



# Marine Management Organisation

## Scoping Opinion

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

**Title:** UK-France HVDC Interconnector: MMO EIA Scoping Opinion

**Operator:** Aquind Limited

**Scoping reference:** EIA/2018/00011

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## 1. Proposal

### 1.1. Project Background

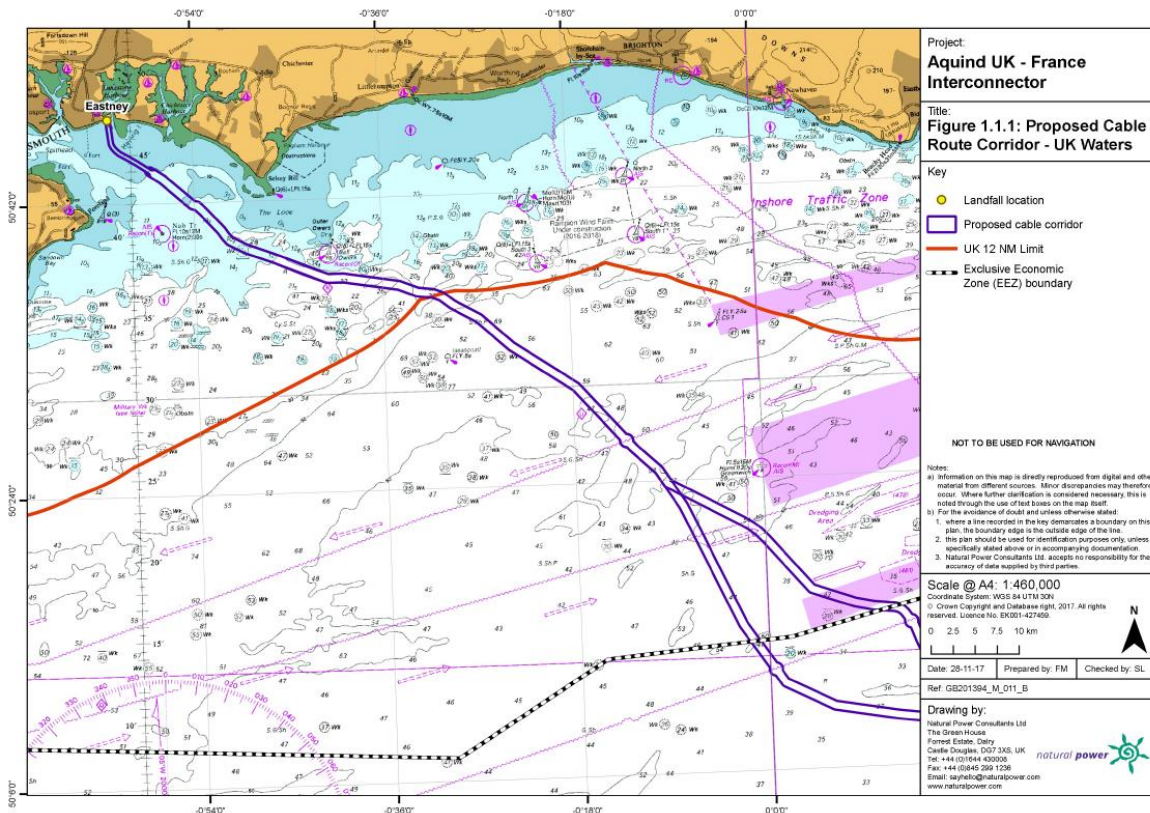
AQUIND Limited (the ‘Proposer’ hereafter) is intending to submit applications for planning permission and marine consent (the ‘Application’ hereafter) for the development of a new subsea and underground High Voltage Direct Current (HVDC) power cable transmission link between Normandy in France and the south coast of England.

The development will include four HVDC subsea cables, which shall be installed as two bundled pairs or four single cables, along with fibre optics data transmission cables, which will either be integrated within the subsea cables or installed alongside them within a shared trench.

## 2. Location

The proposed Aquind Cable will make landfall in Eastney, East Hampshire in the UK, and either Pourville or Dieppe in France (as there are two cable route options), which are displayed in Figure 1 below.

**Figure 1:** Indicative cable route corridor options in UK waters.



### 3. Environmental Impact Assessment (EIA)

Council Directive 2011/92/EU (as amended) on the assessment of the effects of certain public and private projects on the environment (“the EIA Directive”) aims to protect the environment and the quality of life by ensuring that projects which are likely to have significant environmental effects by virtue of their nature, size or location are subject to an EIA before permission is granted.

The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) (“the Regulations”) transpose the EIA Directive into UK law for marine licence applications.

Pursuant to Regulation 5 of the Regulations, it was agreed between the Marine Management Organisation (MMO) and Aquind Limited that the proposed works constitute an EIA development.

Therefore, the application required for the proposed works for a marine licence under Part 4 of the Marine and Coastal Access Act 2009 (“the Act”) will be accompanied by an Environmental Statement (“ES”).

## 4. Scoping Opinion

Pursuant of regulation 13 of the Regulations, Aquind Limited have requested a Scoping Opinion from the MMO. In so doing a Scoping Report entitled “UK-France HVDC Interconnector EIA Scoping Report” has been submitted to the MMO for review.

