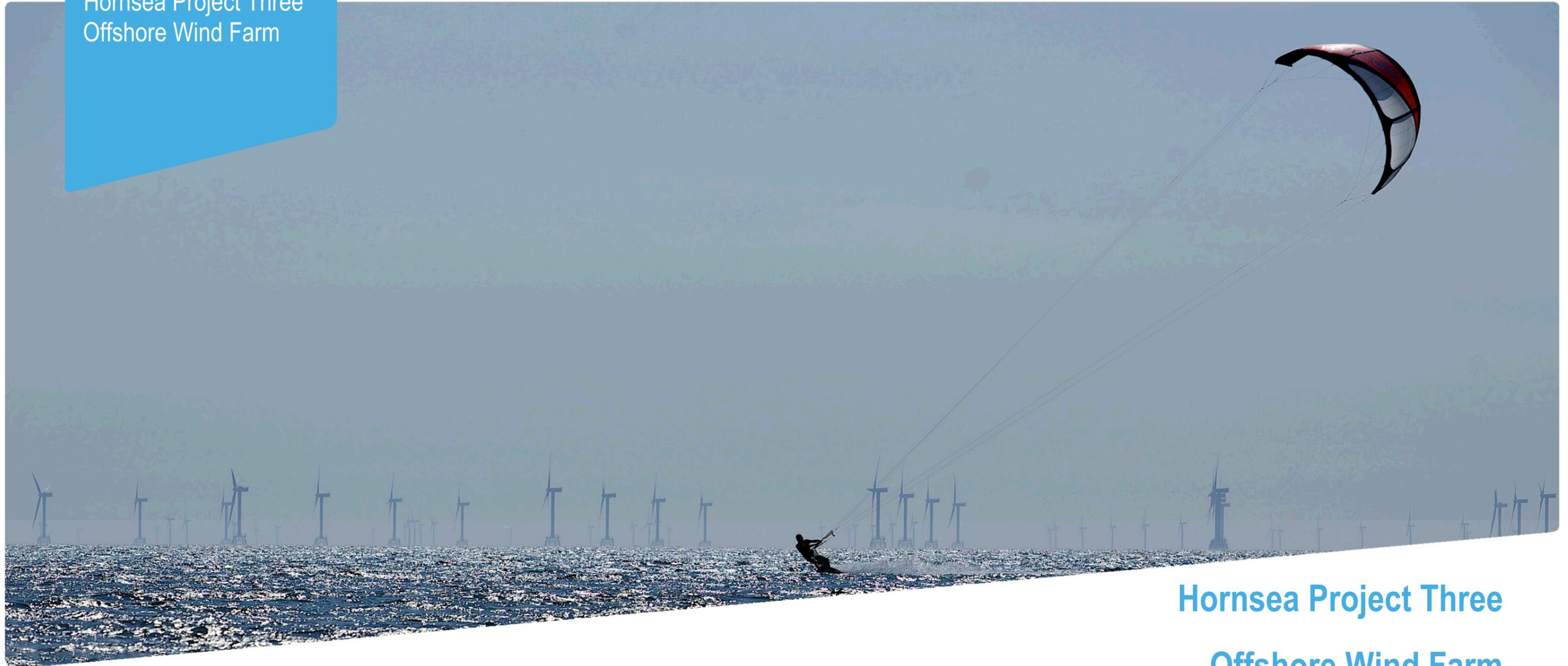


Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three Offshore Wind Farm

Consultation Report
Annex 1 - Evidence Plan
PINS Document Reference: A5.5.1
Planning Act 2008, s37 (7)

Date: May 2018

Hornsea 3
Offshore Wind Farm

Orsted

Consultation Report

Annex 1 - Evidence Plan

Report Number: A5.5.1

Version: Final

Date: May 2018

This report is also downloadable from the Hornsea Project Three offshore wind farm website at:

www.hornseaproject3.co.uk

Ørsted.

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Front cover picture: Kite surfer near a UK offshore wind farm © Orsted Hornsea Three (UK) Ltd., 2018

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Glossary

Term	Definition
Former Hornsea Zone	The Hornsea Zone was one of nine offshore wind generation zones around the UK coast identified by The Crown Estate (TCE) during its third round of offshore wind licensing. In March 2016, the Hornsea Zone Development Agreement was terminated and project specific agreements, Agreement for Leases (Afls), were agreed with The Crown Estate for Hornsea Project One, Hornsea Project Two, Hornsea Project Three and Hornsea Project Four. The Hornsea Zone has therefore been dissolved and is referred to throughout the Hornsea Project Three Scoping Report as the former Hornsea Zone.
Hornsea Project One	The first offshore wind farm project within the former Hornsea Zone. It has a maximum capacity of 1.2 gigawatts (GW) or 1,200 MW and includes all necessary offshore and onshore infrastructure required to connect to the existing National Grid substation located at North Killingholme, North Lincolnshire. Referred to as Hornsea Project One throughout the Evidence Plan.
Hornsea Project Three offshore wind farm	The third offshore wind farm project within the former Hornsea Zone. It has a capacity of 2.4 GW (2,400 MW) and includes offshore and onshore infrastructure to connect to the existing National Grid substation located at Norwich Main, Norfolk. Referred to as Hornsea Three throughout the Evidence Plan.
Hornsea Project Two	The second offshore wind farm project within the former Hornsea Zone. It has a maximum capacity of 1.8 GW (1,800 MW) and includes offshore and onshore infrastructure to connect to the existing National Grid substation located at North Killingholme, North Lincolnshire. Referred to as Hornsea Project Two throughout the Evidence Plan.
Statutory Nature Conservation Bodies	Comprised of JNCC, Natural Resources Wales, Department of Agriculture, Environment and Rural Affairs/Northern Ireland Environment Agency, Natural England and Scottish Natural Heritage these agencies provide advice in relation to nature conservation to government

Acronyms

Unit	Description
EWG	Expert Working Group
DCO	Development Consent Order
DECC	Department for Energy and Climate Change
EIA	Environmental Impact Assessment
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
IPC	Infrastructure Planning Commission
JNCC	Joint Nature Conservation Committee
MMO	Marine Management Organisation
PINS	Planning Inspectorate
pSPA	Potential Special Protection Area
EWG	Expert Working Group
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds

Units

Unit	Description
km	Kilometre (distance)
m	Metre (length)
kJ	Kilojoules (energy)
MW	Megawatt (power)

1. Introduction

1.1 Aims of the Evidence Plan

- 1.1.1.1 The Evidence Plan process was initially developed by the Major Infrastructure Environment Unit (MIEU) of the Department for Environment Food and Rural Affairs (Defra) to provide a formal mechanism to agree, between applicants and statutory bodies, what information and evidence an applicant should submit in support of an application for a Nationally Significant infrastructure Project (NSIP), with a specific focus on Habitat Regulations Assessment (HRA) matters.
- 1.1.1.2 The option to request and agree an Evidence Plan was made available in September 2012 for all applicants for proposed NSIPs entering the pre-application stage. It is a voluntary process and an Evidence Plan is a non-legally binding agreement between the applicant and relevant Statutory Nature Conservation Bodies (SNCBs).
- 1.1.1.3 The Evidence Plan is a mechanism to agree upfront what information the applicant needs to supply to the Planning Inspectorate (PINS) as part of a Development Consent Order (DCO) application. Whilst the process was initially aimed at ensuring compliance with the Habitats Regulations (Defra, 2012), it has increasingly also been applied to relevant EIA matters as well.
- 1.1.1.4 As stated in the Defra Guidance Note “Habitats Regulations: Evidence Plans for Nationally Significant Infrastructure Projects” (2012) “an Evidence Plan aims to reduce the risk of NSIPs being delayed by issues relating to the Habitats Regulations during the evolution of a proposed DCO application, by:
- Giving greater certainty to all parties on the amount and range of evidence an applicant should collect;
 - Helping address and agree issues earlier on in pre-application so robust, streamlined decisions can be taken; and
 - Focusing the evidence requirements so they are proportionate to the NSIP’s potential impacts and costs to applicants are minimised”
- 1.1.1.5 An Evidence Plan is intended to be a working document that is developed by the parties involved on an on-going basis through the development of the EIA and HRA, continuing up until the point of application, or until it is considered otherwise complete and agreed upon.

1.2 The Evidence Plan Process

- 1.2.1.1 As part of the Hornsea Three Evidence Plan, it has been agreed with all participants (see Table 3.1) that the Evidence Plan will cover topics relevant to both HRA and EIA regulations i.e. those which affect: Features designated under the Council Directive 2009/147/EC on the conservation of wild birds (the ‘Birds Directive’) and Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the ‘Habitats Directive’) as implemented by the Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations), the Conservation of Offshore Marine Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended); and ecological features of relevance to the Infrastructure and Planning (Environmental Impact Assessment) Regulations 2017. In addition, internationally important wetland sites designated under the Ramsar Convention 1971 (‘Ramsar sites’) are afforded the same protection as Special Areas of Conservation (SACs) and Special Protected Areas (SPAs) when considering development proposals (as stated in ODPM Circular 06/2005).
- 1.2.1.2 The process that the Defra 2012 guidance follows is to:
- Ensure that the Applicant provides sufficient and proportionate information in the assessment of Hornsea Three, so as to enable PINS and the Secretary of State (SoS) to form a view on the Likely Significant Effects (LSE) of the Project and potential for adverse effect in the integrity of Natura 2000 sites and the conclusions of the EIA;
 - Document agreement on information supplied by the Applicant to SNCBs (and other relevant parties);
 - Provide greater certainty for all parties that the survey methods, baseline data and the methods and analyses used for the EIA and HRA reports satisfies the relevant legislation;
 - Identify issues early on in the process and approach to the resolution of those issues; and
 - Agree the evidence and data that supports the HRA and EIA for Hornsea Three.
- 1.2.1.3 The Evidence Plan was requested formally by MIEU (now PINS) in February 2016. Figure 1.1 sets out the key stages of the development and completion of the Evidence Plan. Throughout the process the Evidence Plan has been updated and revised where necessary to document discussions held with the EWGs and outline areas of agreement and disagreement.

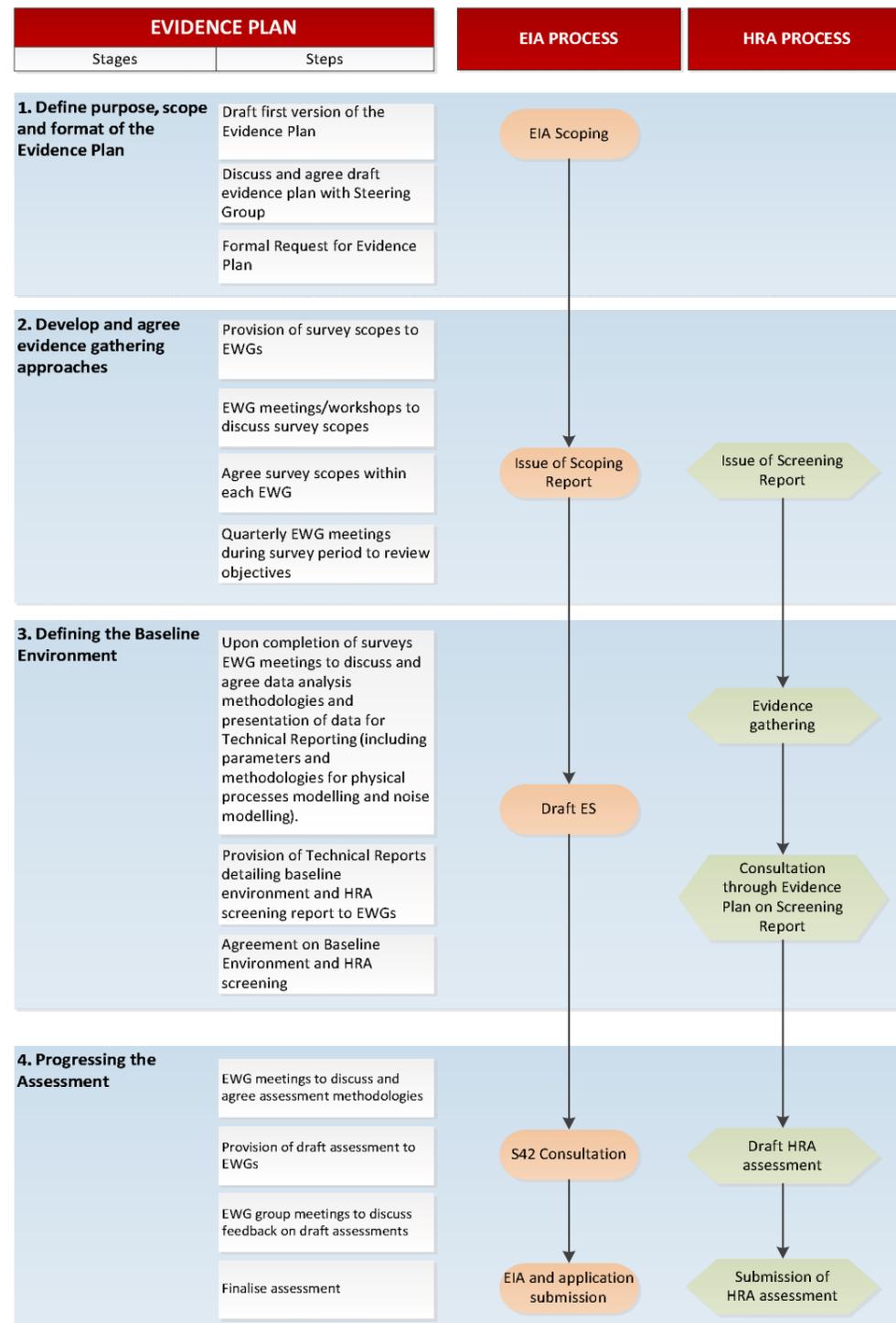


Figure 1.1: Key stages in the development of the Evidence Plan.

1.2.1.4 The Evidence Plan forms part of the DCO application and documents the key areas of agreement and any outstanding areas of disagreement between the relevant parties. The document has formed the basis for the Statement of Common Grounds (SoCG), which will be agreed during the pre-examination/examination phase of the project. The timeframe of the Evidence Plan has coincided with the key milestones throughout the pre-application process particularly the stages of the HRA and statutory consultation periods.

1.3 Wider Consultation

1.3.1.1 A significant volume of consultation has been undertaken as part of the pre-application phase of Hornsea Three. The Consultation Report (document reference number A5.1) describes the consultation process that Ørsted has followed both in terms of the non-statutory 'informal' consultation and the statutory 'formal' consultation and publicity stages as required under sections 42, 47 and 48 of the Planning Act 2008. It outlines the feedback received and explains how the feedback received has been taken into account by Ørsted. Consultation on Hornsea Three has been undertaken in two broad phases:

- Phase 1: consultation on the Hornsea Three Scoping Report as part of the Environmental Impact Assessment (EIA), Habitats Regulations Assessment (HRA) Screening Report and two rounds of community consultation under section 47 of the 2008 Act; and
- Phase 2: one round of statutory consultation on the Preliminary Environmental Information (PEI), which ran in parallel to consultation under section 47 and 48 of 2008 Act, a further round of statutory consultation under section 42, which ran alongside consultation under section 47 and 48 of the 2008 Act and a third round of focussed statutory consultation under section 42 of the 2008 Act only.

1.3.1.2 Outside of the main phases of consultation stakeholders, where possible, have been engaged consistently to ensure that they are informed of Hornsea Three's progress and to enable further discussion around the application. Natural England have been engaged through the Discretionary Advice Service (DAS) to ensure key discussions and project updates are communicated. Ørsted consulted informally on Hornsea Three throughout the pre-application consultation period from March 2016 up until submission of the DCO application. This included regular meetings with key stakeholders including, statutory bodies, the local authorities, Parish Councils and landowners.

1.3.1.3 The Evidence Plan has been implemented throughout the pre-application phase and statutory and non-statutory consultation responses have been addressed within the EWG meetings.

2. Hornsea Three

2.1 Hornsea Zone

- 2.1.1.1 Orsted Power (UK) Ltd, (previously known as DONG Energy) on behalf of Orsted Hornsea Project Three (UK) Ltd. (Ørsted), is promoting the development of the Hornsea Project Three Offshore Wind Farm (hereafter referred to as Hornsea Three).
- 2.1.1.2 The Applicant purchased the rights to develop the remainder of the 4GW Hornsea Round 3 zone from the Smart Wind consortium (SMW) in August 2015. This zone was also known as 'Zone 4' and the division of the Zone 4 areas are shown below in Figure 2.1 as agreed with The Crown Estate.
- 2.1.1.3 The Hornsea Zone, Zone 4 of Round 3 of The Crown Estate's offshore wind programme, is located in the southern North Sea adjacent to the Yorkshire and Lincolnshire coast and extending eastwards, almost to the boundary of British and Dutch waters.
- 2.1.1.4 Development rights were initially awarded to the Smart Wind consortium who initiated development of the first two projects within the zone. In August 2015 Ørsted acquired those projects and the rights to further development of the zone. Ørsted is the Applicant for Hornsea Three, the third project to be brought forward (see Figure 2.1).
- 2.1.1.5 The development status of Projects 1 and 2 are as follows:
- Hornsea Project One – consented and awarded a CfD, onshore construction commenced in early 2016; and
 - Hornsea Project Two – consented (16 August 2016), CfD awarded in 2017.
- 2.1.1.6 A considerable amount of work has been completed in consenting Hornsea Project One and Hornsea Project Two. Appendix A outlines the survey data collected through the baseline characterisation of the Hornsea Zone and Hornsea Project One and Hornsea Project Two. This survey data along with other offshore regional data sets and regional environmental assessments, have been used to inform discussions at EWG meetings, over the requirements for additional site specific survey data.

2.2 The Proposed Development

- 2.2.1.1 Hornsea Three consists of an offshore wind farm and its associated ancillary infrastructure. The Hornsea Three array area, offshore export cable corridor and onshore export cable corridor (including associated infrastructure and compound areas) are depicted in Figure 2.1.

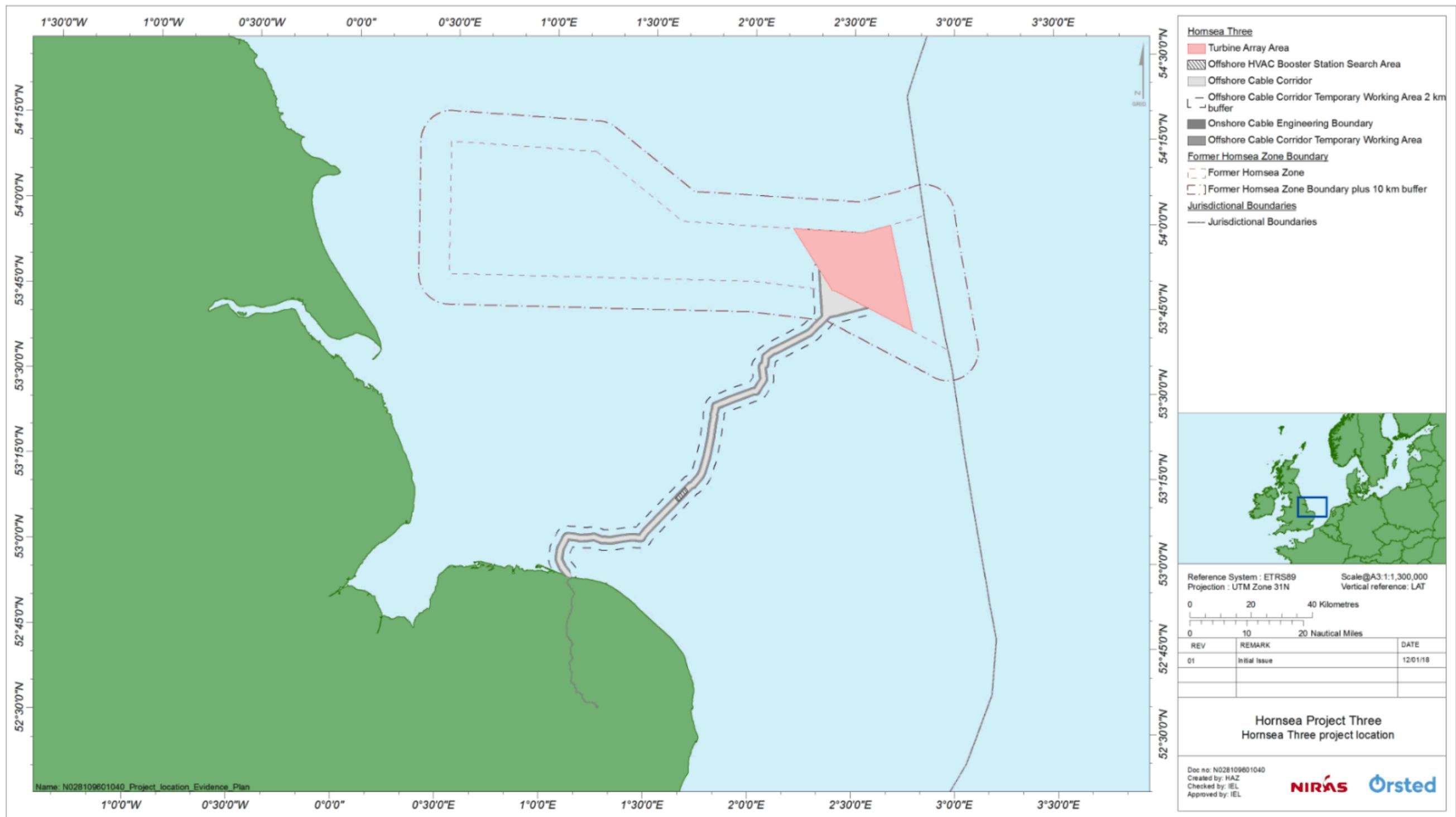


Figure 2.1: Location of Hornsea Three within the Hornsea Zone and associated export cable corridor.

3. Roles and responsibilities of the Evidence Plan Stakeholders

3.1.1.1 The Evidence Plan process has been led by Orsted Hornsea Project Three. Table 3.1 provides a list of all parties involved in the Evidence Plan Process including lead contact for that organisation and contact details.

Table 3.1: Organisations participating in the Hornsea Three Evidence Plan Process.

Organisation	Lead Contact
Ørsted	Sophie Banham
NIRAS Consulting	Tim Norman
Applicant's HRA Consultant	NIRAS
Applicant's EIA Consultant	RPS
The Planning Inspectorate	Helen Lancaster
Natural England	Marija Nilova Emma Brown
MMO	Richard Green Richard West
The RSPB	James Dawkins
The Wildlife Trust Norfolk Wildlife Trust	Tania Davey John Hiskett
Local Planning Authorities (LPAs)	David White (Norfolk County Council) Kerys Witton (North Norfolk District Council)
Environment Agency	Barbara Moss-Taylor
Joint Nature Conservation Committee (JNCC)	Becky Hitchin

3.2 The Steering Group

3.2.1.1 In developing the Evidence Plan stakeholder engagement and input is of principal importance. The development and monitoring of the Plan and its subsequent progress has been undertaken by the Steering Group. The Steering Group comprises of PINS, the Applicate, Natural England, Marine Management Organisation and Cefas.

3.2.1.2 The Steering Group met at the start of the Evidence Plan process and then at key milestones throughout the programme.

3.3 Expert Working Groups

3.3.1.1 Expert Working Groups (EWGs) have been set up to discuss topic specific issues with the relevant stakeholders. The aim of the EWGs is to discuss and agree (where possible) key elements of the EIA and HRA during the pre-application period. The process is iterative and each group works through the discussion points and agree as possible during the pre-application period. The EWG stakeholders are summarised in Table 3.2.

Table 3.2: Expert Working Groups.

Expert Working Group	Participants
Offshore Ornithology	Natural England The RSPB MMO
Marine Mammals	Natural England JNCC MMO The Wildlife Trusts Cefas
Benthic Ecology, Marine Processes and Fish and Shellfish Ecology (BE, MP and FSE)	Natural England MMO Cefas The Wildlife Trusts JNCC
Onshore Ecology	Natural England Environment Agency Local Planning Authorities Norfolk Wildlife Trust The RSPB

4. Progress of agreements

4.1 Steering Group

4.1.1.1 The Steering Group oversees the development and monitoring of the Evidence Plan and its subsequent progress. The focus of the Steering Group initially was to agree the aims, scope and content of the Evidence Plan. Subsequent meetings have been focused on updating the Steering Group on the progress made within the EWGs and discussing any issues that arose.

4.1.1.2 The programme of meetings held to date is outlined within Table 4.1 and full meeting minutes are attached within Appendix 2. Five Steering Group meetings were held over the course of the Evidence Plan.

Table 4.1: Steering Group meetings held to date.

Date	Group	Participants	Focus of meeting
22.03.2016	Steering Group	PINS, Natural England & MMO	Evidence Plan Process
18.07.2016	Steering Group	PINS, Natural England, Cefas & MMO	Evidence Plan Process & evidence based approach
27.01.2017	Steering Group	PINS, Natural England, Cefas & MMO	Evidence Plan updates
22.05.2017	Steering Group	PINS, Natural England, MMO & Cefas	EWG updates and Evidence Plan progress
31.01.2018	Steering Group	PINS, Natural England, MMO & Cefas	Evidence Plan progress, EWG updates and look ahead to final application

4.2 Benthic Ecology, Fish and Shellfish Ecology and Marine Processes

4.2.1 Overview

4.2.1.1 It was agreed at the first EWG meeting that Benthic Ecology, Marine Processes and Fish and Shellfish Ecology will form one EWG due to the inter-related nature of the three topics. The remit and input required for the BE, FSE and MP EWG is as follows:

- To agree survey methodologies and coverage to address key issues, if required

¹ It was agreed at the EWG meeting on 1st February 2017, that discussions regarding Marine Processes were best advanced through a separate discussion with Cefas and the MMO, noting any concerns from the other EWG participants.

- To agree survey data analysis methodologies and expected outcomes
- To agree any modelling requirements (marine processes/ underwater noise), parameters and methodologies
- To agree that the baseline environment information is appropriate for the purposes of the assessment and agree any limitations to the baseline data and solutions to address these limitations;
- To discuss and agree potential for effects on protected habitats and/or species
- To agree assessment methodologies and risk assessment tools for the purposes of the HRA and EIA.
- To agree thresholds for determining LSE on Natura 2000 features.

4.2.1.2 The programme of meetings held to date is outlined within Table 4.2 and full meeting minutes are attached within Appendix C. Six meetings in-person and two telecom meetings have been held with the EWG.

Table 4.2: BE, MP and FSE EWG meetings held to date.

Date	Group	Participants	Focus of meeting
06.06.2016	BE, FE & MP EWG	Natural England, MMO & Cefas	Process & surveys
21.06.2016 (Telecom)	BE, FE & MP EWG	Cefas	Process & surveys
12.07.2016	BE, FE & MP EWG	Natural England, MMO & Cefas	Surveys of Export Cable Route
18.11.2016	BE, FSE & MP EWG	Natural England, MMO, TWT & Cefas	Surveys, EIA Scoping and HRA Screening
01.02.2017	BE, FSE, and MP EWG	Natural England, MMO, TWT & Cefas	Surveys, evidence based approach
11.04.2017 (Telecom)	Marine Processes ¹	Cefas, MMO	Evidence Based approach to Marine Processes
02.12.2017	BE, FSE, and MP EWG	Natural England, MMO, TWT & Cefas	Section 42 consultation, baseline characterisation, project description refinement
23.02.2018	BE, FSE, and MP EWG	Natural England, MMO, TWT, JNCC & Cefas	Project description, baseline characterisation, assessment approach

4.2.2 Issues agreed

Data collection and baseline characterisation

4.2.2.1 There has already been significant survey effort undertaken on benthic, fish and shellfish and marine processes across the Hornsea Three array area due to the Hornsea zonal surveys and overlap with the site specific surveys of Hornsea Project One/Two. The EWG agreed that the following surveys are not required to inform the Hornsea Three environmental baseline as existing information has been deemed sufficient:

- MetOcean data collection within the Hornsea Three array;
- Otter or beam trawls;
- Site specific fish or shellfish surveys along the offshore export cable route; and
- Sediment chemistry – it has been agreed that sediment contaminants across the Hornsea Zone, are generally at levels that are not of concern.

4.2.2.2 The Hornsea Three array sampling strategy and the offshore export cable sampling strategy was agreed by the EWG, with the understanding that any alterations to the offshore export cable route and therefore potential alterations to the sampling strategy will be presented to the EWG. During the discussions, additional sampling was requested at the Markham's Hole MCZ and the Cromer Shoals MCZ, which was incorporated and agreed. Two offshore cable corridor alterations were presented to the EWG:

- The offshore reroute - reduced the route through the North Norfolk Sandbanks and Saturn Reef (NNSSR) SAC; and
- The nearshore reroute - reduced the route through the MCZ, based on stakeholder concerns around the impacts to the Cromer Shoals MCZ, which in turn increased the route through the Wash and North Norfolk SAC.

4.2.2.3 The EWG agreed that the offshore reroute was beneficial and the baseline characterisation of the route was acceptable. The EWG accepted that the nearshore reroute reduced impacts to the Cromer Shoals MCZ.

4.2.2.4 A preliminary potential sandeel habitat assessment was performed using the PSA data from the geophysical surveys and Markham's Triangle survey data according to the methodology described by Latta *et al.*, (2013), as agreed by the EWG. The preliminary assessment indicated that suitable potential sandeel habitat at Hornsea Three array area is relatively limited compared to the former defined Hornsea Zone. The EWG has agreed with this classification of the Hornsea Three array area and have agreed the baseline characterisation for fish and shellfish ecology.

Assessment methodology

Identification of impacts

4.2.2.5 All relevant construction, operational and decommissioning impacts to be assessed as part of the application have been agreed by the EWG. The outputs from the Marine Processes assessment shall be used to inform subsequent assessments on prey availability (benthic ecology and fish and shellfish ecology) during the construction, operation and decommissioning phases of the proposed development.

Marine processes

4.2.2.6 The EWG agreed the proposed evidence based approach to the following impact areas:

- Increases in suspended sediment concentrations (SSC) and subsequent deposition of disturbed sediment to the seabed;
- Impact to hydrodynamics, sediment transport and beach morphology at the landfall;
- Impacts to the tidal regime, with associated potential impacts on sediment transport; and
- Scour of seabed sediments.

4.2.2.7 Specifically, the EWG agreed that a realistic assessment of cable burial shall be provided and the level of scour protection will be based on experience from previous OWF, interconnector and Oil and Gas projects. The exact location of any cable protection will be determined post-consent, noting that Natural England have expressed concerns around cable protection within marine protected areas along the ECR. It is also understood that any available data and lessons learnt from other offshore wind farms regarding sand wave clearance should be incorporated into the assessment.

4.2.2.8 The EWG agreed that the rule based wave model will be validated using the results of the MIKE (DHI) model.

Benthic ecology

4.2.2.9 The EWG have agreed that suspension of contaminants within the array site and along the offshore cable corridor can be scoped out of the assessment.

4.2.2.10 The EWG have agreed that as the North Norfolk Sandbanks and Saturn Reef (NNSSR) SAC is under the jurisdiction of JNCC (outside 12 NM) and the HRA should be undertaken in line with JNCC advice. JNCC have detailed, high quality information on the habitats within the NNSSR SAC which have enabled them to define the entire SAC as Annex I habitat, rather than focusing upon the specific physical and biological features of interest within the site, as per Natural England's approach.

4.2.2.11 The EWG have agreed that because Sabellaria reef (Annex I habitat) is an ephemeral feature and therefore the baseline may have changed by the point of construction, the assessment will outline the level of risk for each export cable (up to six) affecting Sabellaria reef.

Fish and shellfish ecology

- 4.2.2.12 The EWG has agreed the methodology for assessing impacts on sandeels. The assessment will be undertaken on the same precautionary basis as has been accepted for Hornsea Project Two, in that the entire array site will be treated as potential suitable habitat as per the spawning maps produced by Ellis *et al.*, (2012).
- 4.2.2.13 The EWG has agreed the underwater noise modelling approach, using the INPIRE subsea noise model. The behaviour effects assessment was agreed to be carried out in line with Popper *et al.*, (2014).
- 4.2.2.14 It was agreed that there is no impact pathway in relation to herring spawning habitats.

Nature conservation sites

- 4.2.2.15 The designated conservation sites to be considered within the Environmental Statement and HRA have been agreed with the EWG. In relation to the Wash and North Norfolk SAC, it has been agreed that subtidal features will be considered within the assessment and intertidal features can be screened out of the assessment as long as there is evidence presented showing that sediment movements will not be affected. The feature 'large shallow inlets and bays' can also be screened out. The EWG have agreed that an assessment will be presented on the sub-features of sandbanks which are slightly covered by sea water at all times as well as the feature itself.
- 4.2.2.16 The evidence based approach to assessing SSC has been agreed with the EWG, and based on previous experience and initial assessments it is anticipated that impacts will be localised. It has been agreed that the outcomes of the Marine Processes assessment will determine whether there is a requirement for other topics (e.g. ornithology and marine mammals) to assess changes to prey availability. It has been communicated that any effects on birds or SPAs will be addressed within the ornithological assessments.

4.2.3 Issues under discussion

Nature Conservation sites

- 4.2.3.1 The potential effects on the North Norfolk Sandbanks and Saturn Reef SAC are still under discussion in relation to the restore conservation objective, although it is understood that the key attributes of the conservation objectives are extent and distribution, physical structure and biological structure. There is ongoing discussion with JNCC and Natural England around how oil and gas decommissioning activities affect the cumulative/in-combination assessment for Hornsea Three and more innovative methods on how to reduce the impacts within the SAC.

- 4.2.3.2 The baseline characterisation for the offshore cable corridor within the Wash and North Norfolk SAC is still under discussion. The EWG agreed that the nearshore reroute reduced the potential impacts to the Cromer Shoal MCZ, but there were concerns over the lack of site specific survey data within the Wash and North Norfolk SAC. The Project presented a baseline informed by a number of baseline data sources as outlined within the Benthic ecology Environmental Statement chapter (Environmental Statement Volume 2, Chapter 2, document reference number A6.2.2). There was a concern that because the SAC is designated for stony reef, the mixed sediment biotope present may qualify as Annex I habitat. The baseline characterisation was not agreed for the offshore cable corridor within the Wash and North Norfolk SAC.

- 4.2.3.3 Also under discussion is how subtidal mixed sediment, considered a sub-feature of the *sandbanks which are slightly covered by seawater all the time*, is considered within the Wash and North Norfolk Coast SAC assessment.

Cable protection

- 4.2.3.4 The EWG have raised concerns over the volume of cable protection required along the export cable route within SACs or other designated sites. Hornsea Three have built upon experience from previous projects when calculating a realistic envelope for cable protection, as advised by the EWG. The aim is to avoid any alterations to the DCO at later stages, i.e. requesting additional cable protection after consent is granted. Natural England's most recent advice is that a condition of no cable protection for the project would be preferable, as this ensures that a detailed discussion is held post-consent regarding the realistic volume of cable protection. The Applicant does not believe that this is an appropriate or realistic approach and that the Cable Specification and Installation Plan that is required by the DCO and DMLs provides for the level of consideration sought by Natural England post-consent.

- 4.2.3.5 The effects of cable protection on nearshore sediment transport has been discussed and evidence is presented within Environmental Statement, Volume 2, Chapter 1 Marine Processes (document reference number A6.2.1).

Cumulative/in-combination assessment

- 4.2.3.6 The Wildlife Trust consider that commercial fishing should be included within the cumulative/in-combination assessment. Hornsea Three consider commercial fishing as part of the baseline environment as the fishing activity was present at the time the Natura 2000 sites were designated. Even if commercial fishing was not considered as part of the baseline there is no plan or project for which to assess against.

4.2.4 Summary of progress

- 4.2.4.1 A summary of the progress against key areas of discussion is presented in Table 4.3.

Table 4.3: Progress within the Benthic Ecology, Fish and Shellfish Ecology and Marine Processes EWG.

Item	Area where agreement is sought	Status	Progress of agreement
Aims of the Evidence Plan			
1	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group.	Agreed	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes EWG.
Data collection and baseline characterisation			
2	Sufficient survey data has been collected, or is planned to be collected to appropriately characterise the baseline environment	Agreed	The EWG have agreed topics for which sufficient information exists and no further surveys are required. The EWG have agreed the sampling strategy and existing desktop information sources. The EWG have agreed the baseline characterisation across the Hornsea Three array area and offshore cable corridor. The EWG have agreed the baseline characterisation for fish and shellfish ecology.
		Under discussion	The baseline characterisation is not agreed for the section of cable corridor which passes through the Wash and North Norfolk SAC.
Assessment methodology			
3	All construction, operational and decommissioning impacts have been identified.	Agreed	The impacts that are required to be assessed have been agreed following the submission of the EIA Scoping Report. It is agreed that suspension of contaminants can be scoped out of the assessments.
4	All relevant designated conservation sites have been identified	Agreed	The relevant designated sites have been identified and agreed. The Marine Processes assessment will inform the assessment of designated sites in other topics such as ornithology and marine mammals.
5	Benthic ecology: The Wash and North Norfolk Coast SAC	Agreed	It has been agreed that subtidal features will be considered within the assessment and intertidal features can be screened out of the assessment as long as there is evidence presented showing that sediment movements will not be affected. The feature 'large shallow inlets and bays' can also be screened out.
		Under discussion	Discussion is ongoing over the assessment parameters for cable protection within the SAC. The EWG have agreed that the sandbank features and sub-features will be assessed, exactly how the sub-features are incorporated into the assessment is under discussion .
6	Benthic ecology: NNSSR SAC assessment approach	Agreed	The assessment approach towards the north Norfolk sandbanks and Saturn reef SAC has been agreed, following JNCCs approach of classifying the entire area as sandbanks. Although no <i>Sabellaria</i> reef has been found along the cable corridor, the EWG have agreed to incorporate an understanding of the level of risk that the export cables will interact with <i>Sabellaria</i> reef.
		Under discussion	There is ongoing discussion with JNCC and Natural England around how oil and gas decommissioning activities affect the cumulative/in-combination assessment for Hornsea Three.
7	Fish and shellfish	Agreed	The sandeel assessment methodology has been agreed following the same precautionary approach as for Hornsea Project Two. The noise assessment methodology has been agreed, using the INPIRE subsea noise model.
8	Marine processes evidence based approach	Agreed	The marine processes evidence based approach has been agreed for all impacts, aside from the wave regime. It has been agreed to validate the rule based wave modelling with the outputs of the MIKE (DHI) model.

4.3 Ornithology

4.3.1 Overview

4.3.1.1 The remit and input required for the Ornithology EWG was as follows:

- To agree survey methodologies and coverage to address key issues in relation to offshore ornithological features particular in relation to features of SPAs and potential SPAs (pSPAs) if appropriate and rare and vulnerable birds (as listed on Annex I of the Birds Directive), and for regularly occurring migratory species;
- To agree the survey data analysis methodologies and expected outcomes;
- To agree that the baseline environment information is appropriate for the purposes of the assessment and agree any limitations to the baseline data and solutions to address these limitations;
- To agree assessment methodologies and risk assessment tools for the purposes of the HRA and EIA; and
- To agree thresholds for determining LSE on Natura 2000 features.

4.3.1.2 Discussions with the Ornithology EWG covered both the Hornsea Three array area and the offshore cable corridor. It was agreed early in the evidence plan process that a separate intertidal EWG and Environmental Statement chapter was not required and any assessment requirements will be covered by the offshore ornithology EWG or Onshore Ecology EWG as relevant.

4.3.1.3 The programme of meetings held to date is outlined within Table 4.4 and full meeting minutes are attached within Appendix 4. Eight meetings have been held with the EWG.

Table 4.4: Ornithology EWG meetings held to date.

Date	Group	Participants	Focus of meeting
10.03.2016	Ornithology EWG	RSPB, Natural England & MMO	Process & surveys
13.04.2016	Ornithology EWG	RSPB, Natural England & MMO	Process & surveys
27.07.2016	Ornithology EWG	RSPB, Natural England & MMO	Surveys of Export Cable Route
21.11.2016	Ornithology EWG	RSPB, Natural England & MMO	Baseline characterisation and assessment methodology
29.03.2017	Ornithology EWG	Natural England, RSPB	Baseline characterisation and assessment methodology (meeting minutes to be confirmed)
05.06.2017	Ornithology EWG	Natural England, RSPB	Meta-analysis and baseline characterisation

Date	Group	Participants	Focus of meeting
23.11.2017	Ornithology EWG	Natural England, RSPB	Baseline characterisation, assessment methodology
27.02.2018	Ornithology EWG	Natural England, RSPB	Baseline characterisation, assessment methodology

4.3.2 Issues agreed

Data collection and baseline characterisation

Survey methodology

4.3.2.1 The EWG agreed that, considering the timescales of Hornsea Three, monthly site specific aerial surveys will be conducted from April 2016 – September 2017 (see Figure 4.1). The survey period was then extended to include October 2017 and November 2017, so the final survey period ranged from April 2016 – November 2017. The surveys were agreed to comprise of an aerial digital video methodology and cover the array area and a surrounding 4 km buffer. There is a period, from December to March, over the non-breeding season where two years of site specific survey data has not been collected. This is due to the Project timeline not allowing a full two year survey period. Natural England's advice remains that a full two years of baseline data is the minimum requirement so that inter-annual variability in seabird abundance within a site can be taken in to account in the assessment, but suggested that a meta-analysis of existing data (from the Hornsea Zone) could address the data gap for Hornsea Three. Therefore to provide further information, a desk based meta-analysis was conducted, with input from Natural England and RSPB on the scope of works. The aim of the meta-analysis was to provide additional baseline information during the months for which two years of site specific surveys were unable to be completed and determine a reasonable characterisation of key species densities.

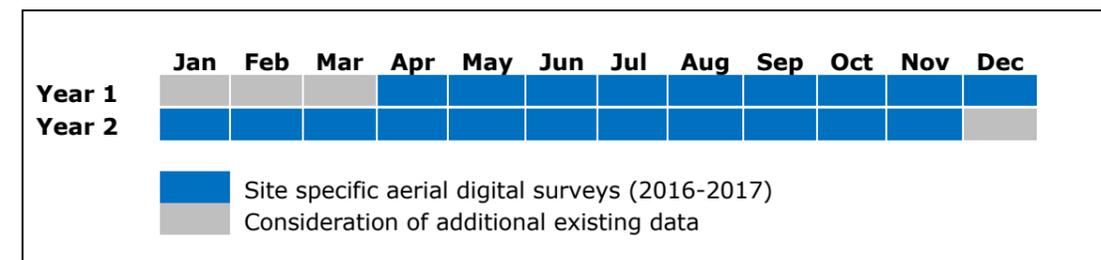


Figure 4.1: The approach to inform the Hornsea Three ornithological baseline.

4.3.2.2 Walk over surveys were carried out along the intertidal area and based on the results, it was agreed that sufficient data has been collected to inform the assessment and that the assessment will be incorporated into the offshore ornithology Environmental Statement chapter, there is no requirement for a specific intertidal chapter.

Baseline characterisation

4.3.2.3 The baseline has been agreed for the months of which two years of site specific surveys have been carried out (see Figure 4.1). The baseline remains under discussion for the months December – March.

Assessment methodology

BDMPS populations against which impacts should be assessed

4.3.2.4 The EWG agreed that for the breeding season the Biologically Defined Minimum Population Scale (BDMPS) for each species will be defined by breeding colony populations with connectivity to Hornsea Three. Connectivity is determined through analyses of the likely foraging ranges of breeding features.

4.3.2.5 The non-breeding season seabird populations BDMPS will be defined by the species-specific seabird populations presented by Furness (2015). The EWG agreed that migratory species will be dealt with separately using specific data sources (e.g. Wright *et al.*, (2012)).

Seasonal definitions

4.3.2.6 The EWG have agreed the seasonal definitions for razorbill and guillemot and the extent of the post-breeding season for kittiwake.

Connectivity between colonies and Hornsea Three in the breeding season

4.3.2.7 The criterion used to establish connectivity between an SPA breeding colony and the Hornsea Three array area has been agreed. The approach utilises mean-maximum foraging range plus one standard deviation as reported by Thaxter *et al.*, (2012). In some case more specific information will be used from GPS/satellite tracking studies (e.g. FAME/STAR initiatives for kittiwake and gannet colonies associated with the Flamborough and Filey coast pSPA (FFC pSPA)).

4.3.2.8 The EWG have agreed the species that have connectivity with Hornsea Three, which are fulmar, gannet, kittiwake, puffin, guillemot and razorbill for the Flamborough and Filey Coast pSPA, and common scoter, red throated diver and Sandwich tern for the Greater Wash pSPA.

Apportioning - Proportion of breeding birds at Hornsea Three during the breeding season

4.3.2.9 The EWG has agreed the following approaches of determining the proportion of adult birds observed during the breeding season at Hornsea Three:

- All adult gannets observed at the array site in site-specific survey data for Project will be taken to equate the proportion of breeding adult gannets present at the Hornsea Three array area during the breeding season;
- All fulmar present at the Hornsea Three array area during the breeding season will be taken as breeding adults.

4.3.2.10 The approach for puffin, kittiwake, guillemot and razorbill is still under discussion.

Apportioning - Proportion of breeding birds at the Hornsea Three array area during the non-breeding season

4.3.2.11 The EWG has agreed that for each colony with connectivity to the Project, the proportion of breeding adults of a seabird species present at the Hornsea Three array area during non-breeding season, will be derived by utilising data presented in Furness (2015).

Collision Risk Modelling methodology

4.3.2.12 The EWG have agreed the approach to collision risk modelling that will be utilised for Hornsea Three. Both the Basic and Extended versions of Band (2012) will be presented.

4.3.2.13 Available baseline data and information on species' ecology will be used to determine which species are to be included in collision risk modelling.

Avoidance rates

4.3.2.14 The EWG have agreed the avoidance rates that will be presented within the environmental assessment.

Displacement

4.3.2.15 The EWG have agreed the approach to assessing displacement, following current SNCB guidance (Natural England and JNCC (2012)) and is similar to that conducted for Hornsea Project Two:

- The spatial extent to which the effects of operational displacement will be assessed for each species following the interim guidance presented in Natural England and JNCC (2012);
- A range of displacement and mortality figures will be presented following the interim guidance presented in Natural England and JNCC (2012). If the rates are revised, further discussion may be required; and
- The predicted intensity of displacement for each species is based on available published evidence (e.g., Krijgsveld *et al.*, 2011; Vanermen *et al.*, 2013) and published reviews of species vulnerability to the effect (e.g. Wade *et al.*, 2016).

In-combination assessment

4.3.2.16 The EWG has agreed the use of a tiered approach to the in-combination assessment. An initial list of potential in-combination projects has been presented to the EWG, and it is noted that this was not the full long list of projects that will be considered.

4.3.3 Issues under discussion

Data collection and baseline characterisation

Baseline Characterisation

4.3.3.1 Where two years of baseline data has not been collected the baseline is still under discussion.

4.3.3.2 The requirement for the meta-analysis has been agreed with the EWG. The meta-analysis addendum, now referred to as the Environmental Statement, Annex 5.4 Data Hierarchy Report (document reference number A6.5.5.4), provides a population or density for assessment, across the months where two years of site specific surveys have not been collected. Multiple bird densities and population estimates have been calculated from different data sources across the Hornsea Zone. The proposed hierarchical approach to considering the different data sources is still under discussion.

Identification of designated sites (HRA Screening)

4.3.3.3 The majority of Special Protection Areas (SPAs) that should be considered within the RIAA and Environmental Statement have been agreed by the EWG. The EWG are still discussing whether the conclusions of the HRA Screening can be agreed.

Assessment methodology

Seasonal definitions

4.3.3.4 The seasonal definitions for puffin, gannet and kittiwake for the breeding and non-breeding seasons are still under discussion.

Apportioning - Proportion of breeding birds at Hornsea Three during the breeding season

4.3.3.5 Discussions are ongoing regarding determining the proportion of adult breeding puffin or kittiwake observed during the breeding season at the Hornsea Three array area. Queries were raised by the EWG, over the proposed use of survival rates and age class data.

4.3.3.6 The EWG have agreed that it is unlikely that breeding razorbill or guillemot from Flamborough and Filey Coast pSPA will utilise the Hornsea Three array area.

Avoidance rates

4.3.3.7 The EWG has not agreed the appropriate avoidance rates to be taken forward to the assessment, Hornsea Three has presented the Projects position on which avoidance rates are appropriate and will be taken forward to assessment.

Collision risk modelling

4.3.3.8 Hornsea Three's position is to use Option 1 of the Band model (2012), using flight height data from the existing boat based data that overlaps with the Hornsea Three array area, apart from for lesser black-backed gull and greater black-backed gull for which Option 3 is utilised. Natural England and RSPB advise to use Option 2 of the Band model.

4.3.3.9 The EWG are discussing the appropriate interacting population sizes for migratory waterbirds for inclusion within the CRM. Queries have been raised over whether it is appropriate to use BDMPS populations for migratory modelling.

Approach to assessing impacts on populations

4.3.3.10 The EWG are discussing the use of PVA modelling to inform the RIAA. Natural England and the RSPB are advising on alterations to the PVA models that were agreed for Hornsea Project Two.

4.3.3.11 The Applicant and the EWG are still discussing the degree of change that may occur at the population level, to inform the EIA. The key point of discussion is to identify what is an appropriate population scale to complete the assessment and calibrate against indicators such as the 1% threshold.

4.3.4 Summary of progress

4.3.4.1 A summary of the progress against key areas of discussion is presented in Table 4.5. Certain topics are yet to be discussed and therefore are not captured in the table below.

Table 4.5: Progress within the Ornithology EWG.

Item	Area where agreement is sought	EWG position	Progress of agreement
Evidence Plan aims and process			
1	The aims of the Evidence Plan and of the Ornithology EWG.	Agreed	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Ornithology EWG. It was agreed that no separate intertidal EWG or intertidal Environmental Statement chapter is required.
Data collection and baseline characterisation			
2	There is sufficient existing baseline data or planned surveys, using appropriate methods, to inform the characterisation of Hornsea Three and the impact assessment. There is no requirement for addition surveys. All data gaps have been highlighted and appropriate measures for filling them have been proposed.	Agreed	The baseline characterisation has been agreed for all months where two years of site specific aerial survey data has been collected. It has been agreed that no further surveys are required regarding the offshore cable corridor or the potential landfall.
		Under discussion	Considering the timescales of Hornsea Three 20 months of aerial surveys will be undertaken across the array area. Natural England's advice remains that two years of site specific data is a minimum, but a meta-analysis may sufficiently supplement the site specific survey data for Hornsea Three. The scope of the meta-analysis has been agreed as appropriate to provide baseline data across the non-breeding season, when two years of site specific data is unavailable. The final densities and population estimates, during Dec-Mar where only one years of site specific data has been collected, are yet to be agreed.
3	All designated conservation sites have been identified	Under discussion	The majority of sites that should be considered have been agreed. The EWG are yet to agree the final screening of designated sites.
Assessment methodology			
4	All construction, operational and decommissioning impacts have been identified.	Agreed	Discussions following the EIA Scoping report have agreed upon the relevant impacts to be taken forward to the assessment.
5	BDMPS populations	Agreed	The EWG has agreed how the BDMPS populations will be defined for both the breeding season and non-breeding season.
6	Seasonal definitions	Agreed	The EWG has agreed the seasonal definitions for guillemot and razorbill.
		Under discussion	The seasonal definitions for kittiwake, gannet and puffin remain under discussion.
7	Connectivity between SPA colonies and Hornsea Three	Agreed	The EWG has reached agreement on criteria to establish connectivity between an SPA breeding colony for adult breeding birds and the Project for all species.
8	Proportion of breeding birds at Hornsea Three during the breeding season	Agree	The EWG has reached agreement on the approach to determining the proportion of adult birds observed during the breeding season at Hornsea Three for gannet and fulmar.
		Under discussion	An agreement has not been reached for kittiwake or puffin.
9	Proportion of breeding birds at Hornsea Three during the non-breeding season	Agreed	The EWG has agreed that Furness (2015) will be used to determine the proportion of breeding birds at the Project site during the non-breeding season.
		Under discussion	Discussions are ongoing regarding on the approach to identifying a likely significant effect.
10	Collison Risk Modelling methodology	Agreed	The EWG agreed the CRM approach using the Band model (2012).
11	Avoidance rate	Agreed	The EWG have agreed the avoidance rates that will be presented within the assessment.
		Under discussion	The EWG have not agreed the final rates to be taken forward to assessment.
12	Displacement	Agreed	The approach is assessing displacement has been agreed, following current SNCB guidance.

Item	Area where agreement is sought	EWG position	Progress of agreement
13	Approach to assessing impacts on populations	Under discussion	Discussions are ongoing regarding the use of PVA modelling to inform the RIAA.
14	In-combination assessment methodology	Agreed	The EWG have agreed the use of a tiered approach.
		Under discussion	Still under discussion is the approach to consider the differences in collision risk estimates due to changes in turbine scenarios between application and operation.

4.4 Marine Mammals

4.4.1 Overview

4.4.1.1 The remit and input required for the Marine Mammal EWG was as follows below:

- To agree survey methodologies and coverage to address key issues in relation marine mammal species specifically those listed on Annex II, Annex IV and Annex V of the Habitats Directive;
- To agree the survey data analysis methodologies and expected outcomes;
- To agree that the baseline environment information is appropriate for the purposes of the assessment and agree any limitations to the baseline data and solutions to address these limitations;
- To agree the input parameters for underwater noise modelling and the project scenarios to be modelled;
- To agree assessment methodologies and risk assessment tools for the purposes of the HRA and EIA; and
- To agree thresholds for determining LSE on marine mammal features of SACs and cSACs.

4.4.1.2 Eight meetings were held with the Marine Mammals EWG and discussions have covered both the array area and the offshore cable corridor. Key topics have included survey methodology and baseline data collection and the subsea noise assessment.

4.4.1.3 The programme of meetings held to date is outlined within Table 4.6 and full meeting minutes are attached within Appendix 5.

Table 4.6: Marine Mammals EWG meetings held to date.

Date	Group	Participants	Focus of meeting
10.03.2016	Marine Mammal EWG	Natural England & MMO	Evidence Plan Process and survey methodology
13.04.2016	Marine Mammal EWG	Natural England, TWT & MMO	Evidence Plan Process and survey methodology
04.08.2016 (Telecom)	Marine Mammal EWG	Natural England & TWT	Surveys focus upon the Export Cable Route
23.11.2016	Marine Mammal EWG	Natural England & TWT	Surveys updates, baseline characterisation, subsea noise modelling approach
28.03.2017	Marine Mammals EWG	Natural England, MMO, TWT	Surveys updates, baseline data characterisation, subsea noise assessment
10.07.2017	Marine Mammals EWG	Natural England, MMO, TWT	PEIR overview, incorporation of a more realistic piling scenario

Date	Group	Participants	Focus of meeting
20.11.2017	Marine Mammals EWG	Natural England, MMO, TWT	Noise modelling approach, S42 comments
15.02.2018	Marine Mammal EWG	Natural England, MMO, TWT, Cefas	Assessment methodologies and conclusions, Evidence Plan summary

4.4.2 Issues agreed

Data collection and baseline characterisation

Desktop data sources

4.4.2.1 The existing baseline data that is available and will be considered has been outlined and agreed with the EWG.

Survey methodology

4.4.2.2 The EWG agreed that monthly aerial surveys will be conducted from April 2016 – November 2017. The surveys were to be undertaken over the array area plus a 4 km buffer. The EWG agreed that whilst data from four cameras would be collected during surveys (representing approximately 20% of the array area) only data from two of those cameras (i.e. representing coverage of approximately 10%) would be analysed and assessed initially. Additional analysis would be discussed further, if for example, if the marine mammal data showed sufficient number of minke whale or white-beaked dolphin that meaningful analysis would be possible.

4.4.2.3 The EWG agreed that a meta-analysis of existing data from the former Hornsea Zone will be undertaken to explore how boat based survey data and aerial survey data can be combined and analysed. A summary of the meta-analysis findings has been presented to the EWG.

Interpretation of survey data

4.4.2.4 The EWG agreed that as it has not been possible to calculate a site specific correction factor from the aerial data a correction factor from Teilmann *et al.*, (2013) will be used. The correction factor is used to account for marine mammals below the surface during aerial surveys.

Assessment methodology

Identification of impacts

4.4.2.5 All relevant construction, operation/maintenance and decommissioning impacts to be assessed have been identified and agreed by the EWG. The approach to assessing UXO within the application and how this links into post-consent activities has been discussed and the principles agreed.

Reference populations

- 4.4.2.6 The EWG agreed the reference populations that will be used within the assessment in order to assess potential impact on each species at the population level.

EIA assessment

- 4.4.2.7 The EWG agreed that the proposed definitions of sensitivity and magnitude applied consistently across the assessment allow for a robust and transparent assessment.

Assessing the effects of Subsea Noise

- 4.4.2.8 The EWG agreed that the NOAA thresholds are appropriate for determining the risk of PTS. The new NOAA marine mammal injury threshold guidelines are considered more precautionary.

- 4.4.2.9 The EWG agreed that the use of the INSPIRE underwater noise modelling tool is appropriate, with all model parameters provided. The EWG agreed that the underwater noise modelling often has multiple layers of precaution and as such the worst case scenario produced by underwater noise modelling is often unrealistic. Additional contextual information showing more realistic scenarios will be presented within the application, alongside the worst case scenario. The EWG agreed that PTS and TTS ranges will be presented within the assessment and that the behavioural effects assessment should use the dose-response curve approach.

- 4.4.2.10 In relation to the RIAA, the EWG agreed that a distance of 26 km was appropriate when considering harbour porpoise disturbance, as this is how far significant disturbance effects will generally be felt (in line with current advice). The 26 km is seen as a standard distance, even if the underwater noise modelling presents different results. The Environmental Statement will refer to the subsea noise modelling when assessing disturbance effects on harbour porpoise.

Additional impacts

- 4.4.2.11 A more realistic assessment scenario for vessel traffic and vessel collision risk was agreed by the EWG.

Consideration of UXO

- 4.4.2.12 The EWG agreed that Hornsea Three are not seeking consent for UXO clearance as part of the DCO application, however UXO clearance needs to be considered within the assessment. It was agreed that the assessment will be based on assumptions from wider project experience in terms of the size and number of UXO expected and that a separate Marine Licence will be applied for to remove any UXO later in the development process.

Cumulative assessment approach

- 4.4.2.13 The EWG agreed the cumulative assessment approach. The cumulative noise assessment will consider the effect of subsea noise at Hornsea Three alone with noise arising from activities at other plans or projects within an appropriate frame of reference ("cumulative study area") depending on the species being considered. The cumulative study area for each species will be based on the Management Units for the key species, with the exception of minke whale and white-beaked dolphin, for which the harbour porpoise study area will be utilised. It has also been agreed that the cumulative assessment will utilise data presented within the projects' Environmental Statement (e.g. Hornsea Project One and Hornsea Project Two) and the data will not be updated or adapted in line with new thresholds, as this was considered outside of the scope of the Hornsea Three assessment.

- 4.4.2.14 The EWG agreed that a qualitative assessment of seismic activity will be included within the cumulative assessment.

Assessment conclusions

Subsea Noise assessment

- 4.4.2.15 The EWG have agreed the conclusions of the PTS noise assessment and the behavioural assessment, as presented within the EWG meeting.

4.4.3 Issues under discussion

Assessment methodology

Subsea noise assessment

- 4.4.3.1 Hornsea Three have not quantitatively assessed Temporary Threshold Shift (TTS). TTS represents a range of effect and as such there is no means of assessing the impact to individuals within this range, therefore the number of animals effected by TTS is not presented. Scottish authorities have advised that injury assessments should only be based on PTS. This point is still under discussion, with Cefas stating that the effects of TTS should be quantified as it is a form of injury distinct to PTS.

- 4.4.3.2 The cumulative subsea noise assessment has drawn comparisons with the Booth *et al.*, (2017) assessment of the cumulative effects on the North Sea harbour porpoise population. There are uncertainties inherent in this modelling approach and further discussion is required on whether the comparison is appropriate.

Mitigation approach

- 4.4.3.3 The EWG agreed that a Marine Mammal Mitigation Protocol (MMMP) approved by the MMO in consultation with Natural England will be implemented during construction. The details of the MMMP will be agreed with Natural England. The proposed mitigation measures are likely to include using a soft start procedure and acoustic deterrent devices (ADD).

4.4.3.4 The requirement for Marine Mammal Observers has yet to have been discussed.

Cumulative/in-combination assessment

4.4.3.5 Hornsea Three have assessed commercial fishing as part of the baseline as the activity was present before the designation of Natura 2000 sites. Even if commercial fishing was not considered as part of the baseline there is no plan or project against which to assess future activity. TWT consider that commercial fishing should not be included as part of the baseline environment.

4.4.4 Summary of progress

4.4.4.1 A summary of the progress against key areas of discussion is presented in Table 4.7.

Table 4.7: Progress within the Marine Mammals EWG.

Item	Area of discussion	Status	Progress of agreement
Aims and procedure of the Evidence Plan			
1	The aims of the Evidence Plan and of the Marine Mammal EWG.	Agreed	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Marine Mammal EWG.
Data collection and baseline characterisation			
2	There is sufficient existing baseline data or planned surveys, using appropriate methods, to inform the characterisation of Hornsea Three and the impact assessment. There is no requirement for addition surveys. All data gaps have been highlighted and appropriate measures for filling them have been proposed.	Agreed	Natural England still has reservations over not having two years of survey data, but recognises that there are a number of existing sources of information to supplement this. The EWG has agreed that monthly aerial surveys will be conducted from April 2016 – September 2017, across the survey area and associated buffer. As agreed a meta-analysis of existing data has been undertaken to inform the baseline characterisation. The baseline data available along the ECR is sufficient to inform the impact assessment.
Assessment methodology			
3	All construction, operational and decommissioning impacts have been identified	Agreed	All impacts have been identified and agreed following the submission of the EIA Scoping report, Preliminary Environmental Information Report (PEIR) and subsequent discussions.
	EIA definitions of sensitivity and magnitude	Agreed	Consistently applied, the definitions of sensitivity and magnitude have been agreed with the EWG.
4	All relevant designated conservation sites have been identified.	Agreed	All relevant designated conservation sites have been identified following submission of the HRA Screening report and subsequent discussions.
	Reference populations	Agreed	The reference populations for assessing population level impacts have been agreed.
6	Assessing the effects of subsea noise	Agreed	The EWG have agreed that the use of the INSPIRE subsea noise model is appropriate. The principles of the subsea noise modelling have been agreed, and the piling scenarios to be modelled have been agreed. For harbour porpoise disturbance effects, the RIAA will utilise the 26 km distance as advised by the EWG.
		Under discussion	Hornsea Three is not presenting an assessment for TTS, this aspect is still under discussion.
7	Mitigation approach	Agreed	It has been agreed that mitigation will be based upon the instantaneous injury ranges and include both ADD and soft start procedure.
		Under discussion	The use of MMOs has yet to be discussed.
8	Cumulative assessment approach	Agreed	The cumulative assessment approach including study area and data presentation has been agreed.
		Not agreed	TWT stated that commercial fishing should not be included as part of the baseline
Impact assessment			
9	Subsea noise modelling results	Agreed	The EWG have agreed the underwater noise assessment conclusions for PTS and the behavioural assessment.

4.5 Onshore Ecology

4.5.1 Overview

4.5.1.1 The remit and input required for the Onshore Ecology EWG was as follows :

- To agree survey methodologies and coverage for terrestrial ecology receptors and specifically Annex I habitats and Annex II species as listed in the Habitats Directive;
- To agree the survey data analysis methodologies and expected outcomes;
- To agree that the baseline environment information is appropriate for the purposes of the assessment and agree any limitations to the baseline data and solutions to address these limitations;
- To agree assessment methodologies and risk assessment tools for the purposes of the HRA and EIA; and
- To agree thresholds for determining LSE on Annex I habitats and Annex II species.

4.5.1.2 Five EWG meetings were held. The focus was upon agreeing the survey methodologies to inform the baseline characterisation. The programme of meetings held to date is outlined within Table 4.8 and full meeting minutes are attached within Appendix F.

Table 4.8: Programme of Onshore Ecology EWG meetings.

Date	Group	Participants	Focus of meeting
17.02.2017	Onshore Ecology EWG	Natural England, Norfolk Wildlife Trust, Norfolk County Council, Environment Agency, RSPB, North Norfolk District Council	Evidence plan process, survey methodologies, hydrology, designated conservation sites
28.04.2017	Onshore Ecology EWG	Natural England, Norfolk Wildlife Trust, Norfolk County Council, RSPB, Environment Agency, North Norfolk District Council	Interim survey results, assessment methodology, hydrology, County Wildlife Sites.
25.07.2017	Onshore Ecology EWG	Natural England, Norfolk Wildlife Trust, Norfolk County Council, RSPB, Environment Agency, North Norfolk District Council	PEIR project description, PEIR assessment submissions, ecological survey updates
02.11.2017	Onshore Ecology EWG	Norfolk Wildlife Trust, Norfolk County Council, RSPB, Environment Agency, North Norfolk District Council	Survey updates, project refinements
23.03.2018	Onshore Ecology EWG	Norfolk Wildlife Trust, Norfolk County Council, RSPB, Environment Agency, North Norfolk District Council	Review of baseline, assessment conclusions, management measures

4.5.2 Issues agreed

Date collection and baseline characterisation

Survey methodology

4.5.2.1 The EWG agreed the following survey methodologies:

- Winter birds: The methodology covers functionally linked habitat, areas of permanent land take and surveys along the ECR corridor (point counts). It was confirmed through follow-up correspondents that the point count locations appropriately take into account County Wildlife Sites (CWS).
- Breeding birds: The methodology includes area of permanent land-take and surveys along the onshore cable corridor (point counts). It was confirmed through follow-up correspondents that the point count locations appropriately take into account CWS.
- Protected Species: A preliminary Ecological Appraisal (PEA) was undertaken and the results informed the scope and extent of further ecological surveys. The EWG have agreed that the protected species surveys methodologies are appropriate and all species requiring surveying have been identified.

Baseline characterisation

4.5.2.2 The final onshore ecology survey reports were circulated to the EWG and the EWG have agreed the baseline characterisation of Hornsea Three. All survey methodologies have been agreed and there is no requirement for additional surveys.

Hydrological characterisation study

4.5.2.3 The hydrological characterisation study (Volume 6, Annex 2.4 Hydrological Characterisation Study, document reference number A6.6.2.4) addresses concerns surrounding the disruption of surrounding hydrological regime. The EWG have agreed the scope of the Hydrological characterisation study.

Assessment methodology

Nature conservation sites

4.5.2.4 The EWG has agreed that all relevant designated conservation sites have been identified, including Natura 2000 sites, Ramsar sites and any functionally linked habitat, SSSIs and CWS. The EWG agreed that there is no pathway for effect for the North Norfolk Coast SAC.

4.5.2.5 The EWG have agreed that all direct impacts to Natura 2000 sites have been avoided through the route refinement approach and the cable installation procedure (including the use of Horizontal Directional Drilling (HDD)).

Ecological assessment approach

- 4.5.2.6 The EWG have agreed the assessment approaches within the EIA and the approach for assessing effects on designated sites and features within the HRA. The EWG have discussed and agreed the assessment principles for wintering birds. Direct impacts to the North Norfolk Coast SPA are avoided, therefore the assessment considers impacts to the functionally linked habitat. The EWG agreed that the wintering birds assessment would consider the impact of the onshore cable corridor and temporary disturbance buffer against the area available for foraging based on the survey data collected, highlighting the proportion of the habitat that would be disturbed. The assumptions with this assessment included that the distribution of the birds will be the same at the point of construction and that the entire corridor is affected for the entire winter period.
- 4.5.2.7 The approach to assessing habitat loss within designated sites, as a percentage of the total site area, was agreed with the EWG. The EWG have agreed that due to cable route refinement, there is not expected to be any direct habitat loss to European designated sites.

4.5.3 Issues under discussion

Final assessment conclusions

- 4.5.3.1 The only potentially significant impact identified (in EIA terms) is from disturbance effects to pink-footed geese (PFG) and the EWG has agreed that this issue should be dealt with in more detail within the HRA and the context of the wider PFG North Norfolk SPA population. The EWG have agreed that no significant effects have been identified that cannot be appropriately managed through the mitigation and management measures presented. Further discussion is required upon review of the final application to confirm this position.

