

NORTH SEA WIND POWER HUB CONSORTIUM

Planning and Permitting Study

Final Report



P2303_R4682_Rev3 | 1 July 2019

DOCUMENT RELEASE FORM

North Sea Wind Power Hub Consortium

P2303_R4682_Rev3

Planning and Permitting Study

Final Report

Author/s

Charlie Cameron, Jillian Hobbs

Project Manager

Emma Langley

Authoriser

Beth Monkman

Rev No	Date	Reason	Author	Checker	Authoriser
Rev 0	25/04/2019	Draft Section 1 & 2	CC	JH	BHM
Rev 1	10/05/2019	Draft Section 3	CC	JH	BHM
Rev 2	24/05/2019	Final Draft	CC	JH / ESL	BHM
Rev 3	01/07/2019	Final	CC	ESL	BHM

Intertek Energy & Water Consultancy Services is the trading name of Metoc Ltd, a member of the Intertek group of companies.

CONTENTS

	DOCUMENT RELEASE FORM	I
	GLOSSARY	IV
1.	INTRODUCTION	1
1.1	Project Overview	1
1.2	Study Objectives	1
1.3	Scope of Work	2
2.	SUMMARY OF APPLICABLE LEGISLATIVE FRAMEWORK	4
2.1	International and European Policy and Legislation	4
2.2	National Policy and Legislation	10
2.3	Current Status of Hydrogen Transmission in the UK	19
3.	UK PLANNING AND PERMITTING REQUIREMENTS	20
3.1	Planning Considerations	20
3.2	Consents Required for OWF and Interconnector Cables	31
4.	KEY PLANNING AND PERMITTING ISSUES	54
4.1	Consultation	54
4.2	Key Issues	57
5.	PROJECT PROPOSED TIMELINES	59
6.	RECOMMENDATIONS AND NEXT STEPS	61
6.1	Recommendations	61
6.2	Next Steps	61
	REFERENCES	62
APPENDIX A	Crown Estate Seabed Leasing Rounds	A-1
A.1	Introduction	A-2
A.2	Offshore Transmission Owner (OFTO) Auctions	A-3
A.3	Contracts for Difference (CFD) Auction Round Application Process	A-3
APPENDIX B	Required information for a DCO Application	B-1
B.1	Required information for a DCO application	B-2

LIST OF TABLES AND FIGURES

Tables

Table 3-1	Permitting requirements for marine Surveys in Territorial waters (England) and UK Offshore waters for UK OWFs and electrical interconnectors	43
Table 3-2	Permitting requirements for installation in Territorial waters (England) and UK Offshore waters for UK OWFs and electrical interconnectors	47

Figures

Figure 3-1	Proposed new OWF development regions for Round 4 (The Crown Estate, 2018a)	21
Figure 3-2	How rights are granted by the Crown Estate (TCE 2016)	22
Figure 3-3	Offshore Wind Farm Development Regions and Key Environmental Sensitivities (Drawing Number P2303-LOC-001-A)	25
Figure 3-4	Graphical representation of the DCO application process with associated timescales (after RWE 2015)	35
Figure 3-5	Summary of the HRA process (The Planning Inspectorate, 2015)	39

GLOSSARY

AA

Appropriate Assessment

AC

Alternating Current

BAT

Best Available Techniques

BEIS

Department for Business, Enterprise and Industrial Strategy

BEP

Best Environmental Practice

CCA

The Climate Change Act 2008

CCC

Committee on Climate Change

CFD

Contracts for Difference

CJEU

Court of Justice of the European Union

COP

Conference of the Contracting Parties

DC

Direct Current

DCO

Developmental Consent Order

DE

Germany

DECC

Department of Energy and Climate Change

DEFRA

Department for Environment, Food and Rural Affairs

DK

Denmark

DML

Deemed Marine Licence

DNO

Distribution Network Operators

EEZ

Exclusive Economic Zone

ExA

Examining Authority

EIA

Environmental Impact Assessment

EMR

Electricity Market Reform

ENTSO-E

European Network for Transmission System Operators-Electricity

EU

European Union

EPS

European Protected Species

ES

Environmental Statement

FAO

Food and Agricultural Organisation

GES

Good Environmental Status

GHG

Greenhouse Gas Emissions

GW

Gigawatt

H2

Hydrogen

HAT

Highest Astronomical Tide

HM

Her Majesty

HRA

Habitats Regulation Assessment

IPC

Infrastructure Planning Commission

IROPI

Imperative Reasons of Overriding Public Interest

ITT

Invitation to Tender

JNCC

Joint Nature Conservation Committee

LCCC

Low Carbon Contracts Company

LSE

Likely Significant Effect

MaRS

Marine Resource System

MCAA

Marine and Coastal Access Act

MCZ

Marine Conservation Zones

MMO

Marine Management Organisation

MOD

Ministry of Defence

MPAs

Marine Protected Areas

MPS

Marine Policy Statement

MSFD

Marine Strategy Framework Directive

MSP

Maritime Spatial Planning

MW

Megawatt

NCA

National Competent Authority

NDC

Nationally Determined Contribution

NERC

Natural Environment and Rural Communities Act

NL

Netherlands

NM

Nautical Mile

NO

Norway

NPS-EN1

National Policy Statement for Overarching Energy (EN-1)

NPS-EN3

National Policy Statement for Renewable Energy (EN-3)

NPS-EN5

National Policy Statement for Electricity Networks (EN5)

NPS

National Policy Statement

NSER

No Significant Effect Report

NSIP

Nationally Significant Infrastructure Project

NSWPH

North Sea Wind Power Hub

OFGEM

Office of Gas and Electricity Markets

OFTO

Offshore Transmission Owner

OGA

Oil and Gas Authority

OPRED

Offshore Petroleum Regulator for Environment and Decommissioning

OREI

Offshore Renewable Energy Installation

OWF

Offshore Wind Farm

P2G

Power to Gas

PAD

Protocol for Archaeological Discoveries

PBR

Post Build Report

PCI

Project of Common Interest

PIER

Preliminary Environmental Information Report

PINS

The Planning Inspectorate

PQQ

Pre-qualification stage

REZ

Renewable Energy Zone

SAC

Special Area of Conservation

SCP

Supply Chain Plan

SEA

Strategic Environmental Assessment

SNCB

Statutory Nature Conservation Bodies

SPA

Special Area of Protection

SSSI

Site of Special Scientific Interest

TCE

The Crown Estate

TEN-E

Trans-European Networks

TNO

Transmission Network Operators

UNCLOS

United Nations Convention of the Law of the Sea

UN

United Nations

UNECE

United Nations Economic Commission for Europe

UNFCCC

United Nations Framework Convention on Climate Change

WFD

Water Framework Directive

WSI

Written Scheme of Investigation

1. Introduction

Intertek Energy & Water (Intertek) and MarineSpace have been contracted by the Port of Rotterdam (part of the North Sea Wind Power Hub (NSWPH) Consortium) to provide a planning and permitting study for the NSWPH for the UK jurisdiction.

1.1 Project Overview

The NSWPH Consortium is in the early stages of investigating the feasibility of a NSWPH, aimed at making the energy transition (to meet the Paris Climate Agreement) more feasible from a spatial, environmental and economic standpoint.

The proposed NSWPH is based on a 'hub and spoke' concept, in which one or several hub islands will be created in the North Sea for offshore wind farms (OWF's) to connect into via alternating current (AC) cables. The power from these OWF's will then be converted into direct current (DC) electricity by converters on the hub islands, before being exported by a series of interconnectors (the 'spokes') to connecting North Sea countries, including the United Kingdom, the Netherlands, Germany, Denmark and Norway. By utilising this 'hub & spoke' system, the NSWPH consortium aims to optimise the spatial efficiency of both OWFs and interconnectors in the North Sea, which would reduce the environmental impact these projects have and allow for areas deeper and further offshore to be exploited.

Another potential synergy of this project is to utilise Power to Gas (P2G) technologies on the hub islands to convert power generated by the OWF's into hydrogen (H₂), which would then be exported to connected countries via new and existing gas pipelines. This could have multiple benefits, including helping to balance power delivery to connected countries in times of decreased wind power generation, or the utilisation of H₂ as a feedstock for industrial use.

As such, the NSWPH aims to become a hub for OWF's to connect to, an interconnector between North Sea countries, a site for areas further offshore to be explored from and a conversion site for P2G systems. Due to the early stages of this projects development and number of countries involved, each with differing legislation on offshore infrastructure installation, operation and decommissioning, understanding any legislative and consenting benefits/constraints is imperative.

Various studies are underway to look at the potential location and design of the hub(s), but at this time no decisions on location have been made. For the purposes of this study the locations of the hubs are assumed to be:

- A. Dogger Bank area (Dutch EEZ)
- B. An area south of Dogger Bank (Dutch EEZ)
- C. Two areas off the Danish west coast (Denmark EEZ)

1.2 Study Objectives

The NSWPH consortium has requested studies to be undertaken to inform the consortium on the planning and permitting regimes in each of the applicable jurisdictions (United Kingdom, Netherlands, Germany, Denmark, Norway).

A concise report is required which sets out the findings of the desk-based study using clear overviews and schedules. The main purpose of the desk-based study is to inform the consortium on the planning and permitting aspects of the hub and to provide insight into the following:

- Relevant international and European treaties, regulations and directives and their specific implementation

- Relevant national planning and permitting regimes, including competent authorities, procedures and procedure time lines
- An overview of the implications of these consenting regimes for the project locations, configurations and technologies listed above
- The information required for relevant planning and permitting applications
- Specific national points of attention, e.g. known legal constraints and obstacles or specific procedural risks and requirements.

It is acknowledged that no decision has been taken on project location or configuration of the hub(s) and spokes, including the location and capacity of the hub and adjacent offshore wind farms, the number of hubs to be envisaged, as well as the technology and timetable for realisation. Therefore, at this stage the Planning and Permitting Study can only be a general assessment taking worst case configurations into account. The planning and permitting period to be considered is from 2022 – 2028 with first construction activities planned from 2030 and assumes current legislation will remain in place during this period.

1.3 Scope of Work

Intertek's scope is for the UK only, therefore the planning and permitting aspects related to the hub and associated infrastructure (including airstrip, helipad, harbour) are not relevant and not considered further.

Infrastructure connected with the NSWPH may be located within UK territorial waters, therefore the geographical scope for permit requirements covered in our study will include the UK EEZ and English territorial waters up to mean high water springs. The following foundation technologies for OWFs are to be considered for this study:

- Mono-pile;
- Jackets;
- Gravity based;
- Bucket; and
- Floating.

The mode of interconnector to be considered are as follows:

- All electric;
- Combined electric and hydrogen; and
- All hydrogen.

Additionally, other aspects to be considered relevant to the UK study include:

- Offshore development and maintenance activities;
- Post construction monitoring; and
- Opportunities for environmental integration and sustainable development as provided by the Dutch example of the Oyster bed development.

The study has been split into the following main sections in addition to this Introduction:

Section 2 - Summary of applicable legislative framework: The first part of the study comprises a literature review of current key planning policy and legislation for OWFs, interconnectors and H2 pipelines at an international and European level and at the UK national level.

Section 3 - UK planning and permitting requirements: The second part of the study includes a review of the planning process and required consents, permits, licences and notifications for OWFs, interconnectors and H2 pipelines in the UK. It comprises a qualitative assessment of the information needed for planning and permit applications and identifies known legal constraints, obstacles or specific procedural risks and requirements. Where available, timelines for each consent/permit/licence/notification have been provided.

Section 4 – Key planning and permitting issues: Key findings from consultation undertaken to fill gaps in knowledge or ‘grey areas’ identified during the desk based study have been summarised in this section, along with key consenting issues associated with OWF developments taking into consideration the location and configuration of the project.

Section 5 – Project proposed timeline: The final part of the study has used the information collated in Sections 2 - 4 to outline the consenting processes for each of the project components against the project proposed timelines for planning and permitting (between 2022 and 2028).

Section 6 - Recommendations and next steps: This section provides a summary of the recommendations and potential next steps for the study.

2. Summary of Applicable Legislative Framework

The first part of the study which is presented in this section comprises a literature review of the applicable legislative framework relevant to the NSWPH in the UK jurisdiction. It provides a summary of current key planning policy and legislation for OWFs and electrical interconnectors at the international and European level, followed by at the national level. In the absence of current legislation specific to hydrogen interconnectors a brief summary is provided on the status of potential for hydrogen transmission offshore in the UK.

This section has therefore been split into three sub-sections:

- Section 2-1 – International and European policy and legislation
- Section 2-2 – National policy and legislation
- Section 2-3 – Current Status for Hydrogen Transmission in UK

2.1 International and European Policy and Legislation

2.1.1 Paris Agreement (2015)

Adopted by 196 signatories to the UN Framework Convention on Climate Change (UNFCCC) on 12 December 2015, the Paris Agreement is an ambitious, legally binding framework designed to limit global warming levels to below 2°C (UNFCCC, 2015). This agreement provides the legislative mechanisms for signatories to adhere to the agreement by requiring mitigation measures of countries to be expressed as nationally determined contributions (NDCs) which must be revised every 5 years. This in turn encourages countries (including the UK) to adopt zero-emission technologies such as offshore wind to meet their assigned targets.

2.1.2 The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)

The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) is a unification of the previously separate Oslo and Paris Conventions which promotes co-operation between countries to protect the North-East Atlantic marine environment. The convention came into force on the 25th of March 1998, with the UK being one of the original contracting parties when the convention was opened for signature in 1992. The convention is based on an ecosystem approach, being defined as “the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity” (OSPAR, 2015a). This approach is further guided by the Precautionary and Polluter Pays principles and use of Best Available Techniques (BAT) and Best Environmental Practice (BEP) (OSPAR, 2015b). The convention has four main aims, which are:

- **Protection of Ecosystems and Biological Diversity:** Signatories must take, both individually and jointly, measures to protect the marine environment from adverse human effects to safeguard human health and conserve marine ecosystems.
- **Hazardous substances:** Naturally occurring substances should be at concentrations of near background levels, with synthetic substances being as close to zero as possible.

- **Eutrophication:** To stop eutrophication outbreaks in the North-East Atlantic and prevent further occurrences.
- **Radioactive substances:** Naturally occurring substances should be at concentrations of near background levels, with artificial radioactive substances being as close to zero as possible.

Development of any infrastructure associated with the NSWPH within UK waters must be undertaken with regard to the guidelines set out by the OSPAR convention.

2.1.3 ESPOO Convention: The United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context

The ESPOO (EIA) Convention came into force on the 10th September 1997. It details proceedings requiring organisations to conduct an Environmental Impact Assessment at the early planning stages if the proposed activity or development is predicted to have a significant adverse effect on the environment; while also requiring Member States to notify and consult bordering states should a development be likely to have a significant adverse environmental impact across their boundary (United Nations Economic Commission for Europe, 2017). As the NSWPH project will cross multiple jurisdictions, the obligations of the ESPOO Convention are likely to be required. It may be possible to achieve this through a 'bridging document' which summarises the findings of the environmental assessments of each component of the project e.g. the marine components for each jurisdiction and the onshore components for each jurisdiction as applicable.

2.1.4 Environmental Impact Assessment Directive (2011/92/EU as amended by 2014/52/EU)

The Environmental Impact Assessment (EIA) Directive requires that an environmental impact assessment (EIA) is undertaken for certain types of projects that have the potential to cause significant adverse effects on the receiving environment (European Commission, 2017). Under the Directive all projects listed in Annex I are considered as having significant effects on the environment and require an EIA (European Commission, 2017). Projects listed in Annex II may need an EIA subject to a screening opinion by the national appropriate authorities. Offshore wind farms are listed as Annex II projects, and therefore must undergo screening to determine if EIA is required. In making this decision the national appropriate authority will take into consideration the nature, size and location of the project. Interconnector cables alone are not listed on either Annex of the EIA Directive, however, interconnectors in the context of offshore wind farms are treated as part of the offshore wind farm development and as such would require an EIA if it is deemed the offshore wind farm requires one. It is expected that any infrastructure developments associated with the NSWPH will require an EIA as part of the consenting process. For projects which require development consent under the Planning Act 2008, the requirements of the EIA Directive has been transposed into UK legislation by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations). This directive is transposed into UK law for marine licence applications under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

2.1.5 20 20 by 2020 and Renewable Energy Directive (2009/28/EC)

In 2008 the European Union (EU) published the policy document '20 20 by 2020: Europe's Climate Change Opportunity', which featured two targets;

- Greenhouse gas emissions to be reduced by 20% by 2020.
- Renewable energy sources to provide 20% of the EU's total energy consumption by 2020.

To implement this policy, the Renewable Energy Directive (European Directive 2009/28/EC) was introduced in 2009 which replaced the previous EU Renewables Directive (2001/77/EC). In this directive individual EU countries set their own renewables targets to reach by 2020, with the UK

setting a target of 15%. A revision of the directive was published in 2018, which set a target of 32% energy consumption from renewable sources across the EU by 2030. The directive additionally promotes co-operation between Member States and those outside of the EU to achieve their renewable energy targets, with joint renewable energy projects being explicitly promoted, which in the context of the NSWPH gives clear policy support for the project.

2.1.6 2030 Targets

In October 2014, EU countries agreed on a 2030 framework for climate and energy, which included targets and policy objectives for the period between 2020 and 2030. The targets to be achieved by 2030 include:

- A 40% cut in greenhouse gas emissions compared to 1990 levels;
- At least a 27% share of renewable energy consumption; and
- At least 27% energy savings compared with the business-as-usual scenario.

To meet the targets, the European Commission has proposed:

- A reformed EU emissions trading scheme;
- New indicators for the competitiveness and security of the energy system, such as price differences with major trading partners, diversification of supply, and interconnection capacity between EU countries; and
- First ideas on a new governance system based on national plans for competitive, secure, and sustainable energy. These plans will follow a common EU approach. They will ensure stronger investor capacity, greater transparency, enhanced policy coherence and improved co-ordination across the EU.

2.1.7 Maritime Spatial Planning Directive (2014/89/EU)

With the number and types of users of the marine environment continuing to increase, there is a need for countries' waters to be more effectively managed. The Maritime Spatial Planning Directive was created to provide a common Maritime Spatial Planning (MSP) framework for EU Member States to adopt. There are several proposed benefits of MSP, including:

- Reducing conflicts between different sectors (e.g. shipping, fishing, offshore wind) by intelligently planning out where such activities should take place and creating synergies between them;
- Encouraging investment in Member States seas by providing clear and predictable planning regimes for sectors to follow;
- Increasing cross-border co-operation between different Member States to develop not only their infrastructure (such as pipelines and energy grids) but also developing networks of protected areas; and
- Protecting the environment through earlier impact identification and more efficient use of space by other users of the area.

Member States were required to have transposed the directive into their own legislation and nominated competent authorities by 2016, with final MSPs to be established by 2021. In the UK, the directive is transposed into UK law by the Marine and Coastal Access Act 2009, with DEFRA (Department for Environment, Food and Rural Affairs) and its' devolved administrations being nominated as the competent authority (SIMCelt, 2019)

2.1.8 Guidelines for Trans-European Networks for Energy (TEN-E Regulation) (EU) No. 347/2013

The TEN-E Regulations are a set of guidelines that aim to streamline the permitting process for large-scale energy infrastructure projects, referred to as Projects of Common Interest (PCIs) (DECC, 2014). The EU initially identified 248 PCI projects around Europe, including technologies such as smart grids and interconnector projects, involving two or more EU countries. This highlights the need for strong regional co-operation to enable effective delivery of these projects, something the TEN-E Regulations aims to achieve. These PCI's, under the TEN-E Regulations, are required to be given 'Priority Status' at a national level to expedite their administrative approval. PCI's are identified and selected bi-annually by Regional Groups which consist of representatives from numerous ministries authorities and organisations (European Commission, 2018). One such organisation is the European Network for Transmission System Operators-Electricity (ENTSO-E), which in a report examining the NSWPH, appeared to respond positively to the proposal (ENTSO-E, 2018). This backing in the future could be beneficial in the NSWPH receiving PCI status.

The TEN-E Regulations require that a single National Competent Authority (NCA) is assigned by each Member State. The nominated NCA is responsible for co-ordinating the permitting process in their respective country while also co-ordinating with NCA's from other countries. In the UK, the nominated NCA is the Department for Business, Enterprise and Industrial Strategy (BEIS), which delegated the role to the Marine Management Organisation (MMO).

Similar to the EIA process, the NCA is required to highlight all material, and the level of detail required for such material, needed to be submitted by a developer to receive approval for any works. Any marine elements identified will need to be researched for the marine licence to be issued. A draft application file must be submitted to both the NCA and for public consultation by the developer so that objections can be raised, and omissions noted. Once the draft application file has been submitted and received, the NCA will confirm that the final application file may be submitted within 3 months.

The TEN-E Regulations specify clear guidelines for public participation in the process, with Annex IV(5) stating that as a minimum the following tasks should be undertaken:

- Establishment of a project website;
- The publication of an information leaflet detailing the purpose of the project, an approximate timeline, the national grid development plan, any alternative routes considered, expected impacts in both the host and neighbouring countries, and potential mitigation measures. This should be published before the start of the public consultation;
- All affected stakeholders should be informed through the projects' website;
- Write to relevant stakeholders inviting them to dedicated meetings, allowing their concerns to be addressed; and
- Conduct at least one public consultation before submitting the draft application file.

It should be noted that the UK has not directly transposed the Ten-E Regulation into domestic legislation, due to a similar consenting process for major energy infrastructure projects already existing within the UK. As such, in the event of the UK leaving the EU the Ten-E Regulation will no longer apply in UK waters.

2.1.9 Habitats and Birds Directives

There are two key directives issued by the EU to legislate for the protection of habitats and species of conservation importance. These are Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (known as the Habitats Directive), and Directive 2009/147/EC (as amended) on the Conservation of Wild Birds (known as the Birds Directive). Through these directives the Natura

2000 network of protected sites was established. These protected sites include Special Areas of Conservation (SACs) for habitats and species, and Special Protected Areas (SPAs) for birds. Natura 2000 sites are commonly referred to as European sites or European marine sites where designated below Highest Astronomical Tide (HAT) height.