The MMO agrees with the topics outlined in the Scoping Report and in addition, have outlined the following aspects to be considered further during the EIA process and to be included in any resulting Environmental Statement.

### 4.1. General Comments

- 4.1.1. Statements and conclusions included in the ES must be supported by recent empirical evidence or scientific publications. If it is necessary to make conclusions based on expert judgements this must be clearly described and discussed in the text. Furthermore, the level of uncertainty/confidence associated with each significance assessment must clearly present the type of evidence used and state how it was incorporated into the assessment.
- 4.1.2. The Proposer plans to gather evidence from a range of sources, including: their own geophysical, geotechnical and benthic surveys. The planned surveys appear appropriate; however details are not included in the document. Standard practices for the preparation and gathering of evidence must be adhered. The MMO requires full details of quality standards and assurance methods to be detailed in the ES.
- 4.1.3. The scoping report provides an appropriate overview of potential impacts on relevant receptors that might derive from the proposed project. The MMO notes that there is not a definitive method statement with regard to cable installation, as cable route surveys have yet to be completed and analysed, in order to inform final cable route design. Therefore, the total footprint of the cable route and any associated cable protection (if required) is not yet known.

The ES must clearly describe all potential methodologies of cable installation being considered, and a realistic worst-case-scenario footprint of the cable and any associated cable protection, to aid understanding of the type and scale of impacts of the project as a whole.

- 4.1.4. The MMO supports the use of Horizontal Directional Drilling (HDD) as a preferred method of cable landfall installation.
- 4.1.5. The EIA scoping report provides an outline of the various impacts that might occur, both directly and indirectly, from the proposed works. The EIA must examine these pathways in further detail, and quantify the magnitude of each impact and its significance, as well as propose mitigation measures where required.

4.1.6. The ES must include an assessment of the proposal's compliance with all relevant plans and policies, including the South Inshore and Offshore Marine Plans, and the Marine Policy Statement. Further information regarding Marine Plans can be found here: <http://mis.marinemanagement.org.uk/south> and <https://www.gov.uk/government/collections/marine-planning-in-england>.

## **4.2. Habitats Directive / Wild Birds Directive**

4.2.1. The potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement must be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EclA) have been developed by the Institute of Ecology and Environmental Management (IEEM) and are available on their website. EclA is in the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EclA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal.

4.2.2. Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017, an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.

4.2.3. The MMO considers that this proposal is not directly connected with or necessary to the conservation management of the site and therefore requires a Habitats Regulations Assessment to determine whether there will be a likely significant effect on the European sites listed below. Given the limited information available at this stage on the final design and potential construction/operational impacts, the MMO is of the view that, at present, it cannot be excluded, on the basis of the objective information supplied in the Scoping Report, that the application will have a likely significant effect on the internationally designated sites listed below. This is because there is a risk that it will affect the following features of the designated site(s):

- Benthic habitats; and
- Breeding and non-breeding birds.

4.2.4. In reference to the structure shown in Appendix 1 of the Scoping report, the MMO recommends the inclusion of a separate section of the ES to address impacts upon European and Ramsar sites entitled 'Information for Habitats Regulations Assessment' as this will help the Marine Management Organisation to determine whether the proposal is likely to have a significant effect on the European sites and to undertake an appropriate assessment if required.

### **Special Protection Areas (SPA)**

4.2.5. The works, as set out in the information supplied in the Scoping Report, are near to the following designated Special Protection Areas:

- Poole Harbour SPA extension;
- Chichester and Langstone Harbours SPA;
- Pagham Harbour SPA;
- Solent and Dorset Coast pSPA; and
- Portsmouth Harbour SPA.

4.2.6. The ES must thoroughly assess the potential for the proposal to affect the designated sites listed above.

4.2.7. In Paragraph 5.4.12 of the Scoping Report the list of SPA features is incomplete. The ES must be updated to include the full list of features. Natural England's Designated Sites View website can be utilised to collate the list.

4.2.8. In Tables 5.4.1 and 5.4.2 of the Scoping Report the feature 'Common Tern' has not been included within the list of features for the Chichester and Langstone Harbours SPA or for the Pagham Harbour SPA. This must be considered within the ES.

4.2.9. In Paragraph 5.4.6 of the Scoping Report Poole Harbour SPA extension has now been classified and assessment must be included within the ES.

4.2.10. Throughout the report the Portsmouth Harbour SPA has not been identified as at risk to potential impacts. The risk to the site must be considered within the ES.

4.2.11. Further information regarding the designated sites can be found at the following website: <https://designatedsites.naturalengland.org.uk/>

### **Special Areas of Conservation (SAC)**

4.2.12. The works, as set out in the information supplied in the Scoping Report, is near to the following designated Special Area of Conservation:

- Solent Maritime SAC; and
- Solent and Isle of Wight Lagoons SAC.

4.2.13. The ES must thoroughly assess the potential for the proposal to affect the designated sites listed above.

### **Ramsar Sites**

4.2.14. The works, as set out in the information supplied in the Scoping Report, are near to the following designated Ramsar Sites:

- Portsmouth Harbour Wetland of International Importance under the Ramsar Convention (Ramsar site); and



- Chichester and Langstone Harbours Wetland of International Importance under the Ramsar Convention (Ramsar site).