Mitigation and management measures

- 4.5.3.2 The content of the outline ecological management plans and outline Code of Construction Practice documents have been outlined to the EWG. The EWG agreed the approach to developing these documents were appropriate. Further discussion is required to ensure the content of these plans is agreed.

4.5.4 Summary

- 4.5.4.1 A summary of the progress against key areas of discussion is presented in Table 4.9.

Table 4.9: Progress of agreement within the Onshore Ecology EWG.

Item	Area of discussion	Status	Progress of agreement
Aims and procedure of the Evidence Plan			
1	The aims of the Evidence Plan and of the Onshore Ecology EWG.	Agreed	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Onshore Ecology EWG.
Data collection and baseline characterisation			
2	There is sufficient existing baseline data or planned surveys, using appropriate methods, to inform the characterisation of Hornsea Three and the impact assessment. There is no requirement for additional surveys. All data gaps have been highlighted and appropriate measures for filling them have been proposed.	Agreed	The required data collection and baseline characterisation has been agreed. The scope of the hydrological characterisation study has been agreed. All relevant designated conservation sites have been identified, including Natura 2000, Ramsar sites and County Wildlife Sites
Assessment methodology			
3	Impact identification	Agreed	The EWG have agreed the relevant impacts for assessment. The EWG agreed that, following route refinement and proposed installation methods there will be no direct impacts to Natura 2000 sites. The EWG have agreed that there is no pathway for effect for the North Norfolk Coast SAC
	Ecological assessment approach	Agreed	The assessment approach within the EIA and HRA has been agreed, including the wintering bird assessment approach and habitat loss within designated sites.
Impact assessment			
4	Impact assessment conclusions	Under discussion	The EWG have agreed that no significant impacts have been identified that cannot be appropriately management through the mitigation and management measures discussed. Further discussion is required upon review of the final application.
5	Mitigation and management measures	Under discussion	The content of the environmental management plans and code of construction practice have been discussed with the EWG. The EWG have agreed that at a high level there have been no major admissions and the approach is appropriate. Further discussion is required

5. Conclusions

5.1.1.1 As described in Section 1.2, the Evidence Plan aims to ensure that sufficient information is provided in the assessment of Hornsea Three to enable PINS and the SoS to form a view on the Project. It also aims to document agreement on the information supplied by Hornsea Three to the EWGs to reduce risk and streamline the examination process. In doing so it is envisaged that agreement can be reached on evidence presented by the Hornsea Three at key stages within the Evidence Plan process (as defined in Figure 1.1) for all the topic areas. The key areas of agreement are identified in Table 5.1 and were agreed by all parties.

- 5.1.1.2 The Evidence Plan outlines the progress of agreements during the pre-application phase of Hornsea Three. Significant progress has been made across all stages of the Evidence Plan (stage 1 and 4 - Table 5.1). Agreements have been made by each of the EWGs on the baseline data, the survey methodologies and the consideration of potential impacts, designated sites and assessment methodologies.
- 5.1.1.3 Full meeting minutes are included within the appendixes (Appendix B - F). Positive feedback has been received from the Steering Group on the progress and implementation of the Evidence Plan process.
- 5.1.1.4 The Evidence Plan has formed the basis for the Statement of Common Grounds (SoCG), which will be agreed during the examination phase of the project.

Table 5.1: Areas of agreement sought as part of the Evidence Plan process.

Stage of the Evidence Plan	Agreement sought
Stage 1 – Define purpose, scope and format of the Evidence Plan	The purpose, scope, format and programme of the Evidence Plan is appropriate and fit for purpose.
Stage 2- Develop evidence gathering approaches	The surveys of the Hornsea Three area are appropriate to inform the baseline environmental information for (insert specific topic) and suitable for the purposes of the EIA and HRA.
	The methodologies and analysis of survey data is transparent and appropriate to inform the baseline environmental information for each specific topic and suitable for the purposes of the EIA and HRA.
Stage 3 - Defining the baseline environment	The baseline information and data presented provides appropriate characterisation of the Hornsea Three area for each specific topic and is a suitable basis upon which the EIA and HRA can be based.
Stage 4- Progressing the Assessment	The Natura 2000 sites and features for which there is potential for LSE as a result of Hornsea Three have been agreed.
	The assessment methodologies used are appropriate to inform the conclusions of the HRA and EIA.
	The risk assessment tools, input data and analysis are appropriate to inform the conclusion of the HRA and EIA (e.g. population modelling).
	The key uncertainties within the assessment are presented and conclusions have been drawn with these uncertainties considered.
	The projects/plans included within the cumulative and in-combination assessment are appropriate to determine the conclusions of the EIA and HRA.
	The conclusions of the EIA and HRA are measured and accurate and reflect the potential impacts of the Hornsea Three.

6. References

Band, B., 2012. Using a collision risk model to assess bird collision risks for offshore wind farms – with extended method. [Online]. Available at: <http://www.bto.org/science/wetland-and-marine/soos/projects> (Accessed 2 November 2012).

Defra (2012) Habitats Regulations: Evidence plans for Nationally Significant Infrastructure Projects

JNCC (2015) Seabird Displacement Impacts from Offshore Wind Farms: report of the MROG Workshop, 6-7th May 2015

Pirotta, E., Merchant, N.D., Thompson, P.M., Barton, T.R and Lusseau, D. (2015) Quantifying the effect of boat disturbance on bottlenose dolphin foraging activity. *Biological Conservation*, p 82-89

Appendix A Understanding the Zone and identification of key issues

- A.1.1.1 A considerable amount of work has been completed in developing the existing Hornsea Project One and Hornsea Project Two, through both zonal survey and assessment and site specific surveys and assessment. There are also offshore regional data sets and regional environmental assessments that exist and are relevant to the environmental characterisation of Hornsea Three and the Hornsea Zone. Table A.1 below provides further details of the surveys that have been completed for the Hornsea Zone and Hornsea Project One and Hornsea Project Two.
- A.1.1.2 Given the extent of zonal and project specific surveys for Hornsea Project One and Hornsea Project Two the surveys requirements for Hornsea Three have been discussed within the EWGs prior to commencement. It is possible for some topic areas that sufficient survey information exists for the area covering Hornsea Three that further site specific surveys are not required. For example for fish ecology otter trawls were carried out for the Hornsea Zone and Hornsea Project One, which were subsequently used to inform the Hornsea Project Two assessment. It is felt there is sufficient information from the Hornsea Zonal surveys that further surveys of Hornsea Three are not required (see Table A.1).
- A.1.1.3 In order to determine the extent and requirement for site specific surveys an understanding of key assessment issues is required. The site specific surveys have been and will be targeted to answer specific questions about the Hornsea Three and respond to issues that were raised during the examination of Hornsea Project One and Hornsea Project Two. Table A.1 details the key assessment issues relevant to Hornsea Three and details proposed management solutions to respond to these issues through the Evidence Plan process. The issues detailed in Table A.1 have been discussed during the Steering group meetings and the majority of the EWG meetings (see Table A.1) and the proposed solutions discussed have been included within the Evidence Plan. Progress on these aspects has been outlined within section 4.

Table A.1: Offshore surveys completed for the Hornsea Zone and Hornsea Project One and Hornsea Project Two.

Zone	Survey Type	No. of surveys	Survey Period	Coverage	Relevance to Hornsea Three	Further surveys required for Hornsea Three
Benthic						
Hornsea Zone	Benthic Grab and Drop down video (DDV)	1	2010	122 sites throughout the Hornsea Zone	The surveys undertaken overlap with the Hornsea Three with approx. 28 sites within Hornsea Three site and provide an indication of the benthic environment.	It is likely that additional surveys will be required to finalise the benthic characterisation of Hornsea Three.
	Epibenthic trawl	1	2010	40 sites throughout the Hornsea Zone	The surveys undertaken overlap with the Hornsea Three with approx. 9 trawl locations within Hornsea Three site providing an indication of the benthic environment.	
Subzone 1	Benthic Grab and Drop down video (DDV)	1	July, September, November 2010; and June and October 2011	161 sites in subzone 1 and 57 in the export cable route corridor.	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three.	
	Epibenthic trawl	1		41 sites in subzone 1 and 28 sites in the export cable corridor.	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three.	
	Sediment chemistry samples	1		40 sites in subzone 1 and 16 sites in the export cable route corridor.	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three.	
Subzone 2	Benthic Grab and Drop down video (DDV)	1	July 2012	51 sites in subzone 2 and 9 sites within the export cable route corridor.	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three.	
	Epibenthic trawl	1		21 sites within subzone 2	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three	
	Sediment chemistry samples	1		15 sites within subzone 2.	Additional contextual information on the Hornsea Zone. Not directly applicable to Hornsea Three due to localised extent of benthic habitats.	
	Intertidal walkover and core samples	1		Horseshoe Point.	Not relevant to Hornsea Three	
Marine Mammals						
Hornsea Zone	Boat-based visual and acoustic surveys	Monthly	March 2010 – February 2013	Hornsea zone plus a 10km buffer. Transects running north to south with 6km spacing.	The surveys are directly related to Hornsea Three as they extend across the entirety of the Hornsea Zone.	Additional surveys required to build upon existing Hornsea Three data and contextual information from the wider Hornsea Zone. [surveys currently underway]
Subzone 1	Boat-based visual and acoustic surveys	Monthly	March 2010 – February 2011	Subzone 1 plus a 4km buffer. Transects running north to south with 2km spacing.	Provides additional contextual information on the Hornsea Zone. Applicable to Hornsea Three due to the mobile nature of marine mammals.	
Subzone 2	Boat-based visual and acoustic surveys	Monthly	March 2011 – February 2013	Subzone 2 plus a 4km buffer. Transects running north to south with 2km spacing.	Provides additional contextual information on the Hornsea Zone. Applicable to Hornsea Three due to the extensive range of marine mammals.	
Fish and shellfish ecology						
Hornsea Zone	Otter Trawl	2	Spring (April, 2011) Autumn (Sept- Oct, 2011)	Hornsea Zone- included stations within Hornsea Three (and Hornsea Project One and Hornsea Project Two).	The surveys undertaken provide coverage across the Hornsea Zone including Hornsea Three.	Site specific surveys are not considered to be required, sufficient coverage of the Hornsea Three zone compiled from previous surveys.
	Scientific Beam Trawl	NA- Survey carried out as part of the benthic sampling programme (epibenthic) with outputs used to inform fish and shellfish ecology Environmental Statement for Hornsea Project One and Hornsea Project Two.				Likely to be required as part of the benthic survey, but not specifically required for fish ecology.

Zone	Survey Type	No. of surveys	Survey Period	Coverage	Relevance to Hornsea Three	Further surveys required for Hornsea Three
Subzone 1	Otter Trawl	2	Spring (April, 2011) Autumn (Sept- Oct, 2011)	Hornsea Zone- included stations within Hornsea Three (and Hornsea Project One and Hornsea Project Two).	The surveys undertaken provide coverage across the Hornsea Zone including Hornsea Three.	Not considered required, sufficient coverage of the Hornsea Three zone compiled from previous surveys.
				Export Cable route -at limited number of locations.	Not relevant to Hornsea Three	Not considered required. Where there is no overlap between areas previously surveyed and Hornsea Three export cable route, a desktop review should provide the same level of information.
	Scientific Beam Trawl	NA- Survey carried out as part of the benthic sampling programme (epibenthic) with outputs used to inform fish and shellfish ecology Environmental Statement for Hornsea Project One and Hornsea Project Two.			Likely to be required as part of the benthic survey got Hornsea Three, but not specifically for fish ecology.	
	Intertidal (fyke, beach seine and push nets)	2	Spring (April, 2011) Autumn (Sep, 2011)	Cable landfall.	Not relevant to Hornsea Three	Unlikely to be required. Desktop review of fish ecology data should provide the same level of information.
	Potting survey	2	June, 2011 October, 2011	Along export cable route (3 stations located on known potting grounds).	Not relevant to Hornsea Three	Likely required if cable route overlaps overlap with important potting grounds.
Potting observer survey	1	September, 2011	Across known potting grounds in and in the vicinity of the export cable route.	Not relevant to Hornsea Three	Likely that observer surveys are required if the cable route overlaps with important potting grounds.	
Subzone 2	Otter Trawl	Hornsea Project One surveys were used to inform the Hornsea Project Two assessment.			Not considered required. Where there is no overlap between areas previously surveyed and Hornsea Three export cable route, a desktop review should provide the same level of information.	
	Scientific Beam Trawl	NA- Survey carried out as part of the benthic sampling programme (epibenthic) with outputs used to inform fish and shellfish ecology Environmental Statement for P1 and P2.			Likely to be required as part of the benthic survey, but not specifically for fish ecology.	
	Intertidal (fyke, beach seine and push nets)	Hornsea Project One surveys were used to inform the Hornsea Project Two assessment.			Unlikely to be required. Desktop review of fish ecology data should provide the same level of information.	
	Potting survey (plus P1 surveys)	2	May, 2012 November, 2012	Along export cable route (3 stations located on known potting grounds).	Not relevant to Hornsea Three.	Likely required if cable route overlaps with important potting grounds.
	Potting –Observer survey	Hornsea Project One surveys were used to inform the Hornsea Project Two assessment.			Likely that observer surveys are required if the cable route overlaps with important potting grounds.	
Offshore ornithology						
Hornsea Zone	Boat-based visual surveys	Monthly	March 2010 – February 2013	Hornsea zone plus a 10km buffer. Transects running north-south with 6km spacing.	Surveys directly relatable to Hornsea Three as they extend across the entirety of the Hornsea Zone.	Additional surveys required to build upon existing Hornsea Three data from the contextual information from Hornsea Project One, Hornsea Project Two and the wider Hornsea Zone. [Surveys currently underway]
Subzone 1	Boat-based visual surveys	Monthly	March 2010 – February 2011	Subzone 1 plus a 4km buffer. Transects running north-south with 2km spacing.	Provides additional information on the Hornsea Zone. Applicable to Hornsea Three due to the extensive range of birds.	
Subzone 2	Boat-based visual surveys	Monthly	March 2011 – February 2013	Subzone 2 plus a 4km buffer. Transects running north-south with 2km spacing.	Provides additional information on the Hornsea Zone. Applicable to Hornsea Three due to the extensive range of birds.	

Zone	Survey Type	No. of surveys	Survey Period	Coverage	Relevance to Hornsea Three	Further surveys required for Hornsea Three
<i>Intertidal Ornithology</i>						
P1 landfall	Intertidal waterbird surveys	4-5 surveys every fortnight	September 2011 – August 2012	Horseshoe Point; extending 1km south to 1km north of each landfall site.	Not relevant to Hornsea Three	Likely to be required if cable landfall is routed through sensitive intertidal habitat.
P2 landfall	Intertidal waterbird surveys	Hornsea Project One surveys were used to inform the Hornsea Project Two assessment.				Likely to be required if cable landfall is routed through sensitive intertidal habitat.

Appendix B Steering Group meeting minutes

B.1 Steering Group meeting minutes 22.03.2016

Subject	Steering Group meeting to agree Evidence Plan
Date - hours	22.03.2016 14.30-17.00
Venue	DONG Energy, 5 Howick Place
Attendees	Julian Carolan – Offshore Environmental Manager, DONG Energy Madeline Hodge – NIRAS Consulting Helen Lancaster – Planning Inspectorate Chris Gibson – Principal Advisor, Natural England By phone Lisa Southwood – MMO Tim Norman – NIRAS Consulting
Supporting Material	HOW Evidence Plan circulated on the 4 th March 2016 Letter detailing questions within the Evidence Plan circulated on the 16 th March 2016

Item	Description	Action
1	Introductions	
	Q1. Do all parties agree with the aims of the Evidence Plan? Natural England: Yes MMO: Yes	
	Q2. Do all parties agree with the policies identified to secure an effective outcome for the Evidence Plan? Natural England: Yes agree no further suggestions MMO: Yes	
	Q3. Do all parties agree with the working principles identified or have any additional suggestions? Natural England: Yes, however, some elements may require longer review periods, such as detailed technical reports MMO: Generally yes- note that timeframes of 1 week may not always be feasible for MMO, particularly if technical advice is sought.	

	HOW03 noted that the following statement would be added to Table 5.1 of the Evidence Plan regarding timescales associated with review of meeting documents prior to meetings “1 week in advance of meeting unless otherwise agreed”	
	Q4. Should any other parties be involved in the Evidence Plan process? PINS: The MIEU should be removed from Table 3.1 MMO: No, noted that Cefas involvement would be routed through the MMO. Natural England: JNCC to be removed from Table 3.1, all case work has been delegated to Natural England. Suggest The Wildlife Trust are involved in the Marine Mammal EWG. HOW03 noted they were not opposed to the inclusion of The Wildlife Trust and their inclusion was currently being determined. HOW03 also noted the need for continuity of individuals from stakeholders to ensure consistency in advice	ACTION: DONG to confirm involvement of Wildlife Trust in Marine Mammal EWG.
	Q5. Do all parties agree with their roles and responsibilities as detailed in Section 3 of the Evidence Plan? Natural England: Yes, although we will seek to reach agreement with the Applicant there may be issues that cannot be resolved that we cannot reach agreement on. MMO: Yes- the level of involvement MMO have is up to the developer, but we would like to be informed of key outcomes as a minimum. We are happy to be involved where the developer thinks we can provide value. MMO feel they can add value at a Steering Group level and where issues surrounding the DML need to be discussed. HOW03 noted that the MMO’s expertise will be useful in the latter stages of the project when determining ML conditions and monitoring.	
	Q6. Do all parties agree with the Principles for reaching agreement? Natural England: Yes noting earlier comments about some documents requiring longer review times depending on technical content and length. MMO: Note that receipt of documents 1 week in advance of meetings dates may not be long enough to organise MMO/Cefas attendance. It would be appreciated if a summary of overall topics for discussion is provided in advance of this (at least 3 weeks) to determine appropriate timescales	
	Q7. Can it be agreed that the key assessment issues are identified in Table 6.2 and the Evidence Plan process should aim to address these within the timescales discussed?	

	<p>Natural England: Yes although these are issues from past experience and want to make an observation that EIA is much broader than the issues listed and that other issues may arise throughout the process.</p> <p>MMO: Topics appear to broadly cover what is relevant. Cefas may feel there are additional areas for discussion when they become involved.</p> <p>PINS stated that Rebecca Walker at Natural England had additional comments on Table 6.2 at the EWG meeting, HOW03 noted they would chase Rebecca for any additional comments.</p> <p>PINS also stated that baseline information is a concern and that some of the data available is now quite old and this could verge on an acceptance risk stakeholders don't agree that no further surveys are required.</p> <p>HOW03 acknowledged that further discussions are required with the MMO and Natural England on other topic areas and acknowledged the risks associated with existing survey information.</p>	<p>ACTION: HOW03 to ask Rebecca Walker for any further comments on Table 6.2</p>
	<p>Q8. Can it be agreed that the aims of the Evidence Process will be to seek agreement on the items listed in Table 7.1?</p> <p>Natural England: Yes, however, Natural England cannot guarantee agreement will be reached in all cases but this will certainly be the aim of the process.</p> <p>MMO: Yes- aims seem sensible.</p>	

Action:

- 1) ACTION: HOW03 to confirm involvement of Wildlife Trust in Marine Mammal EWG
- 2) HOW03 to ask Rebecca Walker for any further comments on Table 6.2
- 3) HOW03 to consider the programme and function of the Expert Working Group on Fisheries, Benthic and Coastal Processes.
- 4) HOW03 to update the Evidence Plan upon receipt of all responses to Questions and circulate to Steering Group and Expert Working Groups

B.2 Steering Group meeting minutes 18.07.2016

<i>Subject</i>	HOW03 Evidence Plan Steering Group Meeting
<i>Date - hours</i>	18.07.2016 10.30 - 12.30
<i>Venue</i>	DONG Energy, London Office
<i>Attendees</i>	<p>In person Tim Norman- NIRAS, Evidence Plan (Chair) Madeline Hodge – NIRAS, Evidence Plan David Bloxsom – NIRAS, Evidence Plan Tracey Siddle – DONG Energy, Environmental Consents Manager Helen Lancaster – PINS, Senior EIA Lead Chris Gibson – Natural England, Principal Advisor</p> <p>Telecom Lisa Southwood – MMO, HOW03 Case Officer Martin Kerby – Natural England, Senior Advisor Yorkshire, Northern Lincolnshire Team Karema Randall – Cefas, Senior Marine Advisor</p>
<i>Supporting Material</i>	Steering Group meeting update presentation circulated on 15.07.2016

Item	Description	Action
1	<p>Introductions and Project Update The aim of the Steering Group (SG) meeting was:</p> <ul style="list-style-type: none"> to provide an update on the progress made within the EWGs to date; to provide a re-cap on the evidence based approach and to outline what next steps are for the process; and to resolve any outstanding issues and provide an opportunity to discuss any concerns. <p>The HOW03 export cable route (ECR) scoping corridor has been finalised and was presented to the SG. It was noted that within the EWGs questions had been raised over why that particular ECR had been chosen and an outline of the reasoning was presented to the SG.</p>	

	<p>It was noted that Natural England (NE) have raised concerns over the ECR within the EWGs. NE clarified that the onshore concerns were focused around the proximity of the ECR to SAC and SPA sites (including The Broads SAC and Great Yarmouth North Denes SPA). The network connection was due to be confirmed w/c 18th.</p> <p>NE noted a number of personnel changes within the organisation, and who will be responsible going forward.</p>	
2	<p>An evidence based approach An overview of why an evidence based approach was considered to be appropriate was presented.</p> <p>PINS raised the point that the data being collected must be relevant to the question being asked. It was emphasised that the focus is upon developing sufficient, relevant baseline data to identifying likely significant effects or adverse effects on integrity. NE noted that older data sets can be acceptable as long as the data is relevant and that changing survey techniques need to be taken into account when considering whether new data should be collected, including how comparable data sets are.</p> <p>It was stated that what defines appropriate relevant data is defined by what is collectively agreed upon and presented in an acceptable manner to the examining authority.</p> <p>It was noted within the EWG meetings that there has been progress made on what information is actually required and obtaining a more holistic view point.</p> <p>The SG understood the constructive and efficient approach to the EP and were happy with the proposed process.</p>	
3	<p>Benthic Ecology, Fish and Shellfish Ecology and Marine Processes EWG Participating organisations:</p> <ul style="list-style-type: none"> DONG Energy NIRAS RPS Cefas Natural England MMO <p>Overview was provided of:</p> <ul style="list-style-type: none"> The previous meetings objectives; and The previous meetings conclusions and agreements Areas where discussion is ongoing; Participants within the meetings; and Future meeting plans. 	NE to follow up with JNCC on the

<p>Noted that geophysical surveys were scheduled to be mobilised on 20th July and that data to inform the SAC designations will also be available.</p> <p>It was stated that the EWG have been aiming to draw out guidance from Cefas and NE on the points of discussion to help understand what understanding or information is exactly required (e.g. what density of sampling is required to sufficiently understand the extent of sandeel habitat). Cefas confirmed they are happy with how the issues are being dealt with and confident that they will be concluded within the timescale.</p> <p>The scoping report is due for submission in October 2016. An EWG meeting was planned in November following consultation on scoping report. This would also be an opportunity to look at geophysical data, and produce an initial look at the benthic habitat across the array and cable corridor.</p> <p>PINS confirmed the following timescales:</p> <ul style="list-style-type: none"> • 42 day deadline once a request for a scoping opinion has been received • 28 day deadline for response to formal consultation <p>The SG agreed to schedule the EWG meeting in November once the scoping opinion has been received, to deal with any queries around the scoping report at the same time. It was noted that there may be the need to conduct the meetings earlier dependent on the requirements to collect baseline data.</p> <p>NE noted they would be happy to copy DONG into the responses to the scoping report.</p>	<p>availability of SAC data.</p> <p>NE to copy DONG into response to the scoping report</p>	<p>agreed that in order to understand how the existing data can be used to inform the baseline for HOW03 and to understand how to integrate boat based survey data and aerial survey data, a meta-analysis will be conducted. The scope for this has been developed by NE and RSPB. DONG are currently tendering for this piece of work with the aim for it to be complete by November. This meta-analysis will be key to determining the robustness of the existing data sets.</p> <p>It was stated that a key point of focus was to look at variability in the data sets and what is driving that variability, with the aim to provide NE more confidence in the data set.</p> <p>PINS noted that baseline data is the biggest risk as it cannot be rectified during examination and that an agreed approach to the presentation of variability within the data sets would be highly beneficial.</p> <p>It was noted that active use was being made of the EP to discuss issues now rather than at examination and discussions are still to be held around certain topics e.g. collision risk modelling. It was agreed that the EP is an efficient tool to build a common understanding of how we deal with the data uncertainties that inevitably exist.</p> <p>The next ornithology meeting is scheduled for the 27th July and it is anticipated that further meetings will be scheduled following the outputs from the meta-analysis and upon receipt of the scoping opinion. EWG meetings will be held at key milestones throughout the process such as when the baseline is developed and to discuss the assessment methodology.</p> <p>It was further agreed that the Greater Wash draft SPA was to be assessed as if it was fully designated.</p>	
<p>Ornithology EWG Participating organisations:</p> <ul style="list-style-type: none"> • DONG Energy • NIRAS • RSPB • Natural England • MMO <p>An overview was provided of:</p> <ul style="list-style-type: none"> • The previous meetings objectives; and • The previous meetings conclusions and agreements • Areas where discussion is ongoing; • Participants within the meetings; and • Future meeting plans. <p>Aerial surveys are ongoing and the methodology had been agreed within the EWG meetings. The proposal is for 12-18 months aerial surveys, whereas NE have advised that 2 years of relevant survey data is required. Therefore, it was</p>		<p>Marine Mammals EWG Participating organisations:</p> <ul style="list-style-type: none"> • DONG Energy • NIRAS • RPS • The Wildlife trust • Natural England • MMO <p>An overview was provided of:</p> <ul style="list-style-type: none"> • The previous meetings objectives; and • The previous meetings conclusions and agreements • Areas where discussion is ongoing; • Participants within the meetings; and • Future meeting plans. 	

<p>It was noted that the EWG agreed upon aerial survey methodology. Similarly to ornithology a meta-analysis was agreed to be conducted on the existing data to see whether this could address collecting 12-18 months data. The scope for this is being developed by DONG and is currently in the process of going to tender.</p> <p>It was noted there are some uncertainties relating to the pSAC designation that is currently under consultation, as DEFRA were due to update their advice. This is being monitored and there may be implications as to how we carry out the assessment.</p> <p>PINS confirmed they cannot provide advice on suitable screening approaches for transboundary sites and consultation should be sought from the adjacent authorities.</p> <p>PINS raised the issue of cumulative impacts and whether the topic has been broached within the EWGs. It was noted that the focus currently has been on data requirements and during the assessment methodologies this topic will be raised.</p> <p>The next EWG is scheduled for 27th July pending confirmation.</p>	
<p>AOB and Next steps The plan moving forward is to update SG following response to the scoping opinion at the end of November/December. This will provide the opportunity to discuss any major concerns surrounding the scoping opinion and provide an update on the project and programme.</p> <p>PINS noted that the scoping report should follow the PINS advice note and specifically what format the shapefile must be in.</p> <p>NE note how helpful it has been to bring NGOs into the EWGs.</p> <p>SG agree that the front loading approach of the process is proving very beneficial.</p>	

Actions

1. **NE** to follow up with JNCC on the availability of SAC data.
2. **NE** to copy DONG into response to the scoping report

B.3 Steering Group meeting minutes 27.01.2017

Subject	HOW03 Evidence Plan Steering Group Meeting
Date - hours	27.01.2017 11.00- 13.00
Venue	DONG Energy, London Office
Attendees	<p>In person</p> <p>Helen Lancaster (HL) – PINS, Senior EIA Lead (Chair)</p> <p>Martin Kerby (MK) – Natural England, Senior Advisor</p> <p>Sophie Banham (SB) – DONG Energy, Consents Project Manager</p> <p>Tim Norman (TN) - NIRAS, Evidence Plan</p> <p>David Bloxsom (DB) – NIRAS, Evidence Plan</p> <p>Telecom</p> <p>Richard Green (RG) – MMO, Hornsea Three OWF Case Manager</p> <p>Richard West (RW) – MMO, Hornsea Three OWF Case Officer</p> <p>Karema Randall (KR) – Cefas, Senior Marine Advisor</p>
Supporting Material	Steering Group meeting presentation

Item	Description	Action
1	<p>Introductions and Project Update</p> <p>The aim of the Steering Group (SG) meeting was:</p> <ul style="list-style-type: none"> to provide an update on the project progress; to provide a re-cap on the evidence based approach; provide an overview of the discussions being held within the EWGs; and outline the next steps for the Evidence Plan <p>A refined Hornsea Three envelope figure was presented to the SG. SB stated that this current view of Hornsea Three is just starting to be made</p>	

	<p>public and will be included in the next series of public events, which are scheduled for the start of March. Broadly what is shown [different from the previous project envelope] is a 1.5 km wide offshore export cable corridor and a refined 200m onshore export cable corridor with an additional buffer while landowner agreements are organised.</p> <p>Hornsea Three is on an accelerated timescale compared to previous round three projects. The Crown Estate milestones are driving this timescale. PEIR is currently anticipated to be submitted in early Q3 this year (July), with submission in Q2 2018.</p> <p>DONG have been working closely with NE to develop a schedule for DAS advice, and have been working hard to align workloads and ensure sufficient engagement with stakeholders. It is being considered to include future consultation dates into the Evidence Plan (EP) to help forward planning.</p> <p>The array area has not been altered since it was last presented to the SG (27.07.2016). It was noted that the export cable landfall currently presented as two cable routes, may be presented as a cone. This is due to an awareness of the sensitivity of certain habitats at the landfall and will allow additional flexibility in the technical engineering which may help to mitigate any stakeholder concerns.</p>	
2	<p>An evidence based approach</p> <p>TN noted that there is a large quantity of data and lessons learnt from Hornsea Project 1 and Project 2, and the under-pinning premise of the EWGs is how to make best use of the data that we have.</p> <p>HL noted that this approach is evident within the meeting minutes, and reiterated that the evidence must be robust with significant buy-in from stakeholders, in order to facilitate the process. There is a risk to the project if these points are not met.</p> <p>TN acknowledged those points and the Project team is aware that the EP is a partnership and aim is to provide a suitable evidence base for the purpose of EIA/HRA.</p>	
3	<p>Benthic Ecology, Fish and Shellfish Ecology and Marine Processes EWG</p> <p>It was agreed that the combination of topics within this EWG has been working well and the SG agreed that there were no issues with this approach.</p> <p>MK noted that the EP needs to clearly state the development of the discussion, so as to represent the current state of agreement. There were aspects of the EP circulated in advance of the steering group that have been superseded by more recent discussions (e.g. p45-46).</p>	

<p>There have been four meetings to date and NE, MMO, CEFAS, DONG, NIRAS, RPS and ABPmer have all participated, although the MMO have not been able to attend all meetings. TN provided an overview of the key discussion areas across benthic ecology, fish and shellfish ecology and marine processes.</p> <p>Benthic Ecology:</p> <ul style="list-style-type: none"> The extent to which we can rely on data from the existing Hornsea Zone has been discussed extensively. There has been a lot of data collected across the zone, but it is recognised that some additional data is required. The extent of any data gaps and the requirement for additional data has been discussed in depth. The ECR has not been surveyed previously and therefore the approach to filling any data gaps, through prioritising survey efforts, has been discussed. Currently a position paper outlining the analysis that has been completed on existing data and on the proposed approach to data collection has been circulated ahead of the next EWG meeting (01.02.2017). <p>Fish ecology:</p> <ul style="list-style-type: none"> The distribution of sandeel habitat has been a key point of discussion. The focus has been over whether the data are sufficient to identify all the sites of interest within the array. <p>Marine processes:</p> <ul style="list-style-type: none"> Currently there is a wealth of evidence suggesting a lack of effects of OWFs on marine processes on a significant spatial scale and hence it is being suggested that numerical modelling is not required. Agreement is yet to be reached on this topic with further evidence to be provided at the next EWG meeting (1st Feb 2017). <p>TN stated that Cromer Shoal MCZ is a key project issue and accordingly a separate line of discussion will deal with this issue, outside of the Evidence Plan. The Wildlife Trust have been invited to join this additional group.</p> <p>MK noted that this is the first NSIP where an MCZ is potentially a large issue and raised whether BEIS need to be involved in the process. HL states that BEIS are unlikely to engage with the process at this stage.</p> <p>TN noted that the potential impacts of UXO detonation has also been flagged as a potential impact that should be assessed in the Application. SB noted that the Project was particularly keen to receive advice from Natural England</p>		<p>on the level of precaution within the assessment and how other projects have dealt with this issue, on the basis that permission for UXO detonation is not being requested at this stage. Until detailed magnetometer data is collected during pre-construction surveys it is not possible to know how many UXO might be present. Typically this would be confirmed during pre-construction surveys and a separate Marine Licence sought, if required. TN noted that phrasing an assessment around a notional topic is always a difficult process, and whether you can say something meaningful within an assessment.</p> <p>MK acknowledge that it is a difficult process and recognise that it is a case of developing a best estimate of a realistic worst case scenario. MMO noted that UXO detonation is not normally dealt with in any detail during the application stage, and usually a separate Marine Licence is sought.</p> <p>TNO outlined the objectives of future meetings:</p> <ul style="list-style-type: none"> HRA Screening Sampling strategy and survey requirements Evidence based approach to marine processes Impact assessment methodologies 	
<p>Ornithology EWG</p> <p>TNO provided an overview of the meetings to date and the participants which include DONG, NIRAS, Natural England, MMO, RSPB and HiDef.</p> <p>A high level overview was provided of the key issues of discussion and where agreement has been reached:</p> <ul style="list-style-type: none"> TNO noted that it has been agreed that there will not be a separate intertidal Environmental Statement chapter and any intertidal considerations will be dealt with in the onshore/offshore ornithology chapters. This followed on from the findings of the intertidal bird surveys. The aerial survey methodology has been commissioned and surveys are ongoing, it was agreed that these would be aerial digital surveys. Originally it was indicated by HOW03 that only one year of aerial surveys would be undertaken, which was extensively discussed within the EWG. It has now been clarified that surveys will be extended and will include two breeding seasons, although the timeframe for the assessment does not permit a complete survey of a second non-breeding season. A meta-analysis [aiming to combine existing data and site specific data] has now been commissioned. NE noted that the meta-analysis still has a large role to play in informing the wintering bird baseline. HL questioned whether NE and RSPB have been consulted in the development of the scope of the meta-analysis. MK confirmed that 			

	<p>both Natural England and RSPB have provided input to the initial scope of work. TNO indicated that as data will now be collected over two breeding seasons the emphasis on the meta-analysis had reduced. MK questioned whether the meta-analysis would therefore now focus on wintering birds and TNO confirmed that the meta-analysis would still look all the data to try to build as robust a dataset as possible. MK noted that it may be beneficial to have a focused discussion regarding the meta-analysis, potentially separate from the wider EWG, once an initial investigation has been conducted.</p> <ul style="list-style-type: none"> Initial conversations have started on the key impact assessment parameters. <p>All agreed that the purpose of the EWG is to be at the point of examination and discussing impacts rather than data. SB noted that the industry is moving to a place where it is comfortable to present a wide range of information, but support this with clear reasoning of the chosen approach to assessment, allowing NE and RSPB to present reasoning for their preferred approach.</p> <p>SB noted that Hornsea Three is very conscious of ensuring Natural England has adequate time to review various pieces of information before the application. Efforts are being made to consider if elements can be phased, to get as much information to Natural England as early as possible from an impact assessment perspective.</p> <p>MK noted that November EWG had only just been received and that it would take some time for NE to respond to these.</p> <p>Next EWG meeting anticipated for the end of February.</p>		<ul style="list-style-type: none"> Impact assessment: largely similar to that undertaken in Hornsea Project Two, although the NOAA updated injury thresholds will be used. HRA guidance is to be updated in light of more recent guidance on the Southern North Sea (SNS) pSAC. <p>MK confirmed that the Southern North Sea pSAC and the Flamborough and Filey Coast pSPA are still with DEFRA. TN requested due notice of any updates.</p> <p>Next meeting currently anticipated late Feb/March, aiming to focus on underwater noise modelling, impact assessment methodology and HRA methodology.</p>	
	<p>Marine Mammals EWG</p> <p>TNO provided an overview of the meetings held to date and the discussion points:</p> <ul style="list-style-type: none"> Survey methods: agreed that aerial surveys would be conducted and that data from two out of the four cameras would be analysed resulting in 10% area coverage of the survey area. Meta-analysis has been shared with the EWG, and there is a dialogue over methodologies of assessing impacts. It was felt that the existing boat based data may be better placed for a quantitative assessment of EIA effect, which has led to an ongoing dialogue around the use of boat based and aerial data. The discussion has moved onto an in-depth discussion around noise modelling. Discussion over what data do you use to inform the propagation of noise, beyond the survey area. It was agreed that the densities would be extrapolated from the edge of the survey area. Seal reference populations need to be updated in line with latest counts. 		<p>Onshore Ecology EWG</p> <p>TN stated that it has been identified there are onshore issues that relate to the HRA, and therefore an onshore EWG has been set up. Related issues have been included within the programme e.g. other conservation sites such as SSSI.</p> <p>The EWG has been organized based on the specific sites in proximity to the onshore cable corridor, and will identify the specific issues related to each site. Key sites include the North Norfolk Coast and the River Wensum SAC.</p> <p>The first meeting is on the 17th February with Natural England, RSPB, Norfolk Wildlife Trust, Environment Agency and Local Planning Authorities participating.</p> <p>MK noted that NE's input is more likely to involve a local lead who is familiar with the designated sites, but who may require expert input on specific topics – as opposed to fielding topic specialists at the EWG.</p> <p>HL questioned whether Internal Drainage Boards have been considered. SB noted that meetings have been set up with the internal drainage boards to identify whether they have any concerns.</p>	
			<p>AOB and Next steps</p> <p>RG - unfortunately no one from the MMO can attend the next BE, MP and FSE EWG meeting and as such the MMO have sent discussion points to Julian Carolan.</p> <p>SB noted that the Evidence Plan structure is under review, thinking ahead into how it fits into Statement of Common Ground (SoCG), and there may be a re-structure in the next issue. The SG noted they were happy with this and anything that links into SoCG would be beneficial.</p> <p>HL questioned whether the Project had considered publicizing the Evidence Plan. SB stated that this would be considered and would respond accordingly.</p>	

	<p>The SG noted that how the meeting minutes are to be included within Evidence Plan and how documents can be shared with stakeholders more efficiently need to be considered.</p>	
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B.4 Steering Group meeting minutes 22.05.2017

<i>Subject</i>	HOW03 Evidence Plan Steering Group Meeting
<i>Date - hours</i>	22.05.2017 14.00 - 16.30
<i>Venue</i>	DONG Energy, London Office
<i>Attendees</i>	<p>In person</p> <p>Helen Lancaster (HL) – PINS, Senior EIA Lead (Chair)</p> <p>Martin Kerby (MK) – Natural England, Senior Advisor</p> <p>Richard Green (RG) – Marine Management Organisation, Marine Licencing Manager</p> <p>Sophie Banham (SB) – DONG Energy, Consents Project Manager</p> <p>Tim Norman (TN) - NIRAS, Evidence Plan & HRA</p> <p>David Bloxsom (DB) – NIRAS, Evidence Plan & HRA</p> <p>Telecom</p> <p>Karema Randall (KR) – Cefas, Senior Marine Advisor</p>
<i>Supporting Material</i>	Steering Group meeting presentation

Item	Description	Action
1	<p>Introductions and Project Update</p> <p>TN outlined that the key upcoming Project milestone is the delivery of the PEIR, scheduled for the end of July.</p> <p>It was noted that conversations held within the EWG meetings may progress further than the information presented within PEIR. This is due to the period of time required to compile the PEI documents.</p> <p>TN stated that since the last Steering Group (SG) meeting, two BE, MP and FSE meetings, one marine mammal EWG meeting and one ornithology EWG meeting have occurred, as well as the initiation of the Onshore Ecology EWG and two subsequent meetings.</p>	
	<p>Benthic Ecology, Fish and Shellfish Ecology and Marine Processes EWG</p> <p>Key discussion points were noted to include:</p>	

<ul style="list-style-type: none"> The proposed sampling strategy. HL questioned whether the discussions have involved consideration of fishing gear movements for benthic surveys. SB explained that while this has been considered, for the benthic survey it is currently considered that the surveys can go ahead without the need to move fishing gear. The location of the ECR and its passage through the North Norfolk Sandbanks and Saturn Reef SAC. Feedback has also been obtained on the assessment approach to features of the SAC and the agreed approach is to follow JNCC's advice with the entire SAC area considered Annex I habitat. MK noted that the differences in approach between JNCC and NE is because JNCC have more detailed information on the site to inform the decision making process. MK also confirmed that NE will still lead on providing advice to PINS. Evidence based approach to marine processes. TN noted that the issue still under discussion is surrounding the cumulative wave regime and that there had been recent feedback from the MMO and Cefas regarding this point (received 18.05.2017). TN stated that the EP process has been successful in that the issues have been narrowed down to a particular point rather than a general statement of disagreement. <p>TN outlined the progress of agreements made within the EWG.</p> <p>MK noted that queries have been raised by NE regarding stratification, and questioned whether the dialogues with Cefas and the MMO will provide a response to NE's questions. SB explained that a compiled response had been submitted to NE providing a response to the Scoping and Screening queries and that Hornsea Three were still awaiting a response.</p> <p>SB explained that there have been certain breakout groups or separate correspondence within this EWG, to focus the discussions on certain topics or to certain feedback to queries. These have been agreed with the EWG and conclusions will be fed back into the wider EWG at the next meeting.</p> <p>HL questioned whether there are any major issues that are expected out of this topic. SB noted that in-combination effects on the North Norfolk Sandbanks and Saturn Reef SAC (NNSSR), relating to impacts of Oil and Gas decommissioning activities will be a key point of discussion. The decommissioning approach involves the placement of material on the seabed rather than the removal of all infrastructure. Marine Processes is not expected to remain an issue up to examination and further discussion is anticipated following the Cefas/MMO response.</p>	<p>MK to check the status of Natural England's response to compiled Scoping and Screening responses.</p>
<p>Ornithology EWG</p> <p>TN outlined the meetings held to date and the progress of agreement that has been reached. Key discussion points included:</p> <ul style="list-style-type: none"> Site specific survey data. TN explained that the approach of collecting 18 months of survey data, considering the timescales of Hornsea Three, is 	

<p>the best solution. This approach results in the collection of two breeding seasons of data and the meta-analysis providing additional data across the non-breeding season. MK stated that while NE's concerns around having less than two years of data remain, the meta-analysis was NE's idea and it should be given the opportunity to try to provide the information required. It was noted that discussions will progress further on this topic when the meta-analysis has been presented at the next EWG meeting. TN stated that it is useful to focus on what the evidence is showing rather than referring back to a consistent requirement of 2 years of data.</p> <ul style="list-style-type: none"> • Assessment methodologies: <ul style="list-style-type: none"> ○ Connectivity with colonies. MK noted that guillemot and razorbill are very difficult to catch at Flamborough and therefore there is unlikely to be a site specific dataset to understand site-specific foraging behaviour. There is new data from other UK colonies, which the Project is considering. TN stated that the point of Thaxter et al., (2012) was to produce a broader picture, rather than applying data from a particular site elsewhere. TN explained that it was felt that it would be preferred to wait until a review (such as Thaxter et al., (2012)), was updated with this new data and is peer reviewed and accepted. ○ Collision risk modelling. NE's current advice is to use the Band (2012) model. Issues with the script of the Masden (2015) CRM have been found during a review of the model commissioned by NE. SB explained that what the Ornithology PEIR presents will have to be reviewed as this currently presents results from Masden (2015). <p>SB noted that Hornsea Three is picking up on minor details through the EP process, in order to try to ensure that, come the examination, the Project does not have to readdress particular points.</p> <p>HL noted that if agreement on baseline data can be reached and all modeling options are presented, then this will remove a significant proportion of the first round of questions at examination, which will focus discussions on the key issues.</p> <p>RG questioned whether a draft ornithological monitoring plan will be produced, as it can be difficult to review the discussions held at the examination phase when discussing post-consent monitoring. SB explained that a number of new monitoring approaches are being developed; more novel approaches looking at addressing evidence gaps the industry has and understanding the potential impacts. For example there is on-going DONG Energy work with NE and RSPB regarding Flamborough Head. As a result the Project wouldn't want to provide too much detail in a monitoring plan because this may rule in or out certain elements that may or may not be considered relevant or required by the time post-consent monitoring is under detailed discussion. MK noted that there may be a role for the in-principle monitoring plan, to set out the key issues for monitoring to investigate without stating the detailed approaches.</p>		<p>Marine Mammals EWG</p> <p>TN outlined the progress of agreements to date and noted that the effects of underwater noise is the key discussion area within this EWG.</p> <p>MK questioned whether the aerial surveys were providing sufficient data to characterize the baseline environment. SB noted that in general aerial surveys seem to record higher numbers of marine mammals than boat based surveys as they are able to collect data in a wider range of conditions. The marine mammal meta-analysis was focused upon combining data sets.</p> <p>TN noted that there is a process being discussed on how to present more realistic underwater noise modelling scenarios. SB explained that DONG has accumulated a large amount of data on piling scenarios and hammer energy, and are working to understand how often the full energy of the hammer is realistically used. The intention is to undertake modelling before the final application, to understand how a more realistic scenario can be communicated.</p> <p>Onshore Ecology EWG</p> <p>TN explained that this EWG was initiated in February 2017 and deals with a number of different ecological topics, key points include:</p> <ul style="list-style-type: none"> • The wintering bird surveys and breeding bird surveys have been discussed in detail. The key issue for wintering birds are pinked-footed geese and the functionally linked habitat of the North Norfolk Coast SPA. There is also a large programme of protected species surveys. • The onshore export cable route crosses a number of water courses, specifically the River Wensum SAC and Booton Common SSSI. This has resulted in a specific piece work being developed - a hydrological characterisation study - the scope of which has been agreed with the EWG. • The importance of the County Wildlife Sites has been highlighted by the EWG, which are often used as buffers to SSSIs. Areas of importance to bats have also been highlighted. <p>SB explained that survey access has been discussed with the EWG and it is understood that this is a common problem affecting all terrestrial projects. The EWG have confirmed that the level of survey access that has been obtained is standard.</p> <p>SB explained that local conservation groups have been very forthcoming with environmental information and this is being incorporated where possible.</p> <p>TN explained that currently land take at protected sites is over estimated due to the wide PEIR corridor, and as this is refined more sites have been/will be removed.</p> <p>MK noted that the NE onshore lead is now working on other areas, and therefore Louise Burton and Marija Nilova will be covering in the interim.</p>	<p>DBL to confirm any NE outstanding actions</p>
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	<p>HL questioned whether cumulative effects/in-combination effects are being considered only within the corridor. TN noted that the only project being considered is the Vanguard OWF, no other projects were identified with the potential to interact. SB explained that there is an ongoing communication with Vanguard to ensure that there will be sufficient information to inform our assessment. SB also noted that there is an ongoing piece of work that is actively monitoring planning applications.</p>	
<p>AOB and Next steps</p>	<p>The SG were happy with the updated format of the Evidence Plan document. SB stated that any additional feedback on the format would be welcomed. SB explained that the intention is to submit the EP in a draft form as an appendix to the PEIR draft Report to Inform Appropriate Assessment.</p> <p>The next SG meeting will be confirmed.</p>	<p>SG to forward any comments on the Evidence Plan to DBL.</p>

Actions

- MK to check the status of Natural England's response to compiled Scoping and Screening responses.
- DBL to confirm any NE outstanding actions
- SG to forward any comments on the Evidence Plan to DBL.

B.5 Steering Group meeting minutes 31.01.2018

<i>Subject</i>	HOW03 Evidence Plan Steering Group Meeting (5)
<i>Date - hours</i>	31.01.2018 14.00 - 16.00
<i>Venue</i>	Ørsted, London Office
<i>Attendees</i>	<p>In person</p> <p>Helen Lancaster (HL) – PINS, Senior EIA Lead (Chair)</p> <p>Emma Brown (EB) – Natural England, Senior Advisor</p> <p>Marija Nilova (MN) – Natural England, Hornsea Three Case Officer</p> <p>Sophie Banham (SB) – Ørsted, Consents Project Manager</p> <p>Tim Norman (TN) - NIRAS, Evidence Plan & HRA</p> <p>David Bloxsom (DB) – NIRAS, Evidence Plan</p> <p>Telecom</p> <p>Richard West (RW) - Marine Management Organisation, Case Manager</p> <p>Richard Green (RG) – Marine Management Organisation, Marine Licencing Manager</p> <p>Chris McMullon (CM) – Natural England, Environmental Advisor</p>
<i>Supporting Material</i>	Steering Group meeting presentation

Item	Description	Action
1	<p>Introductions and overarching</p> <p>DB provided an update on the key project milestones since the last Steering Group Meeting in May 2017. The upcoming set of EWG meetings are the last in the Evidence Plan process, although discussions will still be progressed towards examination.</p> <p>DB summarised the consultation that has been held over the two year period that the Evidence Plan has covered, up to 8 meetings for certain topics, as well as the more formal consultation including Scoping/Screening, Section 42 consultation and draft ornithology documents.</p>	

2	<p>Marine Processes, Benthic Ecology and Fish and Shellfish Ecology EWG</p> <p>TN noted that the combination of these topics has consistently worked well.</p> <p><u>Marine Processes</u></p> <p>TN explained that the main topic for discussion has been around the wave modelling, and what further evidence was required on top of the evidence base presented. Currently only the spectral wave modelling results are outstanding.</p> <p>EB stated it would be useful to clarify the difference between EIA level impacts, and more site specific HRA impacts. TN clarified that there are two processes:</p> <ul style="list-style-type: none"> • Modelling the impacts from the array; and • Understanding more site specific impacts from cable protection and their effects on designated sites. <p>EB mentioned there is still uncertainty around the habitat type and level of cable protection in relation to effects on marine processes. SB noted that the impact of cable protection on marine processes was considered at PEIR and the amount of cable protection has been reduced since then.</p> <p>CM noted that the reason to flag it is due to concerns about effects on sediment processes. SB confirmed that the impacts from sandwave clearance on sediment transport have been fully assessed, and that the aim is to retain any sediment within the same sediment system.</p> <p><u>Fish and Shellfish</u></p> <p>TN explained that the EWG has reached a good level of agreement, and that this is no longer a key area of concern within the EWG. The noise modelling outputs are to be discussed at the next EWG meeting.</p> <p><u>Benthic Ecology</u></p> <p>TN explained there are two parts to this assessment:</p> <ul style="list-style-type: none"> • the EIA general understanding of the effects on the benthic ecology; and • the HRA specific impacts on designated sites and features. <p>The export cable route passes through the offshore NNSSR SAC, and closer inshore, though the Cromer Shoals Chalk Beds MCZ. There is a general lack of experience with dealing with applications for these types of works within an MCZ.</p>	
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<p>Nevertheless, there has been detailed analysis and discussion of the potential effects of cable installation on the Cromer Shoals MCZ. This has led to consideration of an alternative route which passes westwards of the MCZ but which takes it instead through a greater proportion of the Wash and North Norfolk SAC. SB noted that an eastern landfall route option was considered but this was dropped earlier in the process to try to mitigate impacts on the chalk feature of the MCZ.</p> <p>HL queried Natural England's position on passing through the SAC rather than the MCZ. EB explained that there is not enough evidence relating to either option at present to provide that advice with any certainty. Initially it was considered passing through the SAC might be more preferable with the understanding that it contained softer sediment (compared to the MCZ), but the geophysical information showed that there was potentially hard substrate present, raising questions over whether the optimal cable burial depth can be achieved.</p> <p>SB explained that the Project is aiming to be as open and realistic on how much the envelope can be refined at this point. Until the cable is installed there is not complete certainty on the success rate of installation, and cable protection is being included now so if required alterations don't have to be made to the consent later. Even if there was more data/evidence on the alternative route, it is not thought that any further project envelope refinements could be made.</p> <p>EB stated that both route options will have an impact on a designated site, and the discussion needs to move on from which route is best, as Natural England aren't going to be able to provide a definitive steer. SB explained that the comparison note produced was aimed to help the discussion, and if nothing else it identified that the level of interaction within designated sites was significantly reduced by the alternative route. From a developers perspective the longer alternative route will add a significant cost to the project.</p> <p>EB confirmed:</p> <ul style="list-style-type: none"> • If the cable can be buried to its optimal depth across the majority of the site and cable protection is minimal, then the alternative route could be the best option; • If the cable cannot be buried to its optimal depth there would be more uncertainty over the level of cable protection needed, which means the original route might be more preferable. <p>SB explained that additional information on cable burial will only become available post-consent where geotechnical information and discussions with</p>		<p>contractors can happen. EB can only provide advice on the information provided and these are the concerns that are outstanding.</p> <p>TN understands that there is a heightened concern around cable protection, but if we can converge on an approach to move forward then significant progress can be made. SB noted that both the IFCA and TWT responded to welcome the alternative route through the SAC.</p> <p><i>MCZ assessment</i></p> <p>RG questioned whether there are any particular timescales for the MCZ stage 2 assessment, should the MCZ route be selected. SB explained that the 'shadow' documents are being produced to inform PINS/the ExA and the SoS, and then the SoS's assessment will take the assessments into account along with other comments. It is the project's view that the assessment will not need to proceed to Stage 2. TN noted that it is difficult to have the conversations regarding the later assessment phases without an agreement on where the prior stages reach. Need to understand the magnitude and significance of any potential impact before discussing compensatory measures, otherwise the conversation is abstract but with large implications. HL noted that the examining authority may ask questions over Stage 2 assessment (both HRA and MCZ) just to ensure that all bases are covered.</p> <p><i>Baseline characterisation</i></p> <p>MN clarified that the information provided is enough to characterise the benthic biotopes present, but there still is not enough information to characterise the geological characteristics, the sub-cropping rock. SB confirmed that this issue then does not relate to the benthic baseline characterisation as the sub-cropping rock is not a designated feature, but more to the project design in whether the cable can be installed to an appropriate depth. TN noted that the subsurface features have been interpreted as issues with respect to the installation of the cable, rather than as interest features of the designated site.</p> <p><i>Sediment chemistry</i></p> <p>It was agreed with the EWG that this issue will be scoped out of assessment, if the values are within the OSPAR background levels.</p> <p><i>NNSSR SAC</i></p> <p>Prioritised for discussion at the next EWG on 23rd Feb.</p>	
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<p>3</p>	<p>Marine Mammals EWG</p> <p>TN explained that there has been good progress towards agreements relating to the baseline characterization, more realistic subsea noise modelling, the assessment of vessel movements and cumulative assessment approach (incl. qualitative assessment of seismic activity).</p> <p>Information to be discussed at the next EWG meeting:</p> <ul style="list-style-type: none"> • Subsea noise modelling outputs; • Progress towards Statement of Common Ground (SoCG); • Consideration of UXO within assessments. <p>EB explained that it is always useful to receive the information to inform the meeting as early as possible.</p> <p>SB confirmed that UXO clearance is not being included within the consent application as the data is currently not available, a separate Marine Licence will be obtained if and when required.</p> <p><i>BEIS review of consents</i></p> <p>TN stated that the review is not anticipated to change anything in relation to the assessments but it is something to be aware of as it may have implications for other projects.</p>		<p>that the different data sources are not equally weighted and this can be further explained at the EWG.</p> <p>EB stated that while there is information for the Hornsea Zone, there was a lot of concern for Hornsea Two in-combination effects to Kittiwake, therefore an emphasis has been placed on having a reliable baseline to assess against. TN stated that the main concerns (in terms of impact) relates to the breeding season for which we have an agreed baseline and therefore there is probably a disproportionate amount of effort being placed on the winter season, and the meta-analysis, in relation to the effects on the impact assessment.</p> <p>EB agreed that the discussion has been distracted by the meta-analysis and if we can overcome this issue, looking at precautionary figures, putting them through the analysis then we can move onto discussing the assessment.</p> <p>TN noted that RSPB have reached an area of relative comfort with the baseline data once two years of breeding season data was collected.</p> <p>SB explained that a schedule for agreement is being produced to track and work through issues to set deadlines.</p> <p>EB noted NE's concern on staff resources. HL noted that it would be useful to submit the schedule for agreement as part of the application as it might influence the timing of the examination.</p>	
<p>4</p>	<p>Ornithology EWG</p> <p>TN stated that there has been little progress towards agreements.</p> <p>The focus of discussion has been in relation to the baseline characterisation and a period of four months over the winter where two years of site specific aerial survey data has not been collected. The meta-analysis outlines the methodology to include supplementary data and discussions have become stuck in understanding this analysis.</p> <p>Natural England's concern is that they could be in a position where they can't advise, without an agreed baseline, and agree that the conversation has become stuck on the meta-analysis. EB stated that Natural England's concern is around the supplementary data (zonal data) being presented as the equivalent of the aerial survey data, sometimes higher than the aerial survey data. SB confirmed</p>		<p>5</p> <p>Onshore Ecology EWG</p> <p>TN explained that this EWG is at a relatively progressed level of agreement. The key discussions were highlighted early in the process.</p> <p>The EWG has reached agreement on what should be assessed and how it should be assessed, and also generally if there were a range of mitigation measures included in the consent then there is a general acceptance that there will not be a significant effect. MN noted that the key point for the next meeting is to discuss the detail of the mitigation measures. SB noted that the commitments to HDD reduced the concerns around the onshore cable route.</p> <p>The next EWG meeting will focus on the content of the management plans.</p>	

6	<p>Summary and AOB</p> <p>One of the overarching aims for the next EWGs will be to sum up the conclusions of the Evidence Plan, which will hopefully be able to be incorporated into SoCG.</p> <p>Another Steering Group meeting would be useful after the next round of EWG meetings, this might potentially be a call rather than a face-to-face meeting. Estimated around early April.</p>	
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Appendix C Benthic Ecology, Fish and Shellfish Ecology and Marine Processes EWG meeting minutes

C.1 BE, FSE and MP EWG meeting minutes 06.06.16

<i>Subject</i>	Benthic and Fish Ecology and Marine Processes EWG
<i>Date - hours</i>	06.06.2016 10.30- 15.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person Julian Carolan- Offshore Environmental Manager, DONG Energy Alun Williams- EIA Project Director, RPS Anna Prior- Benthic and Fish Ecology specialist, RPS Madeline Hodge- NIRAS, Evidence Plan Tim Norman- NIRAS, Evidence Plan Tom Manning- Case Officer, Natural England Mark Jonhston- Benthic Ecology specialist, Natural England Stefania Schinaia – Marine Processes specialists, Cefas Georgina Greenhalgh – Fish Ecology specialist, Cefas</p> <p>By phone Lindsey Booth-Huggins- MMO Jacqueline Eggleton – Benthic Ecology specialist, Cefas Andrew Griffiths – Marine Licensing Coordinator, Cefas</p>
<i>Supporting Material</i>	Marine Processes, Fish and benthic ecology position paper circulated on 24.05.2016 and meeting presentation

Item	Description	Action
1	<p>Introductions and review of the aims of the Evidence Plan and aims of Expert Working Groups All parties agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.</p>	
2	Benthic Ecology	

It was noted that the meeting would focus on the benthic environment in relation to the array area only as the export cable route has not been determined at this stage.

Presentation on the data collected from Hornsea Project One, Hornsea Project Two and the wider zonal characterisation surveys, there are 27 sampling locations (grab and DDV) within the HOW03 array area also corresponding with 9 epibenthic trawls.

Natural England questioned why additional data was collected for Hornsea Project One and Hornsea Project Two when data already existed from the zonal characterisation (ZOC) surveys.

RPS noted that additional surveys for Hornsea Project One and Hornsea Project Two were completed to provide more detailed characterisation information, however, these only confirmed what was already known about the two project areas from the ZOC surveys. There were no Annex I habitats within the array area, with the subtidal benthic habitats/receptors predominantly classed as of regional importance. For Hornsea Project One and Hornsea Project Two biotopes were grouped into 4 VERs across the array area, according to vulnerability and sensitivity, to provide clarification to the assessment.

It was noted that during Hornsea Project One and Hornsea Project Two no key assessment concerns had been raised during the pre-application and examination phases and as such no significant issues could be foreseen for HOW03.

Cefas stated that there was an area at the eastern boundary of HOW03 where there was currently no ZOC data available and any assumptions made regarding the presence of certain habitat types from any existing third party data sources would need to be verified by additional data collection.

Natural England noted that the presence of rMCZs may cause concerns for HOW03 that had not previously arisen for Hornsea Project One and Hornsea Project Two and that some of the conservation features for the Markhams Triangle rMCZ may be present within the HOW03 array area. Natural England stated that this should be considered within the assessment.

RPS noted that the MCZ status would be factored into the assessment when assigning receptor sensitivity.

With regard to the impacts considered in Hornsea Project One and Hornsea Project Two assessments it was noted that the following impact would be screened out of the assessment “release of contaminants in the construction and decommissioning phase” as sediment contamination was low across Hornsea Project One and Hornsea Project Two and given the similar nature of the sediments present in HOW03 as well as the distance offshore the same is predicted to be true of HOW03.

<p>Cefas stated that the presence of muddy sediment in the north east of the site would likely contain more contaminants and therefore there may be justification to include this impact within the assessment. RPS noted that the majority of the array area is sandy and the scale of the impact does not warrant further assessment. RPS noted they would check whether any of the ZOC samples have been taken from muddy areas.</p> <p>Cefas questioned whether the current geophysical surveys could focus collecting benthic grab samples from the area at the eastern boundary of HOW03.</p> <p>DONG noted that the proposed 20 samples are being collected by the geophysical survey contractor as part of the geophysical survey campaign to ground-truth the seabed mapping. These works have been contracted by DONG Energy's Site Investigations Department and the intention of the survey contractor was to discharge the material overboard upon description.</p> <p>It is DONG Energy's intention to retain these samples at the request of DONG Energy's Environment and Consents Department for (1) PSA, (2) Contaminant and (3) infaunal analysis. To this end the geophysical survey contractor has kindly agreed to broaden the scope of their works to retain the samples on-board to facilitate subsequent analysis onshore for (1) PSA, (2) Contaminant and (3) infaunal analysis. However, due to significant weather downtime the geophysical survey is now running behind schedule and there is a possibility that not all 20 locations will be sampled and that, at those which are, 3 samples may not be retrieved. DONG Energy's Site Investigations Department will make a decision in two weeks' time when they have a better understanding of survey progress relative to the programme. The outcome of this consideration will be communicated to all the relevant stakeholders.</p> <p>Cefas recommended more benthic samples were taken on the eastern boundary of the HOW03 array as the ZOC samples are sparse and outdated (collected in 2010).</p> <p>RPS stated that the area to the east is well characterised from existing data sources and there was no justification for further surveys. NIRAS questioned whether we just needed a more detailed description and mapping of the benthic habitats present in this area of whether there is concern that something may be missed from not completing additional surveys.</p> <p>Cefas noted that the area may be important for sandeels and that collecting grab samples for PSA to just fill the gaps in knowledge and there would be no requirement for trawls.</p> <p>Natural England also noted there may be the potential for Annex I habitat and should further surveys not be carried out to verify the presence of lack of such</p>	<p>Action: RPS to produce a brief sign-posting note directing NE/Cefas to the relevant sections of the Hornsea Project Two EIA where the existing desktop data covering the HOW03 array is presented. In this note, RPS to also confirm if any of the ZOC samples had been taken within the muddy sediment types</p>	<p>habitat Natural England may have to caveat their conclusions on the assessment as they will not have certainty in the baseline data. This in turn may lead to the requirement for additional data collection as part of ML conditions during pre-construction surveys.</p> <p>DONG noted that the geophysical surveys would help with the identification of Annex I habitat within the array area. Cefas noted that the geophys surveys would not assist with the identification of suitable sandeel habitat.</p> <p>DONG asked if Cefas were willing to consider an evidence based approach to the assessment. Cefas noted that we would need to be able to verify our predictions with site specific current data and have confidence in the assessment.</p> <p>DONG questioned whether there was any data available from the MCZ designation process. Natural England noted they would go away and confirm the availability of data to inform the MCZ designation process.</p> <p>DONG questioned what further surveys would need to look like in order to verify the existing data sets available for the area. Cefas noted that surveys should be designed to allow for the identification of sandeel habitat. RPS noted that a comprehensive analysis of sandeel habitats was undertaken for the Hornsea Project Two fish assessment drawing on data collected from fishing vessels targeting sandeels and site specific PSA data which were processed according to the methodologies described in Latta <i>et al.</i> (2013). RPS noted that the results of these analyses demonstrated that the HOW03 array area does not coincide with prime (preferred) sandeel habitat. Surveys will not demonstrate conclusively that an area is sandeel habitat and as a precautionary worst case can we assume all of the HOW03 array area is sandeel habitat and complete the assessment on this basis (as was done for Hornsea Project Two). It was agreed that this would be discussed further in the fish ecology part of the meeting.</p>	<p>Action: Natural England to look at MCZ verification surveys and data available.</p>
		<p>3 Fish Ecology RPS presented information of the existing baseline data available for Hornsea Project One, Hornsea Project Two and the Hornsea Zone. In terms of key assessment issues, no assessment issues were raised from an Hornsea Project One and Hornsea Project Two perspective. RPS stated that no additional otter or beam trawls were proposed and the information from the ZOC surveys were sufficient to inform the assessment.</p> <p>Cefas noted that apart from the identification of sandeel habitat there was nothing of particular concern for HOW03, noting that the export cable route was yet to be determined and there may be potential for this to interact with herring spawning area (assuming a similar cable route to that for Hornsea Project</p>	<p>Action: RPS to produce a brief sign-posting note to refer Cefas to the relevant sections of the Hornsea Project Two EIA describing the baseline sandeel habitat</p>

	<p>One/Hornsea Project Two). Cefas also agreed with the conclusion there would not be a requirement to carry out any additional otter or beam trawls.</p> <p>RPS noted that a worst case assessment for sandeel had been completed for Hornsea Project One and Hornsea Project Two and the will provide Cefas with note cross referring to the relevant sections of the EIA.</p> <p>Natural England noted that further information on decommissioning methodologies may be required to differentiate between long term habitat loss and permanent habitat loss and they would be looking for a robust assessment.</p> <p>It was agreed with regard to surveying for potential sandeel habitat further discussion was required between Cefas specialists and that a telecom to discuss options was required.</p>	<p>characterisation and the assumptions regarding the extent of sandeel habitat lost for the impact assessment.</p> <p>Action: Georgina to speak with Jackie requiring what surveys could be completed to address data gaps and what would be achieved from doing so.</p> <p>Action: NIRAS to organise follow up call with Cefas and the MMO to discuss surveying options for sandeel habitat</p>	<p>RPS stated that if the available evidence demonstrates that the HOW03 area is similar to the Hornsea Project One and Hornsea Project Two array areas (which is considered likely based on initial evaluations) and the Project Description is sufficiently within the envelope of the previous Project Descriptions, then no additional modelling work would be proposed for HOW03.</p> <p>Cefas noted they would have concerns over not completing modelling for the site where we are adding turbines to two previous sites.</p> <p>RPS noted that the key areas that have been previously modelled include:</p> <ul style="list-style-type: none"> - Sediment plume modelling (e.g. seabed preparation during construction etc) - Tidal flows/levels changes during operation - Wave regime changes during operation <p>Modelling has been undertaken for each of these as part of the assessment for Hornsea Project One and Hornsea Project Two and this provides strong evidence for potential use at HOW03.</p> <p>DONG noted that an evidence based approach had been used previously for Walney Extension and that too was the 3rd project in a tranche.</p> <p>RPS also stated that this was part of the process and there was still a need to demonstrate that this approach was suitable and this would be presented to stakeholders as part of the ongoing Evidence Plan process.</p> <p>Natural England noted that they would be looking to Cefas to confirm that not completing further modelling for HOW03 was suitable.</p>	<p>Action: DONG to provide Walney documents to Cefas with cross referral to the relevant sections.</p>
4	<p>Marine Processes</p> <p>RPS presented information on the baseline data collected for Hornsea Project One, Hornsea Project Two and the Hornsea zone noting there is a very comprehensive data set for the zone and the current geophysical campaign will provide information on seabed topography, morphology and sub bottom geology.</p> <p>RPS identified the key issues raised during the pre-application and examination phase of Hornsea Project One and Hornsea Project Two, the potential for the presence of WTG's and associated offshore infrastructure to affect the wave regime, with associated potential impacts along adjacent shorelines was raised during the examination of Hornsea Project Two. However, it should be noted that this was resolved with further clarification and this is not deemed to be a concern for HOW03 but further discussion should be had on how the assessment is carried out.</p> <p>RPS stated that all the impacts assessed within the Hornsea Project One and Hornsea Project Two assessment would be considered for HOW03 pending details of the Project Description.</p>		<p>5</p> <p>Conclusions and AOB</p> <p>It was noted that this meeting had focussed on the HOW03 array area and an equivalent meeting would be required for the export cable and this was planned for early July, Cefas to confirm availability the week of 11th July.</p> <p>MMO suggested that further discussion was required regarding data collection for the verification of baseline characterisation from existing data sources. DONG noted this point as suggested this was raised at the next Steering Group meeting.</p> <p>The MMO requested that they are cc'd into all correspondence with Cefas.</p>	<p>Action: Cefas to confirm availability for a meeting in July</p> <p>Action: NIRAS to organise meeting regarding the export cable route</p> <p>Action: NIRAS/DONG to organise next Steering Group meeting and to raise data collection and arrange</p>

		subsequent meeting to confirm CEFAS position.
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Actions

1. RPS to produce a brief sign-posting note directing NE/Cefas to the relevant sections of the Hornsea Project Two EIA where the existing desktop data covering the HOW03 array is presented. In this note, RPS to also confirm if any of the ZOC samples had been taken within the muddy sediment types.
2. Natural England to look at MCZ verification surveys and data available.
3. RPS to produce a brief sign-posting note to refer Cefas to the relevant sections of the Hornsea Project Two EIA describing the baseline sandeel habitat characterisation and the assumptions regarding the extent of sandeel habitat lost for the impact assessment.
4. Georgina to speak with Jackie requiring what surveys could be completed to address data gaps and what would be achieved from doing so.
5. DONG to provide Walney documents to Cefas with cross referral to the relevant sections
6. NIRAS to organise follow up call with Cefas and the MMO to discuss surveying options for sandeel habitat
DONG to provide Walney documents to Cefas with cross referral to the relevant sections.
7. Cefas to confirm availability for a meeting in July
8. NIRAS to organise meeting regarding the export cable route w/c 11th July
9. NIRAS/DONG to organise next Steering Group meeting and to raise data collection and arrange subsequent meeting to confirm CEFAS position.