The Habitats Directive aims to promote habitat and wildlife conservation by requiring Member States to undertake measures to maintain or restore habitats and species listed on the Annexes of the directive. These annexes cover the following features:

- Annex I: Habitats of conservation importance;
- Annex II: Species requiring designation of SACs;
- Annex IV: Species in need of strict protection both within and outside Natura 2000 sites; and
- Annex V: Species whose taking from the wild must be compatible with maintaining their conservation status

When applying conservation measures the Member State is required to take into consideration economic, social and cultural requirements of the habitat and/or species in question, as well as local and regional components.

The Birds Directive aims to protect EU bird species, and their eggs, nests and habitats, through the preservation, maintenance and restoration of new and existing habitats important to bird species. This is primarily achieved through the designation of SPAs. There are more than 500 wild bird species naturally occurring in the EU which are protected under various annexes:

- Annex 1: 194 species and sub-species are particularly threatened. Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species;
- Annex 2: 82 bird species can be hunted. However, the hunting periods are limited and hunting is forbidden when birds are at their most vulnerable: during their return migration to nesting areas, reproduction and the raising of their chicks;
- Annex 3: overall, activities that directly threaten birds, such as their deliberate killing, capture or trade, or the destruction of their nests, are banned. With certain restrictions, Member States can allow some of these activities for 26 species listed in this annex;
- Annex 4: the directive provides for the sustainable management of hunting but Member States must outlaw all forms of non-selective and large scale killing of birds, especially the methods listed in this annex; and
- Annex 5: the directive promotes research to underpin the protection, management and use of all species of birds covered by the Directive, which are listed in this annex.

2.1.10 The Ramsar Convention

The Ramsar Convention on Wetlands of International Importance (especially as waterfowl habitat) is an international treaty for the conservation and sustainable use of wetlands. It is also known as the Convention on Wetlands. It is named after the city of Ramsar in Iran, where the Convention was signed in 1971.

A wetland can be considered to be internationally important if any of the following nine criteria apply:

- Criterion 1: It contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
- Criterion 2: It supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

- Criterion 3: It supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
- Criterion 4: It supports plant and/or animal species at a critical stage in their life cycles or provides refuge during adverse conditions.
- Criterion 5: It regularly supports 20,000 or more waterbirds.
- Criterion 6: It regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.
- Criterion 7: It supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
- Criterion 8: It is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
- Criterion 9: It regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

Every three years, representatives of the Contracting Parties meet as the Conference of the Contracting Parties (COP). This is the policy-making organ of the Convention which adopts decisions (Resolutions and Recommendations) to administer the work of the Convention and improve the way in which the Parties are able to implement its objectives.

In the UK a wetland site meeting one or more of the criteria can be designated and is commonly referred to as a Ramsar site. For the purposes of legislation and management Ramsar sites are generally designated in association with relevant Natura 2000 sites and conservation objectives and advice on operations are provided as part of the relevant European/European marine site.

Ramsar sites are terrestrial or coastal sites and are only included within the scope of works in association with landfall of export cables etc.

2.1.11 Water Framework Directive (2000/60/EEC)

The Water Framework Directive (WFD) (2000/60/EEC) came into force in December 2000 and aimed to reduce the fragmented nature of the current EU water policy at that point in time. The central aim of the directive was for all inland, estuarine, groundwater and coastal water bodies (up to 1 nautical mile out) to achieve 'Good Ecological Status' by 2015. Chemical and biological Environmental Quality Indicators were used to inform the status of water bodies in relation to Good Ecological Status, with a programme of measures being implemented to improve water bodies that were not of sufficient quality. Any development related to the NSWPH that falls within WFD legislative boundaries should ensure that they do not have an adverse effect on the Good Ecological Status of the water body. The WFD is transposed into UK law under The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. A WFD assessment will be required to support a marine licence application for works below MHWS to ensure the works are compliant with the objectives of the Directive.

2.1.12 Marine Strategy Framework Directive (2008/56/EU)

The Marine Strategy Framework Directive (MSFD) (2008/56/EU) was enforced in July 2008 and set the goal of achieving 'Good Environmental Status' (GES) in EU waters by 2020. GES is defined by 11 qualitative descriptors (such as Biological Diversity, Seafloor Integrity) which are defined by associated criteria and their indicators. Unlike the previous WFD which only extended to 1 nautical mile (nm) from the coast, the MSFD extends out to each Member States' EEZ or 200nm from their coastline. The directive required each Member State to create a marine strategy for their waters. This involved:

- Assessing the current baseline of their waters;
- Detailing what GES means for their waters, and the associated targets and indicators;
- Establishing a monitoring programme to assess progress towards GES; and
- Establishing a programme of measures to achieve GES in their waters by 2016

Similarly, to the WFD, any development related to the NSWPH that falls within MSFD legislative boundaries should ensure that they do not have an adverse effect on the GES of the water body being developed in. The MSFD is transposed into UK law by the Marine Strategy Regulations 2010.

2.1.13 Current legislative framework for EU Hydrogen transmission

2.1.13.1 Directive 2009/73/EC concerning common rules for the internal market in natural gas

Directive 2009/73/EC establishes common rules for the transmission, distribution, supply and storage of natural gas, which through Article 1(2) (which states that rules applying to natural gas also applies to other gases as long as such gases can be safely injected and transported through the natural gas system), also applies to hydrogen gas (EU, 2009a). These rules must be followed when considering the transmission of any hydrogen gas from the NSWPH.

2.1.13.2 Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators

Regulation (EC) No 713/2009 established the Agency for the Cooperation of Energy Regulators to assist in coordinating between different Member States (EU, 2009b). Article 8 of the directive sets the Agency's 'Tasks as regards terms and conditions for access to and operational security of cross border infrastructure'. As such this makes the agency a relevant stakeholder when considering the regulation of hydrogen gas transmission and distribution across multiple countries as the NSWPH hopes to achieve.

2.2 National Policy and Legislation

2.2.1 Climate Change Act 2008

The Climate Change Act 2008 commits the UK to a net reduction in greenhouse gas emissions against the 1990 baseline by 2050. This is implemented through a system of carbon budgets, which are set by the Government for a period of five years each. The UK Government has legislated for the first four carbon budgets to cut emissions by 23% below 1990 levels by 2012, 29% by 2017, 35% by 2022, 50% by 2027, and 57% by 2032 (TCCC, 2009, 2011, 2016). The first target, 23% below 1990 levels by 2012, was met by the UK. Currently, the UK is on track to outperform the targets of the second and third carbon budgets (The Committee on Climate Change, 2017).

The Climate Change Act 2008 also established the Committee on Climate Change. The Committee on Climate Change advises the UK and devolved administration governments on setting and meeting the carbon budgets, and on preparing for climate change. In May 2011, the Committee published the Renewable Energy Review, which sets out a detailed vision of the role of renewable energy in meeting longer term emissions targets. The Renewable Energy Review concludes that the development of renewable energy is a potentially significant contributor to delivering decarbonisation of the power sector by 2030 at reasonable cost. It also underlined that firm commitments of support for offshore wind and marine generation through to the 2020s should be made (The Committee on Climate Change, 2011).

2.2.2 UK Climate Change and Energy Policy

In December 2011, the Government published its Carbon Plan (DECC, 2011b). The Carbon Plan states that electricity demand may rise by between 30% and 60% by 2050, which may require today's electricity capacity to double in order to deal with peak time demands. It goes on to state that "renewable energy, particularly onshore and offshore wind farms" is likely to be one of the three main low carbon sources to produce electricity (paragraph 44; DECC, 2011b). The document further sets out the policies for meeting the commitment of an 80% reduction in greenhouse gas emissions made under the Climate Change Act. It also describes the measures proposed to meet the first four carbon budgets. In June 2016 the government passed the fifth carbon budget to keep the UK on a cost-effective path to meet the 2050 target. The budget commits the UK to reduce its GHG emissions by 36% in 2020 and by 57% in 2030.

The Renewable Energy Roadmap (DECC, 2011e, 2012, 2013) updated some of the aims within the Renewable Energy Strategy (HM Government, 2009) and identified eight technologies capable of providing 90% of the renewable energy required to meet the UK's 2020 target of 15% of energy consumption derived from renewable sources. It suggests that offshore wind is an ideal technology for the UK, where shallow seas and strong winds make it an important national asset which will play a key role in enabling the UK to meet its legally binding 2020 renewable energy targets. Offshore wind has the potential to be generating up to 16 GW by 2020. Beyond 2020, there is a very high potential for further deployment, with up to 39 GW possible by 2030 (DECC, 2013).

In March 2016, a Strategic Environmental Assessment (SEA) (DECC, 2016) was undertaken to inform licensing and leasing decisions for offshore energy, by considering the environmental implications of the proposed plan/ programme and the potential activities which could result from their implementation.

For offshore wind, DECC's draft plan/ programme included further OWF leasing in the relevant parts of the UK Exclusive Economic Zone (EEZ) and the territorial waters of England and Wales. It included the tethered (i.e. floating) turbines in waters up to 200 m. The SEA concluded that the most favourable option was to restrict the areas offered for leasing and licencing, through the exclusion of certain areas together with a number of mitigation measures to prevent, reduce and offset significant adverse impacts on the environment and other users of the sea, and would allow the objectives of the draft plan/ programme to be achieved. It should be noted that the SEA did not specifically identify specific areas for the development of offshore wind, as this falls under the Crown Estates remit under their seabed leasing process, detailed in section 3.1.3 further in this report. The conclusions of the SEA, while having no direct legal implication, carry political weight as the recommendations made in the assessment are used by government ministers to assess the environmental implications of proposed new developments, and so would be used in the assessment of any developments in UK waters associated with the NSWPH.

2.2.3 Offshore Wind Sector Deal

The Offshore Wind Sector Deal, published on the 7th March 2019 by the Department for Business, Energy and Industrial Strategy, aims to deepen the governments ties with the OWF sector and cement the UK's position as a global leader in its' development. As part of this deal the government has committed to sourcing 30% of the UK's energy from offshore wind by 2030, an increase of approximately 20% of the projected estimates in 2020, as well as continuing the Contracts for Difference scheme into the 2020's which is projected to be worth up to £557 million for industry (BEIS, 2019b) In relation to the NSWPH, this deal provides clear political support for offshore wind projects in the UK for at least the next decade, which greatly improves the potential of governmental support for the project.

2.2.4 The Planning Act 2008

The Planning Act 2008 created a new consenting regime in England and Wales for Nationally Significant Infrastructure Projects (NSIPs). Section 31 of the Planning Act 2008 requires a DCO for a development which is, or forms part of, a NSIP. In accordance with Section 15(3) of the Planning Act 2008, an OWF with a generating capacity of greater than 100 MW constitutes a NSIP and it is thought that any UK OWF connecting into the NSWPH is likely to exceed this threshold and therefore be defined as a NSIP.

Under Section 37 of the Planning Act 2008, an application for an order granting Development Consent must be made to the Secretary of State. In making the decision as to whether to grant the development Consent, the Secretary of State, in accordance with Section 104(2) of the Planning Act 2008, must have regard to:

- Any NPS, which has effect, in relation to the development to which the application relates (a relevant National Policy Statement);
- Any local impact report (within the meaning given by Section 60(3)) submitted to the Secretary of State before the deadline specified in a notice under Section 60(2);
- Any matters prescribed in relation to the development to which the application relates;
- Any other matters which the Secretary of State thinks are both important and relevant to the decision; and
- The appropriate marine policy documents (if any), determined in accordance with Section 59 of the MCAA 2009.

Details of the requirements of the Developmental Consent Order process are provided further in Section 3.1.1.

2.2.4.1 National Policy Statements

National Policy Statements (NPS) describe the need for certain infrastructure developments (such as energy) in the UK, as well as identifying potential key issues that should be considered by the Examining Authority (ExA) when considering a DCO application. There are currently three NPS designated in 2011 that relate to the development of offshore wind:

- NPS for Overarching Energy (EN-1)

The NPS for Overarching Energy (NPS EN-1) highlights the need for new renewable energy projects so that the UK may reach its target of generating 15% of energy from renewable sources, with offshore wind projected to provide the single largest contribution to this target. NPS EN-1 establishes that the Secretary of State should start with a presumption in favour of granting a DCO for energy NSIPs given the pressing need for such developments (DECC, 2011c)

- NPS for Renewable Energy (EN-3)

The NPS for Renewable Energy (NPS EN-3) recognises the need for 25GW of new OWF projects within the UK Renewable Energy Zone and English and Welsh territorial waters. NPS EN-3 reiterates that OWF projects of more than 100MW capacity are defined as NSIPs and require development consent through a DCO, and confirms that the Secretary of State may grant deemed marine licences as part of a projects DCO. NPS EN-3 also gives advice on EIA procedure for OWF developments. This includes recommending that applications follow the 'Rochdale Envelope' approach, where the worst and best-case scenarios are considered within the EIA submitted as part of a DCO. This is because there are typically still unknowns present at the application phase regarding aspects like project specification, and planning with a Rochdale Envelope approach therefore allows for greater flexibility during development (DECC, 2011b).

- NPS for Electricity Networks (EN-5)

The NPS for Electricity Networks (NPS EN-5) provides, with NPS EN-1, the basis for decisions on applications for electricity networks infrastructure development (DECC, 2011d).

2.2.4.2 Secondary Legislation and Amendments to the Act

The Planning Act 2008 is also governed by secondary legislation, such as the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (The Planning Inspectorate, 2017). This is the most recent revision of the original 2009 regulation and transposed the European Environmental Impact Assessment Directive (2014/52/EU) into UK law. Offshore wind farm developments fall under Schedule 2 of the regulations ('Industrial (energy) installations for the production of electricity, steam and hot water (projects not included in Schedule 1) and Annex II (installations for the harnessing of wind power for energy production (wind farms)). Schedule 2 NSIPs may require an EIA, depending on whether they are likely to have a significant effect on the receiving environment. The regulation details the requirements of the screening, scoping processes and the submission of an environmental statement summarising the EIA process and its findings. An ES is one of the supporting documents required to be submitted as part of the DCO process for NSIP's.

The Local Planning Act 2008 has been amended since its' original introduction by the Marine and Coastal Access Act 2009, the Localism Act 2011 and the Growth and Infrastructure Act 2013. The Localism Act 2011 was primarily responsible for abolishing the IPC and transferring decision-making powers to the Planning Inspectorate (PINS) and the Secretary of State under schedule 13 of the Planning Act 2008. The Growth and Infrastructure Act 2013 aimed to reduce overlapping legislation and speed up the development process of infrastructure projects. Through this, the act amended sections 127 and 138 of the Planning Act 2008, removing the requirement to obtain consents from the Secretary of State for certain statutory undertakers before a DCO is made (HM Government, 2013).

2.2.5 Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended)

The Marine Works Regulations 2007 transpose the EIA Directive into national law and put into practice the Directive in relation to marine licences overseen by the Marine Management Organisation (MMO). An EIA will be mandatory if the project is listed in Annex I of the EIA Directive (Council Directive 97/11/EC of 3 March 1997 amending Council Directive 85/337/EEC on the assessment of the impacts of certain private and public projects on the environment) and may be required under the discretion of the regulatory authority (in this case the MMO) if listed in Annex II of the Directive.

Interconnector cables are not listed on either Annex of the EIA Directive and therefore alone do not require a statutory EIA. However, as part of a NSIP an EIA is likely to be required.

2.2.6 The Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2009 (as amended)

For projects which require development consent under the Planning Act 2008, the requirements of the EIA Directive have been transposed into UK legislation by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations).

NSIPs that fall within the description of developments in Schedule 1 of the EIA Regulations automatically require an EIA to be undertaken. NSIPs that fall within Schedule 2 of the Regulations may require an EIA.

Offshore wind farm developments fall under Schedule 2 of the EIA Regulations. Schedule 2 NSIPs require an EIA where they are likely to have significant effects on the environment by virtue of factors such as their nature, size or location.

2.2.7 Marine and Coastal Access Act 2009

The Marine and Coastal Access Act (MCAA) 2009 introduced a new legislative regime for protecting the marine environment in England and Wales. The MCAA led to the establishment of the Marine Management Organisation (MMO), which under the MCAA is responsible for licensing of activities related to construction or removal of any substance or object in English territorial waters (up to 12 nm) and also for such activities where they are undertaken outside of UK territorial waters.

With regards to the laying of a subsea electrical power cable, previous consultation with the MMO has confirmed the following:

- The laying of inshore cables within UK territorial waters (up to 12 nm) requires a marine licence under Part 4 of the MCAA.
- If the cable is an international cable then the MMO must grant the application but still has the power to attach conditions (up to 12 nm).
- Anything done in the course of laying or maintaining the offshore stretch (beyond 12 nm) of the Interconnector is exempt for marine licence requirement under Section 81(1) of the MCAA.
- The MMO consider that any form of cable protection works, is a licensable activity, whether the need for such protection works is identified before or after the laying of the cable.
- The Marine Licence would apply to the section of the cable between Mean High Water Springs (MHWS) and the 12 nm limit. However, the MMO will consider the project as a whole and can include consent for cable protection in the offshore section of the cable within the Marine Licence if required.

With regards to OWFs, the MMO is a statutory consultee within the DCO application process. The MCAA has also amended certain provisions of the Planning Act 2008. It inserts in the Planning Act 2008 a new Section 149A 'Deemed Consent under a marine licence' which enables any DCO applicant to seek within that DCO a deemed marine licence for operations carried out below MHWS wholly in England, and in waters adjacent to England up to the seaward limits of the territorial sea, and (for England and Wales) the UK Renewable Energy Zone (REZ)¹

Although for NSIPs the Secretary of State is responsible for issuing these licence's, the MMO still must be consulted if any DCO application may affect the marine environment.

2.2.8 UK Marine Policy Statement

In order to rationalise planning in the marine environment a UK Marine Policy Statement (MPS) was prepared in 2011 in accordance with Section 44 of the MCAA and was the first part of the new system with the aim to direct marine planning activities. The document sets out the policies intended to help achieve sustainable development in the UK marine area and provides the framework for preparing marine plans and for taking decisions that affect the marine environment.

The MPS will be used, or referred to, by a wide range of public authorities (including planning authorities) as well as developers and other users of the marine area. The MCAA requires all public authorities taking authorisation or enforcement decisions that affect or might affect the UK marine area to do so in accordance with the MPS and relevant marine plans unless relevant considerations indicate otherwise (HM Government, 2011) Authorities taking decisions that affect or might affect the UK marine area which are not authorisation or enforcement decisions must have regard to the MPS and relevant marine plans.

¹ Defined in Section 84 (4) of the Energy Act 2004

The MPS provides the high-level policy context within which national and sub national Marine Plans will be developed and implemented and will ensure consistency in marine planning across the UK marine area.

2.2.9 Marine Plans

Marine Plans will translate the MPS into detailed policy and guidance, putting into practice the objectives for the marine environment identified in the MPS. Under the MCAA, the Secretary of State has delegated functions relating to Marine Planning to the MMO. The MMO is responsible for preparing marine plans in England. The purpose of marine plans is to provide a clear approach to managing marine plan areas, their resources, and the activities and interactions that take place within them. The process aims to promote sustainability, enhance the environment and increase certainty for developers by clarifying where the best areas in the marine environment to invest resources may be.

Each of the 11 marine plan areas around England, which are made up of inshore and offshore areas, will have a marine plan with a long term (20 years) view of activities and will be reviewed every 3 years. The MMO is phasing in the application of marine plans for each of these areas and all marine plan areas are scheduled to have a plan by 2021.

The East Inshore and East Offshore marine plan areas were the first 2 marine plan areas to be selected in England and the final plans for these areas were published on 2 April 2014. Interconnectors and OWFs in the UK EEZ and English territorial waters which may form part of the NSWPH are likely to be located in these marine plan areas.

2.2.10 Marine Conservation Zones (MCZs)

The MCAA also legislated for the creation of a network of marine protected areas, known as Marine Conservation Zones (MCZ). The MMO has the authority to designate areas that it deems to feature nationally important habitats, species, geology and geomorphology. As of 2019, 50 sites in English and Welsh waters have been designated (JNCC, 2016). A MCZ assessment is likely to be required in support of a marine licence application should the proposed development have the potential to hinder the conservation objectives of a designated or recommended MCZ.

2.2.10.1 Archaeological legislation

In support of the application for a marine licence, three pieces of marine archaeological legislation must be considered: The Protection of Wrecks Act (1973), the Ancient Monuments and Archaeological Remains Act (1979), and the Protection of Military Remains Act (1986).

The Protection of Wrecks Act gives legal protection for wrecks and wreckage of historical, archaeological or artistic importance by way of designation. Once a wreck is protected it becomes an offence to carry out certain activities around the defined area of the wreck unless a licence is granted by Historic England.

The Ancient Monuments and Archaeological Remains Act, although primarily land based, has been utilised in recent years to grant protection for underwater sites. The act provides for the scheduling of monuments, providing the monument is of national importance. Any works conducted on or around a scheduled monument require a Scheduled Monument Consent from Historic England.

The Protection of Military Remains Act is administered by the Ministry of Defence (MOD) and is responsible for the protection of military wrecks of aircraft and ships. Wrecks are designated by name and can be designated even if the location of the wreck is not known, thus providing protection for previously undiscovered aircraft wrecks. Ships however must be specifically designated and must have sunk after 4th August 1914 to be granted protection. The act makes it an offence to disturb or remove any artefacts from designated sites unless a licence has been provided by the MOD.

When assessing archaeological remains in a proposed project area, an existing baseline study of existing information is carried out initially to determine the locations of any known remains, with further specialist surveys being conducted in the proposed area to ensure no potential remains are missed.

2.2.11 The Habitat Regulations

The Conservation of Habitats and Species Regulations 2017 (as amended) transpose the Habitats Directive into law on land and in territorial waters (up to 12nm limit) of England and Wales. The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) consolidate and update the Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 and transpose the Habitats Directive into law for UK offshore waters from 12nm to the UK EEZ. Both regulations also transpose elements of the EU Wild Birds Directive in England and Wales. As such, any developments in UK waters that adhere to these regulations will therefore be compliant with the Habitats and Birds Directives. These regulations are collectively referred to as 'the Habitats Regulations'.

