities may be required to support the preparations activities for the jacket foundation removal.

4.2.5.1 Site Preparations

In the years prior to the start of decommissioning a number of survey and inspection activities may be carried out, such that the findings could be used in detailed design studies. The preparation works incorporate the following activities, some of which could be performed during or ahead of the OSS and RCS removal preparation phase.

Topsides

The following activities (in no particular order) should be performed to remove the topside structure:

- De-energise and isolate required electrical control and power cables from National Grid and SCADA system;
- Dismantle terminations for export and array cables;
- Removal of all cables back to cable deck or seabed;
- Identification of any modifications to the structure;
- Remove any loose items;
- Cut and remove any projecting structures to maintain clearances during lift operations;
- Install additional temporary access / rigging platforms, as required;
- Survey of principal topside members and joints, especially around critical nodes;
- Survey and identification of damaged or corroded areas;
- Surveys to determine the condition of appurtenances and attachments;
- Installation and/or certification of lifting points;
- Installation of tugger attachments; and
- Cutting welded stab-in connections between topside and foundation.

Jacket

The following activities (in no particular order) should be performed following completion of the topsides removal:

- Cut and remove any projecting structures to maintain clearances during lift operations;
- Determining the condition of jacket structure walkways;
- Install temporary access and rigging platforms as required;
- Inspect critical joints and members on the jacket (e.g. adjacent to lift points) and carry out remedial work as required;
- Survey and identification of damaged or corroded areas;
- Identification of any modifications to the structure;
- Remove any loose items;
- Surveys to determine the condition of appurtenances and attachments;
- Installation and/or certification of lifting points to Jacket structure;
- Installation of tugger attachments;
- Deploy ROVs or divers to inspect the foundation;
- Perform marine growth survey;
- Cut drainage holes in legs and selected bracing members, as necessary;
- Confirm pile stick up elevations and measure soil plug elevations;
- Examination of ROV accessibility.

General

- Prepare barges with custom grillages and associated sea fastening;
- Define disposal sites and offloading methods for all structures.

4.2.5.2 Removal of Topside

Once the site preparations have been completed the offshore operation can commence. The first component to be removed is the topside and is anticipated to take place as follows:

1. Mobilise suitable vessel (likely to be a heavy-lift vessel);
2. Prepare set-down area on nominated cargo vessel or installation vessel deck;
3. Remove / lift topside structure. This is anticipated to take place with one lift, so the topside will not need to be dismantled;
4. Backload topside structure into the awaiting cargo barge or in the installation vessel deck;
5. Release rigging;
6. Install / engage sea fastening as required; and
7. The jacket structure will be received by the barge left on standby or an additional suitable vessel depending on carrying capacity.

4.2.5.3 Removal of Foundation (substructure)

After removing and securing the topside the foundation (substructure) of the offshore substation will be decommissioned. The jacket removal process is anticipated to be as follows:

1. Prepare set-down area on nominated cargo vessel or installation vessel deck;
2. Deploy specified cutting tool via work-class ROV;
3. Cut the piles 1m below the seabed using a mechanical cutter, a water jet or abrasive cutter or controlled directional explosive cutting tool inside the pile;
4. Perform additional jetting, as required, until static friction between mud mat and seabed is overcome;
5. Remove / lift jacket structure. This is anticipated to take place with one lift, so the jacket will not need to be dismantled;
6. Backload jacket structure into the awaiting cargo barge or in the installation vessel deck;
7. Release rigging;
8. Install / engage sea fastening as required;
9. Recovery of HLV anchors, if necessary; and
10. Barge sails to disposal location.

4.2.5.4 Transport and Disposal of Topside and Foundation (substructure)

After both structures have been loaded and sea fastened to the cargo barge or installation vessel the next step would be to transport and dispose of the structures onshore. The process is anticipated to be as follows:

1. Transport the loaded cargo barge or installation vessel to shore;
2. Perform the load-out;
3. Demobilise all Marine Spread;
4. Dismantle interconnections between electrical equipment;
5. Remove oil from transformers; and
6. Parts will be processed for reuse, recycle or disposal.