Item	Issue on which agreement is sort	Cefas position
1	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	Cefas agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group
2	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the HOW03 array.	Cefas agreed with the conclusion there would not be a requirement to carry out any additional otter or beam trawls.

C.2 BE, FSE and MP EWG meeting minutes 21.06.16

Subject	Benthic and Fish Ecology and Marine Processes EWG
Date - hours	21.06.2016 10.30- 12.00
Venue	Teleconference
Attendees	Call participants Tim Norman- NIRAS, Evidence Plan (Chair) Julian Carolan- Offshore Environmental Manager, DONG Energy Alun Williams- EIA Project Director, RPS Anna Prior- Benthic and Fish Ecology specialist, RPS David Bloxsom – NIRAS, Evidence Plan Jacqueline Eggleton – Benthic Ecology specialist, Cefas Georgina Greenhalgh – Fish Ecology specialist, Cefas
Supporting Material	Sign-posting note for the Benthic Ecology and Fish Ecology Expert Working Group (EWG) circulated on 16.06.2016

Item	Description	Action
1	Introductions and agenda Basis of discussion surrounding the Sign-Post note produced by RPS as an action from previous EWG meeting (06.06.2016)	
2	Characterisation of baseline environment RPS provided an overview of the information presented within the sign-post note relating to benthic ecology and fish and shellfish ecology. In summary, it was demonstrated via cross-reference to material submitted as part of the Hornsea Project Two application that previous benthic ground-truthing surveys undertaken for Hornsea Project One and Hornsea Project Two indicate that the SeaZone HydroSpatial sediment data and the UKSeaMap (2010) predicted EUNIS habitats provide a reasonable prediction of sediment distribution and habitat types within the HOW03 array. The key questions arising from Cefas were in relation to: <ul style="list-style-type: none"> <u>Whether the distribution of sandy sediments/habitats is accurately predicted from the desktop data sources</u> The accuracy of predicted desktop datasets has been demonstrated via the site-specific surveys undertaken for Hornsea Project One and 	

Hornsea Project Two. RPS considers that a high level of correlation was observed between the desktop data sets and the site specific surveys, although Cefas disagree about the degree of this correlation.

- Whether the habitat maps for HOW03 are sufficiently detailed for assessment
It was confirmed that, as was undertaken for the Hornsea Project Two Application, the assessment will be based on broader habitat types (biotopes grouped into Valued Ecological Receptors). The VERs will be defined for HOW03 based on desktop data and site-specific ground-truthing. In addition, site specific geophysical data currently being collected, will provide seabed morphology information, within the HOW03 area, which can be used to check and refine, if necessary, the biotope boundaries. Cefas noted that it was important to characterise the VERs for the specific HOW03 area and not to simply assume correspondence with Hornsea Project One and / or Hornsea Project Two. In addition, Cefas noted that the ability to define the boundaries of biotopes and to ground-truth them depends on the type and resolution of site-specific sampling data. In this respect, it was unclear, yet, whether the geophysical surveys would provide sufficient additional data to that obtained from previous surveys of the area, including zonal surveys.
- The absence of data for the eastern areas of the HOW03 site
It was confirmed that RPS have acquired the data collected by Cefas in 2012 to support the Markham's Triangle MCZ designation which, when combined with existing data, will increase the coverage for the north eastern part of the HOW03 array. Cefas noted that there would still be some areas of the eastern part of the site where data were relatively sparse. Although it was noted that any ground-truthing obtained during geophysical surveys within this area may provide additional information.
- Likelihood of Sabellaria occurring within HOW03
Cefas consider there is uncertainty over what habitats are present within the site, both for sandeel habitats or potential Sabellaria habitats and there would be a benefit to characterising the site in detail. RPS stated that some ZoC samples have been collected in the vicinity of the area identified from the Humber Regional Environmental Characterisation (REC) as potential Sabellaria habitat and that no reef was recorded and Sabellaria would also be specifically looked for in the pre-construction surveys. Cefas consider the 5 x 5 km spacing of the ZoC sampling, is not detailed enough to confirm the presence or lack of Sabellaria or sandeel habitat and noted that it would be beneficial to have more information on the potential distribution of this

Action: RPS to share with EWG map presenting the overlap of the MCZ with the HOW03 site and any PSA data from the MCZ.

Action: RPS to produce a brief note outlining the position on Sabellaria.

	<p>habitat at the assessment stage in order to help target pre-construction monitoring.</p> <p>With respect to the assessment of impacts on sandeels, it was confirmed that this would be undertaken on the same precautionary basis as had been used (and accepted) at Hornsea Project Two. It was also confirmed that the PSA acquired from the Markham's Triangle rMCZ survey would be analysed according to the methodology described in Latta <i>et al.</i> (2013) in order to identify preferred, marginal and unsuitable sandeel habitats. On this basis, it was agreed that it was not necessary to understand precisely the distribution of all sandeel spawning habitats (as the entire site is treated as suitable habitat as per the spawning maps produced by Ellis <i>et al.</i> (2012).</p> <p>Cefas confirmed that they will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats (including those that could support sandeels), in light of the existing data already available.</p>	<p>Action: Cefas to confirm their advice regarding required sampling for sandeel habitats.</p> <p>Action: Cefas to confirm their advice regarding the resolution of habitat sampling required.</p>
3	<p>Sediment Chemistry RPS provided an overview of the information presented within the sign-post note, relating to sediment chemistry.</p> <p>It was agreed that, based on the existing data, sediment contaminants across Hornsea Zone are generally at levels that are not of concern including in sediments with proportions of mud similar to those within the HOW03 array. On this basis, it was agreed that no further sampling of sediment chemistry within the HOW03 array is required.</p>	
5	<p>Conclusions and AOB Minutes and action outcomes to be circulate with absentees. Follow up discussions to occur at the next EWG, date to be confirmed.</p>	

Actions

1. RPS to share map presenting the overlap of the MCZ with the HOW03 site, with CEFAS.
2. RPS to produce brief note outlining the position on *Sabellaria*.
3. Cefas to confirm their advice regarding the resolution of any further benthic habitat sampling required.
4. Cefas to confirm their advice regarding required sampling for sandeel habitats.

Progress of agreements reached to date

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the HOW03 array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the HOW03 array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the HOW03 array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired, to inform the benthic characterisation of the HOW03 array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the HOW03 array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole HOW03 array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on Hornsea Project Two and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the HOW03 array.	The EWG agreed that no further sampling of sediment chemistry within the HOW03 array is required.

C.3 BE, FSE and MP EWG meeting minutes 12.07.16

<i>Subject</i>	Benthic and Fish Ecology and Marine Processes EWG
<i>Date - hours</i>	12.07.2016 11.00 - 15.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person Julian Carolan - Offshore Environmental Manager, DONG Energy Madeline Hodge - NIRAS, Evidence Plan Tim Norman - NIRAS, Evidence Plan David Bloxsom – NIRAS, Evidence Plan Alun Williams - EIA Project Director, RPS Anna Prior - Benthic and Fish Ecology specialist, RPS Mark Johnston - Benthic Ecology specialist, Natural England Stefania Schinaia – Marine Processes specialists, Cefas Georgina Greenhalgh – Fish Ecology specialist, Cefas Jacqueline Eggleton – Benthic Ecology specialist, Cefas Louise Straker – Fish Ecology specialist, Cefas</p> <p>By phone Lisa Southwood- MMO</p>
<i>Supporting Material</i>	<p>Marine Processes, Fish and benthic ecology position paper circulated on 05.07.2016</p> <p>Marine Processes, Fish and shellfish ecology and benthic ecology Signposting Note circulated on 05.07.2016 (updated from previous meeting 21.06.2016)</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting The focus of the meeting was on:</p> <ul style="list-style-type: none"> the discussions and agreements made to date; the presentation of the Export Cable Route (ECR) scoping corridor; and discussion around the evidence gathering process to define the baseline environment for the ECR scoping area <p>The aim of the evidence plan process is to enable the use of existing data to the best possible extent. The previous meeting was held on the 6th June and a teleconference on the 21st June.</p>	

2	<p>Summary of EWG discussions and agreements to date on HOW03 array area A brief summary of the discussions to date was presented. Topics that were noted as closed (agreed upon) included:</p> <ul style="list-style-type: none"> No requirement to carry out any additional MetOcean data collection within the HOW03 array; No requirement to carry out any additional otter or beam trawls within the HOW03 array; and No requirement to carry out additional sampling of sediment chemistry within the HOW03 array. <p>Topics that were noted as still open (agreement yet to be reached) included:</p> <ul style="list-style-type: none"> The existing characterisation of sandeel habitats within the HOW03 array is sufficient for the purposes of undertaking the EIA; and There is sufficient confidence in the data and information that has been previously acquired, to inform the benthic characterisation of the HOW03 array site and in turn the EIA. <p>Cefas recently circulated (11.07.2016) a response regarding Sandeel habitat, however the EWG had not had the opportunity to review this advice prior to this meeting. Cefas noted that the response reiterated previous comments made, relating to sufficient data for habitat characterisation and the spacing of existing sampling points across the array site. It was also noted that the worst case scenario that the entire zone is considered suitable sandeel habitat, as previously presented, may not take into account the potential for impacting sandeel habitat 'hotspots'.</p> <p>It was noted that, relating to sandeel habitats, it is the scale of the habitat that relates to the level of importance and it is habitats that extend over square kilometres that are of interest.</p>	
3	<p>Review of survey extent to date RPS provided an update on the benthic sampling surveys that have occurred within the HOW03 array site to include the recently completed geophysical survey and benthic samples. RPS confirmed that PSA and benthic infaunal samples had been collected at 20 locations across the array, including in the south eastern part of the HOW03 array where previous survey data was lacking. Overall, when considered with the available data from the Markham's Triangle rMCZ survey, this demonstrates a greater density of sampling coverage across the HOW03 array than has previously been presented to the EWG. The EWG agreed that this reduces the concern regarding sufficient data coverage to inform the benthic characterisation of the array area.</p> <p>Cefas stated that the UK Sea Map data is not always reliable and during MCZ characterisation process a statistical analysis is undertaken to determine how many benthic samples are required within a defined area in order to adequately characterise the area. Cefas noted this was from an MCZ point of</p>	

<p>view and the EWG confirmed that less detail is likely to be required for the purposes of baseline characterisation for conducting an impact assessment.</p> <p>Natural England (NE) noted that the density of sampling points seems to be similar to that used in other wind farm applications, other EIAs and previous MCZ assessments. NE noted that there appears to be enough information to support an EIA. NE noted that there are data gaps but these would be supported by geophysical data, modelling data and pre-construction surveys and any areas of significance could be mitigated through micro-siting. It was noted that there is 100% geophysical coverage across the array area and Cefas considered that when this information is available that could present sufficient data. Cefas also suggested investigating whether any of the Humber Regional Environmental Characterisation (REC) data points overlap with the HOW03 array.</p> <p>The EWG agreed that when the PSA and geophysical data becomes available (estimated October) it would be beneficial to present this data together with the equivalent data collected previously across the Hornsea Zone to provide an oversight of the sediments present across the HOW03 array area. Due to timescales, it was agreed that initial high level data (i.e. geophysical survey data and PSA data from the ground truthing sampling) would be presented rather than finalised data including the infaunal analysis which will be presented in full in the PEIR. This high level data is anticipated to be circulated prior to, and discussed at, the next EWG meeting in November.</p>	<p>RPS: to present all existing PSA and geophysical data that has been collected to the EWG.</p>	
<p>Proposed marine export cable route corridor DONG provided an overview of the reasoning behind the area selection process for this corridor. Summary points were:</p> <ul style="list-style-type: none"> No existing room within the shared Hornsea Project One and Hornsea Project Two cable corridor; the Killingholme substation is at full capacity; and NG are responsible for selecting the grid connection and have indicated that the Norfolk area is most likely to be offered. <p>It was noted that within the scoping area there are six potential cable routes connecting to four potential landfalls. The refinement process will progress throughout scoping.</p> <p>NE noted concerns about the choice of cable route, both onshore and offshore, and stated that the EIA should include a strong justification as to why this option was chosen. NE main offshore environmental concerns are the potential for disturbance to three protected areas: the North Norfolk Coast Sandbanks and Saturn Reef cSAC, Haisborough, Hammond and Winterton SCI and the Cromer Shoal Chalk Beds MCZ. It was noted that DONG has a</p>		
<p>lack of control over the grid connection and this will be presented within the site selection/consideration of alternatives section of the Environmental Statement.</p> <p>NE raised particular concerns over the Cromer Shoal Chalk Beds MCZ and the chalk bed features and stated that if trenching through the chalk beds was proposed this was likely to have a significant impact on the conservation objectives of the MCZ. DONG noted that the chalk beds (and associated areas of flint) provide a technical constraint to the installation of the export cable. If that landfall site is chosen, it is currently proposed to bury the cable within an existing palaeo channel through the chalk beds, therefore avoiding any direct damage to the designated features. <i>Further discussion noted in the marine process topic.</i></p>		
<p>4</p> <p>Benthic Ecology The discussion was based on what evidence is required to adequately inform the benthic characterisation for the completion of the impact assessment.</p> <p>RPS outlined that, to date, there had been no project specific survey work along the export cable corridor. Desktop data is available in the form of the UKSeaMap and Humber REC. Cefas highlighted that there is available benthic data for the SACs which can be acquired from JNCC to also inform the benthic EIA baseline characterisation.</p> <p>The EWG reached agreement on the following:</p> <ul style="list-style-type: none"> The designated conservation sites presented in the ECR Position Paper are considered relevant to the ECR, noting the Cefas request to preliminarily include the Southern North Sea (SNS) pSAC due to the potential presence of supporting marine mammal habitats (sandeel habitat), although it was inconclusive at the time, whether the supporting habitats were listed within the consultation information; The relevant construction/decommissioning impacts, their applicability to HOW03, the data gaps identified and the approach to filling the data gaps as presented in the ECR Position Paper. It was noted any sampling required to fill the data gap around the 'release of contaminants' along the export cable corridor, is dependent on the geophysical survey outputs and the presence of areas of high fines. It was agreed to consider including UXO detonation as a potential impact within the Rochdale Envelope for benthic ecology, dependent on the project description which would be informed by the results of the magnetometer survey and the presence of any potential UXOs within the ECR. The operation/maintenance impacts presented, their applicability to HOW03, any data gaps identified and the approach to filling these data gaps (it was noted that DONG are looking to include operations 		<p>Cefas: Provide any available information on the supporting habitats and management measures for the Southern North Sea pSAC.</p> <p>RPS: To provide a survey scope for the benthic survey along the ECR, for discussion and agreement with EWG.</p>

	<p>and maintenance activities within the assessment so a separate marine licence is not required).</p> <ul style="list-style-type: none"> The broad survey approach proposed to fill data gaps. Benthic sample locations will be presented and discussed with the EWG once an indicative marine ECR has been established and when the outputs of the ECR geophysical data are available. The key assessment issues from Hornsea Project One and Hornsea Project Two which may be relevant to HOW03. Key specific HOW03 issues are the vicinity of the SACs and MCZ. An open dialogue will be kept with the EWG as the route and surveys are defined further. <p>Further discussion points included:</p> <ul style="list-style-type: none"> <i>Cable protection works within designated sites.</i> NE confirmed any works of this nature would not be recommended, the widespread deposition of a different substrate (e.g. rock protection) on chalk or sand is considered direct habitat loss. On sandbanks the use of Frond Mattressing may not be considered as direct loss of habitat and on chalk beds suggested methods to reduce impact footprint include metal armouring or bolting the cables in place both of which are considered to result in less direct loss. <i>The avoidance of sandbank features (and Annex 1 features).</i> NE noted that the North Norfolk Sandbanks and Saturn Reef cSAC and Haisborough Hammond and Winterton SAC is not entirely covered by sandbank habitats, and while dynamic, their location is relatively stable. It was confirmed that the ECR has been specifically situated to avoid the majority of the cSAC sandbanks. <i>Chalk bed features of the Cromer Shoals MCZ.</i> NE noted that the chalk features within the MCZ are of importance for nature conservation and impact upon them is a concern. It is important to demonstrate how those impacts would be avoided. DONG confirmed that it was their intention, in any case, to avoid installing the cables directly within the chalk beds due to the presence of flint beds, which presented a significant technical challenge. They were exploring options for avoiding chalk beds entirely or to install cables within identified palaeo-channels comprising non-chalk sediments of sufficient depths. Existing Cefas MCZ data was presented indicating the location and scale of palaeo-channels. <i>Side scan sonar – imperfect identification of Sabellaria reefs.</i> RPS confirmed that, as for Hornsea Project One/02, where historical data has previously shown the potential presence of <i>Sabellaria</i>, these sites would be ground truthed irrespective of whether recent results of side scan sonar indicated the presence of reefs or not. 	
5	Fish & Shellfish Ecology	

	<p>RPS stated that no previous site specific data has been collected along the export cable route and outlined the key desktop data sources that will be utilized.</p> <p>The EWG reached agreement on the following:</p> <ul style="list-style-type: none"> The designated conservation sites that are considered relevant to the ECR as presented in the ECR Position Paper, noting the preliminary inclusion of the SNS pSAC as a supporting marine mammal habitat; The relevant construction/decommissioning impacts, their applicability to HOW03, the data gaps identified and the approach to fill the data gaps. No data gaps were identified, aside from the release of contaminants, which is dependent on the geophysical survey outputs and the presence of areas of high fines; The operation/maintenance impacts presented, their applicability to HOW03, any data gaps identified and the approach to fill these data gaps (operational noise was not deemed applicable). No data gaps were identified; No site-specific fish or shellfish surveys of the ECR are required (although noting that the results of the epibenthic beam trawls proposed for benthic characterisation would be useful to help inform the fish baseline); and The key assessment issues from Hornsea Project One and Hornsea Project Two which may be relevant to HOW03. There are no HOW03 specific issues. <p>Further discussion points situated around:</p> <ul style="list-style-type: none"> <i>The key receptors.</i> Cefas highlighted receptors of key interest including herring, elasmobranchs, nearshore shellfish communities and potentially sea trout. Cefas highlighted that Sheringham Shoal OWF had undertaken elasmobranch surveys which could be used to provide additional data for the EIA characterisation of the ECR; <i>The availability of data.</i> Cefas noted there is sufficient data available to inform the assessment. <i>The export cable construction method.</i> Cefas stated that construction is acceptable as long as the substrate is left in a suitable state after the cable has been laid. Methods that are suitable include ploughing or trenching which only create a channel in the sediment, while cable protection is a more complex issue. <i>Electro-magnetic fields.</i> Cefas noted that a lot research into EMF is generally inconclusive and that burial depth is considered an appropriate mitigation. EMF is generally not considered to be an issue, with appropriate burial depths. 	
6	Marine Processes	

<p>RPS provided an overview of the existing baseline information and the planned surveys that, along with existing data, would inform the marine processes characterisation for HOW03.</p> <p>RPS provided an overview of the surveys that are planned for the export cable route including, geophysical surveys and landfall geophysical and geotechnical surveys.</p> <p>The EWG reached agreement on the following:</p> <ul style="list-style-type: none"> • The relevant construction/decommissioning impacts, their applicability to HOW03, the data gaps identified and the approach to fill the data gaps. The EWG agreed that there is sufficient planned data collection to inform the impact assessment. It was noted that requirements for sand wave clearance, should this be required, will be included within the project description. • The operation/maintenance impacts presented, their applicability to HOW03, any data gaps identified and the approach to fill these data gaps. • The key assessment issues from Hornsea Project One and Hornsea Project Two which may be relevant to HOW03. An ongoing dialogue with the EWG was proposed regarding the landfall, which is yet to be determined and the assessment methodology of marine processes within the SACs. • There is sufficient data to characterise the marine processes of the ECR in order to inform the impact assessment. Additional information will be shared with the EWG when available. <p>The further discussion focused on geophysical data collection at the nearshore of one of the potential cable landing points within the Cromer Shoal Chalk Beds MCZ. DONG explained that high fishing activity at the western inshore area of the ECR limits the ability to utilise towed geophysical gear (magnetometer and sub-bottom profile). There is the potential for limited geophysical data collection within the nearshore area. The worst case scenario would be to assume that from 0 -3 nm no data would be collected, but from 3nm onwards higher data coverage would be obtained. Sub-bottom profiler data will be attempted to be collected in between the fishing gear. The data gaps within the 3 nm zone would be infilled by the existing Cefas data (the original data will provide better resolution than the MCZ verification reports) collected for the MCZ designation. During the pre-construction phase, full geophysical surveys have to be completed and consultation will be initiated with fishermen in order to clear the area of fishing gear.</p> <p>NE considered that sub-bottom profiler data from beyond 3 nm, combined with available MCZ side scan data within 3 nm could be used to demonstrate the natural extension of the palaeo channel through the chalk beds. DONG confirmed that for the purpose of the assessment there would be no</p>		<p>significant impact on the MCZ chalk features (recognised as four separate MCZ features), even if cable protection was required, as the chalk would be avoided through use of the paleo channel. A more detailed confirmation of this would be gathered at pre-construction. NE agreed in principle that the avoidance of chalk features would be possible, but NE would need a closer examination of the data to confirm whether this is the case. NE also note that any impacts to the sediment features of the MCZ will have to be considered within the assessment. Cefas raised the question of whether the paleo channel is deep enough for cable burial to which DONG confirmed that the bathymetry of the channel does not allow any sediment to escape and therefore it is deep enough to bury the export cable.</p> <p>Cefas raised the possibility of Horizontal Direction Drilling (HDD) and NE confirmed they would recommend HDD under the chalk. It was confirmed that HDD is a potential option and with HDD landfall impacts may be further reduced.</p> <p>The potential for including the Environment Agency in the EWG was also considered due to the presence of beach recharge schemes towards the eastern extent of the ECR scoping corridor.</p>	
		<p>Natura 2000 /MCZ Assessment The approach to the HRA screening process was discussed. It was highlighted that:</p> <ul style="list-style-type: none"> • Natura 2000 sites that are directly impacted will be screened in; • Based on the evidence base from Hornsea Project One/02 suspended sediment dispersal of up to 2 mg/l extends out to 16 km, this distance will be used for screening purposes around the HOW03 array site; and • Further consideration is being given to the applicability of the evidence base from Hornsea Project One/02 cable route to the HOW03 cable route. <p>NE raised the issue of the requirement of an MCZ assessment. NE confirmed that if there is the potential to impact an MCZ, a MCZ assessment is required and this would be anticipated to be seen as a separate document '<i>Information to support an MCZ Assessment</i>'. The stage 1 of the MCZ assessment is similar in process to an Appropriate Assessment. A stage 2 MCZ is only considered if it is determined that the activity will hinder the conservation objectives of on the MCZ. This only applies to designated MCZ not recommended MCZ, unless the site is going through public consultation. The MCZ assessments are similar to an AA, in regards to robustness, the precautionary principle and the need for evidence. The EWG agreed that similar screening criteria will be used for MCZ assessment as for the HRA.</p>	<p>NIRAS / RPS: to update the EWG on the proposed screening distance around the HOW03 ECR.</p> <p>NE: to provide guidance documents on MCZ Assessments and</p>

		any available examples.
7	<p>Conclusions & Next steps The next EWG meeting will be in November with discussion points including the scoping report, the proposed benthic survey methodologies, the geophysical data that has been collected, the project description and the proposed landfall sites.</p> <p>A separate meeting, in November, will be planned to discuss the marine processes assessment methodology. Another EWG meeting will be scheduled for early 2017 to discuss the assessment methodologies for benthic ecology and fish and shellfish ecology.</p>	

Actions

1. **RPS:** When available, to circulate all existing PSA and geophysical data that has been collected to date in the array area, to the EWG, to provide an overview of the data coverage.
2. **RPS:** To provide a survey scope for the benthic survey along the ECR, for discussion and agreement with EWG
3. **NIRAS / RPS:** to update the EWG on the proposed screening distance around the HOW03 ECR.
4. **RPS:** To request from JNCC any information on the supporting habitats and management measures that are currently available for the Southern North Sea pSAC.
5. **Natural England:** To provide guidance documents on MCZ Assessments and any available examples.

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the HOW03 array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the Hornsea Three array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the Hornsea Three array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the Hornsea Three array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole Hornsea Three array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on Hornsea Project Two and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the Hornsea Three array.	The EWG agreed that no further sampling of sediment chemistry within the Hornsea Three array is required.
7	12.07.2016	There is sufficient confidence in the data and information that has been acquired to inform the benthic characterisation, including sandeel habitat characterisation, of the Hornsea Three array site and in turn the environmental impact assessment.	It was noted that recent geophysical and benthic sampling reduces the concern over sufficient data coverage and that the sampling coverage appears to be similar to previous applications. The EWG agreed it would be beneficial to present all existing geophysical and sediment (PSA) data to provide an overview before Cefas provide a final view on this.
8	12.07.2016	Regarding benthic ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminarily inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered, with consideration to be given to the inclusion of UXO detonation in the Rochdale Envelope.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered.</p>

			The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept as the ECR and surveys are defined further.
9	12.07.2016	Regarding fish and shellfish ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that all relevant construction/decommission impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps. The EWG agreed that no further fish and shellfish surveys of the ECR will be required.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and that there were no Hornsea Three specific issues that required further consideration</p>
10	12.07.2016	Regarding marine processes, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all relevant construction/decommission impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all relevant operation/maintenance impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept regarding the landfall, which has yet to be determined.</p>

C.4 BE, MP and FSE EWG meeting minutes 18.11.2016

<i>Subject</i>	Benthic and Fish Ecology and Marine Processes EWG
<i>Date - hours</i>	17.11.2016 11.00 - 16.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Julian Carolan - Offshore Environmental Manager, DONG Energy</p> <p>Tim Norman - NIRAS, Evidence Plan</p> <p>Alun Williams - EIA Project Director, RPS</p> <p>Nicola Simpson - Benthic and Fish Ecology specialist, RPS</p> <p>Martin Kerby – Senior Responsible Officer for the whole project and Senior Adviser for the array, Natural England</p> <p>Louise Burton – Senior Adviser for the cable route (offshore and onshore) and Intertidal Specialist, Natural England</p> <p>Marija Nilova – Case Officer, Natural England</p> <p>Stefania Schinaia – Marine Processes specialists, Cefas</p> <p>Jacqueline Eggleton – Benthic Ecology specialist, Cefas</p> <p>Louise Cox – Fish Ecology specialist, Cefas</p> <p>By phone</p> <p>David Lambkin – Physical Processes Specialist, ABPmer</p>
<i>Supporting Material</i>	<p>Marine Processes, Fish and benthic ecology position paper circulated on 10th November 2016</p> <p>Presentation circulated on 16th November 2016</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The aims of the meeting were to:</p> <ul style="list-style-type: none"> Summarise where we are within the Evidence Plan and what has happened since the last EWG meeting Discuss the information included within the Hornsea Three Scoping Report Discuss the benthic ecology surveys across the array area and the export cable corridor Discuss approach to MCZs 	
2	<p>Activities since last meeting</p> <p>The Scoping Report was issued to PINS and is available on PINS' website.</p> <p>The offshore ECR corridor search area has been refined at the landward end.</p> <p>Geophysical interpretation data from Hornsea Three array has been received.</p> <p>Progression of geophysical survey in ECR scoping corridor.</p>	
3	<p>Summary and discussion of the Scoping Report – Marine Processes</p> <p>It was noted that all participants had received the Scoping Report and were still reviewing it with a view to providing responses to PINS.</p> <p>AW introduced the Scoping Report as it relates to Marine Processes, outlining the potential impacts that would be considered in the assessment and proposed assessment methodologies. He emphasised that evidence based approach would be used to characterise the baseline and for predicting the likely effects of wind farm construction and operation. This evidence based approach would draw on the evidence from the assessments of Hornsea Projects One and Two, as well as other relevant offshore wind projects and the wider industry evidence base. AW also stated that in order for the application of an evidence based approach to be valid, two criteria needed to be met: Firstly there needed to similarities in the nature and characteristics of the baseline environment between Project Three and the projects from which evidence was being used. Secondly there also needed to be sufficient similarities in the project design envelope, such that similar changes would be expected to arise from the development, relative to the projects from which evidence was being drawn. It was highlighted that these two criteria had been considered when determining a proposed approach to this topic,</p>	

<p>With respect to potential increases in suspended sediment concentrations and deposition of disturbed sediment to the seabed within the Hornsea Three array area. It is considered that there is sufficient information from previous modelling of Project One and Two and that no further numerical modelling of these effects was proposed.</p> <p>DL stated that an evidence based approach was now an established approach and had been used elsewhere for predicting these types of effects. There was good correspondence now from previous modelling of sediment transport and deposition and these effects are relatively well understood.</p> <p>SS did not understand why further modelling was not being proposed, particularly as up to 400 additional turbines were being proposed. This was a general comment applying to the assessment of other marine processes impacts as well.</p> <p>AW stated that if you have previously modelled similar scenarios in an environment with similar characteristics then you would expect similar modelling predictions.</p> <p>JE asked if the particle sizes likely to be present at Hornsea Three had been modelled (particularly the predominance of fines compared to the other HOW sites)?</p> <p>AW confirmed that a range of particle sizes, including those occurring in Hornsea Three, had been modelled. AW also stated that the similarities between the baseline environments between Hornsea Three and the previous Hornsea projects would be presented when applying this approach.</p> <p>With respect to the ECR, MK asked if effects of sand wave clearance would be required and asked that the project made any requirement clear. JC confirmed that the Project would seek to avoid sand waves for engineering reasons in any case. The need or otherwise for sandwave clearance would be determined as evidence from the geophysical surveys becomes available, though this cannot be confirmed at this stage of Project development. JC to provide further information when available.</p> <p>LB suggested that there were lessons to be learned from Race Bank on sand wave clearance. Natural England's preference, where these activities are required within designated sites, is for sediment to be retained within the local</p>		<p>circulation system. Preference is for up-stream disposal so it redistributes back to its source.</p> <p>JC acknowledged that this was good practice, but it can be difficult to implement due to operational constraints (for example in relation to tidal conditions).</p> <p>With respect to landfall LB highlighted that Natural England will flag presence of eroding cliffs and local opposition to further development in that location that is not related to sea defences. Need to consider impact of erosion (both back from the beach and downwards) on infrastructure. Cable installation design needs to ensure that no parts of infrastructure are exposed though the lifetime of the project. Consider set back of jointing pits etc. Sheringham Shoal wind farm undertook a beach profile survey, both before and after cable installation.</p> <p>AW noted that the EA's beach profiling information would be key information.</p> <p>LB indicated that Natural England is concerned about sediment mobilisation and deposition into nearshore MCZ.</p> <p>With waves DL noted that previous assessments (including P1 and P2) have produced very similar outcomes and the effects of Hornsea Three are expected to lead to similar effects on wave heights. Waves are affected in a predictable way and these can be used to generate a set of 'rules' that can be used to predict wind farm effects with respect to wave height reduction behaviour.</p> <p>MK raised issue of turbidity and stratification. Noted that there was a paper indicating that wind turbines might disrupt stratification. Could Hornsea Three affect the Flamborough Front, for example?</p> <p>JC noted that a similar assessment had been undertaken at BB Ext/ Walney Ext, but could not recall that this had predicted any significant effect. Unlikely that micro-scale structures (turbines) could adversely affect to any significant degree a macro-scale feature, such as a salinity front.</p> <p>MK raised issue of turbid wakes, need to explain these and their magnitude. DL responded that the key issue is whether any erosion is occurring, turbid wakes are visually striking, but not necessarily indicative of erosion.</p>	<p>Marine Processes topic to consider evidence from Race Bank, evidence base with respect to sandwave clearance</p> <p>Natural England to forward relevant references</p>
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	<p>MK a key issue for assessment is whether cable needs to be protected. There are examples where more of this has been required than was predicted in the Environmental Statement. JC pointed out that it is difficult to say now, but previous experience indicates that about 10% of the cable will be affected by cable protection measures where burial to target depth is not attained. Furthermore, Hornsea Three will assess and consent any emergency cable repair works to be included in the Deemed Marine licence as part of the DCO. LB stated that (surface) cable protection would not be acceptable to NE within designated sites.</p> <p>SS is concerned about an approach that only relies on previous modelling undertaken for P1 and P2. AW asked for more information on the reasons for concern. SS indicated that transboundary effects were an issue, as Hornsea Three is close to Dutch waters. JC pointed out that the Dutch would be consulted, but what was the concern in UK waters? Need Cefas to confirm its specific concerns.</p> <p>AW suggested providing an position paper outlining the justification for the evidence based approach to marine processes for each impact assessment.</p> <p>LB indicated that NE currently has no geomorphologist employed, so is not in a position to comment separately to Cefas.</p>	<p>Hornsea Three if possible, to include assessment of cable protection in EIA rather than as later operational ML variation</p> <p>RPS to propose further justification for the application of an evidence based approach in the form of a Position Paper submitted to through the EWG.</p>	<p>MN highlighted the need to consider the potential impact of the introduction and dispersal of non-native species over and above those currently considered as part of colonisation of hard structures. This would be a new category of issue not currently addressed in the Scoping Report. NS asked if there were any examples of where this had been covered for OWF previously. LB confirmed not aware of any to date but had been raised by stakeholders as a specific concern.</p> <p>LB raised why sediment contamination has been scoped out. NS/JE confirmed that this had been discussed at previous EWG meetings, and position papers noted that apart from naturally occurring arsenic, that there were low levels of contaminations in sediments found within the array.</p>	
4	<p>Summary and discussion of the Scoping Report – Benthic Ecology</p> <p>In terms of proposed topics for impact assessment, LB noted that the effects of gravity bases and associated seabed preparation are covered in some detail in the section of the Scoping Report dealing with marine processes, but not in benthic ecology. The habitat loss arising from this aspect is not identified. This becomes a particular issue for stakeholders, as they generally only review specific sections of the Environmental Statement, so need to ensure clear sign posting.</p> <p>MN said that we need to consider any changes to the seabed material as temporary habitat loss e.g. sandwave clearance</p> <p>AW/NS confirmed these potential impacts will be addressed, it is just that they are described more generally in the benthic ecology section of the Scoping Report than they are in the physical processes section.</p>	<p>RPS to ensure its apparent that gravity bases and sandwave clearance are covered in marine ecology sections of PEIR</p> <p>RPS to include a separate/specific non-native species impact assessment section in PEIR</p>	<p>5</p> <p>Summary and discussion of the Scoping Report – Fish & Shellfish Ecology</p> <p>LC noted that displacement of fishermen could occur leading to impaired access to resources. NS noted that this is a commercial fisheries impact, and LC confirmed it would be in their Scoping response so could be picked up by commercial fisheries aspect from there.</p> <p>LB noted that Defra had requested that NE consider the evidence for inclusion of additional features for the Cromer Shoal MCZ. NE still considering the evidence, but will only advise Defra, who will ultimately decide whether to include it or not. Focus is currently on the north-western part of the MCZ. Noted that it would be a good idea to consider using appropriate methods for detection for the additional features in any surveys undertaken in the MCZ – e.g. drop down video but that detection methods are limited to non-invasive as protected species (OSPAR, UKBAP).</p>	
			<p>6</p> <p>Benthic Ecology Surveys</p> <p><i>With respect to the Array area:</i></p> <p>LC requested that the sample locations tabulated in Appendix A of the position paper were cross-referenced to specific locations on the accompanying maps. It would also be helpful to have all the various maps in a layered PDF/ArcView to help the reader interpret the information.</p> <p>JE had expected the position paper to include an analysis of geophysical survey backscatter data. In particular for the central eastern part of the Hornsea Three array area – the area known as “Markham’s Hole”. As there are no benthic sampling locations in this area, these data would have been useful to confirm correspondence with areas for which sampling data are available.</p>	<p>RPS to update table in Appendix A and figures to allow cross-referencing</p> <p>RPS Present analysis of geophysical backscatter data versus PSA to justify that existing data</p>

	<p>MK agreed that it is important to have confidence in the habitats of this area, as it is likely to be of importance for benthic ecology. It was the original location for the MCZ, but this was subsequently moved northwards (to its current location) due to fishing interests. MK said that a more formal assessment is required to demarcate biotope types. NS agreed to provide further information/evidence in an updated position paper using the geophysical dataset and ground truthing dataset to demonstrate the sufficiency of the data coverage.</p> <p>NE confirmed that Defra is still considering the potential merits of designating Markham's Triangle MCZ.</p> <p>JE noted that Cefas have data from the "Southern North Sea Synthesis", which is more relevant to the ECR. It was based on 2 large surveys using mini-Hamon grabs. JE to check if these data can be made available.</p> <p><i>With respect to the ECR:</i></p> <p>LB is concerned that proposed approach to identifying survey locations, based on prioritisation of data gaps, might not be effective. Concerned that some habitat features are dynamic and that historic data for some locations might no longer be accurate.</p> <p>TN/AW argued that a structured approach was necessary due to the length of the corridor and that it made sense to prioritise those areas where there were gaps in data, but also where there were potential sensitivities. The principles set out in the position paper could be revisited to make this clearer. NS agreed to include a temporal aspect to the assessment of data gaps to address NE's concerns i.e. the age of the data would be taken into consideration when identifying data gaps as well as spatially. In addition, if/where possible, the longevity of any habitat features e.g. Sabellaria (which is potentially short lived and ephemeral) and sandbank/waves (which are longer lived/more stable) would be taken into consideration when identifying data gaps. Overall, the approach will be to gather an appropriate level of data in the ECR to enable a full characterisation for the purposes of the PEIR and EIA from existing data sources and site-specific surveys.</p> <p>LB raised concerns over the proposed scheduling of review of the benthic ecology survey plans. NS/AW highlighted that the turnaround times were to allow for the ECR surveys to be undertaken early 2017 so that the data could then be available for the EIA. Currently, it was not considered likely that the</p>	<p>coverage is sufficient.</p> <p>RPS to update position paper to present plot of all data including geophysical data to demonstrate sufficient coverage of grab sampling to inform an assessment.</p> <p>Cefas to provide data for surveys undertaken in 2011 and 2014, and S North Sea data synthesis 2012</p> <p>Cefas to forward data/reports if available</p>		<p>data would be available for the purposes of the PEIR, but that existing data would be used. LB raised concerns with this and that this left DE open to issues during the latter EIA stages, however it was discussed that the purpose of the EWG and continuing engagement with stakeholders was to alleviate these types of concerns.</p> <p>TN enquired whether there was any guidance on defining sand banks. MK noted that there is NE advice on sand banks, which can be provided to Hornsea Three.</p> <p>It was agreed that the next steps would involve:</p> <ol style="list-style-type: none"> 1) The Project would provide more information on the data available for the ECR 2) A detailed programme (in the form of a position paper) would be submitted to NE prior to any request for sign-off of proposed benthic ecology surveys <p>7 MCZ Assessment</p> <p>LB said that NE is concerned about the routing of export cables through Cromer Shoal MCZ. There had already been disturbance caused by installation of export cables for Dudgeon and Sheringham Shoal, which had been consented prior to MCZ designation. Though it should be noted that Dudgeon (cable route passes through the rMCZ) was consented while the Cromer Shoal area was designated as a rMCZ. LB stated that Sheringham have been unable to avoid chalk beds and had had to cut through them. Similarly ploughing had not been possible for Dudgeon and more invasive techniques had to be used to install the cable in shallow sediment areas. The proposal to install in mixed sediments would need to be investigated in greater detail as it was unclear what its depth was and whether cables could be installed within that sediment without cutting through chalk. It should also be noted that this is a geological site so buried chalk is protected, as is mixed sediment, but this sediment type is more likely to recover.</p> <p>MK also asked what the sediment would look like afterwards and would the process of installation lead to "simplification" of the substrate – e.g. though removal of cobbles. The biology of these habitats would also need to be characterised.</p> <p>LB noted that other stakeholders, such as commercial fishermen, may object to further development of this kind within the MCZ.</p>	<p>RPS to provide updated timescales for review</p> <p>NE to provide advice on sand banks</p> <p>RPS to update proposal for benthic ecology surveys</p>
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	MK suggested that there may be useful information from the Humber Gateway Application, where cobble had been removed and replaced.	
8	Conclusions & Next steps	

Actions

1. **RPS** to develop Position Paper providing further justification for the application of an evidence-based approach to the marine processes impact assessment.
2. **Natural England** to forward relevant references on stratification effects
3. **RPS** to prepare revised / updated Benthic Ecology position paper to cover:
 - a. Array area data coverage (incorporating geophysical data when available to justify sufficiency of existing data)
 - b. ECR: Data coverage plots to show include survey / sample locations, age of data, purpose / methodology of survey
4. **Cefas** to forward data/reports on Southern North Sea Synthesis if available
5. **RPS** to develop draft ECR benthic survey specification for circulation and agreement with EWG
6. **Natural England** to provide advice on sand banks

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the Hornsea Three array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the Hornsea Three array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the Hornsea Three array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the Hornsea Three array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole Hornsea Three array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on Hornsea Project Two and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the Hornsea Three array.	The EWG agreed that no further sampling of sediment chemistry within the Hornsea Three array is required.
7	12.07.2016	There is sufficient confidence in the data and information that has been acquired to inform the benthic characterisation, including sandeel habitat characterisation, of the Hornsea Three array site and in turn the environmental impact assessment.	It was noted that recent geophysical and benthic sampling reduces the concern over sufficient data coverage and that the sampling coverage appears to be similar to previous applications. The EWG agreed it would be beneficial to present all existing geophysical and sediment (PSA) data to provide an overview before Cefas provide a final view on this.
8	12.07.2016	Regarding benthic ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered, with consideration to be given to the inclusion of UXO detonation in the Rochdale Envelope.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered.</p>

			The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept as the ECR and surveys are defined further.
9	12.07.2016	Regarding fish and shellfish ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that all relevant construction/decommission impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps. The EWG agreed that no further fish and shellfish surveys of the ECR will be required.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and that there were no Hornsea Three specific issues that required further consideration</p>
10	12.07.2016	Regarding marine processes, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all relevant construction/decommission impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all relevant operation/maintenance impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept regarding the landfall, which has yet to be determined.</p>

C.5 BE, MP and FSE EWG meeting minutes 01.02.2017

<i>Subject</i>	Benthic and Fish Ecology and Marine Processes EWG
<i>Date - hours</i>	02.02.2017 10.30 - 13.30
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Louise Burton (LB) – Senior Adviser for the export cable route (offshore and onshore) and Intertidal Specialist, Natural England</p> <p>Marija Nilova (MN) – Case Officer, Natural England</p> <p>Stefania Schinaia (SS) – Marine Processes specialists, Cefas</p> <p>Jacqueline Eggleton (JE) – Benthic Ecology specialist, Cefas</p> <p>Louise Straker-Cox (LC) – Fish Ecology specialist, Cefas</p> <p>Georgina Greenhalgh (GG) – Fish Ecology specialist, Cefas</p> <p>Tania Davey (TD) – Living Seas Sustainable Development Officer, The Wildlife Trusts</p> <p>Julian Carolan (JC) - Offshore Environmental Manager, DONG Energy</p> <p>Sophie Banham (SB) – Consents Manager, DONG Energy</p> <p>Alun Williams (AW) - EIA Project Director, RPS</p> <p>Kevin Linnane (KL) - Benthic and Fish Ecology specialist, RPS</p> <p>Tim Norman (TN) - NIRAS, Evidence Plan</p> <p>David Bloxsom (DB) – NIRAS, Evidence Plan</p> <p>By phone</p> <p>David Lambkin – Physical Processes Specialist, ABPmer</p> <p>Martin Kerby – Senior Responsible Officer for the whole project and Senior Adviser for the array, Natural England</p>
<i>Supporting Material</i>	<p>Justifying the application of an evidence based approach to the assessment of Marine Processes – Position Paper</p> <p>Updates on Array Area Data and Export Cable Route Sampling Strategy - Position Paper:</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The aims of the meeting were to:</p> <ul style="list-style-type: none"> Summarise where we are within the Evidence Plan Discuss the information included within the Hornsea Three Scoping Report Agree whether the benthic ecology surveys across the array area and the export cable corridor are sufficient for the purpose of EIA Discuss the evidence based approach to marine processes <p>TN summarised the meetings to date and the key points of discussion.</p>	
2	<p>Benthic Ecology Surveys – Array Area</p> <p>KL provided an overview of:</p> <ul style="list-style-type: none"> Available desktop information Existing survey data from the Hornsea Zone Existing survey data in the Hornsea Three Array, including 61 grab sample sites and 9 epibenthic trawl sites. <p>The Hornsea Three sampling sites were presented in the context of a number of different data sets e.g. bathymetry and seabed sediments interpretation (based on the 2016 geophysical data) and the biotope maps produced for the Hornsea P2 Environmental Statement.</p> <p>Preliminary sandeel habitat classification data has been undertaken following the established methods Latta <i>et al.</i> (2013), using the sea zone hydrospatial data and the 2016 PSA data. The sediments within the Hornsea Three array are broadly less suitable as sandeel habitat than the wider Hornsea Zone.</p> <p>The Project team feel that the sampling density across the Hornsea Three area is sufficient for characterising the seabed and specifically sandeel habitat, for the purpose of informing the EIA. There is good coverage of the broad scale sediment types and sediment features within the array and the sediments are broadly similar to Hornsea P1 and P2.</p> <p>The discussion focused on two specific areas:</p> <ul style="list-style-type: none"> Survey requirements within the array; and Markham's Triangle MCZ 	

<p><u>Markham's Triangle</u></p> <p>Regarding Markham's Triangle MCZ, LB noted that, through correspondence with JNCC, there is a clear message that the survey resolution must be sufficient to be able to demonstrate:</p> <ul style="list-style-type: none"> • That there is sufficient environmental data to inform a realistic approach to cable protection/scour prevention within the MCZ. This is to avoid changes to the proposed method(s) occurring post-consent. • That any cable protection/scour prevention can be fully decommissioned (removed). • That the features of the MCZ will be able to fully recover <p>LB advised that the benthic environmental data and associated cable protection/scour prevention approaches being utilised for Hornsea Project One or projects with similar conditions, are referenced to inform the proposed approach within the Hornsea Three impact assessment. This increased level of detail pre-consent is being requested of all OWFs going forward.</p> <p>LB noted that Natural England would be likely to provide a view on which methods are acceptable before the application is submitted. JC asked whether there was an evidence base to support the NE decision on which methods would be approved. LB stated that currently there is no evidence on the feasibility of removing scour protection and as such Natural England are taking a more precautionary stance. It was noted that there is little information available from Oil and Gas as they are often not required to remove such protection measures and are predominantly not located within MCZs.</p> <p>LB noted that Natural England are happy with the proposed sampling approach for the array area, but wanted to emphasise the importance of fully understanding the MCZ benthic habitats/sediment types to be able to provide a realistic approach to cable protection/scour prevention within the application and to ensure that the approach can be fully decommissioned.</p> <p>JC noted that the PEIR will be based on the worst case scenario but where possible the envelope will be refined for the final application to provide a realistic picture of possible protection types.</p> <p>SB noted that some flexibility will be required within the project envelope. There are various types of scour/cable protection that you can be more</p>		<p>confident in your ability to remove at a later date. TN noted that the decision about the Rochdale envelopes is not just about the certainty of the seabed, but also a number of other aspects, and that even complete certainty of the sediment structure does not mean it is possible to state exactly what infrastructure will be utilised.</p> <p>MK stated that what would help with ensuring a full understanding of the Markham's Triangle site would be to describe the physical processes within the site, particular with respect to sedimentation. This would help the detailed assessment of impacts. SB confirmed that DONG Energy will consider carrying out such an assessment.</p> <p><u>Survey requirements</u></p> <p>JE noted that Cefas still doesn't feel there is enough data on the deep mud areas [Markham's Hole].</p> <p>JE stated that Markham's Hole is the area of concern and need you to be confident that you can describe the habitat based on the sampling points [currently 3 sampling points]. LC noted that the concerns were regarding the impact assessment and whether the data was going to be detailed enough to inform the assessment and any potential monitoring afterwards.</p> <p>SB noted that the information presented is sufficient to classify a biotope, which is the standard approach in impact assessments. Information on particular species would not change the approach to impact assessment, which is based on biotopes.</p> <p>SS stated that Cefas would want additional sampling focused on the deep areas of the array [Markham's Hole].</p> <p>MK noted that what might help, along with additional sampling, would be to describe the function of these deeper areas and to reference other deep water channels across the Hornsea Zone as well, this would raise the confidence on what might be found within those areas.</p> <p>AW stated that the marine processes assessment would look at sediment transport as part of the baseline, which would involve developing a conceptual understanding of the sediment transport within the area. MK requested that</p>	<p>Hornsea Three to circulate the number and location of additional sample sites within the</p>
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	<p>the marine processes work is fed back into the MCZ considerations around broad scale habitat to join those two bits of the assessment up.</p> <p>The EWG agreed that extra sampling would be carried out within the Markham's Hole area. This would consider density of sampling within Markham's Hole and aim to match the sampling density across the rest of the array area. The number and location of the samples will be circulated to the EWG. [The updated sampling strategy within the array area has since been circulated to the EWG and agreed]</p> <p>LC noted that Cefas are broadly happy with the classification of potential sandeel habitats. Cefas are happy with the impact assessment approach to assume the whole area is potential sandeel habitat. Cefas to respond with any additional comments by the end of the week [to check whether the site specific sampling is broadly the same as the habitat mapping].</p>	<p>Markham's Hole area</p> <p>Cefas to respond with any addition comments on the classification of potential sandeel habitats by 3rd February 2017.</p>	<p>LB noted that there has been significant change in the ECR since the scoping report was submitted. LB noted the following:</p> <ul style="list-style-type: none"> • Both NE and JNCC agreed that the route is not environmentally desirable. • A preferred route would be further to the west avoiding the majority of the NNSSR SAC, only passing through the 'Dalek Arm' [western extension of the SAC], limiting the impact to the designated site. The advice is currently to avoid the NNSSR SAC due to the importance of the reef habitats. JNCC are the SNCB responsible for the SCI/SAC as it is outside 12nm and hence they will advise, through NE, how the Appropriate Assessment will need to be undertaken. In particular, for offshore SACs, they define the entire site as Annex I habitat. This is in contrast to Natural England's approach which would focus on specific physical and biological features of interest within a site. • NE position is that sandbanks should not to be levelled • NE and JNCC would advise against any cable protection/scour prevention within the NNSSR SAC and would not be content to say no adverse effect should any additional protection be required. • There is a new aggregate area [no. 483] in the northern area of the ECR which is at appropriate assessment stage. 	
<p>3</p>	<p>Benthic Ecology Survey – Export Cable Route</p> <p>KL stated that the 2017 Benthic ecology surveys will not be available for inclusion within PEIR, but will be incorporated in the final Environmental Statement. A full impact assessment will be provided in PEIR.</p> <p>KL provided an overview of:</p> <ul style="list-style-type: none"> • the principles of the proposed survey design and the data sources that will inform the PEIR (existing desktop data sources and 2016 geophysical survey). • The process of identifying priority areas for benthic surveys, based upon existing data coverage, which has resulted in all the broad scale habitat types having been covered. • The proposed additional sampling along the ECR, providing a geographic spread while sampling all the broad scale habitat types. Noting that sediment chemistry would only be conducted in areas of over 5% fine sediment. • Sampling locations [drop down video] within the North Norfolk Sandbanks and Saturn Reef SAC and Cromer Shoal Chalk Beds MCZ. Noting that the purpose is to identify presence/absence of reef not definitive mapping of the habitats, which will occur in the pre-construction surveys of the cable route. <p>Proposed actions moving forward is to sign off on the ECR survey specification 1 week from the EWG meeting [1st Feb 2017].</p>	<p>Cefas (JE) to provide the Southern North Sea synthesis interpretative report and PSA data.</p>	<p>LB noted that the logic of the gap filling exercise proposed is acceptable, for the proposed ECR.</p> <p>LB noted that the sampling points within Cromer Shoal Chalk Beds MCZ still need to be discussed and raised concerns over intrusive sampling within areas of high biodiversity. KL confirmed that no grab samples will be conducted within any areas of potential Sabellaria reef or chalk [based on existing data], only drop down video would be conducted in these areas. [Feedback on the sampling strategy within the Cromer Shoal Chalk Beds MCZ was received in writing from Natural England. The sampling strategy was subsequently updated and circulated to the EWG. The strategy has now been agreed]</p> <p>In relation to LB's concerns on the ECR, JC noted that a multitude of factors are considered within route selection and all of this will be reported within the PEI site selection and consideration of alternatives. The rationale for route planning will be fully explained and justified.</p> <p>SB noted that it is recognised that the process of identifying the chosen landfall location, and offshore route, needs to be clearly communicated. This process will initially start within the MCZ workshop. The natural process to</p>	

	<p>present this information is within the PEIR, but this is not a quick process, so it will be considered whether this can be communicated earlier.</p> <p>MK noted that as there are significant concerns about the interaction of the proposed ECR and the NNSSR SAC, IROPI and compensation measures should be thought about now.</p> <p>MK questioned whether the route corridor presented demonstrates the maximum flexibility of the ECR. JC noted that the route presented is currently the optimum route, and the corridor presented in the scoping report was to allow extra flexibility. JC noted that the survey extent needs to reflect the flexibility that may be required along the ECR. MK advised that if there are areas with reduced constraints, particularly within designated sites, then providing a broader ECR in that area and a sampling methodology to reflect this would allow this flexibility.</p> <p>The EWG agreed that the proposed sampling locations for the purpose of characterising the proposed ECR was sufficient.</p> <p>The Project will review the route selection to identify areas of flexibility in the ECR. If any areas of flexibility are identified an additional sampling strategy will be developed and circulated to the EWG for sign-off.</p>	<p>Hornsea Three to provide a date on when the potential additional sampling will be presented to the EWG.</p>	<p>DL stated that the previous studies considered waves from north to east, which were considered to be the dominant conditions. Waves from north west to west (which may affect European coastlines) only occur infrequently and therefore wouldn't be an obvious case to consider. Waves from the north have the greatest potential to reach any coastline and in those cases the maximum effect almost doesn't reach the Norfolk coastline.</p> <p>TN questioned whether it is Cefas' role to provide advice on other countries jurisdictions. SB noted that this wasn't the case for other SNCBs. SS stated that Cefas were requested by the MMO to advise on transboundary impacts.</p> <p>TN sought clarification about the issues specifically within UK waters. SS stated that there are a number of sensitive receptors that are of concern within UK waters.</p> <p>DL provided a summary of the proposed assessment methodology with regard to impacts to the wave regime:</p> <ul style="list-style-type: none"> • Expect the baseline conditions to be similar with Hornsea Project One and Hornsea Project Two • Similar worst case scenario project envelope • Similar underlying wave height reduction behaviour • Based on Hornsea Project One and Hornsea Project Two modelling results a set of 'rules' have been established to estimate the effects, both for Hornsea Three individually and in-combination. 	
<p>4</p>	<p>Marine Processes</p> <p>DL presented the justification for the Hornsea Three evidence based approach outlined in the points below:</p> <ul style="list-style-type: none"> • Evidence for describing the baseline and undertaking impact assessment. Evidence from P1 and P2 which are in close proximity. • All three Hornsea sites have a similar physical environment and similar project design characteristics. • Assessment outcomes for P1 and P2 concluded no significant impact. • Evidence based approach has been successfully applied to a number of other offshore wind farm projects. <p>SS raised concerns over transboundary effects, noting that these effects were not considered in Hornsea Project One or Hornsea Project Two, but must be considered in Hornsea Three.</p>		<p>DL noted that numerical coefficients combined with a numerical model will be used to quantitatively assess the distribution of wave energy, the magnitude of wave reduction and wave recoverability. DL explained that quantitative tools will be used, so while the proposed approach does not produce a spectral wave model, it will produce a quantified prediction.</p> <p>SS stated that Cefas will be against the evidence based approach in general. SS stated that while position paper had not been reviewed in detail, the source data is not enough, and that this position had been made clear previously. Not enough modelling has been conducted to inform the cumulative impact scenarios. SS is happy to provide a review on the position paper, but is of the opinion that the evidence from the previous modelling is not enough.</p>	

	<p>AW noted it would be beneficial to go through the specific approach to each impact, which was the aim of the position paper. At the previous EWG meeting it was felt that the conversation about the evidence based approach was quite generic, and significant efforts have been made to focus in on each impact assessment so specific dialogues can be held. We have started down this road with waves.</p> <p>TN noted that the Project needs to understand specifically what the issues are with the evidence based approach for each impact and where the approach is insufficient.</p> <p>The EWG is happy for the discussion regarding the evidence based approach to be progressed specifically with SS and feedback any conclusions to the EWG. The MMO will also be involved in this discussion.</p> <p>NE note there are certain points they would like to discuss further regarding stratification and potential impacts on the Flamborough Front (as raised in their scoping response), but this could be dealt with through separate feedback. NE also noted that it would be useful to have a conversation with DONG Energy and JNCC regarding the NNSR SAC and the approach to impact assessment.</p> <p>Cefas stated the position paper will be reviewed by shell fisheries team, and any feedback provided.</p>	<p>Hornsea Three is clarify with the MMO how transboundary effects are to be dealt with.</p> <p>Cefas and MMO to provide feedback on the marine processes position paper</p> <p>Cefas to provide any additional feedback on the marine processes position paper on a per impact basis.</p> <p>Cefas to provide any additional feedback in relation to fish ecology once reviewed by the shell fisheries team</p>
8	<p>Conclusions & Next steps</p> <p>Next EWG meeting to be organised prior to issue of PEI.</p>	

Actions

- Hornsea Three to circulate the number and location of additional samples sites within the Markham's Hole area.
- Cefas to respond with any addition comments on the classification of potential sandeel habitats by 3rd February 2017.
- Cefas (JE) to provide the Southern North Sea synthesis report and PSA data.
- Hornsea Three to provide a date on when the potential additional sampling will be presented to the EWG.
- Hornsea Three is clarify with the MMO how transboundary effects are to be dealt with.
- Cefas and MMO to provide feedback on the marine processes position paper on a per impact basis.
- Cefas to provide any additional feedback on the marine processes position paper
- Cefas to provide any additional feedback in relation to fish ecology once reviewed by the shell fisheries team

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the Hornsea Three array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the Hornsea Three array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the Hornsea Three array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the Hornsea Three array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole Hornsea Three array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on Hornsea Project Two and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the Hornsea Three array.	The EWG agreed that no further sampling of sediment chemistry within the Hornsea Three array is required.
7	12.07.2016	There is sufficient confidence in the data and information that has been acquired to inform the benthic characterisation, including sandeel habitat characterisation, of the Hornsea Three array site and in turn the environmental impact assessment.	It was noted that recent geophysical and benthic sampling reduces the concern over sufficient data coverage and that the sampling coverage appears to be similar to previous applications. The EWG agreed it would be beneficial to present all existing geophysical and sediment (PSA) data to provide an overview before Cefas provide a final view on this.
8	12.07.2016	Regarding benthic ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminarily inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered, with consideration to be given to the inclusion of UXO detonation in the Rochdale Envelope.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered.</p>

			The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept as the ECR and surveys are defined further.
9	12.07.2016	Regarding fish and shellfish ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminarily inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that all relevant construction/decommission impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps. The EWG agreed that no further fish and shellfish surveys of the ECR will be required.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and that there were no Hornsea Three specific issues that required further consideration</p>
10	12.07.2016	Regarding marine processes, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all relevant construction/decommission impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all relevant operation/maintenance impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept regarding the landfall, which has yet to be determined.</p>
11	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three ECR and in turn the environmental impact assessment.	The EWG agreed that the proposed sampling locations for the purpose of characterising the proposed ECR was sufficient. If any areas of flexibility along the ECR are identified, then an additional sampling strategy will be developed and circulated to the EWG for sign-off.
12	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment.	The EWG agreed that extra sampling would be carried out within the Markham's Hole area. The extra sampling will provide a similar level of sampling density within Markham's Hole as the rest of the array area. With this extra sampling the EWG is agreed that there is sufficient data and proposed sampling to characterise the Hornsea Three array area.