4.2.15. The ES must thoroughly assess the potential for the proposal to affect the designated sites listed above.

4.2.16. In Tables 5.4.1 and 5.4.2 of the Scoping Report the feature 'Common Tern' has not been included within the list of features for the Chichester and Langstone Harbours Ramsar site. This must be considered within the ES.

### 4.3. Other Designated Sites

#### Marine Conservation Zones (MCZ)

4.3.1. The works, as set out in the information supplied in the Scoping Report, are near to the following designated or proposed (pMCZ) Marine Conservation Zones:

- Offshore Overfalls MCZ;
- Utopia MCZ;
- Offshore Brighton MCZ;
- Kingmere MCZ;
- Bembridge pMCZ; and
- Selsey Bill and the Hounds pMCZ.

4.3.2. The MMO understands that the current proposed cable route will not transect any of the above listed (p)MCZs, however, welcomes the planned assessment for potential impacts on their geomorphological features and benthic communities to be included within the ES.

4.3.3. The Scoping Report states that in the offshore area the HVDC cable route will pass close to the Offshore Overfalls and Offshore Brighton MCZs: the former is partly in English inshore waters (within 12nm of Mean High Water Springs (MHWS)) and the latter is entirely offshore (outwith 12nm of MHWS). If it is possible that either of the MCZs will be impacted by the proposed operations, the EIA must include an assessment of the impacts on the habitats and species of conservation importance for these designated sites. Information on these MCZs is available via the following links:

- Offshore Overfalls MCZ - <http://jncc.defra.gov.uk/page-6776>
- Offshore Brighton MCZ - <http://jncc.defra.gov.uk/page-6775>

4.3.4. The Scoping Report states the cable route passes near to four recommended Marine Conservation Zones (Bembridge rMCZ; East Meridian rMCZ; Norris to Ryde rMCZ and Selsey Bill and the Hounds rMCZ). Two of these sites are now out to consultation as part of the third tranche of MCZ designations: Bembridge rMCZ, and Selsey Bill and the Hounds rMCZ, and now have a proposed MCZ (pMCZ) status. The East Meridian rMCZ and the Norris to Ryde rMCZ have not been taken forward to consultation, however the impacts

to the features of these sites must still be considered, should they be designated in the future.

- 4.3.5. Material consideration must be given to pMCZs and any additional features in existing MCZs out to consultation, as if they are already designated. Information on the above pMCZs and additional features to existing MCZs is available via the following link:  
<https://consult.defra.gov.uk/marine/consultation-on-the-third-tranche-of-marine-conser/>

#### **Sites of Special Scientific Interest (SSSI)**

- 4.3.6. The MMO can confirm that the proposed works are located within the vicinity of the following Sites of Special Scientific Interest:

- Chichester Harbour SSSI;
- Langstone Harbour SSSI; and
- Portsmouth Harbour SSSI.

- 4.3.7. Further information on the above listed SSSIs and their special interest features can be found at:  
<https://designatedsites.naturalengland.org.uk/SiteSearch.aspx>.

- 4.3.8. The ES must include a full assessment of the direct and indirect effects of the proposal on the features of special interest within these sites and must identify such mitigation measures, as may be required in order to avoid, minimise or reduce any adverse significant effects.

- 4.3.9. In Paragraph 5.4.14 and Table 5.4.2 of the Scoping Report Langstone Harbour SSSI has not been identified. This site must be considered within the ES.

- 4.3.10. In Tables 5.4.1 and 5.4.2 of the Scoping Report the feature 'Common Tern' has not been included within the list of features for the Chichester Harbour SSSI and Langstone Harbour SSSI. This must be considered within the ES.

- 4.3.11. Throughout the Scoping Report the Portsmouth Harbour SSSI has not been identified at risk of potential impacts. The risk to the site must be considered within the ES.

#### **4.4. Other Nature Conservation**

- 4.4.1. The ES must thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities to conserve



and enhance biodiversity. Further information on Habitats and Species of Principal Importance is available via the following link:

<http://publications.naturalengland.org.uk/publication/4958719460769792>

- 4.4.2. Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats 'are capable of being a material consideration...in the making of planning decisions'. Therefore, surveys, impact assessment and mitigation proposals for Habitats and Species of Principal Importance must be included in the ES. Consideration must also be given to those species and habitats included in the UK and Hampshire BAPs. For example, construction work could increase suspended sediment concentrations, and this could result in smothering effects on beds of native oysters (*Ostrea edulis*) within the Solent. The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of BAP habitat for the area under consideration.
- 4.4.3. The EIA must include details of:
- Any historical data for the sites affected by the proposal (e.g. from previous surveys);
  - Additional surveys carried out as part of this proposal;
  - The habitats and species present;
  - The status of these habitats and species (e.g. whether BAP priority habitat);
  - The direct and indirect effects of the development upon those habitats and species; and
  - Full details of any mitigation or compensation that might be required.
- 4.4.4. The development must avoid adversely impacting the most important wildlife areas within the area of the project, and must if possible provide opportunities for overall wildlife gain.
- 4.4.5. The onshore elements of this proposal in particular may also have an impact upon species which are protected by the Wildlife and Countryside Act 1981 (as amended) or the Conservation of Habitats and Species Regulations 2017. If any protected species are present within the application area, the ES must include details of:
- The species concerned;
  - The population level at the site affected by the proposal;
  - The direct and indirect effects of the development upon that species;
  - Full details of any mitigation or compensation that might be required; and
  - Whether the impact is acceptable and/or licensable.
- 4.4.6. The MMO agrees that a desk top study of the existing physical and environmental information of data within the area of the cable route and wider region represents a good background which will help to identify the likelihood of nature conservation features which might potentially be present within the development area.