Under the Habitat Regulations, a Habitat Regulations Assessment (HRA) is required for any reasonably foreseeable plan or project which is not directly concerned with management of, and which has the potential to affect, a Natura 2000 site (SACs and SPAs); no matter how far away from that site. Sufficient information must be provided to enable the competent authority to undertake HRA Stage 1 screening for likely significant effects and conduct a Stage 2 Appropriate Assessment (AA), if required (i.e. if no likely significant effect cannot be determined). UK Government policy (ODPM Circular 06/2005) states that sites designated under the Convention on Wetlands (Ramsar, Iran 1971) known as the "Ramsar Convention" are also included under the definition Natura 2000. The vast majority of Ramsar sites are also classified as SPAs. This does not constitute a separate permit from the DCO, instead forming part of the necessary procedure required for the granting of the DCO.

Schedule 1 of the Offshore Marine Habitats and Species Regulations 2017 (as amended) regulations details the European Protected Species (EPS) offered protection under the regulations and details the activities that are prohibited in regards to them. The species listed are:

- All species of cetaceans;
- Common sturgeon (*Acipenser sturio*); and
- Certain marine turtles (*Caretta caretta*, *Chelonia mydas*, *Dermochelys coriacea*, *Eretmochelys imbricate*, *Lepidochelys kempii*).

Should a proposed development be predicted to affect any of these species and disturbance cannot be avoided, an EPS licence may be sought from the MMO. This is granted on the condition that there is no alternative to the proposed works and that the works have sufficiently little impact on the affected species so that their population remains of favourable conservation status. An EPS licence is granted separately to the DCO process and would be applied for after the DCO was granted. However, a draft EPS licence may be provided as an accompanying document for the DCO application.

2.2.12 The Natural Environment and Rural Communities Act (NERC) 2006

The Natural Environment and Rural Communities Act (NERC) Act 2006 received royal assent on 30 March 2006 and established the non-Governmental Departmental Body Natural England. Natural England acts as the government's statutory advisor on nature conservation and its remit (under Section 1(3) of the NERC Act 2006) is exercisable solely in England and its' territorial seas up to 12 nautical miles (Natural England, 2014). Natural England is a statutory consultee for projects that are subject to the requirements of the Conservation of Habitats and Species Regulations 2017 which will likely have a significant effect on terrestrial and marine protected sites, including SPAs (and candidate SAC's), SPAs (and proposed SPA's) and sites listed under the 1971 Convention on Wetlands of International Importance (RAMSAR site). It is also a statutory consultee pursuant to the Offshore

Marine Conservation Regulations 2017 (as amended), where under regulation 2(4)(b) of the 2017 regulations, if an assessment relates to a European site (including offshore marine sites that are within 12nm of England) then the competent authority must notify Natural England (HM Government, 2017). For sites outside of 12nm then the Joint Nature Conservation Committee (JNCC) becomes the statutory nature conservation body and should be consulted regarding the Offshore Marine Conservation Regulations 2017 (as amended).

2.2.13 The Energy Act 2013

The Energy Act 2013 supersedes previous Energy Acts created by the UK government, and aims to establish a legislative framework that will increase the security and reduce the cost of low-carbon energy projects. The main mechanism that the act introduces to achieve this is the Electricity Market Reform (EMR programme), which brings about several provisions to attract renewable energy suppliers to operate in the UK. One of the main mechanisms for this is the creation of the Contracts for Difference (CFD) scheme, which aims to provide a stable financial platform for renewable energy suppliers to encourage new investment in the sector (Low Carbon Contracts Company, 2018).

A CFD is a private contract between an operator of a renewable energy development and the Low Carbon Contracts Company (LCCC), a private company owned by the Department for Business, Enterprise and Industrial Strategy (BEIS). Through the CFD, the developer is paid the difference between the strike price (a pre-agreed price for the low-carbon energy they produce) and the reference price (the current average energy selling price in the UK). Therefore, when the reference price is below the strike price, the developer will receive a top-up payment from the LCCC to match the strike price. However, if the reference price rises above the strike price the developer must pay back the difference.

This process reduces the developer's exposure to the volatile wholesale energy market, providing a greater level of stability and security. CFD's are allocated in rounds, where developers make bids to the LCCC with the proposed strike price of their development. As only a defined amount of money is assigned for each allocation round, not every bid will be successful. There have currently been two allocation rounds, with three offshore wind farms (Triton Knoll, Hornsea Project Two and Moray Offshore (East)) being awarded CFD's in the last round in 2017. The last round was notable in that both Hornsea Project Two and Moray Offshore (East) were awarded contracts on a strike price of £57.50, a near 50% decrease from the previous round and bringing the wholesale price of offshore wind energy in line with the levelised cost of gas (Russell, 2017). The next allocation round is due to take place in May 2019. It is likely that any OWF developments in UK waters that connect into the NSWPH would bid as part of this process, and may impact in the financial feasibility of such projects should their bids succeed or fail.

2.2.14 Energy Act 2004

The Energy Act 2004 legislated for several key developments that allowed the UK offshore renewables sector to grow in recent years. One of these key drivers was the creation of the Renewable Energy Zone (REZ) under Section 84 of the Act (HM Government, 2004). The REZ allows for the utilisation of waters up to the UK's EEZ for renewable energy developments, with the Crown Estate being given responsibility for the leasing of areas within this zone for development.

The act also legislated for the process of the declaration of safety zones around offshore renewable energy installations. Under Section 95 of the act, areas of installation, operation and decommissioning for renewable energy infrastructure may be declared as safety zones by the Secretary of State, and therefore off limits to non-project vessels. The application for safety zones is conducted outside of the DCO process, but a statement of intent regarding the application of safety zones must be included with a DCO under the Infrastructure Planning Regulations 2009.

The legal mechanism for the decommissioning of offshore wind and other marine renewables was set in sections 105 to 114 of the Energy Act 2004. This text outlines the need for decommissioning schemes to be approved by the Secretary of State for BEIS before the construction of any project. This conveys the view of the UK government, and its' obligations under UNCLOS (United Nations Convention of the Law of the Sea) and the OSPAR Convention, that any developer constructing and operating infrastructure in the marine environment should be responsible for its' decommissioning, and the costs associated with this, at the end of its' life.

2.2.15 Crown Estate Act 1961

Currently all English, Welsh and Northern Irish areas of seabed from mean high water to 12nm are the property of The Crown Estate (TCE), a semi-independent organisation that manages the land and property belonging to The Crown, with all profits going to Her Majesty's (HM) Treasury. Under The Crown Estate Act 1961 which established the current role of The Crown Estate, any developer wishing to place infrastructure within UK territorial waters must acquire a lease from The Crown Estate. Under the Energy Act 2004 they also gained responsibility for the leasing of areas in the REZ out to the UK's EEZ. They have no role in the DCO application process, with only temporary leases/licences being granted before the DCO process is completed, at which point (if successful) a full lease/licence will be issued. It should be noted that control of the Scottish seabed has now been transferred to that of The Crown Estate Scotland, a separate entity from The Crown Estate. As such any development associated with the NSWPH must be granted a seabed licence from The Crown Estate before any construction activities may begin.

2.2.16 The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015

To further enable the efficient and cost-effective construction and operation of transmission cables associated with OWFs, the DECC and OFGEM developed the Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations in 2009 (most recently updated in 2015). Through these regulations OFGEM runs a competitive tender process with the objective of licensing Offshore Transmission Owners (OFTO) to operate offshore transmission infrastructure (OFGEM, 2015). These regulations are legislated under the Electricity Act 1989, by which 'The Authority (in this case OFGEM) may by regulations make such provision as appears to it to be appropriate for facilitating the making, in prescribed cases, of a determination on a competitive basis of the person to whom an offshore transmission licence is to be granted' (HM Government, 1989). 5 rounds have taken place since 2009, with £3.3 billion being invested in transmission links during this period (Russell, 2018). The sixth round kicked off in October 2018 and allowed for bidding on three OWF developments; Beatrice, Hornsea Project One and East Anglia ONE. The current plans for the NSWPH would reduce the number of necessary transmission cables required to connect into the UK. This reduction in cable numbers could cause conflict with OFGEM's role in ensuring competition in the OFTO market, as such consultation with OFGEM regarding this factor would be highly recommended.

2.2.17 Implications of Brexit on National Legislation

The UK Government has drafted Statutory Instruments which would transpose European legislation such as the Habitats Directive and Environmental Impact Assessment Directives into UK law by removing any obligations to the EU.

The Government has made it clear that to achieve the duties which this creates for the UK, there will need to be a new environment body and that this will require a new Environment Act. As yet there is no further information on this, but it is hoped that industry stakeholders will be given the opportunity to comment on what it contains and what the implications are for licensing and regulation.

Whilst the uncertainty around Brexit remains Government bodies such as Department for Environment Food and Rural Affairs (Defra) are being instructed to prioritise their work to prepare for a 'no deal' Brexit. The consequences for this are that there are less resources available from regulators such as the MMO for their marine licensing duties.

2.3 Current Status of Hydrogen Transmission in the UK

The potential for the use of hydrogen pipelines to transport energy from OWFs to shore is widely recognised and the reuse of existing oil and gas pipeline infrastructure could be used to facilitate this in part, however, no hydrogen pipeline interconnectors have been developed in the UK yet and there is currently no specific national legislation for the transmission of hydrogen gas offshore.

It is recognised that the global energy system will have to undergo a profound transformation to achieve the targets in the Paris Agreement. Total decarbonisation of certain sectors such as transport, industry and uses that require high grade heat, may be difficult purely by means of electrification. This challenge could be addressed by hydrogen from renewables as it allows large amounts of renewable energy to be channelled from the power sector into end-user sectors. Hydrogen therefore could represent the missing link in the energy transition² (IRENA, 2018).

The Oil and Gas Authority (OGA), the UK Government body charged to regulate, influence and promote the UK oil and gas industry is stepping up work on the energy transition and addressing potential synergies with offshore wind.

The OGA has recently commenced a new integration project which will run to spring 2020, to explore the potential for a more integrated offshore energy sector, including innovative collaboration between oil and gas production and offshore renewables. The OGA is working with BEIS, The Crown Estate, Ofgem and other stakeholders to test for potential technical and regulatory opportunities in the short-term, as well as exploring longer term opportunities to maximise the value of the UK Continental Shelf through energy integration. This can also enhance the value of existing infrastructure; skills, technology and supply chains. Part of the work they will do will involve looking at practical steps that can be taken and how as regulators they can support the energy transition.

Five energy integration themes are being considered in the project:

Platform electrification: Connection of offshore oil and gas platforms to an alternative power source (from shore, offshore wind farm, or offshore grid) to reduce both costs and emissions and extend field lives when compared to platform-based generation

Gas to wire: The use of gas produced from offshore fields to generate electricity offshore and transmitting that to the shore through sharing infrastructure with windfarms. Expected synergies would improve the economics of both renewables and gas projects, enabling further offshore developments

Carbon capture and storage: re-use of offshore oil and gas infrastructure and spent fields to transport and store carbon dioxide, improving economics of the projects.

Hydrogen: enabling production of hydrogen (e.g. via water electrolysis using windfarm power) for power and domestic heating, by repurposing offshore oil and gas platforms, and using pipelines for storage and transportation to shore.

North Sea power hubs: large-scale electricity and hydrogen production from wind, also combined with carbon and energy storage solutions. Benefits from cross sector synergies, and potential North Sea cross-border economies of scale.

² The energy transition is a pathway toward transformation of the global energy sector from fossil-based to zero-carbon by the second half of this century (IRENA 2019).

3. UK Planning and Permitting Requirements

This part of the study provides a review of the key consenting authorities, planning considerations for OWFs and electrical and hydrogen interconnectors and the consenting process for OWFs and associated electrical interconnectors in the UK.

This section has been divided into two subsections:

- Planning Considerations
- Consenting Process

For planning considerations, a high-level review has been provided for the type of processes and studies required in the early planning stages of a OWF and interconnector project, such as site selection, environmental feasibility studies, cable routing studies and applications for seabed leases. It also highlights the surveys which would be required for OWF and interconnector projects, some of which would need to be started in the early stages of project development due to the length of required survey data collection. Additionally, this section provides some consideration of the known legal constraints, obstacles or specific procedural risks and requirements taking into consideration the location and configuration of the project.

For the consenting process, a review has been undertaken of the required consents, permits, licences and notifications for the installation and operations of OWFs, electrical interconnectors in the UK (noting that as there is no consenting process for hydrogen interconnectors in the UK yet, this has not been included). This includes a qualitative assessment of the information needed for planning and permit applications. Where available, timelines for each consent/permit/licence/notification are provided.

There are three main bodies / regulatory authorities which manage / regulate the English territorial waters and UK EEZ in relation to OWF and electrical interconnectors:

- The Crown Estate – Seabed owner – seabed lease
- The Planning Inspectorate (PINS) – Consents NSIPs
- The MMO – Consents marine licences below MHWS

The role of the Crown Estate and the requirements for a seabed lease has been included in planning considerations, whereas PINS and the MMO are discussed within the consenting process.

3.1 Planning Considerations

This section provides details on the planning stages a developer will need to undertake prior to beginning the consenting process.

3.1.1 The Crown Estate and Offshore Wind Leasing Rounds

Under the Crown Estate Act 1961, The Crown Estate (TCE) is entrusted to manage on behalf of the Crown the following:

- over half of the foreshore of the United Kingdom (being the area between mean low water and mean high water on the coast and tidal waters)
- almost the entirety of the seabed of the United Kingdom to 12 nautical miles
- the rights to natural resources (excluding fossil fuels) on the continental shelf under the Continental Shelf Act 1964

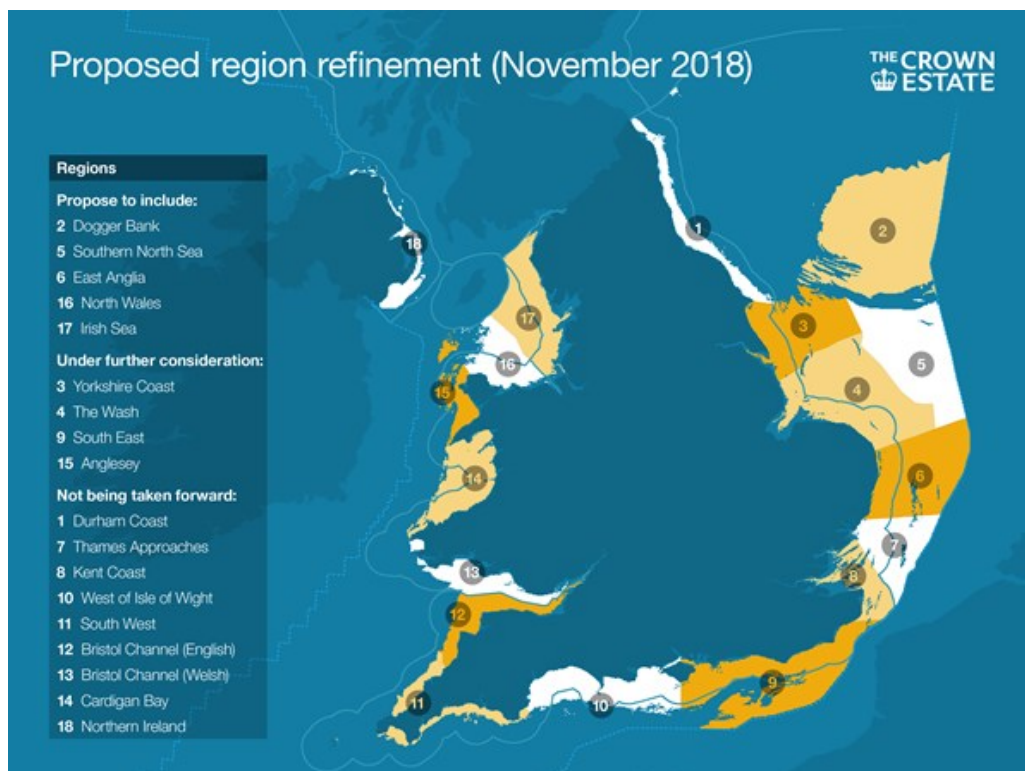
- the rights to generate electricity from wind, waves and the tides on the continental shelf under the Energy Act 2004
- the rights to the transportation and storage of natural gas and carbon dioxide on the continental shelf under the Energy Act 2008

TCE manages the seabed around England, Wales, and Northern Ireland (In Scotland this falls under the remit of The Crown Estate Scotland). In 2001, TCE announced the first UK offshore wind leasing round and since has run two further leasing rounds in 2003 and 2008 respectively.

TCE is currently working with the sector and stakeholders to explore the scale, location and form of proposed new leasing rights. Following this, it intends to confirm plans for a new offshore wind leasing round, to be known as Round 4. This will be launched in the late summer 2019, maintaining a pipeline of projects through to the late 2020s and beyond.

For the upcoming Round 4, TCE initially identified 18 potential seabed regions to put forward in a meeting with developers, statutory bodies and other stakeholders. Through this consultation and further data analysis the regions were categorised as follows: 5 proposed to be included; 4 under further consideration and 9 not taken forward. The 5 regions proposed for inclusion are the Dogger Bank, Southern North Sea, East Anglia, North Wales and the Irish Sea (The Crown Estate, 2018d), as shown in Figure 3-1 below. In relation to the NSWPH the relevant areas would be the Dogger Bank, East Anglia and Southern North Sea.

Figure 3-1 Proposed new OWF development regions for Round 4 (The Crown Estate, 2018a)



3.1.2 Seabed Lease Application

Before the consenting process can begin, the developer must be granted a seabed lease from TCE. This would be required for OWF and associated interconnectors.

3.1.2.1 TCE Seabed Lease for OWF

Figure 3-2 illustrates how rights for renewable energy developments are granted by TCE.

Figure 3-2 How rights are granted by the Crown Estate (TCE 2016)



Rights for seabed use for renewable energy developments are granted by TCE under an Agreement for Lease.

Before applying for a lease, a developer will assess the regions of seabed currently being offered against a range of constraints (DECC, 2011b). These include:

- **Wind Resource:** This aspect is critical to making a successful economic case for an OWF, with developers sometimes collecting wind speed data from potential sites to better inform their economic modelling.
- **Water Depth and Foundation Conditions:** A sites water depth and geological conditions will have a large impact on the size, type and layout of turbines, foundations and cabling respectively, so understanding what technology would/would not be feasible is important information to gather at an early stage.
- **Grid Connection:** Ensuring that suitable grid connection points are present nearby the proposed area of seabed is an important consideration for developers at this stage.
- **Other offshore infrastructure and activities:** Identifying potential conflicts within the proposed site and other users in the area and existing infrastructure early in the project's life will save potential difficulties further along into its' development.

Once a developer has examined the constraints and decided to move forward with a potential new development, they must pass a Pre-qualification stage (PQQ). This stage sets out financial and technical competence criteria that the developer must meet, such as specific financial thresholds and technical expertise requirements e.g. experience with project management and consenting. If a developer meets these criteria, then they will receive an Invitation to Tender (ITT). This is the main assessment stage where the developers bid is assessed against several criteria, including compliance with tender requirements, capacity limits and a project-specific technical and financial assessment. If these criteria are met, the developer will receive option rights to the proposed site, under an Agreement for Lease. (The Crown Estate, 2018e).

An Agreement for Lease grants a developer an option over an area of seabed. Exercise of the option by the developer will be conditional on it satisfying certain conditions. If the conditions are satisfied and the developer exercises the option, TCE will be obliged to grant a lease of the seabed to the developer.

The conditions to be satisfied before the developer may exercise the option will include the obtaining by the developer of all statutory consents for the proposed development. If the developer is unable to satisfy all the conditions within a certain time provided for in the Agreement for Lease, the option will lapse.

During the option period the developer will be permitted to undertake surveys and deploy anemometry equipment. However, the developer is not permitted to commence construction of its development until and unless all statutory consents and a lease are granted.

More information on the leasing process and Offshore Transmission Owner (OFTO) Auctions and Contracts for Difference (CFD) Auction process can be found in Appendix A.

3.1.2.2 TCE Seabed Lease for Cables

Permission is needed for rights to lay, maintain and operate cables on areas of seabed for which they are the landlord. The Crown Estate also request that they are informed of cables that transit the UK continental shelf (within the 200nm limit), as other activities may be impacted. A Crown Estate Licence will be required for the right to install and operate any cables associated with the NSWPH.

Applicants are required to obtain all necessary consents from government, and crossing and proximity agreements from existing tenants in close proximity to the works and works restriction zone.

The Crown Estate permission for cables is given as a seabed licence, associated with which are certain rights to enter onto the seabed, install, operate, maintain and repair. Occupation of any site and performance of works cannot commence until a legal agreement has been completed.

3.1.3 Crossing and Proximity Agreements

The crossing of third party marine infrastructure is made with prior agreement of the owners, following a negotiated formal Crossing Agreement. This agreement describes the rights and responsibilities of the parties and also the detailed design of the crossing. The design addresses the need to protect both the cables and the third party infrastructure and other aspects such as crossing angle and vertical separation.

3.1.4 Feasibility Studies

These studies will be a high-level appraisal of the marine physical, biological and human baseline conditions, environmental constraints and technical constraints of the project. The main objectives will be to assess the suitability of the marine elements of the project and design in terms of the commercial, technical and environmental constraints. The feasibility study will also look at characterisation of baseline conditions, identification of potential constraints, suitability of the project design and location and gap analysis.

3.1.5 Site Selection and Design Considerations

Site selection is one of the most important decisions in the development of an OWF. It is accomplished through a short-listing process that draws together all known information on the site options, with selection decisions driven by health and safety, feasibility, economics and programme. Site selection should also take into account information on consenting issues, grid connection and other technical issues.