C.6 MP, BE and FSE EWG meeting minutes 04.12.2017

<i>Subject</i>	Benthic and Fish Ecology and Marine Processes EWG
<i>Date - hours</i>	02.02.2017 10.30 - 13.30
<i>Venue</i>	Ørsted, 5 Howick Place
<i>Attendees</i>	<p>In person Louise Burton (LB) – Senior Adviser for the export cable route (offshore and onshore), Natural England Emma Brown (EB) – Senior Responsible Officer, Natural England Marija Nilova (MN) – Case Officer, Natural England Becky Hitchin (BH) – Offshore Industry Advice Office, JNCC Tania Davey (TD) – Living Seas Sustainable Development Officer, The Wildlife Trusts Jon Rees (JR) – Coastal Processes, Cefas Helen Lancaster (HL) – Planning Inspectorate Sophie Banham (SB) – Consents Manager, Ørsted Jennifer Brack (RB) – Environmental consents, Ørsted Felicity Browner (FB) – Environmental consents, Ørsted Meltem Duran (MD) – Concept and Layout Engineer, Ørsted Elizabeth Dewing Andrews (EDA) – Lead geophysist, Ørsted Alun Williams (AW) - EIA Project Director, RPS Kevin Linnane (KL) - Benthic and Fish Ecology specialist, RPS Tim Norman (TN) - NIRAS, Evidence Plan Katie Swale (KS) – NIRAS, HRA David Bloxsom (DB) – NIRAS, Evidence Plan</p> <p>By phone David Lambkin (DL) – Physical Processes Specialist, ABPmer Richard West (RW) – Hornsea Three Case Officer, MMO Richard Green (RG) – Marine Licensing Manager, MMO Jacqueline Eggleton (JE) – Benthic Ecology specialist, Cefas</p>
<i>Supporting Material</i>	<p>Justifying the application of an evidence based approach to the assessment of Marine Processes – Position Paper</p> <p>Updates on Array Area Data and Export Cable Route Sampling Strategy - Position Paper:</p>

Item	Description	Action
1	<p>Introduction</p> <p>Brief introduction was provided on the points of discussion and recap on the Evidence Plan process.</p>	
2	<p>Project description updates</p> <p>MD provided an overview of the updates and refinements that have been made to the project description since the PEIR submission in July 2017, including export cable routes, pre-construction activities, cable protection and crossings, piling scenarios and O&M activities.</p> <p>Key clarifications:</p> <ul style="list-style-type: none"> • The eastern nearshore route has been dropped. • The approach to assessing UXO is under consideration (conversations through the Marine Mammal EWG). • Reduction of cable protection to 10% of the route within the NNSSR SAC. • Geophysical data from within the NNSSR SAC shows that sandbank mega-ripples are present but they have a low amplitude and there are significant density boulder fields present. It consists of shallow unconsolidated sediment over light glacial till with a number of sizable boulders (>70cm). It is considered that introducing 'boulder sized' cable protection would not significantly alter the form of the area. SB noted that this information has been reviewed to provide more context for the discussion around cable protection. • Pile driving will be undertaken with the minimum required energy, from a technical perspective, to reduce fatigue on the monopile and load on piling equipment. • O&M will be included in the DCO and an annex to the project description will outline the regular foreseeable activities. 	
3	<p>Marine processes</p> <p>DL provided an overview of the EWG actions and baseline updates.</p> <ul style="list-style-type: none"> • Additional geophysical data along the nearshore route. SB noted that due to fishing gear presence, geophysical data towards the eastern nearshore site is limited. Potting density has meant that drop down video surveys have not been conducted on the Sheringham/Dudgeon export cables despite efforts to do so. <p><u>Wave modelling</u></p>	

	<p>DL presented the previous wave modelling and the new wave modelling results. The previous modelling used SWAN, while the new modelling has been conducted using MIKE (DHI).</p> <ul style="list-style-type: none"> Spectral wave modelling is in progress to validate rule based model results. JR explained the background concern on this issue. The aggregate industry apply a rule of 3% change in wave height along the coastline in their coastal impact statements, this same rule is being applied to OWF. The previous modelling showed areas of greater than 3% change coming down towards the coast, which is why a robust technique is required for this sensitive coastline. SB questioned what happens if it is more than 3%. JR noted that for Hornsea 1 and 2 that conversation wasn't had, and this extra step is due to the addition of a third Project. AW explained that for P2 there was a lot of discussion, considered implications for waves during examination. The wave direction and the scenario presented will only happen for a proportion of the time. Additionally the scenarios modelled are on the assumption that Hornsea 1 and 2 are developed with gravity bases. Hornsea 1 is now committed to a monopile scenario and this will be fed into the assessment. DL stated that there is a good level of consistency between the rule based model and the spectral wave modelling. <p><u>Project description changes</u></p> <p>DL presented the PD changes relevant to the marine processes topic.</p> <ul style="list-style-type: none"> JR noted that it is useful to include contingency for the sand wave clearance volumes because it is uncertain how mobile these features are and other developers have got this wrong. <p><u>Section 42 comments</u></p> <p>DL provided an overview of the key S42 comments raised in relation to Marine Processes. Responses will be provided to all comments as part of the final application.</p> <p>JR requested details be reported to the EWG on the processes in the SWAN model and the processes in the MIKE SW model.</p>	
4	<p>Fish and shellfish</p> <p><u>Baseline characterisation</u></p>	

	<p>KL provided an overview of the August/September survey results for key fish/shellfish species and updates to the habitat classification maps.</p> <p><u>Underwater noise assessment</u></p> <p>KL noted that the modelling approach has changed since PEIR. JB confirmed that dBSea was originally used but it transpired that the model didn't fit particularly well with measured data and that Subacoustech recommend INSPIRE is used as further development of the dBSea model is needed.</p> <p>TD questioned whether a percentage or estimate will be used of how often the average worst case will occur. JB confirmed that the expected time at this energy will be presented. This will be precautionary.</p> <p>KL outlined the use of the Popper <i>et al.</i>, (2014) approach to behavioural effects. The assessment will be presented more or less similarly to the PEIR assessment. To aid interpretation noise contours will be presented over key habitats, although they won't represent the distance over which behavioural responses occur.</p> <p><u>Section 42 consultation</u></p> <p>KL outlined the key S42 comments.</p> <ul style="list-style-type: none"> Relating to the EIA methodology the approach is to use expert judgement when the matrices conclude that two levels of significance could occur. RW stated that the explanation of how the decision is made should be presented within the assessment. Monitoring will be discussed at the next EWG. There is considered to be no impact pathway on herring spawning due to the distance from spawning sites. Sandeel are sensitive to habitat disturbance and there is a good understanding of where sandeel are present within the southern north sea. While sandeel habitat will be affected the proportion of habitat affected is small. KL requested that NE provide additional reports on the effects of suspended sediment on sandeel larvae development. Generally, because the eggs are laid on sand there is a tolerance to suspended sediment and the levels of sediment deposition are minimal. <p>MN noted that winnowing of disposal mounds was not assessed and this may need to be sign posted from the marine process chapter. AW will double check what information has been included within the MP chapter, noting that the impact would be dependent on what sediment is present.</p>	
8	<p>Benthic ecology</p>	

<p><u>Since the last EWG</u></p> <ul style="list-style-type: none"> • Agreement of the scope of benthic surveys • Undertook surveys of the export cable corridor and array infill, sediment chemistry sampling and additional video sampling of annex I reef and additional nearshore sampling. <p>KL presented the completed benthic sampling, which contains four samples along the potential offshore alternative route within the NNSSR SAC.</p> <p><u>Sediment chemistry</u></p> <p>KL explained that the aim is to scope out suspension of contaminants along the cable route if the contaminant levels are of no concern. This impact has already been scoped out for the array area only.</p> <p>JE questioned whether the chemical levels have been checked against the OSPAR background levels, if there are high levels then the OSPAR levels would be referred to. KL to check arsenic and mercury levels against the OSPAR background levels. If the values are within the OSPAR background levels then there is no objection to the impact being scoped out of the assessment.</p> <p><u>Offshore characterisation</u></p> <p>KL explained that the biotope mapping has been updated following additional data and Section 42 comments.</p> <p>KL explained that annex I reef (both biogenic and geogenic) is present along the export cable route and explained the rationale for classifying the reef as not reef, low or medium.</p> <p><u>Nearshore characterization</u></p> <p>KL explained the approach to characterization and EDA provided an overview of the data collected and the specs. The whole of the nearshore area will be characterized to take into account the potential near shore alternative -route. KL outlined the baseline data sources, noting that in the western nearshore area, the level of potting activity meant that drop down video could not be collected. This included the areas of both the Sheringham Shoal and Dudgeon export cable.</p> <p>LB stated that the pre/post-construction drop down video data for Sheringham Shoal was not clear and the video and grab data was combined in the final reports. Therefore, the final reports were</p> <p>never signed off by Natural England. Natural England have never viewed the raw data.. KL explained that the aim has been to only consider how the biotopes have been classified which have then been used to extend the Hornsea Three biotope analysis. LB noted that this approach will be considered, there are still questions over the 2014 data on certain elements not being considered and further information has been requested [from Sheringham]. There will need to be caveats over the age of the data and that the reports weren't signed off by Natural</p>	<p>KL to check arsenic and mercury levels against the OSPAR background levels.</p> <p>MMO to provide Dudgeon OWF pre-construction survey reports.</p>	<p>England. KL explained that biotopes are a broad way of defining communities for the purpose of characterizing the environment. When reviewed alongside each other the Hornsea Three data, the Dudgeon data, the Sheringham data, the Natural England data and the MCZ data are consistent. While some of the data sets have not been signed off by Natural England [Sheringham], the broad community patterns are consistent across the data sources. LB noted that whether the reports or the raw data [from Sheringham] has been used for Hornsea Three biotope mapping is the key point and the emphasis has to be on the Hornsea Three data as this is the most recent data. BH noted it would be useful to see the interpretation of the Hornsea Three data separately and then go on to compare this with the existing data.</p> <p>KL stated that there is a point to balancing the limitations on the data that has been collected against the risk. One of the main issues would be the occurrence of reef (annex I) and there are a number of controls already in place if this happens. LB explained that there is a requirement to avoid habitats of ecological importance (e.g. Annex I habitat). The less evidence to support the characterisation the more emphasis is put on the mitigation and pre-construction surveys. KL explained if we had geophysical data along the potential near shore alternative route and it showed reef habitat, then the control measure would be to carry out a pre-construction survey. LB noted that the onus now is to ensure that the appropriate mitigation measures are agreed. BH noted JNCC and NE may differ in their approach slightly, the ability to microsite around <i>Sabellaria</i> offshore is lower due to the availability of data, therefore while micrositeing is preferable offshore it is recognised that it isn't the easiest task. EDA explained that there is geophysical data to base the cable siting on, and additional data will be collected. SB noted that multiple cables and multiple phases adds an additional level of complexity to the feasibility of micrositeing.</p> <p>TD noted that Eastern IFCA may have collected additional data within MPAs this may be worth investigating.</p> <p>KL explained that the data from the nearshore drop down video is still to be reviewed, but none so far represented potential chalk reef habitat, based on the Natural England criteria. This links up with the geophysical interpretation.</p> <p><u>Cable installation</u></p> <p>LB noted that the optimum cable burial depth is 1-2 metres and therefore it is assumed that it is going to be difficult to install a cable in the nearshore area due to the subcropping rock, the main concern being the amount of rock armouring that is therefore going to be required. Previous projects have underestimated the amount of cable protection required.</p> <p>EDA explained that the geophysical data is now with independent cable laying contractors. Past 100m offshore, the process should be fairly standard. The seabed environment will definitely drive the installation tool selection process and</p>	<p>KL to provide a note explaining how the different data sources have been used to classify the biotopes.</p>
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<p>the corridor size. MD explained that tools are being selected that can install within these environments and experience has been drawn from previous projects. SB noted that the Ørsted technical experts are being pushed to ensure a realistic view is taken forward. EDA stated that a higher level of data has been obtained compared to previous projects. EB stated that there is more flexibility to consider these issues pre-application instead of pushing them to pre-construction.</p> <p>KS questioned that if there was confidence that designated site features were not being impacted, would this effect the level of detail required on cable protection. LB noted that would affect the conversation but the broad scale habitats that support the designated features in the MCZ and areas in the SAC that may potentially support Annex I reef would still be affected by cable protection and stop the potential for reef development. Once rock armouring is placed you fundamentally change the site. The consideration of using rock that is similar to the existing environment is welcomed but it is still Norwegian granite with a different distribution. LB explained that confidence in the biotope mapping would be beneficial even when considering mobile features, as the main point is to understand how feasible it will be to install the cables to the optimum depth.</p> <p><u>Project description change – potential offshore alternate routes</u></p> <p>The potential offshore alternative route results in a reduced length overall through designated sites.</p> <p>SB questioned whether there were any further views on the potential near shore alternative route. LB stated that the potential near shore alternative route is considered to be a better route, but there are concerns that avoiding the MCZ features will result in a large amount of rock dumping in an SAC because the installation is technically more difficult. KL explained that both cable routes share the nearshore route which passes through the area of subcropping rock, and Ørsted are investigating the installation techniques. SB noted that Ørsted have put a lot of time into putting forward a realistic project envelope but there is a concern that the level of detail being requested won't be obtained until pre-construction when much more detailed survey work is conducted and the exact installation tool is known.</p> <p>LB explained that until Natural England can view the data on both routes it is not possible to provide an opinion either way. SB noted that either route will involve an envelope approach so the aim is to understand what information can be provided to move this conversation forward.</p> <p>LB outlined the thought process of what is acceptable regarding installation in an SAC:</p> <ul style="list-style-type: none"> • that there is no concern with installing the cables through the SAC, if Annex I habitats are avoided. • There is an issue if you can't install the cables to the optimum burial depth and rock armouring is required. Rock armouring is a permanent 	<p>Hornsea Three to contact Eastern IFCA over potential additional data.</p>	<p>habitat loss, unless there is certainty it can be decommissioned then it is a lot more favourable.</p> <ul style="list-style-type: none"> • If it is only a small area of rock armouring then this could be acceptable. • If rock armouring is required, due to the subcropping rock, over a large area then, this is a problem because it is changing the site. <p>BH stated that it would be useful to understand what Ørsted's view is on the risk of installing the cables. SB explained the aim is to reach a point that is conservative but still realistic in relation to the project envelope. Ørsted needs to provide confidence on the appropriateness of the envelope, noting that aspects will change.</p> <p>EB stated that it would be acceptable if a percentage of rock armouring along the cable route can be agreed and this is included in the DCO, it will limit the options if, at pre-construction, the situation changes. If the situation does change then it may result that it was more preferable to route through the MCZ. If there was no subcropping rock and the cable burial could be guaranteed then there would be no issue.</p> <p>TN explained that the potential for change cannot be eliminated, what can be done now is formulate a view on whether the project as enveloped, leads to an adverse effect on integrity. The level of detail referred to by EB would never be known for both options as it will depend on the installation success encountered at the point of construction.</p> <p>TN noted that no distinction has been made between the designated features and the supporting habitat. BH explained that an effect on site integrity includes everything in the site. EB explained that there are factors outside of the features that could have an effect.</p> <p>BH explained that an Oil & Gas operator have implemented a tabulated approach that lists all the relevant activities, pressures, sensitivities and links these to the conservation objectives for the sites affected. From this point the specific effects of each activity can be considered. LB noted that the Dogger Bank position statement also looked at form and function as well as extent regarding the conservation objectives. BH noted that a draft Appropriate Assessment has recently been completed for Area 483 [aggregates], which presents this tabulated approach.</p> <p>TN noted that a comparison of effects on the SAC and the MCZ would provide useful information as well as providing information on how the final route has been selected.</p> <p>SB concluded that the action is for the Project to produce a comparison of effects between the SAC and MCZ, and feedback on this document would be welcomed.</p> <p>LB noted that it would be useful to consult the IFCA on the potential offshore alternative routes and future management measures in this area. SB noted that</p>	<p>Hornsea Three to produce tabulated assessment of the SAC vs MCZ routes.</p> <p>MMO to request Area 483 Appropriate Assessment.</p> <p>Hornsea Three to produce comparison of effects on SAC and MCZ.</p> <p>MMO to contact IFCA regarding any information relating to the nearshore area.</p> <p>EWG to provide any further comments on S42 responses.</p> <p>BH to circulate updated GIS files.</p>
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	<p>the IFCA have been unwilling to share any information currently on the proposals for management measures.</p> <p><u>Section 42 comments</u></p> <p>KL requested any further comments on the responses to the section 42 comments provided in the position paper.</p> <p>KL noted that the phased build approach won't result in cable corridors being repeatedly disturbed directly after the cable is installed.</p> <p>BH stated that JNCC have just completed updating the GIS reef layers.</p> <p>LB noted that the Habitats Regulations have been updated.</p> <p><u>HRA</u></p> <p>KS explained the assessment approach towards the Wash and North Norfolk SAC.</p> <p>The EWG agreed the impacts to be assessed, noting that long term habitat loss from cable protection should be defined as permanent. The EWG agreed that subtidal features will be considered and intertidal features can be screened out of the assessment as long as there is evidence presented showing that sediment movements will not be affected. The feature 'large shallow inlets and bays' can also be screened out.</p> <p>BH noted that in relation to the BEIS Oil & Gas Appropriate Assessment, JNCC have produced a paper stating the fundamental disagreement with the conclusions of that assessment.</p>	<p>BH to circulate JNCC position paper relating to the BEIS assessment.</p>
9	<p>AOB & Next steps</p> <p>Next EWG meeting currently planned for January/February 2018. The aim will be to agree final positions on areas of agreement and disagreement.</p>	

8. MMO to contact IFCA regarding any information relating to the nearshore area.
9. EWG to provide any further comments on S42 responses.
10. BH to circulate updated GIS files.
11. BH to circulate JNCC position paper relating to the BEIS assessment.

Actions

1. KL to check arsenic and mercury levels against the OSPAR background levels.
2. MMO to provide Dudgeon OWF pre-construction survey reports.
3. KL to provide a note explaining how the different data sources have been used to classify the biotopes.
4. Hornsea Three to contact Eastern IFCA over potential additional data.
5. Hornsea Three to produce tabulated assessment of the SAC.
6. MMO to request Area 483 Appropriate Assessment.
7. Hornsea Three to produce comparison of effects on SAC and MCZ.

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the Hornsea Three array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the Hornsea Three array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the Hornsea Three array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the Hornsea Three array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole Hornsea Three array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on Hornsea Project Two and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the Hornsea Three array.	The EWG agreed that no further sampling of sediment chemistry within the Hornsea Three array is required.
7	12.07.2016	There is sufficient confidence in the data and information that has been acquired to inform the benthic characterisation, including sandeel habitat characterisation, of the Hornsea Three array site and in turn the environmental impact assessment.	It was noted that recent geophysical and benthic sampling reduces the concern over sufficient data coverage and that the sampling coverage appears to be similar to previous applications. The EWG agreed it would be beneficial to present all existing geophysical and sediment (PSA) data to provide an overview before Cefas provide a final view on this.
8	12.07.2016	Regarding benthic ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC. The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered, with consideration to be given to the inclusion of UXO detonation in the Rochdale Envelope.

			<p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept as the ECR and surveys are defined further.</p>
9	12.07.2016	Regarding fish and shellfish ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that all relevant construction/decommission impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, and their applicability to Hornsea Three had been considered and that there were no data gaps. The EWG agreed that no further fish and shellfish surveys of the ECR will be required.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and that there were no Hornsea Three specific issues that required further consideration</p>
10	12.07.2016	Regarding marine processes, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all relevant construction/decommission impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all relevant operation/maintenance impacts and their applicability to Hornsea Three, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted. It was agreed that an open dialogue would be kept regarding the landfall, which has yet to be determined.</p>
11	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three ECR and in turn the environmental impact assessment.	The EWG agreed that the proposed sampling locations for the purpose of characterising the proposed ECR was sufficient. If any areas of flexibility along the ECR are identified, then an additional sampling strategy will be developed and circulated to the EWG for sign-off.
12	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the Hornsea Three array site and in turn the environmental impact assessment.	The EWG agreed that extra sampling would be carried out within the Markham's Hole area. The extra sampling will provide a similar level of sampling density within Markham's Hole as the rest of the array area. With this extra sampling the EWG is agreed that there is sufficient data and proposed sampling to characterise the Hornsea Three array area.
13	04.12.2017	Designated sites	The EWG agreed that the intertidal features of the Wash and North Norfolk Coast SAC could be screened out of the assessment as long as sufficient evidence is provided to demonstrate there will be no effect on sediment transport which could affect the features. The feature 'large shallow islets and lagoons' could also be screened out. The subtidal features would be assessed within the RIAA.
14	04.12.2017	Baseline characterisation	The EWG agreed that sufficient data is available to successfully characterise the fish and shellfish environment.

			The EWG agreed that sufficient data is available to successfully characterise the potential offshore alternative route if this route is taken forward.
15	04.12.2017	Assessment methodology	<p>The EWG agreed that the approach towards the fish and shellfish underwater noise modelling was appropriate.</p> <p>The EWG agreed that the wave modelling approach is appropriate.</p>

C.7 BE, MP and FSE EWG meeting minutes 23.02.2018

(signed off by Natural England only)

Subject	Benthic and Fish Ecology and Marine Processes EWG (and MCZ workshop)
Date - hours	23.02.2018 10.00 – 17.00
Venue	Ørsted, 5 Howick Place
Attendees	<p>In person</p> <p>Louise Burton (LB) – Senior Adviser for the export cable route (offshore and onshore), Natural England</p> <p>Emma Brown (EB) – Senior Responsible Officer, Natural England</p> <p>Marija Nilova (MN) – Case Officer, Natural England</p> <p>Becky Hitchin (BH) – Offshore Industry Adviser, JNCC</p> <p>Helen Lancaster (HL) – Planning Inspectorate</p> <p>Sophie Banham (SB) – Consents Manager, Ørsted</p> <p>Felicity Browner (FB) – Hornsea Three Environmental Manager, Ørsted</p> <p>Meltem Duran (MD) – Concept and Layout Engineer, Ørsted</p> <p>Alun Williams (AW) - EIA Project Director, RPS</p> <p>Kevin Linnane (KL) - Benthic and Fish Ecology specialist, RPS</p> <p>Tim Norman (TN) - NIRAS, Evidence Plan & HRA</p> <p>Katie Swale (KS) – NIRAS, HRA</p> <p>David Bloxsom (DB) – NIRAS, Evidence Plan</p> <p>Jacqueline Eggleton (JE) – Benthic Ecology specialist, Cefas</p> <p>Richard West (RW) – Hornsea Three Case Officer, MMO</p> <p>Richard Green (RG) – Marine Licensing Manager, MMO</p> <p>Pete Gaches (PG) – Strategic Support, Gobe</p> <p>Gareth Parker (GP) – Electrical Project Manager, Ørsted</p> <p>Chris McMullon (CM) – Principal Environmental Advisor, Natural England</p> <p>By phone</p> <p>David Lambkin (DL) – Physical Processes Specialist, ABPmer</p>

	<p>Jennifer Brack (RB) – Hornsea Three Environmental Manager, Ørsted</p> <p>Tania Davey (TD) – Living Seas Sustainable Development Officer, The Wildlife Trusts</p> <p>John Hiskett (JH) – Senior conservation Officer, Norfolk Wildlife Trusts</p> <p>Steven Wallbridge (SW) – Coastal Processes, Cefas</p> <p>Georgina Eastley – Fisheries advice, Cefas</p>
Supporting Material	<p>Baseline data documents</p> <p>Meeting presentation</p>

Item	Description	Action
1	<p>Introduction</p> <p>DB provided a brief introduction on the points of discussion and recap on the Evidence Plan process.</p> <p>LB noted that the Environment Agency might be currently conducting a survey in the nearshore area.</p> <p>BH noted that the updated GIS offshore reef layers are awaiting sign off and JNCC are awaiting permission from BEIS to circulate the JNCC position paper relating to the recent O&G Appropriate Assessment.</p>	
2	<p>North Norfolk Sandbanks and Saturn Reef SAC</p> <p>BH provided an overview of the infrastructure activities ongoing within the NNSSR SAC, covering Conoco Philips, Shell, Perenco and Centrica/Spirit and aggregate areas. Aggregate area 484 has been dredging for a while and area 483 has recently been licensed.</p> <p>BH noted that Conoco Philips are in the process of developing new approaches to mitigating the impacts of decommissioning activities, including:</p> <ul style="list-style-type: none"> - Redistribution of existing rock, through dredging and re-shaping, to make a pre-used area accessible for new platform; - Consideration of vessel movements and needs for stabilisation; - Narrowing down the worst case scenarios through the evidence base for site specific assessments. 	<p>BH to pass on contact details for the Conoco Philips decommissioning</p>

<p>SB explained one of the major considerations relating to the export cable is the Offshore Transmission Owner (OFTO) divestment process. SB noted that all of the OFTO elements are placed on one marine licence. The issue is that the OFTO divestment process is very commercially focused, so discussions on project development/ management can become lost. TN explained that the aim is to get the consenting correct now and develop a robust solution, and OFTOs are subject to regulation in their own terms.</p> <p>KS noted that a lot of the decommissioning activities within the NNSSR SAC may occur before the Hornsea Three construction phase, which currently hasn't been factored into the assessments. SB noted that the key interaction is the pipeline crossings, and it is currently unclear whether any crossing will fall away if pipelines are removed. BH stated that BDP1 and LDP1 pipelines are being left in-situ, because currently they are buried to a depth that BEIS (and JNCC) consider appropriate (at least 0.6 m) and don't have a history of spanning. Buried pipelines do not affect the restoration of habitats above. LB noted that Vattenfall projects are considering options to remove sections of disused subsea cables. SB explained that Hornsea Three have also considered this but noted the added complication around pipelines.</p> <p>BH explained the theory is that Conoco Philips will not be introducing any new hard substrate unless critically needed. PG advised that this should be reflected in the Hornsea Three assessments if possible. BH explained that she has collated all the information on decommissioning activities to date.</p> <p><u>Assessment updates</u></p> <p>BH explained that additional text has been produced to make the conservation advice for the NNSSR SAC clearer.</p> <p>[note that the assessment matrices have not been fully reviewed and positions may change]</p> <p><u>Sandbanks</u></p> <p>KS explained that matrices have been produced breaking the assessment down against each conservation objective (CO) attribute. TN explained that the matrices demonstrate the breakdown of the assessment and help to focus the discussion on the key areas. KS explained that the key</p>	<p>consents manager</p> <p>BH to circulate collated information on decommissioning activities</p> <p>BH to circulate updated conservation advice</p>	<p>attributes for discussion are biological structure, physical structure and extent and distribution and outlined the high level arguments around each attribute.</p> <ul style="list-style-type: none"> - BH advised to use definite terminology, using 'likely' isn't helpful. CM explained that if a temporary impact is being referred to it would be useful to provide more detail on recovery timescales. - Relating to biological structure, BH noted that epibenthic and infaunal biotopes should be considered. KL confirmed that there is a clear idea of what biotopes are present, the cluster analysis, simpler and raw data are all considered when defining biotopes. - BH explained that the 'function' attribute actually relates to wider production of the sandbanks, which can support fish, marine mammals and/or seabirds, the larger ecosystem role that the features play. SB stated that function also relates to the supporting processes attributes, and if no effect is anticipated on these this supports the lack of effect on the site function. - BH stated that the key focus on the assessment should be on extent and distribution, physical structure and biological structure. <p><u>Sabellaria reef</u></p> <p>KS explained that the site specific surveys currently identified no reef along the cable route, noting the ephemeral nature of <i>Sabellaria</i>. Where possible measures will be taken to avoid reef, it is currently not possible to quantify the amount of reef impacted. Pre-construction surveys will be undertaken prior to construction.</p> <p>LB noted that the SNCB advice is to avoid reef, if it cannot be avoided then there is a LSE and potentially an adverse effect. The condition requested on a marine licence is to avoid Annex I marine habitats. LB explained that plan A should be to avoid reef, and plan B is to consider what approach can be taken if reef cannot be avoided. Projects are being advised to consider a core reef approach and NE's advice would be to consider this. BH stated that a core reef approach offshore would be challenging and based on current knowledge not completed to date. LB advised that the issue should not be left to post-consent.</p> <p>KS explained the difficulty in quantifying the effect on reefs and that there is evidence that <i>Sabellaria</i> can recover.</p>	<p>BH to circulate questions on the cluster analysis.</p>
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	<p>LB explained that in terms of future proofing the project and providing a realistic worst case scenario, it is not appropriate to leave this issue to pre-construction, mechanisms need to be in place to protect the <i>Sabellaria</i> reef given the recover CO. PG stated that therefore the only approach is to assume that the entire area is <i>Sabellaria</i> reef.</p> <p>CM noted that a scenario based approach would allow the regulator to make an informed decision based upon the different scenarios and the associated level of risk. LB recommended placing various cable scenarios (1-6 cables) over historic information of <i>Sabellaria</i> presence. LB explained that the old reef layer demonstrated where reef was and the new reef demonstrates where the reef has moved to.</p> <p><i>[post-meeting note: a follow up call was held with NE/JNCC and the principles of incorporating a level of risk to Sabellaria reef into the assessments based on different cabling scenarios was agreed]</i></p> <p>BH noted that operation/maintenance impacts should be less of an issue than construction/decommissioning.</p> <p>KS outlined the project position relating to operation/maintenance impacts on CO attributes, and the key element relates to cable protection. Discussion points:</p> <ul style="list-style-type: none"> BH explained that a paper on small scale effects has been published and would be useful to review. Relying on a small impact percentage isn't always sufficient KL noted there is an ongoing internal discussion around the type of cable protection, with the aim to minimise the environmental impact. SB has explained that the worst case scenario has been explained in greater detail. The number of crossings is an area where the volume of cable protection is unlikely to change. Cable maintenance is included within the worst case scenario. EB explained that the recover CO, is because there is something other than natural change that is affecting the site. 	<p>BH to circulate paper on small scale effects.</p> <p>KS to recirculate assessment matrixes.</p>		<p>GP provided an overview of practicalities of export cable installation, including:</p> <ul style="list-style-type: none"> The primary aim being to bury cables; The need to protect export cables; Data collected to understand a site; How cable burial is designed; How a site is prepared for burial; How the different tools are chosen; Remedial burial techniques; and Why burial sometimes fails. <p>Clarifications:</p> <ul style="list-style-type: none"> An OFTO is looking for a cable that cannot be damaged, which therefore limits the risk level. Burial answers the majority of risks to offshore cables. The main goal is to ensure that the cable is buried. It is relatively easy to change installation tool mid-installation HDD is not possible offshore. Cable protection is a last resort and every effort is made to reduce the volume required and maximise cable burial. Cable protection, among other aspects is very expensive. Small boulders do pose a risk to cable installation and therefore will be cleared to maximise chances of burial. LB suggested that based on previous experience, a plough is unlikely to work in the Hornsea Three nearshore area. The majority of reasons that result in a burial failure cannot be mitigated with additional baseline data. SB confirmed that over trawl surveys are not a standard condition, although the fishing industry may request this. 	
3	<p>Project Envelope</p>		4	<p>Ecological comparison of nearshore route options</p> <p>SB explained that based on the ecological consideration of the potential nearshore routes considered the <i>alternative</i> nearshore route has been selected as the final route for inclusion within the application.</p> <p>KL explained the differences between the two cable routes in terms of impacts to the MCZ. One of the reasons for selecting the alternative route is because of clay and peat exposures within the MCZ that the alternative route avoids. The overall volume of cable protection within designated sites will be reduced as the number of crossings in designated sites are reduced. In addition, the overall length of cable through designated sites is reduced by taking the alternative route.</p>	

	<p>CM noted that it is recognised that the reroute has been made to avoid impacts to the MCZ, but that doesn't excluded that there are still impacts to consider on the SAC.</p> <p><i>Baseline characterisation</i></p> <p>LB stated that Natural England has reviewed the data sets and confirmed that mixed sediment is present but there is a concern that, because the area is within an SAC designated for stony reef, the mixed sediment may qualify as Annex I habitat. It is not known whether stony reef is present. The data (one or two points) reviewed has not been highlighted to Hornsea Three yet and there is additional anecdotal evidence which suggests stony reef presence. Permission has been sought to share the data set. Within the SAC, the stony reef that has been mapped is within the centre of the Wash, the area of concern (to the eastern edge) has not been surveyed, a survey is currently being organised. PG stated that if a Natural England survey identifies stony reef then at that point in time it should be brought to the Project's attention.</p> <p>Key points from discussion:</p> <ul style="list-style-type: none"> • KL explained that the purpose of the nearshore clarification note was to agree the approach to site characterisation and clarify how the different data sources were being used to characterise the baseline. KL explained that no evidence of stony reef has been identified from the data reviewed as part of the baseline characterisation (all publicly available data). The approach taken is to extrapolate around existing data either side of the cable route. • PG explained that there is no evidence in the vicinity that suggests the presence of stony reef. SB explained that it is considered that sufficient data is available to characterise the baseline, it is not reasonably precautionary to assume the presence of stony reef. • LB explained that normally site specific survey data would be collected to characterise the baseline environment, there is limited confidence in the available data. TN stated that there is data for that part of the site, which is the best available data. • EB stated that the baseline characterisation that has been conducted is suitable, based on the existing data, but the existing data isn't considered sufficient. SB explained that the Project considers that there is sufficient data to characterise the baseline, 	<p>LB to circulate additional data that has caused the concern of stony reef presence along the nearshore cable route and KL to confirm if this data has already been reviewed.</p>		<p>it would be useful to look at the data that has triggered this concern.</p> <p><i>Incorporation of risk into the HRA</i></p> <ul style="list-style-type: none"> • EB explained that the HRA should assume there is the possibility of stony reef, as site specific data is not available to confirm that it is not present. A level of precaution and risk should be incorporated into the HRA. TN stated that an opinion must be formed, based on the evidence available, whether reef is present, and currently there is no evidence to suggest that reef is present. Therefore it can't be speculated that stony reef is present. • TN noted that it is clear that NE consider there is not enough baseline data to confirm that no stony reef is present, but explained that there is no available evidence to suggest the presence of stony reef, and therefore it is not clear how this assumption would be included in a meaningful way within the HRA. EB explained that this is the challenge of introducing a new route through a designated site, and why NE has been unable to advise on which route is preferred. CM explained the assessment has to be based on risks around the level of information. • SB suggested that it is overly precautionary and hence not appropriate, even if additional data was collected, to suggest that stony reef is present as the approach looking at existing data would still conclude that mixed sediment is present (hence it cannot all be stony reef). The data collected does not suggest stony reef so to extrapolate to the presence of reef seems illogical. <p><i>Additional clarifications:</i></p> <ul style="list-style-type: none"> • HL stated that when a site is designated you must be able to say that the features are present. LB explained that stony reef became an Annex I habitat after the original designation was made, and as such the eastern area has not been surveyed. • LB stated that NE believe that the mixed sediment is the area where cable installation may be difficult, if possible at all. • SB stated that additional baseline data cannot be collected. • PG the risk of stony reef presence is low, could this not be managed post consent. LB explained that there could be three different Annex I habitats present; <i>Sabellaria</i>, stony reef or sandbanks. Therefore, the post-consent condition requested would be to avoid the site, but as this is not possible, surveying 	
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	<p>the area would only inform the impact magnitude, not the decision-making process.</p> <p><i>Sandbanks assessment</i></p> <p>LB explained that subtidal sandbanks were designated before the sandbank feature was topographically defined, any subtidal sediment is a sub feature of the subtidal sandbanks. Therefore the subtidal mixed sediment is part of the sandbanks feature, and therefore either way mixed sediment is still Annex I habitat. MN noted that the assessment of sandbanks for the Wash and North Norfolk SAC, should consider all the sub-features of the sandbanks. KS confirmed that therefore the assumption should be that the majority of the site is sandbank feature. It was confirmed that the assessment would consider 100% feature and sub-feature coverage along the cable route.</p> <p><i>Cable protection requirements</i></p> <p>LB explained that Natural England do not want cable protection within the Wash and North Norfolk Coast SAC. The cable installation within the nearshore is going to be very difficult and cable protection is likely to be required. A condition of no cable protection would be preferable rather than attempting to avoid Annex I habitat, the worst case scenario is for cable protection to be laid within the site. SB stated that a condition of no cable protection is unrealistic. The project has taken a maximum design scenario approach and on that basis, using previous experience of cable installation, the 10% value has been developed.</p> <p>LB explained that if developers have a certain percentage of cable protection within their consent they will use cable protection as much as possible up to that 'allowance', and there is no method for Natural England to try to minimise the amount used. LB stated that engineers find the easiest option without considering what is the best environmental option. A condition of no cable protection, results in a realistic discussion, between Natural England and developers, post-consent over how much protection is actually required. LB stated that unrealistic requirements for cable protection from developers is leading Natural England to this position.</p> <p>SB noted the concern that developers use the maximum consented cable protection, but the risk otherwise is that a project is consented with the knowledge that the discussion is going to have to be held post-consent and that the consented project cannot be built without this cable</p>			<p>protection. LB explained that an activity shouldn't be permitted within a designated site, when, even with the inclusion of 10% cable protection, it is not fully understood what the impacts will be. LB explained that even a clear understanding of the sediment type present, Natural England would not want cable protection present in the SAC, because it removes a feature from the SAC.</p> <p>In response to questioning from HL, KL noted that cable protection has been categorised by environmental impact and efforts have been made, where possible, to make use of cable protection which is similar in grain size to the surrounding environment, limiting the effect as much as possible.</p>	
8	<p>Benthic ecology – additional issues</p> <p><i>Sediment chemistry</i></p> <p>KL explained that Arsenic levels were within the OSPAR BAC and Mercury levels were below Cefas AL1. On this basis the EWG agreed that resuspension of contaminated sediments, along the export cable, can be scoped out of the assessment. The impact has already been scoped out of the assessment for the array area.</p>				
9	<p>Fish Ecology</p> <p>KL provided a brief overview of the updates to the fish ecology assessment. The main update has been around the underwater noise assessment.</p> <p>KL explained that there are no major consenting issues identified regarding fish and shellfish ecology therefore it is anticipated that the statement of common ground can be progressed fairly quickly during the pre-examination phase.</p>				<p>GE to circulate any outstanding queries relating the fish ecology assessment</p>
10	<p>MCZ and nearshore marine processes</p> <p><i>Cromer Shoal Chalk Beds MCZ</i></p> <p>EB stated that the conservation advice is due to be published in March 2018. LB confirmed that there are no changes to the COs apart from the removal of all attributes and targets relating to the geomorphological features; those of the other features should be used as a proxy. The assessment on the other features is sufficient to inform whether there will be any impact on geomorphological features. The website will contain the most up to date information on the COs.</p>				

<p>KL provided a brief overview of the effects on subtidal sand and on features of geological interest. DL provided an overview of the impacts from marine processes within the Cromer Shoal Chalk Beds MCZ. DL explained the effects from HDD exit pits, pit mounds and cofferdams, on the geological features of the MCZ.</p> <p>LB questioned whether cable protection running parallel to the coast, and potentially multiple rows of cable protection, would cause a potential barrier for sediment transport to the coastline. AW explained that sediment will accumulate alongside the cable protection and then will then bypass the structure, each cable has the potential to block a relatively small amount of sediment due to the low profile of the structures. The cables won't form one singular barrier due to the small scale of the impact and the spacing of the cables, evidence will be included within the assessment. GP also noted that the sloping sides of cable protection is aimed at avoiding it becoming a significant barrier to sediment movement.</p> <p>AW noted that it may be required to back fill exit pits with rock bags, which in turn are covered by the excavated sediment. CM questioned what depth of sediment would be achieved. AW explained that this is a live issue that is still be worked through.</p> <p>GP/SB noted that open cut is still the preference in the nearshore area. LB suggested that open cutting techniques may struggle based on experience from Sheringham and Dudgeon OWFs whom had to HDD, due in part to public access requirements to the coastline.</p> <p>In relation to the cumulative assessment, LB stated that whether Dudgeon and Sheringham are part of the baseline depends on whether there are ongoing impacts, or whether the environment has recovered. There isn't the information from these Project to determine this, therefore the assumption is these projects are part of the baseline but it cannot be confirmed either way. The condition of the Wash and North Norfolk SAC is to recover because the condition of the site is unknown, BH noted this is the same as for the NNSR SAC which is recover due to the presence of infrastructure put in place before the site was designated.</p> <p><i>Markham's triangle</i></p>		<p>KL provided an overview of the assessment on the recover COs. Benthic trawling is the activity which has caused the recover objective. KL explained that the conclusion has been drawn that recovery to a baseline condition will occur but recovery to a favourable condition may depend on additional fisheries management measures. BH confirmed there is no information on potential fisheries management measures.</p> <p>KL noted that no projects have been identified for inclusion within the cumulative assessment for Markham's triangle. TD noted that TWT consider that commercial fishing is a licensable human activity and should be considered within the cumulative assessment. SB noted that the commercial fishing is considered part of the baseline environment as the fishing activity was present at the time the Natura 2000 sites were designated. Even if commercial fishing was not considered as part of the baseline there is no plan or project for which to assess against.</p> <p><i>Monitoring</i></p> <p>KL outlined the monitoring proposals currently outlined for inclusion within the DCO.</p> <p><i>Statement of Common Ground (SoCG)</i></p> <p>KL explained that certain areas have been progressed and can be included within the SoCG at this point. SB noted that the aim is to achieve a high level overview of the agreements that have been reached, as this demonstrates to PINS that progress has been made and where the ExA may need to focus attention.</p> <p>LB explained that multiple draft SoCG are not a statutory obligation and NE are stretched for resources. Therefore the level of engagement may be limited and this is particularly difficult when there is a lot to be discussed. SB stated that this is the reason why the Project is pushing to sign off issues that do not require further discussion and focus on the key issues. HL explained that a solution needs to be sought as the examining authority will ask questions and base decisions on the evidence provided.</p> <p>Phased build</p> <p>LB explained that Natural England's view of a phased build approach, is for Ørsted to install aspects of the Project at different phases with a certain time period in-between. It is now understood that an aspect of the</p>	
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	<p>Project could be sold to another developer, in which case the project should be presented as two separate Projects. The Projects could operate differently and the envelope is so large that the Project could be developed using different techniques. SB explained that technically it is feasible that part of the Project could be sold to another developer, although this is not Ørsted's primary aim and this is highly unlikely. The same approach was used for Hornsea Project One and Project Two. The Project is still constrained by the envelope that is presented. HL emphasised that this is true of all DCOs. It has always been possible to split a DCO.</p> <p>LB explained that it is not clear how the impacts would differ if the Project was brought forward by two different developers. SB explained that the maximum design scenario demonstrates the worst case scenario.</p>	
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Actions

1. BH to pass on contact details for the Conoco Philips decommissioning consents manager
2. BH to circulate collated information on decommissioning activities
3. BH to circulate updated conservation advice
4. BH to circulate questions on the cluster analysis.
5. BH to circulate paper on small scale effects.
6. KS to recirculate assessment matrixes.
7. LB to circulate additional data that has cause the concern of stony reef presence along the nearshore cable route and KL to confirm if this data has already been reviewed.
8. GE to circulate any outstanding queries relating the fish ecology assessment

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	06.06.2016	The aims of the Evidence Plan and of the marine processes, Benthic and Fish Ecology Expert working group	The EWG agreed they were happy with the aims of the Evidence Plan and the objectives and role of the Benthic and Fish Ecology and Marine Processes Expert Working Group.
2	06.06.2016	There is no requirement to carry out additional otter and beam trawl surveys in order to further characterise the fish ecology baseline for the HOW03 array.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional otter or beam trawls.
3	06.06.2016	There is no requirement to carry out additional metocean surveys for the HOW03 array for the purposes of undertaking the marine processes assessment.	The EWG agreed with the conclusion that there would not be a requirement to carry out any additional metocean surveys in the HOW03 array.
4	21.06.2016	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the HOW03 array site and in turn the environmental impact assessment. Any additional data that is collected during the geophysical survey may provide further detail.	Cefas will consider and revert on the resolution of any additional data that might be required to further confirm the likely extent of key benthic habitats.
5	21.06.2016	The existing characterisation of sandeel habitats within the HOW03 array is sufficient for the purposes of undertaking the EIA. It is not necessary to undertake further surveys to characterise sandeel habitat given that the EIA will adopt a precautionary approach which assumes that sandeel spawning habitat extends across the whole HOW03 array.	The EWG agreed that on the basis of the precautionary approach proposed (the entire area is treated as if it were suitable habitat for sandeel spawning), it is not necessary to further characterise sandeel spawning habitats, in order to undertake the assessment of impacts upon this receptor. Cefas to discuss the approach with the fish and shellfish advisor(s) on HOW02 and revert with their advice regarding further sampling required for sandeel habitats.
6	21.06.2016	There is no requirement to carry out additional sampling of sediment chemistry within the HOW03 array.	The EWG agreed that no further sampling of sediment chemistry within the HOW03 array is required.
7	12.07.2016	There is sufficient confidence in the data and information that has been acquired to inform the benthic characterisation, including sandeel habitat characterisation, of the HOW03 array site and in turn the environmental impact assessment.	It was noted that recent geophysical and benthic sampling reduces the concern over sufficient data coverage and that the sampling coverage appears to be similar to previous applications. The EWG agreed it would be beneficial to present all existing geophysical and sediment (PSA) data to provide an overview before Cefas provide a final view on this.
8	12.07.2016	Regarding benthic ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from HOW01/02 and all the appropriate HOW03 specific issues have been highlighted.	The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC. The EWG agreed that relevant construction/decommission impacts, their applicability to HOW03, the data gaps identified and the approach to filling the data gaps had been considered, with consideration to be given to the inclusion of UXO detonation in the Rochdale Envelope.

			<p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to HOW03, any data gaps identified and the approach to filling these data gaps had been considered.</p> <p>The EWG agreed that all key assessment issues from HOW01/02, relevant to HOW03, had been considered and all the HOW03 specific issues had been highlighted. It was agreed that an open dialogue would be kept as the ECR and surveys are defined further.</p>
9	12.07.2016	Regarding fish and shellfish ecology, no additional designated conservation sites need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from HOW01/02 and all the appropriate HOW03 specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered, with the preliminary inclusion of the Southern North Sea pSAC.</p> <p>The EWG agreed that all relevant construction/decommission impacts, and their applicability to HOW03 had been considered and that there were no data gaps.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, and their applicability to HOW03 had been considered and that there were no data gaps. The EWG agreed that no further fish and shellfish surveys of the ECR will be required.</p> <p>The EWG agreed that all key assessment issues from HOW01/02, relevant to HOW03, had been considered and that there were no HOW03 specific issues that required further consideration</p>
10	12.07.2016	Regarding marine processes, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from HOW01/02 and all the appropriate HOW03 specific issues have been highlighted.	<p>The EWG agreed that all relevant construction/decommission impacts and their applicability to HOW03, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all relevant operation/maintenance impacts and their applicability to HOW03, had been considered. There were no data gaps identified.</p> <p>The EWG agreed that all key assessment issues from HOW01/02, relevant to HOW03, had been considered and all the HOW03 specific issues had been highlighted. It was agreed that an open dialogue would be kept regarding the landfall, which has yet to be determined.</p>
11	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the HOW03 ECR and in turn the environmental impact assessment.	The EWG agreed that the proposed sampling locations for the purpose of characterising the proposed ECR was sufficient. If any areas of flexibility along the ECR are identified, then an additional sampling strategy will be developed and circulated to the EWG for sign-off.
12	01.02.2017	There is sufficient confidence in the data and information that has been previously acquired to inform the benthic characterisation of the HOW03 array site and in turn the environmental impact assessment.	The EWG agreed that extra sampling would be carried out within the Markham's Hole area. The extra sampling will provide a similar level of sampling density within Markham's Hole as the rest of the array area. With this extra sampling the EWG is agreed that there is sufficient data and proposed sampling to characterise the Hornsea Three array area.
13	04.12.2017	Designated sites	The EWG agreed that the intertidal features of the Wash and North Norfolk Coast SAC could be screened out of the assessment as long as sufficient evidence is provided to demonstrate there will be no effect on sediment

			transport which could affect the features. The feature 'large shallow islets and lagoons' could also be screened out. The subtidal features of the Wash and North Norfolk Coast SAC would be assessed within the RIAA.
14	04.12.2017	Baseline characterisation	<p>The EWG agreed that sufficient data is available to successfully characterise the fish and shellfish environment.</p> <p>The EWG agreed that sufficient data is available to successfully characterise the potential offshore alternative route if this route is taken forward.</p>
15	04.12.2017	Assessment methodology	<p>The EWG agreed that the approach towards the fish and shellfish underwater noise modelling was appropriate.</p> <p>The EWG agreed that the wave modelling approach is appropriate.</p>
16	23.02.2018	Identification of impacts	The EWG agreed that resuspension of contaminants can be scoped out of the assessment.
17	23.02.2018	Assessment methodology	The EWG agreed the principles of incorporating levels of risk around impacts to <i>Sabellaria</i> [raised during a meeting and agreed during a follow up call].

Appendix D Ornithology EWG meeting minutes

D.1 Ornithology EWG meeting minutes 10.03.16

<i>Subject</i>	Hornsea Project Three- Evidence Plan (EP) Ornithology Expert Working Group (EWG)
<i>Date - hours</i>	10.03.2016 Time 11.00-13.00
<i>Venue</i>	DONG Energy, 5 Howick Place, London
<i>Attendees</i>	<p>In person</p> <p>Stuart Livesey- Project Manager, DONG Energy Julian Carolan- Offshore Environmental Manager Madeline Hodge- Evidence Plan, NIRAS Tim Norman- Evidence Plan, NIRAS Tom Manning – Case Officer, Natural England Mel Kershaw- Ornithology Technical Specialist, Natural England Lisa Southwood – Case officer, MMO James Dawkins- Case Officer, The RSPB</p> <p>By phone</p> <p>Martin Kerby- Senior Case Officer, Natural England Aly McCluskie- The RSPB Tim Melling – The RSPB Tom Carpen- PINS Helen Lancaster – PINS</p>
<i>Supporting Material</i>	Hornsea Project Three Evidence Plan issued on 04.03.2016 Ornithology Background Paper issued on 08.03.2016

Item	Description	Action
1	Introductions, DONG Overview and introduction to Hornsea Project Three	
2	<p>Introduction to the Evidence Plan Process It was noted that the MIEU no longer exist and will not play a role in the Evidence Plan process and there is no requirement to formally request an Evidence Plan. PINS will replace the MIEU and chair future Steering Group meetings.</p> <p>Hornsea Three stated their desire to update the EP Process via a separate Steering Group (SG) meeting over the coming weeks. Any updates to the EP Process would be communicated to the EWG.</p>	DONG to update Evidence Plan and remove MIEU.
3	<p>Introduction and Aims of the Ornithology Expert Working Group It was noted that the MMO would like to be kept updated with the Ornithology EWG activity but would not necessarily be involved in all meetings.</p> <p>Hornsea Three noted that the EWG will largely focus on offshore ornithology matters until the export cable route and landfall location is known.</p> <p>Natural England asked if there would be separate intertidal working group focusing on both benthic intertidal ecology and intertidal ornithology. It was agreed that this would be determined following selection of the landfall location and whether there was a need for a separate intertidal working group.</p> <p>The RSPB asked if East Anglia may be an option for the landfall location, it was stated by Hornsea Three that a wide envelope on the east coast south of the Humber was still an option.</p> <p>There was a general discussion about the extent to which the Evidence Plan and Application process needs to be flexible to respond to new evidence on assessment methodologies. Natural England asked how new evidence and analysis methods would be dealt with as they emerge throughout the Evidence Plan process. It was noted by all that cut offs would need to be put in place for when new evidence could be incorporated into the baseline data collection and analysis process and these cut offs would correspond with key milestones within the pre-application process. It was noted that some aspects of the assessment e.g. use of and interpretation of model outputs may evolve during the pre-application and application process and Natural England need to be able to respond to this in their advice.</p>	Keep MMO updated on the Ornithology EWG

<p>PINs noted that Examining Authorities often request information regarding new evidence (e.g in published scientific papers) that emerges during the Examination period. It would be beneficial for the EWG to discuss emerging evidence/analysis methods if and when new data and ways of analysing it become important to evaluate.</p>			
<p>4 Offshore Ornithological surveys DONG stated that due to Crown Estate milestones the intention was to complete 12-18 months of surveys, aiming to start surveys in April 2016.</p> <p>Natural England advised that two years of relevant baseline survey data (covering two complete “bird seasons” for each species and season is the minimum requirement. Having less than two years of data will increase the uncertainty around the offshore ornithology impact assessment and will increase the risk for DONG that Natural England will not be able to reach conclusions regarding the impact assessment. Natural England asked what type of surveys were being planned, DONG responded that proposals have been received for both boat-based and aerial surveys. Natural England advised that a meta-analysis of all the existing datasets pertaining to the Hornsea Zone should be undertaken to inform the design of the baseline survey methodology for HOW3. Natural England asked if there was scope to integrate the existing data sets, and to commission a statistical analysis to, for example, look at spatial and temporal variation in each of the data sets and undertake a power analysis to inform the survey methods and survey effort needed to answer the key questions needed for the impact assessment. Natural England noted that the data collected for Hornsea to date could be used to test differences in the distribution across the Hornsea zone and examine whether inter-annual variation is greater than the spatial differences across the zone. This might indicate whether any of the existing Hornsea data could be integrated into the HOW3 impact assessment and this would have a bearing on which survey platform would be most appropriate for the HOW3 baseline surveys (i.e. boat or digital aerial).</p> <p>Hornsea Three noted that further interrogation of the zonal data would be of benefit to Hornsea Three but there was a need to establish the priorities of data acquisition and the type of data required without the meta-analysis of existing data as due to time constraints surveys would need to commence before any meta-analysis of the existing data sets could be completed so it was necessary to agree the type and frequency of surveys immediately.</p> <p>Natural England advised that given that HOW3 are unable to undertake an analysis of existing data to inform the HOW3 surveys, digital aerial surveys would be the preferred survey platform on the basis that they will contribute to a body of digital aerial data for the Hornsea Zone going forward (e.g. HOW1 is</p>	<p>Natural England and the RSPB to provide a scope of works for the meta-analysis of existing data (timescales to be agreed)</p>	<p>planning digital aerial surveys for their post consent monitoring) and because further boat based surveys were unlikely to resolve outstanding issues with the offshore ornithology assessment such as resolution of flight height behavior. Natural England noted that HOW2 had indicated that some digital aerial data had already been collected for the Hornsea Zone and that these data could potentially be used in the HOW3 assessment – e.g. to calibrate boat and aerial datasets, or to supplement HOW3 datasets (subject to testing the statistical and biological validity of doing this).</p> <p>DONG were not aware of the existence of these digital aerial data. ACTION: DONG to clarify the existence, nature (spatial coverage, time period covered) and ownership of the digital aerial datasets for Hornsea Zone with SMartWind and report back to EWG regarding whether these data could be integrated into the assessment for HOW3.</p> <p>The RSPB noted that their preference was for aerial surveys and asked if the aerial data collected for Project Two could be used and compared with the boat based surveys completed. The RSPB suggested power analysis was completed to detect change in inter annual variability, this could include annual variability in flight heights and confidence limits around PCH values. ACTION: DONG to set up an EWG meeting including the ornithological survey contractor asap so that details of the proposed baseline surveys can be agreed. Hornsea Three requested that Natural England and the RSPB provide a scope of works for the meta-analysis of existing data.</p> <p>It was agreed that digital aerial surveys would be the most suitable platform for Hornsea Three surveys.</p> <p><u>Hornsea Three</u> stated that their preference was for one year survey due to the time constraints of the development timescale. While 18 months was possible it would be extremely tight to consult on 18 months prior to submission. It was queried whether DONG Energy could extend the survey area beyond the 4km buffer to acquire data over a greater area to partially offset the temporal duration of data acquisition.</p> <p>Natural England noted their earlier comments regarding the need for baseline survey data spanning at least two years. Natural England are particularly concerned about the proposal to only collect data over 12 months. Natural England also suggested that it might be beneficial to include co-variate data in the analysis to try to explain observed variations in bird distribution and abundance. For example, there may be co-variate data such as bathymetry, sea temperature, prey abundance, chlorophyll A that could be interrogated together with the ornithology data set. DONG suggested, for example, that historical chlorophyll A data could be examined alongside kittiwake distribution data.</p>	

<p>Natural England noted that the version of the bird collision risk model (CRM) developed by Liz Masden takes better account of the uncertainty around collision risk prediction. This version of the model requires more detail about wind turbine characteristics, such as blade pitch and more detailed information on the relationship between wind speed and rotor speed. Hornsea Three asked if Natural England were likely to validate that model in time for use within the Hornsea Three assessment. Natural England stated that they were planning on reviewing use of the model and this was likely to happen by the time of the Hornsea Three assessment.</p> <p>The RSPB noted that the Masden model has been tested as part of the MROG groups and they were not seeing different results to those coming from Band. DONG asked if flight speed was still critical to the model inputs, RSPB stated it was still important but could be dealt with by aerial LiDAR data.</p> <p>- Martin Kerby provided an update on the Greater Wash draft SPA (submission of recommendations to Defra this spring) and noted that in due course there would need to be EWG discussions regarding the best methods to assess impacts on the site, given the potential change in its status between now and 2018.</p> <p>Hornsea Three stated an invite for the next EWG group meeting would be circulated once timescales for the surveys scopes were available to these could be circulated in advance of the meeting.</p>	
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Actions

1. Hornsea Three to update Evidence Plan and remove MIEU.
2. Hornsea Three to continue to update MMO on on the Ornithology EWG
3. Natural England and the RSPB to provide a scope of works for the meta-data analysis (timescales to be agreed).
4. DONG to clarify the existence, nature (spatial coverage, time period covered) and ownership of the digital aerial datasets for Hornsea Zone with SMartWind and report back to EWG regarding whether these data could be integrated into the assessment for HOW3.
5. DONG to set up an EWG meeting including the ornithological survey contractor asap so that details of the proposed baseline surveys can be agreed.

Agreements

1. It was agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2. Aerial surveys would be the most suitable platform for Hornsea Three ornithological surveys.

D.2 Ornithology EWG meeting minutes 13.04.2016

<i>Subject</i>	Ornithology EWG Review of draft survey scope
<i>Date - hours</i>	13.04.2016 10.30-15.30
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Julian Carolan- Offshore Environmental Manager, DONG Energy Emily King- EIA Project Manager, RPS Madeline Hodge- NIRAS, Evidence Plan Tim Norman- NIRAS, Evidence Plan Kit Hawkins- Commercial Director, HiDef Andy Webb- Statistics and Environment Manager, HiDef Aly McCluskie- RSPB James Dawkins- RSPB Mel Kershaw- Natural England</p> <p>By phone</p> <p>Tom Mannings – Natural England Martin Kerby- Natural England</p>
<i>Supporting Material</i>	HiDef aerial survey methodology Tracked change version of Meta-analysis scope of works Previous meeting minutes from 10 th March 2016

Item	Description	Action
1	<p>Introduction and updates on the Evidence Plan Steering group meeting was held on the 22nd March 2016, Evidence Plan, working principals and process for agreement was agreed and currently awaiting comments from the Wildlife Trust. Update Evidence Plan will be circulated to all participants w/c 18th April.</p>	DONG to circulate updated EP to all participants w/c 18 th April.
2	<p>Actions from previous meeting and review meeting minutes All actions from previous meeting were completed.</p> <p>DONG asked Natural England to clarify their position with regard to amendments made to meeting minutes from the 10.03.16 with specific reference to the comment: "Natural England advised that two years of baseline survey data (covering two complete "bird seasons" for each species and season is the minimum requirement". In the meeting, Natural England clarified that it is their stated preference to have 2 years of survey data to characterise the baseline environment and assess potential ornithology impacts for the Environmental Statement, although agreed that, subject to further analysis (in the form of the proposed meta-analysis), that it could be possible to compile a baseline for impact assessment that comprises both site-specific survey data (collected over less than 2 years) and existing zonal data. It was, therefore, agreed that the wording of the meeting minutes would be amended to state "Natural England advise that two years or more of relevant baseline survey data for each species is required"</p>	DONG to update meeting minutes from the 10.03.16 with revised wording.
3	<p>Review of meta-analysis scope DONG noted that the proposed amendments to the meta-analysis scope were made to reflect a clear focus on exploring how best to make use of existing data and planned site-specific survey data. Natural England and RSPB noted that the analysis of the flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two had been removed and that analyzing this data was critical. RSPB stated it was important to understand how variable the existing data sets is and to understand how representative the new data for Hornsea Three are. Natural England stated there is a need to understand the seasonal and inter annual variation in flight heights and also if existing bird density data collected in the Hornsea Project area can be integrated with HOW3 data to generate more than one year of data . DONG stated they were happy to incorporate analysis of existing flight height data into the meta-analysis provided the focus is on informing the assessment for Hornsea Three, not simply revisiting the assessments for Hornsea Project One and Hornsea Project Two.</p>	

<p>DONG asked Natural England and the RSPB if they were happy with the co-variates listed in the SoW and if there was anything further to add to this list. RSPB noted that shipping/fishing vessel activity would be of interest however such data may be difficult to obtain and interpret. It was noted that, in any case, patterns of shipping/fishing usage were unlikely to vary much over large scales from year to year, in a way that would influence the distribution/abundance of key bird species.</p> <p>Natural England asked if food resource data collected for other topic areas, such as fish and benthos could be analysed.</p> <p>DONG noted that surface roughness data could be obtained to look at the presence/strength of oceanic fronts. DONG noted more generally that the focus should be on to investigation of the typical variables that drive distribution of key bird species.</p> <p>RSPB stated that if we can account for the causes of variability then we can have more confidence in the data we collected for Hornsea Three. It was noted that the assessment should be carried account for the any variance in the data. If possible it would be advantageous to integrate existing data sets into the new data collected for Hornsea Three, noting this may require a comparison of the different data platforms.</p> <p>DONG questioned of the power analysis noting that due to timescales imposed on the Project by the Crown Estate they would be unable to do any more than 18 months of surveys at best and instead the meta-analysis should focus on the extent of variability in the existing data sets and the possible causes for such variation, with a view to informing how to analyse survey data and to undertake risk assessments.</p> <p>Natural England and RSPB stated that the purpose of the meta-analysis was to answer 2 questions, i) will 12-months of data be sufficient to inform the Hornsea Three assessment, ii) if not how can we integrate the existing dataset into the data collected for Hornsea Three? It was stressed that the reason for undertaking multiple years of site-specific surveys was to capture (to the extent possible) natural variability in bird densities, distribution and behaviour and to be able to incorporate this variability (e.g. via appropriate confidence intervals) in the baseline characterisation and assessment of impacts. It was important, therefore, to understand how variable populations were likely to be at the site in order to understand how representative site specific surveys were and to generate representative confidence intervals round the baseline ornithology data. It was agreed that these fundamental questions should be added to the meta-analysis SoW as the objectives of the study.</p> <p>The requirement to compare survey platforms was noted and, if DONG were intending to carry out boat-based surveys, could the recording of flight heights be added to the survey requirements.</p> <p>It was agreed the meta-analysis SoWs would be updated to include the requirement to address points (i) and (ii) above and investigate variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April. DONG would</p>	<p>DONG to update meta-analysis and circulate to NE and RSPB w/c 18.04.16</p>	<p>then seek to procure the work and share the methodologies as proposed by the contractors with NE and RSPB.</p> <p>4</p> <p>Presentation of survey methodology HiDef presented the proposed aerial survey methodology. Natural England asked if birds can be aged accurately using the aerial survey techniques. HiDef noted that birds can be aged correctly in most instances, although there was some difficulty in aging birds on the water. The ability to discriminate species was also good (overall 95% of records identified to species level), although this varied between species.</p> <p>HiDef stated the aim was to achieve 10% coverage of the Hornsea Three area. Natural England asked if DONG could look back at the boat based survey data and check 10% coverage was sufficient, HiDef responded that this had already been considered when determining that 10% was sufficient to characterise the Hornsea Three area.</p> <p>Natural England asked if the proposed south to north orientation of transects was appropriate. It was felt that there may be a west to east gradient that might be a more important driver of the survey method. HiDef noted that the gradient across the zone is both south/north and east west but as you move further east the east/west gradient becomes less apparent (due to distance from shore). Overall it was felt that south/north better reflected bathymetric variability as this was a key driver of bird distribution and abundance offshore. RSPB asked whether it would be the case that if the transects did not follow previous methodology that this would affect comparability of data with previous surveys. HiDef responded stating that this would depend on how the data was analysed, if a model based approach was taken this would be less of an issue.</p> <p>Natural England and RSPB asked if the buffer to the survey area could be extended to include areas of historical data collection (Hornsea Project One and Hornsea Project Two), in order to compare data using different platforms. It was noted by all parties that it would be difficult to determine the reasons for any differences in the results of these surveys conducted in different years and using different methods.</p> <p>Natural England asked whether, if data was analysed using a model based approach, it would be beneficial to survey a larger area or to increase coverage. HiDef noted that data would be collected using all 4 cameras, however, in the first instance it is proposed that data from only 2 of the cameras is analysed. If required, to increase coverage, the data from the additional cameras can be analysed. It was also noted that Natural England and JNCC have updated the interim displacement guidance note and this currently states a buffer of up to 4km for the most sensitive species (divers and sea ducks).</p>	<p>Action: Natural England confirm</p>
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	<p>HiDef stated that confidence limits around flight height data could be produced. RSPB noted the difficulty in using option 3 of the Band (2012) model with aerial survey data, as the generic flight height distributions used in that version of the model are based on an aggregation of the results of boat-based surveys. RSPB asked if flight height data collected by HiDef for multiple sites could be collated following methods used by Johnston <i>et al</i> (2014) to produce flight height distributions for key species. HiDef noted that this was underway but was not yet complete but could be done to enable use of the Option 3 of the model with aerial data. RSPB noted that Liz Masden's version of the model required monthly flight height data with standard deviations.</p> <p>RSPB also asked if flight speed data was currently available using aerial survey methodology. HiDef noted that at present they don't have a method for determining CLs around flight speeds yet.</p> <p>RSPB noted that there are two issues currently precluding application of Option 4 of the Band model: lack of avoidance rates compatible with the use of the extended model for gannet and kittiwake; and, lack of agreed, site-specific flight height distributions for key species. On avoidance rates, the bird collision and avoidance study currently being conducted under ORJIP, aims to recommend these. There was greater skepticism, however, that site-specific survey data collected over a relatively short period (12-18 months) would be likely to adequately account for variability in flight heights, such that flight height distributions for key species could be agreed. There would be greater confidence in these flight height distributions if they were combined with similar data from other offshore wind farm sites in a similar way to that described in Johnston <i>et al</i> (2014).</p> <p>DONG asked if NE or RSPB thought that any changes to the survey methodology were required. Both the RSPB and NE stated they were happy with the proposed methodology but highlighted the risk associated with collecting less than 2 years of site-specific survey data.</p>	<p>when update displacement guidance would become available</p> <p>Action: HiDef to confirm status of study to produce aerial version of Johnston flight height curves</p>
5	<p>Next steps and AOB Next meeting to be held in May, end of 2nd week as Aly away last 2 weeks of May.</p>	

4. Natural England confirm when update displacement guidance would become available
5. Action: HiDef to confirm status of study to produce aerial version of Johnston flight height curves

Agreements

1. It was agreed that the wording of the meeting minutes from EWG meeting on the 10.03.2016 would be amended to state "Natural England advise that two years or more of relevant baseline survey data for each species is required"
2. It was agreed the meta-analysis SoWs would be updated to include the requirement to investigate points (i) and (ii) above and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and the circulated to NE and RSPB the w/c 18th April. DONG.
3. It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data

Actions

1. DONG to circulate updated EP to all participants w/c 18th April.
2. DONG to update meeting minutes from the 10.03.16 with revised wording.
3. DONG to update meta-analysis and circulate to NE and RSPB w/c 18.04.16

D.3 Ornithology EWG meeting minutes 27.07.2016

<i>Subject</i>	Offshore ornithology EWG
<i>Date - hours</i>	27.07.2016 13.00 – 16.30
<i>Venue</i>	DONG Energy, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Allen Risby (AR) – Lead Environment and Consents Specialist, DONG Energy Tim Norman (TN)- Evidence Plan, NIRAS David Bloxsom (DB) – Evidence Plan, NIRAS Ian Ellis (IE) - Ornithologist, NIRAS Melanie Kershaw (MK)– Senior Specialist (Marine Ornithology), Natural England Tom Manning (TM) - Case Officer, Natural England Martin Kerby (MKE)– Senior Adviser, Natural England Phil Pearson (PP)– Senior Conservation Officer, RSPB James Dawkins (JD)– Case Officer, RSPB</p> <p>By phone</p> <p>Lisa Southwood (LS) - MMO Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB</p> <p>Apologies</p> <p>Louise Burton – Ornithological Specialist (intertidal and onshore), Natural England</p>
<i>Supporting Material</i>	Ornithological ECR position paper circulated on 21.07.2016

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The focus of the meeting was on:</p> <ul style="list-style-type: none"> • Discussions and agreements to date with regards to the Hornsea Three array area • The export cable route (ECR) scoping area and landfall locations • Discussion around the evidence gathering process to define the baseline environment and to agree the applicability of the Hornsea Project One/02 potential impacts to HOW3 • Discuss any key issues that are identified. 	
2	<p>Summary of EWG discussions and outstanding actions</p> <p>A brief summary of the discussions to date was presented, which has been focused on the Hornsea Three array area. The following agreements have been reached:</p> <ul style="list-style-type: none"> • Aerial surveys will be utilised • A meta-analysis of existing data from the Hornsea Zone will be undertaken. The SoW has been produced by DONG with input from NE, RSPB and NIRAS. <p>It is the intention for the EWG to comment on the proposal for the meta-analysis work when they are received.</p> <p>It was noted that the finalisation of the joint SNCB interim advice note on displacement is still on-going.</p> <p>IE queried whether there was any development in the joint agency response to the Cleasby <i>et al.</i>, (2015) 'three-dimensional tracking of a wide-ranging marine predators: flight heights and vulnerability to offshore wind farms' paper. MK confirmed that this is still under review.</p>	<p>DONG to update the EWG when they have received tender/s for the meta-analysis – and circulate the tenders to EWG members.</p> <p>NE to provide update on progress of the displacement guidance</p> <p>NE to follow up on the timescales involved in the response to Cleasby <i>et al.</i>, (2015)</p>
3	Export cable scoping corridor	

	<p>It was noted that the scoping corridor still covers a large area as it is currently a search area, which will be refined as the processes continues. There are two landfall options currently being considered within the ECR scoping corridor.</p>	
4	<p>Landfall Locations</p> <p>IE detailed that for Hornsea Project One/02 the ornithology topics were split into terrestrial, intertidal and offshore. This division has been deemed likely to be inappropriate for Hornsea Three due to the lack of any meaningful intertidal bird habitats at both landfall zones. A more efficient way forward would be two chapters: offshore and onshore. RSPB (PP) noted that different lifecycle stages of certain species (e.g. ringed plover), may utilise both the terrestrial and offshore environments, and there needs to be clarity on this overlap.</p> <p>An overview was provided of the habitats and species present at:</p> <ul style="list-style-type: none"> • <u>Zone 2 survey area</u> – Western side of the ECR scoping corridor • <u>Zone 4 survey area</u> – Eastern side of the ECR scoping corridor <p>It was noted that the intertidal area at these landfall locations is a narrow strip of cobble / shingle / sand with minimal opportunities for foraging and roosting.</p> <p>Further discussion was focused upon little terns in the vicinity of Zone 4. RSPB noted an increased number of little terns towards the end of June, after the walk over surveys had been completed on the 15th June. IE confirmed that shore based foraging surveys have been conducted three times since that initial survey, and findings will be shared with the EWG once the data have been compiled.</p> <p>PP noted that the east Norfolk area contains some of the biggest little tern colonies in the UK. The Winterton colony is important despite the abnormally low numbers of little terns this year, while the Eccles colony has grown consistently in the last few years. PP requested that the assessment reflects the movement of little terns between colony locations. IE noted that it would be useful to incorporate RSPBs colony counts into the data already collected.</p> <p>IE queried whether the surveys undertaken to date are sufficient to inform an assessment on foraging little terns. RSPB (PP) noted that a compilation of little tern prey species fisheries data would provide a greater understanding of the prey movements and provide more certainty regarding the potential impact</p>	

	<p>of construction works. IE noted this but clarified that this is independent of survey work on the terns themselves.</p> <p>MKE noted that ringed plover have previously been found late at the pre-construction phase, due to habitat changes, and that the EWG should be aware of potential issue. IE confirmed that the Project are aware of Wildlife & Countryside Act issues and will investigate Ringed Plover presence where the final landfall location is confirmed.</p> <p>It was noted by DONG Energy (AR) that the Norfolk Wildlife Trust, who would have an overview of what is happening along the Norfolk coast, have not yet been informed during the evidence plan process but wider consultation will occur further into the process.</p> <p>For the purpose of the EIA, the EWG agreed:</p> <ul style="list-style-type: none"> • The ornithology assessment will be split into either onshore or offshore ornithology. Species, based on their predominant distribution, will be considered either in the onshore or offshore ornithology assessment sections; • An intertidal survey programme of winter and passage periods for birds is not necessary; and • The data that has been collected to date for little terns in Zone 4 is anticipated to be appropriate and alongside consideration of supporting fisheries data (data sources to inform the fisheries and shellfish ecology baseline are outlined within the Marine Processes, Benthic Ecology and Fish and Shellfish Ecology: Meeting 2 - position paper), will be sufficient to inform the EIA. A final position on little terns at Zone 4 will be provided once the final survey report has been reviewed. RSPB (PP) also noted that a greater understanding of the installation methodology would assist with the understanding of the potential impacts upon little tern prey species and prey species spawning grounds. MKE noted that impacts of cable protection on inshore coastal processes affecting foraging habitat for little tern would also need to be considered. 	<p>NIRAS to circulate intertidal report findings when available.</p> <p>RSPB (PP) to provide final 2016 colony counts</p>
5	<p>Export Cable Scoping corridor</p> <p>An overview was provided of the existing baseline information. It was noted that the ECR corridor crosses or is in proximity to several national and regional sites of conservation importance for which ornithological data is available.</p> <p>The EWG reached agreement on the following:</p>	

	<ul style="list-style-type: none"> The designated conservation sites presented in the Ornithological ECR Position Paper are considered relevant to the ECR, noting the Outer Thames Estuary SPA should also be included. The relevant construction/decommission and operational impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps as presented in the ECR Position Paper. Habitat modification of foraging habitat within the nearshore was included as an impact. The operation/maintenance impacts presented, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps The key assessment issues from Hornsea Project One and Hornsea Project Two which may be relevant to Hornsea Three. <p>MKE confirmed that the proposal for the Greater Wash SPA is currently with DEFRA and that NE is unable to provide, at this stage, any further update on progress towards its classification.</p> <p>RSPB noted that the Breydon Water SPA Common Tern populations forage within the Outer Thames Estuary SPA. The Outer Thames Estuary SPA is being extended to provide protection for common and little tern foraging areas and to protect breeding terns on the Scroby Sands sandbank (all five species of terns that breed within the UK have been recorded using the sandbanks).</p> <p>It was stated that The Wash has not been considered following an analysis of foraging ranges which concluded that the features are unlikely to forage within the ECR, as noted within the position paper. This was agreed with the EWG.</p> <p>DONG noted that there is expected to be a requirement for transformer stations to be constructed offshore and operated, in addition to the proposed export cables, within the ECR shown. The main potential effect of these structures on birds is predicted to be noise disturbance caused during foundation installation. NE highlighted that, depending on location of installation, this has the potential to disturb red-throated diver associated with the Greater Wash draft SPA.</p> <p>MKE noted that use of rock armouring to protect cables inshore could have impacts on subtidal habitats supporting red-throated diver and common scoter from the Greater Wash.</p>	<p>NE to investigate the availability of the JNCC visual tracking data around the North Norfolk coast.</p> <p>NE to follow up with Mike Meadows (NE ornithologist) regarding available count data for common scoter.</p>	<p>The identification of key issues has been focused around SPAs including:</p> <ul style="list-style-type: none"> Greater Wash draft SPA North Norfolk Coast SPA. It was noted that if Sandwich and Common Terns need to be explored in more detail, then access would be sought to the JNCC visual tracking data that informed the designation. NE note that the North Norfolk Coast can support populations of Common Scoter as they are found further east than the JNCC report suggested. Great Yarmouth North Denes SPA Breydon Water SPA – RSPB note that the tern populations have shifted to the Scroby Sands area, and that this should be considered when investigating the foraging ranges of species. Weybourne Cliffs SSSI / Overstrand Cliffs SSSI- It was noted that plotting the location of the bird sites in relation to the land fall would be beneficial. <p>MKE queried the potential location of the operational port with respect to disturbance impacts on common scoter and red-throated diver from the Greater Wash. DONG confirmed that further detail cannot be provided at this point and that this issue will be picked up in future EWG meetings.</p>	<p>6</p> <p>Review of Actions and AOB</p> <p>Meeting minutes will be circulated for review (this document).</p> <p>The EWG timetable will be reviewed and circulated.</p> <p>The next meeting is planned to be held towards the end of November/early December, following submission of the Scoping Report and the expected request for comment from stakeholders to inform the PINS Scoping Opinion.</p> <p>The purpose of the meeting was to present the export cable route to the offshore ornithology EWG. As agreed, there will not be a separate group covering intertidal habitats, these will be considered within either the terrestrial or the offshore EWG, depending on the species. The offshore EWG will deal with ornithological issues relevant to the ECR corridor and the offshore wind farm site. A terrestrial EWG has not yet been established but DONG Energy will ensure that dialogue is maintained between the groups.</p>	
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Actions

1. DONG to update the EWG when they have received tender/s for the meta-analysis – and circulate the tenders to EWG members.
2. NE to provide update on progress of the displacement guidance.
3. NE to follow up on the response to Cleasby et al., (2015).
4. NIRAS to circulate intertidal report findings when available.
5. RSPB (PP) to provide final 2016 colony counts.
6. NE to investigate the availability of the JNCC visual tracking data.
7. NE to follow up with Mike Meadows (NE ornithologist) regarding availability of count data for common scoter.