- 4.4.7. The MMO advises that it is critical to provide evidence of sensitive habitats and species present in the area of the cable route: Annex I species and Annex II habitats (under the Offshore Marine Regulations 2007, as amended), UK BAP and OSPAR Threatened and/or Declining Habitats and Species. The MMO must stress that in the survey design, characterisation is best achieved with a combination of acoustic mapping of the seabed followed by targeted ground-truthing using grab sampling and/or seabed imagery. The standard approach for benthic habitat characterisation involves the collection of new, or analysis of existing, acoustic data to identify seabed habitats and seabed features, followed by targeted ground-truthing surveys whose design is guided by interpretation of acoustic data. The MMO recommends the use of Noble-James et al (2017) to inform survey decisions.
- 4.4.8. Where guidelines exist for the detection and quality assessment of particular habitats (e.g. Irving 2009 for stony reef; and Gubbay, 2007 and Limpenny *et al.* 2010 for *Sabellaria spinulosa* reef) then these should be followed.

## 4.5. Marine Mammals and Elasmobranchs

- 4.5.1. The MMO agrees with the Scoping Report that the following impacts to marine mammals have been **scoped in** for further assessment:
- Increased anthropogenic noise from geophysical survey and positioning equipment which emits sound e.g. sonars, sub-bottom profilers, USBL positioning systems and transponder beacons; and
  - Unexploded Ordnance (UXO) removal (if in situ detonations are required).
- 4.5.2. The MMO note that the following impacts on marine mammals have been **scoped out** of further assessment:
- Collision with vessels;
  - Increased vessel noise; and
  - Increased anthropogenic noise from geotechnical investigations, seabed preparation, route clearance, cable lay and burial.

The MMO understands that Natural England has previously reviewed the Proposer's EPS Risk Assessment for geophysical and geotechnical surveying in which they considered that two marine mammal observers would be required in inshore waters to ensure 360 degree coverage is achieved, and that the duration of the pre works marine mammal searches would be 30 minutes in waters less than 200m deep and 60 minutes in waters greater than 200m deep with a mitigation zone of 500m. However, this advice applied to geophysical and geotechnical surveying, and was not provided for seabed preparation, route clearance, cable laying and burial.

The MMO note the Scoping Report's conclusion to scope out 'Increased anthropogenic noise from geotechnical investigations, seabed preparation,

route clearance, cable lay and burial'. The MMO disagree with this conclusion and it must be scoped in. Full details and references must be included within the final ES, as to why the risk of significant impact on marine mammals from these sources is considered to be low. For example, increased anthropogenic noise from geotechnical investigations, seabed preparation, route clearance, cable lay and burial is to be scoped out of the ES on the basis that the maximum impact ranges are likely to be small (< 30m for drilling, suction dredging and cable laying; ≤140m for trenching; <100m for rock placement). The impacts of increased vessel noise are also proposed to be scoped out for similar reasons and that sound from vessels is unlikely to significantly add to existing noise levels from vessels in the Channel.

4.5.3. The MMO welcome the decision to scope in potential impacts arising from UXO removal and note that in-situ detonations will be carried out in accordance with JNCC guidelines. Natural England have developed new draft advice regarding UXOs which can be found in Annex 1 of this Scoping Opinion. Acoustic Deterrent Devices (ADDs) must be used and certain UXOs may require an EPS licence for injury depending upon the expected impacts.

4.5.4. If UXO operations are to be carried out during the course of the project the following must be included in the ES:

- Consideration of the types of UXO likely to be present, the number of detonations likely in a single day, and the season over which these operations are due to occur;
- An informed estimate of potential injury zones and marine mammal numbers within those zones (per species);
- Details of marine mammal monitoring methods e.g. visual detection, Passive Acoustic Monitoring (PAM), designated person;
- Details of the deployment of acoustic deterrent devices;
- Details of monitoring procedures e.g. mitigation vessel, mitigation zone, pre-detonation monitoring, timings and delay procedures;
- Explosive charge sequencing and post detonation searches; and
- A communication protocol and a reporting protocol.

4.5.5. The MMO recommends reviewing the Solent Seals project which monitored the foraging behaviour of harbour seals in the Solent; and the MARINE Life Charm III project for more site specific information regarding marine mammal sightings.

4.5.6. The potential impacts of Electromagnetic Fields must be scoped into EIA when assessing the impacts to Marine Mammals and Elasmobranchs.