3.1.5.1 Environmental Sensitivities

As previously discussed in 3.1.1., the areas identified by TCE as proposed Round 4 OWF lease areas that are relevant to the NSWPH are the Dogger Bank, the Southern North Sea and East Anglia (Figure 3-1). Within these areas there are several sites designated for the protection of varying species and habitats (see Figure 3-3 Drawing Number P2303-LOC-001-A). The largest of these sites is the Southern North Sea Special Area of Conservation (SAC), which covers an area of 36,951km² and extends across each of the three relevant proposed lease areas (JNCC, 2019). The site was designated in February 2019 for the protection of harbour porpoise (*Phocoena phocoena*), a species listed under Annex II of the Habitat's Directive, with the objective of maintaining the sites integrity. The northern part of the SAC is recognised as being an important site for harbour porpoise in the summer months, while the southern section sees higher densities of the species during the winter. The following sections describe the environmental sensitivities of the three proposed round 4 lease areas. In addition, The Wash, which is one of the sites still under consideration by TCE, has been described because development in

this region is very challenging now from a consenting perspective due to the pressures of existing infrastructure and the environmental importance of the region which includes several designated sites.

The Dogger Bank

The Dogger Bank is the largest contiguous shallow sandbank found in UK waters, which is classed as an Annex I habitat under the Habitats Directive ('Sandbanks which are slightly covered by seawater all the time') (JNCC, 2017). The area has been designated as a SAC since September 2017 and covers an area of 12,331km². Due to its location in the open seas it is subject to strong wave energies which prevents vegetation from taking hold on the seabed. The area is home to numerous species, with the most important being the sandeel (*Ammodytes marinus*), an important prey species that attracts marine birds and mammals to the area. This includes the harbour porpoise, grey seal (*Halichoerus grypus*) and common seal (*Phoca vitulina*), which are all non-qualifying features of the SAC (JNCC, 2018a). During consultation the MMO advised that although there are not many OWF constructed on the Dogger Bank yet, there are planned OWFs there.

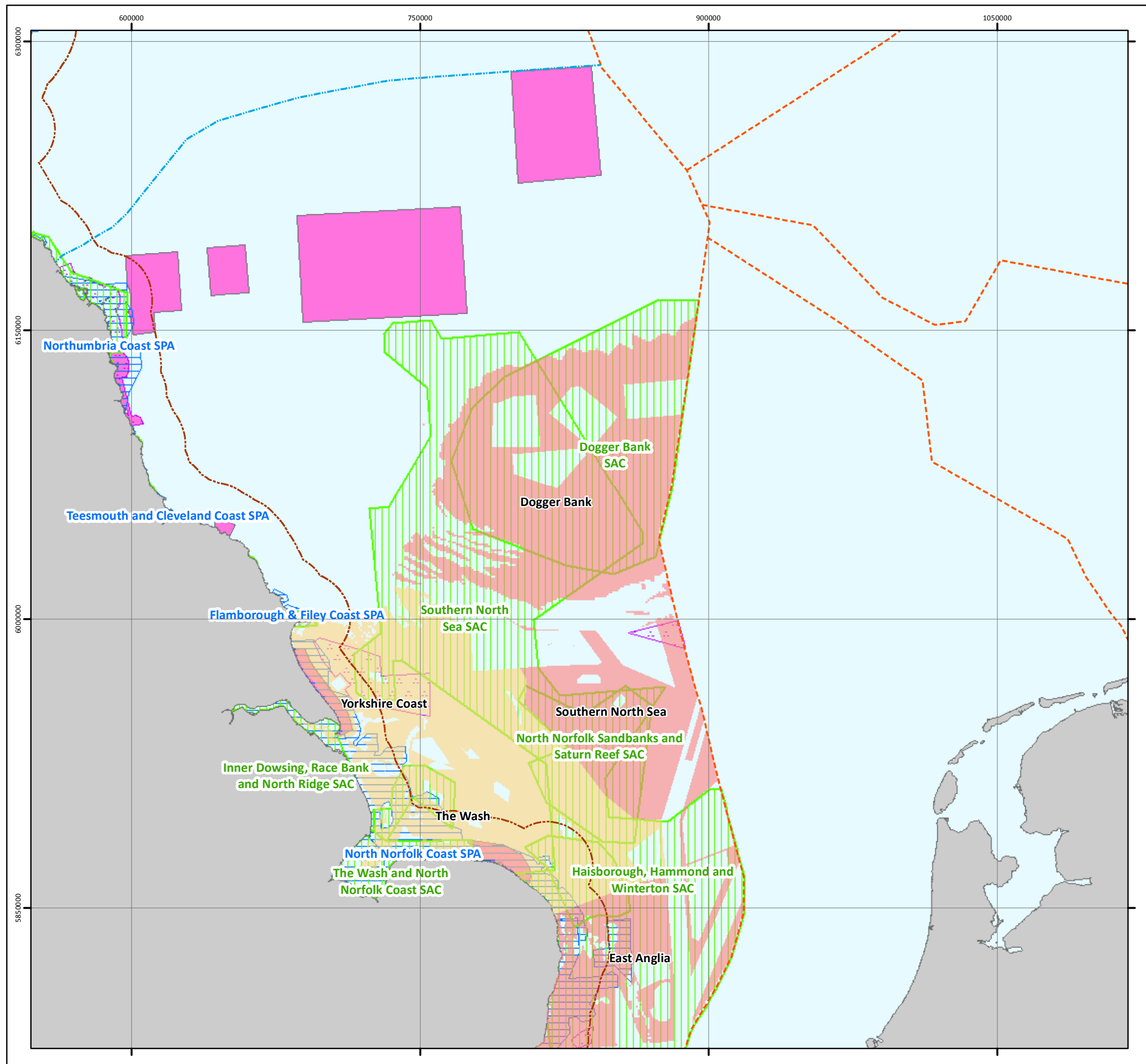
Southern North Sea

The Southern North Sea area identified by TCE intersects the Haisborough, Hammond and Winterton SAC, which lies off the north east coast of Norfolk. It was designated in September 2017 and measures 1,467.59 km² in extent. The site is designated for 'Sandbanks slightly covered by sea water all the time' and 'Reef'. The site contains a mosaic of different physical habitats corresponding to different biological communities.

The site contains very mobile sandy sediments in the strong tidal currents which characterise the area. Large scale bank migration or movement is evidenced by megaripple and sandwave formations on the banks. The sand bank crests are consequently predominantly low diversity with polychaete (cat worms) and amphipod (shrimp-like crustaceans) communities that are typical of mobile sediment environments. The banks are separated by troughs containing more gravelly sediments and support diverse infaunal and epifaunal communities with occurrences of reefs of the tube-building ross worm (*Sabellaria spinulosa*). Aggregations of *S. spinulosa* provide additional hard substrate for the development of rich epifaunal communities. There are a number of areas where sediment movements are reduced, and these areas support an abundance of attached bryozoans, hydroids and sea anemones. Other tube-building worms such as keel worms (*Pomatoceros sp.*) and sand mason worms (*Lanice conchilega*) are also found in these areas, along with bivalves and crustaceans (JNCC, 2018b).

East Anglia

The proposed East Anglia leasing area intersects with the North Norfolk Sandbanks and Saturn Reef SAC, designated in September 2017. Measuring 3603km² in extent, the site contains two examples of Annex I habitats, 'Sandbanks which are slightly covered by sea water all of the time' and 'Reefs'. The site contains the most extensive example of offshore linear ridge sandbanks in UK waters, with currents of differing strengths and sediment transport continually creating new sandbanks between existing ones (JNCC, 2018c). The sediment environment is home to several invertebrate species including polychaete worms and crustaceans. The other protected feature present on site are areas of biogenic *Sabellaria spinulosa* reef. The polychaete worm species *S. spinulosa* produces fragile sand-tubes to reside in, which can consolidate together with thousands of other individuals to form reef structures that support the settlement of other species not found in nearby habitat-sparse areas. Such structures can grow up to 60cm in height (Jackson and Hiscock, 2008). Previous aggregations of the species were discovered during the development of the Thanet Offshore Wind Farm, located 12km off Kentish coast. Through appropriate mitigation measures undertaken such as micro-siting of turbines, species loss was reduced during installation, with post-construction surveys finding that the *S. spinulosa* reefs had actually increased in extent compared to the pre-construction baseline (Fariñas-Franco *et al.*, 2014).



NSWPH PLANNING AND PERMITTING STUDY - UK

Offshore Wind Farm Development Regions and Key Environmental Sensitivities

Drawing No: P2303-LOC-001

A

Legend

Round 4 Offshore Wind Regions

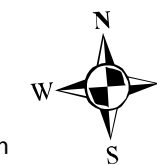
- Proposed Regions
- Regions Under Further Consideration

Administration

- 12nm Territorial Sea Limit
- Scotland Adjacent Waters Limit
- Median Line

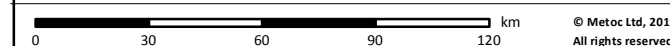
Environmental Sensitivities

- SAC
- SPA
- MCZ
- Proposed MCZ



NOTE: Not to be used for Navigation

Date	23 May 2019
Coordinate System	WGS 1984 UTM Zone 30N
Projection	Transverse Mercator
Datum	WGS 1984
Data Source	CDA; UKHO; GEBCO; JNCC; NE; ESRII TCE
File Reference	J:\P2303\Mxd\01_LOC\ P2303-LOC-001.mxd
Created By	Emma Langley
Reviewed By	Chris Goode
Approved By	Jill Hobbs



© Metoc Ltd, 2019
All rights reserved.

The Wash

The area known as The Wash is one of the sites still under consideration by TCE to be opened up for OWF development.

The Wash is the largest estuarine system in the UK and contains several different habitat types including extensive saltmarsh, large intertidal sand and mud banks, shallow waters and deeper areas (JNCC, 2004). The areas sheltered nature supports bivalve mollusc species such as the blue mussel (*Mytilus edulis*) and cockles (*Cardium edule*). These species are vital in supporting the internationally important assemblage of breeding, wintering and over-wintering bird species. Additionally, the Wash and North Norfolk Coast SAC, designated in April 2005, contains several Annex I and II qualifying features for protection (Natural England, 2019). This includes sandbanks, mudflats, reefs, saltmarsh (*Salicornia* sp.), Atlantic salt meadow, Mediterranean and thermo-Atlantic halophilous scrubs and the breeding harbour seal population (JNCC, 2005).

This area has a high proportion of existing OWFs and subsea cable infrastructure in an environmentally sensitive area. Although many projects have been consented, Docking Shoal OWF was refused consent due to environmental issues (cumulative bird impacts).

Additionally, the seabed is very mobile, and problems occur on existing subsea cables regarding exposures/shallow burial/interactions with fishing gear. Landfall options are limited due to designated intertidal regions. Works in intertidal regions are also constrained temporally, i.e. on Lincs and Race Bank OWFs, landfall works are only permitted between 15th May to 31st August each year to avoid impacts on over-wintering birds.

There is also a very active and vociferous commercial fishing sector with extensive experience of negotiating commercial agreements and, where necessary, disrupting works.

3.1.5.2 OWF Foundation Considerations

When designing an OWF, developers have several current and future foundation technologies to consider. These technologies include mono-pile, jackets, suction-cassion, floating and gravity-based foundations (Esteban, López-Gutiérrez and Negro, 2019). Each foundation type has benefits and disadvantages in their use, with mono-pile and gravity-based structures typically being used in shallower environments up to 15 - 30m in depth and jacket structures being utilised in deeper waters over 30m.

Currently in the UK there are no specific legislative differences regarding the use of these foundation types. The main difference between technologies and their implications in the permitting process is the use of impact pile driving to anchor foundations to the seabed. This process is used for monopile and jacket foundations, and generates high broad-band noise levels that propagate far from their source, posing a risk to other marine life (Koschinski and Lüdemann, 2013). If a developer proposes to use piling techniques, the appropriate mitigation measures should be proposed to minimise their impact on nearby wildlife and ensure regulatory approval of such activities. Such mitigation measures may include pausing piling activities if marine mammals are spotted within the a defined exclusion zone (ACCOBAMS, 2013), or the use of bubble curtains to physically block the noise generated from the piling activity (Koschinski and Lüdemann, 2013).

The development of the suction-cassion and floating foundation structures have the potential to reduce noise levels created by OWF construction, with these technologies not requiring piling activities to be used in anchoring them to the seabed. Such technologies are not currently being utilised by any large scale OWF, but are being tested at various sites around Europe (Koschinski and Lüdemann, 2013; 4C Offshore, 2016; Esteban, López-Gutiérrez and Negro, 2019).

It is likely that the use of monopile foundation structures, due to the emission of underwater noise generated during piling operations as part of their installation, are likely to represent the worst-case scenario in terms of foundation type that may potentially be used in an OWF development.

3.1.6 Survey Procurement, Specification and Baseline Surveys

The purpose of the surveys is to inform project design and provide a robust baseline for environmental assessment. This will consist of:

- seabed surveys, which will inform site selection and export cable and interconnector routing.
- characterisation surveys, which will provide a baseline and inform the EIA.

Consultation with the competent authorities for the EIA will ensure that the survey specification and scope is suitable for the required studies.

The main expected surveys required will include:

1. Geophysical survey (bathymetry / side-scan sonar / sub-bottom profile / magnetometer)
2. Geotechnical survey
3. Metocean survey
4. Water quality survey
5. Biological baselines - Ornithology, fish and shellfish, marine mammals, benthic ecology
6. Human environment - Commercial fisheries, shipping and navigation, marine archaeology, land/seascape characteristics and aviation and radar

Other characterization surveys are likely to include:

- a. Review of geophysical data for marine archaeological assessment;
- b. Marine ecological survey (grab/drop down video), including intertidal/landfall habitat surveys;
- c. Desk-based review of commercial fisheries activity, including port visits and interviews;
- d. Marine traffic surveys to inform Navigation Risk Assessment;

It is expected that statutory consultees would request up to two years of aerial bird surveys to inform EIA collision modelling work. However, due to large amount of existing bird data in the North Sea region, there is the potential that this could be limited to one year or possibly even removed entirely.

3.1.7 Landfall Site Selection

Landfall site selection should be undertaken with particular emphasis on the technical solutions with reference to the ground conditions encountered. The following tasks will be required:

- Desktop bibliographical studies and constraint analysis undertaken to compile all relevant information for the landfall areas.
- Initial constraint analysis using the data collated and satellite imagery analysis of the sites.
- Available landfall technical solutions analysed (horizontal directional drilling and open-cut trench) in order to inform the engineering, authorisation and consenting process for the Project.
- Different parameters will need to be analysed and compared such as:
 - Environmental constraints (e.g. protected species/sites, contamination, seasonal working restrictions, disturbance);
 - Legal constraints (e.g. any authorities constraints);

- Geological/geotechnical constraints (e.g. the geology and beach composition);
- Metocean conditions (e.g. waves, tides) and ice risk;
- Seabed morphology and landfall topography including morphodynamic studies;
- Third party interaction in proximity to the landfalls;
- Nearshore approach - bathymetry, soils, shipping routes, sensitive fishing grounds, other obstructions/constraints;
- Presence of constructions (e.g. coastal protections, breakwaters) in proximity of the proposed landfalls;
- Commercial conditions characterisation (e.g. tourism, fishing, marine traffic, ports / harbour);
- Civil engineering.

3.1.8 Interconnector Routing

The development of the submarine cable/pipeline corridor balances the need for options that are technically feasible and economically viable whilst limiting disturbance to people and the environment, and minimising cable length. In identifying short-listed options, and determining if a route is feasible, the physical, environmental and human aspects need to be considered. The route will need to be permissible, but also allow flexibility for detailed pre-construction design.

Initial route studies are typically based on publicly available data and involve determining whether selected routes are appropriate and identify any areas where additional survey data may be required.

3.1.9 Integration of energy sector with other sectors – co-location opportunities

Renewable energy will play a vital role in meeting worldwide growing energy demands, which are predicted to increase by up to three times by 2050. Large, high capacity wind farms are being developed around the British Isles to enhance security of energy supply and meet 2020 renewable targets. However, such developments place additional pressure on existing sea space which may result in conflicts with other sea users and marine activities. As the types of marine activities increase and existing ones are developed and expanded there will be an increased competition for marine space resulting in further pressure on traditional sea uses such as fishing and navigation.

A systematic approach with a coordinated, integrated and complementary planning and management system is required to prevent spatial or temporal marine space conflicts and resolve competing demands. Marine spatial planning will have to consider how marine activities can overlap in time and space, in other words consider co-location. Co-location of marine protected areas, aquaculture and commercial fishing in particular, has been proposed as one solution to ease the demands on marine space and these three areas are considered further below.

A key driver for marine spatial planning in Europe has been regional conservation legislation. Within the EU and at an international level, there has been a focus on better management of the oceans and the species they support, which in turn has influenced domestic environmental law and policy. The EU Marine Strategy Framework Directive and its aim for 'good environmental status' for all Member State coastal seas by 2020 provides legally binding targets for Member States. This also requires increased attention on the development of a network of marine protected areas in inshore and offshore waters. At the domestic level the introduction of the UK Marine Policy Statement (MPS) under the MCAA has established a framework for action through marine planning. As the MMO continues the development of marine plans for English inshore and offshore waters, co-location is emerging as a preferred means of addressing spatial conflicts (Christie *et al.*, 2014).

Although proposed and existing OWF zones occupy a significant proportion of the marine space in countries within the North Sea such as UK, Denmark, The Netherlands, and Germany, it has been

suggested that only 3% of the total area leased for an offshore wind farm is occupied by the structures which sit on the seabed (turbine piles and foundations).

Stakeholders in general seem amenable to co-locating activities within and around wind farms, although displacement of fishing by wind farms remains a concern. Consultation with Round 3 developers in the UK, indicates they are keen to consider co-location of activities within offshore wind farms.

Visual distance to proposed wind farms can affect the level of opposition by local residents. A study undertaken on tourists in the region of Languedoc Rousillon in France suggested there are two acceptable policy options in terms of siting wind farms: 1) irrespective of other factors, wind farms should be >12km from shore to avoid loss of tourism revenues, 2) a minimum of 5km from shore can be achieved without loss of tourism revenue if the wind farm is associated with recreational activities and is accompanied with a coherent environmental policy. Therefore, co-locating recreational or fishing activity in areas along the coast where recreation is important, may assist in making renewable projects more acceptable to the public (Christie et al 2014).

3.1.9.1 Marine Protected Areas

Marine Protected Areas (MPAs) are promoted and regulated under international, European and national legislation including the EU Birds and Habitats Directives, the MSFD, the Convention on Biological Diversity 1992 and, in the UK, the MCAA. This legislation supports the development of a coherent network of MPAs. An increase in MPAs puts additional pressure on the already heavily utilised sea space. Nearly a quarter of English inshore waters are designated as a European protected site.

The operational phase of an OWF development is thought to result in minimal environmental impacts, and it has been suggested that scour protection may lead to habitat enhancement. Wind farm sites can therefore create an informal MPA as they often become an effective no-take-zone for fish. Due to the nature of the licensing and operational legislation for wind farms, it means certain fishing gear, such as trawls and other towed gear, cannot be used within the area. Co-locating wind farms and MPAs could therefore be a feasible option.

There is a substantial spatial overlap between offshore wind farms and possible MCZs with 30% of existing, and 13% of planned, offshore wind farm arrays, and up to 30% of wind farm export cables, overlapping with possible MCZs. In line with the MCAA and government policy the development of the MCZ network must take into consideration adverse socio-economic impacts. It has been suggested that wind farm development is an important socio-economic interest and therefore can be taken into consideration in the selection process for MCZs (Christie et al 2014).

Whilst co-location of wind farms with existing Natura 2000 sites is legally possible, because the Habitats Directive does not prohibit the development of renewable energy installations within Natura 2000 sites, the developer would have to demonstrate that it will not have a likely significant effect on the integrity of the site through the HRA process. This is discussed further in Section 3.2.1.3.

It is likely that successful co-location of offshore wind farms with MPAs will require an effective pre and post construction monitoring regime. This would ensure that in line with conservation legislation, any development within the MPA does not hinder achieving the conservation objectives of the MPA (Christie et al 2014).

3.1.9.2 Aquaculture

Aquaculture is becoming increasingly important worldwide due to an increasing demand for seafood which according to the Food and Agricultural Organisation (FAO) cannot be met by wild species alone. Europe is one of the largest aquatic-food markets in the world and is increasingly relying on imports in order to meet consumer demands. It is anticipated that marine aquaculture, specifically offshore aquaculture (Christie et al 2014), will form a key area for development due to its potential to

contribute to the sustainability and security of food supply and economic development (ABPmer, 2015).

This is supported by the UK MPS which states in section 3.9.6: '*Marine plan authorities should consider the benefits of encouraging the development of efficient, competitive, and sustainable aquaculture industries in line with the policies set out above. They should ensure that proposed activity has minimal wider effect and should seek to embrace the significant opportunities for co-existence of aquaculture and other marine activities in developing Marine Plans*' (HM Government 2011).

A limitation for marine aquaculture is that in environmentally sensitive areas it should be restricted to indigenous species to avoid adverse effects on the existing ecosystem. Given only a small number of indigenous species are regarded as high-value, this limits the potential for profitable economic opportunities. Additionally, as offshore aquaculture systems cannot be attended daily, the most suitable species are those which can be cultured extensively rather than intensively with minimal service requirements e.g. sugar kelp (*Laminaria saccharina*) and blue mussel (*Mytilus edulis*).

There are two main benefits of an increase in aquaculture: food security and contribution to biofuel technologies. It is recognised at EU and national level the importance of sustainable aquaculture but that it will place additional pressures on marine space. As a result, there is growing recognition in Europe of the potential for integrating offshore renewable energy structures with certain types of aquaculture. In the UK, Defra has supported this with consultation on the future of aquaculture in England, which has highlighted in particular the opportunity for offshore energy infrastructure to support production of non-food raw materials, to be used in biofuel production. Macro-algae can be grown for renewable energy production by growing species that can attach to underwater ropes or similar support structures. These could be sited within the OWF and wind turbine foundations used as anchor points.