Progress of agreements to date

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for Hornsea Three.	It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the Hornsea Three assessment and if not, how the existing data set can be integrated into the data collected for Hornsea Three, and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter. The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA. The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor. The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor . Potential habitat modification of foraging habitats was included as an impact. The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted in relation to the export cable corridor.

D.4 Ornithology EWG meeting minutes 21.11.2016

<i>Subject</i>	Offshore Ornithology EWG
<i>Date - hours</i>	21.11.2016 11.00 – 16.00
<i>Venue</i>	DONG Energy, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Allen Risby (AR) – Lead Environment and Consents Specialist, DONG Energy Tim Norman (TN)- Evidence Plan, NIRAS Robin Ward (RW) – Senior Ornithologist, NIRAS Melanie Kershaw (MK) – Senior Specialist (Marine Ornithology), Natural England Marija Nilova (MN) - Case Officer, Natural England Martin Kerby (MKE)– Senior Adviser, Natural England James Dawkins (JD)– Case Officer, RSPB</p> <p>By phone</p> <p>Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB Phil Pearson (PP)– Senior Conservation Officer, RSPB</p> <p>Apologies</p> <p>Louise Burton – Senior advisor for the cable route (onshore and offshore) and intertidal specialist, Natural England</p>
<i>Supporting Material</i>	<p>Ornithological ECR position paper circulated on 16th November 2016.</p> <p>Presentation provided in the meeting</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The focus of the meeting is to:</p> <ul style="list-style-type: none"> Summarise where we are within the Evidence Plan and what has happened since the last EWG meeting Discuss the information included within the Hornsea Three Scoping Report and the HRA Screening report Discuss the proposed ornithology assessment methodology Provide an updated on the meta-analysis 	
2	<p>Summary of EWG discussions and outstanding actions</p> <ul style="list-style-type: none"> Scoping Report was issued to PINS and is available on PINS website The offshore ECR search area boundary has been refined at the landward end Aerial surveys of the proposed wind farm and a buffer are currently ongoing HRA Screening Report has been completed and will be circulated shortly 	
3	<p>EIA Scoping report</p> <p>RSPB noted that they had not seen the Scoping Report and may not be in a position to submit a response to PINS. AR identified that Hornsea Three will still like to receive comments from the RSPB if possible</p> <p>MK indicated that Natural England were likely to recommend scoping in impacts such as indirect permanent habitat loss and lighting (including from accommodation platforms).</p> <p>PP was concerned about the cumulative effects of development on birds in the Weybourne area.</p>	
4	<p>HRA Screening</p> <p>RW pointed out that sites had been screened into HRA based on known foraging distances published in Thaxter et al, as well as tracking data from the colonies at the Flamborough and Filey Coast pSPA. AM noted that there are tracking data for auks from sites other than Flamborough and Bempton. This may provide updated information on foraging distances. RW questioned the availability of these data but AM indicated that the RSPB might be able to make them available. TN questioned how this information could be used. The</p>	<p>RSPB to confirm data can be made available and its format. Hornsea Three to review</p>

	<p>point of referring to Thaxter et al was that it aggregated data from multiple sites to generate averages which had been used widely for screening purposes. Where there were specific colony data available that were relevant to the assessment (eg FFC pSPA) then this should be taken into account. But it was unclear how data from a study undertaken in, say Scotland, would add to this.</p> <p>MKE asked whether screening took into account sites for which additional species have been added, such as Farne Islands, Coquet and some Scottish SPAs. TN said he would check.</p> <p>MK was concerned that some populations might be screened out on the basis of no connectivity during one season (eg the breeding season). This would overlook the fact that the same population could be affected at other times of year. TN confirmed that this was not the intention, the assessment would look at each relevant season for each species and aim to quantify effects during those seasons. The screening report highlighted, however, where it was considered that there was no likelihood of an affect within a particular season because of a lack of connectivity.</p>	<p>if/how these data can be used</p> <p>Hornsea Three to check whether sites screened in include extended sites</p>	<p><i>Apportioning</i></p> <p>RW presented the approach to apportioning of each key species.</p> <p>1. <i>Puffin</i></p> <p>AM and MK did not agree with the approach presented and questioned the assumptions being made. TN said that further justification of the assumptions made would be presented.</p> <p>2. <i>Gannet</i></p> <p>It was agreed that all adult birds would be assumed to be breeding birds.</p> <p>3. <i>Kittiwake</i></p> <p>MK and AM did not agree with the approach which is based on using the age structure of kittiwakes in the North Sea as determined by Furness (2015) for the non-breeding season.</p> <p>4. <i>Fulmar</i></p> <p>It was agreed that all birds would be assumed to be breeding birds.</p> <p>5. <i>Non-breeding populations</i></p> <p>Based on the methods set out in Furness (2015), but using, to the extent possible, contemporaneous counts from the colonies affected.</p> <p>MK and AM noted that this approach implies that there could be birds from other colonies present and hence a potential impact which might need to be assessed.</p> <p><i>Collision risk modelling</i></p> <p>MK asked Hornsea Three to consider use of Liz Masden's version of the Collision Risk Model. AM thought it should be used in any case. Both of the view that it deals better with uncertainty in input parameters. TN asked MK and MKE whether it is now Natural England's advice to use this model for CRM as the current guidance (SOSS-02) relates to the Band (2012) model. TN requested that Natural England makes its position clear in its response to the Scoping Report.</p>	<p>Hornsea Three to present more evidence on breeding season definitions.</p> <p>Hornsea Three to present justification for proposed approach to the apportioning of puffin and kittiwake</p> <p>Hornsea Three to confirm screening of non-breeding populations</p> <p>Natural England to confirm their advice on use of 'Masden' CRM</p>
<p>5</p>	<p>Assessment methods</p> <p><i>Definition of seasons</i></p> <p>RW explained the seasons that were proposed in the position paper. These are based on Furness (2015) and include a general breeding season (when breeding activity is known to occur at the FFC pSPA). For part of the breeding season, particularly the early months, there is also known to be migration still occurring and this is believed to substantially inflate the population recorded at offshore sites. This is expected to be particularly the case at Hornsea Three which is about 170 km offshore (at mid-point). As a consequence, Furness also defined a "migration-free breeding season" which excludes those months where significant migration is expected. It is proposed that this definition is used for the assessment of impacts during the breeding season. For other months, the assumptions about post-breeding or non-breeding seasons would apply.</p> <p>MK noted that Furness had defined general seasons for use nationally and that the main purpose of the report was to define the non-breeding season. Recommended use of site specific information on timing of breeding activity, but recognised that there was a period during which both breeding and migration would occur. Concerned that excluding months from the breeding season, when there was a likelihood that breeding adult birds may have a reliance on the proposed wind farm area, could lead to under-estimating the impact on the colony. Suggested that further evidence be presented on the specific timing of breeding activity and / or a range of values be used.</p>			

<p>6</p>	<p>Surveys and meta-analysis</p> <p><i>Surveys</i></p> <p>AR confirmed that surveys would extend for 2 years, but that due to the deadlines for submission of the Environmental Statement, it would only be possible to include data from surveys undertaken up to Aug or Sept in 2017. AM noted that this meant that there would be 2 breeding seasons in the baseline data and this was a positive step.</p> <p>AR also presented some preliminary data which comprised raw counts of observations of birds at Hornsea Three.</p> <p><i>Meta-analysis</i></p> <p>AR confirmed that he was seeking revised proposals from the contractors and hoped to be in a position shortly to appoint one of them.</p> <p>AM noted that the meta-analysis was less important now that it was confirmed that there would be site-specific surveys over 2 breeding seasons. Should consider appointing the contractor and then consulting NE and RSPB on the final scope of work. But, overall happy with the approach being proposed.</p>	<p>Hornsea Three to appoint meta-analysis contractors</p>
<p>7</p>	<p>Next steps</p> <p>AR indicated that the HRA Screening report would be issued soon with responses anticipated in January 2017</p> <p>The next EWG meeting would be scheduled for February 2017, but it might be useful to have a teleconference to discuss the meta-analysis at an earlier date.</p>	

Natural England to confirm their advice on use of 'Madden' CRM

Hornsea Three to appoint meta-analysis contractors

Actions

RSPB to confirm data on auk foraging distances can be made available and its format. **Hornsea Three** to review if/how these data can be used

Hornsea Three to check that sites and features screened in include extended sites

Hornsea Three to present more evidence on breeding season definitions.

Hornsea Three to present justification for proposed approach to the apportioning of puffin and kittiwake

Hornsea Three to confirm screening of non-breeding populations

Progress of agreements to date

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for Hornsea Three.	It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the Hornsea Three assessment and if not, how the existing data set can be integrated into the data collected for Hornsea Three, and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	<p>The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter.</p> <p>The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.</p>
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor. Potential habitat modification of foraging habitats was included as an impact.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted in relation to the export cable corridor.</p>

6	21.11.16	Apportioning of birds for impact assessment	It was agreed that all fulmar and adult gannets present during the breeding season, would be assumed to be breeding birds for the purposes of impact assessment
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D.5 Ornithology EWG meeting minutes 29.03.2017

<i>Subject</i>	Offshore Ornithology EWG
<i>Date</i>	29.03.2017
<i>Venue</i>	DONG Energy, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Melanie Kershaw (MK)– Offshore Ornithological Specialist, Natural England Marija Nilova (MN) - Case Officer, Natural England James Dawkins (JD)– Case Officer, RSPB Sophie Banham (SB)– Hornsea Three Consents Manager, DONG Energy Allen Risby (AR) –Environment and Consents Specialist, DONG Energy Tim Norman (TN)- Evidence Plan, NIRAS David Bloxsom (DB) – Evidence Plan, NIRAS Robin Ward (RW) – Senior Ornithologist, NIRAS</p> <p>By phone</p> <p>Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB Alexandra Fawcett (AF) – Senior Case Officer, Natural England</p>
<i>Supporting Material</i>	Ornithological ECR position paper circulated on 01.03.2017

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The focus of the meeting is to:</p> <ul style="list-style-type: none"> Summarise where we are within the Evidence Plan and what has happened since the last EWG meeting Discuss the approach to characterising the baseline for the offshore ornithology impact assessment, including the meta-analysis of previous zonal boat based surveys Discuss the proposed ornithology impact assessment methodologies 	

2	<p>Response to EIA Scoping</p> <p><i>Disturbance from lighting</i></p> <p>MK stated that disturbance from lighting cannot be completely scoped out as there is still uncertainty regarding the details and specification of the lighting that will be used by HOW3 as well as the magnitude of any potential impact. Disturbance from lighting was not scoped out for Hornsea Project One and Hornsea Project Two and we need to understand the nature and intensity of the lighting that will be used during all phases of the project, so any potential impacts and mitigation can be explicitly stated and documented.</p> <p>SB noted that Hornsea Three will follow the industry standards in relation to lighting and that these tend to be determined primarily on safety grounds. MK noted that for Hornsea Project Two there was an assumption made that meeting the minimum legal requirements for lighting would minimise the risk to migrating birds, but as these legal standards relate to safety they do not consider environmental impacts, therefore it cannot be assumed that they will minimise the risk to birds.</p> <p>MK acknowledges that only a qualitative response will be required as there is not the evidence to provide otherwise. AF noted that it isn't expected to be a major issue but it still needs to be considered within the Environmental Statement.</p> <p>SB stated Trinity House don't advise on lighting until the final layout is presented, post consent and that changing approaches to lighting is likely to be difficult as it is driven by safety requirements. AR noted that information is limited on this topic and an impact assessment will be challenging. There is no evidence on whether there is an impact or not, therefore there will be limited conclusions.</p> <p>MK noted that additional best practice information, within the legal minimal requirements could be included in relation to minimising the potential environmental impacts of lighting.</p> <p><i>Accidental pollution</i></p> <p>TN noted that it is difficult to assess accidental pollution because mitigation is in place for any unavoidable pollution which leaves accidental events. Standard practices are in place in the case of any accidental pollution. MK stated that it is useful to have the mitigation plans described and acknowledged within the Environmental Statement.</p> <p><i>Use of Masden (2015) for collision risk modelling</i></p>	
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<p>TN stated that the RSPB have made it clear that they would prefer Masden update to be used, but Natural England's position is still unclear.</p> <p>MK stated that Natural England are happy that the Band (2012) model forms the core of the Masden (2015) model, but the additional elements around sampling parameter variability haven't been fully tested. NE has, therefore, commissioned a project to look at the Masden update to determine if any modifications are required and how to parametrise the model appropriately. This project will determine NE's position and should be published in April 2017. Marine Science Scotland are also commissioning an evidence project to ensure a more user friendly front end and ensure the correct input parameters. AM noted that it would be useful to get an indication of Natural England's projects findings as soon as possible.</p> <p>TN explained that if Natural England's project is likely to only result in refinements and not a complete revision in position then this is reassuring. MK noted that it would be useful to see how HOW3 plan to parametrise the collision risk model. TN explained that the intention is to provide this in the PEIR. AM stated that it seems reasonably certain that the Masden update will be appropriate. AM also reassured that it was not the intention to look at using the highest confidence limit for risk assessment, rather to understand how much certainty there was around the mean predicted collision rate.</p> <p><i>Sensitivity</i></p> <p>TN noted NE's suggested revisions to the ecological value (sensitivity) of bird features and these will be updated as appropriate.</p> <p><i>Connectivity with designated sites</i></p> <p>MK noted that wildfowl and waders have not been connected to SPAs and this has been done for previous assessments.</p> <p>TN confirmed that potential impacts on wildfowl and waders will be assessed. However, wildfowl and waders at Hornsea Three could potentially be associated with a very large number of SPAs in both east and west coasts of Britain. The proposed approach was to assess the collision risk for these species along with other migratory species. If this analysis did not indicate any risk of a significant impact then all sites for which they are potentially a feature of can be confidently screened out without having to list them all. However, it was explained that if there is a risk of a significant impact, an approach to apportioning these impacts would be presented.</p> <p><i>Connectivity between development sites and breeding colonies</i></p>		<p>TN stated that it is agreed that where there is site specific SPA data this should be used over Thaxter <i>et al.</i> 2012,</p> <p>MK stated that there may be evidence from other colonies nearby to an SPA or within the same region that is more relevant than Thaxter et al 2012. AM confirmed that RSPB has data from more UK and international colonies than Thaxter presented and this will be made available.</p> <p>SB noted that any additional data supplied will be reviewed and where appropriate and reasonable, taken in to account in the assessment.</p> <p>3 Response to HRA Screening</p> <p><i>Foraging terns</i></p> <p>RW explained that the foraging habitat for the breeding tern population at the North Norfolk Coast SPA is covered by the Greater Wash pSPA. Therefore if you can conclude no LSE on the Greater Wash pSPA there will be no LSE on the foraging activities of terns at the NNC SPA. The EWG agreed this approach and that both sites will be mentioned within the report.</p> <p><i>Lesser black-backed gull – not considered</i></p> <p>MN explained that additional context for screening out LBBG was required. RW presented appropriate text during the EWG meeting that was agreed as appropriate and could be included within the HRA.</p> <p><i>FAME dataset</i></p> <p>This data set has been requested.</p> <p><i>Assessment of LSE on non-breeding sites</i></p> <p>TN stated that the proposed approach is to consider the likelihood of a significant effect on the population (through analysis of the site specific baseline information) and then work back to the non-breeding sites, in order to avoid presenting a very large number of SPAs. MK noted that we just need to be sure that no designated sites are missed taking this approach. SB stated that it will be made clear in PEIR that site specific data will be reviewed and depending on what this shows additional sites may be considered, but the approach we are taking initially is to focus on the important issues. MK explained that it is important to have a clear audit trail for when sites have been screened out. The group agreed.</p> <p><i>Prey availability during the operation phase</i></p>	
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	<p>Agreed that this point depends on the outcome of the discussion within the Marine Processes and Benthic Ecology Environmental Statement chapters. If the assessment concludes that there is no significant impact to benthic ecology then this impact does not need to be considered.</p> <p><i>Farne Islands pSPA and Coquet Island pSPA has been scoped out</i></p> <p>MK explained that if there is potential connectivity then the audit trail of why they have been scoped out needs to be presented. A greater level of clarity is required.</p> <p><i>Breeding season impacts on guillemot and razorbill</i></p> <p>TN noted that currently based on the evidence there is no connectivity. If there is evidence that shows connectivity, such as tracking data for auks, then it will be considered. The site has been screened in, on the basis of potential impacts during the non-breeding season, displacement of guillemot and razorbill is not considered during the breeding season (as Hornsea Three lies beyond the foraging distance of both species).</p>		<p>collection then the extra data may be of use. MK noted that without seeing the baseline data or meta-analysis it is difficult to determine the risk.</p> <p>TN stated that we will be aiming to submit the 18 months of survey data and meta-analysis as part of the application. The meta-analysis will determine what is a reasonable characterisation of the key species densities during the winter months. TN noted that the Project is working with HiDef to develop how this information is analysed and presented. MK pointed out that the meta-analysis could also provide information on the variability of bird densities across years and seasons as well as variability in flight height behaviour. MK stated that it would be important to look more widely at the inter-annual variability across the larger Hornsea data set (HOW1, HOW2 and Hornsea Zone data including data not coincident with the HOW3 project area) to ensure that the variability is adequately represented in the HOW3 assessment. TN noted that the wider data set will be used to extrapolate and interpret the data into an understanding of e.g. the likely density of birds. The focus is to fill in the gap where there is less site-specific data.</p> <p>SB explained that how the meta-analysis will inform the assessment will be addressed in the next EWG meeting. Due to the timing of proposed Section 42 consultation, it is likely that the analysis and discussion of it may move beyond the information included in PEIR. In responding to PEIR it would be useful if those parallel discussions were also taken into account when commenting.</p> <p>The EWG agreed that this approach to the use of the meta-analysis to supplement survey data is appropriate for the timescales the project is working towards.</p>	
<p>4</p>	<p>Baseline characterisation – aerial surveys</p> <p>TN explained how the survey data will be incorporated within the reporting:</p> <ul style="list-style-type: none"> • PEIR analysis is currently being undertaken, including data collected up to and including Jan 2017. PEIR will be used as a draft run through the process and to present the detailed methodology. Not too much emphasis can be placed upon the conclusions at this stage. • The draft Environmental Statement/HRA chapter will include data up to Jul 2017 (early August if possible), aiming for submission to DONG Energy in early October and submission to the EWG thereafter. • The final assessment to be included in the Environmental Statement that will be submitted with the Application, will include survey data up to Sept 2017 (potentially Oct 2017). <p>TN noted that the surveys could be continued beyond Oct 2017 for the full two years, but this raises the question of what do we do with the data. It is currently understood that these additional data could not be introduced into the examination. SB highlighted that this could raise the question of re-characterising the baseline and there is a legal argument of how you introduce such information into the process without resetting the DCO examination. AF stated that if there were remaining uncertainties at the end of the data</p>	<p>TN/SB to investigate if there is a legal process of introducing additional data into the examination.</p>	<p>5</p> <p>Proposed assessment methodology</p> <p>BDMPs</p> <p>RW explained the approach to defining BDMPs for both the breeding season and non-breeding season, noting that any new information that becomes available (e.g. FAME project) will be considered.</p> <p>RW stated that for the non-breeding season the calculated proportions presented in Furness (2015) will be used within the assessment. RW confirmed that migratory species (e.g. little gull) will be dealt with separately using specific data sources e.g. Wright <i>et al.</i> (2012)².</p> <p>Definitions of biological seasons</p> <p>RW outlined the proposed definitions of the biological seasons for impact assessment in line with Furness (2015). MK noted that Furness (2015) seasonal definitions are generalised to be applicable to the entire UK and</p>	

² SOSSMAT is a publically available tool, which Natural England had a part guiding the development of. This tool assesses the theoretical passage movements of waterbirds based on estimated flyway populations.

<p>provide a general breeding period, and that relevant colony specific information on the breeding period should be used when assessing breeding season impacts on specific colonies.</p> <p>TN stated that the aim is to acknowledge that not only breeding birds will be present at the project site during March. This is not what biologically happens when you are so far offshore. Hence the aim is to modify the apportioning during the 'shoulder periods' such as March. MK noted that evidence from the baseline data collected by Hornsea Projects should be used to inform assumptions about the origins of birds in the project area in different months, and that the population sizes in the Furness report (which inform the apportioning) are generalised and for many species have high uncertainty associated with them. Therefore, modifying apportioning figures as proposed is applying a level of precision that is not warranted based on the data.</p> <p>MK stated that all the evidence needs to be reviewed including project specific data. MK agreed that there are likely to be non-breeders or migrants, present or passing through the project site during the 'shoulder months'. There is a large amount of uncertainty around these numbers and Furness (2015) does not address this uncertainty quantitatively.</p> <p>TN stated that the aim is to reflect that breeding birds may arrive at a colony in March, but this doesn't result in Hornsea Three affecting all the breeding birds straight away. TN noted that this is a very precautionary approach to apportioning during the breeding season.</p> <p>AF raised the question of whether it would be possible to present both positions. TN explained that this would be difficult because it feeds into the further analysis (e.g. CRM) and results in very wide ranges of effects that aren't helpful.</p> <p>TN stated that in principal the aim is to agree a different apportioning value for the 'shoulder periods' to demonstrate that it ramps up rather than a finite increase. MK stated that the concern is to not lose the level of uncertainty because assumptions have been made and questioned whether it is possible to present a table defining the breeding season, outlining the Furness non-breeding seasons that are relevant and have this agreed relevant to the colony. Then for the assessment the evidence can be evaluated and the appropriate apportioning value can be determined.</p> <p>TN stated that what could be produced is, for the key species, a table that compares the seasonal definitions from different sources (e.g. Furness 2015, Coulson, 2011), and then highlight the colony breeding season which is being applied and agreed as appropriate. The table will highlight where there are differences in the proposed breeding season and will provide the logic for demonstrating the apportioning values per month. The EWG agreed that this was an appropriate approach moving forward.</p>		<p>Connectivity between colonies – breeding season</p> <p>RW outlined the criterion used for establishing connectivity between an SPA breeding colony and Hornsea Three. RW explained that it is anticipated that there are four key species which have connectivity with the project.</p> <ul style="list-style-type: none"> • <i>Fulmar</i> – all birds considered as breeding adults (EWG agreed) • <i>Gannet</i> – all adult birds considered breeding adults (EWG agreed) • <i>Puffin</i> – use age structure determined from no. of one year old birds and immature proportions calculated from survival rates. (EWG further discussion) • <i>Kittiwake</i> - use age structure determined from no. of one year old birds and immature proportions calculated from survival rates. (EWG further discussion) <p>MK noted that the screening document appears to screen out features on expectation, without looking at the data. RW noted that as discussed above, the logic will be made clear.</p> <p>MK explained that the survival rates used apply a level of precision that isn't supported. The age structures based on a wider demographic analysis cannot be applied to such a specific area such as Hornsea Three. There is so much uncertainty in relation to the survival rates and therefore they should not be applied to the Flamborough colony.</p> <p>TN questioned whether it would be possible to use the age classes from the PVA. MK stated that this would be making the assumption that the age classes relevant to the colony will then disperse themselves equally in these proportions offshore. There are a number of ecological reason why this wouldn't be the case.</p> <p>RW noted that there is the possibility of using the Hornsea Zone boat based data to determine age structure. SB confirmed that it is possible to identify 1yr old birds (for certain species e.g. Puffin) from the existing site specific data and aerial data and this can be used to calculate the proportion of non-breeding birds, through the application of survival rates.</p> <p>MK noted that you can identify adult birds and non-adult birds from the site specific data, but it is not appropriate to assume the proportions of other age classes through population modelling. The EWG could not conclude how this could be resolved.</p> <p>MK stated that it is useful to think how this information will be subsequently used within the population modelling, as previously an adult mortality figure was applied to all age classes. TN stated that the key point is that you assume the magnitude of the impact on an age class is proportional to the representation of that age class in the population. It works if the assessment mechanism is only PVA. The key point is how to calculate the adult proportion for use within the population model. If the only way to calculate this is through</p>	
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<p>PVA then the solution might be to not separate the age classes and ensure the PVA is appropriately calibrated.</p> <p>MK explained that the concern was regarding conducting assessments based on particular proportions of different age class birds at the project site and then using this information in a population model which then makes different assumptions about the proportion of birds and associated mortality levels in the different ages classes. A level of consistency is required. TN noted that the concern is that the output will come from a conflated set of age classes and for in-combination it may be an issue.</p> <p>MK stated that site specific data providing information on a particular age class would be useful to see, but this can't be broken down into a full set of age classes. If different age classes cannot be distinguished from site specific data, the totally predicted mortality can be assigned proportionally across the model age classes in the population model.</p> <p>SB explained that it is anticipated that few breeding birds will be recorded at the Hornsea Three site due to its distance from the colonies. Therefore if a large percentage of birds are classed as juveniles then the apportioning values may be quite different. The worry would be that if you took the total number this could result in an over apportioning of birds to the colony.</p> <p>TN summarised that the previous approach (Hornsea Project Two) to structuring age classes cannot be agreed. The PVA approach will be investigated, which filters out the juvenile birds (1 yr birds) and then takes the adults and undifferentiated immatures (2-3yr birds) as a set of age classes and puts this through the PVA model.</p> <p>AM agreed that the PVA approach seems the most appropriate approach, although noting there may be issues with cumulative impacts.</p> <p>Connectivity between colonies – non-breeding season – updated equation was confirmed.</p> <p>Proportion of breeding birds at the project site during the non-breeding season</p> <p>MK explained that if there is potential connectivity then it should be screened in, then you should look at the impact and see whether the impact is over 1% of the baseline mortality for the population.</p> <p>TN explained that if the proportion of birds present represents less than 1% of the SPA, when you take the fraction that will be impacted this cant result in a significant effect. It is a way of testing whether there are enough birds present to have a significant effect.</p> <p>MK not sure how this approach compares to a usual screening approach, in terms of what sites may be included or not included. SB explained that the aim</p>	<p>NIRAS to investigate the proposed PVA approach and feed back to the EWG</p>	<p>is to use previous experience shorten the number of SPAs considered but that the results would be the same in the end. MK questioned whether there are any issues for the in-combination assessment.</p> <p>AM noted that any kind of threshold (e.g. 1%) is quite arbitrary, and there is so much uncertainty around all the impacts that have a threshold that it provides a false level of precision. RW explained that the 1% threshold is a guidance value and AM confirmed this is acceptable. SB suggested that perhaps a worked example would be useful.</p> <p>Collision risk modelling (CRM)</p> <p>RW confirmed the Band model will be used, but where possible the Masden update will be used. The EWG deemed the approach to CRM for seabirds appropriate. Further discussion was around migratory birds.</p> <p>MK questioned whether it was appropriate to use BDMPS population size for migratory modelling. It is acceptable to use the BDMPS to identify the relevant colonies that birds originate from, but in terms of calculating the total numbers of birds that are passing through the project site the BDMPS was not appropriate.</p> <p>RW confirmed that the Marine Scotland report had been reviewed, but the methodology could not be directly followed as this was more of a strategic approach. RW confirmed that Furness can be considered as guidance rather than definite numbers.</p> <p>AM questioned whether annex 6 of the Band guidance is being referred to. RW confirmed this is being used.</p> <p>MK noted that the key point is to identify what the interacting population size is for inclusion within the CRM. MK noted that would be useful to have a discussion over what the population scale is for the birds within the model, flagging that the BDMPS numbers probably aren't the correct numbers to be using.</p> <p>Avoidance rates</p> <p>RW confirmed that all the avoidance rates will be presented within the Environmental Statement chapter and highlight the preferred project options.</p> <p>AM stated that RSPB's preferred avoidance rate for gannet in the breeding season is 98.0 and for non-breeding season 98.9 for the basic model, and these should be presented. TN confirmed that a range of avoidance rates will be presented.</p> <p>Operational displacement and mortality rates</p>	<p>NIRAS to provide worked example of the 1% threshold screening approach.</p> <p>NIRAS to revisit the BDMPS numbers and identify</p>
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Progress of agreements to date

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for Hornsea Three.	It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the Hornsea Three assessment and if not, how the existing data set can be integrated into the data collected for Hornsea Three, and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter. The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA. The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor. The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor. Potential habitat modification of foraging habitats was included as an impact. The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted in relation to the export cable corridor.
6	21.11.16	Apportioning of birds for impact assessment	It was agreed that all fulmar and adult gannets present during the breeding season, would be assumed to be breeding birds for the purposes of impact assessment. The approach for Kittiwake and Puffin is still under discussion.

7	29.03.2017	Baseline data collection	The EWG have agreed that an appropriate approach moving forward is for site specific data will be collected through monthly aerial surveys from April 2016 – September 2017 and the meta-analysis will supplement the survey data. An agreement was not reached on the whether this would provide a viable baseline
8	29.03.2017	Assessment methodology: BDMPS populations	The EWG agreed that for the breeding season the Biologically Defined Minimum Population Scale (BDMPS) for each species will be defined by breeding colony populations with connectivity to Hornsea Three. The non-breeding season seabird populations BDMPS will be defined by the species-specific seabird populations presented by Furness (2015). The EWG agreed that migratory species will be dealt with separately using specific data sources (e.g. Wright et al., (2012)).
9	29.03.2017	Assessment methodology: connectivity between colonies and Hornsea three during the breeding season	The criterion used to establish connectivity between an SPA breeding colony and the Hornsea Three array, has been accepted for fulmar and gannet. Additional data provided by RSPB is currently under consideration.
10	29.03.2017	Assessment methodology: Proportion of adult breeding birds (associated with an SPA colony) at Hornsea Three during the non-breeding season	The EWG has agreed that for each colony with connectivity to the Project, the proportion of breeding adults of a seabird species present at the Hornsea Three array area during non-breeding season, will be derived from the application of non-breeding proportions from Furness (2015).
11	29.03.2017	Assessment methodology: Collision Risk Modelling	The EWG has agreed that where possible the Masden update (2015) will be utilised, otherwise the Band model (2012) will be used. Both the basic and extended approaches for the Band Model (2012) will be presented.
12	29.03.2017	Assessment methodology: Avoidance rates	The EWG have agreed that the avoidance rates that will be presented.
13	29.03.2017	Assessment methodology: Displacement	The EWG have agreed the approach to assessing displacement, following SNCB guidance.
14	29.03.2017	Assessment methodology: In-combination	The EWG have agreed the use of a tiered approach.

D.6 Ornithology EWG meeting minutes 05.06.2017

<i>Subject</i>	Offshore ornithology EWG
<i>Date - hours</i>	05.06.2017 11.00 – 15.30
<i>Venue</i>	DONG Energy, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Marija Nilova (MN) - Case Officer, Natural England Martin Kerby (MKB) – Senior Adviser, Natural England James Dawkins (JD) – Case Officer, RSPB Sophie Banham (SB) – Hornsea Three Consents Manager, DONG Energy Allen Risby (AR) – Environment and Consents Specialist, DONG Energy Tim Norman (TN) - Evidence Plan, NIRAS David Bloxsom (DB) – Evidence Plan, NIRAS Andy Webb (AW) – Meta-analysis Lead Author, HiDef Kit Hawkins (KH) - Meta-analysis Director, HiDef Georg Nehls (GN) – Director, Bioconsult</p> <p>By phone</p> <p>Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB Melanie Kershaw (MK) – Offshore Ornithological Specialist, Natural England Robin Ward (RW) – Senior Ornithologist, NIRAS</p>
<i>Supporting Material</i>	Meta-analysis report Presentation

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <ul style="list-style-type: none"> A brief explanation on the purpose of the meeting and the structure of the meta-analysis report. AW noted that Appendix F also includes flight height information 	
2	<p>Meta-analysis</p> <p><i>Introduction</i></p> <p>AW outlined the content of the presentation and what HiDef have been contracted to complete.</p> <p><i>Key species and seasons</i></p> <p>AW outlined that the majority of seasonal definitions were taken from Furness (2015), with certain changes were made due to data restrictions. LBBG have four seasonal definitions but the migration and winter seasons were combined into a non-breeding season.</p> <p>AW noted that it was considered appropriate for razorbill and guillemot to consider a breeding season and non-breeding season rather than including a separate migration season. MK questioned whether any modelling or review of site specific data sets was carried out to see if there was a more suitable seasonal definition. MK also noted that Furness did not split guillemot into migration and winter seasons because he felt there was not suitable evidence to do so.</p> <p><i>Overview of boat/aerial data</i></p>	

<p>AW provided a brief overview of the survey coverage across Hornsea Three and the Hornsea Zone:</p> <p>March 2010/February 2011:</p> <ul style="list-style-type: none"> • Good coverage during the summer months, reasonable coverage during the autumn and winter months <p>March 2012/February 2013:</p> <ul style="list-style-type: none"> • Certain months (e.g. November 2012) there is no coverage of Hornsea Three, but a skirting overlap with the Hornsea three buffers – these data were not counted as they were considered to be unrepresentative. <p>April 2016/February 2017</p> <ul style="list-style-type: none"> • Good coverage across all months <p><i>Analytical methods</i></p> <p>AW provided an overview of the boat-based analysis and aerial-based analysis approaches.</p> <p>Boat-based:</p> <ul style="list-style-type: none"> • MK questioned whether the distance analysis included all of the transect data, the 6km spaced transects of Hornsea Zone as well as the 2km spaced transects from Hornsea P1 and P2 and whether the stratification included in the analysis was therefore by area, as the areas are nested within each other. AW confirmed this is correct to allow the calculation of density estimates. • MK questioned whether the density estimates across different strata would be affected by the different levels of coverage between the zones. AW explained that it would not make too much difference if the analysis had 		<p>been done separately, it's just a way of organising the data.</p> <p>Aerial-based:</p> <ul style="list-style-type: none"> • MK questioned the availability bias, as the report seems to imply that loss of detection due to availability bias in the aerial surveys is approximately equal to the combined effects of availability bias, perception bias and responsive movement of boat based surveys, implying that these are cancelled out. The report seems to suggest that some analysis was carried out without considering availability bias. AW acknowledged that the sentence is confusing and explained that both densities corrected for availability bias and not corrected have been presented. • JD questioned whether the identification of birds to a species level is more or less accurate between boat-based surveys and aerial surveys. AW confirmed that the identification rates are broadly comparable. <p><i>Modelling methods</i></p> <p>AW provided an overview of the modelling methods:</p> <ul style="list-style-type: none"> • MK questioned how coarse the SST data is. AW confirmed the data is derived from modelling data from the hydrographic office, which is based on predictions at 5 km spacing, so quite fine. • MK questioned whether the modelling was carried out on two sets of data; the Hornsea Zone model using a single density estimate applicable to the entire zone and 	<p>AW to confirm that the densities used within predictive modelling are those that have been corrected for availability bias.</p>
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<p>a single estimate of sea surface temperature averaged across the zone, and a Hornsea Three model using a single density estimate relevant to Hornsea Three and a sea surface temperature estimate specific to Hornsea Three. AW confirmed that this is correct, the values of the covariates differed from Hornsea Three+4km and for the Hornsea Zone, there was no special information included.</p> <ul style="list-style-type: none"> • MK questioned how the year, month and season covariates have been used. Some of the seasons might overlap across years and it should be split based on the biological seasons rather than calendar year. AW will confirm a response. 	<p>AW to confirm a response on how the covariates have been used.</p>
<p><i>Fulmar density – example</i></p>	
<p>AW explained the fulmar density table as an example:</p>	
<ul style="list-style-type: none"> • Density estimates presented are taken straight from the data. Fulmar has not been corrected for availability bias as it not a pursuit-diving species, but guillemot, razorbill and puffin density were. AW explained that a point estimate and confidence intervals for predictions from boat-based data and aerial data were presented alongside each other. • MK questioned whether the Hornsea Three data is nested within the Hornsea Zone data. AW confirmed this is correct. MK noted that therefore the comparison between the Zonal data and Hornsea Three data is a nested analysis. 	

<ul style="list-style-type: none"> • AW explained that the green and red colour coding signifies when there is a significant difference between the Hornsea Three boat based data and the digital aerial data. The significance test between the Zonal and Hornsea Three data used half the confidence limits to see if these overlapped. The comparison is between the Hornsea Three + 4km boat based data and the Hornsea Three aerial data. MK noted it would be interesting to compare the data between the boat based Hornsea Three data and the boat based Zonal data. TN stated that the more interesting comparison is whether we have a reasonable representation of the density for the impact zone. MK explained that the modelling suggests there isn't enough data from the Hornsea Three zone for a robust analysis, and it would be better to have some wider pooled data. So the first point is to decide whether there is any difference between the Hornsea Three and the Zone. AW stated that the coverage is reasonably good across the seasons and there are multiple ways of doing the comparisons. MK questioned whether the conclusion is that there are some significant differences between the Hornsea Three boat based and the aerial data, due to platform differences or temporal differences or can't say either way. AW wouldn't like to say either way, but there may be some platform differences. MK noted that are also inter-annual differences as well. • TN stated that the objective of the meta-analysis was to produce a baseline for the purpose of impact 	
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	<p>assessment, making the best use of data available. The aim is not to analyse how many years of data are required to adequately incorporate sufficient variability. SB noted that the modelling has taken the variability and produced a number for Hornsea Three which builds upon the existing data and accounts for inter annual variability. AM stated that the EWG originally needed convincing that 12 months of data would be sufficient in the context of historical data, now there is 18 months of data the question is less pertinent. The EWG need to think how the data is incorporated to get the best possible assessment.</p> <ul style="list-style-type: none"> • TN explained that examining the data presented, the EWG should be able to come up with a value to take forward for the assessment. For winter maybe an increased reliance on the Zonal data may be necessary, as noted by MK. • AW also noted there will be an additional breeding season of data still to be included. <p>AW explained the Fulmar modelling graph as an example:</p> <ul style="list-style-type: none"> • AW explained that the model produced predicted densities for Hornsea Three + 4 km based upon the boat based data, which have been compared to the aerial survey data. The predicted densities are in general higher than the aerial data. • MK questioned whether the model outputs were based on a change to the sea surface temperature and the other covariates, which are variable. AW stated that if 	
	<p>there was an annual trend then 'year' would have been included. MK stated 'year' would be collinear with other variables and therefore may fall out of the models. AW stated that this is correct, the principle variation will be within sea surface temperature (and other covariates) between years.</p> <ul style="list-style-type: none"> • MK stated that given that the models don't seem to have a high predictive power, comparing the predictive density based on the wider Hornsea data may have a better fit. AW stated that this has not been considered at this point. • JD questioned whether the sea surface temperature was similar between the actual recorded value and the value used in the modelling. AW stated that the predicted sea surface temperature was from hydrographic office models, so is effectively like-for-like. 	
3	<p>Meta-analysis – continued</p> <p><i>Continued discussions over densities</i></p> <p>MK stated that the model has been generated using the Hornsea Three only boat based data which doesn't seem to be particularly robust. Comparisons of the model with the aerial data may not be the right thing to look at in order to understand what the meta-analysis has shown and how the data can be used to inform the impact assessment. AW noted that certain models are better than others and it is under discussion whether there is a 'rule' to decide whether it is best to use the modelled data or the older-boat based data, which may be more accurate but less contemporary. MK explained it would be useful to understand how the aerial data can be</p>	<p>AW to feedback on potential methodology for developing a threshold below which it is considered more appropriate to utilise the zonal boat-</p>

<p>integrated with the historical data and what is taken through the assessment. SB explained that this was not part of the scope of HiDef and TN explained that we are looking to the EWG for assistance on this matter.</p> <p>AW provided a brief run-through of the species modelling graphs, in order to assist the identification of any issues or solutions.</p> <ul style="list-style-type: none"> • Gannet: there is a divergence between predicted and aerial densities across Aug – Nov, which could be down to an abnormal timing of migration, it is unlikely to be down to the survey platforms. • Puffin: generally found low densities, compared to the remaining Hornsea Zone. • Razorbills: in general lower densities found at Hornsea Three. • Guillemot: generally higher densities in aerial surveys. • Kittiwake: in general high densities in the aerial surveys. Low R² value. • Little gull: very low densities, no predictions possible. • Great black-backed: Good r² value. High numbers during winter. • Lesser black-backed: low densities, but higher during the non-breeding season from the modelled data, which is unrealistic. Model can't take into account migration strategy. <p>MK questioned what is meant by the graphics in the appendix that refer to the Hornsea zone and are used to make</p>	<p>based data or modelled zonal data</p> <p>AW to follow up on negative</p>	<p>predictions for 16/17. AW explained that the Hornsea Zone models (GLM) used all the boat based data and all the covariate data for the zone, while the models for Hornsea Three+4km used the same spatial scope for density data and covariates. AW noted that 'Hornsea region' refers to Hornsea Three+4km buffer. MK noted that some of the diagnostic plots were predicting negative densities. AW noted that is not uncommon in modelling, but will follow up on this point.</p> <p>MK stated that the Hornsea Three only models/predictions aren't particularly good and therefore may not be suitable. AW noted that the Hornsea Zone models are better, but what is key is the extent to which the Hornsea Three models are sufficient. AW stated that if the Hornsea Three models are sufficient then they should be used, but if the Zonal outputs are better and provide a reasonable assessment of the density then it might be acceptable to use these values if there is a reasonable process for reaching this decision. MK noted that this seems appropriate but what is missing is the assessment process of which is appropriate to use. It would be useful to look at the predictions that come from the model of the wider Hornsea Zone and whether there is any evidence of significant differences with Hornsea Three, where there are no differences in the platform and year. MK states that it would be appropriate to use the wider Hornsea data to quantify the variability for the aerial data if it can be demonstrated that there isn't a significant difference between the densities, or the variability around the densities, between the Hornsea Three and the Hornsea Zone.</p>	<p>modelled densities</p>
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	<p>MK stated that the discussion is suggesting that we may want to use predicted values alongside data that has been currently collected. The other way of looking at it, is to look at the variability that you have around the data that has been collected, Hornsea Three or Hornsea Zone, and use the variability in numbers translated to the aerial data to quantify the data rather than taking a prediction from a model. AW explained that it is difficult to understand how the aerial data fits within the variability. TN stated that you could present all of the data, but there still has to be a decision on what value is used within the assessment.</p> <p>SB explained that there will be at least 18 months of data so the focus is now upon the non-breeding season and those associated key species. The logical approach as to how we identify a density value for these species will come out of following this analytical process through and looking at what the aerial data and the modelled is saying and confirming whether we are comfortable with the number included within the assessment. MK noted that at some point soon there will be two years' worth of data available (for certain months) and it will be interesting to look at the variability. TN noted that what becomes slightly more difficult is when the range of values for each dataset (zonal, modelled, raw etc) is widely different.</p> <p><i>Summary</i></p>	<p>Hornsea Three to share</p>	<p>TN summarised that the Hornsea Zone data and model predictions, observed boat based data and model predictions and aerial data will be presented for the key species non-breeding season species (i.e. species without 2 years of aerial data). Then the Project will suggest what values to take forward into the assessment and the EWG can discuss this further. MK noted that there is a logic which can be set out on which model/dataset to use for each particular species. For example, for certain species (e.g. guillemot, gannet, kittiwake and lesser black-backed gull) there doesn't seem to be significant difference between Hornsea Three and the Hornsea Zone, and therefore there may be a justification for using the Hornsea Zone model (which is a better fit). If there is a significant difference between Hornsea Three and the Hornsea Zone, then the next step would be to check if the Hornsea Three model is robust enough.</p> <p>Pending the minor clarifications [actions], the EWG agreed that no issues had so far been identified that required an alteration to the modelling. MK stated that the only outstanding clarification, which may result in a re-run of the modelling, was regarding how season had been treated within the model.</p>	<p>approach for identifying values to be taken forward into the assessment.</p>
			<p>4 <i>Flight heights</i></p> <p>AW outlined the boat based flight heights information, including percentages below 35m turbine base. AW explained that aerial data on flight heights has not been presented due to low sample size, which is currently the focus of ongoing work. AW noted that gannets, kittiwakes, great and lesser black backed gulls all appear at turbine height. MK questioned whether different flight heights were identified between seasons, and that it may be warranted</p>	

	<p>to factor in a difference between migration and breeding. AW explained that a statistical test had not being carried out at this stage.</p> <p>MK also questioned whether the calculation of flight heights will incorporate both the aerial data and boat based data. SB explained it is likely that this topic will be discussed further with the EWG, PEIR will use the Johnston <i>et al.</i>, (2014) generic flight height data.</p>	
5	<p><i>Age classes</i></p> <p>AW presented information on age classes from both boat-based data and aerial data and noted that there are potentially significant differences between the boat based data and aerial data.</p>	
7	<p><i>General queries</i></p> <ul style="list-style-type: none"> • MK requested the tables within Appendix C in an excel format. • MKB questioned whether there was any evidence of auks carrying fish from the boat/aerial surveys [and therefore potential connectivity between Flamborough Head SPA and Hornsea Three]. AW explained the boat based surveys should have recorded it. The aerial data has made observations of fish carrying, it isn't easy and probably is on the edge of what is possible. <p>Any additional comments requested by the end of June.</p>	<p>AW to provide tabulated data in an excel format.</p> <p>AW to confirm whether fish carrying behavior has been recorded.</p> <p>Any additional comments requested by the end of June</p>
8	<p><i>PEIR</i></p> <p>TN provided an overview on what will be included within the PEIR.</p> <p>MK questioned how outstanding topics not included within the PEIR will be addressed and therefore whether reviewers should provide comment on</p>	

	<p>sections currently being discussed/in progress. SB suggested that if there is an acknowledgement within the report that discussions are ongoing then comments do not need to be repeat discussions within the EWG. The draft Evidence Plan will also be appended to the draft RIAA.</p> <p>TN explained that a draft Environmental Statement will be circulated in the Autumn, which will include additional survey data and the meta-analysis. SB noted that the maximum design scenario parameters are the worst case scenarios and this will be acknowledged within the report, with the aim to refine these parameters further.</p> <p>MKB questioned whether the new EIA regulations (2017) have been taken into account and noted the expansion of the alternatives questions. The requirement is now to consider how alternatives to the project compare in terms of the environmental impact. SB stated that DONG have taken these into account, on the basis that it is good practice to do so, although noted that there is no requirement on the Project to do so because of the timings of when the regulations came into force. With regards to the question of alternatives, SB noted that it is not the intention to expand on this significantly from what is typically presented within EIAs.</p> <p>SB explained that with regards to the cumulative assessment the intention is to include additional contextual information on tier 1 offshore wind farms projects, because there are some significant differences between those projects with a CfD and those with only consent.</p>	
9	<p><i>Collision risk modelling</i></p> <p>TN explained that an issue has been identified with the Masden model, which will probably result in a more detail analysis of the methodology. TN stated that, as a result, the collision risks previously calculated using Masden are being re-calculated using Band (2012). This therefore won't provide the same</p>	

	<p>level of variability that Masden delivers. MK questioned whether any information will be provided on how variability will be included. TN stated that variability from the analysis that HiDef produce will be included.</p> <p>MK noted that, considering the timescales of the Project, Natural England's advice will be to use the Band (2012), and therefore would advise to look at the variability around the key parameters that impact upon the collision risk modelling, similar to Hornsea Project Two. TN noted this won't be included within PEIR.</p>	
10	<p><i>Next steps</i></p> <p>TN noted there are a number of actions from the previous EWG meeting that are still outstanding and these will be picked up after PEIR. The aim is to reach agreement on these topics ahead of the draft Environmental Statement, so this forms, as much as possible, a final assessment.</p> <p>SB stated that if there are any points at PEIR that can be closed off at this stage then it would be extremely beneficial to do this. TN also noted that the draft Evidence Plan is currently structured along the lines of a statement of common ground to ease the transition come examination.</p>	

6. AW to provide tabulated data in an excel format.
7. AW to confirm whether fish carrying behavior has been record.
8. Any additional comments on meta-analysis report requested by the end of June.

Actions

1. AW to confirm that the densities used within predictive modelling are those that have been corrected for availability bias.
2. AW to confirm a response on how the covariates have been used.
3. AW to feedback on potential methodology for developing a threshold below which it is considered more appropriate to utilise the zonal boat-based data or modelled zonal data.
4. AW to follow up on negative modelled densities.
5. Hornsea Three to share approach for identifying values to be taken forward into the assessment.

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for Hornsea Three.	It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the Hornsea Three assessment and if not, how the existing data set can be integrated into the data collected for Hornsea Three, and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	<p>The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter.</p> <p>The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.</p>
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor. Potential habitat modification of foraging habitats was included as an impact.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted in relation to the export cable corridor.</p>

6	21.11.16	Apportioning of birds for impact assessment	It was agreed that all fulmar and adult gannets present during the breeding season, would be assumed to be breeding birds for the purposes of impact assessment. The approach for Kittiwake and Puffin is still under discussion.
7	29.03.2017	Baseline data collection	The EWG have agreed that an appropriate approach moving forward is for site specific data will be collected through monthly aerial surveys from April 2016 – September 2017 and the . The meta-analysis will supplement the survey data. An agreement was not reached on the whether this would provide a viable baseline
8	29.03.2017	Assessment methodology: BDMPS populations	The EWG agreed that for the breeding season the Biologically Defined Minimum Population Scale (BDMPS) for each species will be defined by breeding colony populations with connectivity to Hornsea Three. The non-breeding season seabird populations BDMPS will be defined by the species-specific seabird populations presented by Furness (2015). The EWG agreed that migratory species will be dealt with separately using specific data sources (e.g. Wright et al., (2012)).
9	29.03.2017	Assessment methodology: connectivity between colonies and Hornsea three during the breeding season	The criterion used to establish connectivity between an SPA breeding colony and the Hornsea Three array, has been accepted for fulmar and gannet. Additional data provided by RSPB is currently under consideration.
10	29.03.2017	Assessment methodology: Proportion of adult breeding birds (associated with an SPA colony) at Hornsea Three during the non-breeding season	The EWG has agreed that for each colony with connectivity to the Project, the proportion of breeding adults of a seabird species present at the Hornsea Three array area during non-breeding season, will be derived from the application of non-breeding proportions from Furness (2015).
11	29.03.2017	Assessment methodology: Collision Risk Modelling	The EWG has agreed that where possible the Masden update (2015) will be utilised, otherwise the Band model (2012) will be used. Both the basic and extended approaches for the Band Model (2012) will be presented.
12	29.03.2017	Assessment methodology: Avoidance rates	The EWG have agreed that the avoidance rates that will be presented.
13	29.03.2017	Assessment methodology: Displacement	The EWG have agreed the approach to assessing displacement, following SNCB guidance.
14	29.03.2017	Assessment methodology: In-combination	The EWG have agreed the use of a tiered approach.

D.7 Ornithology EWG meeting minutes 23.11.2017

<i>Subject</i>	Offshore Ornithology EWG
<i>Date - hours</i>	23.11.2017 10.00 – 15.30
<i>Venue</i>	Ørsted, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Emma Brown (EB) – Senior Responsible Officer, Natural England Marija Nilova (MN) - Case Officer, Natural England Sophie Banham (SB) – Hornsea Three Consents Manager, Ørsted Felicity Browner (FB) – Hornsea Three Environmental Manager, Ørsted David Bloxsom (DB) – Evidence Plan, NIRAS Andy Webb (AW) – Meta-analysis Lead Author, HiDef Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB Matthew Hazleton (MH) –Ornithologist, NIRAS</p> <p>By phone</p> <p>Melanie Kershaw (MK) – Offshore Ornithological Specialist, Natural England James Dawkins (JD) – Case Officer, RSPB</p>
<i>Supporting Material</i>	Hornsea Three Evidence Plan Ornithology EWG position paper Presentation

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>DB provided an introduction to the EWG meeting, a brief review of the previous EWG meetings and the previous meeting actions. Certain actions were incomplete and carried over to the next meeting e.g. AW to provide tabulated data [from Appendix C of original HiDef meta-analysis report] in an excel format and another action: AW to confirm whether fish carrying behavior has been recorded.</p> <p>MK noted that NE has some additional comments on HiDef's responses to the meta-analysis comments.</p>	MK to circulate additional comments on the meta-analysis responses
2	<p>Baseline characterisation: Meta-analysis</p> <p>Andy provided an overview of the approach used within the meta-analysis addendum (no referred to as the Data Hierarchy Report) , including a worked example.</p> <p>AW confirmed that all data [i.e. 2km spacing boat transect data collected for HOW1 and HOW2 in addition to 6km spacing boat transect data collected for wider Hornsea Zone surveys] had been used in generating the Hornsea Zone densities and populations estimates.</p> <p><u>Ranking of data sources</u></p> <p>AW outlined the approach to ranking the different data sources available.</p> <ul style="list-style-type: none"> MK questioned whether the limited number of boat based transects across Hornsea Three + buffers were sufficient to generate a robust density estimate with variability. AW confirmed that the boat transect data is sufficient to generate robust density estimates with variability, 	

<p>generally the density estimates are comparable with the aerial data taking into account availability bias. The data from all three years provides a robust second tier of data.</p> <ul style="list-style-type: none"> • MK questioned whether areas that have full boat based coverage and aerial coverage are comparable. AW confirmed that a statistical test has not been used, but through review of the density estimates and confidence limits to see if there is overlap, which has suggested that there are few cases of major difference. • AW explained that the hierarchy applies in the winter months, which is the focus of the meta-analysis given that other months have two years of aerial survey data. <p><u>Incorporation of data</u></p> <ul style="list-style-type: none"> • MK questioned whether as much available data has been used as possible when generating densities of birds in HOW3, i.e. the Hornsea Three + 4km buffer. Given the small number of transects that overlap with the HOW3 area, it would be useful to use as much data as possible. AW explained that for CRM it is proposed that Hornsea Three data is used [no buffer], while for displacement it is proposed to use Hornsea Three + 2 km buffer (area of potential influence). This is to focus on the affected areas. AW noted that to improve the survey coverage it is proposed to use all three years of boat based data, rather than expanding the area. Extending the area can result in over-precaution as you bias your abundance estimate. MK questioned the rationale for calculating a density from only Hornsea Three as using a larger data set would seem to be more robust. • SB noted that the transects missing from boat based data are generally those furthest to the east. If you are creating a seabird density for the Hornsea Three+4 km area, and there is a lack of data from the easterly 	<p>Hornsea Three to provide written response on including data from a wider area into the CRM density and displacement population values.</p>	<p>side of the site, incorporating data from a wider zone would skew the result. AM agreed on this point. AW agreed and stated that expanding the area would result in a less precautionary density value. MH explained that the mean value would be unlikely to change, but that confidence limits may change, potentially resulting in a less precautionary position.</p> <ul style="list-style-type: none"> • EB explained that where there is less confidence in the data a more precautionary position might have to be taken. SB stated that there is significant precaution included across various stages of the project and including the wider buffer in the data set is unlikely to result in a material change in the assessment. EB and AM noted that if you present the numbers then you have more confidence that there will be no change in the final assessment. Agreement on this point was not reached and the Project will provide a written response. <p><u>Confidence limits</u></p> <ul style="list-style-type: none"> • MK questioned how the confidence limits were derived for the density estimates for individual months across multiple years. AW explained that simply summing the mean of the lower/upper confidence limits provides an unrealistic estimate. Therefore, a formula is used to derive the confidence limits from the coefficient of variance from multiple population estimates, a new coefficient of variance is calculated and then the confidence limits can be back-calculated. MK noted that there are other methods available for calculating confidence limits. • MK questioned whether it would be better to model all the data across multiple years together and then generate a combined variance for a particular month. MK noted that if the data were modelled in a package such as MRSeaPower, you could potentially generate multiple datasets that have the same distribution as the observed data and calculate a monthly density with confidence limits from the multiple datasets 	<p>AW to provide worked example of how confidence limits are calculated. In particular where boat based data has been combined with DAS data.</p>
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created. MK noted that the confidence limits presented seemed narrow compared to the confidence limits from the boat based data, noting that the aerial data has much tighter confidence limits. MK stated that it would be useful to provide a worked example of how the confidence limits were calculated, especially for where aerial and boat based data has been combined. AW noted the amount of variance is reduced by using three years of boat based data. SB noted if it was possible to explain whether this is likely to affect the outcome of the assessment.

- MK questioned how the density estimates were calculated for the digital aerial data. AW confirmed that it is a design based estimate, calculating the mean density of birds across all transects and then using a bootstrap method on densities from each transect to calculate the upper/lower confidence limits and coefficient of variance.

Selection for displacement

- AW stated that boat based data will be incorporated for the autumn/winter migration period.
- SB clarified that the approach to defining a seasonal mean depends on the species.
- AW explained that in the worked example for gannet once October 2017 data has been obtained, there will be 2/3 months with aerial data (>50% of months for that season) and therefore the DAS estimates will be used to calculate a mean of peak population [in the case of the worked example]. MK stated that this could be un-precautionary as there is the possibility of missing a peak value. MK noted there have been situations where boat based surveys have not been able to complete surveys during the winter and the advice has been to complete another survey. There are concerns over trying to pick a peak

seasonal value where only 50% of the months are covered as this would potentially underestimate peak counts.

- MH explained that there should not be an issue for the species of relevance. The terminology can be updated to state that if there is <50% in one year, then the boat based data will be incorporated.

Selection for CRM

- AW provided an overview of the approach to identifying a mean density value for each month, to be used within the CRM.
- AW clarified that if the DAS confidence intervals overlap with the equivalent flying bird density from the boat based data from Hornsea Three, then one year of DAS data will be used for CRM.
- MK questioned whether it is valid to compare the mean DAS value with the variance around the boat based data, which is particularly large. MH noted that the overlap between the DAS and boat based data still must reach 50%.

Worked example

AW explained the worked example for gannet displacement.

- EB stated that the process of identifying a mean value results in the different data sources being considered at the same accuracy level, which could skew the outcome. SB noted that the aim is to follow the mean of peaks methodology. SB explained that the reason for considering different data sources was to acknowledge there was an inter-annual variability within the population estimates. The confidence is highest for the DAS, but what has been addressed is the lack of confidence in capturing the inter-annual variation. EB suggested that it would be useful to explore the difference between the complete DAS

<p>data and the boat based data for a given month or season, unless there is a way of presenting that there are differing levels of confidence between the different values. AM agreed the point and suggested that a solution would be to clearly present the different levels of confidence, and that this is mainly a presentation issue. SB noted that the lower confidence during the winter months is an issue across the majority of boat based surveys.</p> <ul style="list-style-type: none"> • MK questioned whether it would make sense to look at the wider Hornsea Zone boat based data to see if there is a higher peak value when there remains incomplete monthly coverage within a season even after considering available DAS and HOW3 boat data. . SB noted that in the context of the earlier discussion, by considering the Hornsea Zonal data this would reduce the confidence in the final value obtained by incorporating data that has lower confidence in the first place. AM stated that it would not be necessary to include the zonal data in the calculation of the final season value but still useful to present the value for context. • MK noted that for Hornsea Project Two the upper/lower confidence limits were considered around the density estimates. MK questioned whether there would be information on the upper/lower confidence limits for when information from the boat based data has been incorporated. AW explained upper/lower CL don't apply when considering mean peaks. MH explained that at Hornsea Project Two the upper/lower displacement was presented based on the 30-70/1-10 displacement mortality rates. [MK confirmed after the meeting that at HOW2 NE did consider mean seasonal peaks that were calculated using the individual monthly mean densities as well as the upper and lower 95% CIs of the monthly densities. • AW explained the worked example for gannet CRM 	<p>EWG to provide any additional comments on the meta-analysis addendum.</p> <p>EWG to consider how alterations to the meta-analysis approach will affect the assessment outcomes.</p>	<ul style="list-style-type: none"> • MK noted that comments will be provided from NE and in addition to the points raised today. <p>SB noted that the draft assessments have been updated based on the work presented, which will demonstrate the implications as these are worked through the assessment. It would be useful to understand how the points raised on the meta-analysis, would fundamentally affect the outcome of the assessments.</p> <p><u>Flight height data</u></p> <p>MK noted that the aerial data was not being used to calculate flight heights. SB explained that at PEIR issues with the aerial data flight heights were being worked through and a full data set had not been acquired. Currently issues have been identified with the process of calculating flight heights and hence the aerial data has not been used for this purpose. AW noted that significant work has gone into improving the quantity and quality of flight height data generated, but it has been concluded that at the moment in relation to Hornsea Three it is best to proceed with the generic flight height data provided by Johnson <i>et al.</i>, (2014).</p> <p>SB noted that it would be useful to discuss the options for including the boat based site specific flight data from the Hornsea Zone. MH noted that the position from Hornsea Project Two was that using the boat based data was acceptable if the flight heights bands weren't subdivided, so this is something that will be considered.</p> <p><u>Age class of birds</u></p> <p>MK noted that there was the suggestion that there wasn't enough information from the DAS data to calculate the proportion of birds in each age class. AW explained that the age classification from the DAS is strongly biased towards</p>	
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	<p>flying birds, but noted that the DAS data can be provided. MH explained that the boat based data provides a much bigger data set, which includes both flying and sitting birds. An analysis of the boat based data has been presented within Annex 3 of the draft documents.</p>			
3	<p>Draft ornithology assessments</p> <p>MH provided an overview of the updates that have been made to the PEIR assessments [now referred to as draft ornithology assessments].</p> <ul style="list-style-type: none"> • SB noted that the updated approach to cumulative assessment tiering presented in these documents is being applied consistently across all environmental topics. • MH noted that the nocturnal activity factors have been updated in line with the discussions held for EA3. AM stated that the empirical evidence for gannet is valid. AM questioned whether the survey data would have covered the dusk/dawn periods. SB noted that this probably wasn't the case for the aerial survey data but potentially for the boat based data. MH to review historical boat based data to understand survey timings. AM noted that additional contextual information on the level of confidence/ acknowledgement of uncertainty or certainty would be useful. 	<p>MH to review historical boat based data to understand whether the surveys covered the dawn/dusk periods.</p>		
4	<p>Phenology, connectivity and apportioning</p> <p>MH noted that Annex 3 has been produced in response to a number of discussion points raised in EWG meeting 5 (March 2017).</p> <ul style="list-style-type: none"> • AM explained that a minor coding error has been found in the Wakefield <i>et al.</i>, (2017) report, this is not anticipated to make a large difference to the conclusions but the consequences are not 			
			<p>understood yet. MH stated that the report has been used to provide contextual information and has currently been left in the reports.</p> <ul style="list-style-type: none"> • AM noted it would be useful to refer contextually to the kittiwake tracking report from Flamborough head [Flamborough and Filey Coast Seabird Monitoring Group], noting the benefits of using colony specific data. • MK queried whether tracking data from 2014 had been included. MH to check whether this has been included. 	<p>MH to request 2014 tracking data if not included.</p>
5			<ul style="list-style-type: none"> • Further analysis • MH provided an overview of the additional analysis that is yet to be carried out. • Population Viability Analysis • MH explained that Mark Trinder has confirmed that using a matched pairs approach would make little difference to the PVA outputs. MK noted that BTO concluded that using a matched runs approach does produce a difference in the outputs, and specifically in the uncertainty in the impacts that are predicted. MH explained that Mark Trinder used 5000 simulations and because of the high number it is considered that the matched runs approach would make little difference to the outcome [unknown how many simulations BTO used]. • AM stated that if the effect is on the mean then this is less of an issue. MK stated that the difference from using a matched runs approach or not, will be in the confidence intervals. Presumably there will be more variability in the approach Mark used, and using a matched runs approach would result in tighter confidence intervals. MK noted it would be useful to contact BTO to understand how many simulations were conducted. MK stated that the variability within the data itself will also influence the outcome. 	<p>NE to contact Aonghais Cook at BTO to confirm how many simulations the BTO report used and whether this is the reason difference in conclusions.</p> <p>AM to review BTO report</p>

<ul style="list-style-type: none"> • MK noted that Mark Trinder did not tune the PVA models for Hornsea Project Two, as the population trends being predicted were not matching the population trends that were occurring. MK noted that it would be useful to understand how the predicted windfarm impacts are factored into the PVA models that are proposed for HOW3. Natural England understands that in the proposed PVA models there is an assumption that the OWF mortality affects all age classes in proportion to the numbers in the population, but that the additional mortality predicted from the OWF is added to the model based on predicted breeding adult mortality. If different assumptions are going to be made at HOW3 about apportioning of different age classes of birds in the project area back to the population being modelled, there is the potential that some of the birds in the project area are connected to an SPA (or population) but not through the breeding adult population (e.g. failed breeders or birds about to recruit), e.g. if the assumption is that for guillemot and razorbill that none of the birds in the project site are breeding adult birds from the colony there is still the potential that some of the birds that are out in the Hornsea area are failed breeders or birds about to recruit into the population. Therefore there is connectivity but not through the breeding adult population. This raises the issue of how predicted mortality of these individuals should be factored into the population model. Natural England's understanding is that at HOW1 and HOW2 additional mortality was added to the model via the adult component with an assumption that there would be additional OWF mortality across all the other age classes in proportion to their representation in a stable age structure population model. This doesn't work if the assumption is that different age classes are disproportionately impacted by the OWF – and in particular if no adults are predicted to 		<p>be affected but other age classes are. There are potentially a couple of ways to deal with this:</p> <ul style="list-style-type: none"> ○ Use a level of adult mortality as a proxy in the population model, (even though the assumption is that there aren't any adult birds in the project area from the colony), to allow potential impacts on other age classes to be included. ○ Produce a population model where different mortality effects can be added to different age classes; <ul style="list-style-type: none"> • MK stated that predicted impacts at EA3 didn't surpass 1% baseline mortality for FFC pSPA species and therefore population modelling wasn't required. MH noted that the population of non-breeding/immature birds is probably quite large and it would be unlikely to pass the 1% baseline mortality. MH explained that there is no new evidence since EA3 to use a different PVA approach. SB noted that the Dogger Bank projects are a similar distance away and it was not considered for those projects. MK noted that further comments would be provided on the draft assessments. • EB explained that from a cumulative/in-combination perspective issues can become more important than for previous projects and need more refined detail. SB noted the point but if no project has investigated the issue to this level of detail then it would be a level of analysis beyond what one single project can produce. EB noted that is part of the challenge of coming later in the queue. SB noted concern around the point that no new evidence has been put forward, but there is an obligation to say that there is an impact on SPA populations. MK explained that the PVA models [produced for Hornsea Project Two] might not be the most appropriate, but if that model is going to be used then we may have to consider how the information on mortality impacts is factored in. MH stated that firstly it 	
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	<p>needs to be considered whether PVA is required for guillemot and razorbill.</p> <ul style="list-style-type: none"> MH noted that gannet is not being considered for displacement effects in Scotland based on the results of the CEH 2014 paper, and the conclusions for gannet can be applied to fulmar. MK explained that NE's advice on assessing displacement impacts will follow the SNCB 2017 advice note, subsequent to that if there is any site specific evidence to a project in English waters then it would be useful to consider that information. NE's advice is not always consistent with Marine Scotland's advice as the latter applies to project applications in Scotland e.g. NE do not advise including kittiwake for displacement effects. MK explained that effects on fulmar should not be scoped out at the LSE stage and should be taken through to RIAA but while it may not result in a significant effect it is important to consider potential cumulative/in-combination level impacts. 	
7	<p>Next steps</p> <p>Comments on the draft assessments are requested to be provided by Friday 15th December 2017. SB explained that Annex 3 and the Meta-analysis addendum are 'new' documents and therefore are key areas where comments are required. Comments made previously do not have to be repeated, an overarching statement could be provided if required.</p> <p>MK noted that some areas of the assessments have presented a variety of values (e.g. avoidance rates), these different values are not shown within the in-combination tables. MK questioned whether it would be possible to include these values, or provide the underlying assumptions to the SNCBs so the tables could be recreated. SB stated that it will be discussed internally how this information can be presented. The application reflects the project's case and the project would come back on this point.</p>	SB to present a view on how

	<p>Next EWG is anticipated for January/February. One of the aims will be to review where the EWG has got to in terms of areas of agreement/discussion, with the aim towards the production of a preliminary Statement of Common Ground (SoCG).</p>	<p>additional information can be communicated to the EWG.</p>
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Actions

1. MK to circulate additional comments on the meta-analysis responses
2. Hornsea Three to provide written response on including data from a wider area into the CRM density and displacement population values.
3. AW to provide worked example of how confidence limits are calculated. In particular where boat based data has been combined with DAS data.
4. EWG to provide any additional comments on the meta-analysis addendum.
5. EWG to consider how alterations to the meta-analysis approach will affect the assessment outcomes.
6. MH to review historical boat based data to understand whether the surveys covered the dawn/dusk periods.
7. MH to request 2014 tracking data if not already included
8. NE to contact Aonghais Cook at BTO to confirm how many simulations the BTO report used and whether this is the reason difference in conclusions.
9. AM to review BTO report
10. SB to present a view on how additional information can be communicated to the EWG.