## **4.6. Benthic Ecology**

4.6.1. The MMO agrees with the potential impacts on benthic species and habitats that have been considered for inclusion within the ES (Section 5.2.5 of the Scoping Report):

- Seabed disturbance;
- Deposition of sediment;
- Increase in suspended sediments;
- Habitat loss; and
- Seabed disturbance due to operation and maintenance activity.

4.6.2. The MMO notes the following potential impacts on benthic species and habitats have been scoped out from inclusion within the ES:

- Suspension of contaminated sediment;
- Introduction of invasive non-native species; and
- Impacts from Electromagnetic Field (EMF) emissions.

4.6.3. The MMO disagrees with the conclusion that water quality impacts can be scoped out on the basis that 'the potential release of sediment bound contaminants is considered unlikely to result in significant effects as there are no dredge disposal sites within the vicinity of the Proposed Development.

As there are elevated levels of metals and other pollutants within sediments in the area, the benthic surveys that will be carried out along the cable route must also sample for contaminants, focusing on inshore areas where sediments are muddy (i.e. 'A5.23 or A5.24' and 'A5.25 or A5.26') as this is the environment in which contaminants are most likely to be retained and thus mobilised when disturbed. The presence or absence of elevated levels of contaminants in these areas will help to determine whether impacts, and associated receptors, due to the resuspension of contaminated sediments should be scoped in or out of the EIA. If the collection of such data is not feasible, then the Proposer must clarify whether existing data are available on contaminant levels specifically in muddy sediments around the proposed cable route and, if so, confirm that all contaminants were below Cefas action levels within these areas.

4.6.4. The MMO agrees that the introduction of invasive non-native benthic species can be scoped out of the ES (Table 5.2.3 and Section 5.2.10 of the Scoping Report).

4.6.5. A benthic survey campaign will be undertaken along the proposed cable route to characterise subtidal and intertidal habitats and identify any protected benthic features (Section 5.2.16 of the Scoping Report). Based on what is written in Section 5.2.17 of the Scoping Report, it is unclear whether sensitive/protected habitats will be surveyed only if they occur along the corridor or, in addition, if they occur outside the cable corridor but within areas that may be indirectly affected by the proposed works (i.e., within the predicted zone of influence). The former approach would be acceptable, as information on sensitive and protected habitats in nearby designated sites is already available (Table 5.2.1 of the Scoping Report), but the latter would be preferable as contemporary, quantitative data would allow more reliable assessments of potential impacts.

4.6.6. Section 4.10 of the Scoping Report states that mitigation measures will be

identified and incorporated into the design as environmental assessments are developed. It is stated that such measures will be considered if any potentially high magnitude impacts are identified. This approach is reiterated with specific regard to benthic ecology in Table 5.2.3 of the Scoping Report. The MMO agrees that this approach is sufficient.

- 4.6.7. It is not clear from the Scoping Report how intertidal habitats will be surveyed. More information is needed in this regard before the MMO can advise on whether the evidence base is appropriate.
- 4.6.8. There is a lack of consistency in tenses (both past and future tenses used) in Sections 5.2.16 and 5.2.17 of the Scoping Report which makes it unclear whether the benthic surveys used to inform the EIA have already been conducted. The ES must clearly state when surveys were conducted.
- 4.6.9. There is no reference to the use of existing benthic community data in the Scoping Report, and such data will likely not be necessary if surveys of both the cable corridor and nearby sensitive/protected habitats will be conducted. If surveys of nearby sensitive habitats will not be conducted, then existing data on sensitive habitats in nearby designated sites will suffice. This must be clarified in the ES.
- 4.6.10. Details of standard practices for the preparation and gathering of evidence have not been provided in section 5.2 of the Scoping Report. The MMO would expect further details to be presented in the ES with regard to benthic community and contaminant sampling.
- 4.6.11. Section 4.9 of the Scoping Report states that cumulative impacts will be considered. However, there is no indication in Section 5.2 of the Scoping Report that cumulative impacts on benthic species or habitats will be scoped into the EIA. It is not clear whether this is because cumulative impacts on the benthos have not been considered or because there are no plausible cumulative impacts on the benthos. This must be clarified in the ES.
- 4.6.12. Impacts of physical disturbance to seabed geology and morphology are scoped in (Table 5.1.1). Any knock-on effects that such changes may have on benthic habitats and species must be considered under the impact of 'seabed disturbance', which is scoped in with regard to benthic ecology (Table 5.2.3).
- 4.6.13. Impacts due to increased suspended sediments will be scoped in (Table 5.2.3). The ES must include transboundary effects if models (or other evidence) suggests that sensitive receptors and/or designated sites beyond the immediate vicinity of the cable corridor could be affected. It may also be necessary to include the potential transboundary impacts of the suspension of contaminated sediments.
- 4.6.14. The application potentially involves the introduction of hard substrate into a mainly sedimentary environment. Although the changes are not necessarily considered as having a significant impact in this instance, the amount of hard substrate material to be used must be kept to a minimum. The

MMO note that the long-term effect of the introduction of substratum into naturally sandy or muddy sea beds is not fully understood at present, and must be carefully considered.