OWF sites can provide a potential location for aquaculture as their solid foundations provide a base for culturing species such as blue mussels (*Mytilus edulis*), oysters (*Ostrea edulis*, *Crassostrea gigas*) and seaweed (*Laminaria saccharina*, *Palmaria palmata*). A study in Germany for offshore wind and aquaculture co-location involved the culture of *L. saccharina* and *M. edulis* within OWFs showed that *L. saccharina* grew well in offshore locations. Although *M. edulis* experienced a lower settlement success, it lacked the harmful parasites found with nearshore cultivation, making it a good candidate if settlement rates can be increased.

Although aquaculture projects in association with wind farms have been widely cited as potential options for addressing competition for marine space, they are still in the planning or trial stages. There appear to be clear benefits for the aquaculture sector because co-location may reduce the high start-up costs associated with building an offshore facility, as well as providing some shelter in a high energy environment. The key advantage to the aquaculture industry is that they can use the turbine foundations as anchor points, without them due to the high energy environment of much of the North Sea, installation of aquaculture equipment would not be economically feasible. However, for co-location to work there would need to be clear benefits for both parties. It is less clear how the renewables sector would benefit. One possible benefit could be in the form of providing a means to mitigate and offset environmental impacts of OWF developments, e.g. by cultivating macroalgae as a source for biofuels (Christie et al 2014).

Another current barrier is a lack of a clear regulatory framework and operational protocols that would provide security for both of the co-location partners.

Co-location of mussel farms with wind farm structures in the UK currently seems unlikely to be viable under current economic conditions and would only seem to be likely if there was a regulatory imperative. This would need to be in the form of a compulsion, such as no development being allowed other than in wind farms, or in the form of an incentive such as development and operating costs being

subsidized or long term price guarantees being given for product, as is the case for OWF developers (Corbin, Holmyard and Lindell, 2017).

3.1.9.3 Fishing

The impact of increasing offshore wind on fishing is likely to be significant. This is not only due to adverse effects on fish populations resulting in a potential depletion of stocks around individual sites, as a result of construction, operation and decommissioning activities, but also due to access issues for fishing vessels once safety zones around the wind farms are established.

Uncertainties remain surrounding fishing rights in areas where wind farms are being developed and concerns amongst fishermen heighten as offshore wind developments intensify.

The key question from the fishing industry is ‘which, if any, fishing activities will be permitted inside these sites.’

Public rights to fish and public rights to navigate are enshrined in English common law. These rights are held irrespective of the Crown Estate ownership of the seabed. The Crown and developers must respect these public rights. However, provisions of the Energy Act successfully limits these rights by removing public rights of navigation in the area where the turbine is sited. Under the Energy Act a safety zone is permitted around an offshore installation. The extent to which access for fishing is allowed is determined by the permissible size of the safety zone. Under international law safety zones can be up to 500m within a coastal state EEZ. Given the average spacing between wind turbines is likely to be 500 – 700m, if the maximum entitled safety zones under international law are commonly adopted, the effect would be to close significant portions of the sea to navigation and fishing.

However, the Safety Zone Regulations specify dimensions of ‘standard safety zones’ as 500m radius for construction, extension and decommissioning of wind turbines and 50m radius for operational wind turbines.

This means although there is likely to be significant disruption to fishing during the construction, maintenance and decommissioning phases of a wind farm, legally fishing vessels will be able to access the wind farms during the operational phase. However, due to health and safety concerns and issues regarding insurance, studies have indicated that fishermen would be inclined to avoid wind farms.

For co-location to work, these issues will need to be addressed. The artificial reef effect of wind farms especially where scour protection is used, has the potential to benefit some species. For example, where crab/lobster fisheries already exist in an area, after the initial potential damaging nature of the construction phase, there may be potential to enhance the habitat for these species. Stocks may be enhanced through careful construction of scour protection resulting in increased yields of both crab and lobster which thrive in a rocky environment. Commercial fishing may then benefit from the wind farm so long as they are allowed access to fish within the area. This is most likely to be agreeable to both parties for traditional fishing methods such as pots / creels rather than trawling which could pose a threat to the wind farm infrastructure e.g. through snagging the buried cables associated with the wind farm array (Christie et al 2014).

During consultation with the MMO they commented that although they had heard about integration projects in conferences, they weren’t aware of plans or pilot studies in the MMO. The planned Swansea Bay Tidal Lagoon is the only known project with a co-design element in it. This project would include oyster restoration within the lagoon. The MMO did suggest the MMO strategic team may know more about such projects or the evidence team may be looking into it.

3.2 Consents Required for OWF and Interconnector Cables

This section provides detail on the consenting processes currently in place for the development of OWFs and electrical interconnector cables. As discussed in Section 3.1 it is not yet known exactly how the UK would regulate a hub and spoke project which crosses multiple jurisdictions. In the UK, the

consenting process for installing an OWF differs from that of a submarine interconnector cable. The most notable difference being the requirement to obtain a DCO with a deemed marine licence for an OWF under the Planning Act 2008. An interconnector cable requires a marine licence for the marine components of the project under the MCAA 2009 and planning permission under the Town and Country Act 1990 for the onshore elements.

Should the components making up the NSWPH in the UK consist of OWF(s) and interconnector(s), it may be possible for the interconnectors to also be consented under the same DCO process.

Consultation with PINs confirmed that there are three possible ways under the Planning Act 2008 that a project can be defined as a NSIP and therefore be consented via the DCO process:

1. **Section 15: By definition** - An offshore generating station which has a capacity of more than 100 megawatts is classed as a NSIP.
2. **Section 35: By direction** – The applicant can apply to the SoS for direction as a NSIP. This application could be made in respect of interconnectors which are part of the NSWPH project.
3. **Section 115: Associated development** – development consent may be granted for development which is associated with the NSIP development e.g. an interconnector associated with an OWF.

It should be noted that PINs do not provide advice on whether a project is a NSIP or not and it is the applicants responsibility to determine this. PINs will only comment on receipt of the full application however, they agreed it is likely that interconnectors which are part of the NSWPH project could be consented via the DCO process under routes 2 or 3 above.

Tables 3-1 and 3-2 below summarise the key consents required for survey and installation work respectively.

3.2.1 Consents for non-NSIP's and the Marine Licencing process

The Round 4 seabed leasing process currently being undertaken by TCE specifies that any OWF development given a seabed lease must be >300mw in capacity. As such it is assumed that any OWF associated with the NSWPH in UK waters would exceed this capacity, and therefore be designated a NSIP and go through the DCO consenting process.

Should the only component of the NSWPH project in UK waters be an interconnector cable(s) then it is likely they would be consented by the MMO under the MCAA and a marine licence applied for. As discussed in Section 2.2.7, a marine licence is required for laying power cables within UK territorial waters (up to 12 nautical miles). If the cable is an international cable, the MMO are obliged to grant the marine licence, but can include conditions.

Laying international cables outside UK territorial waters (beyond 12 nautical miles) does not require a marine licence. However, associated works, such as pre-lay dredge and disposal and cable protection works may require a marine licence.

During consultation with the MMO it was raised that an interconnector that is part of the NSWPH project may or may not be exempt from requiring a marine licence beyond the 12nm limit under Section 81 of the MCAA. Further consultation with the MMO would be required to clarify this. Implications for not being exempt would be that an EIA would be required for the whole route and any maintenance works on the cable would not be exempt from marine licencing.

Under the MCAA Marine Licences may be required for six categories of activity. These activities are:

1. Construction, alteration or improvement of works;
2. Dredging;
3. Deposits of any substance or object;

4. Incineration of any substance or object;
5. Removal of any substance or object; and
6. Scuttling of any vessel or floating container

In terms of an interconnector cable, the licensable activities will include construction of new works (laying the cables) and may include deposit of materials for the purpose of cable protection (concrete mattresses or rock berms). Other possible licensable activities depending on project site specific conditions may include dredging for removal of the tops of sand waves, unexploded ordnance (UXO) detonation and unexploded ordnance (UXO) removal.

Before making a Marine Licence application, applicants are encouraged to conduct a pre-application enquiry with the MMO to determine if they require a marine licence for their proposed activity. The MMO can also advise on what information may be required to support the application, and if the project may require an EIA, HRA or WFD Assessment (MMO, 2018a).

An EIA would follow the same procedure as described in section 3.2.2.2 in this report. In summary this includes screening to determine if a statutory EIA is required and scoping to agree with the regulator and statutory consultees the scope of the topics within the EIA and any baseline assessments required to support the assessment.

The applicant can submit the marine licence application form via the Marine Management Organisation Case Management System Portal. All supporting information including (but not limited to) the Environmental Statement (statutory EIA) / Environmental Report (non statutory EIA), HRA, MCZ assessment, WFD Assessment can be uploaded to the portal.

The HRA and WFD assessments would also follow the processes as described in sections 3.2.2.3 and 3.2.2.4 in this report respectively.

Once an application has been accepted and been technically assessed, the applicant may be required to advertise the application and its' supporting documents and open up the application for consultation. The consultation period will vary depending on if the application is supported by an EIA or not with EIA-applications taking up to 6 weeks and non-EIA applications taking up to 4 weeks typically. This timeframe is included within the 13 week estimate the MMO aims to process a marine licence application.

A Marine Licence application is assessed by the MMO in a seven stage process, with the MMO aiming to reach a decision on licence applications within 13 weeks of submission in 90% of cases (MMO, 2018d). Licence applications for more complex developments can however take longer, with the 13 week figure provided by the MMO only being advisory. The process is as follows:

1. **Allocation** – The applicant is allocated a case officer and manager who notifies the applicant that their application is being assessed.
2. **Technical Assessment** – The case officer conducts a technical assessment of key points in the application. This may include an EIA, HRA, Marine Planning Assessment, WFD Assessment etc. Should further information be required the case officer will request this from the applicant. Once complete the case officer will advise the case manager of the estimated timescales for approval and prepare the application for approval to proceed to consultation.
3. **Consultation** – The case officer starts consultation on the application, along with any supporting documents or assessments. The case officer will instruct the applicant on any advertisements to be made if needed and gather information from the public and consultees. If the case officer determines that more information is required to continue the assessment based off any response, then further consultation with the applicant and advisers may be necessary. If further consultation does take place and the required additional information not received, then the application may be

postponed or even rejected. Applications that require an EIA assessment require a 6-week minimum consultation period.

4. **Review** – All consultation responses considered in stage 3, along with any other assessments identified in stage 2 are reviewed and recorded. Once complete a decision document will be prepared, with a draft licence, if applicable, being prepared and shared with the applicant. The applicant may then query any points in the licence should there be a misunderstanding. At this stage, the application is 2 weeks from completion.
5. **Decision recommendation and approval** – The case manager then completes a quality check of the decision, assessments, supporting documents and licence, with changes to the documents being made if required. The case manager will then approve the licence and all supporting documents to be issued to the applicant.
6. **Application completion** – The marine licence, decision documents and supporting information are then published on the public register for interested parties to read. The application is now closed.
7. **Monitoring** – This is an ongoing process, with any impacts and consequences of the activity being monitored in accordance with the conditions specified by the marine licence.

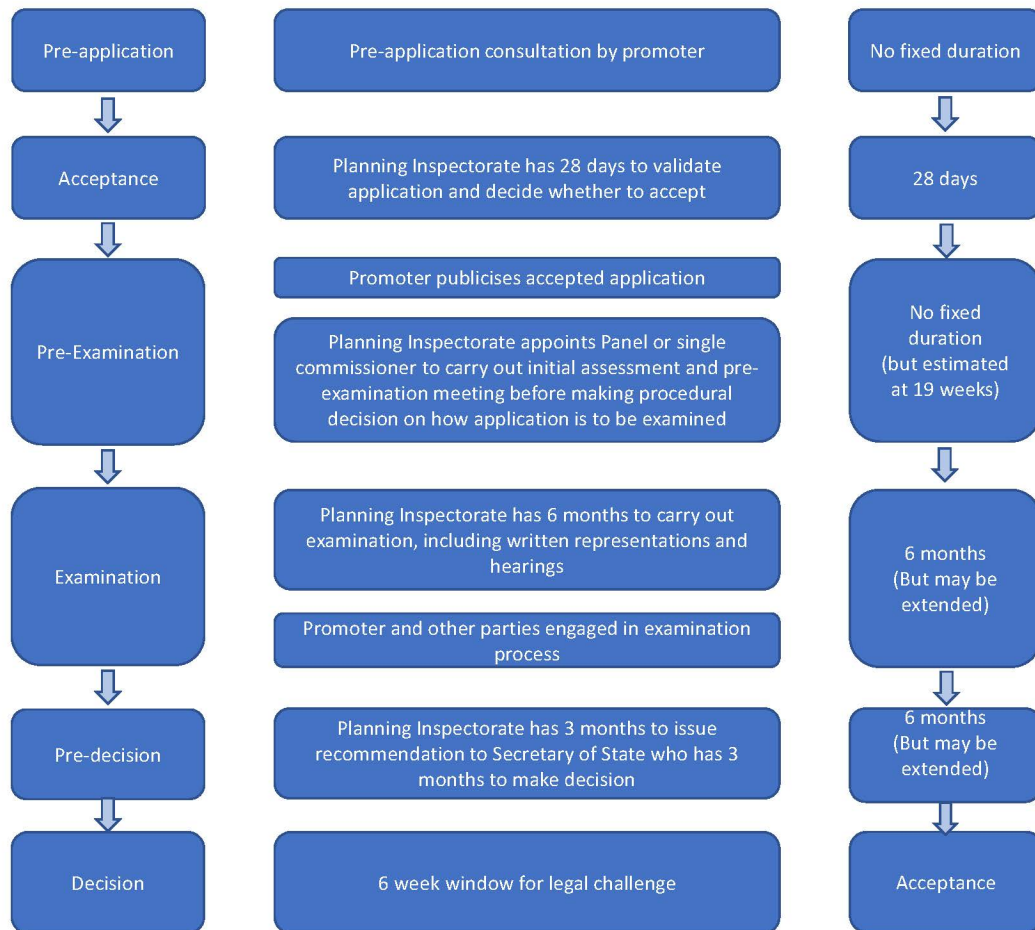
3.2.2 Development Consent Order Application Process

The Secretary of State for the Department for Business, Energy and Industrial Strategy (BEIS) grants or refuses consent based on a recommendation made by the Planning Inspectorate (PINS). PINS on behalf of the Secretary of State is the competent authority for the Development Consent Order (DCO) process.

In England, a DCO is granted under the Planning Act 2008 (as amended) which incorporates a number of consents, including a marine licence and onshore consents.

The six key stages in the DCO application process, along with associated timescales are illustrated in Figure 3-4 and described further below.

Figure 3-4 Graphical representation of the DCO application process with associated timescales (after RWE 2015)



- **Pre-application (No fixed duration of time)** – Before an application is submitted, the applicant must carry out public consultation on the project to allow members of the public to pass comment and raise concerns on the plans.
- **Acceptance (Up to 28 days)** – Once the applicant has submitted the application for development consent, PINS (on behalf of the Secretary of State) has up to 28 days to decide whether the application meets the required standards to be accepted for examination.
- **Pre-examination (No statutory timescale but typically 3-6 months)** – Once accepted, the Examining Authority (ExA) is appointed, and the accepted application is publicised by the applicant. The ExA then organises a preliminary meeting, with all interested parties being invited to attend. Interested parties include statutory bodies and members of the public who have registered to become interested parties by making a relevant representation (a summary of a person's views on an application, made in writing). The meeting sets out how the application will be examined so a timetable for the examination process can be set, with key issues to consider when determining the examination timetable being drawn from the interested parties.
- **Examination (Up to 6 months)** – PINS the has up to 6 months to carry out the examination, which includes written representations and hearings. The applicant and other interested parties are involved at this stage.
- **Recommendation and Decision (Up to 6 months)** – Once the examination is complete, PINS prepare a report on the application for the Secretary of State, including a recommendation, within

3 months of the close of the examination. The Secretary of State then has 3 months to decide whether to grant or refuse the DCO.

- **Post Decision (6 weeks)** – After a decision has been made, a six-week period begins in which the decision may be challenged in the High Court, with the process of a legal challenge being known as Judicial Review.

Under the DCO process, the Secretary of State for BEIS has the authority to issue a Deemed Marine Licence (DML). This is done in consultation with the MMO, who if the DCO is granted, are still responsible for the enforcement, post-consent-monitoring, variations, suspending and revoking of a Deemed Marine Licence (MMO, 2018a). It is expected that the developer would consult with the MMO at an early stage in the projects development to ensure that any information submitted as part of the DCO application would be sufficient in the granting of a marine licence. A failure to do this could result in a project being denied a DCO on this basis. Variations to a DML can be approved by the MMO under section 72 of the MCAA. Should a variation on a DML be required, then an application to the MMO must be made and include the following information:

- A cover letter;
- Details of the proposed alteration(s) to the DML;
- A statement detailing why the variation is permissible with regards to the original DML and in consideration of any implications do the existing DCO; and
- Any additional supporting information required.

There are several supporting documents and reports that must be prepared and supplied with a DCO when an application is submitted to PINS. These include, where applicable, an Environmental Statement (ES) under The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, a brief non-technical description of the development proposal and a report highlighting potential European protected sites that may be affected by the development (Department for Communities and Local Government 2013).

During this time period several baseline surveys must be conducted to allow for sufficient impact modelling to take place (BVG Associates, The Crown Estate and ORE Catapult 2019). This includes environmental surveys covering the benthic environment, fish and shellfish, ornithology and marine mammals. Physical surveys analysing the seabed area of the proposed site are also required in order to properly detail the cable route engineering and turbine array design. This stage of the process is very time-consuming and is the main driver in the length of time it takes to complete a thorough EIA for a project, with the process estimated to take up to three years.

Processes of the key supporting assessments required as part of a DCO application are detailed below.

3.2.2.2 Environmental Impact Assessment process

The main stages of the Environmental Impact Assessment (EIA) for an OWF development, are as follows:

1. **Screening** – At this stage a decision is taken on whether a statutory EIA is required. Under schedule 2 of the EIA Regulations 2009, an OWF development may require an EIA if “likely to have significant effects on the environment by virtue of factors such as nature, size or location”. Given the size and scope of modern OWF’s it is very likely that any OWF development in UK waters will require an EIA.
2. **Scoping** – At this stage the subject matter and potential significant effects of the project are determined. At this stage the developer may request a ‘Scoping Opinion’ from the secretary of state for BEIS as to what information should be included in the Environmental Statement that will be created in the EIA process.

- 3. Baseline surveys and impact assessment** – Baseline data of the physical, biological and socio-economic environment is gathered, through review of available data and baseline surveys taken of the proposed development area. This includes baselines on the geology and physical process, water quality, biological baselines (e.g. ornithology, fish and shellfish, marine mammals, benthic ecology) and human environment baselines (e.g. commercial fisheries, shipping and navigation, marine archaeology, land/seascape characteristics and aviation and radar). Potential impacts of the development during the construction, operation (including maintenance and repair) and decommissioning phases, in relation to the baselines can then be assessed. Once the necessary data has been gathered, appropriate mitigation and compensation measures that may be taken to reduce impacts of the project are identified, along with any residual effects that may remain after these measures are taken. This stage can take several years to complete owing to the large amount of data required to be gathered.
- 4. Consultation** – Throughout the EIA process, consultation with the relevant statutory bodies, stakeholders and members of the community should be undertaken in accordance with the Planning Act 2008 guidance notes on the pre-application process and consultation requirements (Ministry of Housing Communities & Local Government, 2015).
- 5. Preparation and release of the Preliminary Environmental Information Report (PEIR)** – Under the EIA regulations 2009, a Preliminary Environmental Information Report (PEIR) is required to be created by any developer applying for a DCO. A PEIR is intended for public consultation purposes, to allow for consultees a better understanding of the projects scope and potential effects to the environment, allowing for more informed contributions to be made at the pre-application stage. While there is no defined list of information required to be included in the PEIR, the Planning Inspectorate have produced an advice not on what details to include (PINS, 2017).
- 6. Environmental statement** – The Environmental Statement (ES) is the culmination of the EIA process and should include all of the information necessary to demonstrate that any likely significant effects of the project have been assessed. The ES would be expected to include descriptions of:
 - The proposed development including its' physical characteristics and land-use needs and estimate of the type and quantity of emission expected to be released by the project;
 - Alternatives considered and reasons for why this site, infrastructure choices etc. were chosen over the alternatives;
 - The aspects that may see likely significant environmental effects, particularly air, water, soil, flora, fauna, populations, material assets, landscape and any relationships between these aspects;
 - The likely significant effects of the development on the receiving environment. This includes direct and indirect, secondary, cumulative, temporal severity and positive or negative effects;
 - How the potential environmental effects were assessed;
 - Avoidance, mitigation and compensation measures proposed to be used to eliminate/reduce any likely significant environmental effects;
 - A non-technical summary of the ES; and
 - Limitations/difficulties of the assessment and any knowledge gaps that may still be present.

Archaeology: Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD)

As part of the EIA process, a Written Scheme of Investigation (WSI) may be required to be produced for any archaeological investigation activities conducted under mean high-water spring under the

terms of the Deemed Marine Licence. The WSI should include a summary of the archaeological and historical background of the site, details of the impact assessment and archaeological surveys conducted to that point and any committed mitigation measures to prevent/reduce the effects on any archaeological remains. The Protocol for Archaeological Discoveries (PAD) will also be set out in the WSI. The PAD details the system for reporting and investigating any unidentified archaeological remains found during the installation phase of the development and makes provision for the creation of exclusion zones around unidentified remains.