Progress of agreements

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for Hornsea Three.	It was agreed that the proposed aerial survey methodology for Hornsea Three was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the Hornsea Three assessment and if not, how the existing data set can be integrated into the data collected for Hornsea Three, and variability in flight height data collected for the Hornsea Zone, Hornsea Project One and Hornsea Project Two and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	<p>The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter.</p> <p>The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.</p>
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from Hornsea Project One/02 and all the appropriate Hornsea Three specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to Hornsea Three, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to Hornsea Three, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor. Potential habitat modification of foraging habitats was included as an impact.</p> <p>The EWG agreed that all key assessment issues from Hornsea Project One/02, relevant to Hornsea Three, had been considered and all the Hornsea Three specific issues had been highlighted in relation to the export cable corridor.</p>

6	21.11.16	Apportioning of birds for impact assessment	It was agreed that all fulmar and adult gannets present during the breeding season, would be assumed to be breeding birds for the purposes of impact assessment. The approach for Kittiwake and Puffin is still under discussion.
7	29.03.2017	Baseline data collection	The EWG have agreed that an appropriate approach moving forward is for site specific data will be collected through monthly aerial surveys from April 2016 – September 2017 and the . The meta-analysis will supplement the survey data. An agreement was not reached on the whether this would provide a viable baseline
8	29.03.2017	Assessment methodology: BDMPS populations	The EWG agreed that for the breeding season the Biologically Defined Minimum Population Scale (BDMPS) for each species will be defined by breeding colony populations with connectivity to Hornsea Three. The non-breeding season seabird populations BDMPS will be defined by the species-specific seabird populations presented by Furness (2015). The EWG agreed that migratory species will be dealt with separately using specific data sources (e.g. Wright et al., (2012)).
9	29.03.2017	Assessment methodology: connectivity between colonies and Hornsea three during the breeding season	The criterion used to establish connectivity between an SPA breeding colony and the Hornsea Three array, has been accepted for fulmar and gannet. Additional data provided by RSPB is currently under consideration.
10	29.03.2017	Assessment methodology: Proportion of adult breeding birds (associated with an SPA colony) at Hornsea Three during the non-breeding season	The EWG has agreed that for each colony with connectivity to the Project, the proportion of breeding adults of a seabird species present at the Hornsea Three array area during non-breeding season, will be derived from the application of non-breeding proportions from Furness (2015).
11	29.03.2017	Assessment methodology: Collision Risk Modelling	The EWG has agreed that where possible the Masden update (2015) will be utilised, otherwise the Band model (2012) will be used. Both the basic and extended approaches for the Band Model (2012) will be presented.
12	29.03.2017	Assessment methodology: Avoidance rates	The EWG have agreed that the avoidance rates that will be presented.
13	29.03.2017	Assessment methodology: Displacement	The EWG have agreed the approach to assessing displacement, following SNCB guidance.
14	29.03.2017	Assessment methodology: In-combination	The EWG have agreed the use of a tiered approach.

D.8 Ornithology EWG meeting minutes 27.02.2018

<i>Subject</i>	Offshore Ornithology EWG
<i>Date - hours</i>	27.02.2018 10.00 – 15.30
<i>Venue</i>	Ørsted, 5 Howick Place, London SW1P 1WG
<i>Attendees</i>	<p>In person</p> <p>Sophie Banham (SB) – Hornsea Three Consents Manager, Ørsted Felicity Browner (FB) – Hornsea Three Environmental Manager, Ørsted David Bloxsom (DB) – Evidence Plan, NIRAS Matthew Hazleton (MH) – Ornithologist, NIRAS James Dawkins (JD) – Case Officer, RSPB</p> <p>By phone</p> <p>Melanie Kershaw (MK) – Offshore Ornithological Specialist, Natural England Emma Brown (EB) – Senior Responsible Officer, Natural England Marija Nilova (MN) - Case Officer, Natural England Chris McMullon – Principal advisor, Natural England Sophy Allen – Senior Marine Ornithologist, Natural England Aly McCluskie (AM) – Offshore Ornithological Specialist, RSPB Mark Trinder (MT) – PVA support, MacArthur Green Madeline Hodge (MH) – Ørsted strategic ornithological support, Ørsted</p>
<i>Supporting Material</i>	Presentation

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>DB provided an introduction to the EWG meeting and the previous meeting actions:</p> <ul style="list-style-type: none"> MH confirmed that the historical boat based surveys did cover dusk/dawn periods and the 2014 tracking data has been obtained. MK confirmed that BTO ran 1000 simulations within the PVA model, and it is BTO's view that there is a significant difference between using a matched run response and a non-matched run response. BTO considered that increasing the number of simulations may result in the median values converging, but the confidence intervals around the metric would still be different. SB confirmed that the alternative views on CRM outputs are presented within the assessment but these will not be taken through the in-combination assessment, as the Environmental Statement/RIAA is the Project's position on the potential impacts, appreciating that other stakeholders may disagree. 	MK to forward written response on matched/un-matched approach
	<p>PVA</p> <p><i>Matched run or unmatched run</i></p> <p>MT provided an overview of the match run/unmatched run comparison work undertaken. MT noted that BTO cite reports as the source for the methodology, which make no mention of a matched runs approach so the origin of the approach is unclear. MT explained:</p> <ul style="list-style-type: none"> Non-matched run approach: every simulation has completely independent, random survival and reproduction rates. No linkage between them. Matched run: generates a sample of reproduction and survival rates, which is used twice. <p>MT provided a comparison of the matched run and non-matched run approaches using the same baseline data for the counterfactual of final population size;</p> <ul style="list-style-type: none"> 10 simulations: matched run approach cancels out variation 1000 simulations: medians are converging 5000 simulations: conclusions are almost the same <p>Across all approaches the medians are relatively similar and, particularly for the 5000 simulation, the two approaches produce very similar outputs.</p>	

<p>Therefore, BTO's conclusion that the two approaches produce different outputs is curious.</p> <p>MK explained that BTO's comparison used 1000 simulations and for the counterfactual of growth rate metrics the median values between matched and unmatched seem to be similar, but for the counterfactual of final population size the median values were significantly different. The key point is that the confidence intervals for un-matched pairs are a function of the variability between the stochastic element of the model and the effect of the wind farm on the metric. BTO's view was the stochastic element should be eliminated and it is more useful to have confidence intervals that reflect the result of the wind farm on the metric. The confidence intervals will be different and will be wider for an un-matched approach. AM noted that it is not just BTO and NE that recommend the matched run approach, CEH have also recommended the approach.</p> <p>MT noted that it seemed unlikely that the population growth rate approach would be unaffected while population size is affected. MT explained that by using a matched run approach, the reason for completing a stochastic simulation is negated, you remove the stochastic element, so you may as well just run a deterministic model. MK explained that the confidence intervals are important and reflect the sensitivity of the metric to the stochastic element of the model. The aim is to remove the stochasticity from the calculation of the metric when comparing the impacted and the un-impacted metrics. So, the metric is measured not just on the basis of the mortality from the wind farm, but across the simulations you are still looking at the stochastic element of the model by having the confidence intervals.</p> <p>MT explained that the previous modelling for Hornsea Project Two was based on a large number of simulations (5000), the median and the confidence intervals are likely to be very similar. The counterfactual of population size is based on the median. MK noted it would be useful to see the upper and lower confidence intervals.</p> <p>SA stated that NE's advice is to undertake a matched runs approach, perhaps it would be useful to undertake this so this issue can be moved forward. SB explained that the Project is listening to both sides of the argument and while there may be some differences in the confidence intervals, the work may result in similar outcomes, or at least for there to be very little difference in the overall impact. SA stated that NE doesn't agree that it will make little difference, and two technical groups have concluded that it may well make a difference.</p>		<p>SB stated that it would be useful to take a step back and consider which aspects of the ornithological discussions are the most critical and make the most difference overall, and then we can focus on these points. AM was happy with prioritising issues, and suspected that this may not be the biggest issue.</p> <p><i>Mortality across age classes</i></p> <p>MK stated that the PVA outputs that we currently have are based on adult mortality, so the model is proportionally assigning mortality across the other age classes according to the stable age structure. The age distribution in the Project area may not mirror the age structure in the population model. There may be limited breeding adult mortality but there may be mortality on other age classes, but there is no method of interpreting the PVA model outputs in this way. An option to consider would be to add differential mortality to the age classes in the model, so it does not follow the proportional age structure. This would require further discussion.</p> <p>MT explained that the model is non-selective in the terms of the age classes that are subject to additional mortality. Mortality is distributed in proportion to the different age classes of the population, it does not select a particular age group. It is an annual model, with a single instance of mortality, a single mortality number would have to be calculated which reflects what has occurred across the seasons. Different age distributions can be built into the model, if required.</p> <p>SB explained there are concerns over how we relate the number of birds that we are impacting to a model that is specific for Flamborough, when data is suggesting that a large number of these are from the meta-population and relate to other colonies. In addition, it is unclear how the outputs could then be considered in an in-combination assessment which is expected to be the key concern in terms of predicted impacts. TN explained that this seems like a process of discovery, the aim is to get a narrower list of disagreements.</p> <p>MK stated that we need to understand the large amount of uncertainty, which is why NE consider it important to see the sensitivity analyses, rather than make an overarching assumption. TN explained that the issue is exploring different methodological variabilities. MK stated that, if the PVA models are to be rerun, NE would like to have further discussion over how the outputs are configured and presented.</p>	
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	<p><i>Summary</i></p> <p>Understand the concerns around the PVA. The PVA model for Project Two was agreed with NE, RSPB among others. Therefore, there is a reluctance to re-do a lot of this work, but if it can be done in an informative way which can be agreed on then it will be considered if it is required.</p>	Hornsea Three to forward NE PVA comments to MT		to being included within the RIAA. There are some species that should be taken forward to the RIAA, partly because they may be contributing to in-combination assessments.	species taken forward to the RIAA, highlighting the species of concern.
3	<p>HRA screening</p> <p>MH explained that in NE's DAS comments there were two broad categories of concern regarding the screening:</p> <ul style="list-style-type: none"> - Greater Wash pSPA - Effect on breeding seabirds in the non-breeding season <p><i>Effect on breeding seabirds in the non-breeding season</i></p> <p>MH outlined the approach, which is the same as the method used for Hornsea Project Two, and concluded that no LSE has been identified for any species.</p> <p><i>Greater Wash pSPA</i></p> <p>MH outlined the approach, and concluded that Sandwich tern has been included in the RIAA, but no LSE was identified for common tern or little tern. No LSE was identified for little gull.</p> <p>AM explained that RSPB does not agree the method of calculating LSE in relation to the use of a 1% threshold but agrees with the screening conclusion.</p> <p>MH confirmed the species included within the RIAA:</p> <ul style="list-style-type: none"> o Red-throated diver, o Common scoter o Sandwich tern o Fulmar o Gannet o Kittiwake o Puffin o Guillemot o Razorbill <p>MK noted NE reservations for screening separately for non-breeding season and breeding seasons, and the point of which something goes from no LSE</p>			<p>4</p> <p>Baseline characterisation</p> <p>MH outlined the aerial survey data collected to date and SB confirmed that it no further baseline data has or will be collected. The EWG agreed that the baseline has been agreed for April to November and therefore meta-analysis discussion are only focusing on December – March.</p> <p>MH outlined the updates that HiDef have made to the meta-analysis report.</p> <p>MK explained that NE are not satisfied that there is a complete baseline. MK explained that NE have concerns over the hierarchical approach applied. SA explained that NE consider that the use of data from the whole Hornsea Zone would be more robust, although there remain issues of combining data across boat and aerial platforms. SB explained that the zonal data is within the tables, but HiDef consider the zonal data to have the lowest confidence based on the evidence of the meta-analysis. MK stated that previous comments indicated that NE did not agree with the hierarchy. NE have not seen the wider Hornsea Zonal data.</p> <p>TN stated that we need to find a constructive approach to work past the lack of two years of data over the winter season of data. SB stated that if NE position is that the Zonal data should be considered to complete the data gap then the Project can consider this, it is not clear that NE have recommended this. MK stated that NE consider that there should not be higher data confidence in the HOW03 overlap data over the Hornsea Zonal data and this has been made clear. MK confirmed that the full Hornsea Zonal data is a more robust data set, which includes all the HOW01 and HOW02 data that has been collected over three years, and therefore this should be used in preference to the HOW03 overlap.</p> <p>MH noted that previously NE have presented the numbers and assessment approaches that are considered appropriate, does NE have an idea over what numbers they consider appropriate. MK stated that the issue is that the complete data has not been presented, therefore NE have been unable to see what the Hornsea Zonal density information is. SB stated that an approach should be defined regardless of the actual values, if the confidence is higher in the Zonal data then a mean of peak can be derived using this</p>	
		MH to provide a table of species/colonies that have been taken forward to the RIAA.			
		NE to confirm position on the species/colonies included within screening and on the conclusions of the screening, the			

	<p>data. MK said this approach would be quite different from what has been presented to date, therefore NE are being asked to comment on elements of the assessment without showing the full set of information. MK noted that in principle NE do not accept the use of the HOW03 overlap data, and therefore the wider Hornsea Zonal data is the more robust.</p> <p>SA explained that NE require the data to determine what values are considered appropriate, and therefore all the data should be presented. The EWG agreed that all data will be provided in the application.</p> <p>MH explained that the first step in the hierarchical approach is to identify which data sets we have the highest confidence in. NE view is that there is highest confidence in the aerial surveys, followed by the Zonal data and then the HOW03 overlap data. MK confirmed that density estimates from the Hornsea Zonal data is more robust, there still remain issues of platform differences and combining confidence intervals. SB stated that as there is confidence in the methodology of calculating the aerial or boat based population estimates/density estimates, then it is uncertain why it is an issue to compare these data, particularly when the in-combination assessment combines multiple data sources. MK explained that this is a particular issue because you are trying to combine digital aerial data with the boat based data, in particular in relation to the confidence intervals as there are different assumptions on how the data is derived and distributed.</p> <p>MK stated that the assessment will be submitted based on the Projects consideration of the data, NE need all the data available to take a view on the assessment approach considered appropriate.</p> <p>AM stated that it seems that the meta-analysis currently is not able to provide comfort that an assessment can be robustly carried out on 20 months of aerial data, although the final draft may resolve these.</p>			
<p>5</p>	<p>Assessment approach</p> <p><i>Phenology</i></p> <p>MH explained that, following previous comments, data from other North Sea projects has been incorporated into RIAA Annex 3. These data support the seasons previously defined for all species, with the only alteration being that April is now included within the non-breeding season for puffin. The data indicates there is a peak in puffin through the North Sea in April, which represents the movement of migratory birds. Hornsea Three is 149 km from the very small puffin colony at Flamborough. NE's position is that a puffin in the Hornsea Three site is more likely to be associated with the Flamborough</p>		<p>colony. MH explained that the colony at Flamborough is very small, and the Project is located 149km from the colony therefore the population of puffin across the Hornsea Zone is unlikely to be comprised solely from the small population of puffin at Flamborough.</p> <p>MK explained that in terms of HRA and looking at connectivity with the Flamborough colony, it is about the probability of a bird being present in the Project site from any colony along the North Sea coast, or whether it is more likely to be a bird associated with the Flamborough colony. It depends on what the seasons are being used for. SA explained that there is a subtlety around seasons being defined for a particular SPA colony and seasons more appropriate for an EIA, NE have provided comments on FFC pSPA and the information provided does not change this position.</p> <p>MH questioned why NE position has shifted from Hornsea Project Two, the assessment presented by Natural England for Hornsea Project Two are the same that are being proposed, apart from Puffin. MK explained that the information presented for Project Two was constrained by the information available, NE did not present the seasons considered appropriate. MH stated that NE's position is stated within Deadline 5 submission.</p> <p>A summary of the positions reached in relation to each seasonal definition is as follows;</p> <ul style="list-style-type: none"> • The EWG agreed the seasonal definitions for Razorbill and Guillemot. • Puffin is based on North Sea Projects data, which shows there is a movement of birds offshore in April and therefore this is included within the non-breeding season. NE considered that April should be considered as part of the breeding season. • The EWG agreed the kittiwake post-breeding season (August – December). Hornsea Three define the breeding season as April-July, NE's final position for Hornsea Project Two. NE's current position is that March – July is the appropriate breeding season. • The RSPB stated that the Gannet breeding season should be March – September, but this may be revised when the baseline data is seen. MK explained that it is difficult to provide a judgement without seeing all the baseline data. <p><i>SPA connectivity</i></p> <p>The EWG agreed that in relation to breeding adult birds gannet, kittiwake and puffin are connected to the FFC pSPA.</p>	

	<p><i>Apportioning</i></p> <p>MH explained that age class data from the aerial surveys has been included within RIAA Annex 3, however, limitations with this dataset exist including the inability to age birds sitting on the water. Apportioning values are presented and selected based on the age class data collected and additional evidence.</p> <p>Apportioning in the non-breeding season is based on the data used in Furness (2015).</p> <p><i>Displacement</i></p> <p>MH explained that a literature review has been undertaken to identify the displacement rates and the mortality rates remain consistent with those used at Hornsea Project Two.</p> <p>The EWG do not agree with the proposed displacement and mortality rates.</p> <p><i>Collision risk modelling</i></p> <p>MH explained that option 2 and 3 of the CRM are presented, but option 1 has also been included using the flight height data from the boat based surveys.</p> <p>NE's advice is to use option 2. MK stated that it is not considered appropriate to use the boat based data in Option 1 alongside the digital aerial data. AM questioned how the boat based data has been aggregated. MH explained the data used is the three years of boat based data that overlaps with HOW03. AM agreed with NE's position and would advise to use Option 2, but there would be value in looking at the boat-based data.</p> <p>SB explained that it is considered that there is sufficient site-specific flight height data for incorporation into the assessment. The previous disagreements around the boat based flight height data was around the sub-division of the flight height bands, the data is not being sub-divided in this way so this issue has been avoided. The Johnston <i>et al.</i>, (2014) data is also primarily based on boat derived data, so any issue on combining boat based data and aerial data will also occur when using Option 2 of Band (2012). MK requested that it be made clear which data sets are being used within the CRM.</p>	
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	<p>MH explained approach to the cumulative/in-combination assessment including the consideration of nocturnal activity factors and as-built scenarios. A quantitative analysis is provided for projects built to their maximum consented capacity, and a qualitative analysis is provided for projects built but not to their full consented capacity.</p>	
7	<p>AOB</p> <p>DB explained an issue tracker has been developed to help progress each aspect of the ornithological discussion and to set deadlines which will hopefully limit the issues that are open when starting the examination process. NE and RSPB agreed that this would be a valuable tool</p> <p>SB confirmed that the application date is currently aiming for May. PINS will have a 28 day acceptance period, and the project will try to send versions of documents to NE and RSPB when they are signed off to allow more time for review.</p> <p>MH requested that NE circulate Babcock 2015 report that has been referenced, relating to Flamborough.</p>	<p>DB to circulate updated issue tracker</p> <p>NE to circulate Babcock 2015 report.</p>

Actions

1. MK to forward written response on matched/un-matched approach
2. Hornsea Three to forward NE PVA comments to MT
3. NE to confirm position on the species/colonies included within screening and on the conclusions of the screening, the species taken forward to the RIAA, highlighting the species of concern.
4. MH to provide a table of species/colonies that been table forward to the RIAA.
5. NE to circulate Babcock 2015 report.
6. DB to circulate updated issue tracker

Progress of agreements

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	10.03.2016	The need for a separate intertidal EWG.	The EWG agreed that the requirement for an intertidal EWG would be determined following determination of the export cable landfall
2	10.03.2016	The ornithological survey methodology for HOW03.	It was agreed that the proposed aerial survey methodology for HOW03 was appropriate, noting the risk of collecting less than 2 years of site-specific survey data
3	13.04.2016	The suitability of existing ornithological data from across the Hornsea zone to inform the EIA, specifically regarding the array site.	It was agreed the meta-analysis SoW would be updated to include the requirement to investigate whether 12-months of data will be sufficient to inform the HOW03 assessment and if not, how the existing data set can be integrated into the data collected for HOW03, and variability in flight height data collected for the Hornsea Zone, HOW01 and HOW02 and then circulated to NE and RSPB the w/c 18th April.
4	27.07.2016	The approach to the intertidal ornithology assessment and that no additional intertidal ornithological survey data is required to inform the EIA.	<p>The EWG agreed that intertidal ornithology will be assessed within the terrestrial and offshore ornithology chapters as appropriate rather than in a separate Environmental Statement Chapter.</p> <p>The EWG agreed that the Little Tern data collected is anticipated to be sufficient to inform the EIA, with the addition of supporting fisheries data. A final position on little tern at Zone 4 will be made once the final survey report has been reviewed.</p>
5	27.07.2016	Regarding the offshore ornithology of the ECR, no additional designated conservation sites (beyond those listed in the position paper) need to be considered, no additional construction/ decommissioning and operational/ maintenance impacts need to be considered, all data gaps have been highlighted and all appropriate measures for filling any data gaps have been proposed, all the relevant key issues from HOW01/02 and all the appropriate HOW03 specific issues have been highlighted.	<p>The EWG agreed that all the relevant designated conservation sites have been considered in relation to the export cable corridor, with the additional inclusion of the Outer Thames Estuary SPA.</p> <p>The EWG agreed that relevant construction/decommission impacts, their applicability to HOW03, the data gaps identified and the approach to filling the data gaps had been considered in relation to the export cable corridor.</p> <p>The EWG agreed that all relevant operation/maintenance impacts, their applicability to HOW03, any data gaps identified and the approach to filling these data gaps had been considered in relation to the export cable corridor. Potential habitat modification of foraging habitats was included as an impact.</p>

			The EWG agreed that all key assessment issues from HOW01/02, relevant to HOW03, had been considered and all the HOW03 specific issues had been highlighted in relation to the export cable corridor.
6	21.11.16	Apportioning of birds for impact assessment	It was agreed that all fulmar and adult gannets present during the breeding season, would be assumed to be breeding birds for the purposes of impact assessment. The approach for Kittiwake and Puffin is still under discussion.
7	29.03.2017	Baseline data collection	The EWG have agreed that an appropriate approach moving forward is for site specific data will be collected through monthly aerial surveys from April 2016 – September 2017 and the meta-analysis will supplement the survey data. An agreement was not reached on the whether this would provide a viable baseline
8	29.03.2017	Assessment methodology: BDMPS populations	The EWG agreed that for the breeding season the Biologically Defined Minimum Population Scale (BDMPS) for each species will be defined by breeding colony populations with connectivity to Hornsea Three. The non-breeding season seabird populations BDMPS will be defined by the species-specific seabird populations presented by Furness (2015). The EWG agreed that migratory species will be dealt with separately using specific data sources (e.g. Wright et al., (2012)).
9	29.03.2017	Assessment methodology: connectivity between colonies and Hornsea three during the breeding season	The criterion used to establish connectivity between an SPA breeding colony and the Hornsea Three array, has been accepted for Fulmar and Gannet. Additional data provided by RSPB is currently under consideration.
10	29.03.2017	Proportion of adult breeding birds (associated with an SPA colony) at Hornsea Three during the non-breeding season	The EWG has agreed that for each colony with connectivity to the Project, the proportion of birds of a seabird species present at the Project site during non-breeding season that are adults from the colony, will be derived from the application of non-breeding numbers and proportions of adults and immatures in offshore areas from Furness (2015).
11	29.03.2017	Assessment methodology: Collision Risk Modelling	The EWG has agreed that where possible the Masden update (2015) will be utilised, otherwise the Band model (2012) will be used. Both the basic and extended approaches for the Band Model (2012) will be presented.
12	29.03.2017	Assessment methodology: Avoidance rates	The EWG have agreed the avoidance rates that will be presented.
13	29.03.2017	Assessment methodology: Displacement	The EWG have agreed that the approach to assessing displacement will follow SNCB guidance.
14	29.03.2017	Assessment methodology: In-combination	The EWG have agreed the use of a tiered approach.
15	05.06.2018	Assessment methodology: Collision Risk Modelling	The EWG agreed to use the Band model (2012)
16	27.02.2018	Baseline characterisation	The EWG have agreed that the baseline is appropriate for the months with two years of data, April – November and that the meta-analysis conversation is focused on December – March.
17	27.02.2018	Assessment methodology: seasonal definitions	The EWG agreed the seasonal definitions for razorbill and guillemot and the kittiwake post-breeding season
18	27.02.2018	Assessment methodology: Displacement	The EWG do not agreed the current displacement and mortality rates.

19	27.02.2018	Assessment methodology: SPA connectivity	The EWG agreed that in relation to breeding adult birds gannet, kittiwake and puffin are connected to the FFC pSPA.
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Appendix E Marine Mammal EWG meeting minutes

E.1 Marine Mammal EWG meeting minutes 10.03.2016

<i>Subject</i>	Hornsea Project Three- Evidence Plan Marine Mammal Expert Working Group
<i>Date - hours</i>	10.03.2016 Time 13.45-15.00
<i>Venue</i>	DONG Energy, 5 Howick Place, London
<i>Attendees</i>	<p>In person</p> <p>Stuart Livesey- Project Manager, DONG Energy Julian Carolan- Offshore Environmental Manager Madeline Hodge- Evidence Plan, NIRAS Tim Norman- Evidence Plan, NIRAS Tom Manning – Case Officer, Natural England Lisa Southwood – Case officer, MMO</p> <p>By phone</p> <p>Martin Kerby- Senior Case Officer, Natural England Rebecca Walker – Natural England Helen Lancaster – PINS</p>
<i>Supporting Material</i>	Hornsea Project Three Evidence Plan issued on 04.03.2016 Marine Mammal Background Paper issued on 08.03.2016

Item	Description	Action
1	Introductions, HORNSEA PROJECT HREE (Hornsea Three) Overview and introduction to Hornsea Project Three	

2	<p>Introduction to the Evidence Plan Process</p> <p>It was noted that the MIEU no longer exist and will not play a role in the Evidence Plan process and there is no requirement to formally request an Evidence Plan. PINS will replace the MIEU and chair future Steering Group meetings</p> <p>Hornsea Three stated their desire to update the EP Process via a separate Steering Group (SG) meeting over the coming weeks. Any updates to the EP Process would be communicated to the EWG.</p>	DONG to update Evidence Plan and remove MIEU.
3	<p>Introduction and Aims of the Marine Mammal Expert Working Group</p> <p>Hornsea Three asked if the JNCC would play any role in the Evidence Plan process. Natural England stated that JNCC had delegated all offshore case work to Natural England but they would liaise with JNCC as part of the process.</p> <p>Natural England recommended the Wildlife Trust be invited to the Marine Mammal Expert Working Group. Hornsea Three stated they would consider this for future meetings.</p> <p>Natural England stated that Table 3.2 of the Evidence Plan needed to be updated to include Annex IV and V marine mammals</p>	Hornsea Three to update Table 3.2 of the EP.
4	<p>Marine Mammal surveys</p> <p>Natural England noted that the surveys of the Hornsea Project One, Hornsea Project Two and the Hornsea Zone did not use a dedicated Marine Mammal Observer (MMO) and that they would have concerns with using the existing data to inform the marine mammal baseline and this would require further discussion internally at Natural England.</p> <p>Natural England noted that aerial survey methods were suitable to inform the baseline at Hornsea Three but they had preference to for video surveys rather than digital images.</p> <p>Natural England asked if we could compare boat-based and aerial survey outputs, has this been done to date? Hornsea Three stated they would have a look if this has been done elsewhere and provide details.</p>	<p>Natural England to confirm the requirement for additional surveys of Hornsea Three area</p> <p>Hornsea Three to look at the availability of comparisons between boat-based and aerial surveys</p> <p>Natural England to confirm if there are</p>

E.2 Marine Mammal EWG meeting minutes 13.04.2016

Subject	Hornsea Project Three Marine Mammal Expert Working Group
Date - hours	13 th April 2016, 15:30 until 17:00
Venue	DONG Energy, 5 Howick Place, London
Attendees	In person Julian Carolan- Offshore Environmental Manager Emily King – Project Three EIA Project Manager, RPS Tessa McGarry – Senior Consultant, RPS Madeline Hodge- Evidence Plan, NIRAS Tim Norman- Evidence Plan, NIRAS Eleanor Stone – TWT By phone Lindsey Booth-Huggins - MMO Tom Manning – Case Officer, Natural England Rebecca Walker – Natural England
Supporting Material	Previous meeting minutes from 10 th March 2016 HiDef aerial survey methodology and presentation:

Item	Description	Action
1	<p>Introductions and Update on the Evidence Plan TWT were welcomed to the Project Three Marine Mammal Working Group following Natural England’s recommendation that they should be included.</p> <p>DONG Energy noted that a marine mammal working group meeting was held on 10th March 2016. This meeting discussed the marine mammal survey strategy, in which it was agreed that aerial surveys were the most appropriate survey methodology. Subsequent to the meeting on 10th March 2016, HiDef have been appointed as aerial survey contractor and RPS Energy as lead EIA consultants for the Hornsea Project Three EIA.</p> <p>A steering group meeting was held on the 22nd March 2016, in which the Evidence Plan, working principals and process for agreement was agreed. It was noted in this meeting that DONG Energy are currently awaiting comments from TWT, which have since been received. An updated</p>	

	Evidence Plan will be circulated to the Evidence Plan Steering Group and Working Groups in the week commencing 18 th April 2016.	DONG Energy to update and circulate the Hornsea Project Three Evidence Plan.
2	<p>Actions from Previous Marine Mammal Working Group Meeting on 10th March 2016 DONG Energy noted that Natural England were to confirm if there are best practice guidelines for aerial surveys. Natural England stated that there are no best practice guidelines for aerial surveys.</p> <p>DONG Energy noted that they have acquired the paper detailing Dutch military activities (Benda-Beckmann <i>et al.</i>, 2015).</p>	
3	<p>Presentation of Aerial Survey Methodology HiDef presented an overview of the proposed aerial survey methodology (PowerPoint presentation embedded above). Key elements of the proposed aerial survey include:</p> <ul style="list-style-type: none"> • One year of aerial surveys; • 20 parallel transects aligned north to south in the Project Three area and a 4 km buffer around it; • GEN II camera rig containing four extreme high-resolution digital video cameras; • Two of the four cameras to be analysed to achieve 10% coverage; • Identification rates to species for cetaceans, turtles and sharks of over 99% and for pinnipeds, approximately 50% are identified to species (which is similar to or better than other targeted survey platforms); and • Williamson <i>et al.</i>, (in press), which identified an availability bias factor of 0.56 for harbor porpoise in the Moray Firth, will be used to calculate availability bias. <p>During the presentation, Natural England queried whether a 10% survey effort would be sufficient, particularly for those marine mammal species with a lower density (i.e. white beaked dolphin and minke whale). DONG Energy noted that in order to achieve a sufficient sample size, the survey methodology would need to be significantly increased. DONG Energy referred to a German study, which had been completed over the last couple of summer seasons. On reflection, it was agreed between all parties that the survey effort was appropriate to characterise the marine mammal baseline, given the existing knowledge basis and historical site specific survey data. It was further discussed that the aerial survey data to be analysed would be from two of the four cameras used. However, if the marine mammal data showed sufficient numbers of minke whale or white-beaked dolphin (such that meaningful analysis may be possible) the option of analyzing the data from the two additional cameras will be discussed with the EWG.</p>	<p>DONG Energy to circulate Williamson <i>et al.</i>, (in press) paper.</p> <p>DONG Energy to circulate, if publically available, the German Dogger Bank study.</p>

	<p>TWT noted that the HiDef survey methodology (Table 3) identified that the aerial survey will be undertaken in up to sea state 6. DONG Energy confirmed that this is correct and that marine mammal identification rates are not affected up to sea state 6.</p> <p>Natural England queried whether any assessment was to be undertaken to assess the comparability between boat based and aerial surveys. DONG Energy noted that aerial surveys have a higher detection rate and, as long as the data is corrected for the survey conditions, the data should be comparable regardless of the survey methodology. TWT agreed and noted that Dogger Bank identified higher densities in the aerial survey compared with the boat based survey.</p> <p>DONG Energy explained that they are currently considering what meta-analysis will be undertaken to inform the Hornsea Project Three Environmental Impact Assessment. The meta-analysis scope will be circulated prior to the next Marine Mammal Working Group meeting.</p> <p>DONG Energy discussed the potential for boat-based visual surveys to be conducted for ornithology as a ground-truthing exercise. Whilst the scope of these have not been agreed, DONG Energy asked Natural England and TWT if there is any value that can be added for marine mammal surveys. For example, the use of towed hydrophones to collect vocalizing cetacean species? TWT noted that a better understanding of harbour porpoise behaviour, in the context of the Southern North Sea pSAC, would be useful. TWT and Natural England said they would need to give some thought as to what additional benefit could be gained. DONG Energy suggested that they consider this after looking at the meta-analysis.</p> <p>DONG Energy asked if Natural England or TWT required any changes to the proposed aerial survey methodology. Both Natural England and TWT stated that the aerial survey methodology was appropriate and that no changes to the survey methodology were required.</p>	<p>DONG Energy to circulate meta-analysis scope for Natural England and TWT comment.</p> <p>Natural England and TWT to provide ideas for adding value to marine mammal baseline, assuming that a vessel may be deployed for ornithological surveys.</p>
5	<p>Next steps and AOB Next meeting to be held in May.</p>	

Actions

1. DONG Energy to circulate updated Evidence Plan to all participants week commencing 18th April 2016.
2. DONG Energy to circulate Williamson *et al.*, (in press) and German Dogger Bank study.
3. DONG Energy to circulate meta-analysis scope prior to the next Marine Mammal Working Group meeting.
4. Natural England and TWT to provide ideas for adding value to the marine mammal baseline on the assumption that a boat may also be deployed for part of the survey period as part of the ornithological surveys.

Agreements

1. It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate.

E.3 Marine Mammal EWG meeting minutes 04.08.2016

<i>Subject</i>	Ornithology EWG
<i>Date - hours</i>	04.08.2016 14.00 – 15.30
<i>Venue</i>	Telecom
<i>Attendees</i>	<p>Participants</p> <p>Allen Risby – Lead Environment and Consents Specialist, DONG Energy Tim Norman - NIRAS, Evidence Plan David Bloxsom – NIRAS, Evidence Plan Emily King – Project Three EIA Project Manager, RPS Tessa McGarry – Senior Consultant, RPS Lissa Batey – Living Seas Officer, The Wildlife Trusts Joan Edwards – Head of Living Seas, The Wildlife Trusts Rebecca Walker – Marine mammal expert, Natural England</p> <p>Apologies</p> <p>Lisa Southwood - MMO</p>
<i>Supporting Material</i>	Marine Mammal position paper circulated on 25.07.2016

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The focus of the meeting was on:</p> <ul style="list-style-type: none"> Discussions and agreements to date with regards to the Hornsea Three array area The export cable route (ECR) scoping area and landfall locations Discussion around the evidence gathering process to define the baseline environment for the ECR and to agree the applicability of the Hornsea Project One/02 potential impacts to Hornsea Three Discuss any key issues that identified. 	

	It was agreed to recirculate the Evidence Plan to the EWG.	NIRAS to recirculate the Evidence Plan to the EWG
2	<p>Summary of EWG discussions and outstanding actions</p> <p>A brief summary was presented of the discussions to date, which have been focused on the Hornsea Three array area. The following agreements have been reached:</p> <ul style="list-style-type: none"> One year of aerial surveys will be utilised A meta-analysis of existing data from the Hornsea Zone will be undertaken. <p>Three actions from the previous meeting are still in progress and need to be followed up on:</p> <ol style="list-style-type: none"> DONG Energy to circulate Williamson <i>et al.</i>, (in press) and German Dogger Bank study. DONG Energy to circulate meta-analysis scope prior to the next Marine Mammal Expert Working Group (EWG) meeting. Natural England and TWT to provide ideas for adding value to the marine mammal baseline on the assumption that a boat may also be deployed for part of the survey period. 	NIRAS to follow up on actions from previous meetings
3	<p>Export cable scoping corridor</p> <p>It was noted that the scoping corridor covers a large area as it is currently a search area that will be refined as the process continues. There is the potential for four Reactive Compensation Stations or Offshore Converter Substations and six subsea cables within the ECR scoping corridor.</p>	
3	<p>Key issues raised in Hornsea Project One and Hornsea Project Two</p> <p>It was noted that all the activities across the construction, operation and decommissioning phases of the project are anticipated to follow the typical procedures for offshore wind farms. It was noted that some of the issues are generic across the entire wind farm (array and export cable) but can be applied to the export cable.</p> <p>The EWG agreed on the key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.</p>	

	<p>NE noted that SCOS marine mammal counts data and SCOS reports are available and should be included within the baseline data. Blakeney to the west of the ECR and Horsey to the east are both important areas for seals and local seal counts be considered. SCOS reports are updated every year and the latest reports can be requested. The National Trust also undertake seal counts at Horsey and this data should be available.</p> <p>It was confirmed that the February 2015 interim advice on the risk of corkscrew injuries is the latest available and any new guidelines will be considered within the assessment.</p> <p>It was confirmed that an open dialogue will continue regarding electromagnetic fields (EMF), as the worst case parameters for cable burial depth are not yet available. NE confirmed that no new evidence is available on the subject of EMF, relevant to marine mammals.</p>		<p>5</p> <p>Designated Conservation Sites</p> <p>RPS provided an overview of the conservation sites currently considered. It was noted that the designated marine mammal features highlight what species inhabit the area.</p> <p>The EWG agreed that all conservation sites relevant to the ECR had been considered.</p> <p>TWT and NE raised concern over the Cromer Shoal Chalk Beds MCZ. DONG noted TWT's concerns and will look to organise a meeting to discuss these in due course. TWT note that they would welcome the opportunity to discuss this issue further with DONG Energy.</p>		<p>DONG to discuss further with TWT, the issue of the Cromer Shoal MCZ.</p>
<p>4</p>	<p>Baseline environment</p> <p>An overview was provided of the baseline data that is available including:</p> <ul style="list-style-type: none"> • Three years Hornsea Zone boat based surveys; • Wildfowl and Wetlands Trust aerial survey data; • SCANS-II data and hopefully SCANS-III survey data; • Joint Cetacean Protocol (JCP) data <p>It was noted that for Hornsea Project One/02 site specific survey data, from the wind farm array, was extrapolated across the export cable route using a precautionary approach. This approach is proposed for Hornsea Three.</p> <p>The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.</p> <p>NE and TWT noted that they are broadly happy with the baseline data that has been presented for the purpose of informing the EIA. NE stated that the potential impacts associated with the cable corridor are relatively low. Any piling from the substations will be considered within the HRA due to the presence of the Southern North Sea pSAC. The existing data is fairly robust and access to JCP is beneficial.</p>		<p>6</p> <p>Impacts considered in Hornsea Project One and Hornsea Project Two and their applicability to Hornsea Three</p> <p>It was noted that no impacts have been screened out as of yet. Some impacts have previously been considered in combination across both the array area and the ECR.</p> <p>NE raised the issue of onshore construction works impacting on marine mammal haul out areas (primarily seals) and stated that this should be included within the impacts table.</p> <p>MMO questioned – via email - whether pre-construction impacts are anticipated or are currently being considered, such as geophysical surveys/UXO detonation. DONG stated that the need for pre-construction surveys and UXO detonation still needs to be defined however, once the need, or otherwise, is known, it will be discussed with the EWG.</p> <p>The EWG agreed on the impacts assessed in Hornsea Project One/02, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to impact some marine mammals.</p>		<p>DONG to consider pre-construction impacts and feedback to the EWG.</p>
			<p>7</p> <p>Identification of Key Issues Specific to Hornsea Three</p>		

	<p>RPS provided an overview of the key issues specific to Hornsea Three, which include the SNS pSAC.</p> <p>NE raised the importance of the landfall areas to seals, with Blakeney and Horsey being the most important sites. The National Trust carry out annual surveys of the Horsey area and this data may be available. It was noted that Blakeney survey data is incorporated within the SCOS reports.</p> <p>The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.</p>	<p>NE and TWT is identify whether the National Trust survey data is available.</p>	
8	<p>AOB</p> <p>DONG requested advice on assessing impacts in a transboundary context and whether following the assessment approach outlined by the SNS pSAC is appropriate. NE confirm that a consistent approach would be best suited at the moment. Consultation with the relevant authorities is a key step to ensuring everyone is informed.</p> <p>NE questioned whether there has been an initial feedback from the aerial surveys. DONG confirmed summary reports from April and May had been received.</p> <p>The next EWG meeting is scheduled after the publication of the Scoping Report (due to be published on the 28th October) and prior to receipt of the scoping opinion (due on 12th December).</p> <p>TWT note that Tania Davey will be joining the team and will be involved in future EWG meetings.</p>	<p>TWT to keep the EWG informed of participating personnel</p>	

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Actions

1. **NIRAS** to recirculate the Evidence Plan to the EWG
2. **NIRAS** to chase actions from previous meetings
3. **DONG** to discuss further with TWT, the issue of the Cromer Shoal MCZ.
4. **DONG** to consider pre-construction impacts and feedback to the EWG.
5. **NE and TWT** is identify whether the National Trust survey data is available.
6. **TWT** to keep the EWG informed of participating personne

Progress of agreements to date

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	13.04.16	The appropriate survey methodology and survey effort.	It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate, with a 10% survey effort.
2	04.08.2016	The key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.	The EWG agreed on the key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.
3	04.08.2016	The baseline data requirements in order to inform the EIA.	The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.
4	04.08.2016	The designated conservation sites relevant to the ECR.	The EWG agreed that all the conservation sites relevant to the ECR had been considered.
5	04.08.2016	The impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps.	The EWG agreed on the impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to disturb certain marine mammals.
6	04.08.2016	The Hornsea Three specific issues that require consideration.	The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.

E.4 Marine Mammal EWG meeting minutes 23.11.2016

<i>Subject</i>	Marine Mammals EWG
<i>Date - hours</i>	23.11.2016 11.00 - 16.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Allen Risby - Lead Environment & Consents Specialist, DONG Energy Tessa McGarry – Senior Marine Ecologist, RPS Alun Williams - EIA Project Director, RPS Tim Norman - Evidence Plan, NIRAS Rebecca Walker – Senior Marine Mammal Specialist, Natural England Marija Nilova – Marine Lead Advisor, Natural England Tania Davey – Living Seas Development Officer, TWT Lissa Batey – Living Seas Development Officer, TWT</p> <p>By phone</p> <p>Louise Burton – Marine Senior Adviser, Natural England Richard Green – Marine Licensing Manager, MMO</p> <p>Afternoon presentation: Tim Mason - Senior Acoustic Consultant, Subacoustech Environmental Ltd</p>
<i>Supporting Material</i>	<p>Position paper circulated on 16/11/2016 Presentation circulated on 22/11/2016</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>The aims of the meeting are to:</p> <ul style="list-style-type: none"> Summarise where we are in the Evidence Plan programme and what has happened since the last EWG meeting 	

	<ul style="list-style-type: none"> Discuss the information included within the Hornsea Three EIA Scoping Report Discuss baseline information and meta-analysis progress Agree on approach to underwater noising modelling and assessment approach 	
2	<p>Activities since last meeting</p> <p>The Scoping Report was issued to PINS and is available on the PINS website</p> <p>The ECR scoping boundary has been refined at the landward end to reflect the use of one landfall zone</p> <p>Meta-analysis progress: meta-analyses has now been completed and results are being written up</p> <p>Aerial survey data: due to commence aerial data analyses for PEIR based on data collected to date</p> <p>Subsea noise: subsea noise contractor appointed and discussions have commenced to determine approach to modelling</p>	
3	<p>Summary and discussion of the EIA Scoping Report</p> <p>TMcG explained the study area used for assessment, noting that the Regional Marine Mammals Study Area comprises SCANS Block U with additional areas to the east and south. This wider area is included to allow contextualisation of data from the proposed wind farm area.</p> <p>TMcG explained the baseline data that would be used for the assessment noting that there may be additional data for the current year for grey seals along the north Norfolk coast. TMcG asked if EWG was aware of any other data that may be available</p> <p>RW highlighted the following additional, potential sources:</p> <ul style="list-style-type: none"> JCP data may be relevant, although noting that these are collected at a larger scale, but were not available yet (awaiting advice from JNCC when these would be released). Aerial surveys of harbour seal pup distribution undertaken for Dudgeon OWF by SMRU Seal telemetry data from the Race Bank project (Dave Thompson), together with telemetry data currently being collected Seawatch Foundation data European Cetacean Monitoring Coalition – Ferry surveys (line transects), but looking to make this available online. RW to provide contacts for ORCA and MarineLife. 	<p>Hornsea Three to obtain relevant data / information on grey seals at Blakeney Point and the surrounding coastline</p>

	<ul style="list-style-type: none"> SCANS III – RW will check with Phil Hammond when these data will be available <p>RW asked if Cefas (Nathan Merchant) would be involved in reviewing the proposed approach to noise modelling? AR referred this to RG of MMO who agreed that they should be contacted.</p> <p><i>Surface density mapping</i></p> <p>TMcG suggesting using same approach as for Hornsea Project 2 – extrapolated density values from site-specific data using upper 75% quartile from Hornsea Zone boundary cells. There is confidence in this as the predicted number of animals exposed to noise using this approach corresponded well with similar analyses using whole site mean densities.</p> <p>On Marine Mammal Management Units – TMcG thinks it might be worth updating the reference populations for seal using the most recent SCOS data. RW agreed that populations for the management units are now out of date, and had increased.</p> <p><i>Valued ecological receptors</i></p> <p>TMcG noted that all marine mammal populations are categorised as being of international importance, except white-beaked dolphin which is considered to be national (because at southern part of range).</p> <p>[RG, MMO left the call]</p> <p><i>Impacts to be assessed</i></p> <p>There were no comments on impacts scoped in.</p> <p>TMcG asked if there was any update on corkscrew injury? There was no update.</p> <p><i>Impact of piling noise</i></p> <p>Noted that the Project plans to develop a model of underwater noise emissions from percussive piling and that Subacoustech would join the meeting in the afternoon to present and discuss their approach to noise modelling (see below).</p>	<p>Natural England to provide contacts and Hornsea Three to follow up</p> <p>Hornsea Three to confirm with the MMO</p>		<p>The potential to integrate the boat based survey data and the currently acquired aerial survey data is being reviewed in order to generate information on the density of marine mammals that would be used for quantifying effects. The assessment will assume that animals are swimming in the mid-column – where sound pressure is highest. When animals flee they are likely to be closer to surface, so some species will also be modelled at about 2m depths to help understand this.</p> <p>AR noted that modelling of piling noise tends to be precautionary, because no account is taken of how much time piling is actually generating maximum sound outputs (which is less than modelled). It is also assumed that there will be 2 concurrent piling activities at maximum force, but this is unlikely. Need to provide more refined view of likely sound levels and durations.</p> <p>RW generally agreed, but cautioned against making the assumptions too precise. NE see a lot of requests for variations of Marine Licence conditions to accommodate newer technologies, which often requires higher hammer energies than those originally envisaged.</p> <p>AR noted that sometimes desirable to hit a pile hard to get it in, but this might only be a short duration. Would it be more useful (particularly in context of the pSAC) to look at a limit on total noise exposure during a piling event (per pile)?</p> <p>TMcG noted that this is the approach for 24 hr cumulative exposure. But need a threshold of acceptability to be defined.</p> <p>TMcG asked NE/TWT to look at the assessment approach used at Project Two (described in the relevant Environmental Statement Chapter for that Application) and to confirm that they agree with the approach. In particular NE/TWT can review the additional modelling/analysis undertaken for Project Two which looked at i) dose response, ii) a range of hammer energies up to the maximum and iii) received levels at shallower depths to make the assessment less precautionary, particularly with respect to disturbance.</p> <p>AR noted that Project is looking for some feedback on proposed approach – can NE/TWT review approach to P2 re. assessing a worst case and covering more realistic scenarios and let us know?</p>	<p>Hornsea Three to summarise proposed assessment methodology</p> <p>NE/TWT to review and provide feedback / confirm their acceptance of the application of this approach</p> <p>[Ref: P2 Environmental Statement: review noise propagation model (Section 4.6.25 to 4.6.37) and Impact assessment construction phase (Section 4.6.66 to 4.6.92)]</p>
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	<p>The boat based survey data available for Hornsea Three do not extend over the entire area that will potentially be affected by noise. So TMcG proposes to extrapolate densities beyond the survey area as was undertaken for Project Two. TWT/NE agreed with this approach. Also agree that seal Management Unit reference populations (as recommended by the Inter-Agency Marine Mammal Working Group) should be updated in light of more up to date population information.</p> <p>TMcG noted that, at this stage, it was unclear to RPS how aerial digital video data should be corrected. Discussions are planned with HiDef to explore this issue. RPS will continue to explore the potential for incorporating the aerial data into the impact assessment as they acknowledge that this represents a more recent dataset for one of the key species: harbour porpoise,</p> <p><i>HRA Screening</i></p> <p>TN explained screening process and summarised criteria used for LSE test on marine mammal populations. These were agreed to be broadly appropriate. RW noted that the use of 26km for effects on Harbour Porpoise, was taken from interim conservation objectives for the Southern North Sea proposed SAC. As these are draft, they could be updated.</p> <p>RW also noted that in relation to UXO, the new thresholds in NOAA (2016) could be relevant. These indicate effects at relatively large distances and that this is an evolving area. TMcG pointed out it is difficult to know how to assess risk of UXO detonation. RW asked if similar levels as previous projects (say 40 events) could be assumed?</p> <p>In terms of sites included in HRA, these seem reasonable, but RW asked why Farne Islands were excluded. There were tracking data indicating connectivity between there and the Humber Estuary. TN asked if this actually referred to the Berwickshire and North Northumberland Coast SAC?</p>	<p>Hornsea Three to report updates on progress with this to the EWG</p> <p>Hornsea Three to check screening of Farne Islands (Berwickshire and North Northumberland Coast SAC) and rationale for exclusion of this site</p>		<p>whole Hornsea Zone. The meta-analysis finding will be detailed in the PEIR.</p> <p>Low observation rates for some, more dispersed, species during aerial surveys are to be expected (based on a 10% coverage of the survey area). As a consequence it is only possible at this stage to confidently estimate a population size (relative estimate) from these aerial survey data for Harbour Porpoise. The meta-analysis indicates that it may not be possible to combine boat and aerial data. RW noted that given the potential limitations of the new data, (ie. relative estimates rather than absolute) the assessment should review both boat-based and aerial data to determine which provides the most robust and precautionary approach.</p> <p>The main issue is that aerial data (as with boat data) need to be corrected for availability bias (g(0)). TMcG suggested a range of methods and asked for feedback. Discussion about whether could apply boat-based survey derived correction factors to aerial data. TMcG/RW/LB: no because those CFs are method and site specific and not applicable to aerial data. TMcG. Other CFs are available from aerial surveys in the North Sea e.g. Williamson et al calculated CFs for Moray Firth, however, we need to investigate whether it is applicable to use these values for the data at Hornsea. Detectability is influenced by factors such as turbidity, sea surface conditions, seasonal differences in diving behaviour and therefore the most robust approach is to use a site and survey specific value for detection probability. Worth noting, however, that the use of CFs from other studies has been applied to aerial survey data e.g. Dogger Bank OWF surveys. This will be investigated further in order to ensure we are using the best possible approach, whilst also benefitting from the more recent site-specific aerial data collected for Project Three.</p> <p>LB suggested applying various CFs and then expressing outcomes as a range. TMcG – still wouldn't be "absolute" numbers (LB agreed), however, would give an indication of the likely range in harbour porpoise densities.</p> <p>TMcG – data will be presented as part of baseline and noted that aerial data is important for providing a more recent dataset for before and after comparisons where further video aerial work is planned pre- during and post- construction. Currently the Project has absolute abundance/density estimates for harbour porpoise for the Hornsea Zone boat-based data, but will continue to explore correction factors for aerial</p>	<p>Hornsea Three will report updates on this to the EWG and if an appropriate approach to estimating g(0) is developed this will be agreed with the EWG.</p>
4	<p>Summary of meta-analysis findings</p> <p>TMcG summarised the results of the meta-analyses:</p> <ul style="list-style-type: none"> No obvious aggregations of marine mammals indicating any high usage or dependency on the Hornsea Three area No obvious seasonal patterns of usage – as a consequence seasonality will be based on interpretation of data from the 				

	<p>data to allow for estimates of absolute abundance/density of harbour porpoise.</p> <p>RW asked if it would be useful to analyse all the data collected during aerial surveys – presently only data from 2 cameras (ie approximately 10% of the survey area) is being analysed. Analysing the data from all 4 cameras would lead to coverage of approximately 20%. TMcG – this would increase the sample size but not allow us to estimate g(0).</p>			<ul style="list-style-type: none"> • Mortality - assume 240 dBpeak re 1 µPa for a lethal injury • Physical injury – assume 220 dBpeak re 1 µPa • Disturbance – same assumptions as used for Hornsea Project Two but using up to date audiograms for each species <p>These criteria were all agreed. RW noted that she was happy to use the updated Southall criteria (as for Project Two) for disturbance, as these are likely to form the basis for additional future guidance from NOAA on disturbance.</p>	
5	<p>Underwater noise modelling</p> <p>Tim Mason of Subacoustech summarised the proposed approach to noise modelling. Noted that this would involve extrapolating noise measured from smaller piling events to scale up to the hammer energies proposed at Hornsea Three. Well established relationships allow these extrapolations to be made confidently.</p> <p>RW asked if the frequency profiles of noise generated changed with increasing hammer energy? TM confirmed that they already model a very wide range of frequencies including those arising from piling activity, even at higher energies. In any case frequencies are not expected to change very much as these are primarily determined by the characteristics of the pile structure rather than the piling energy, noting the differences expected between pin piles and monopiles due to pile diameter.</p> <p>Modelling will take account of the piling methodology, including soft start and the expected piling rate. Soft start will assume standard criteria of 1 strike/ 6 secs for 20 mins @ 20% hammer energy and thereafter ramping up to full energy at a strike rate of 1 strike / 2 secs. RW noted that 20% of 5,000 kJ (1000 kJ) is a high soft start energy. AR will seek advice from DONG Energy engineers whether a lower soft start can be achieved and this will also be modelled e.g. 10% (500 kJ).</p> <p>TM confirmed that precautionary assumptions would be made based on the worst cases indicated by the foundation design engineers.</p> <p>TM set out the marine mammal and fish impact assessment criteria noting that these now take account of the updated guidance provided by NOAA (2016). For those criteria not included in NOAA the following assumptions will be used:</p>	<p>Hornsea Three to consult with engineers on soft start energy</p> <p>Hornsea Three to consult with Cefas</p>		<p>TM noted that the locations that would be assumed for piling activities in the model had yet to be selected. There would be an internal workshop to review proposed construction methods and to identify appropriate locations. AR noted that the following issues would be important:</p> <ul style="list-style-type: none"> • Water depth • Distance from pSAC • Location of any areas that were known to support higher densities of marine mammals <p>RW agreed and indicated that a key issue for the extent of area potentially affected by noise would be the choice of piling location and the separation distance of concurrent piling activities. The wider this spacing the large the area that would be affected, this is particularly an issue for the pSAC. Need to consult with Cefas on this too.</p> <p>TN indicated that following consultation with Cefas, Hornsea Three would share the response with the EWG. It was agreed that if Cefas accepted the noise modelling approach the EWG would follow Cefas lead and focus on biological aspects.</p> <p>Natural England and TWT expressed interest in attending the noise modelling workshop, but finding time before Christmas might be an issue. In any case both organisations would like to understand the programme for when noise modelling and subsequent impact would be undertaken.</p> <p>Hornsea Three proposes that the results of the initial noise modelling should be shared with EWG members and a workshop arranged if required.</p> <p>Other issues:</p>	<p>Hornsea Three to consult with Cefas and revert to EWG with any comments</p> <p>Hornsea Three to confirm results of initial noise modelling and discuss with EWG</p>

	<p>RW pointed out that it had previously been asked whether there was anything that could be done to enhance the value of any boat-based surveys planned for birds that could be of use for marine mammals. AR identified that no ornithological boat based surveys were planned. RW noted that if they were then including an additional observer for marine mammals would be helpful and that this might help to develop correction factors for the aerial survey data.</p> <p>Natural England have also funded a iPCoD study looking at the cumulative offshore wind related pilling in the English North Sea, although the date cannot be published yet.</p>	
6	<p>Conclusions & Next steps</p> <p>Hornsea Three will revert to the EWG on several matters.</p> <p>The next meeting of the EWG is scheduled for February 2017, date to be confirmed.</p>	

Actions

2. **Hornsea Three** to obtain relevant data / information for north Norfolk coast seals
3. **Natural England** to provide contacts for European Monitoring Coalition and Hornsea Three to follow up
4. **Hornsea Three** to summarise proposed assessment methodology
5. **Hornsea Three** to check screening of Farne Islands (Berwickshire and North Northumberland Coast SAC) and rationale for exclusion of this site
6. **Hornsea Three** to consult with engineers re. a lower soft start energy
7. **Hornsea Three** to consult with Cefas and to revert to EWG with any comments received.
8. **Hornsea Three** to confirm results of initial noise modelling and discuss with EWG

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	13.04.2016	The appropriate survey methodology and survey effort.	It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate, with a 10% survey effort.
2	04.08.2016	The key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.	The EWG agreed on the key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.
3	04.08.2016	The baseline data requirements in order to inform the EIA.	The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.
4	04.08.2016	The designated conservation sites relevant to the ECR.	The EWG agreed that all the conservation sites relevant to the ECR had been considered.
5	04.08.2016	The impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps.	The EWG agreed on the impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to disturb certain marine mammals.
6	04.08.2016	The Hornsea Three specific issues that require consideration.	The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.
7.	23.11.2016	Use of data for impact assessment	Agreed that if aerial survey data cannot be combined with boat survey data then it would be appropriate to use the results (highest abundance) of the previous boat based surveys.
8.	23.11.2016	Extrapolation of surface densities to areas that have not been surveyed	Agreed that surface densities should be extrapolated where there is no survey coverage.
9.	23.11.2016	Study areas and reference populations	Agreed that the study areas are appropriate and that Management Unit reference populations for seal species should be updated to reflect more recent population estimates
10.	23.11.2016	Impact assessment: noise criteria	Agreed that NOAA (2016) guidance should be considered for injury thresholds, noting that sensitivities to UXO detonation are being re-assessed and guidance may be revised.