4.6.15. The ES must include details of the potential cable protection to be used to allow further understanding of their actual nature conservation impact. This must include:

- Location of dump sites;
- Size / grade of rock to be used;
- Tonnage / volume to be used;
- Contingency tonnage / volume to be used;
- Method of delivery to the seabed;
- Footprint of rock
- Assessment of the impact; and
- Expected fate of deposit after end of production, i.e. will it be left in situ or recovered.

4.6.16. Where stabilisation material cannot be avoided, the MMO recommends using a more targeted placement method e.g. fallpipe vessel rather than using vessel-side discharge methods.

## 4.7. Coastal Processes

4.7.1. The MMO agrees with the potential impacts on coastal processes that have been considered for inclusion within the ES:

- Potential direct effects during installation works on seabed geology and features;
- Potential effects on sediment regimes within the vicinity of the proposed development; and
- Potential effects on coastal processes within the vicinity of the proposed development.

4.7.3 The Scoping Report states that the EIA will be based on geophysical data (bathymetry, sidescan sonar, sub-bottom profiling and magnetometer or gradiometer) collected from survey vessels. The Proposer does not plan to make their own wave and tide measurements and will obtain these from pre-existing sources. The MMO agree with this approach given the spatial extent of the project and the requirement to consider the wave climate over an extended period of time (i.e. tens of years).

## 4.8. Shellfish Ecology

4.8.1. The MMO agree with the impacts to shellfisheries that have been scoped in to the ES: temporary habitat loss, major works near a river mouth, temporary increase in suspended sediments, and noise and vibration have been considered to have potential impacts during the installation and decommissioning phases.



- 4.8.2. There is reference to the spider crab (*Maja squinado*) being present within the area of works. *Maja squinado* is now considered to be the Mediterranean species, with *Maja brachydactyla* being present around the UK. The ES must refer to *M. brachydactyla*.
- 4.8.3. The EIA must clarify whether the above potential impact includes consideration to egg-bearing shellfish species such as the edible/brown crab (*Cancer pagurus*) which may be buried along the route of works.
- 4.8.4. During operation, electro-magnetic field effects have also been considered to have potential impacts. Proposed mitigation for EMF includes a likely depth of sediment cover of 0.6m in a cable trench depth >0.9m. The ES must detail what mitigation has been considered should the sediment cover of 0.6m and/or a cable trench depth of >0.9m not be achieved.

## 4.9. Fish Ecology

- 4.9.1. Cumulative and inter-related effects to marine/estuarine and migratory fish as well as commercial fishing must be scoped into the assessment.
- 4.9.2 The Scoping Report has correctly identified potential overlap of the cable corridor with fish spawning and nursery grounds mapped in Coull *et al.* (1998) and Ellis *et al.* (2012); although no charts of the cable route and overlap with indicative spawning / nursery areas are present in the report. In addition, the report has considered fish features of designated sites that are in proximity to the cable corridor (Table 5.3.1 of the report).
- 4.9.3 The Scoping Report refers to some appropriate data sources for inclusion in the ES. These include indicative spawning and nursery ground maps in Coull *et al.* (1998) and Ellis *et al.* (2012), together with International Council for the Exploration of the Seas (ICES)/Marine Management Organisation (MMO) landing data, reports from the Inshore Fisheries and Conservation Authority (IFCA) as well as studies undertaken for other developments.
- 4.9.4 The Proposer is not intending to undertake fish surveys and this approach will be appropriate if sufficient data sources and information are included in the desk-based EIA to ensure that it is robust description of fish receptors and assessment.
- 4.9.5 There data sources recommended in the following points (reference in Annex 2) must be considered in the EIA.
- Migratory fish such as Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta*), lamprey (Petromyzontidae) and European eel adults and elvers (*Anguilla anguilla*), may occur in proximity to the cable route at various times of the year. The MMO recommends that the most recent data is obtained from the Environment Agency's transitional and coastal waters (TraC) Fish Monitoring Programme for inclusion in the EIA, for TraC relevant to the project.