4.3 Summary of Proposed Decommissioning Approach

A summary of the proposed decommissioning measures for the offshore components of Hornsea Project Two are outlined in
Table 6.

Table 6: Summary of proposed decommission measures for Hornsea Project Two

Component	Proposed Decommissioning Measure
Wind turbines	Complete removal from site
Monopile foundations	Cut off at natural seabed and removed
Scour protection	Left *in situ* / portion removal of scour protection at turbines
Substation Topside	Complete removal
Substation Jacket	Cut off at natural seabed and removed
Cables	Complete removal or left *in situ*

4.4 Proposed Waste Management Solutions

Waste management will be carried out in accordance with the approved Project Environmental Monitoring and Management Plan (Ørsted Doc. Ref. 00464250), as well as relevant legislation at the time of decommissioning and paying regard to the waste hierarchy which suggests that reuse should be considered first, followed by recycling, incineration with energy recovery and, lastly, disposal. It is intended that the vast majority of elements from the offshore wind farm will be taken back to land for re-use and recycling. A waste management plan will be drawn up prior to commencement of decommissioning.

The scale of offshore wind farms results in a large amount of material which will require handling once the structures are decommissioned. Contractor health and safety recommendations, and regulatory requirements of the time will be fully considered and factored during planning of the decommissioning process. Decommissioning industry best practice will be applied, considering the legislation applying at that time. An overview of expected types of wastes and their expected fate is provided in Table 7.

Table 7: Wind Farm Waste Types and their Assumed Treatment

Waste type	Re-use	Recycle	Disposal
Steel from wind turbines		X	
WTG	X	X (mostly)	X
Foundations		X	
Scour protection (left *in situ, i.e. n/a)*			
Substation Topside		X	
Substation Jacket		X	

Waste type	Re-use	Recycle	Disposal
Used lubricants from wind turbine		X	
Non-recyclable materials and fluids			X

4.5 Lighting and Marking

During the decommissioning of Hornsea Project Two, appropriate aviation, and nautical marking and lighting will be applied. With regard to aviation safety, the shape, colour and character of the lighting will be compliant with the relevant legislation at the time. In relation to navigational safety, lights and marks will be agreed with relevant UK authorities prior to decommissioning to specify any obstruction marking that may be required during the removal operations. In the event that any obstruction is left on site, which may be considered to present a hazard to navigation, the necessary and specified marking will be provided.

5. Environmental Impact Assessment

An EIA for the project was completed and the results published in an ES in 2015. This EIA included a high-level assessment of the potential environmental impacts of the project during the construction, operational and decommissioning phase. Table 8 summarises the impacts from the decommissioning phase.

Table 8: Summary of decommissioning impact assessment

Topic	Magnitude of Impact	Significance of effect including designed in measures
Marine Processes	Negligible	Negligible (insignificant).
Nature Conservation[1]	Negligible to minor adverse.	Negligible to minor (insignificant).
Benthic Subtidal and Intertidal Ecology	Negligible to low depending on the habitat.	Negligible to minor (insignificant) depending on the habitat.
Fish and Shellfish Ecology	Negligible to Low	Negligible to minor (insignificant)
Ornithology	Negligible to Low	Negligible to minor (insignificant)
Marine Mammals	Negligible to Low	Negligible to minor (insignificant)
Shipping and Navigation	Negligible to Low	Negligible to minor (insignificant)
Commercial fisheries	Negligible to Low	Negligible to minor (insignificant)
Aviation, Military and Communications	Negligible	Minor (insignificant)
Marine Archaeology and Ordnance	Negligible to Low	Minor (insignificant)
Infrastructure and Other Users	Negligible to Low	Negligible to minor (insignificant)
Seascape and Visual Resources	Negligible to High	Negligible to major (significant). Considered acceptable as receptors close range views of works would be transitory for a short distance/duration.