E.5 Marine Mammals EWG meeting minutes 28.03.2017

<i>Subject</i>	Marine Mammals EWG
<i>Date - hours</i>	28.03.2017 11.00 - 16.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Rebecca Walker (RW) – Senior Marine Mammal Specialist, Natural England Marija Nilova (MN) – Marine Lead Advisor, Natural England Tania Davey (TD) – Living Seas Development Officer, TWT Tim Mason (TM) – Senior Acoustic Consultant, Subacoustic Environmental Ltd Julian Carolan (JC) - Lead Environment & Consents Specialist, DONG Energy Sophie Banham (SB) – Hornsea Three Consents Manger, DONG Energy Tessa McGarry (TMc) – Senior Marine Ecologist, RPS Emily King (EK) - Offshore EIA Manager, RPS Tim Norman (TN) - Evidence Plan, NIRAS David Bloxsom (DB) – Evidence Plan, NIRAS</p> <p>By phone</p> <p>Martin Kerby (MK) – Marine Senior Adviser, Natural England Richard West (RWest) – Hornsea Three Case Officer, MMO</p>
<i>Supporting Material</i>	<p>Position paper circulated on 21/03/2017 Presentation circulated on 27/13/2017</p>

Item	Description	Action
1	<p>Introduction, purpose and aims of the meeting</p> <p>Meeting 5 of the Marine Mammal EWG. The aim of the meeting was to:</p> <ul style="list-style-type: none"> - Discuss the EIA Scoping and HRA Screening the responses 	

	<ul style="list-style-type: none"> - Continue discussions on the underwater noise modelling methodology and initial results - Provide an update on aerial survey data collection - Update on the Habitats Regulations Assessment methodology following the February 2017 workshop. 	
2	<p>EIA Scoping responses</p> <p>Four issues were discussed in detail, no other issues were raised regarding the remaining Hornsea Three EIA Scoping responses.</p> <p><i>Noise reduction technology</i></p> <p>RW noted that more information on noise reduction technologies than for previous applications will be required within the EIA, the technology has been applied in Germany and therefore evidence should be provided as to why it can/cannot be used in a UK context. It would be useful to see a more complete consideration of noise reduction technologies, a detailed assessment of why (or why not) certain technologies are appropriate for use and the proposed approach for the project.</p> <p>SB stated that it would be unlikely that this information is incorporated into PEIR due to time constraints. From a wider DONG Energy perspective, there are lessons learnt from other projects and more information will be able to be provided, although an element of flexibility within the project envelope will remain. JC noted that noise mitigation methods will only be considered where a significant impact is identified within the EIA.</p> <p>JC noted that DONG Energy are currently undertaking an internal review of piling records, which currently shows that the worst case scenarios presented within the impact assessments are highly precautionary. There are efforts to make this assessment more realistic.</p> <p><i>UXO</i></p> <p>TMc stated that behavioural effects from UXO are very limited as explosions only occur at a single point time and Hornsea Three will be aiming to have adequate mitigation in place to limit any instantaneous injuries. Therefore UXO was anticipated to be scoped out of the cumulative assessment. RW noted that, especially for the HRA and the harbour porpoise cSAC [Southern North Sea], the noise envelope that might occur from Hornsea Three or other OWFs need to be understood. The Dutch appear to be carrying out routine UXO detonations. The assessment does not necessarily have to be a quantitative but it still needs to be addressed. TMc noted it would be useful to understand how you incorporate UXO detonation into the cumulative assessment, when the timeframe is instantaneous. RW stated that the inclusion can be explained as long as it is clear in the EIA that a post-consent Marine Licence will be</p>	

<p>sought, which will take into account the proposed mitigation that will be deployed.</p> <p>TMc noted that little is known about the number of and size of potential UXO within the Hornsea Three area. RW stated that assumptions have been made for Hornsea Project One and Hornsea Project Two previously.</p> <p>RW explained that the assessment should include an explanation of the potential UXO effects, background information, along with certain assumptions over the number and size and confirm that a licence application will be made at the appropriate time [post consent] if required.</p> <p>TN stated that the approach within the EIA is to make it evident from the impact assessment that the likely mitigation is appropriate based on the understanding of the potential impacts and the assumptions made.</p> <p><i>Cumulative assessment</i></p> <p>EK confirmed that the cumulative assessment will consider underwater noise from other UK OWFs as well as Dutch OWFs. RW noted that other activities should be taken into account such as seismic. The Hornsea Three construction period should not correspond with Hornsea Project One or Hornsea Project Two and therefore no cumulative effect is anticipated and the assessment will demonstrate this. RW noted that new NOAA thresholds may be problematic for the cumulative assessment.</p> <p><i>Baseline data</i></p> <p>TMc noted that SMRU harbour seal data has not been available, as it is currently being updated. Kate Brooks has been contacted regarding these data.</p> <p>TMc outlined what data has been obtained and what additional data will be included post-PEIR. The EWG agreed with the available baseline data for pinnipeds. JCP data is still unavailable and potentially will not be available within the Projects timeline. RW noted that SCANS-III data may be available for use within the final Environmental Statement.</p> <p>HRA Screening responses</p> <p>Four issues were discussed in detail, no other issues were raised regarding the remaining Hornsea Three EIA Scoping responses.</p> <p><i>Pollution impacts:</i></p>	<p>Hornsea Three to see if more contextualised</p>	<p>TN explained that fairly well established pollution prevention plans are in place, but further information will be provided within the HRA on the risks and assumptions of these measures.</p> <p><i>Vessel noise and collision risk:</i></p> <p>TN stated that this is not something that is anticipated to lead to a significant effect and the main concern is assumed to be surrounding in-combination effects.</p> <p>RW stated that there is a wider issue (not project specific) regarding tipping points. Scientific research (i.e. Pirotta et al., 2015) suggests that animals foraging are disrupted by vessel movements. High increases in vessel traffic (e.g. 46% predicted increase in vessel traffic at Hornsea Project Two) therefore may have impact. There was some debate around the 46% and how this was derived and applied to any assessment.</p> <p>SB noted that there is an issue in how information feeds into the marine mammal chapter from other Environmental Statement chapters. During construction vessel activity will role across the array area it is not a block increase across the area. The nature of the shipping assessment presents the total increase in shipping traffic as a worst case scenario. Therefore taking information directly from the shipping assessments, may not reflect a realistic worst case scenario from a marine mammal perspective. TMc stated that the assessment should focus on a more realistic view of the movement of vessels.</p> <p>RW noted that vessel presence occurs over a short time and a small area, but we can only advise on what is presented in the EIA and if there is a large increase in vessel traffic (e.g. 46% from Hornsea Project Two) then this is a concern. More contextual information should be provided (state where the vessels were positioned, whether they were moving or stationary) to clearly explain the scale of the potential effect on marine mammals.</p> <p><i>Operation and maintenance impacts on prey availability:</i></p> <p>TN stated there is on ongoing discussion around how the marine processes assessment is being conducted. MK noted that this issue originates from issues affecting surrounding marine processes and, in particular, effects on the Flamborough front, if this issue is resolved then this issue resolves itself. The EWG agreed that if it is confirmed that there is no effect on prey availability through the benthic ecology and marine processes assessments then this does not need to be assessed and can be screened out.</p> <p><i>UXO clearance</i></p> <p>[See section on EIA Scoping above]</p>	<p>information on vessel movements can be provided to the EWG. Then a decision can be made on the approach to assessment within the Environmental Statement and the requirement for assessment within the HRA</p>
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<p>3</p>	<p>Assessing effects of Subsea Noise on Marine Mammals</p> <p>TMc provided a summary of the approach to assessing the effect of subsea noise on marine mammals, including:</p> <ul style="list-style-type: none"> - Adoption of new NOAA guidelines - Conservatism built into the noise modelling (e.g. TM explained that the noise level is assumed to be the maximum across the entire water column, which is highly precautionary). - Noise density maps - Understanding the realistic worst case scenario <p>TN stated there are layers of precaution built into the noise modelling which results in unrealistic model outputs and raised the question of how this is presented. JC confirmed that the worst case scenario that has been produced is not realistic and this is the case across the majority of assessments. A review of piling records indicates that maximum hammer energy is rarely reached. Modelling of noise at 2 m water depth will be investigated, as an option for presenting a more realistic scenario.</p> <p>RW noted that the worst case scenario produced is unrealistic and it will be useful to see the more realistic scenarios presented as contextual information, this will help the decision making process. JC stated that more contextual information on the parameters of the subsea noise modelling would be beneficial but the realistic scenarios won't be included within the PEIR due to time constraints.</p>		<p>from Hornsea Project Two is available. Projects will be screened in that have temporal/spatial overlap. There will be limitation on what information can be obtained.</p> <p>TMc confirmed that whilst the Hornsea Three assessment will use the updated NOAA thresholds for the project alone assessment, for the cumulative assessment the data presented in other projects Environmental Statements will be utilised and it is not considered appropriate to update or adapt the information in line with new thresholds.</p> <p>RWest noted that the MMO can run a search on their internal GIS tool that will provide information on all applications/licences within 10 km of the Hornsea Three area.</p> <p>EK confirmed that aggregate areas, oil and gas, subsea cables, pipelines, ports and harbours will all be considered within the CIA long list. A specific list of projects are then shortlisted for each potential impact.</p> <p>TMc stated that it is not useful to simply sum the total numbers of marine mammals potentially affected as this would give an overestimate of the numbers affected. RW agreed.</p>	<p>RWest to confirm whether the search can be carried out on a wider scale</p>
<p>4</p>	<p>Reference populations</p> <p>TMc provided an overview of the reference populations that will be used within the Environmental Statement, HRA and EPS licence. Noting that the grey seal population will include the north east England MU.</p> <p>RW agreed with the use of these as reference populations and noted that there are issues with assessing on large scales (i.e. over whole of North Sea MU).</p>		<p>6</p> <p>Subsea noise modelling – initial results</p> <p>JC explained that the aim is to circulate a more detailed noise modelling methodology document to Cefas for comment by the end of the week (31.03.2017). RW also noted it would be useful to see a more complete methodology, while the methodology follows the approach utilised for Hornsea Project Two and Natural England are broadly happy, it would be useful for Cefas to double check a few points. Cefas have requested this to include the model parameters.</p> <p><i>Initial results and explanation</i></p> <p>TMc provided any overview of initial noise modelling results, noting that these are still in draft and the noise modelling has not been finalised. TMc stated that based on the instantaneous injury range for high frequency cetaceans, using the NOAA thresholds, you have a potential maximum auditory range of 1500 m for which mitigation measures will be in place.</p> <p>TM explained the following points:</p> <ul style="list-style-type: none"> • The major parameter for noise production is energy, the noise released is not dependent on the size of the pile, it is dependent on how hard the pile is hit; • Striking with different pile sizes results in different frequencies being produced. Low frequencies travel further (e.g. whale noises); • Low frequency cetaceans have greater cumulative SEL PTS/TTS ranges because the majority of the piling energy released is of a low frequency; 	<p>RW to liaise with Cefas over any comments raised and ensure feedback through the MMO.</p>
<p>5</p>	<p>Cumulative study area</p> <p>TMc stated that the cumulative study areas will be the same as the management units. Aside from white-beaked dolphins and minke whale for which only the North Sea will be considered.</p> <p>RW stated that the approach is appropriate, as long as Hornsea Three is confident that sufficient information can be obtained to carry out the assessment, from other countries, in order to do the assessment. RW also added that non-OWF projects that involve piling and other noisy activities should be taken into account. TMc noted that certain information</p>			

	<ul style="list-style-type: none"> • Mid and high frequency cetaceans have overall comparatively lower PTS and TTS ranges (for cumulative SEL) because there is relatively less conservative weighting in the updated NOAA thresholds compared with the other cetaceans and the majority of the piling energy is within the lower frequencies, which mid/high frequency cetaceans are not sensitive to; • There is little difference between the low frequency cetaceans PTS/TTS ranges between 5000 KJ and 2500 KJ; and • High frequency cetaceans there is a relatively greater difference between the PTS/TTS ranges between 5000 KJ and 2500 KJ. This is because the lower energy pile releases a great proportion of energy at high frequencies and therefore high frequency cetaceans are more sensitive to the lower energy pile. The distribution in frequency has a greater effect than the actual increase in energy. <p><i>Mitigation</i></p> <p>TMc/TM noted that there is considerable precaution built into the noise modelling parameters. Previous assessments have based the mitigation around the instantaneous injury ranges and this will be proposed for Hornsea Three. RW confirm this approach is appropriate, as long as the mitigation ensure that when the soft start procedure starts the marine mammals are more than 1500m away. RW explained it would be useful if the tables in the PEIR/Environmental Statement show how far the mammals could have moved in relation to the ramp up blow energies. This will determine whether an individual could still be within a PTS zone when the energy is ramped up. TMc confirmed that the single strike SELs are presented against the ramp up blow energies and TM confirmed we can put PTS thresholds against the ramp up values as well.</p> <p>TMc outlined the proposed mitigation strategies:</p> <ul style="list-style-type: none"> • Deploy ADD to ensure the mammals can clear the 1500m, if not further, then commence the 15% soft start. • The aim is to minimise the disturbance from ADD while ensuring enough time for mammals to move outside the instantaneous injury zone. <p>RW accepts that ADD is appropriate, although other mitigation measures should also be considered (e.g. Marine Mammal Observers).</p> <p>SB noted that a German paper suggests that marine mammals have learned that vessel noise results in underwater noise and already vacated the area before the piling began. [TN circulated the paper during the</p>		<p>meeting]. SB interesting to see from the piling logs, those occasions where full piling energy is reached, to see how it relates to ground conditions.</p> <p><i>Noise propagation</i></p> <p>TM explained the theory behind why noise modelling produces larger disturbance contours than those recorded in the field. TM explained that if a sound is close but quiet, it will sound different to a sound that might have the same overall volume but it a significant distance away. Noises further away sound more distributed because of the differences in speed in relation to frequency. In reality, the model does not take this effect into account. RW noted that Natural England understand this is the case but there is no empirical evidence on how porpoises respond in relation to a nearby quiet noises or further away louder noises, both with the same noise level.</p> <p>RW explained that NE have accepted that harbour porpoise disturbance generally occurs out to a distance of 26 km (for the cSAC), but it is understood that porpoise won't always react to a noise 26 km away because they realise it is a significant distance away and therefore not an immediate threat. The 26 km distance is where approximately 50% will react. Research needs to be conducted on whether or not the animals are aware that a sound is nearby but weak/far but strong.</p> <p>RW confirmed that the NOAA guidelines should be followed for determining injury thresholds (PTS/TTS). In relation to the HRA for disturbance, RW confirmed that it is understood that the modelling (using Lucke) may show disturbance distances greater than 26km, but 26 km is seen as a standard distance and this is how far generally disturbance effects will be felt, even if the modelling shows different. The EIA should present the modelled disturbance distance and numbers of animals disturbed. TMc noted that if you wanted to align the Environmental Statement with the HRA the dose response numbers may be a more useful metric.</p> <p>TN confirmed that for physical injury the NOAA thresholds will be used. In relation to HRA disturbance is being underpinned by the work surrounding the SAC to date (26 km), subject to any further updates in advice from Natural England. The EIA will show the actual modelled disturbance distances and numbers of animals disturbed.</p>	
			<p>7</p> <p>Update from JNCC workshop</p> <p>RW provided an update from the JNCC workshop surrounding the SNS cSAC. The aim of the workshop was to talk through the SNCBs thinking which was:</p> <ul style="list-style-type: none"> • no more than 20% disturbance spatially at any time (day), • no more than 10% disturbance spatially over a season. With the 26km being the zone of influence for one strike (pile). The cSAC is 	

	<p>split into summer and winter sections and the 20% and 10% thresholds relate to either the summer or winter portion, not the entire cSAC.</p> <p>Three breakout sessions that looked at threshold justification, implementation of a threshold approach and additional approaches.</p> <p>RW noted the discussion points that came out:</p> <ul style="list-style-type: none"> Both industry representatives and regulators suggested that the 20% daily spatial threshold was not workable in implementation. Whether it would be theoretically possible to create an overarching regulator, with oversight. <p>RW concluded that no significant issues had been raised with the approach that has been proposed. TD noted that some of the developers had concerns over how the approach to the cSAC was actually going to be delivered and whether there needed to be some alternatives, but in the short term there are no alternatives.</p> <p>SB questioned whether anything regarding CfD bids was discussed, in terms of the level of confidence the developer requires, as this remains an area of concern. RW stated that nothing specifically came out around the implications for CfD bids.</p> <p>TMc noted that the seasonal approach seemed to be better received rather than the daily limit within the discussion group. SB noted that the wind industry wouldn't want to be in the position of being penalised because it is easy to regulate, when compared to for example seismic surveys for oil and gas.</p> <p>SB stated that it is broadly understood what is required within the consent application regarding the cSAC, and it is understood there will be conditions that will require revisiting at a later date. It is reassuring that in the short term there is unlikely to be any significant changes to the approach.</p> <p>RWest raised the issue of whether it is possible to do a soft start procedure if piling has stopped for a period of more than half an hour.</p> <p>TMc confirmed that this scenario has been reviewed in the past. The ability to re-start the soft start procedure is dependent on the ground conditions. In the study case the ground conditions were suitable and it was determined that if there was a break for over 2.5 hrs then it would retrigger the whole ADD and soft start procedure. For a break less than this period it would trigger ADD and a shortened soft start procedure. This was because if a pile is left undriven, the sediment around it will begin to consolidate and a strike at higher energy is required to free it and drive it</p>		<p>to the required depth. This is something that detail can be provided on but is more suited to post consent, as there will be more specific engineering information available.</p> <p><i>[Natural England Post meeting note- DONG should check how piling breaks relate to the JNCC piling guidance and it should be discussed how long can pass before full ADD and soft start are re-required].</i></p>	
8	<p>Aerial survey data – update</p> <p>TMc explained that it has not been possible to calculate a site specific value for g(0) from the aerial data and therefore existing data from telemetry studies has been explored. TMc explained that evidence from telemetry data shows that porpoises remain fairly close to the surface aside from when conducting a deep dive. The telemetry studies from different locations show there is no significant difference in diving behaviour between locations. There were differences between the seasonality with longer durations at shallower depths occurring at April compared to February.</p> <p>Review of the aerial data has shown that there is fairly high confidence that when porpoises are near the surface they are detectable, and that sea state and turbidity may play less of a role in determining if the animals are detectable.</p> <p>TMc explained that on review of the previous studies it was felt that most appropriate value for G (correction factor) would be using the minimum value for S₂ from Teilmann <i>et al.</i>, (2013), because this is a more precautionary estimate. Therefore 0.43 is intended to be used as a proposed correction factor, to provide absolute numbers instead of relative numbers.</p> <p>RW stated that it is a useful development to use aerial data with a correction factor derived from existing studies, as this kind of robust data has not been obtained before. This will be a useful indication of abundance to include in the PEIR/Environmental Statement but it should be acknowledged that there is limited evidence to this method.. TMc confirmed that the correction factor will provide an estimate of absolute abundance. Baseline data is also available from the boat-based surveys of Hornsea Three. SCANS-II and SCANS-III data (when available) will provide additional contextual information.</p> <p>If aerial data is to be used within the impact assessment, the area of the noise contours will be multiplied by the absolute value, which differs from the approach used for boat based data, which used surface density maps over a larger area. RW stated that whichever method provides the most precautionary result would be best, but when we have the results further discussions can be held. TD noted it would be useful to look initially at both options.</p>			

	EWG confirmed the proposed approach for baseline characterisation using the aerial data.	
9	<p>Conclusions & Next steps</p> <p>SB confirmed that currently PEIR is due at end of July and are aware that there are concerns from Natural England over the consultation period.</p> <p>Next EWG meeting date will be confirmed with the meeting minutes.</p> <p>MK noted that there needs to be a more in-depth discussion about the in-combination elements of the HRA and around how to consider projects at different stages of development and potential tier-ing work.</p>	

Actions

1. Hornsea Three to provide more contextualised information on vessel movements to inform the approach to assessment within the Environmental Statement and the potential requirement for assessment within the HRA
2. RWest to confirm whether the licence search can be carried out on a wider scale
3. RW to liaise with Cefas over any comments raised on the underwater noise modelling methodology and ensure feedback through the MMO

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	13.04.2016	The appropriate survey methodology and survey effort.	It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate, with a 10% survey effort.
2	04.08.2016	The key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.	The EWG agreed on the key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.
3	04.08.2016	The baseline data requirements in order to inform the EIA.	The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.
4	04.08.2016	The designated conservation sites relevant to the ECR.	The EWG agreed that all the conservation sites relevant to the ECR had been considered.
5	04.08.2016	The impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps.	The EWG agreed on the impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to disturb certain marine mammals.
6	04.08.2016	The Hornsea Three specific issues that require consideration.	The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.
7.	23.11.2016	Use of data for impact assessment	Agreed that if aerial survey data cannot be combined with boat survey data then it would be appropriate to use the results (highest abundance) of the previous boat based surveys.
8.	23.11.2016	Extrapolation of surface densities to areas that have not been surveyed	Agreed that surface densities should be extrapolated where there is no survey coverage.
9.	23.11.2016	Study areas and reference populations	Agreed that the study areas are appropriate and that Management Unit reference populations for seal species should be updated to reflect more recent population estimates
10.	23.11.2016	Impact assessment: noise criteria	Agreed that NOAA (2016) guidance should be considered for injury thresholds, noting that sensitivities to UXO detonation are being re-assessed and guidance may be revised.
11.	28.03.2017	Reference populations	The EWG agreed the reference populations, noting that there are issues with assessing on large scales.
12.	28.03.2017	Cumulative study area	The EWG agreed that the cumulative study areas will be the same as the management units.
13.	28.03.2017	Impact assessment: mitigation	The EWG agreed that any mitigation measures will be based around the instantaneous injury ranges.
14.	28.03.2017	Impact assessment: noise criteria	The EWG agreed that the NOAA guidelines will be followed for determining injury thresholds (PTS/TTS). For disturbance, the standard distance of 26 km will be followed, in line with the recent work around the southern North Sea cSAC.

E.6 Marine Mammal EWG meeting minutes 10.07.2017

<i>Subject</i>	Marine Mammals EWG meeting 6
<i>Date - hours</i>	10.07.2017 11.00 – 15.00
<i>Venue</i>	DONG Energy, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Rebecca Walker (RW) – Senior Marine Mammal Specialist, Natural England Marija Nilova (MN) – Marine Lead Advisor, Natural England Tania Davey (TD) – Living Seas Development Officer, TWT Julian Carolan (JC) - Lead Environment & Consents Specialist, DONG Energy Jen Brack (JB) – Environment & Consents Specialist, DONG Energy Sophie Banham (SB) – Hornsea Three Consents Manger, DONG Energy Nicola Simpson (NS) – Principal Marine Consultant, RPS Emily King (EK) - Offshore EIA Manager, RPS Tim Norman (TN) - Evidence Plan, NIRAS David Bloxsom (DB) – Evidence Plan, NIRAS Andrew Henderson (AH) – Senior Lead Windfarm Engineer, DONG Energy</p> <p>By phone</p> <p>Richard West (RWest) – Hornsea Three Case Officer, MMO Louise Burton (LB) – Senior Advisor, Natural England Tim Mason (TM) – Senior Acoustic Consultant, Subacoustic Environmental Ltd</p>
<i>Supporting Material</i>	EWG Meeting Presentation

Item	Description	Action
1	<p>PEIR Baseline</p> <p>NS presented a summary of the desktop baseline sources, noting that currently SCANS-III data is not included (this will be included within the Environmental Statement) and outlined the survey data that has been utilised within the PEIR,</p>	

	<p>including both aerial (Hornsea Three data) and boat based data (Hornsea Zonal data). There will be a total of 18 months of aerial data included within the final Environmental Statement. NS noted that aerial data has produced a harbour porpoise density that is consistent with the visual boat-based data; but that is lower than the acoustic data. The acoustic data density is used in the assessment because it is more precautionary. Currently density plots have not been produced for other species as not enough data has been recorded in the aerial survey.</p> <p>The average density estimates to be used within the impact assessment and the reference populations have been agreed at previous EWG meetings.</p> <p>RW noted that there is large amount of variation in the species densities between years and therefore a precautionary view is important. RW stated that it would be acceptable for all densities to be presented and assessed against, but justification and evidence should be presented as to why a certain value has been taken forward.</p>	
2	<p>PEIR Assessment</p> <p>NS outlined:</p> <ul style="list-style-type: none"> • The impacts assessed (which have been agreed throughout scoping and previous EWG meetings); • The generic definitions for magnitude and sensitivity; • The matrix used to draw conclusions on significance; and • Designed in mitigation measures. <p>NS explained that currently within the PEIR a full assessment on noise and vibration is not provided, as there is work on-going on this topic. All other impacts have been assessed in full.</p> <p>NS outlined the maximum design scenario both spatially and temporarily.</p>	
3	<p>PEIR noise assessment</p> <p>NS presented:</p> <ul style="list-style-type: none"> • The precaution that is included within the noise assessment; • The assessment criteria and thresholds; and • The preliminary assessment summary. <p>TD queried whether the soft start takes into account the use of ADD. NS explained that it does not because ADDs are used beforehand and then the soft start procedure. JC noted that ADD is the mitigation for the assessment. TD stated that the use of ADD would add to the temporal and spatial effect of noise disturbance. SB explained that there are two slightly different assessments, the soft start procedure is focused on PTS which does not take into account that the</p>	

	<p>majority of harbour porpoise should be moved out to >1,500m, whereas the disturbance impact is considered separately.</p> <p>TD queried whether evidence has been presented on ADD providing an effective mitigation zone. SB explained that we have provided evidence that is currently available and following the ORJIP study there will be further information to include.</p> <p>NS stated that there are a number of points regarding the noise assessment that will continue to be worked upon and the EWG will be updated periodically with the progress made. These points may include:</p> <ul style="list-style-type: none"> • Review of MDS and experience of other OWFs; • Application of noise criteria; • Magnitude and sensitivity criteria; • Refinement of noise modelling; • Review of different species densities; • Application of dose response; and • Quantification of layers of precaution (e.g. precaution tree or similar). 	<p>NS to circulate example precaution tree</p> <p>Post meeting note – see Figure 4.21 and Figure 4.22 in the Hornsea Project Two Environmental Statement Chapter (PINS Doc No. 7.2.4³).</p>
4	<p>PEIR cumulative assessment</p> <p>NS outlined the CEA methodology which has focused upon the key topics (underwater noise). Impacts which were assessed as negligible alone have not been taken through to the CEA. NS requested for the EWG to highlight any projects that have been missed off the CEA list [through S42 feedback].</p> <p>RW queried whether seismic surveys had been included in the CEA. NS explained that seismic surveys have not been addressed within PEIR, as information on the extent or location of this activity is not currently available. RW questioned whether it would be possible to create an average over several years obtaining information from the noise registry. SB noted that it would be preferable not to second guess the conclusions of the oil and gas industry's appropriate assessment (not currently available), but that this would be used in the Environmental Statement if available. RW stated that seismic survey noise may need to be considered within the assessment.</p>	
5	<p>RIAA</p> <p>TN outlined the RIAA in relation to marine mammals including:</p> <ul style="list-style-type: none"> • Sites screened into the assessment (as previously agreed by the EWG) • The designated qualifying features (as previously agreed by the EWG) • The potential impacts assessed (as previously agreed by the EWG) • Initial conclusions 	

	<ul style="list-style-type: none"> • Further detail on the harbour porpoise assessment which takes a different approach, as advised, to the PEIR. <p>TN noted that further assessment will be focused around the in-combination assessment of behavioural effects to harbour porpoise. TN noted the project alone has a relatively limited effect on the SNS cSAC, and further consideration will be given to how other projects are included within the assessment where there is little understanding on whether or not these projects will be taken forward. SB stated that by the final Environmental Statement it is anticipated that more information will be available on the projects included in the in-combination assessment.</p>	
6	<p>DONG Energy Piling review</p> <p>AH explained that the aim has been to review piling data obtained from contractors to DONG Energy to gain a more realistic understanding of piling activities. AH has reviewed four projects and presented the results for three UK projects; Westernmost Rough, Burbo Bank Extension and Race Bank. AH stated that DONG Energy want to keep the energy used to install the pile to a minimum because the reduction in energy results in less fatigue damage to the pile itself, or to the piling equipment. A beneficial bi-product of this is a reduction in piling noise.</p> <p>AH explained that a large hammer (energy) is being requested within the MDS, but the average energy used is likely to be similar to other projects built to date. A larger hammer is believed to be more efficient than a smaller hammer (less piling time), due to a higher inertial mass. SB noted that it would be useful to add this information to the final project description.</p> <p>AH presented the piling data from Westernmost Rough, Burbo Bank Extension and Race Bank OWFs. The key points are relatively consistent across the three projects:</p> <ul style="list-style-type: none"> • The average time spent hammering is significantly less than that assumed for the assessment of noise in the Environmental Statement for projects; between approximately 1 hour – 2.5 hours. • The maximum hammer energy used is the instantaneous max value, which is often well below the maximum consented energy and only used for a short period. However the average hammer energy is significantly lower. The piling energy used for WMR was 850 KJ, well below half the consented limit, and 1,300 KJ average maximum, and 2,000 KJ maximum peak (for a v short period of time e.g. 1-5 minutes). Only four piles with peaks of 1,900 KJ or higher. 	

³ <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010053/EN010053-000331-7.2.04%20Marine%20Mammals.pdf>

<p>Efforts are made to avoid siting turbines where drilling is required as drilling is more costly and produces additional environmental issues (spoil). Although drilling equipment is always available.</p> <p>AH explained that the distribution of the average energy and the maximum energy for Burbo Bank and WMR are very similar. Burbo Bank Extension used a larger hammer but the average energy and the maximum average energy are basically the same as Westermost Rough. A 3,250 KJ hammer consented for Burbo Bank Ext, with only 2 piles requiring more than 1,300 KJ. Average piling time for Race Bank was under 1 hour and the average energy was similar to WMR and Burbo Bank Extension at around 850 KJ.</p> <p>JC noted that the consented piling time for Burbo Bank Extension was 8 hours, which was never used in reality and therefore this large maximum time was not really required within the maximum design scenario (albeit with technical issues at one pile). AH stated that it is very interesting across all the projects just how consistent the energy and durations required have been.</p> <p>AH explained that the key driver for duration and energy is the ground conditions. The data on ground conditions has improved greatly over the past few years. JC questioned, having seen the data presented, how comfortable would the EWG be with an assessment that was based on an average hammer energy and time instead of a maximum? RW stated that this would have to be considered further, but it would also need DONG Energy to consider what value would be included. SB stated that it will be relatively easy to conduct an assessment based on what is a realistic scenario with precaution built in, what will take additional consideration is how the condition/constraint could be drafted to capture this.</p> <p>AH noted that a higher energy causes more fatigue within a pile rather than a higher number of blows. Conventionally there are about 30-40 blows per minutes increasing to 60-70 blows per minute. JC noted that the ramp up starts at one blow every six seconds for the first 7.5 minutes at 15% of the maximum hammer energy i.e. 750 KJ at intervals up to 30 minutes. The critical point for the cumulative assessment is to increase the period of time when piling is at 15% energy. Compared to the previous projects the average maximum energy (850 KJ) used is only just over the 15% value for the Hornsea Three maximum hammer energy, so it is unrealistic to assume that the majority of piling will be undertaken using the full 5000 KJ. Consequently, JC explained that the piling scenario that is used in the assessment is a large overestimate compared to what is realistically used.</p> <p>LB questioned whether if there is a break in piling, the ramp up can be started again in the same manner, as previous cases have demonstrated this is not possible. RW noted that it has been conditioned that if there is a break in piling for a certain period of time then the full ramp up will be required and it may be that this is difficult to conduct.</p>	<p>Hornsea Three to present the EWG ideas on how a more realistic</p>	<p>SB noted that thought is required around the conditions/constraints placed on piling. From what AH has presented it suggests that the majority of piles can be installed at just over 15% of the total 5,000 KJ energy therefore you wouldn't want to prolong the noise due to the soft start procedure, if you know you could install the pile faster at only a slightly higher energy. TN stated that potentially a sliding threshold of maximum noise constraint could be developed. Potentially calculate from fleeing speeds for 15%.</p> <p>RW said that the key thing is the percentage of energy that is being used and ensuring that animals are outside of the injury area (1,500 m).</p> <p>RW stated that there are two slightly different conditions; the longer soft start (ramp up) is different to having a condition about the average vs maximum piling energy. TN noted that there may be a way to specify an energy around the proportion of time you exceed a notional maximum.</p> <p>TN concluded that there is a common aim to produce a realistic assessment while maintaining sufficient flexibility for construction.</p>	<p>noise assessment will be developed and considered within the assessment.</p>
		<p>7 Underwater noise modelling queries</p> <p>In March the noise modelling approach was submitted to the MMO and Cefas. Comments were received on this document and further detail was required on the points below. TM provided an overview of the clarifications.</p> <p><i>Sound source levels</i></p> <ul style="list-style-type: none"> • Sound source level is the nominal noise level calculated at 1m from a pile, treated as a point source in long range models. • Three factors; hammer energy, depth of water, size of the pile. • Source levels calculated from a database of OWF measurements. • Examples of Transmission loss curves were presented. <p><i>Pile diameter</i></p> <ul style="list-style-type: none"> • Pile diameter determines the frequency of the noise • Increasing the diameter lowers the frequency. Most of the energy from a 7m pile is well within the hearing range of low frequency cetaceans. Increasing the pile diameter is not expected to have any greater or lesser impact on low frequency cetaceans as all the energy is in the low frequency range already. <p><i>Fish behavioural assessment</i></p> <ul style="list-style-type: none"> • Popper et al., (2014) provides the most comprehensive document on noise effects on fish. There is still a lack of knowledge on the impacts, so broad classifications of risk have been developed. 	

	<p>JC question what effect substrate has on source level. TM explained that the sound spreads rapidly from the source, and then there are differences in reflection and absorption depending on the substrate.</p> <p>TM confirmed that two different models are used; DBSea and Inspire Light.</p>	
9	<p>AOB</p> <p>SB confirmed that PEIR will be available on 27th July 2017. The documents will be available on the website (large files split; low res), but also on USB sticks. Formal consultation closes on 20th September 2017. Within the consultation period there will be a series of community consultation events.</p> <p>LB explained that Natural England currently has reduced resources. Natural England will be working on a number of ongoing OWFs and therefore due to the work load will not be travelling to any meetings, and will only engage in meetings [in person] already agreed to under the DAS. SB will pick this up with Natural England and discuss the best use of time.</p> <p><u>Programme</u></p> <p>JC provided an outline of the short term future:</p> <ul style="list-style-type: none"> • PEIR issued 27th July • S42 consultation until 20th September • Additional community consultation in September • Next EWG to be confirmed late September/ early October <p>Further discussion required over NE available time.</p>	

Actions

1. NS to circulate example precaution tree – Post meeting note.
2. Hornsea Three to present the EWG ideas on how a more realistic noise assessment will be developed and considered within the assessment.

Progress of agreement

(previous meetings points highlighted in grey)

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12.	28.03.2017	Cumulative study area	The EWG agreed that the cumulative study areas will be the same as the management units.
13.	28.03.2017	Impact assessment: mitigation	The EWG agreed that any mitigation measures will be based around the instantaneous injury ranges (i.e. based on peak SPL).
14.	28.03.2017	Impact assessment: noise criteria	The EWG agreed that the NOAA guidelines will be followed for determining injury thresholds (PTS/TTS). For the disturbance assessment in the HRA, the standard distance of 26 km will be followed, in line with the recent work around the southern North Sea cSAC.

E.7 Marine Mammals EWG meeting minutes 20.11.2017

<i>Subject</i>	Marine Mammals EWG meeting 6
<i>Date - hours</i>	20.11.2017 11.00 – 15.00
<i>Venue</i>	Ørsted, 5 Howick Place
<i>Attendees</i>	<p>In person</p> <p>Emma Brown (EB) – Senior responsible officer, Natural England Rebecca Walker (RW) – Senior Marine Mammal Specialist, Natural England Marija Nilova (MN) – Marine Lead Advisor, Natural England Tania Davey (TD) – Living Seas Development Officer, TWT Jen Brack (JB) – Environment & Consents Specialist, Ørsted Sophie Banham (SB) – Hornsea Three Consents Manger, Ørsted David Bloxsom (DB) – Evidence Plan, NIRAS Carol Sparling (CS) – Marine Mammal specialist, SMRU Consulting</p> <p>By phone</p> <p>Richard West (RWest) – Hornsea Three Case Officer, MMO Pete Gache (PG) – GoBe Consulting Katie Swale (KW) – HRA Consultant, NIRAS Rebecca Faulkner (RF) – Underwater noise advice, Cefas</p>
<i>Supporting Material</i>	EWG Meeting Presentation and position paper

Item	Description	Action
1	<p>Introductions</p> <p>DB provided an introduction to the EWG meeting and brief recap of the previous meetings.</p>	
2	<p>Section 42 comments</p> <p>CS outlined the main themes that the S42 comments covered.</p> <p>RW queried when the EWG would be able to view the noise modelling results . JB confirmed that when the draft noise modelling report is completed there will be a better idea of when the results will be able to be shared. JB explained that the modelling methodology has changed as the dBSea model does not fit with measured data and is not ready for market use. Hence the modelling has reverted back to the INSPIRE model.</p> <p>TD raised two points:</p> <ul style="list-style-type: none"> • That based on the previous noise modelling outputs, it is considered important to start discussing mitigation at an early stage, although there is the understanding that the updated noise modelling has not been completed yet. • The difficulty in assumptions regarding return times. CS noted that this will be addressed within the assessment. Empirical data collected to date across a range of sites shows that return times vary from 1-3 days, but it is not understood which factors affect this variation. The assessment will consider the worst-case assumption of the highest return times. There is also the point on whether return time is really the correct phrase as we don't know whether it is the same individuals returning, noting that the worst case assumption is that it is the same porpoises disturbed repeatedly. <p>The EWG agreed that the themes presented covered the main points raised through the Section 42 consultation.</p>	
3	<p>Baseline characterisation</p> <p>CS provided an overview of the baseline data sources and reference populations for the five key species, aerial survey data and harbour porpoise density estimates.</p> <p><u>Baseline data sources</u></p> <p>CS noted that the previous telemetry report only looked at connectivity with the Humber SAC and the Wash SAC. Based on [S42] responses the connectivity with the northeast management unit for grey seals will be reviewed as a small</p>	

	<p>number of animals from this unit may interact with Hornsea Three. RW noted that if the northeast management unit is not connected then the reference numbers should not include that population, this was noted in S42 comments.</p> <p>The EWG agreed that no important baseline data sources have been missed.</p> <p><u>Reference populations</u></p> <p>CS explained that the north sea management unit abundance for harbour porpoise has been updated. No other cetacean species abundance have been updated with SCANS III data. Harbour and grey seal abundances have been updated with SCOS 2017 data.</p> <p>RW noted that the inter-agency marine mammal working group will look to update the paper on the North Sea reference populations when the Irish OBSERVE data has been reported so only one update is required.</p> <p>The EWG agreed that the reference populations and abundances are appropriate for assessment.</p> <p><u>Aerial survey data</u></p> <p>The EWG agreed that the application of a correction factor to the aerial survey data is appropriate and that these corrected density estimates should be used in the impact assessment.</p> <p><u>Harbour porpoise density estimates</u></p> <p>CS stated that the harbour porpoise assessment will be based on a range of densities [presented in the EWG].</p> <p>RW questioned the JCP estimate which seemed very low compared to the other values. CS confirmed that only a visual assessment of the maps had been conducted and this was hoping to be clarified shortly.</p> <p>RW stated that NE want to see a range of values presented, but the issues/potential problems with using a range can be highlighted. CS noted that it is not considered that the outlying values actually represent a realistic number of harbour porpoise being impacted, the best estimate is likely to be an average or middle value of the range.</p> <p>The EWG agreed that all relevant sources of harbour porpoise densities had been presented and a range of values will be used in the assessment.</p>	<p>CS to speak with Phil Hammond to find out if OBSERVE data on minke whale and white beaked dolphin abundance are available to update the MU abundances for these species.</p> <p>CS to clarify the JCP harbour porpoise density value</p>	<p>RW did not recommend a particular approach but suggested that the approach needs to be justified and explained. RW questioned whether there is a way of including a measure of uncertainty/confidence in the data [populations trajectories and impacts] or a way to bring this into the assessment. RW also noted that definitions of 'short/medium/long term' need to be clear for each species. CS noted that confidence can be assigned to each determination based on how well each population/impact/sensitivity is understood, but it is difficult to bring confidence into the EIA matrix.</p> <p>CS stated what is important is that the approach is applied consistently, with some of the definitions defined on a species/impact specific basis.</p> <p><u>Sensitivity</u></p> <p>CS explained that harbour porpoise are normally assessed as highly sensitive to noise. CS questioned whether this could be a response rather than a sensitivity, and therefore advise caution on the assumption that there is a negative consequence. RW stated that the difference between response and sensitivity is not known, but if you are effectively deterring animals from a high density area then there will be some impact from the loss of foraging opportunities. TD noted that the cumulative impact is the issue.</p> <p>CS noted that recent information from Phil Hammond's recent conference presentation suggests that the power of the SCANS data to detect change is higher than previously thought.</p> <p>The EWG agreed the proposed EIA definitions of sensitivity and magnitude applied consistently across the assessment allow for a robust and transparent assessment. TD would confirm TWT position.</p>	<p>TD to confirm position on agreement.</p> <p>CS to try to share Phil Hammond's presentation</p>
<p>4</p>	<p>EIA assessment definitions</p> <p>CS outlined the updated approach to defining sensitivity and magnitude for the EIA methodology.</p> <p><u>Magnitude</u></p> <p>CS stated that it is difficult to apply a specific quantitative magnitude threshold across all impacts and receptors, and therefore a qualitative definition approach is suggested, understanding the limitations of this expert decision led approach.</p>		<p>5</p> <p>Underwater noise modelling</p> <p>CS confirmed that the underwater noise modelling approach has been changed from dBSea to INSPIRE. The INSPIRE model provides a much better fit to the empirical data. Subacoustech have finished the modelling but the report is not finalised yet.</p> <p>RW would defer to Cefas view on the appropriateness of the model. RW questioned whether INSPIRE can still confidently produce predictions for larger hammer energies based on empirical data for smaller piles. JB stated that as pile size increases the noise levels plateaus out and therefore it is considered that predictions will be accurate as advised by Subacoustech.</p> <p>RF stated that the use of INSPIRE is acceptable, as long as all the modelling parameters are provided.</p> <p>CS explained that the model provides a depth averaged prediction of noise.</p> <p>The EWG agreed that the use of INSPIRE is an appropriate tool for the underwater noise modelling.</p>	

6	<p>Underwater noise - Impact assessment approach</p> <p>CS proposed the use of dose-response curves {developed for harbour porpoise and harbour seal} and questioned the need to present any assessment based on TTS ranges. TTS is of interest in that it can lead to PTS but this addressed through the PTS thresholds, TTS is a very difficult impact to assess as it is unknown how much TTS would occur and how long it might last. An alternative approach to the behavioural assessment based on the dose-response curves has been proposed.</p> <p>CS noted that assessing impacts using empirical data in the dose-response curves allows individual projects a means of demonstrating a reduction in impact, by refining piling parameters while the use of a standard 26 km results in a project being unable to demonstrate such a reduction.</p> <p>RW noted that this point is reflecting how EIAs are evolving as this dose-response approach is 'new science'. RW is not adverse to using the dose-response approach. RW noted there has always been an acceptance from the SNCBs that TTS was precautionary and we are only now developing ways to deal with this more appropriately, through dose-response curves.</p> <p>RW stated that NE would have to discuss this point [use of dose-response curves] with JNCC as it is a change in how EIAs are assessed in England.</p> <p>RW confirmed that the inclusion of TTS in assessments has been largely to indicate the distance at which a behavioural response might occur, rather than a specific concern around Temporary Threshold Shift itself.</p> <p><u>Applying the dose-response approach</u></p> <p>CS proposed to apply the harbour porpoise dose-response curve to all cetacean as they are understood to be the most sensitive/responsive species and therefore precautionary.</p> <p>CS explained that in relation to seals, the data from Russell et al., 2016 is being remodelled to provide the exact predicted values of proportional displacement, for mean predicted sound levels, rather than just using the mean of the upper and lower boundaries. The proposed approach is to apply the dose-response curve developed for harbour seals to both seal species.</p> <p><u>Cumulative assessment</u></p> <p>EB questioned how using the dose-response approach would feed into the cumulative assessment. CS it is recognised that different projects will have used different approaches, therefore further consideration will be given on how this is incorporated into the cumulative assessment, noting that project data will not be reworked.</p> <p>The EWG agreed that the NOAA thresholds are appropriate for determining the risk of PTS. The use of TTS has been used previously to predict levels of behavioural response, therefore pending further discussions TTS may not be</p>	<p>NE to discuss dose-response approach with JNCC and feedback to Hornsea Three.</p> <p>Hornsea Three to provide a worked example for one species/piling</p>	<p>presented in the assessment [<i>Cefas provided additional advice on this point after the meeting, stating that TTS should be modelled as it is a form of injury distinct to PTS - see post meeting note</i>].</p> <p>The EWG agreed that the dose-response relationships should be used to predict the number of individuals displaced, with the caveat that this would have to be discussed further with JNCC. RW noted that some early results on one species/scenario would be useful to understand the outputs between using TTS threshold, 26 km and dose-response approaches.</p> <p>7</p> <p>Realistic piling scenarios</p> <p>CS provided an overview of the proposed approach to refining the definitions of the piling parameters, through:</p> <ul style="list-style-type: none"> • Average (most likely) worst case (AWC) ; • Maximum worst case (MWC); and • Overall average hammer energy. <p>CS noted that the ramp up that will be modelled is still very precautionary and much more time will be spent at the lower hammer energies compared to what will be modelled. CS clarified that Hornsea Three are still working on defining a precautionary estimate of the proportion of pile installation locations that will fall into each scenario.</p> <p>CS confirmed that previous discussions around extending the ramp up times, where based on the dBSea outputs and the aim is to review whether this is necessary with the updated modelling outputs from INSPIRE before deciding whether extended soft/slow starts need to be modelled.</p> <p>SB stated that the larger hammer energies were actually included in the envelope because of the weight of the hammer rather than the energy required. The EWG agreed this clarification would be useful in the project description.</p> <p><u>Licensing/ reporting queries</u></p> <ul style="list-style-type: none"> • RW welcomed the use of collected data to take away the unrealistic worst case approach. The concern is how this would be licenced, so discussing this with the MMO would be useful. SB questioned how much information would need to be captured in the DCO/ML as the information would be within the Environmental Statement which the project would be held to. RW noted a concern over updating the assessment post consent once further geotechnical information has been completed. SB confirmed that the approach that is being presented is still precautionary, and any updates post consent would be decreasing the required hammer energy. • SB confirmed that during piling constant hammer energies are collected to demonstrate what strains each individual piles are under, the commercial sensitivity around this information will have to be reviewed. 	<p>scenario to understand the difference between the approaches</p>
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	<ul style="list-style-type: none"> EB noted that it is important to separate the precautionary/realistic assessment and what is licensable, as you want to avoid the situation where a licence variation is required. SB noted the point, and that the percentage of time that will be used in the assessment between AWC and MWC scenario will contain enough precaution and any variations would be likely to result in decreases. TD questioned how the piling information would be reported to the MMO, as the approach has been to only report on the first four piles. SB stated that from a developer's point of view the first four piles often differ from the rest of the piles because added precaution with starting the operation. CS noted that monitoring of the 'first four piles' has not specifically been related to compliance with hammer energy but instead validating the noise modelling ability to predict impacts. RW recommended that thought might be required on how you ensure the MMO that as a project you have not used the maximum worst case scenario for over 10% of piles. SB noted the point, although the speed that this information can be reported might be an issue. There has been a certain confidence in projects to ensure what is being carried out is correct, and there may be a means that further confidence can be put forward in the MMMP. <p>The EWG agreed in principle that the tiers of worst cases and quantifying the proportion or number of locations at which each tier will be applied, will provide a refinement and reduction in the potential for over precaution within the assessment.</p>		<p>projects might be carrying out UXO clearance and what effect this might have on the SNS cSAC thresholds (20%, 10% thresholds). SB stated that because we are not in a position to request the licence, it is difficult to include information that is relevant to the application when it is actually made. There is a concern in including something that can't be defended if there is an issue. EB the point is to demonstrate that the project can be delivered, and ensuring this through the application documents.</p> <p>RW stated that other projects have assessed a ball park figure of 40 UXO, and then this can be updated within the marine licence. It's understood that this value is a guess, but it allows some reference and assumptions to be drawn within the assessment.</p> <p>CS stated that it has always been assumed that due to low numbers of UXO disturbance is not an issue and only injury has been assessed. RW stated that there has not been an EPS licence given for disturbance due to the temporary nature of the impact, and injury won't require a licence if it is mitigated. In relation to the Environmental Statement/HRA assessments it still needs to be looked at.</p> <p><u>Seismic survey activity</u></p> <p>CS propose a largely qualitative approach to including seismic survey activity, with information provided from the JNCC noise registry.</p> <p>The EWG agreed that this approach was appropriate.</p> <p><u>Ongoing activities</u></p> <p>CS challenged the point that fishing and shipping should be assessed in the cumulative assessment, and that this forms part of the baseline.</p> <p>TD noted that the TWT has just released a paper on the management of the marine environment, and one of the points is that there should be a noise reduction policy and assessing the cumulative impact against ambient noise should be useful. There should be a strategic approach to cumulative assessment but understand that this isn't the responsibility of the project.</p> <p>SB noted that the position just needs to be clear that we are not saying fishing /shipping don't have an impact, just that they are considered as part of the baseline.</p> <p>The EWG agreed that shipping and fishing would not be included within the cumulative assessment, but it would be made clear that the assessment isn't implying that these sources of noise do not effect marine mammals.</p>	<p>Hornsea Three to provide draft text on UXO clearance to the EWG for inclusion within the Environmental Statement/HRA</p>
9	<p>Vessel numbers</p> <p>CS noted that the project envelope with regard to vessel activity is being refined following previous EWG conversations and Section 42 comments. The aim is to provide more detail on where the vessels will be active, and report on vessel density in 5km grid cells – it was proposed that would represent the impacts in a way that links to the evidence base available (e.g. Heinanen and Skov, 2015)</p> <p>The EWG agreed that the proposed refinements to vessel activity should address the comments raised in the EWG and S42 comments.</p>			
10	<p>Additional impacts</p> <p><u>UXO</u></p> <p>DB outlined that what previously had been discussed was to include an understanding of the impacts that occur from UXO clearance and contextual information, assumptions on the size and numbers (drawn from Project One), ensuring that a separate licence would be applied for post consent, and acceptance that the relevant mitigation measures are appropriate.</p> <p>RW noted that this was the case, but the PEIR suggested that UXO was not going to be assessed. There does need to be a thought in terms of how many</p>		<p>AOB</p>	

	<p>RW noted that their queries from the PEIR on the use of SEL cum and the ensuring the harbour porpoise are outside of the PTS zone during the ramp up, but it was understood that these points will be addressed later once the results of the noise modelling is complete.</p> <p>KS explained that within the HRA there is an assessment on disturbance from vessels which included vessel noise and requested clarification on whether NE were requesting (S42 comments) vessel noise to be assessed within the underwater noise section which is associated with piling. RW noted that the assessment split TTS and disturbance for each species and for tier 1 and tier 2 projects (in-combination assessment) and this was difficult to follow.</p>	
	<p>Next steps</p> <p>The next EWG meeting is anticipated to be held in January/February 2018.</p> <p>Meetings to be focused on key issues.</p> <p>Small issues could be discussed via telecom, but in person meetings are useful for any substantial topics.</p> <p>Meeting documents and agendas in advance of meetings is particularly important.</p>	

large impact ranges for TTS in particular, so I think it is important to know what potential effects we are dealing with for this project. Therefore, I would expect that TTS over 24 hours is assessed for the relevant marine receptors, according to the NOAA (2016) noise exposure criteria. As I understand, behavioural responses / disturbance were never going to be assessed using the TTS criteria, and nonetheless, TTS has no direct relevance to disturbance.

If the applicant suggests they do not intend to model TTS, then clear and detailed justification should be included as to why this is the case.

Actions

1. CS to speak with Phil Hammond to obtain OBSERVE data on minke whale and white beaked dolphin.
2. CS to clarify the JCP harbour porpoise density value
3. TD to confirm TWT position on the EWG agreements
4. NE to discuss dose-response approach with JNCC and feedback to Hornsea Three. *[Natural England confirmed post meeting that they agree with Cefas' current position – see post meeting note]*
5. Hornsea Three to provide a worked example for one species/piling scenario to understand the difference between the underwater noise assessment approaches
6. Hornsea Three to provide draft text on UXO clearance to the EWG for inclusion within the Environmental Statement/HRA

Post meeting note – email received from the MMO (and Cefas) post EWG meeting

Sent: 21 November 2017 10:08

Subject: RE: Hornsea Three Evidence Plan: Marine Mammal EWG

I'm afraid I missed most of the discussion centred on TTS (Temporary Threshold Shift) during the telecall yesterday (as I had to change rooms during the meeting). I have a few thoughts and comments I would be grateful if you could pass on to Hornsea Three please to clarify our position.

My view is that TTS should be modelled from the outset. Although recoverable, TTS is still a form of injury, and it is distinct from Permanent Threshold Shift (PTS) and disturbance. Previous developments have shown very

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	13.04.2016	The appropriate survey methodology and survey effort.	It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate, with a 10% survey effort.
2	04.08.2016	The key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.	The EWG agreed on the key assessment issues raised in Hornsea Project One/02, how they apply to Hornsea Three and the proposed management solutions.
3	04.08.2016	The baseline data requirements in order to inform the EIA.	The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.
4	04.08.2016	The designated conservation sites relevant to the ECR.	The EWG agreed that all the conservation sites relevant to the ECR had been considered.
5	04.08.2016	The impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps.	The EWG agreed on the impacts assessed in Hornsea Project One/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to disturb certain marine mammals.
6	04.08.2016	The Hornsea Three specific issues that require consideration.	The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.
7.	23.11.2016	Use of data for impact assessment	Agreed that if aerial survey data cannot be combined with boat survey data then it would be appropriate to use the results (highest abundance) of the previous boat based surveys.
8.	23.11.2016	Extrapolation of surface densities to areas that have not been surveyed	Agreed that surface densities should be extrapolated where there is no survey coverage.
9.	23.11.2016	Study areas and reference populations	Agreed that the study areas are appropriate and that Management Unit reference populations for seal species should be updated to reflect more recent population estimates
10.	23.11.2016	Impact assessment: noise criteria	Agreed that NOAA (2016) guidance should be considered for injury thresholds, noting that sensitivities to UXO detonation are being re-assessed and guidance may be revised.
11.	28.03.2017	Reference populations	The EWG agreed the reference populations, noting that there are issues with assessing on large scales.
12.	28.03.2017	Cumulative study area	The EWG agreed that the cumulative study areas will be the same as the management units.
13.	28.03.2017	Impact assessment: mitigation	The EWG agreed that any mitigation measures will be based around the instantaneous injury ranges (i.e. based on peak SPL).
14.	28.03.2017	Impact assessment: noise criteria	The EWG agreed that the NOAA guidelines will be followed for determining injury thresholds (PTS/TTS). For the disturbance assessment in the HRA, the standard distance of 26 km will be followed, in line with the recent work around the southern North Sea cSAC.
15.	20.11.2017	Baseline characterisation	The EWG agreed that the reference populations and abundances are appropriate for assessment.

			<p>The EWG agreed that the application of a correction factor to the aerial survey data is appropriate and that these corrected density estimates should be used in the impact assessment.</p> <p>The EWG agreed that all relevant sources of harbour porpoise densities had been presented and a range of values will be used in the assessment.</p>
15.	20.11.2017	EIA Assessment methodology	<p>The EWG agreed the proposed EIA definitions of sensitivity and magnitude applied consistently across the assessment allow for a robust and transparent assessment.</p>
15.	20.11.2017	Impact assessment: underwater noise	<p>The EWG agreed that the use of INSPIRE is an appropriate tool for the underwater noise modelling.</p> <p>The EWG agreed that the NOAA thresholds are appropriate for determining the risk of PTS.</p> <p>The EWG agreed in principle that the tiers of worst cases and quantifying the proportion or number of locations at which each tier will be applied, will provide a refinement and reduction in the potential for over precaution within the assessment.</p>
15.	20.11.2017	Impact assessment: additional impacts	<p>The EWG agreed that the proposed refinements to vessel activity should address the comments raised in the EWG and S42 comments.</p> <p>The EWG agreed that a qualitative approach to including seismic survey activity within the cumulative assessment was appropriate.</p> <p>The EWG agreed that shipping and fishing would not be included within the cumulative assessment, but it would be made clear that the assessment isn't implying that these sources of noise do not effect marine mammals.</p>

E.8 Marine Mammal EWG meeting minutes 15.02.2018

(signed off by Natural England and TWT only)

Subject	Marine Mammals EWG meeting 8
Date - hours	15.02.2018 11.00 – 15.00
Venue	Ørsted, 5 Howick Place
Attendees	<p>In person</p> <p>Emma Brown (EB) – Senior responsible officer, Natural England Rebecca Walker (RW) – Senior Marine Mammal Specialist, Natural England Marija Nilova (MN) – Marine Lead Advisor, Natural England Tania Davey (TD) – Living Seas Development Officer, TWT Jen Brack (JB) – Environment & Consents Specialist, Ørsted Sophie Banham (SB) – Hornsea Three Consents Manger, Ørsted David Bloxsom (DB) – Evidence Plan, NIRAS Carol Sparling (CS) – Marine Mammal specialist, SMRU Consulting Katie Swale (KW) – HRA Consultant, NIRAS Rebecca Faulkner (RF) – Underwater noise advice, Cefas</p> <p>By phone</p> <p>Richard Green (RG) – Hornsea Three Case Officer, MMO Pete Gaches (PG) – GoBe Consulting</p>
Supporting Material	EWG Meeting Presentation and position paper

Item	Description	Action
1	<p>Introductions</p> <p>DB provided an introduction to the EWG meeting and brief recap of the previous meetings actions.</p>	

	CS confirmed that the OBSERVE data is unlikely to be available for incorporation into the assessment and that the JCP maps are scaled incorrectly but the underpinning data is correct.	
2	<p>Underwater noise modelling</p> <p>CS provided an overview of the noise modelling approach including the use of a maximum design scenario (MDS) and a most likely design scenario (MLDS). The MLDS is aimed to show a worst case average, what the majority of piling sites would require as a maximum hammer energy. The ramp up energies are still very precautionary.</p> <p>CS explained that the worst case piling locations have been included within the assessment.</p> <p><u>PTS and TTS</u></p> <p>PTS ranges for both the MDS and the MLDS were presented for both SPLpeak and SELcum. SPLpeak is not frequency weighted, while the SELcum is weighted.</p> <ul style="list-style-type: none"> For harbour porpoise the SPLpeak ranges are all within common practice mitigation ranges (<1500m), therefore there is limited risk of instantaneous PTS as long as a MMMP is implemented. Harbour porpoise are high frequency specialists and therefore if the noise is low frequency then a lot of the noise is filtered out. Hence the pin piles ranges are larger compared to monopiles, because pin piles produce a higher frequency noise. Minke whale are low frequency hearing specialists, therefore monopiles produce the largest PTS range. Comfortable that the MMMP (and ADD) would mitigate any impacts. Mid-frequency cetaceans and pinnipeds all have relatively low PTS ranges, which would be covered by the MMMP. <p>CS presented the ranges for the different species being considered, for both the MDS and the MLDS. CS explained that the implementation of an MMMP would reduce the risk of PTS to negligible.</p> <p>CS explained that TTS has not been quantitatively assessed. The TTS onset threshold has only been defined because it is necessary to define TTS in order to define PTS. The TTS onset threshold represents a very small effect (6dB of threshold shift), and it is temporary (<1hr). TTS can still effect animals, but you have a variation in effect up to the PTS onset threshold, which is a larger effect (40dB). There is no way of assessing what the impact is on individuals within this range, therefore there is reluctance to present the number of animals affected by TTS because of the variation in effect. Scottish authorities have advised that assessment should only be based on PTS and JNCC also agree that the focus should be on predicting where the risks are highest around PTS.</p>	

<p>The Project position is that TTS won't be quantitatively assessed as there is no mechanism to understand how the range of TTS effects results fits into an ecological context (e.g. effects on foraging).</p> <p>RF questioned whether it could be included but heavily caveated to address the uncertainties. CS the danger would be that the numbers could be interpreted differently, presenting ranges means that the assumption of the number of animals receiving TTS are not stated, assessing the significance of any TTS numbers would be difficult and inaccurate.</p> <p>SWA explained that no assessment is intended to be presented for TTS in the HRA, although reference can be made to the TTS ranges if useful. SB noted that if only ranges are presented for TTS within the EIA then there are no assessment numbers to base the HRA on. EB/RW stated that it would be useful to refer to the TTS ranges within the HRA, although noting that this would be a 'cut and paste'. PG noted that a number of previous HRA have focused on PTS and behavioural disturbance. The EWG agreed to cross reference the information presented in the Environmental Statement within the HRA.</p> <p><u>Behavioural effects</u></p> <p>CS stated that the dose-response curve from the BOWL phase 1 monitoring work has been used and applied to harbour porpoise, as a proxy for all cetaceans (as the most responsive species).</p> <p>CS explained that the Hornsea Three hammer energy (that differs from BOWL) is taken into account through site specific noise modelling and predicting the distance at which the noise levels will occur. Every animal within the 160dB contour will be displaced/disturbed. Only at noise levels below 160dB that a differential response occurs.</p> <p>The area surveyed from both the aerial surveys and boat based surveys doesn't cover the entire impacted area, therefore SCANS III has been incorporated to supplement this data. There is a lot more evidence from other surveys that the aerial survey data rather than the acoustic survey data provides the density estimate for the site most consistent with other data sources, although both are considered within the assessment.</p> <ul style="list-style-type: none"> Sequential piling <p>The average level of impact would be approximately 1% of the population, for both monopile and pin piles.</p> <p>SB explained that the HRA has used the 26km disturbance and questioned whether it would be useful to compare this with the noise modelling results, which would suggest the population disturbance from an HRA perspective is precautionary. RW noted that this would provide additional context.</p>	<p>NE to provide feedback on the proposed approach to assessing TTS</p>	<ul style="list-style-type: none"> Concurrent piling <p>CS explained that the worst case for concurrent piling is the northwest and northeast locations of the array area. The percentage of the population affected is greater, but the number of piling days is only 189 days compared to 319 days for sequential piling.</p> <p><u>Pinnipeds</u></p> <p>The dose response curve presented in Russel <i>et al.</i>, (2016) paper over estimates the response, particularly at greater ranges. Therefore the data has been reanalysed to consider rings of effect and responses at a certain distance rather than the whole area around the pile.</p> <p>Very low population percentages are predicted to be impacted.</p> <p><u>Summary of piling noise assessment – cumulative</u></p> <p>CS provided an overview of the projects included within the cumulative assessment. RW noted that there are certain upcoming projects (e.g. Norfolk Boreas) and it would be useful just to note that these projects are upcoming. CS to check whether Thanet Extension has been included within the assessment.</p> <p>The total number of harbour porpoise affected across all tiers results in around 7% of the management unit. To put this in context, population modelling commissioned by NE and JNCC modelled cumulative impacts up to 15% of the MU, which didn't result in a change in population trajectory, the Projects cumulative impact is less than half this. Therefore, expert judgement has concluded that the level of impact will not result in a significant effect. RW stated that there are large caveats around that modelling. TD noted that 7% is not a small figure and would highlight precaution around comparing results to the modelling, noting that there is no other available data for comparison.</p> <p>CS noted that there are uncertainties around the modelling, and although the literature is developing this is still the best comparison. The uncertainties will be highlighted within the report.</p> <p><u>Monitoring</u></p> <p>TD questioned what monitoring would be expected to provide evidence on the predictions of the dose response curves. SB noted that monitoring has not been discussed at this point. At a project level, we are looking towards more strategic monitoring that provide answers to long term questions. The industry is beginning to move away from project specific monitoring. PG explained that monitoring discussions at this point are often best kept at a high level, rather than agreeing specific monitoring approaches, as the aims of the monitoring</p>	<p>CS to check whether Thanet Extension has been included within the assessment.</p>
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	might develop closer to the point of construction. SB explained that an in-principle monitoring plan will be included as part of the application. RW noted that from NE's view a strategic monitoring approach is considered the best approach.	
3	<p>Approach to UXO assessment</p> <p>PG stated that the Hornsea Three application is not seeking to consent UXO clearance/detonation as part of the application. Understanding that this activity may be required at some point in the future it has been considered. Information has been provided in the assessment, based on other project experience, on the number of UXO and how UXO are assessed. A bespoke assessment has not been provided as there is not enough information at this point, and hence why consent is not sought at this time. Assumptions have been drawn from Hornsea Project One and relevant literature studies von Benda-Beckman et al., (2015) and BOWL UXO MMMP. The disturbance assessment is based on instantaneous TTS (proxy for a response from a single pulse) and 26 km deterrence range and a commitment to adopting a MMMP if the activity is required. SB noted that the MMMP at this point only considers aspects being consented under the DCO.</p> <p>RW noted that PTS zones are being modelled as up to 15 km, so while not relevant at this stage, this range cannot be mitigated so you are looking at EPS licences for injury. SB explained that this situation is recognised, but the aim is to avoid having this discussion during examination where no useful information can be put forward. RW stated that it is useful that UXO has been brought into the assessment for the cumulative assessment of noise, which is what was requested.</p> <p>EB noted that it isn't unusual if one consent is dependent on another, to include information on all aspects of the project to provide reassurance that the entire project can be developed.</p> <p>In response to RG, SB noted that Hornsea Three will request a letter of comfort from the MMO, with regards to EPS licencing, for the components that consent is being sought (not including UXO).</p> <p>Summary</p> <p>Natural England agreed that the summary of underwater noise modelling assessment for piling noise has covered the main elements expected from the assessment, aside from the approach to TTS. TD to confirm TWT position in relation to the cumulative assessment conclusions being compared to the existing modelling.</p> <p>RW and TD to confirm if the EIA sensitivity definitions are appropriate.</p> <p>The EWG agreed that the approach to the assessment of UXO in the Environmental Statement/HRA is appropriate and a specific MMMP is not expected for UXO as part of the DCO.</p>	CS to circulate magnitude and sensitivity definitions.

4	<p>Summary of the Evidence Plan</p> <p>DB provided an overview of the main areas of agreement and points still under discussion.</p> <p>Agreement:</p> <ul style="list-style-type: none"> • Baseline characterisation • All construction, operation and decommissioning impacts have been identified • All relevant designated conservation sites have been identified • Subsea noise modelling: <ul style="list-style-type: none"> ○ Use of the INSPIRE noise model ○ NOAA thresholds ○ A realistic piling scenario ○ Use of dose response curve • HRA use of 26km for harbour porpoise disturbance assessment in relation to the cSAC • Approach for assessment additional marine mammal potential effects outside of subsea noise (e.g. vessel activity) • Subsea noise assessment approach, noting that agreement on the requirement to quantitatively assess TTS is outstanding • Consideration of UXO • Cumulative assessment study area and approach <p>Under discussion</p> <ul style="list-style-type: none"> • Definitions of sensitivity and magnitude – RW/TD to confirm (see action) • Approach to consideration of TTS, whether a quantitative assessment is required. • TWT consider that fishing activity should not be considered as part of the cumulative baseline. SB noted the projects position is that there is no fishing plan or project against which to assess future activity. • Cumulative assessment conclusions in relation to the comparison to the NE/JNCC modelling. • Final view on mitigation requirements and content of MMMP 	<p>NE to confirm position on how fishing activity should be considered.</p> <p>TWT to send Hornsea Three previous position submitted as part of the Doggerbank application.</p>
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Actions

- NE to provide feedback on the proposed approach to assessing TTS.
- CS to check whether Thanet Extension has been included within the cumulative assessment.
- CS to circulate magnitude and sensitivity definitions.
- NE and TD to confirm if the EIA sensitivity definitions are appropriate

- NE to confirm position on how fishing activity should be considered as part of the cumulative assessment.
- TWT to send Hornsea Three previous position submitted as part of the Doggerbank application

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	13.04.2016	The appropriate survey methodology and survey effort.	It was agreed that the proposed aerial survey methodology for Hornsea Project Three was appropriate, with a 10% survey effort.
2	04.08.2016	The key assessment issues raised in HOW01/02, how they apply to Hornsea Three and the proposed management solutions.	The EWG agreed on the key assessment issues raised in HOW01/02, how they apply to Hornsea Three and the proposed management solutions.
3	04.08.2016	The baseline data requirements in order to inform the EIA.	The EWG agreed that the baseline data available along the ECR, is sufficient to inform the EIA.
4	04.08.2016	The designated conservation sites relevant to the ECR.	The EWG agreed that all the conservation sites relevant to the ECR had been considered.
5	04.08.2016	The impacts assessed in HOW01/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps.	The EWG agreed on the impacts assessed in HOW01/03, their applicability to Hornsea Three, the baseline data to inform the assessment, any relevant data gaps and the approach to fill any data gaps. Noting the potential for construction disturbance above MHWS to disturb certain marine mammals.
6	04.08.2016	The Hornsea Three specific issues that require consideration.	The EWG agreed that all the Hornsea Three specific issues have been identified, with the inclusion of the seal populations around the landfall sites.
7.	23.11.2016	Use of data for impact assessment	Agreed that if aerial survey data cannot be combined with boat survey data then it would be appropriate to use the results (highest abundance) of the previous boat based surveys.
8.	23.11.2016	Extrapolation of surface densities to areas that have not been surveyed	Agreed that surface densities should be extrapolated where there is no survey coverage.
9.	23.11.2016	Study areas and reference populations	Agreed that the study areas are appropriate and that Management Unit reference populations for seal species should be updated to reflect more recent population estimates
10.	23.11.2016	Impact assessment: noise criteria	Agreed that NOAA (2016) guidance should be considered for injury thresholds, noting that sensitivities to UXO detonation are being re-assessed and guidance may be revised.
11.	28.03.2017	Reference populations	The EWG agreed the reference populations, noting that there are issues with assessing on large scales.
12.	28.03.2017	Cumulative study area	The EWG agreed that the cumulative study areas will be the same as the management units.
13.	28.03.2017	Impact assessment: mitigation	The EWG agreed that any mitigation measures will be based around the instantaneous injury ranges (i.e. based on peak SPL).
14.	28.03.2017	Impact assessment: noise criteria	The EWG agreed that the NOAA guidelines will be followed for determining injury thresholds (PTS/TTS). For the disturbance assessment in the HRA, the standard distance of 26 km will be followed, in line with the recent work around the southern North Sea cSAC.
15.	20.11.2017	Baseline characterisation	The EWG agreed that the reference populations and abundances are appropriate for assessment. The EWG agreed that the application of a correction factor to the aerial survey data is appropriate and that these corrected density estimates should be used in the impact assessment.

			The EWG agreed that all relevant sources of harbour porpoise densities had been presented and a range of values will be used in the assessment.
16.	20.11.2017	EIA Assessment methodology	The EWG agreed the proposed EIA definitions of sensitivity and magnitude applied consistently across the assessment allow for a robust and transparent assessment.
17..	20.11.2017	Impact assessment: underwater noise	The EWG agreed that the use of INSPIRE is an appropriate tool for the underwater noise modelling. The EWG agreed that the NOAA thresholds are appropriate for determining the risk of PTS. The EWG agreed in principle that the tiers of worst cases and quantifying the proportion or number of locations at which each tier will be applied, will provide a refinement and reduction in the potential for over precaution within the assessment.
18..	20.11.2017	Impact assessment: additional impacts	The EWG agreed that the proposed refinements to vessel activity should address the comments raised in the EWG and S42 comments. The EWG agreed that a qualitative approach to including seismic survey activity within the cumulative assessment was appropriate. The EWG discussed that shipping and fishing would not be included within the cumulative assessment, but it would be made clear that the assessment isn't implying that these sources of noise do not affect marine mammals. NE agreed with this position but TWT consider that commercial fishing should not be considered as part of the baseline.
19.	15.02.2018	Baseline characterisation	The EWG have agreed the baseline characterization.
20.	15.02.2018	Impact assessment: underwater noise	The underwater noise assessment approach has been agreed, aside from the consideration of TTS. The conclusions of the underwater noise assessment (alone) have been agreed. There are outstanding queries over the cumulative assessment conclusions.
	15.02.2018	Impact assessment: additional impacts	The assessment approach for all impacts outside of subsea noise has been agreed, including the necessary consideration given to UXO at the pre-application stage.

Appendix F Onshore Ecology EWG

F.1 Onshore Ecology EWG meeting minutes 17.02.2017

<i>Subject</i>	Onshore Ecology EWG
<i>Date - hours</i>	17.02.2017 10.30-15.00
<i>Venue</i>	Maid Head Hotel, Norwich
<i>Attendees</i>	<p>In person</p> <p>Francesca Shapland (FS) – Lead adviser, Natural England Marija Nilova (MN) – Lead Advisor, Natural England David White (DW) – Senior Green Infrastructure Officer, Norfolk County Council Teshene Severin-Ormamogho – Intern, Norfolk County Council John Hiskett (JH) – Senior Conservation Officer, Norfolk Wildlife Trust Phil Pearson (PP) - Senior Conservation Officer, RSPB Sophie Banham (SB) - Consents Manager, DONG Energy Jennifer Brack (JB) – Senior Environment and Consents Specialist, DONG Energy Clare Russell (CR) – Onshore EIA, RPS Tim Norman (TN) - Evidence Plan and HRA, NIRAS David Bloxsom (DB) – Evidence Plan and HRA, NIRAS</p> <p>By phone</p> <p>Louise Burton (LB) – Senior Adviser, Natural England Barbara Moss-Taylor (BM) – Senior Project Manager, Environment Agency</p>
<i>Supporting Material</i>	Both the Preliminary Ecological Appraisal (three parts plus addendum) and Hornsea Phase 2 survey method statement (including separate bat activity transect figures), were circulated prior to the meeting, although the discussion was not focused on these documents.