Post-Construction Monitoring

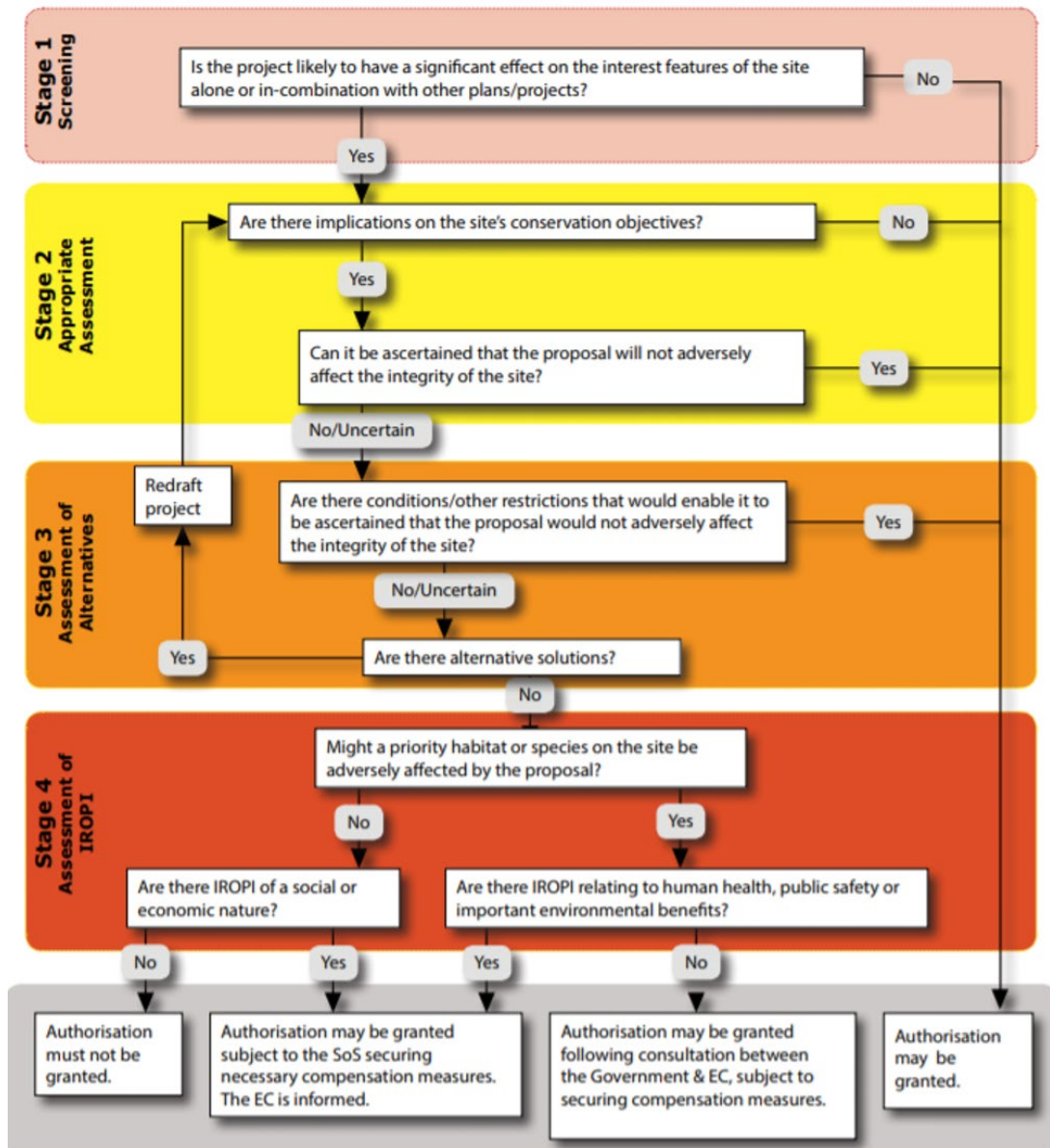
A post construction monitoring plan will be included within the Environmental Statement (ES) for an OWF. The extent of the monitoring required is determined by the mitigation measures identified in the ES, any requirements outlined in the DCO and Deemed Marine Licence and through consultation with other consultees. For example, organisations such as the MMO may request scour to be monitored at foundation sites around the site. A post-construction monitoring programme can in some cases be a mitigation measure itself.

A successful monitoring programme will ensure that any proposed mitigation measures are reducing any significant effects they were prescribed to reduce, and if they are not then new more effective measures may be implemented. Depending on the outcome of the EIA and requests from other organisations, a range of physical, biological and socio-economic conditions may be required to be monitored such as marine mammal populations, the benthic environment and how it has changed from its pre-construction baseline, or impacts the site is having on local seabird populations.

3.2.2.3 Habitats Regulation Assessment and Appropriate Assessment Process

Should a proposed NSIP such as an OWF have a likely significant effect (LSE) on a Natura 2000 site then a Habitats Regulation Assessment (HRA) is required to be undertaken by the developer. This is undertaken within the DCO process and as such falls under the same timescales. A simplified version of this process may be seen in Figure 3-5 below.

Figure 3-5 Summary of the HRA process (The Planning Inspectorate, 2015)



The process begins at the pre-application stage of the DCO process, with the HRA comprising of up to 4 stages, depending on the outcomes reached. These stages are as follows:

1. **Screening** – The applicant must determine which, if any, current or future European protected site(s) are found within the development footprint of the project and the LSE that the works will cause to the affected sites. This process should be done in consultation with the relevant Statutory Nature Conservation Bodies (SNCB), with a Statement of Common Ground being created in conjunction with the SNCB's to help the ExA in focusing on the primary issues later in the examination stage and reduce any points of contention. If it is concluded that no LSE's will occur as a result of the development, then a No Significant Effects Report (NSER) must be submitted with the DCO application, providing stringent detail as to why no LSE will occur and no Appropriate Assessment (AA) is required. Should stage 1 identify LSE for any European protected site(s) considered, then an Appropriate Assessment (AA) will be required. Also required at this stage is the completion of the Screening Matrices found in Appendix 1 of PINS advice notes on the HRA process, which summarise the information gathered in a clear and concise manner. Should this not be completed then the ExA will request it at the examination stage of the DCO process.

2. **Appropriate Assessment** – When an LSE cannot be discounted, then the applicant must consider whether the effects will negatively impact the conservation objectives of the affected site(s). In this stage the applicant must produce an HRA report to be submitted with the DCO application. This report should include information on several topics, including:

- How the site(s)' conservation objectives will be affected by the development;
- Description of avoidance /mitigation measures to reduce the LSE, along with any residual effects;
- A proposed timeline for the proposed mitigation measures; and
- Evidence the applicant has consulted and addressed the comments of the relevant SNCB's.

The report should also include any information that would have been required in the NSER, i.e. which European sites have been screened in/screened out of further analysis. Like stage 1, the Integrity Matrices found in Appendix 2 of PINS HRA advice notes must be submitted with any application. If after the AA is complete there remains problematic LSE's in the design of the project, then the process will move onto stages 3 and 4. Additionally, an assessment of compensatory measures, agreed upon in consultation with relevant SNCB's and landowners, must be included with the HRA report.

3. **Assessment of Alternatives** – Alternatives to the project should be identified and assessed, with the details included in the HRA report. Such alternatives may include altering the scale of the project, changing the projects location or not moving forward with the project at all.

4. **Consideration of Imperative Reasons of Overriding Public Interest** – Should no alternative solution to that would have otherwise had a lesser effect on the identified European site(s), then the project may still go ahead if the ExA is satisfied by the Imperative Reasons of Overriding Public Interest (IROPI) for the project. IROPI justification should be provided with the HRA report should any species and/or habitats of priority conservation be affected by the development.

Once the DCO application has been submitted, the NSER/HRA report will be reviewed by PINS against an acceptance checklist to determine if the applicant has submitted sufficient information to enable the ExA to carry out an AA or determine if it is not needed. A decision on the application will be made within 28 days of submission. If accepted, during the Pre-Examination stage the ExA will carry out a detailed assessment of the applicant's report, and, in combination with representations raised during the projects Preliminary Meeting, determine the principal issues and if additional information is required this stage typically takes approximately 3 months.

In the examination stage, the ExA analyses the principal issues raised in the pre-examination process, with the LSE being assessed to determine if the integrity of the European site(s) will/won't be affected. Should the AA come out with a negative outcome then the ExA will assess the alternatives that are available for the project and if applicable, examine the case for IROPI put forward by the applicant. Any compensatory measures put forward and consultations with SNCB's will also be examined to determine if they are suitable. The examination stage can take up to 6 months to complete.

After the examination has concluded, the ExA then has three months to write-up a report containing their recommendation to the Secretary of State. Once received, the Secretary of State then has a further 3 months to complete their own assessment of the application and come to a decision on whether to approve or reject the consent application.

It is likely that any OWF development will require both an EIA and HRA as part of the DCO process. While both fundamentally similar documents that can indeed be presented together in the same document, the distinction between the two stems from their basis in either the EIA Directive (EIA) or Habitats Directive (HRA). While an LSE identified in an EIA may not prevent the development from moving forward, an LSE identified in an HRA may do so.

A recent ruling by the European Court of Justice in case C-323/17 – People Over Wind and Sweetman ruled that “it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.” This ruling may in the future require developers to conduct an Appropriate Assessment where before they only needed to undertake screening, which could increase the time and costs required to conduct an HRA and so should be considered in any future developments.

3.2.2.4 WFD Assessment

Assessed by the Environment Agency, a WFD assessment must be conducted for any activity in UK waters up to 1nm out to sea. This assessment consists of three stages; scoping, screening and impact assessment (Environment Agency, 2017). The screening stage determines which (if any) activities can be excluded from scoping and impact assessment. The scoping stage identifies the receptors that may be at risk of the proposed activities. Risks to (or from) the following receptors should be identified in scoping stage: hydromorphology, biology (habitats and fish), water quality, protected areas and invasive species.

Finally, the impact assessment stage assesses the impacts of the proposed activities and how they may be avoided or mitigated against, thus showing if the activity could impact the water body achieving good status. The impact assessment should assess for deterioration of protected areas, the risk of invasive species and whether the proposed activities have the potential to jeopardise either the good ecological status of the water body or any mitigation measures already in place. At this stage it may also be determined if the activities meet the conditions of article 4.7 of the WFD, in which certain activities are permitted to deteriorate a water bodies status. As this consent application runs in conjunction with the DCO process, it can take up to 2 years for a decision to be reached.

3.2.3 Decommissioning Programme Process

It is the UK governments view that any person who constructs, extends, operates or uses any infrastructure in the marine environment should be responsible for its’ decommissioning at the end of its’ useful life (BEIS, 2019a). As such, any new OWF development in UK waters must also feature a decommissioning programme approved by the Secretary of State for BEIS. The decommissioning programme process is made up of 5 initial stages. These stages are:

1. Preliminary discussion between the developer and BEIS and inclusion of a decommissioning statement in their DCO application.

The developer should contact BEIS as soon as reasonably possible to discuss their proposed plans for their projects decommissioning programme. During these discussions, the developer should inform BEIS of their corporate structure so that BEIS may identify which party ultimately is liable for the decommissioning. It should be noted that BEIS expects the first draft of the decommissioning. Programme to submitted at least 12 months in advance of construction starting.

2. Secretary of State issues a Section 105 notice under the Energy Act 2004 obligating the recipient to submit their decommissioning programme in the required timeframe.

This notice requires the developer of an Offshore Renewable Energy Installation (OREI) to submit a decommissioning programme for approval by the Secretary of State. It is unlikely that such a notice would be issued before at least one relevant statutory consent for the project had been issued.

3. Developer prepares a draft decommissioning programme following detailed discussions.

This programme should include the following details:

- a. Background information on the project, site, prevailing weather and physical conditions, nearby fishing or shipping activity, nearby protected areas, other adjacent facilities.

- b. Description of items to be decommissioned.
 - c. Description of the proposed decommissioning measures, including (but not limited to) proposed method of removal, details of any items left in-situ, costs, financial security and site restoration.
4. Consultation with interested parties.

To enable transparency in the decommissioning Programme preparation process, the developer must sufficiently advertise the process and draft programme to allow statutory consultees and interested parties to provide comment. Consultees expected to be included in discussions include the JNCC, Natural England, the Environment Agency and the Maritime and Coastguard Agency, among others. Comments from all parties should be used to update the draft decommissioning Programme, as well as be recorded and included in a table within the document. BEIS will review the post-consultation draft in conjunction with other relevant departments and consultees before providing the developer with their final comments.

5. Formal submission and approval.

Once the programme has been updated with the consultee's comments, it will be emailed to the Offshore Renewables Decommissioning team for approval. The Secretary of State may then grant approval, approve the programme with modifications, reject the proposed programme and request a new one, or prepare their own decommissioning programme and recover the costs from the developer. Once a programme has been approved the developer must make it available to the public, with commercially confidential sections permitted to be redacted.

Once operational, it is expected that the developer will conduct updates and reviews of the decommissioning programme at regular intervals to determine if any internal or external changes to the project warrant modification of the original document.

Table 3-1 Permitting requirements for marine Surveys in Territorial waters (England) and UK Offshore waters for UK OWFs and electrical interconnectors

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information/ consents required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent ruling (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
Seabed Survey Licence	The Crown Estate	Crown Estate Act 1961	<p>Small scale survey activities that interact with the seabed within the 12nm limit, or certain activities outside of this area relating to activities such as offshore wind (The Crown Estate, 2018c). Such activities include:</p> <ul style="list-style-type: none"> ▪ Geotechnical Survey ▪ Environmental / Benthic surveys with Fauna and flora sampling on the seabed; ▪ Meteorological and oceanographic climate monitoring; and ▪ Archaeological/Wreck study and exploration (The Crown Estate, 2018b). 	An application form is completed and sent to the Crown Estate for approval, with a conflict check ensuring no conflicts with other sea users would occur.	<p>Applicant details. Nature of application. Statement of requirement of a marine licence. Business area of the activity. Details and description of the small works. Method description. Dates and locations of the works.</p> <p>Additional consents from other statutory organisations may be required to obtain a survey licence, such as a marine licence from the MMO or permission from the harbour authority. Any licence issued will be conditional based on any other necessary consents being obtained.</p>	N/A	1 – 2 days	4 – 6 weeks, although this may be longer from May to September due to increased demand.	Normal licenses are valid only for 12 months, so should be submitted at an appropriate time. Longer term licenses, known as Seabed Survey Licence PLUS, allow for deployment of survey equipment for up to 3 months, which could potentially save reapplying for a new licence.
Voluntary Notification	MMO	Marine and Coastal Access Act 2009	Any geophysical survey that has the potential to disturb marine protected species through man-made sound. Applies within the UK 12nm boundary.	The voluntary notification form should be completed and sent to the MMO at least 28 days before any survey works begin (MMO, 2016). The form includes several sections which must be filled in by the applicant to detail the proposed survey and provide sufficient background to allow the MMO and statutory	<p>Contact details of the applicant. The purpose and type of survey, along with dates and locations. Details of the survey equipment and the vessels to be used. Environmental information e.g. proximity to protected areas.</p>	N/A	No prescribed timescale	Within the 28-day period of submitting the notification	

				<p>consultees (e.g. Natural England and JNCC) to assess the impacts it might cause. Once the assessment is complete the MMO will give feedback to the developer on their findings. Should the applicant be using the Marine Noise Registry to provide information on seismic survey works, then completion of the voluntary notification form is not necessary.</p>	<p>A European protected species (EPS) licence stage 1 risk assessment. Mitigation or liaison.</p>				
Exemption Notification	MMO	The Marine Licensing (Exempted Activities) (Amendment) Order 2011 (Article 17)	<p>Exemption from requirement for a marine licence applies in England for certain activities if conditions listed in the Order are met. Such activities include removal of samples <math><1\text{m}^3</math>, if they will not have an adverse effect on a protected site and not cause an obstruction or danger to navigation, and boring tunnels under the seabed provided that the construction does not adversely affect the UK marine environment or species that it supports.</p>	<p>Exemption notifications should be made through the MMO's online Case Management System (MMO, 2018b).</p>	<p>Any notification submitted must describe the nature of the proposed activity, the need for it, the exemption criteria you are relying on and how you meet those conditions.</p>	N/A	1 – 2 days	No less than 28 days.	<p>If it is later found that the activities did not meet the exemption criteria the MMO may take enforcement action.</p> <p>Some exemptions do not apply in areas protected under other legislation e.g. SAC's, the relevant conservation body should be consulted</p>
Site of Special Scientific Interest (SSSI) Assent	Natural England	Wildlife and Countryside Act 1981	<p>Activities planned to take place on an SSSI</p>	<p>An application form detailing the operations proposed to take place and their timescales should be sent to Natural England (Natural England, 2015b).</p>	<p>Additional information such as a map of the site, vehicle routes and materials/chemicals proposed to be used may be requested by Natural England.</p>	N/A	1 -2 days	10 working days	

European Protected Species Licence	Natural England	Offshore Marine Habitats and Species Regulations 2017	Any activity which may cause adverse impacts to any listed species that would otherwise be illegal. This may include geophysical surveys.	An application form available at https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence must be submitted to Natural England (Natural England, 2015a). A licence is required only if it is likely the proposed activity will affect EPS.	The licence application must pass 3 legal tests: The activity must have a purpose i.e. is in the public interest; There must be no satisfactory alternative available; and The activity must not have an adverse effect on the long-term conservation status if the species. A method statement to show how any impacts on the protected species will be reduced. A reasoned statement to show the activity fits the criteria and that no satisfactory alternative exists. References to show that the ecological consultant has sufficient expertise to apply for a mitigation licence.	Potentially affected species should be identified in the scoping stage of the project.	Timescale will change depending on the EPS in question.	Decisions on a licence will take up to 30 days.	Should a Further Information Request from Natural England be received, failure to provide the necessary information within 6 months will result in the application being cancelled, with a new application then being required (Natural England, 2013).
Harbour Works Consent	Individual harbour bodies	The Harbour Works (Environmental Impact Assessment) Regulations 1999	Any works taking place in the vicinity of a harbours defined boundary	Applications should be made to the individual harbour authority in which the works are proposed to take place.	Differs between harbours, but usually requires applicant details, nature, location of proposed works, necessity for a Marine Licence or other consents for the works, impacts on WFD status, protected sites/species, sediment contamination.	An assessment of the baseline harbour conditions would likely be required.	Will differ by activity type.	Will differ by harbour authority.	In some cases, a marine licence may also be required to conduct any harbour works.
Environmental permit (Formerly flood defence consent)	Environment Agency	The Environmental Permitting (England and Wales)	Any works taking place on or near a main river, on or near a flood defence structure, in a flood plain or near a sea defence	A three-part application form must be completed and sent to the Environment Agency along with the appropriate payment.	Part B11: Standard rules permit application (How your works fall under the standard rules as set out by the Environment Agency (EA))	N/A	1 – 2 days	2 – 4 months depending on the scale of works and need for	Should the works not fall within the standard rules set out by the Environment Agency then

		Regulations 2016			<p>Part A: About you (Details of your company/organisation including address and contact details)</p> <p>Part F3: Charging for flood risk activities and declarations (Determines the amount to be paid to the EA for any flood risk activities)</p>			public consultation.	you must apply for a bespoke permit to cover that activity.
--	--	------------------	--	--	--	--	--	----------------------	---

Table 3-2 Permitting requirements for installation in Territorial waters (England) and UK Offshore waters for UK OWFs and electrical interconnectors

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
Crown Estate Seabed Lease (Round 4 and beyond)	The Crown Estate	Crown Estate Act 1961	Construction and operation of infrastructure within 12nm of the British coast, or in certain areas outside this such as the Renewable Energy Zone.	Once the developer has conducted the necessary surveys and checks to determine the feasibility of the proposed site, they must pass the pre-qualification stage (PQQ). Here the developer must meet certain technical and commercial criteria. If met they will receive an Invitation to Tender (ITT) where their bid will be assessed against various criteria. If the bid is accepted, they will receive and Agreement for Lease, giving them option rights over the area of seabed. The developer must then obtain the necessary statutory consents before the option can be exercised and construction begin.	The financial metrics, technical management experience and project development experience of the developer is assessed at the PQQ stage. At the ITT stage, the projects definition and location, the financial & technical competence of the applicant, and an commercial assessment of the bid will be conducted.	Baseline study of the proposed sites physical and environmental characteristics, to inform the scope and design of the OWF.	Up to 2 years	1 year	When an Agreement for Lease is granted, applicant has 10 years to exercise the option.
Development Consent Order (DCO)	Secretary of State for Business, Enterprise and Industrial Strategy (BEIS)	Planning Act 2008 (as amended)	Development of Nationally Significant Infrastructure Projects within 12nm of the British coast or in particular	<p>1. Pre-application (No fixed duration of time) - Public consultation on proposals to allow public to raise concerns.</p> <p>2. Acceptance (Up to 28 days) – PINS decides whether application meets required examination standards.</p>	Under the DCO process a deemed Marine Licence from the MMO can be obtained for licensable activities below MHWS. This means the applicant does not need to apply for this licence separately. Supporting information required for a DCO	See appendix B.	Up to 3 years.	Up to 2 years.	Very long, transparent process, information gathered and disseminated must be of high quality to reduce chances of conflicts with interested parties.

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
	Planning Inspectorate (PINS)		areas out to the UK EEZ, such as the Renewable Energy Zone.	<p>3. Pre-examination (No statutory timescale but typically 3-6 months) – ExA appointed, application is publicised, and a preliminary meeting is held to allow interested parties a platform to raise concerns and queries.</p> <p>4. Examination (Up to 6 months) - PINS carries out the examination of the application.</p> <p>5. Recommendation and Decision (Up to 6 months) - Once the examination is complete, PINS prepares a report on the application for the Secretary of State. The Secretary of State decides whether to grant or refuse the DCO.</p> <p>6. Post Decision (6 weeks) - After a decision is made, a six-week period begins in which the decision may be challenged in the High Court under judicial review.</p>	<p>application, are detailed in Schedule 2 of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009.</p> <p>These documents are listed in Appendix B.</p> <p>Key information likely to include (but not limited to);</p> <p>Baseline Surveys and collection of data, ES, HRA, marine mammal risk assessment, WFD assessment.</p> <p>Archaeological assessments, Written Scheme of Investigation and Protocol for Archaeological Discoveries.</p>				
Marine Licence	MMO	Marine and Coastal Access Act 2009	A marine licence is likely to be required if the components of the NSWPH	<p>1. Allocation – Case officer and manager allocated to application.</p> <p>2. Technical Assessment – Case officer reviews supporting technical documents</p>	Differs by scale of development but may include (but not limited to) an EIA, HRA, Marine Planning Assessment, WFD Assessment.	Baseline study of the proposed sites physical, environmental and human characteristics.	Depends on scale of development and background information required.	Within 13 weeks of submission.	