The ES will be reviewed when the final decommissioning schedule is known. Based on this review and the following criteria, the projected impacts may have to be re-assessed, and newly discovered potential impacts may need to be added.

- An updated review, identification and assessment of potential impacts on the physical, biological and human environment by planned surveys in and around Hornsea Project Two.
- An updated review, identification and assessment of activities of other legitimate users of the sea with the potential to be affected by decommissioning. This is because the nature and/or intensity of

[1] Not including ornithology.

human activities taking place on/around the Hornsea Project Two site, such as commercial fishing, could have changed over the lifetime of the project;

- An updated review, identification and assessment of the potential impacts of decommissioning on the local community, i.e. potential socio-economic impacts; and
- An updated review, identification and assessment of potential impacts on historic environment interests such as marine archaeological features (Archaeological Exclusion Zones). The Offshore Renewables Protocol for Archaeological Discoveries will also be adhered to when relevant.

6. Consultations with Key Stakeholders and the Public

Throughout Hornsea Project Two's development, close consultation with key stakeholders at a national and local level, has and will continue to be maintained during the remaining construction, operational and decommissioning phase.

This Decommissioning Programme has been consulted on with the following stakeholders:

- Chamber of Shipping;
- Joint Nature Conservation Committee;
- Maritime and Coastguard Agency;
- National British Marine Aggregate Producers Association (BMAPA);
- National Federation of Fishermen's Organisation;
- Historic England;
- Natural England;
- Associated British Ports;
- North Eastern Inshore Fisheries and Conservation Authority;
- Royal Yachting Association;
- Trinity House Lighthouse Service;
- East Lindsey District Council;
- Marine Management Organisation;
- The Crown Estate; and
- The Environment Agency.

Furthermore, this draft Decommissioning Programme will be made available publicly on the Hornsea Project Two website and at Grimsby Library[2] and East Lindsey Access Point – Mablethorpe Library[3]. Notices advertising the availability of the draft Decommissioning Programme were placed in the Grimsby Telegraph on 29th July 2019. Appendix 1 will provide a summary table of the comments and actions taken following receipt of the responses. Appendix 2 will provide copies of the consultation responses received.

[2] Town Hall Square, Grimsby, DN31 1HG:

Opening Hours: Tuesday to Friday – 8:30am - 5.30pm, Saturday – 9am - 1pm. Closed Sunday and Monday

[3] Stanley Avenue, Mablethorpe, Lincolnshire, LN12 1DP.

Opening hours: Monday, Tuesday, Wednesday and Friday – 9am - 5pm, Thursday – 9am - 6pm, Saturday – 9am - 1pm. Closed Sunday

7. Proposed Decommissioning Schedule

At the time of writing, only one minor offshore wind farm has been decommissioned fully worldwide, and another pilot site is in process. It is therefore difficult to anticipate the operational challenges, costs and precise timing of works. Once larger-scale wind farms start to be decommissioned, it will provide valuable insight into the timing, costs and operational challenges to be faced. The Decommissioning Programme will be updated prior to decommissioning once this knowledge has evolved to the extent that it will allow for a refinement to this document and the associated financial security information.

It is anticipated that the decommissioning phase could last up to two years however, these dates and timeframes are indicative only and may not be finalised until closer to the time of decommissioning. When the Hornsea Project Two construction is complete the Decommissioning Programme will be updated to reflect any changes to the project design which may have occurred during construction. When the operational phase is complete, any potential unforeseen issues that arise which may influence the decommissioning phase, will additionally be considered. This knowledge, together with the outcome of consultation with relevant authorities, will help develop a final schedule of decommissioning works.