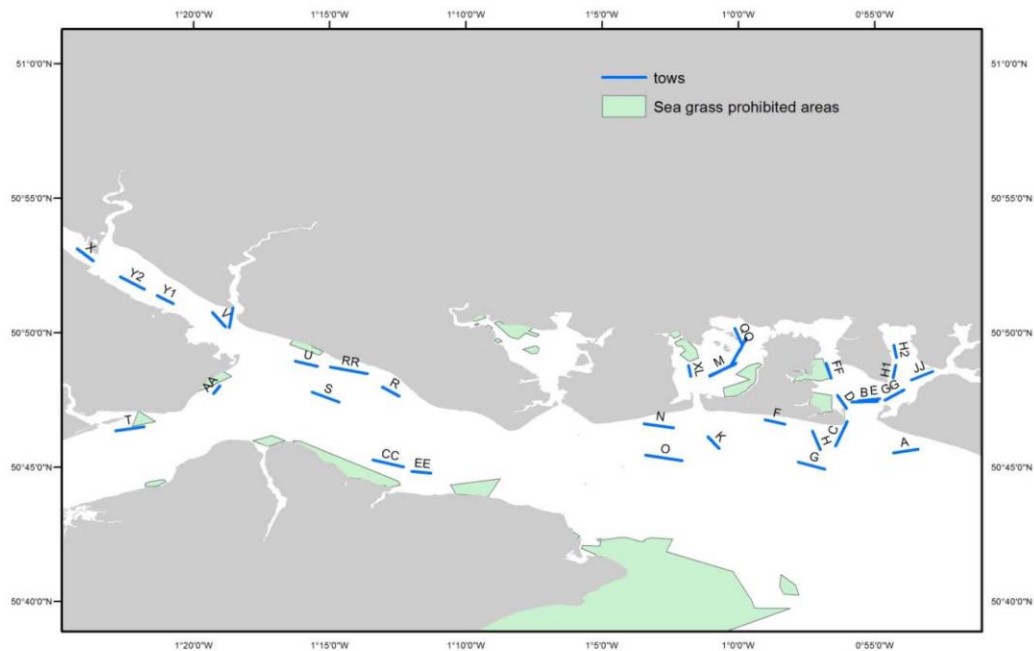
- The Cefas Young Fish Survey provided indices of abundance of small demersal fish for several areas around the UK coastline, including the south coast. The survey particularly targeted juvenile 0-group plaice and sole, prior to their recruitment into the fishery, and the survey time-series concluded in 2010. This data may provide useful information for juvenile fish within inshore areas of the cable corridor. The historic survey series data is reviewed in Rogers et al. (1998) and within a research project that analysed the data and produced a report in 2011 (Cefas, 2011); “Trends in the inshore marine community of the east and south UK coast: 1970s to present”. The project included an assessment of trends in species and community indicators using data on the abundance and distribution of young fish, shellfish and epibenthos in inshore habitats. A summary of the report is available and Appendix 1 of the report contains relative abundance maps of commonly caught fish species.
- Data on the fish community within Langstone Harbour (including Eastney Point) has been collected through the Small Fish Survey since 2012. The 2012-2017 survey reports by the Langstone Harbour Board are available online<sup>1</sup>.
- The Fish Atlas of the Celtic Sea, North Sea and Baltic Sea (Heessen *et al.*, 2015) provides an overview of 40 years of information collected from internationally coordinated and national surveys to present data and information on the recent distribution and biology of demersal and small pelagic fish in these ecoregions. It may provide the Proposer with a useful resource of information on fish receptors.
- There are designated nursery areas for seabass (*Dicentrarchus labrax*) in Portsmouth, Langstone and Chichester Harbours. The Solent Seabass Pre-recruit Survey has been undertaken since 1983 and is aimed at providing abundance indices of 2-4 year old seabass (refer to Figure 2 for sampling locations). The catch density of other species taken is also recorded. The survey has been undertaken twice yearly during May and September for most years up to 2009. Since then, one September survey each year has taken place. The abundance, age and length of seabass is recorded from fishing stations on a standard grid in Southampton Water and the Solent, using a standard bass trawl. Solent Seabass Pre-recruit Survey data for 2017 is currently available<sup>2</sup> and Pickett *et al.* (2002) provides a description of the survey.

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<sup>1</sup> <http://www.langstoneharbour.org.uk/environment-fish-survey.php>

<sup>2</sup> <Http://data.cefas.co.uk/#/View/18912>

**Figure 2: Sampling locations of the Cefas Solent seabass survey**



4.9.6 Potential impacts scoped into the EIA during installation, operation and decommissioning are appropriate; however, there are additional impacts recommended as follows:

- Seabass are a slow growing species that have suffered a long-term decline in population due to overfishing. As a result of declining stocks, seabass have been placed under special protection measures since 2015 (MMO, 2018). These were introduced as scientific advice identified the need to drastically reduce catches of this species, following an increase in the fishing pressure and a reduction in reproduction (ICES, 2015; ICES, 2017b). The EIA must consider potential impacts to seabass within the context of the current measures i.e. whether any of the activities likely to disturb or potentially impact juvenile fish and nursery grounds. The EIA must consider potential impacts to seabass within the context of the current Defra management measures i.e. whether any of the activities likely to disturb or potentially impact juvenile fish and nursery grounds.
- Sandeel and Atlantic herring (*Clupea harengus*) spawning grounds identified in Coull *et al.* (1998) and Ellis *et al.* (2012) are in the vicinity of the cable route. Sandeel and Atlantic herring lay demersal eggs and these species are of significant ecological and fisheries importance. Therefore, the EIA must adequately assess the potential impacts upon sandeels and Atlantic herring, such as from sedimentation, release of contaminated material and disturbance of spawning habitat.
- The 2016/17 Central North Sea IHLS data is available and indicates herring spawning occurred in the vicinity of the cable route in 2016/17 (Figure 3). It is

advisable that the latest IHLS data for herring larvae is considered within the EIA for assessing potential impacts to herring spawning habitat.