Item	Description	Action
1	<p>Introductions</p> <p>TN provided an introduction to the meeting and outlined the agenda and aims.</p> <p>LB noted that Hornsea Three appeared to be taking a slightly different approach to the Evidence Plan when compared to other projects, in that only Natura 2000 sites and SSSIs seem to be considered. DW stated that County Wildlife Sites (CWS) should be taken into account as they are often functionally linked to sites of international and national importance (Natura 2000 sites/SSSIs).</p> <p>TN noted that for the purposes of the first EWG meeting the discussion has been focused on Natura 2000/SSSIs due to limited time and the need to prioritise discussions. It is not being stated that local conservation sites will not be considered. CR confirmed that local conservation sites would be considered within the EIA process and would be included in the protected species surveys as directed by the Preliminary Ecological Appraisal.</p>	
2	<p>Summary of the Evidence Plan process</p> <p>TN provided an overview of the Evidence Plan's aims and principles to ensure a sufficient and proportionate approach to the evidence underpinning the EIA and HRA, and to provide effective involvement and consultation. TN noted the wider project aim of using existing data and information to support the environmental characterisation where possible. Whilst this aspect of the evidence based approach may not be directly relevant to the onshore element of Hornsea Three, there are lessons learnt from both Project Two and Project One that can be built upon.</p>	
3	<p>Proposed onshore cable route</p> <p>JB explained that the landfall point for Hornsea Three will be at Weybourne and the grid connection point that the project has been provide by National Grid is located just outside Norwich.</p> <p>JB summarised the overarching export cable routing principles and the specific principals used to identifying a suitable onshore export cable route (ECR). It was noted that the refinement of the onshore ECR is an ongoing</p>	

	<p>process and the route will be further developed through stakeholder consultation, surveys and site visits.</p> <p>Two different technical options for the cable route will be applied for:</p> <ul style="list-style-type: none"> • An AC option that will require a HVAC booster substation close to the landfall (ideally within 10 km of landfall) • DC solution where no HVAC booster stations will be required. <p>JB explained that the project will consider two transmission options (AC and DC). The AC option would require a HVAC booster station close to the landfall (ideally within 10 km of landfall). Whereas the DC option would not require a booster station.</p> <p>JH questioned how fixed the cable route is. JB stated that the onshore ECR refinement is an ongoing process, the figure presented is a current reflection of the desk top studies that have been carried out to date in order to facilitate discussions. Further refinements will occur through site visits, consultation and engagement with landowners. The aim is to narrow the onshore ECR corridor further, to the point where the majority of the route is approximately 80m across apart from certain crossing locations where the corridor may need adjusting for engineering reasons.</p> <p>JH explained that landowners often express concerns about cable routes but once it becomes clear how narrow the actual route will be these concerns are likely to be allayed.</p> <p>TN noted that we are in early phase of this process and currently no information has been provided for public consultation other than that shared at the scoping stage. The next formal consultation milestone will be PEIR [aiming for July 2017].</p>		<p>HVAC site options areshown. SB noted that there has been a conscious effort to balance landscape screening and ecological effects when searching for substation sites.</p> <p>JB noted that detailed access plans have not been developed for the infrastructure along the ECR. A detailed access strategy will be developed once the cable route is refined further.</p> <p><i>Landfall</i></p> <p>TN stated that the ECR at the Weybourne landfall is currently shown as a wide area. JB explained that site investigation work at the landfall has taken place and the data will help inform where and how the project makes landfall. PP questioned what work is being conducted regarding coastal erosion and sustainability in terms of the durability of the design. SB noted that coastal erosion is being considered in detail and this work will be reflected within the physical processes chapter of the Environmental Statement.</p> <p>PP noted there is bird monitoring data to the west of the landfall, but can't guarantee what data is available further to the east. LB mentioned that ringed plover has been observed nesting on the beach near Weybourne so it is important that access route planning takes the birds into account.</p> <p>TN noted that coastal areas around the landfall are considered as functionally linked habitat for pink-footed geese (feature of the North Norfolk Coast SPA) and have been incorporated into the survey methodology. DW noted there is a CWS adjacent to the Kelling Heath SSSI, and the habitat is functionally linked, with e.g. Nightjars crossing between both. The CWS often buffer nationally designated sites.</p> <p>JH stated that it would be useful to know to what level that land is restored to its original structure. CR noted that in most cases when crossing arable land, the land will be restored as much as possible to its original condition, although there are restrictions on using deep rooting tree species in proximity to the cable route. TN noted there is no need to maintain an easement along the entire ECR and it can be re-vegetated subject to the considerations such as root depth .</p> <p><i>Interaction with designated sites</i></p> <p>TN noted that the cable clips north east corner of Booton Common SSSI. JH noted that the land the cable passes through is not of direct concern, but we</p>	<p>PP to confirm what bird monitoring data is available surrounding the landfall site</p>
4	<p>Presentation of current route options</p> <p>TN stated that the PEIR will present multiple location options for the onshore HVAC booster station and the onshore HVDC converter/HVAC substation (and the associated cable route to these options). However, these options will be reduced to one HVAC booster station and one HVDC converter/HVAC substation in the final Environmental Statement.</p> <p>Only one main compound will be required by the project. Additional compounds at the landfall and substation will be required, and multiple smaller compounds which fit within the cable corridor will also be needed. Three</p>			

	<p>would want to be certain that potential hydrological effects are considered. TN/CR noted that hydrological impact would be considered and the area has been highlighted in the Hydrological Characterisation Note.</p> <p>TN noted that there is potential for a small landtake within the Alderford Common SSSI designation. DW noted old chalk beds and long standing bat hibernation roosts (monitored regularly) are the main features, as well as summer roosts to the south of the common around the River Wensum. DW stated that there were no particularly concerns around the potential land-take at Alderford, as it would not be at the locations of any major roosts or chalk pits. Norfolk Bat Group monitors the bat populations in the area. Monitoring data is likely to be available.</p> <p>DW noted that the Norfolk Barbastelle Study Group has an interest in the woodland around Barningham Green and Edgefield Little Wood SSSI outside of the ECR, and that initial survey work has been carried out. DW noted that the Marriott's Way CWS(a former railway line, which the ECR crosses) is a significant area for badgers.</p> <p>JH noted that the Pond Hills and The Belt CWSs are in the proximity of the ECR and there are a number of CWS in the vicinity of the HVAC booster station option locations. There are useful monitoring records for these sites.</p> <p><i>River Wensum SAC/ SSSI</i></p> <p>CR noted that the River Wensum is hydrologically complex and there are a number of ecologically linked habitats. A drilled solution will be sought for the river crossing. The location of the entry and exit pits, locations of compounds and their distance from the river will take into account the presence of tributaries and smaller streams that connect with the surrounding habitats. CR confirmed that sites visits would be undertake with hydrologists/ hydro-geologist and engineers to identify features that cannot be seen from mapping/aerial photos. CR also suggested that landowners would also be a useful source of information. PP recommended bringing in an ecologist to the site visits. FS to forward contact details of Nik Bertholdt for further correspondence on the hydrology of the River Wensum.</p> <p>DW noted that the Norwich Northern Distrubutor Road NSIP (A1067) project (west of the ECR), identified populations of barbastelle bats of <i>at least national significance</i>. 17 separate roosts were identified within the Wensum Park ('dinosaur park') (south of the Norwich road) and a large number of bats were recorded. There are also roosts in the nearby Scotch Wood Plantation through which the ECR passes. GPS data is available on the location of the roosts.</p>	<p>DW to circulate information on bats populations and contact details for the Norfolk Bat Group.</p> <p>FS to forward the contact details of the site responsible officer for the River Wensum SAC [JB should have Nik's details from the email MN sent with comments on the hydrological note on 3rd Feb]</p>	<p>The main flight corridors from these roosts passes over the River Wensum, and the river (along with the Marriott's Way) is used as a flight corridor. Norfolk Biological Information Service (NBIS) may not have held this information when the data request for the PEA was made last year. CR confirmed that they would request an update from NBIS. The Morten hall area also supports a number of bat species including (barbastelles, brown long eared and daubentons).</p> <p>The River Tudd, the River Bure and the River Yare would all be crossed by the ECR and are being considered within the hydrological characterisation study. DW noted that there are two CWS close to where the ECR crosses the River Tudd (i.e. land adjacent to Tudd CWS and Hammonds Grove CWS).</p>	<p>RPS to consult the Norfolk Biodiversity Information Service (NBIS) for information on the location and movement of bat populations</p>
5	<p>Designated sites</p> <p>Aside from the CWSs, the EWG agreed that all relevant nationally and internationally designated sites have been identified, which are:</p> <ul style="list-style-type: none"> • North Norfolk Coast SPA and Ramsar • River Wensum SAC and SSSI • Norfolk Valley Fens SAC (Holt Lowes SSSI and Booton Common SSSI) • Kelling Health SSSI • Alderford Common SSSI; and • Weybourne Cliffs SSSI 			
6	<p>Winter bird surveys</p> <p>TN provide an introduction to the wintering bird survey components and noted that advice from Natural England has been incorporated into the methodology.</p> <p><i>a. SPA Functionally linked habitat</i></p> <p>TN provided an overview of the wintering birds survey methodology that has been proposed for functionally linked habitats and agreed with Natural England prior to the EWG meeting. Noting that historical data from the WWT report is also available.</p> <p>PP highlighted the importance of the coastland area around the landfall for pink-footed geese and noted it may be worth considering field size as this relates to how suitable a foraging area is [larger areas are considered better foraging grounds].</p>			

	<p>The EWG agreed that the methodology presented is suitable.</p> <p><i>b. Permanent land-take</i></p> <p>TN provided an overview of the wintering birds survey methodology that has been proposed for permanent land take areas and agreed with Natural England prior to the EWG meeting.</p> <p>The EWG agreed that the methodology presented is appropriate.</p> <p>PP noted it would be interesting to understand what added value could be provided by the project to the ECR environment, especially in relation to farmland species. Generic guidance is available on food and nesting provision. Species specific guidance can be provided once we understand what species are present.</p> <p><i>c. Export cable route</i></p> <p>TN provided an overview of the wintering birds survey methodology that has been proposed along the ECR and agreed with Natural England prior to the EWG meeting.</p> <p>DW noted that the approximate 1 km spacing of point counts may result in specific CWS habitats (which have been selected due to their greater botanical interest) and certain bird species being missed. It may be advantageous to stratify sampling points according to habitat type. It would be useful to see where the sampling points are located in relation to the local wildlife sites, it may be that they are already covered. PP advised agri-environment schemes should also be considered.</p> <p>PP noted that species (both wintering and breeding) that emerge at dusk may be missed by the timings of the point counts [mainly occurring from dawn through daylight hours] such as; woodcock, turtle dove, barn owl, golden plover, geese, nightjar. It would also be useful to understand what construction operations would be occurring into the dusk period.</p> <p>SB noted that it is understood that construction operations will be considered within the project envelope and it will be considered how this feeds into the impact assessment. A Code of Construction Practice will also be developed for the Project and agreed for the project.</p> <p>The EWG agreed on the proposed approach, pending further discussions on whether the point counts appropriately cover CWS habitats. [The point count locations have since been circulated to the EWG and approved]</p>	<p>PP to provide guidance on food and nesting provisions</p> <p>NIRAS to plot point count locations over CWS map.</p>
<p>7</p>	<p>Breeding birds summary</p> <p>TN provided an overview of the breeding bird survey methodology across both areas of permanent and temporary land-take and along the onshore ECR corridor search area. The methodology is broadly similar to the wintering birds methodology in areas of permanent land take. If any species of particular interest (i.e. Schedule 1 species) are identified then the methodologies outlined in Gilbert <i>et al.</i>, will be implemented.</p> <p>PP noted that the methodology does not intend to carry out surveys in March, which can be an important month for certain species such as ringed plover, and annex I and schedule 1 raptor species. PP also noted it would be useful to understand how close the corridor will be to habitats and the timings that construction will occur, although it is understood some of this information may have to come under a pre-construction protocol.</p> <p>FS noted that it again should be considered to stratify the point counts along the ECR by habitat type.</p> <p>Natural England are providing a detailed review of the breeding birds survey methodology under DAS and will provide separate feedback. Otherwise, the EWG agreed that the approach was acceptable, noting that further information may be required on the points counts and whether they cover CWS habitats. [The point count locations have since been circulated to the EWG and approved].</p>	<p>DONG Energy to share the Breeding bird survey methodology with NE for comment</p>
<p>8</p>	<p>Protected species surveys</p> <p>CR stated that the Phase 1 (completed for the entire ECR) and desk top surveys have identified the list of species surveys required. CR stated that the bats survey methodology has been adjusted to focus upon static monitoring, under taking transect as required. CR noted that the bat populations mentioned earlier have not been included and this will require updating.</p> <p>FS confirmed Natural England were happy with the species and proposed surveying approaches.</p> <p>DW noted that the UK population of white-clawed crayfish is under threat and there is a research group in Norfolk which knows the locations of the local populations. The Weybourne Beck has recently become an Ark Site for white-clawed crayfish with a population moved there in 2016 from a Norfolk river that was subject to pressure from the plague and non-native signal crayfish. The River Wensum and Bure are not however of concern regarding white-</p>	<p>Any feedback on the phase 2 survey methodologies to be provided asap, aiming for agreement ahead of the next EWG meeting [28th April 2017].</p>

	<p>clawed crayfish. There is a population in the River Wensum but it is located upstream of the proposed cable route and is highly unlikely to be affected. The River Tud potentially contains the species and therefore surveys may be required, but DW stated you would be unlikely to find them. CR noted that the crayfish plague is being taken into account and biosecurity measures are also being considered.</p> <p>CR questioned that if survey access became an issue what would be the appropriate response within the Environmental Statement assessment. LB noted that other projects have conducted eDNA surveys for great crested newt where access was limited, and this could be considered. CR stated that eDNA has been included within the methodologies. The EWG agreed that access cannot always be obtained and that this is a common issue, with often only 75%. The appropriate approach would be, for bats, to assume the worst case scenario, and for other species to use data from adjoining habitats. SB noted that pre-construction surveys would also be conducted, once the DCO has been obtained.</p> <p>The EWG agreed that the proposed approach to protected species surveys was appropriate, pending any additional feedback.</p>	<p>DONG Energy to contact Martin Horlock (NBIS) for details on the Norfolk White-Clawed Crayfish Group's work</p>
9	<p>Programme</p> <p>EWG agreed that the EWG process would be used to update the participants on survey progress as well as providing interim reports. It was also agreed that survey reports would be staggered as much as possible to spread out the review load, but that they should be provided at the earliest opportunity.</p>	
10	<p>Hydrological characterisation survey</p> <p>CR provided an overview of the scope of the Hydrological Characterisation Note. Its aim to define the hydrological regime of each main river crossing, including tributaries, streams, flooding and water quality. Interactions with adjacent habitats will also be considered.</p> <p>BM stated that the presence of source protection zones should be noted. CR noted that these will be referred to.</p>	

	<p>PP questioned how up to date the baseline information was. CR noted that up to date evidence is required and that further work/surveys may be required.</p> <p>CR stated that the results may not be ready by the PEIR deadline, but if that is the case then the option for sharing initial results with the EWG would be considered.</p> <p>The EWG agreed that the scope of the study was acceptable.</p>	
	<p>Next Steps</p> <p>Next EWG meeting agreed for the 28th April 2017.</p>	

Actions

1. PP to confirm what bird monitoring data is available surrounding the landfall site
2. DW to circulate information on bats populations and contact details for the Norfolk Bat Group.
3. -see above
4. RPS (CR) to consult the Norfolk Biodiversity Information Service (NBIS) for information on the location and movement of bat populations PP to provide guidance on food and nesting provisions
5. NIRAS to plot point count locations over county wildlife site map.
6. DONG Energy to share the Breeding bird survey methodology with NE for comment
7. EWG to feedback on the phase 2 survey methodologies to be provided asap, aiming for agreement ahead of the next EWG meeting [28th April 2017].
8. DONG Energy to contact Martin Horlock (NBIS) for details on the Norfolk White-Clawed Crayfish Group's work

Progress of agreement

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	17.02.2017	Onshore designated sites of relevance to Hornsea Three.	The Natura 2000 sites and SSSIs presented as the focus of the EWG were agreed. CWS of specific relevance to Hornsea Three require further discussion.
2	17.02.2017	Winter birds survey methodology	EWG is agreed that the proposed methodology is appropriate, pending further discussions on whether the point counts appropriately cover CWS habitats. (see action 4.) Points count locations have since been circulated and approved.
3	17.02.2017	Breeding birds survey methodology	Natural England are providing a detailed review of the breeding birds survey methodology under DAS and will provide separate feedback. Otherwise, the EWG agreed that the approach was acceptable, noting that further information may be required on the points counts and whether they cover CWS habitats. [The point count locations have since been circulated to the EWG and approved].
4	17.02.2017	Protected species survey methodology	The EWG agreed that the proposed approach to protected species surveys was appropriate. Additional feedback may be provided (see action 5).
5	17.02.2017	Hydrological characterisation study scope	The EWG was agreed on the scope of the study.

F.2 Onshore Ecology EWG meeting minutes 28.04.2017

<i>Subject</i>	Onshore Ecology EWG
<i>Date - hours</i>	28.04.2017 10.30-15.00
<i>Venue</i>	Maids Head Hotel, Norwich
<i>Attendees</i>	<p>In person</p> <p>Sophie Banham (SB)– Consents Manager, DONG Energy Jennifer Brack (JB) – Senior Environment and Consents Specialist, DONG Energy Clare Russell (CR)– Onshore EIA, RPS Karen Akehurst (KA)– Lead Field Ecologist, Thomson Ecology Ian Ellis (IE)– Principal Ecologist, NIRAS Tim Norman (TN)- Evidence Plan and HRA, NIRAS David Bloxsom (DB)– Evidence Plan and HRA, NIRAS Francesca Shapland (FS)– Lead Adviser, Natural England David White (DW)– Senior Green Infrastructure Officer, Norfolk County Council John Hiskett (JH)– Senior Conservation Officer, Norfolk Wildlife Trust Phil Pearson (PP)– Senior Conservation Officer, RSPB James Dawkins (JD) – Case Officer, RSPB Barbara Moss-Taylor (BM) – Sustainable Place Planning Specialist, Environment Agency Kerys Witton (KW)– Landscape officer, North Norfolk District County</p> <p>By phone</p> <p>Louise Burton (LB)–Senior Adviser, Natural England Marija Nilova (MN)– Marine Lead Advisor, Natural England</p>
<i>Supporting Material</i>	Position paper circulated prior to the meeting Presentation circulated prior to the meeting

Item	Description	Action
1	Introductions and aims of the EWG	

	<p>TN led introductions to the EWG and outlined aims of the EWG:</p> <ul style="list-style-type: none"> Review the actions from the previous EWG meeting Provide an update on project progress Present non-statutorily designated sites Present the survey results for the wintering bird surveys Provide an update on the protected species surveys Provide an update on the hydrological characterisation study Outline the principles of the ecological assessment methodology 	
2	<p>Recap on previous EWG meeting and any project updates</p> <p><i>Previous EWG Meeting and Actions</i></p> <p>TN provided a recap of the agreements made at the previous EWG and the actions that came out of the previous meeting.</p> <p>MN confirmed that NE has no further comments on the breeding bird survey methodology.</p> <p><u>Action – RSPB to confirm what bird monitoring data is available for land surrounding the landfall</u></p> <p>PP noted that the existence of volunteer ornithological monitoring data up to and beyond Weybourne isn't actually clear. PP did note that the further east from Weybourne suitable habitat diminishes and there is less likely be any extensive data sets.</p> <p><u>Action – NE to forward the contact details of the site officer for the River Wensum</u></p> <p>FS to send again.</p> <p><u>Action – RSPB to provide guidance on food and nesting provisions</u></p> <p>PP confirmed that priority species require bespoke food and nesting provisions therefore, need to know what species are present before can give advice. Most of the provisions relate to enhancement opportunities.</p>	<p>KW to chase any feedback from North Norfolk District Council on the ECR, particularly the landfall</p> <p>BM to confirm the contact and find out the programme of work.</p>

	<p><u>Action – contact Martin Horlock (NBIS) for details of the Norfolk White-Clawed Crayfish Group’s work</u></p> <p>DW confirmed that the best contact would be Helen Beadsley at the EA.</p> <p><i>Project updates</i></p> <p>JB explained that feedback from community consultation events is provided to the Hornsea Three team. PP noted that it would be useful for the community consultation comments to be shared with the EWG. SB explained that the majority of comments are quite high level at the moment or related to construction practice from experience with previous projects.</p> <p>JB explained that as the route is defined, preferences to certain sites are developing. SB noted it is the intention to have selected a single HVAC site and substation site by the PEIR submission. Active consultation is ongoing with parish councils to ensure their views are incorporated.</p> <p>TN noted that the PEIR submission date is July 2017.</p>		<p>sugar beet (and therefore, PFG) distribution shows where best to avoid but don't know what the crop rotations will be at the point of construction or in future years. The growing of sugar beet around Weybourne (and the presence of PFG) is relatively recent and didn't happen several years ago. It is assumed that until the route preference is narrowed down conversations about crop rotations are unlikely to occur. SB confirmed that it is unlikely that these conversations will be held until later in the project programme, due to a number factors.</p> <ul style="list-style-type: none"> • <i>Installation works and timings</i> <p>TN explained that the construction of the onshore cable route is likely to be relatively quick and the intention that land will be returned to its original use once the works have been complete (i.e. the loss of habitat would be temporary). KW questioned whether the route will be ducted along the entire length. SB/TN explained that is not the intention, and it is only common to duct under specific constraints (e.g. roads, rivers). The burial depth of the cable has been increased to ensure that the land can return to its original use once construction is complete (e.g. agriculture practices will be able to continue). JB explained that there are a number of cable laying scenarios, which will all be located within 60 m. The exact configuration will be decided with the final design of the project.</p> <p>LB noted that Humber Gateway considered limiting construction to certain times of the year, not only for PFG but all protected species. Natural England would be looking for Hornsea Three to consider the potential to reduce impacts to habitats through installation timings. TN noted that the temporary loss of habitat is likely to persist over more than one season so the timing of the installation works may not be crucial. TN explained that the first point is to consider whether the works will result in any impact, considering that the land-use will return once the works are complete.</p> <ul style="list-style-type: none"> • <i>Assessment approach</i> <p>TN noted that the intention is to assess potential impacts against the PFG distribution as currently recorded, noting that the distribution may change. IE noted that the PFG key window of occurrence was from late November to late January. IE also stated that field observations have concluded that PFG are not particularly sensitive to disturbance, having observed PFG flying only approx. 100m from walkers on a nearby PRoW.</p> <p>JD noted that it seems like the potential disturbance would result in displacement of PFG into adjoining fields. There is more flexibility with functionally linked habitat that with SPA habitat, and there may be potential to discuss with landowners about amending crop rotations to move sugar beet to fields outside the PEIR boundary. TN explained that the process should first to be to quantify the potential impact (e.g. percentage of functionally linked habitat disturbed) and then see if there is a concern at the end, in terms of a deficit of foraging habitat.</p>	
3	<p>Winter Bird Surveys</p> <p>IE outlined the findings of the winter bird surveys, which have now been completed, noting that the survey methodology had been agreed at the previous EWG. Pink-footed geese (PFG) have been the main species of focus, as they are a listed feature of the North Norfolk Coast SPA.</p> <ul style="list-style-type: none"> • <i>Distribution of PFG</i> <p>PP noted that the distribution of PFG as shown from the winter survey results may change as the birds could use alternate locations that were not recorded by the surveys. IE explained that the PFG distribution is clearly linked to the presence of sugar beet crop, with the results map indicating that nearly all such fields at the northern end of the survey area being utilised at some point over the winter. Therefore, combined with the fact that the surveys were undertaken every two weeks, so providing excellent coverage, the distribution shown is as accurate as possible representation of PFG for this winter.</p> <p>PP questioned whether there was a preference on the landfall location and SB explained that this is still under investigation.</p> <p>TN explained that the assessment will be based upon the survey results for PFG. At this stage of the project, it cannot be excluded that construction will not occur during the winter or will avoid any PFG functionally linked habitat.</p> <p>TN explained that the uncertainty is because at the time of construction the location of sugar beet will be unknown. PP confirmed this is the key issue - the</p>		<p>LB to provide a summary of advice given to</p>	

	<p>TN summarised that the assessment approach involves a quantification of the habitat loss based on our current understanding of available habitat and similarly a consideration of the disturbance to PFG through a field-by-field assessment.</p> <p>LB noted that Natural England will consult with the EA1 and EA3 case officers and circulate any feedback in relation to disturbance impacts to brent geese, which may be applicable.</p> <p>PP stated that it is important to remember that the distribution is based on one year of data and be aware that this may change with cropping patterns. TN noted this and mentioned it will be useful to bench mark the data against historical data outlined within the Natural England commissioned report⁴.</p> <p>DW noted that ground disturbance is used as a conservation action (e.g. for the creation of breeding habitat) and there may be the potential to combine this with the Project.</p>	<p>EA1 and EA3 regarding disturbance to brent geese and detail whether this is applicable to PFG.</p>	<p>species, woodlark and Dartford Warbler and been found holding territory within the survey area.</p> <p>The EWG agreed this approach.</p>	
<p>Breeding birds</p> <p>IE provided a brief recap of the breeding bird methodology.</p> <p>PP stated that bespoke surveys may be useful to identify certain species inhabiting woodland blocks (e.g. raptors) that the onshore ECR passes through. The aim being to understand what could potentially be disturbed, the sensitivity of the species inhabiting the woodland blocks, and if the onshore ECR passes through the woodland blocks is this habitat going to be removed and how will this affect the timings of the works. IE explained that this should not feed into the survey work programme but a desk-based review of the potential distribution / sensitivity of the species mentioned by PP.</p> <p>PP stated that it comes down to understanding what the baseline information is and what is being collated. TN explained that there is a methodology for specific breeding bird territories and habitats that are affected directly, as well as a mechanism for characterising the entire corridor. NBIS data could be used to identify if any protected species have been recorded close to or within the survey area. IE reiterated that if specific species are of concern then particular methodologies will be implemented in line with Gilbert et al., (e.g. Nightjar at Kelling Heath). With respect to species that may breed alongside the onshore ECR (e.g. red kites), there is considered likely to be very limited potential for disturbance, as the level is comparable to agricultural activity. The approach will be to review the detailed route to understand how to manage any impacts. Nightjar at Kelling Heath however is a species that requires a specific response. DW queried the forthcoming availability of breeding bird data from Kelling Heath. IE confirmed that this would be available on completion and that two schedule 1</p>		<p>4 Protected Species Surveys</p> <p>TN re-caped the previous discussions regarding the protected species surveys and KA outlined the initial findings for:</p> <ul style="list-style-type: none"> • Great crested newt • Reptile surveys • Bats • Otter • Water vole • Desmoulin's Whorl Snail • Badger • White-claw crayfish • Hedgerow • NVC survey • Additional desktop study • Extended Phase 1 Habitat Survey <p>The EWG agreed that no further surveys were required for hazel dormouse, red squirrel or fresh water pearl mussel, following the results of the desktop study.</p> <p>DW noted that white-clawed crayfish are present at the Weybourne beck, but may not show on existing records. Helen Beadsley of the EA can provide more information on this topic.</p> <p>SB stated that currently survey access was approximately 70-75%. FS noted that this should be explained within the reporting, but is inherently an issue that every project deals with. DW noted that the DCO would provide the right to access land where access has previously not been granted.</p>		
			<p>5 Ecological Assessment Approach</p> <p>CR outlined the principles of assessment for designated sites, wintering birds and badgers. The aim being to agree the assumptions behind the assessment.</p> <ul style="list-style-type: none"> • Designated sites: Direct loss of habitat will be the main impact. • Wintering bird surveys: have identified a defined area of where the birds are, identified that it is an area of importance and identified that the 	

⁴ Brides, K., Mitchell, C. & Hearn R.D. 2013. Mapping the distribution of feeding Pink-footed Geese in England. Wildfowl & Wetlands Trust / Natural England Report, Slimbridge. 44pp.

	<p>functionally linked habitat is linked to sugar beet crop. The potential impact that will be the focus of the assessment is disturbance and temporary loss of habitat relating to the land-use (sugar beet).</p> <ul style="list-style-type: none"> • Badgers: sets have been found but not to the extent to warrant a diversion of the onshore ECR. Any impacts could be managed on a local scale, which can be managed through the pre-construction process following established methods. <p>JD stated it may be useful to provide a master map of all ecological elements along the cable route, which may be useful to highlight important areas. SB noted that an interactive pdf could be produced.</p> <p>SB explained that Hornsea Three is looking into setting up an extranet site for the sharing of documents with stakeholders.</p> <p>CR noted that the ecology chapter will follow standard ecology IEEM guidance, which will apply to all ecological topics.</p>	
6	<p>Hydrological Characterisation Study</p> <p>CR noted that the need for the study and the requirement to look at environmental topics in combination was identified from the Scoping report. The study has been informed by:</p> <ul style="list-style-type: none"> • Data collected from the Environment Agency and other available databases, to identify river crossings with important surrounding habitats. Desk-based information has been used to present a characterisation of the water courses and their uses. • Landowners interviews to obtain site specific information • Site visits attended by ecologist/hydrologist/engineers – to identify any constraints that will need to be taken into account, regarding the HDD works. <p>No sites were identified where works were not feasible. Booton Common has been identified as the most complex site due to topography and a high water table. A detailed construction plan will be required for this site. A more generic construction plan can be used for the other sites. CR stated that the aim will be to prioritise certain sites of concern. The report is currently being finalised.</p> <p>JB explained that there will be discussion with engineers to bring all the aspect together and decide on what the next steps will be.</p> <p>DW noted that the model of this approach is very positive.</p>	
7	<p>County Wildlife Sites (CWS)</p> <p>CR provided an overview of the CWS along the onshore ECR. The EWG agreed that the CWS identified within the position paper were correct and no additional</p>	

	<p>sites needed to be considered. CR explained that certain sites may fall out of the assessment as the route is defined further.</p> <p>DW noted that the CWS reference numbers should be included. PP stated that any key features of the CWS should be highlighted as this informs any potential impacts. DW explained that each CWS has met certain criteria, largely based on the floral community. Each site has a reference to what criteria has been met.</p> <p>Key points regarding the CWS include:</p> <ul style="list-style-type: none"> • Beach Lane Weybourne – previous cable routes have flagged as an area to avoid • Old Decoy – linked to the Norfolk Valley Fens. River Glaven conservation group are concerned over the surrounding habitats and potential impact of silt. SB noted that the project has had written feedback from the conservation group. • Mariott's Way – Badgers and bats both present • Land adjoining River Tud – tud valley group have raised concerns over pollution and run-off. White-claw crayfish present. • Braymeadow – new housing development is planned nearby. Locations for balancing ponds are located in close proximity. <p>JH noted that further discussions can be had once the route is finalised.</p>	CR to circulate CWS with associated reference numbers
8	<p>AOB</p> <p>JH questioned when mitigation measures will be considered. SB explained that some aspects of the project consider built in mitigation, but mitigation will be considered in detail once the draft impact assessment has been produced, not at the PEIR stage. JH stated it would be useful to explore how mitigation could improve the wider ecosystem.</p> <p>TN noted that the discussion within the EWG may proceed past the PEIR submission.</p> <p>Future EWG meeting dates to be confirmed.</p>	

Actions

- KW to chase any feedback from North Norfolk District Council on the ECR.
- BM to confirm that Helen Beadsley is the contact for the White clawed crayfish group and to find out their programme of work.
- LB to provide a summary of advice given to EA1 and EA3 regarding disturbance to brent geese and detail whether this is applicable to PFG.
- CR to circulate CWS with associated reference numbers

Progress of agreements

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	17.02.2017	Onshore designated sites of relevance to Hornsea Three.	The Natura 2000 sites and SSSIs presented as the focus of the EWG were agreed. CWS of specific relevance to Hornsea Three require further discussion.
2	17.02.2017	Winter birds survey methodology	EWG is agreed that the proposed methodology is appropriate, pending further discussions on whether the point counts appropriately cover CWS habitats. (see action 4.) Points count locations have since been circulated and approved.
3	17.02.2017	Breeding birds survey methodology	Natural England are providing a detailed review of the breeding birds survey methodology under DAS and will provide separate feedback. Otherwise, the EWG agreed that the approach was acceptable, noting that further information may be required on the points counts and whether they cover CWS habitats. [The point count locations have since been circulated to the EWG and approved].
4	17.02.2017	Protected species survey methodology	The EWG agreed that the proposed approach to protected species surveys was appropriate. Additional feedback may be provided (see action 5).
5	17.02.2017	Hydrological characterisation study scope	The EWG was agreed on the scope of the study.
6	28.04.2017	County Wildlife sites relevant to the project	All relevant CWS have been outlined within the Position Paper and agreed with the EWG.
7	28.04.2017	Assessment methodology: Wintering birds and designated sites	The assessment approach to wintering birds and designated sites has been agreed with the EWG.
8	28.04.2017	Survey requirements: Hazel dormouse, red squirrel and freshwater pearl mussel surveys.	The EWG agreed that surveys for hazel dormouse, red squirrel and freshwater pearl mussel surveys do not have to be undertaken for Hornsea Three.

F.3 Onshore Ecology EWG meeting minutes 25.07.2017

<i>Subject</i>	Onshore Ecology EWG
<i>Date - hours</i>	25.07.2017 10.30-15.00
<i>Venue</i>	Maids Head Hotel, Norwich
<i>Attendees</i>	<p>In person</p> <p>Sophie Banham (SB) – Consents Manager, DONG Energy Andrew Guyton (AG) – Onshore Environmental Lead, Hornsea Project Three Sarah Drijaca (SD) – Environment and Consents, DONG Energy Clare Russell (CR) – Onshore EIA, RPS Gabrielle Graham (GG) – Principle Ecologist, Thomson Ecology Paul Franklin – Principle Ecologist, Thomson Ecology Ian Ellis (IE) – Principal Ecologist, NIRAS Tim Norman (TN) - Evidence Plan and HRA, NIRAS David Bloxsom (DB) – Evidence Plan and HRA, NIRAS David White (DW) – Senior Green Infrastructure Officer, Norfolk County Council John Hiskett (JH) – Senior Conservation Officer, Norfolk Wildlife Trust Phil Pearson (PP) – Senior Conservation Officer, RSPB James Dawkins (JD) – Case Officer, RSPB Barbara Moss-Taylor (BM) – Senior Project Manager, Environment Agency Marija Nilova (MN) – Marine Lead Advisor, Natural England Craig Thomas – District licensing, Natural England</p> <p>By phone</p> <p>Louise Burton (LB) – Senior Adviser, Natural England</p>
<i>Supporting Material</i>	Presentation circulated prior to the meeting

Item	Description	Action
1	<p>Introductions and aims of the EWG</p> <p>AG led a brief introduction to the EWG covering the aims and agenda.</p>	
2	<p>Recap on previous EWG meeting and any project updates</p> <p>DB outlined the agreements that were made at the previous EWG meeting (April 2017) and the current outstanding actions:</p> <ul style="list-style-type: none"> • KW to chase any feedback on the ECR from North Norfolk District Council - unknown • BM to confirm that Helen Beadsley is the correct contact for the white-clawed crayfish – completed • LB to provide summary of advice given to EA1 and EA3 regarding disturbance to brent geese and confirm whether or not this is applicable to PFG - incomplete • CR to circulate CWS with associated reference numbers – reference numbers acquired but as yet not circulated to EWG. 	<p>DB to follow up with KW over previous action</p> <p>DB to follow up with LB after the EWG meeting over previous action</p>
3	<p>Project update and statutory consultation</p> <p>AG presented the wider Hornsea Three programme:</p> <ul style="list-style-type: none"> • Statutory consultation period under Section 42 starts 27th July – 20th September <p>AG outlined the material that will be received as PEIR, how the PEIR material will be circulated and how best to submit responses.</p> <p>TN explained that the PEIR presents a snap shot in time and the consultation that is ongoing in the onshore EWG may have progressed further. SB confirmed that in every PEIR chapter there is a next steps section where at a high level ongoing discussions will be noted. The draft Evidence Plan is also part of the PEIR, as an annex to the draft RIAA.</p>	
4	<p>Onshore PEIR Plan and route refinement</p> <p>AG presented the onshore PEIR plan including:</p> <ul style="list-style-type: none"> • Landfall • PEIR boundary • Selected booster station, converter station and substation sites. 	

	<p>AG note that the plans show potential alternative routes that are being considered due to constraints/landowners, but have not been considered within the PEIR assessment. Location options for the main construction compound are also highlighted.</p> <p>AG outlined the key points from post PEIR to application submission, including:</p> <ul style="list-style-type: none"> • Key inputs • Design refinement • Construction management and mitigation <p>PP noted that it is useful to be notified of any publication notifications on the project so the RSPB are aware in case they are contacted with any questions. AG explained the methods of notification, e.g. formal advertising in newspapers, site notices at approximately locations to capture local users.</p> <p>SB confirmed that a potential constraint has been identified in the Kelling Heath area, where the route crosses the railway line. This is why the potential reroute has been identified, but there is still work to understand whether a route alteration is necessary.</p> <p>SB explained how the worst case scenario has been developed and noted that the process should be clearly explained within the maximum design scenario within each PEIR chapter.</p>		<p>(CoCP) and the ecological management plan (EMP) are the main documents which will set out any commitments. The EMP will outline any specific ecological mitigation.</p> <p>CR noted that enhancement has not be discussed yet. SB stated that the project currently is not at the point to consider enhancement, but it will be discussed later.</p> <p>JH noted that the NWT reserve manager had some questions around the Booton Common site. CR noted that the hydrological characterisation study is not included in PEIR so any questions can be discussed separately.</p> <p>SB noted that comments on the Hydrology Characterisation Study would be useful in order to feed into the development of the study.</p> <p><i>Draft RIAA</i></p> <p>TN provided an overview of the draft RIAA content that will form part of the PEIR material, including:</p> <ul style="list-style-type: none"> • Designated sites of concern • Potential impacts assessed • Mitigation measures considered • Overall conclusions <p>PP questioned whether conversations were being held with other OWFs whose onshore cables are likely to cross with Hornsea Three's. SB confirmed that Norfolk Vanguard and potentially Norfolk Boreas are also likely to propose installing export cables in the area of Reephams. DONG has a good relationship with Vanguard, but the project is not as advanced as Hornsea Three and hence there is little published information that can be incorporated into the cumulative/in-combination assessments at the present time.</p> <p>TN noted that certain impacts may fall away as the route boundary is refined further.</p> <p>PP stated that provisioning of food for birds should be considered, if they is a significant loss of food. TN explained that the disturbance to birds is seen as something that is manageable and there are processes which will be considered.</p>	<p>CR to contact JH and the NT reserve manager around questions on the hydrological characterisation study and particular the Booton Common site.</p> <p>MN to feedback on NE's availability to provide comments on the hydrological characterisation study.</p>
5	<p>PEIR and draft RIAA submission</p> <p><i>PEIR</i></p> <p>CR highlighted the key PEIR chapter relevant to onshore ecology. CR provided an overview of the onshore ecology PEIR chapter and the hydrology and flood risk PEIR chapter, including :</p> <ul style="list-style-type: none"> • Surveys included within the PEIR; • Key potential impacts; • Proposed mitigation; and • Next steps. <p>CR noted that the cross schedule is yet to be developed, and this will outline in more detail the crossings of public rights of way and water courses including the proposed crossing method at each location. The code of construction practice</p>	<p>JH to forward hydrological queries onto CR.</p>		

<p>6</p>	<p>Breeding Birds</p> <p>IE provide a re-cap on the breeding birds survey methodology and an overview of the survey reporting and the initial survey results.</p> <p>IE stated that the alternative routes highlighted by AG have been accounted for in the breeding bird surveys. This includes Kelling Heath SSSI with the two route options leading to both the western and eastern edges of the site being surveyed.</p> <p>IE noted that initial results have shown multiple territories of Dartford warbler, woodlark and night jar within the survey area at Kelling Heath while the landfall supported Cetti's warbler and little ringed plover. Also of note was a hobby nest recorded along the ECR route during point count surveys.</p> <p>PP noted that the initial results are broadly what was expected and noted:</p> <ul style="list-style-type: none"> • It would be useful to know what other records are available to see how the survey results compare. • It would be useful to see how the territories of key species at Kelling Heath relate to the cable route. IE confirmed that territory mapping of all species of interest would be provided in the report. With regards to Kelling Heath, most territories of key species were to the south of the railway line but nightjar and woodlark were also present to the north. <p>DW noted more nightjar territories may existing outside of the survey area, along with woodlarks and Dartford warbler. IE commented that the surveys have noted some territories, including of Dartford Warbler and nightjar that are entirely outside of the survey area.</p> <p>SB noted that it would be useful for the report to be issued ahead of the next EWG meeting.</p> <p>IE confirmed that the report will not be a public document as it contains information on the nesting sites of raptors.</p>	<p>AG to confirm when the breeding bird survey report will be issued to the EWG</p>	<ul style="list-style-type: none"> • A strategic approach, working with developers and conservationists, to ensure a net gain in GCN. • The aim to use resources to create GCN habitat and a net gain in GCN, building upon projects such as the Norfolk Pond Project and pond auctions which focus upon a bottom up land owner consensus approach. • Money will be invested in habitat creation at a strategic level for GCN to create a net gain in GCN. • The requirement on the developer would be to provide financing, and the actually process would be provided by existing programmes. <p>CT noted that the traditional method of GCN mitigation is still appropriate and acceptable but the approach discussed is an alternative. Further clarifications:</p> <ul style="list-style-type: none"> • SB questioned that whether other mitigation measures don't need to be considered if it is possible to commit to this new strategic process. CT explained that there would still be a requirement to survey for GCN, but it would be considered if the 'trap and move' would be required. • GG questioned if you have to demonstrate the presence of GCN in newly created habitat. CT noted that this wouldn't necessarily be the case, but you would look to create habitat in areas where there are GCN. • CT confirmed that the developer would still hold a protected species licence but the mitigation ties into the strategic programme. <p>PP noted that this approach may potentially count towards enhancement.</p> <p>SB thought that there could be a benefit of this proposed approach, provided it offers a route to a secure consent that is more straightforward than the current process, which is tried and tested. There are still questions about how the financing would be undertaken.</p> <p>CT explained that it can be demonstrated that this approach works for GCN.</p>	
<p>7</p>	<p>Natural England - Great Crested Newt Initiative</p> <p>CT introduced a new process for mitigating impacts to GCN:</p> <ul style="list-style-type: none"> • Current mitigation methods are not considered to be effective or sustainable, with the population still in decline. 		<p>8</p> <p>Protected species surveys</p> <p>GG provided an update on the protected species surveys GCN, Reptile, Bats, Otter, Water vole, Desmoulin's whorl snail, Badger, White-clawed crayfish, Hedgerow, NVC survey.</p> <p>GG confirmed that any deviations from best practice have been justified and the most limiting factor has been land owner access. There is significant surrounding information that land owner access should not affect the characterisation.</p>	

	<p>PP questioned the approach for crossing hedgerows. AG stated that normally the right to remove a hedgerow is secured and there is an obligation to reinstate the hedgerow. The process if the project is constructed in phases needs further consideration. CR opportunities to improve hedgerow connectivity will be considered.</p>	
9	<p>Additional work lines</p> <p><i>Hydrological characterisation note</i></p> <p>CR outline the purpose and content of the hydrological study and noted that the study has provided significantly more information upfront than previous approaches.</p> <ul style="list-style-type: none"> JH questioned how smaller streams will be crossed and whether there are any general principles for which crossing technique will be used . CR confirmed that the crossing schedule will provide information on each crossing. Some streams may warrant HDD while others may use open cutting. <p><i>Freshwater Fish Note</i></p> <p>CR outline that the note had been develop in response to queries from the EA on the requirement for freshwater fish surveys. The note concludes that no further surveys are required.</p>	
10	<p>AOB</p> <ul style="list-style-type: none"> Consultation responses to be sent to DONG by 20th Sept Next EWG date to be confirmed – currently estimated end of September/ early October LB noted that NE are pressed on resource currently and the focus is upon statutory consultation. 	

Actions

- DB to follow up with KW over previous action
- DB to follow up with LB after the EWG meeting over previous action
- JH to forward hydrological queries onto CR.
- CR to contact JH and the NT reserve manager around questions on the hydrological characterisation study and particular the Booton Common site.
- MN to feedback on NE's availability to provide comments on the hydrological characterisation study
- AG to confirm when the breeding bird survey report will be issued to the EWG

Progress of agreement

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	17.02.2017	Onshore designated sites of relevance to Hornsea Three.	The Natura 2000 sites and SSSIs presented as the focus of the EWG were agreed. CWS of specific relevance to Hornsea Three require further discussion.
2	17.02.2017	Winter birds survey methodology	EWG is agreed that the proposed methodology is appropriate, pending further discussions on whether the point counts appropriately cover CWS habitats. (see action 4.) Points count locations have since been circulated and approved.
3	17.02.2017	Breeding birds survey methodology	Natural England are providing a detailed review of the breeding birds survey methodology under DAS and will provide separate feedback. Otherwise, the EWG agreed that the approach was acceptable, noting that further information may be required on the points counts and whether they cover CWS habitats. [The point count locations have since been circulated to the EWG and approved].
4	17.02.2017	Protected species survey methodology	The EWG agreed that the proposed approach to protected species surveys was appropriate. Additional feedback may be provided (see action 5).
5	17.02.2017	Hydrological characterisation study scope	The EWG was agreed on the scope of the study.
6	28.04.2017	County Wildlife sites relevant to the project	All relevant CWS have been outlined within the Position Paper and agreed with the EWG.
7	28.04.2017	Assessment methodology: Wintering birds and designated sites	The assessment approach to wintering birds and designated sites has been agreed with the EWG.
8	28.04.2017	Survey requirements: Hazel dormouse, red squirrel and freshwater pearl mussel surveys.	The EWG agreed that surveys for hazel dormouse, red squirrel and freshwater pearl mussel surveys do not have to be undertaken for Hornsea Three.

F.4 Onshore Ecology EWG meeting minutes 02.11.2017

<i>Subject</i>	Onshore Ecology EWG
<i>Date - hours</i>	02.11.2017 10.30-15.00
<i>Venue</i>	Maids Head Hotel, Norwich
<i>Attendees</i>	<p>In person</p> <p>Sophie Banham (SB) – Consents Manager, DONG Energy</p> <p>Clare Russell (CR) – Onshore EIA, RPS</p> <p>Paul Franklin (PF)– Principle Ecologist, Thomson Ecology</p> <p>Ian Ellis (IE) – Principal Ecologist, NIRAS</p> <p>Tim Norman (TN) - Evidence Plan and HRA, NIRAS</p> <p>David Bloxsom (DB) – Evidence Plan and HRA, NIRAS</p> <p>David White (DW) – Senior Green Infrastructure Officer, Norfolk County Council</p> <p>John Hiskett (JH) – Senior Conservation Officer, Norfolk Wildlife Trust</p> <p>Phil Pearson (PP) – Senior Conservation Officer, RSPB</p> <p>James Dawkins (JD) – Case Officer, RSPB</p> <p>Barbara Moss-Taylor (BM) – Planning Specialist, Environment Agency</p> <p>Kerys Witton (KW) – Landscape Officer, North Norfolk District County</p>
<i>Supporting Material</i>	Position Paper and Presentation circulated prior to the meeting

Item	Description	Action
1	<p>Introductions and aims of the EWG</p> <p>TN introduced the meeting's aims, the participants and provided a brief recap on the progress since the last EWG meeting.</p> <p>SB explained that DONG Energy are changing name to Ørsted and therefore the company name will be updated to Orsted Hornsea Project Three (UK) Ltd.</p>	
2	<p>Recap on actions from previous EWG meeting</p> <p>TN briefly went over the actions from the previous EWG meeting.</p> <p>JH questioned whether any progress had been made with the GCN mitigation scheme that NE introduced at the last EWG meeting [July 2017]. TN explained that there have been further discussions on this matter with NE and the Environment Bank and it is being discussed how the scheme could practically work with Hornsea Three. The benefits of the scheme are understood by the project as well as the additional complexities.</p>	
3	<p>Evidence Plan process</p> <p>TN outlined the Evidence Plan process to the final application, with upcoming topics including finalising the baseline characterisation, draft management plans and approach to SoCG.</p> <p>JD noted that it is beneficial to have a focused SoCG. SB explained that the SoCG are being seen as evolving documents and it is the projects aim to provide a draft SoCG with the final application outlining the areas of agreement/disagreement. JD stated that the SoCG needs to clearly state that these agreements represent a point in time and may change.</p> <p>PP noted there are a number of reports that are yet to be seen in full by the EWG and it would be best to circulate these as soon as possible.</p> <p>TN noted that the intention will not be to agree the SoCG at the next EWG meeting but there may be certain aspects we can record as agreed. Typically SoCG are finalised in the period between application and issue specific hearings.</p>	

4	<p>Route refinement and crossing schedule</p> <p>The working version of the refined cable corridor red line boundary was presented to the EWG. This included a route that has been refined from 200m to 80m, and highlighted anticipated HDD points and access routes.</p> <p>Clarifications:</p> <ul style="list-style-type: none"> The 80m ECR includes temporary working areas and includes a series of six cable trenches, areas for storing top soil and central haul road The landfall is situated in the western area of the PEIR landfall and the ECR now proceeds to the west of Kelling Heath The corridor may widen slightly from the 80m around complex crossings Where the route extends outside of the PEIR boundary, this is because of landowner feedback, technical constraints or updated information on existing infrastructure. Further edits will be made as the version presented was a first draft SB explained the project phasing; the maximum construction duration for any component is presented, the earliest possible start to latest possible finish. Contract for Difference (CfD): the next auction is scheduled for early 2019. Hornsea Three is not likely to gain consent by this time, but the CfD timings to date have shifted in each case after timings were first announced. <p>Questions:</p> <ul style="list-style-type: none"> JH questioned whether landowners have seen this route and if not when? SB confirmed that the route has not yet been shared with landowners as there are still edits to be made. The aim would be to share this in the next month or two. JD questioned whether the choice between AC and DC would affect the number of cables? SB noted that based on currently existing technology you would need all six cable trenches for either option. PP questioned who would have the management responsibility for planted areas? CR explained that normally landscape management plans state a commitment from the Project of 5-10 year. JD questioned whether there is the potential that no CfD will be required with developments in technology. SB explained that there will be a requirement to have a mechanism to determine the price for the energy generated and there is currently no certainty of what this mechanism might look like post CfD. 		<ul style="list-style-type: none"> JH noted that there is a new round of CWS which will be announced in 2018, however it isn't anticipated that any of these will interact with the ECR. JH questioned whether a proportion of the community fund will be allocated to biodiversity projects. SB explained that previously community funds have been set up in a manner that local projects bid for funding, with an independent company leading this process. <p>Crossing schedule:</p> <ul style="list-style-type: none"> CR explained that the crossing schedule currently presents information on each water course identified. Any additional information or more up to date information on the water courses would be welcomed. 	<p>EWG to provide any updates to the Crossing schedule information</p>
5	<p>Section 42 consultation</p> <p>The Project is in the process of reviewing and incorporating the Section 42 comments.</p> <p>SB confirmed that further project decisions will be communicated to the general public through the website (e.g. FAQs and interactive maps) and newsletters.</p> <p>CR provided a brief overview of the Section 42 comments for each EWG participant (only major comments will be noted within the Environmental Statement chapter consultation table although others will be dealt with in updated drafting) and confirmed that an Outline Code of Construction Practice (OCoCP) is being developed and will be shared with the EWG as soon as possible.</p>			<p>CR to share draft OCoCP</p>
5	<p>Assessment progression</p> <p>Environmental Statement</p> <p>CR provided an overview of the PEIR conclusions.</p> <p>JD questioned whether HDD fully addresses any hydrological impacts. CR explained that HDD was a design mitigation measure and that management measures would be implemented to minimise the impacts of construction. As well as the OCoCP there will be a bentonite breakout plan to ensure that effective procedures are in place. The hydrological characterisation note has defined compound locations outside of watercourse flood zones. Pollution prevention</p>			

<p>measures will all be incorporated into the OCoCP. More detailed management plans will be developed post consent and these plans will address specific issues.</p> <p>KW questioned the sensitivity of CWS as low/moderate. CR explained that the sensitivity of the CWS and other ecological receptors will be assessed in accordance with guidance and the approach will be set out in the Environmental Statement chapter.</p> <p>CR noted that the depth of HDDs for each watercourse crossing can't be defined at this stage. A suitable standoff between the depth of the hard bed of the watercourse/depth to groundwater and the depth of the HDD will be finalised during the detailed design post consent. Currently there are a limited number of HDDs occurring in Source Protection Zones (SPZs). CR explained that the SPZ plans are currently under review by the EA and the number of HDDs within SPZs will be confirmed once the EA has completed their review.</p> <p>HRA</p> <p>TN stated that with the cable refinement all direct impacts on designated sites have dropped out of the assessment. Leaving the focus upon hydro-ecology and management of protected species.</p> <p><u>Norfolk Valley Fens SAC</u></p> <p>Cable route now avoids the Booton Common area and therefore direct impacts will drop out of the assessment. Any effects to water quality on Annex I habitats will still be assessed. The assessments for temporary disturbance/damage to Annex II species and accidental pollution will be updated accordingly.</p> <p><u>Wensum SAC</u></p> <p>The river crossing will be conducted using HDD, which will therefore avoid the majority of impacts. The assessment provided in the draft RIAA will be updated with the final crossing approach and updated survey information. Annex I habitat is located downstream and therefore with the appropriate management measures it is anticipated that there will be limited impact.</p> <p><u>North Norfolk Coast SAC</u></p> <p>No pathway for effect has been identified.</p>	
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	<p><u>North Norfolk Coast SPA/ Ramsar</u></p> <p>TN explained that additional wintering bird surveys are being conducted using the same approach as previously agreed to cover the re-routes.</p> <p>In relation to the impact on pink-footed geese (PFG) there will be a disturbance effect but it is not obvious that a significant effect is likely to occur or something that causes an adverse effect on the SPA feature. JD/PP noted that at the point of construction sugar beet cropping patterns could occur significantly along the cable route and this worst case scenario requires full explanation.</p> <p>TN stated that the assessment would explain the proportion that you have reduced the wintering foraging areas. The aim will be to confirm there is a significant impact before committing to any mitigation. TN explained that the disturbance results from the 80m corridor plus a temporary disturbance buffer. The assessment could draw some assumptions on the areas that are available for foraging based on the survey data collected and explain what proportion of the available habitat would be disturbed if we assume the entire corridor is affected for the entire winter period.</p> <p>TN noted that the winter surveys are ongoing and the aim will be to include as much data as possible into the assessment. The survey data may not be critical for the PFG assessment but as much data as possible will be included. There will be a freeze point on when data can be incorporated based on the project timelines.</p>	
6	<p>Survey updates</p> <p>PF provided an overview of the protected species surveys that have been conducted. The focus was upon the refined cable route, although often the survey area extended outside of this area. PF noted that access to certain sites change over time.</p> <p>PF noted that all the surveys are now complete, but some of the data is still being analysed. All the data has not yet been circulated to the EWG.</p> <p>DW noted that the key point is being able to relate the survey data to the project impacts. DW stated there are a few key areas for surveys and particularly for</p>	

	<p>bats, and whether survey data has been collected is useful to know. Key areas for bats include:</p> <ul style="list-style-type: none"> • The woods near the booster station, which the Norfolk Barbastelle Study group consider have the potential to contain barbastelle bats; and • The area around the Wensum, including Aldeford common and the Marriott's Way. <p>PF confirmed that the bat activity surveys should have been completed across these areas, and access has been sought everywhere.</p> <p>SB noted that a next step for the next EWG would be to highlight clearly where there have been gaps in the surveys due to access and what data is available.</p>	
7	<p>Future meetings and next steps</p> <p>The next meeting is currently anticipated to be the last EWG meeting ahead of the final application and the aim will be to reach final areas of agreement, looking ahead to Statements of Common Ground.</p> <p>All documentation will be circulated as early as possible to allow adequate review time.</p> <p>SB noted there are a number of documents that have been under discussion (survey reports, OCoCP), so we will look towards staggering the circulation of documents.</p>	

I finally had some comments back from the terrestrial colleagues regarding the Onshore position paper issued for the meeting on 2 November, I am sorry this took a while. Overall, we are inclined to agree there will be no adverse effect on the integrity of designated sites subject to mitigation measures. However, until full details of those measures are available we are unable to provide a more definite position. We agree with the conclusion of major-moderate significance in EIA terms of the habitat loss from trenching. We have no further comments on the information presented in relation to EPS but we look forward to reviewing the full details of the surveys at a later stage. It is important that the survey findings are linked to the potential impacts of the project works in the final application.

I am hopeful that Natural England would be able to provide greater support for the onshore ecology aspects of the project. I will speak to you in the new year.

Kind regards,
Marija

Marija Nilova

Marine Lead Adviser – Major Casework

Actions

1. EWG to provide any updates on the Crossing schedule information
2. CR to share draft CoCP

Post Meeting Note – Update from Natural England

Dear Sophie,

Progress of agreements

(previous meetings points highlighted in grey)

Item	Meeting Date	Issue on which agreement is sought	Progress of agreement in the EWG
1	17.02.2017	Onshore designated sites of relevance to Hornsea Three.	The Natura 2000 sites and SSSIs presented as the focus of the EWG were agreed. CWS of specific relevance to Hornsea Three require further discussion.
2	17.02.2017	Winter birds survey methodology	EWG is agreed that the proposed methodology is appropriate, pending further discussions on whether the point counts appropriately cover CWS habitats. (see action 4.) Points count locations have since been circulated and approved.
3	17.02.2017	Breeding birds survey methodology	Natural England are providing a detailed review of the breeding birds survey methodology under DAS and will provide separate feedback. Otherwise, the EWG agreed that the approach was acceptable, noting that further information may be required on the points counts and whether they cover CWS habitats. [The point count locations have since been circulated to the EWG and approved].
4	17.02.2017	Protected species survey methodology	The EWG agreed that the proposed approach to protected species surveys was appropriate. Additional feedback may be provided (see action 5).
5	17.02.2017	Hydrological characterisation study scope	The EWG was agreed on the scope of the study.
6	28.04.2017	County Wildlife sites relevant to the project	All relevant CWS have been outlined within the Position Paper and agreed with the EWG.
7	28.04.2017	Assessment methodology: Wintering birds and designated sites	The assessment approach to wintering birds and designated sites has been agreed with the EWG.
8	28.04.2017	Survey requirements: Hazel dormouse, red squirrel and freshwater pearl mussel surveys.	The EWG agreed that surveys for hazel dormouse, red squirrel and freshwater pearl mussel surveys do not have to be undertaken for Hornsea Three.

F.5 Onshore Ecology EWG meeting minutes 23.03.2018

(not signed off by EWG)

Subject	Onshore Ecology EWG
Date - hours	23.03.2018 10.00-14.00
Venue	OPEN, Norwich
Attendees	<p>In person</p> <p>Andrew Guyton (AG) – Onshore Environmental Consents Lead, Ørsted Paul Franklin (PF)– Principle Ecologist, Thomson Ecology Tim Norman (TN) - Evidence Plan and HRA, NIRAS David Bloxsom (DB) – Evidence Plan and HRA, NIRAS David White (DW) – Senior Green Infrastructure Officer, Norfolk County Council John Hiskett (JH) – Senior Conservation Officer, Norfolk Wildlife Trust James Dawkins (JD) – Case Officer, RSPB Kerys Witton (KW) – Landscape Officer, North Norfolk District County</p> <p>Phone</p> <p>Clare Russell (CR) – Onshore EIA, RPS Barbara Moss-Taylor (BM) – Planning Specialist, Environment Agency Sarah Drljaca (SD) – Onshore Environmental Manager, Ørsted</p>
Supporting Material	Position Paper and Presentation circulated prior to the meeting

Item	Description	Action
1	<p>Introductions, meeting aims and previous actions</p> <p>DB provided a brief introduction to the meeting and overview of the aims of the meeting.</p> <p>No further updates to the Crossing Schedule were received and none mentioned further.</p> <p>Outline Code of Construction Practice (OCoCP) was circulated prior to the EWG meeting.</p>	
2	<p>Review of baseline surveys</p> <p>CR provided a brief overview of the protected species survey completed and noted that the survey reports have been circulated through the external SharePoint site.</p> <p>TN explained that all the baseline surveys have been completed. The wintering bird surveys were repeated for 2017/2018 to incorporate an alteration in the onshore cable corridor.</p>	
3	<p>EIA conclusions</p> <p>CR/TN provided an overview of the EIA ecological conclusions in relation to habitats, birds and protected species. Key queries:</p> <ul style="list-style-type: none"> JH questioned whether hedges in poor condition, effected by the cable installation, will be restored to a better condition. AG explained that within the 80m easement hedge rows would be replanted to a better standard, there is not an ambition to restore like-for-like. Trees will not be replanted where the cable passes through and no commitment is currently within the application to replant trees outside of the 80m easement – although this could be explored further. CR explained that a case by case approach may be more useful towards planting outside of the 80 easement, rather than a catch all commitment. AG stated that the outline landscape management plan, the outline traffic management plan, the outline ecological management plan and the outline code of construction practice document are all certified documents that sit 	

<p>under the DCO. DW noted that it would be beneficial if the same plan/s can be adopted by all the relevant local authorities. AG explained that the aim will be to have one plan that applies to the entire project, it may be that each district will have different requirements that have to be incorporated. It may be that subsections will relate to the requirements of each district.</p> <ul style="list-style-type: none"> • AG explained the project timescales: <ul style="list-style-type: none"> ○ Application submission aiming for Q2 2018 (mid to late May) ○ June - 28 day acceptance period ○ S56 notifications – when project is accepted ○ PINS appoint examiners ○ Preliminary meeting could be held around mid-August ○ 6 month examination period <p><i>Wintering birds assessment – PFG</i></p> <p>TN explained that the additional year of wintering bird surveys has reinforced the understanding of pink-footed geese distribution and abundance. There are fluctuations from year to year as expected, but the relative importance of the area and how the birds use the area (depending on the beet cropping pattern) is well established. It is difficult at this point to quantify any impact at this point as it depends on the land use at the time of construction. When fed through the EIA matrix approach disturbance to PFG results in a moderately adverse effect. Considering the nature of the effect this seems like an over estimation. The disturbance impact is now considered further within the HRA, in the context of the effects to the wider PFG North Norfolk Coast SPA population.</p> <p>JH questioned whether an appropriate mitigation measure would be to ensure there is significant foraging habitat outside of the cable route, i.e. ensuring that sugar beet is grown elsewhere. TN explained that it is not clear whether there would be an adverse effect is even if there was some disturbance, as there is sufficient habitat to support PFG foraging. KW noted that the precautionary principle should be followed if the disturbance effect and impact on foraging cannot be quantified. DW stated that the area impacted, as a proportion of the potential area that PFG feed, is very small. Therefore the likelihood of having an adverse effect on integrity is very small and intrinsically there can't be a significant effect. The problem is writing the argument in a way that everybody accepts the point.</p> <p>AG stated that from a wider project viewpoint, at this stage it is not beneficial to lock in mitigation measures which may not be appropriate, depending on future decisions on how the project is developed. AG suggested it is better to commit to principles that can then be developed further closer to construction.</p>

<p>JD explained that the main point is to ensure that there is a mechanism in place that can be utilised and that is reasonably flexible. TN stated that the aim will be to agree a set of principles and ensuring the correct options are available and doesn't lock in a measures that may not proportionate.</p> <p><i>Protected species</i></p> <p>PL provided an overview of the key findings from the protected species surveys:</p> <ul style="list-style-type: none"> • White-clawed crayfish were only found at one site at the River Yar. • Five meta-populations of GCN were found • Kelling Heath was the most important site for reptiles • Four bat roosts were recorded, but only one in proximity to the cable corridor • No main badger sets were recorded in the cable corridor <p>CR provided an overview of the key impacts and conclusions. No significant impacts have been identified.</p> <p>AG clarified the project is happy to reinstate hedgerows across the entire 80m corridor in discussion with landowners over gaps that may be used for access. JD noted that this is a positive position.</p> <p>AG explained that there is a contractual obligation to ensure that land is restored to its previous condition.</p>	<p>4 HRA conclusions</p> <p>TN provided an overview of the HRA conclusions for the Norfolk Valley Fens, Wensum River SAC, North Norfolk SAC/SPA and Ramsar site. Key points:</p> <ul style="list-style-type: none"> • TN explained that the cable corridor has been refined to ensure no direct overlap with the SAC. Best practice construction methods will be implemented through the EMP and CoCP both of which will ensure responsible construction activities. • AG explained that prior to construction a construction programme will be submitted. • The North Norfolk SAC is avoided and there is no pathway for effect. • The HRA for the North Norfolk SPA has reached the conclusion of no adverse effect, but the question is how the measures are captured to ensure this conclusion.
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	<p>AG confirmed that the public plans present the HDD locations and this is what the EIA/HRA has based the assessment upon. Where open cut trench is currently assumed the Project has the right to conduct HDD if required.</p>			
5	<p>Mitigation and management measures</p> <p>CR provided an overview of the ‘mitigation by design’ and ‘mitigation during construction and operation’, and a more detailed look at the OCoCP and EMP.</p> <p><i>Outline Code of Construction Practice</i></p> <ul style="list-style-type: none"> • Document will be developed in more detail post-consent • Linked to a number of additional plans (e.g. communication plan, landscape management plan etc.) • DW stated that these documents works best when the sections are comprehensively cross referenced to other relevant information and/or management plans. <p><i>Outline Ecological Management Plan</i></p> <ul style="list-style-type: none"> • Considers measures in the context of pre, during and post construction • Full EMP produced prior to construction • Document records the relevant ecological mitigation measures and also how these measures are anticipated to be monitored and reported. <p>It is anticipated that a dialogue will be held over the further development of the management documents.</p> <p>The EWG were happy with the approach to developing these documents, and at a high level there didn’t appear to be any major omissions. DW stated that a plan showing the ecological hot spots along the cable route has been extremely beneficial for contractors as a visual aid, to clearly highlight when certain ecological management measures need to be considered. CR noted that the constraints plan does include key results from the ecological surveys along with different construction approaches.</p> <p><i>Enhancement measures</i></p> <p>The Project has committed to hedgerow enhancements and bat and owl boxes. Bat and owl boxes will be installed when a roost is lost and when potential roost habitat</p>		<p>is lost. CR noted that discussions are ongoing around enhancement measures but no further commitments can currently be made.</p> <p>AG noted that the Project will commit to obtaining the relevant GCN licensing, but the mitigation approach is currently open between more traditional fencing and the more strategic approach advocated by Natural England.</p> <p>AG explained that the Project is open to discuss enhancement measures further. The Project’s aim, for commercial purposes, is to demonstrate to the future OFTO that all the mitigation is required by the Project.</p>	
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			7	

Progress of agreement

(previous meetings points highlighted in grey)

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8	28.04.2017	Survey requirements: Hazel dormouse, red squirrel and freshwater pearl mussel surveys.	The EWG agreed that surveys for hazel dormouse, red squirrel and freshwater pearl mussel surveys do not have to be undertaken for Hornsea Three.
9	23.03.2018	Data collection and baseline characterisation	The EWG have agreed that all survey methodologies are appropriate and no further survey data needs to be collected. The EWG have agreed the baseline characterisation of the onshore ecology.
10	23.03.2018	Assessment methodology	The EWG have agreed the assessment methodology for both the EIA and HRA.
11	23.03.2018	Impact assessment	The EWG have agreed that no significant effects have been currently identified that cannot be appropriately managed.
12	23.03.2018	Mitigation and management measures	The management plans have not been agreed entirely, although at a high level there is broad satisfaction that the information provided is appropriate. Further discussion is required to agree the final content of the management plans.