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
			<p>project in UK waters are interconnectors only and does not include OWFs.</p> <p>A marine licence for interconnect or cables is required for licensable activities as listed in Section 66 of the MCAA.. This includes laying of cables within 12nm and deposit of rock or removal of dredged material within and beyond 12nm.</p>	<p>3. Consultation – Consultation with relevant statutory bodies and members of the public.</p> <p>4. Review – Consultations responses reviewed, draft licence issued.</p> <p>5. Decision recommendation and approval – QC of decision documents, case manager provides applicant with licence approval.</p> <p>6. Application completion – Marine licence and other documents published on public register.</p> <p>7. Monitoring – Ongoing monitoring of the impacts of the licensed activity.</p>					
Notices of Safety Zones	BEIS	Energy Act 2004	Declaring a safety zone around an NSIP during the	A safety zone statement must be included in the developers DCO application indicating whether they intend to apply for a safety zone (DECC,	Basic information on the installation and the location of infrastructure above the surface and sub-sea.	Up to date vessel traffic survey.	1 – 2 days	No specified timescale	Safety zone applications must be advertised in a number of newspapers and

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
			installation, operation and decommissioning stages of its' lifecycle, preventing access to non-project vessels.	2011a). The application itself should be submitted to BEIS and the Maritime and Coastguard Agency (MCA) post-DCO approval, and should be prepared in accordance with the previous safety zone statement. BEIS will then assess the application in conjunction with any consultees, and provide a judgement to the developer.	An appropriate navigational risk assessment.				journals as part of the application process, this brings the potential for objection of other parties, delaying the approval process.
Decommissioning Scheme	BEIS	Energy Act 2004	The decommissioning of any offshore wind and marine energy installation, including related electric lines.	Initial application process consists of 5 stages. These stages are: <ol style="list-style-type: none"> 1. Preliminary discussion between BEIS and developer 2. Issue of section 105 by BEIS requiring a decomm. programme to be submitted. 3. Detailed discussion, submission and consideration of draft programme. 4. Consultation with interested parties. 5. Formal submission of programme and acceptance under section 106. 6. Further refinement and implementation of the plan will take place during the project's lifespan. 	Background information on the project, site, prevailing weather and physical conditions, nearby fishing or shipping activity, nearby protected areas, other adjacent facilities. Description of items to be decommissioned. Description of the proposed decommissioning measures, including (but not limited to) proposed method of removal, details of any items left in-situ, costs, financial security and site restoration.	An initial EIA determining effects of proposed decomm. programme, with a more detailed assessment taking place towards the end of the development's lifespan.	No prescribed timescale	6 months	

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
European Protected Species Licence	Natural England	Offshore Marine Habitats and Species Regulations 2017	Any activity which may cause adverse impacts to any listed species that would otherwise be illegal. This may include activities such as pile driving and UXO detonation	An application form available at https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence must be submitted to Natural England (Natural England, 2015a). A licence is required only if it is likely the proposed activity will affect EPS.	The licence application must pass 3 legal tests: The activity must have a purpose i.e. is in the public interest; There must be no satisfactory alternative available; and The activity must not have an adverse effect on the long-term conservation status if the species. A method statement to show how any impacts on the protected species will be reduced. A reasoned statement to show the activity fits the criteria and that no satisfactory alternative exists. References to show that the ecological consultant has sufficient expertise to apply for a mitigation licence.	Potentially affected species should be identified in the scoping stage of the project.	Timescale will change depending on the EPS in question.	Decisions on a licence will take up to 30 days.	Should a Further Information Request from Natural England be received, failure to provide the necessary information within 6 months will result in the application being cancelled, with a new application then being required (Natural England, 2013).
Energy Generation Licence	Office of Gas and Electricity Markets (OFGEM)	Electricity Act 1989	Enables the applicant to generate electricity for the purpose of giving a supply to any premises or	An application form, with sufficient payment, is submitted to OFGEM, who then review the documentation to ensure sufficient detail is present, and come to a decision based on this. You may be asked for	The application form and any other information the applicant deems to be relevant outside the required information.	N/A	No specified timescale	Up to 45 days.	

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
			enabling a supply to be so given.	further information if required (OFGEM, 2013).					
F10 – Notification of Construction Project	Health and Safety Executive	Construction (Design and Management) Regulations 2015	Construction projects that are lasting longer than 500 person days or 30 working days with more than 20 workers,	A notification from must be submitted to the HSE in advance of construction activities This form must be signed off by, or on behalf of, the client (HASpod, 2019).	The form includes, but is not limited to, details such as project address, planned construction activities and planned number of contractors on site.	N/A	1 – 2 days	N/A, no decision required on the document from the HSE.	
Site of Special Scientific Interest (SSSI) Assent	Natural England	Wildlife and Countryside Act 1981	Activities planned to take place in an SSSI.	An application form detailing the operations proposed to take place and their timescales should be sent to Natural England (Natural England, 2015b).	Additional information such as a map of the site, vehicle routes and materials/chemicals proposed to be used may be requested by Natural England.	N/A	1 -2 days	10 working days	
Crossing of third-party cable/ pipeline infrastructure	N/A	N/A		Should it be determined that the proposed export cable/interconnector route will cross other third-party infrastructure, the relevant third parties should be consulted as soon as reasonably possible to ensure no conflict arises and a suitable measure for both sides may be reached.					

Consent / permit / licence / notification	Statutory Body / Licensing Authority	Legislation under which consent is required	Activities for which consent is required	Application process	Supporting information required for application	Baseline studies / surveys required	Estimated timescales to compile information required for application	Timescale required for consent determination (regulator decision)	Known legal constraints / obstacles / or specific procedural risks and requirements
Harbour Works Consent	Individual harbour bodies	The Harbour Works (Environmental Impact Assessment) Regulations 1999	Any works taking place in the vicinity of a harbours defined boundary	Applications should be made to the individual harbour authority in which the works are proposed to take place.	Differs between harbours, but usually requires applicant details, nature, location of proposed works, necessity for a Marine Licence or other consents for the works, impacts on WFD status, protected sites/species, sediment contamination.	An assessment of the baseline harbour conditions would likely be required.	Will differ by activity type.	Will differ by harbour authority.	In some cases, a marine licence may also be required to conduct any harbour works.
Environmental permit (Formerly flood defence consent)	Environment Agency	The Environmental Permitting (England and Wales) Regulations 2016	Any works taking place on or near a main river, on or near a flood defence structure, in a flood plain or near a sea defence	A three-part application form must be completed and sent to the Environment Agency along with the appropriate payment.	Part B11: Standard rules permit application (How your works fall under the standard rules as set out by the Environment Agency (EA)) Part A: About you (Details of your company/organisation including address and contact details) Part F3: Charging for flood risk activities and declarations (Determines the amount to be paid to the EA for any flood risk activities)	N/A	1 – 2 days	2 – 4 months depending on the scale of works and need for public consultation.	Should the works not fall within the standard rules set out by the Environment Agency then you must apply for a bespoke permit to cover that activity.

4. Key Planning and Permitting Issues

This section provides a summary of the key planning and permitting issues. Key findings from consultation undertaken to fill gaps in knowledge or ‘grey areas’ identified during the desk based study have been summarised in this section, along with key consenting issues associated with OWF developments taking into consideration the location and configuration of the project.

4.1 Consultation

As part of the planning and permitting study consultation was undertaken with key stakeholders and regulators. Consultation correspondence and telephone calls have been undertaken with:

- The Crown Estate (TCE),
- Planning Inspectorate (PINS).
- Marine Management Organisation (MMO),
- Offshore Petroleum Regulator for Environment and Decommissioning (OPRED),

The purpose of the informal consultation was to fill gaps in knowledge and grey areas identified during the desk-based study and to determine any obstacles, procedural risks or requirements relevant for the NSWPH planning and permitting applications and its associated infrastructure.

Consultation with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) confirmed there was no requirement to undertake further consultation with them as the project will not be within OPREDs remit. If the NSWPH consortium seeks to utilise existing UK oil and gas infrastructure (e.g. re-use of pipelines for hydrogen transport) then further consultation with the appropriate department of BEIS is recommended.

4.1.1 The Crown Estate (TCE) Consultation

Consultation with TCE provided some initial input, and this is summarised below.

TCE’s main comments on obstacles and procedural risks to overcome:

- The current legal regime does not suit multi-purpose infrastructure projects at present. This could lead to complex procedures for the NSWPH project.
- The different relevant regulatory regimes do not sit well in terms of the processes required to be followed.
- TCE and other Government departments are involved in a number of studies that are looking at the principles of energy hubs. Part of this will include reviewing regulatory constraint limitations, possible policy enablers and potential removal of regulatory barriers. Two key projects of interest are:
 - The OGA UK Continental Shelf Integration project (discussed in Section 2.3) – as this project progresses there is potential opportunity for NSWPH involvement through stakeholder engagement with the offshore energy sector.
 - WindConnector Project – TenneT, the operator of the Dutch offshore grid, and The Crown Estate, the GB real estate business and seabed manager, have joined forces to explore possible opportunities for further cost reduction in offshore wind through alternative grid connection infrastructure solutions. This led to the jointly commissioned study assessing the potential benefits of combining cross-border electricity interconnection with electrical infrastructure for offshore wind farms; a so-called ‘WindConnector’. Current regulatory frameworks present

restrictions on multi-use of offshore transmission assets. In order to realise the maximum potential benefits, amendments to the regulatory frameworks would be needed.

- OWF developers have different perspectives on the benefits of radial versus hub and spoke design. Buy-in from developers on the hub and spoke concept will be important in the advancement of the approach.

TCE comments on obtaining a seabed lease for the whole project (OWFs and interconnectors):

- TCE do not see any problems in principle of obtaining one lease, but it does not fit well with the way the individual components are leased at present. This is because TCE's powers work differently in different sectors and jurisdictions, currently seabed leasing is as follows:
 - Interconnector cables out to 12nm limit
 - OWF export cables out to limit of EEZ
 - Pipelines out to 12nm limit (oil and gas – hydrogen regulatory regime not known).

4.1.2 The Planning Inspectorate (PINS) Consultation

The key points made by PINS in terms of regulatory and legal barriers are as follows:

- The regulatory environment for the NSWPH project isn't established and this could cause issues in preparing a robust application. Understanding how the different regulatory permitting consents work together is a stumbling block. Regulators themselves do not at present know how to address these.
- It will be hard to define how the project will be consented – whether or not it is defined as a NSIP and falls under the DCO process.
- Due to the multi-use scope of the project and the fact that it is not easily defined, means that this could be a hinderance in preparing an application and in the examination stage of the DCO process. PINS referred to a carbon capture and storage pipeline project as an example of a similar type of project which required new lines of communications to be set up between different bodies e.g. between PINS and the Health and Safety Executive. PINS commented there wasn't much regulation in place to support the project and concluded that it was complex in terms of application and examination. This project has not been built.
- The NSWPH is a project which facilitates other projects. There are issues with this, as we do not know the size of the project and can't easily define the size of the project and give confidence in the design for the assessment. The DCO process was set up to consent clearly defined critical infrastructure projects of known design. For this project we don't know how many wind farms and interconnectors require consent so there is uncertainty on the design.
- The DCO is a statutory instrument that cannot be changed easily and a material change could result in another examination of the change with implications for project timescales. However, it was recognised that some OWF developers want a lot of flexibility in terms of the foundation types used and can achieve this through use of the Rochdale Envelope. This has the disadvantage of requiring much larger amounts of assessment - if they apply for an envelope for the worst case type of foundation and have multiple turbines then the area of assessment can be vast. PINS did however agree the Rochdale Envelope could be applied to the NSWPH which would accommodate uncertainty of project design but noted the Rochdale Envelope Approach came from case law relevant to the Town and Country Planning Act and has not been tested in court for national infrastructure projects.
- Issue around size and needs case – as part of the consenting process the applicant needs to make the case for the project need and its size which may be difficult if the number and size of the

NSWPH components are not fixed from the outset. For example, if the project applies for consent for a pipeline to allow for future connection and facilitate more future development but it is not known how much hydrogen is required to be transported or how many OWFs will tie into the interconnector then this may cause issues.

- A DCO is constrained and will be difficult to adapt in the future. If the OWFs and interconnectors are consented together under one DCO then multiple parties will be benefiting from the development order and this is problematic.
- If an OWF developer is different from the developer of the hub, this could cause issues for transferring the benefits of the Order. If OWF developers apply for DCO for the wind farm and export cable, then the developer can pass the export cables order over at a later stage.
- Vast number of government departments and bodies which would be involved cause issues for progressing the project. Each would have a different role but difficult to determine responsibilities. The required stakeholder engagement in the Planning Act isn't very clear offshore.
- How to establish and undertake a robust assessment on environment based on technology for hydrogen generation may be complex, as this is untested.
- The DCO process under the planning act is designed to deliver neatly wrapped up projects. The process for the NSWPH may not be straightforward.
- The Planning Act 2008 is designed to deliver critical infrastructure named in the NPS. If not named in the NPS then the process is weakened.

4.1.3 The MMO Consultation

The key points made by the MMO in terms of regulatory and legal barriers and more general how the NSWPH project would fit with MMO and PINS roles are as follows:

- A major stumbling block would be trying to get commitment and cooperation between developers as it is a very competitive market. There is a lot of privacy between developers and necessarily project specific information is kept from other parties. Nevertheless, the MMO could see the concept could be a major advantage for developers being able to plug in to the hub and spoke system.
- Future proofing capacity of interconnectors to accommodate the huge expansion in wind capacity would be another hurdle.
- The MMO thought it would be a DCO project based on scale and wouldn't fit well with marine licensing. As such PINS would be the National Competent Authority (NCA) not the MMO. PINS would therefore be responsible for coordinating different nations and the MMO would feed into it.
- The MMO role is to provide steer on conditions applied post consent and make consider views of stakeholders, response from consultation under s42 of the Planning Act 2008.
- The MMO can accommodate marine licensing and then they would be the NCA and get the role of TEN-E back but then you might have two NCAs if PINS are NCA for the OWFs which would make the project consenting more complex.
- The MMO didn't see the NSWPH crossing multiple jurisdictions as being a particular problem because the components in each jurisdiction would be consented in their constituent countries just as for a PCI project.
- It is not clear if the exemption under Section 81 of the MCAA from marine licensing beyond the 12nm limit would apply as for international interconnectors if the interconnector is associated with

the NSWPH and OWFs. This could be clarified through seeking further internal advice within the MMO.

- The implications for it not being exempt is that the EIA would be required for the whole route and any maintenance works would require a marine licence.
- Key issues in terms of environmental constraints are impacts on marine mammals and birds, underwater noise on marine mammals from piling and the Southern North Sea SAC which is designated for harbour porpoise.
- Other issues are often coastal at the landfall. Some MCZ features removed and result in a permanent loss of habitat. The MMO treat MCZs in a very similar manner to Natura 2000 sites – in some ways MCZs have stronger conservation objectives as sustainable development underpinning them.
- The MMO commented that OWF developers are commercial entities and funding for strategic research into new areas such as co-location is a challenge. Any research undertaken by a developer will be focused on their development and EIA to obtain their consents.
- Aware of a few bodies looking at strategic projects but it is limited what projects come out of them but in terms of OWF and co-location this is likely to be a reflection of the young (~15 years) wind industry. Aggregates industry more advanced sector.
- OWF sector very competitive.

4.2 Key Issues

This section summarises the key issues highlighted throughout the report either within the regulatory framework or issues highlighted by the consultees.

4.2.1 Legal and regulatory barriers

- TCE and PINs both highlighted concerns relating to a lack of coherent regulatory framework for a multi-use cross jurisdictional project such as the NSWPH.
- The MMO were more positive that it could be consented by each jurisdiction obtaining consent for the elements of their project in their country, as per a PCI project.

4.2.2 The Sweetman ruling and Appropriate Assessment

- The HRA screening for likely significant effect (LSE) has to be compliant with the recent Court of Justice of the European Union (CJEU) caselaw ‘People Over Wind & Sweetman (Case C-323/17)’. The CJEU’s ruling in People Over Wind - that it is not appropriate at the screening stage of HRA to take account of measures to avoid or reduce harmful effects on a European site – will have to be considered and applied. Therefore, any initial screening for LSE will have to be based solely upon the presence / absence of a spatial interaction between pressure envelopes / footprints (from activity / sub-activities associated with installation of cables and any sub-station infrastructure) and the boundary of any designated European site.
- The application of the People Over Wind & Sweetman (Case C 323/17) ruling generally results in more sites screened into Appropriate Assessment than previously. This results in further consideration and presentation of assessment and evidence base within the report to inform the appropriate assessment than may have previously been required. Therefore, the process has become more complex and resource intensive than it was prior to the determination of the European Union Court of Justice.
- The MMO commented that as a result of the ruling, there has been a move to be more mindful of the IROPI route with consideration of alternatives.

4.2.3 Buy in from OWF developers

- In order for the NSWPH concept to be realised it will require buy-in from OWF developers. Consultees commented on the highly competitive nature of the offshore wind sector which may be a stumbling block as it requires commitment and cooperation between developers who are reluctant to share project information.
- OWF developers may not see benefit of hub and spoke over radial approach.

4.2.4 Environmental sensitivities within potential OWF lease areas, and interconnector landfalls

- The location of future OWF which could connect into the NSWPH in the UK will be dictated by the round 4 leasing areas and potential future leasing areas beyond round 4. There are many environmental and social-economic constraints.
- Key environmental sensitivities with regard to offshore wind are birds and marine mammals, particularly the harbour porpoise due to its' protected status under the extensive Southern North Sea SAC.

4.2.5 Scope for opportunities for environmental integration and sustainable development

- For integration projects to work, there needs be a clear advantage to the OWF developer – currently this advantage isn't clear.
- Regulatory framework requires work to accommodate consent of different sectors / activities in the same location.

5. Project Proposed Timelines

This section provides an outline the consenting processes for each of the project components against the project proposed timelines for planning and permitting (between 2022 and 2028).

6. Recommendations and Next Steps

This section provides a summary of the recommendations and potential next steps which have been highlighted within the main body of the report.

6.1 Recommendations

Given the limited brief and timescales for this study, limited consultation was undertaken with the key consenting / licensing bodies. Further consultation at a later date, when these bodies may be further along the line of the learning curve with respect to projects such as the NSWPH may be beneficial. The recommendations bulleted below highlight areas where gaps through further consultation could be closed and provides a recommendation to monitor the status of the offshore wind round 4 leasing approach.

MMO further consultation

- Intertek's contact at the MMO was uncertain whether the exemption from marine licensing for interconnector cables beyond the 12nm limit would apply as it would for international interconnectors, if the interconnector is associated with the NSWPH and OWFs. We recommend this is closed out by further consultation.
- Further consultation with the MMO to see if the MMO Strategic Team and / or Evidence Team are involved in plans/pilot studies in the UK to explore environmental integration with sustainable development may be advisable

TCE further consultation / monitoring

- Intertek is still awaiting a response from our initial consultation with TCE who recommended we speak to other departments for further information on the work TCE are involved in and to better understand how TCE consenting would work for such a project.
- Monitor progress of the new Offshore Wind Round 4 Leasing approach in the UK. TCE does not anticipate launching Round 4 until after the summer 2019 now but will provide an update on progress and timelines prior to the end of the summer.

BEIS consultation

- OPRED recommended they would only need to be involved in any consultation with regards to the NSWPH project should existing oil and gas infrastructure be planned for use in the project (e.g. hydrogen pipelines)
- BEIS should be consulted to better understand how the project would be defined in terms of NSIP and to better understand how hydrogen pipelines might be consented. Sue Harrison of BEIS has been recommended by TCE as a good point of contact.
- Consultation with the OGA could be undertaken to explore opportunities for NSWPH involvement with the OGA UK Continental Shelf Integration project through their stakeholder engagement with the offshore energy sector.

6.2 Next Steps

Intertek can undertake further consultation and monitoring as per the recommendations listed above and summarise the findings of this further work either in an addendum to this report or as a standalone briefing note.

REFERENCES

- 1 4C Offshore (2016) *Suction Bucket or Caisson Foundations*. Available at: <https://www.4coffshore.com/windfarms/suction-bucket-or-caisson-foundations-aid11.html> (Accessed: 10 May 2019).
- 2 ABPmer (2015) A Spatial Assessment of the Potential for Aquaculture in Welsh Waters. Report R.2384 Available at: <https://gweddill.gov.wales/docs/drah/publications/150702-a-spatial-assessment-of-the-potential-for-aquaculture-in-welsh-waters-en.pdf> (Accessed: 23 May 2019).
- 3 ACCOBAMS (2013) *METHODOLOGICAL GUIDE: GUIDANCE ON UNDERWATER NOISE MITIGATION MEASURES*. Available at: <https://www.cbd.int/doc/meetings/mar/mcbem-2014-01/other/mcbem-2014-01-submission-accobams-01-en.pdf> (Accessed: 10 May 2019).
- 4 BEIS (2018) *SUPPLY CHAIN PLAN GUIDANCE For projects of 300MW or more applying for a Contract for Difference*. Available at: www.nationalarchives.gov.uk/doc/open-government-licence/ (Accessed: 18 April 2019).
- 5 BEIS (2019a) *DECOMMISSIONING OF OFFSHORE RENEWABLE ENERGY INSTALLATIONS UNDER THE ENERGY ACT 2004*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/788051/decommissioning-offshore-renewable-energy-installations-guidance.pdf (Accessed: 1 May 2019).
- 6 BEIS (2019b) *Industrial Strategy Offshore Wind Sector Deal*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786278/BEIS_Offshore_Wind_Single_Pages_web_optimised.pdf (Accessed: 3 April 2019).
- 7 Christie, N., Smyth, K., Barnes, RA., and Elliott, M. (2014). Co-location of activities and designations: a means of solving or creating problems in marine spatial planning? *Marine Policy* 43: 254-261 <http://dx.doi.org/10.1016/j.marpol.2013.06.002>. Available at: <https://core.ac.uk/download/pdf/151156666.pdf> (accessed 22/05/2019).
- 8 Corbin, J. S., Holmyard, J. and Lindell, S. (2017) 'Regulation and Permitting of Standalone and Co-located Open Ocean Aquaculture Facilities'. Available at: https://link.springer.com/chapter/10.1007/978-3-319-51159-7_9. (Accessed 23/05/2019).
- 9 DECC (2011a) *Applying for safety zones around offshore renewable energy installations*. Available at: <https://www.og.decc.gov.uk/EIP/pages/offshore.htm> (Accessed: 1 May 2019).
- 10 DECC (2011b) *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf (Accessed: 9 April 2019).
- 11 DECC (2011c) *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed: 9 April 2019).
- 12 DECC (2011d) *Planning for new energy infrastructure National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf (Accessed: 9 April 2019).
- 13 DECC (2011e) *UK Renewable Energy Roadmap*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48128/2167-uk-renewable-energy-roadmap.pdf (Accessed: 9 May 2019).
- 14 DECC (2012) *UK Renewable Energy Roadmap*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/80246/11-02-

13_UK_Renewable_Energy_Roadmap_Update_FINAL_DRAFT.pdf (Accessed: 9 May 2019).