8. Project Management and Verification

The Decommissioning Programme will be finalised once consultation is complete and will be submitted to the SoS before construction below Mean Low Water commences in accordance with Schedule 1, Part 3, Requirement 10 of the Hornsea Project Two DCO, as well as in compliance with the Section 105 notice served by the SoS on the 21st December 2018 and re-issued on the 5th April 2019. However, the final review of this document and the proposed schedule of decommissioning works will be completed towards the end of the operational lifetime. This review will produce a Decommissioning Programme of Works, including current knowledge of decommissioning methods, measures and timing which will be made available to the public for comment.

A Decommissioning Report will be issued for approval to the appropriate regulatory authorities after the decommissioning phase is finished, in compliance with the relevant guidance, summarising how the Programme has been carried out.

As a minimum, this report should include:

- Confirmation that the approved decommissioning programme has been adhered to during the decommissioning works; otherwise, an explanation of any major variances from the programme; this includes information of actual costs of the works and an explanation of any major variances from the forecast costs;
- Information on the outcome of the decommissioning phase, including sea-bed clearance;
- Confirmation that relevant authorities have been notified of infrastructure remains; and
- Information of any appropriate aids to navigation that have been installed, where required, to overcome risks posed by such remains.

Upon completion, not more than four months after the decommissioning works, the report will be provided to BEIS.

9. Restoration of the Site

Following the completion of decommissioning works, the Hornsea Project Two site will be restored, as far as reasonably practical, to its original pre-construction state. This applies to both the array area and the export cable corridor. The key restoration works will include securing and adequately covering any cables and cut foundations that are left in the seabed. The security and adequacy of this coverage will be agreed in consultation with the appropriate regulatory authorities towards the end of the wind farm's operational lifetime.

10. Post-decommissioning site monitoring, maintenance and management

It is proposed that post-decommissioning monitoring surveys of the site will be carried out by an independent contractor at appropriate intervals after the decommissioning works completion. The scope of which will be agreed in advance with the relevant authorities.

Should these surveys identify any residual elements of the wind farm protruding above the seabed, appropriate measures will be taken to remove or re-bury them to avoid posing risk to mariners using this area. The removal or re-burying technique and associated machinery will likely be the same as that used for the initial decommissioning works but will ultimately depend on the type and size of the identified elements.

Should there be any uncertainty regarding the identification of anomalies during the surveys other than those associated with the wind farm, which could be of archaeological interest, these will be referred to the appropriate independent public authority at the time of decommissioning. The UK Hydrographic Office will be informed of these residual elements, so that they can be marked as potential anchoring hazard on relevant maps and charts with the purpose of providing a warning to mariners.

It should be noted that the Hornsea Project Two Undertakers are required to apply to the MMO closer to the time for a Marine Licence for decommissioning activities, which are not consented under the wind farm's current consents. It is at this stage that the finer details of the methods and details of any monitoring will be agreed with the relevant authorities and their consultees.

11. References

SMart Wind 2015. Hornsea Project Two Offshore Wind Farm Environmental Statement. 2015.

Department of Business, Energy & Industrial Strategy (BEIS) 2019. Decommissioning of Offshore Renewable Energy Installations Under the Energy Act 2004. Guidance notes for industry (England and Wales). March 2019.

Department of Business, Energy and Industrial Strategy (BEIS) 2016. The Hornsea Two Offshore Wind Farm Order. August 2016.

Department of Business, Energy and Industrial Strategy (BEIS) 2016. The Hornsea Two Offshore Wind Farm (Correction) Order. November 2016.

Department of Business, Energy and Industrial Strategy (BEIS) 2016. The Hornsea Two Offshore Wind Farm (Amendment) Order. April 2018.

Marine Management Organisation (MMO) 2016. Deemed Marine Licences. August 2016.

12. Consultation

To be included once consultation takes place.

12.1 Appendix 1 – Summary of consultation responses and actions taken.

Consultee	Summary of issues raised	Action taken
-	To be completed following consultation	-

12.2 Appendix 2 – Consultation responses received in full.

This section will include the consultation responses once received.