15 DECC (2013) *UK Renewable Energy Roadmap Update 2013*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/255182/UK_Renewable_Energy_Roadmap_-_5_November_-_FINAL_DOCUMENT_FOR_PUBLICATION_.pdf (Accessed: 9 May 2019).

16 DECC (2014) *THE TEN-E REGULATION EU347/2013 Manual of Procedures: The permitting process for Projects of Common Interest in the UK*. Available at: www.nationalarchives.gov.uk/doc/open-government-licence/ (Accessed: 9 April 2019).

17 DECC (2016) *UK Offshore Energy Strategic Environmental Assessment*. Available at: www.gov.uk/decc. (Accessed: 9 May 2019).

18 Department for Communities and Local Government (2013) *Planning Act 2008 Application Form Guidance*. Available at: www.gov.uk/dclg (Accessed: 9 April 2019).

19 ENTSO-E (2018) *Project 335 - North Sea Wind Power Hub, the European Network for Transmission System Operators Electricity*. Available at: <https://tyndp.entsoe.eu/tyndp2018/projects/projects/335> (Accessed: 17 April 2019).

20 Environment Agency (2017) *Water Framework Directive assessment: estuarine and coastal waters*. Available at: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters#submit-your-wfd-assessment> (Accessed: 2 May 2019).

21 Esteban, M., López-Gutiérrez, J.-S. and Negro, V. (2019) 'Gravity-Based Foundations in the Offshore Wind Sector', *Journal of Marine Science and Engineering*, 7(3), p. 64. doi: 10.3390/jmse7030064.

22 EU (2009a) *DIRECTIVE 2009/73/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC*. Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136:en:PDF> (Accessed: 10 April 2019).

23 EU (2009b) *REGULATION (EC) No 713/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators*. Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0001:0014:EN:PDF> (Accessed: 10 April 2019).

24 European Commission (2017) *Environmental Impact Assessment - EIA*. Available at: <http://ec.europa.eu/environment/eia/eia-legalcontext.htm> (Accessed: 3 April 2019).

25 European Commission (2018) *Consultation on the list of candidate Projects of Common Interest in electricity infrastructure*.

26 Fariñas-Franco, J. M. *et al.* (2014) 'Repeated mapping of reefs constructed by *Sabellaria spinulosa* Leuckart 1849 at an offshore wind farm site', *Continental Shelf Research*. Pergamon, 83, pp. 3–13. doi: 10.1016/J.CSR.2014.02.003.

27 HASpod (2019) *What Is The HSE's F10 Notification Form?* Available at: <https://www.haspod.com/blog/cdm/what-is-hse-f10-notification-form> (Accessed: 3 May 2019).

28 HM Government (1989) *Electricity Act 1989*. Statute Law Database. Available at: <https://www.legislation.gov.uk/ukpga/1989/29/section/36> (Accessed: 9 April 2019).

29 HM Government (2004) 'Energy Act 2004'. Statute Law Database. Available at: <http://www.legislation.gov.uk/ukpga/2004/20/part/2/chapter/2> (Accessed: 16 April 2019).

30 HM Government (2009) *The UK Renewable Energy Strategy*. The Stationery Office. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228866/7686.pdf (Accessed: 9 May 2019).

31 HM Government (2011) *UK Marine Policy Statement*. The Stationery Office Limited. Available at: <http://www.official-documents.gov.uk/> (Accessed: 3 April 2019).

32 HM Government (2013) *Royal Assent for Growth and Infrastructure Act*. Available at: <https://www.gov.uk/government/news/royal-assent-for-growth-and-infrastructure-act> (Accessed: 3 April 2019).

- 33** HM Government (2017) *The Conservation of Offshore Marine Habitats and Species Regulations 2017*. Available at: http://www.legislation.gov.uk/uksi/2017/1013/pdfs/uksi_20171013_en.pdf (Accessed: 18 April 2019).
- 34** Jackson, A. and Hiscock, K. (2008) *Sabellaria spinulosa* Ross worm, *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*. Available at: <https://www.marlin.ac.uk/species/detail/1133> (Accessed: 14 May 2019).
- 35** JNCC (2004) *The Wash*. Available at: <http://jncc.defra.gov.uk/default.aspx?page=2003> (Accessed: 15 May 2019).
- 36** JNCC (2005) *The Wash and North Norfolk Coast SAC*. Available at: <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0017075> (Accessed: 15 May 2019).
- 37** JNCC (2016) *Marine Conservation Zones, JNCC*. Available at: <http://jncc.defra.gov.uk/page-4525> (Accessed: 3 April 2019).
- 38** JNCC (2017) *Annex I Sandbanks*. Available at: <http://jncc.defra.gov.uk/page-1452> (Accessed: 15 May 2019).
- 39** JNCC (2018a) *Dogger Bank SAC*. Available at: <http://jncc.defra.gov.uk/page-6508> (Accessed: 15 May 2019).
- 40** JNCC (2018b) *Haisborough, Hammond and Winterton SAC*. Available at: <http://jncc.defra.gov.uk/page-6534> (Accessed: 15 May 2019).
- 41** JNCC (2018c) *North Norfolk Sandbanks & Saturn Reef SAC*. Available at: <http://jncc.defra.gov.uk/page-6537> (Accessed: 15 May 2019).
- 42** JNCC (2019) *Southern North Sea SAC*. Available at: <http://jncc.defra.gov.uk/page-7243> (Accessed: 9 May 2019).
- 43** Koschinski, S. and Lüdemann, K. (2013) *Development of Noise Mitigation Measures in Offshore Wind Farm Construction 2013*. Available at: www.riffgat.de (Accessed: 10 May 2019).
- 44** LCCC (2019) *Frequently Asked Questions | Contracts For Difference (CFD)*. Available at: <https://www.cfdallocationround.uk/faqs> (Accessed: 16 April 2019).
- 45** Low Carbon Contracts Company (2018) *CFD Scheme | Low Carbon Contracts, LCCC*. Available at: <https://www.lowcarboncontracts.uk/cfd-scheme> (Accessed: 10 April 2019).
- 46** Ministry of Housing Communities & Local Government (2015) *Planning Act 2008: guidance on the pre-application process for major infrastructure projects*. Available at: <https://www.gov.uk/government/publications/guidance-on-the-pre-application-process-for-major-infrastructure-projects> (Accessed: 9 May 2019).
- 47** MMO (2016) *Perform a marine seismic or geophysical survey*. Available at: <https://www.gov.uk/guidance/perform-a-marine-seismic-or-geophysical-survey> (Accessed: 2 May 2019).
- 48** MMO (2018a) *Make a marine licence application*. Available at: <https://www.gov.uk/guidance/make-a-marine-licence-application> (Accessed: 22 May 2019).
- 49** MMO (2018b) *Marine licensing: nationally significant infrastructure projects*. Available at: <https://www.gov.uk/government/collections/marine-licensing-nationally-significant-infrastructure-projects> (Accessed: 1 May 2019).
- 50** MMO (2018c) *Marine Licensing exempted activities*. Available at: <https://www.gov.uk/government/publications/marine-licensing-exempted-activities/marine-licensing-exempted-activities#cat2> (Accessed: 2 May 2019).
- 51** MMO (2018d) *The marine licence application timeline*. Available at: <https://www.gov.uk/guidance/the-marine-licence-application-timeline> (Accessed: 29 April 2019).
- 52** Natural England (2013) 'European Protected Species : Mitigation Licensing – How to get a licence', pp. 1–68.
- 53** Natural England (2014) *NATURAL ENGLAND'S RELEVANT REPRESENTATIONS IN RESPECT OF DOGGER BANK (TEESSIDE A & B) OFFSHORE WIND FARM*. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2014/06/117353_Dogger-Bank_Teesside-AB_NE_Rel-Reps_140612.docx.pdf (Accessed: 3 April 2019).

- 54** Natural England (2015a) *European protected species: apply for a mitigation licence*. Available at: <https://www.gov.uk/government/publications/european-protected-species-apply-for-a-mitigation-licence> (Accessed: 22 April 2019).
- 55** Natural England (2015b) *Request permission for works or an activity on an SSSI*. Available at: <https://www.gov.uk/government/publications/request-permission-for-works-or-an-activity-on-an-sssi> (Accessed: 3 May 2019).
- 56** Natural England (2019) *North Norfolk Coast SAC*. Available at: <https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0019838&SiteName=theWashand&countyCode=&responsiblePerson=&SeaArea=&FCAArea=> (Accessed: 15 May 2019).
- 57** OFGEM (2013) *Guidance for gas and electricity licence applications*. Available at: http://www.legislation.gov.uk/uksi/2009/1340/pdfs/uksi_20091340_en.pdfhttp://www.ofgem.gov.uk/LICENSING/WORK/Documents1/App_Regs_2010_Consultation.pdf (Accessed: 30 April 2019).
- 58** OFGEM (2015) *The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015*. Available at: <https://www.ofgem.gov.uk/publications-and-updates/draft-electricity-competitive-tenders-offshore-> (Accessed: 16 April 2019).
- 59** OSPAR (2015a) *Ecosystem Approach | OSPAR Commission, OSPAR Commission*. Available at: <https://www.ospar.org/about/principles/ecosystem-approach> (Accessed: 2 April 2019).
- 60** OSPAR (2015b) *Principles | OSPAR Commission, OSPAR Commission*. Available at: <https://www.ospar.org/about/principles> (Accessed: 2 April 2019).
- 61** PINS (2017) *EIA: Process, Preliminary Environmental Information, and Environmental Statements*. Available at: <http://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/> (Accessed: 9 May 2019).
- 62** Russell, T. (2017) *CfD round three scheduled for 2019 - 4C Offshore, 4COffshore*. Available at: <https://www.4coffshore.com/news/cfd-round-three-scheduled-for-2019-nid6519.html> (Accessed: 10 April 2019).
- 63** Russell, T. (2018) *Ofgem make OFTO regime changes, 4C Offshore*. Available at: <https://www.4coffshore.com/news/ofgem-make-ofto-regime-changes-nid9890.html> (Accessed: 16 April 2019).
- 64** SIMCelt (2019) *Supporting Implementation of Maritime Spatial Planning in the Celtic Seas*. Available at: <http://www.simcelt.eu/maritime-spatial-planning/legislation/> (Accessed: 3 April 2019).
- 65** TCCC (2009) *Meeting Carbon Budgets-the need for a step change Progress report to Parliament Committee on Climate Change*. Available at: https://www.theccc.org.uk/archive/aws2/21667_CCC_Report_AW_WEB.pdf (Accessed: 9 May 2019).
- 66** TCCC (2011) *Meeting Carbon Budgets-3rd Progress Report to Parliament Committee on Climate Change*. Available at: www.artworkagency.com (Accessed: 9 May 2019).
- 67** TCCC (2016) *Meeting Carbon Budgets - 2016 Progress Report to Parliament*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/06/2016-CCC-Progress-Report.pdf> (Accessed: 9 May 2019).
- 68** The Committee on Climate Change (2011) *The Renewable Energy Review*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2011/05/Executive-summary.pdf> (Accessed: 9 April 2019).
- 69** The Committee on Climate Change (2017) *Carbon budgets: how we monitor emissions targets - Committee on Climate Change, Committee on Climate Change*. Available at: <https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/> (Accessed: 8 April 2019).
- 70** The Crown Estate (2018a) 'Offshore Wind Potential New Leasing Market Engagement Event', (July), p. 50 p. Available at: <https://www.thecrownestate.co.uk/media/2647/20180725-the-crown-estate-offshore-wind-potential-new-leasing-market-engagement-event.pdf>.
- 71** The Crown Estate (2018b) 'Seabed Survey Licence (SSL) Activities Information Table'. Available at:

<https://www.thecrownestate.co.uk/media/2657/activities-requiring-a-seabed-survey-licence.pdf>.

72 The Crown Estate (2018c) 'Seabed Survey Licences'. Available at: <https://www.thecrownestate.co.uk/en-gb/what-we-do/on-the-seabed/seabed-survey-licences/>.

73 The Crown Estate (2018d) 'The Crown Estate shares further detail on plans for Round 4, including proposed locations to be offered for new seabed rights'. Available at: <https://www.thecrownestate.co.uk/en-gb/media-and-insights/news/2018-the-crown-estate-shares-further-detail-on-plans-for-round-4-including-proposed-locations-to-be-offered-for-new-seabed-rights/>.

74 The Crown Estate (2018e) 'The Crown Estate shares its proposed tender design for new offshore wind leasing'. Available at: <https://www.thecrownestate.co.uk/en-gb/media-and-insights/news/2018-the-crown-estate-shares-its-proposed-tender-design-for-new-offshore-wind-leasing/>.

75 The Crown Estate (2018f) 'UK Offshore Wind Report'.

76 The Planning Inspectorate (2015) *Habitats Regulation Assessment*. Available at: <https://www.gov.uk/government/publications/guidelines-on-the-assessment-of-transboundary-impacts-of-> (Accessed: 30 April 2019).

77 The Planning Inspectorate (2017) *Legislation | National Infrastructure Planning, National Infrastructure Planning*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/legislation/> (Accessed: 18 April 2019).

78 UNFCCC (2015) *The Paris Agreement | UNFCCC, UNFCCC*. Available at: <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (Accessed: 2 April 2019).

79 United Nations Economic Commission for Europe (2017) *Introduction: ESPOO Convention, UNECE*. Available at: <https://www.unece.org/env/eia/eia.html> (Accessed: 2 April 2019).

APPENDIX A

Crown Estate Seabed Leasing Rounds

A.1 INTRODUCTION

Before the consenting process can begin, the developer must be granted a seabed lease from the Crown Estate, with leases being granted in periodic licensing rounds. Three rounds have currently been completed, with the first taking place in the year 2000, and a fourth round due to begin in Spring 2019. Before a round is launched, the Crown Estate undergoes an extensive survey and consultation process to determine the seabed regions that will be made available for developers to apply for, with Strategic Environmental Assessments being conducted around the country to determine the most suitable locations for new OWF developments. During the early planning phases of site selection, consideration to the Marine Policy Statement and relevant Marine Plans should be given and it is also recommended that as best practice developers consult the fishing industry and resources such as MaRS to help start identifying any overlap and/or potential conflict with fishing activity, as well as existing and future marine plans, is also given at this stage. For the upcoming round 4, the Crown Estate initially identified 18 potential seabed regions to put forward in a meeting with developers, statutory bodies and other stakeholders. Through this consultation and further data analysis the regions were categorised as follows: 5 proposed to be included; 4 under further consideration and 9 not taken forward. The 5 regions proposed for inclusion are the Dogger Bank, Southern North Sea, East Anglia, North Wales and the Irish Sea (The Crown Estate, 2018d). In relation to the NSWPH the relevant areas would be the Dogger Bank, East Anglia and Southern North Sea.

Before applying for a lease, a developer will assess the regions of seabed currently being offered against a range of constraints (DECC, 2011b). These include:

- **Wind Resource:** This aspect is critical to making a successful economic case for an OWF, with developers sometimes collecting wind speed data from potential sites to better inform their economic modelling.
- **Water Depth and Foundation Conditions:** A sites water depth and geological conditions will have a large impact on the size, type and layout of turbines, foundations and cabling respectively, so understanding what technology would/would not be feasible is important information to gather at an early stage.
- **Grid Connection:** Ensuring that suitable grid connection points are present nearby the proposed area of seabed is an important consideration for developers at this stage.
- **Other offshore infrastructure and activities:** Identifying potential conflicts within the proposed site and other users in the area and existing infrastructure early in the project's life will save potential difficulties further along into its' development.

Once a developer has examined the constraints and decided to move forward with a potential new development, they must pass a Pre-qualification stage (PQQ). This stage sets out financial and technical competence criteria that the developer must meet, such as specific financial thresholds and technical expertise requirements e.g. experience with project management and consenting. If a developer meets these criteria, then they will receive an Invitation to Tender (ITT). This is the main assessment stage where the developers bid is assessed against several criteria, including compliance with tender requirements, capacity limits and a project-specific technical and financial assessment. If these criteria are met, the developer will receive option rights to the proposed site, under an Agreement for Lease. (The Crown Estate, 2018e).

For a developer to exercise their option on the seabed area and begin construction activities, the proposed project must obtain the necessary statutory consents, e.g. DCO. Should the developer not obtain the appropriate consents within the timeframe set out in the Agreement for Lease, then the option will lapse. During this option period the developer is permitted to undertake survey works and

deploy anemometry equipment. However, the developer is not permitted to commence construction of its development until all statutory consents and a lease are granted.

The Crown Estate also carries out OWF extension application rounds for existing sites, with the last round closing on the 31st May 2018. In this round seven projects were granted the rights to an extension, with the Crown Estate currently undertaking a plan-level HRA to determine if any of the proposed extensions may have an impact on any relevant European nature conservation sites. Any extension approval is subject to acquiring the necessary consents, as well as potential constraints such as the presence of other existing infrastructure nearby (The Crown Estate, 2018f).

A.2 OFFSHORE TRANSMISSION OWNER (OFTO) AUCTIONS

When planning the transmission cabling for an OWF, a developer chooses between two options set out by the OFTO regime (OFGEM, 2015). These are:

- The Generator Build Option

Under this option, the developer will design and construct any required offshore transmission infrastructure themselves, after which they are passed on to the OFTO which then has the responsibility for the operation, maintenance and decommissioning of the infrastructure.

- The OFTO Build Option

Under this option, the developer will conduct high-level design and initial construction works for the offshore transmission infrastructure before transferring them onto the OFTO, which will then take responsibility for the construction and ongoing lifecycle of the transmission infrastructure.

Similar to the leasing round process carried out by the Crown Estate, OFTO applicants must pass a PQQ round before passing through to the final ITT stage. Once shortlisting for the ITT stage has been completed, the OFTO's will be appointed to each available project by OFGEM in a staggered approach. For the current round 6, five applicants have been shortlisted to bid on the transmission infrastructure for Beatrice, Hornsea Project One and East Anglia ONE.

A.3 CONTRACTS FOR DIFFERENCE (CFD) AUCTION ROUND APPLICATION PROCESS

Any developer applying for a CFD for an OWF with a generating capacity exceeding 300MW must provide the National Grid with a statement from the Secretary of State for BEIS approving the Supply Chain Plan (SCP) submitted for the development (LCCC, 2019). This process was incorporated into the second CFD round in 2017, with the aim of further developing low carbon electricity generation supply chains (BEIS, 2018). SCP's are assessed against three criteria, Competition, Innovation and Skills, and how the plan supports these criteria. Developers must also provide an overview of the project and procurement strategy so that the stage of the projects' development can be taken into consideration when assessing the SCP. Should the developer be awarded a CFD with an approved SCP, then they will also be required to submit a Post Build Report (PBR). This is usually requested upon first CFD payment made, with developers typically completing a PBR within three months of the projects commissioning. The PBR is requested to ensure that developers adhere to their SCP. The UK government has produced guidance for both round 2 and 3 of the CFD auctions to guide developers in what information must be included in their SCP and PBR (BEIS, 2018).

Developers applying for a CFD must confirm which applicable planning consent applies to their project, (which in regards to offshore wind would be the projects DCO), and provide the statement from the Secretary of State for BEIS approving the project. While there are technically no limits on the generating capacity levels that may be applied for, the government will set a capacity limit they will fund in each round, with the last round three being set at 6GW. Additionally, as of the latest CFD round any OWF development applying as a phased CFD unit (where construction will be completed in distinct phases such as Hornsea 1, 2, 3 and 4) is permitted to bid for up to 1500MW, with phase 1 required to account for at least 25% of the initial capacity estimate (LCCC, 2019).

APPENDIX B

Required information for a DCO Application

B.1 REQUIRED INFORMATION FOR A DCO APPLICATION

Information sourced from the Planning Act 2008 Application form guidance (Department for Communities and Local Government, 2013).

1. Applicant information
2. Agent information (if applicable)
3. Application fee payment
4. Confirming why the application falls to be determined under the Planning Act
5. Brief non-technical description of the development proposal
6. Location or route of the development proposal
7. Associated Development
8. (a) Consultation Report
(b) Copies of newspaper notices
9. Draft Development Consent Order and Explanatory Memorandum
10. Land plan
11. Works plan
12. Compulsory acquisition of land or an interest in land or right over land
13. (a) Environmental Impact Assessment
(b) Environmental Statement
(c) Screening and Scoping opinions
(d) Publicity required under regulation 11 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009
14. European sites – Habitats Regulations
15. Plans with accompanying information, relating to sites or features of nature conservation, habitats of protected species, etc, and to sites or features of the historic environment
16. Flood risk assessment
17. Matters set out in section 79(1) of the Environmental Protection Act 1990
18. Crown land and Plan identifying new or altered means of access, etc
19. Additional information for specific types of infrastructure
20. Other plans, drawings, etc to describe the development proposal, and any other documents, reports or information to support the application
21. Other consents / licences required under other legislation