**Figure 3: North Sea herring larvae abundances from the IHLS autumn and winter surveys in 2016 / 2017 (From: ICES, 2017a).**

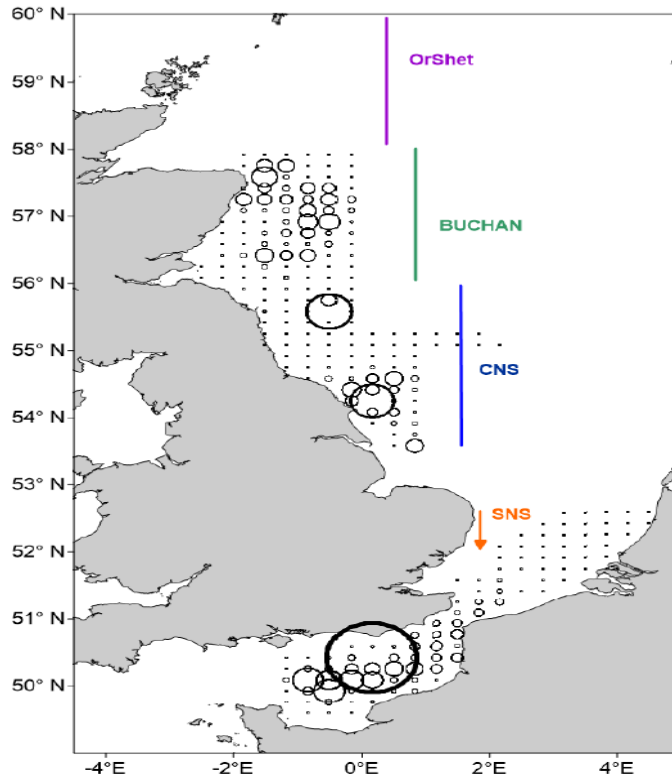


Figure 3.3.2.1: North Sea herring - Abundance of larvae < 10 mm (n/m<sup>2</sup>) in the Buchan, Central and Southern North Sea as obtained from the International Herring Larvae Surveys in autumn and winter 2016 / 2017 (maximum circle size = 20 000 n/m<sup>2</sup>). The survey around the Orkneys was cancelled due to technical problem of the research vessel. The abundance in the Southern North Sea is given as the mean of the three surveys done in December 2016 and January 2017.

- The Proposer may wish to use the methods of MarineSpace *et al.* (2013a; 2013b) for assessments of the potential suitability of habitat for sandeel and Atlantic herring spawning (from the project alone and cumulatively). The MarineSpace *et al.* (2013a; 2013b) methods were applied to assessments produced by the aggregate industry and incorporate regional sediment data sets, VMS data, IHLS data (for herring) and aggregate industry data to assess the suitability of the habitat to support herring and sandeel spawning. The assessments may provide a regional context of Atlantic herring and sandeel habitat availability. The limitations and caveats associated with the assessments should be read and acknowledged if the reports are used. Also, it should be noted that these assessments are currently in the process of being updated with more recently available data.
- An eastern English Channel specific herring spawning assessment (RPS, 2013) was produced for the East Channel Association, which is formed of five UK marine aggregates companies. The report made assessments of herring spawning habitat potential within the East Channel Region (ECR) Licensed Dredging Areas and the wider East English Channel. Herring spawning potential was determined using a weighted ranking system using five datasets

including abundance of newly hatched and older herring larvae (data from 2003 to 2012), probability of recording newly hatched herring larvae and seabed type including proportions of gravels and fine sediments. Based on these factors, herring spawning potential was classified as low, low to medium, medium to high and very high. The report may provide further regional context of Atlantic herring habitat availability, though the limitations and caveats associated with the report and timeliness of the data must be acknowledged if used as an information source for the EIA.

- 4.9.7 There are no mitigation and monitoring for fish receptors detailed in the Scoping Report, which is appropriate given the stage of the application. It is clear from the report that the Proposer will be considering mitigation measures during the EIA, thus any mitigation measures must be clearly described in the ES.

## 4.10. Commercial Fisheries

- 4.10.1. The MMO welcomes the early consideration of mitigation measures for commercial fishing and note the range of measures proposed in Scoping Report. These measures include the following:

- Establishment of a Fisheries Working Group with key fisheries stakeholders to provide a forum for ongoing engagement with the fishing industry;
- Appointing a Fisheries Liaison Officer (FLO) to disseminate installation (and decommissioning) schedule and associated safety risks will be shared through notices to all potential stakeholders;
- Partially installed cable and associated infrastructure that is not fully installed would be marked, possibly guarded and advisory exclusion zones implemented;
- Discussions with relevant vessel owners to determine appropriate mitigation;
- Post maintenance surveys; and
- Accidentally dropped objects and/or debris will be removed.

- 4.10.2. Regarding proposed mitigation measures associated with obstacles and safety risks associated with fishing activities, the MMO suggests this should be expanded to include:

- Communication of post-installation survey and remedial works surveys to the fishing industry;
- Contingency response procedures for reporting of cable exposures post installation;
- Communication of hazard information to Kingfisher; and
- Relevant mitigation and operational arrangements associated with fisheries impacts, disruption and safety to be collated and detailed in a liaison and coexistence plan.

- 4.10.3. With regards to commercial fishing, the Scoping Report has identified a range of appropriate data sources. These include published fisheries statistics for the ICES statistical rectangles of relevance to the proposal, vessel monitoring systems (VMS) data, fisheries surveillance from overflight and surface vessel sightings and consultation with fishermen, particularly from vessels not fitted with VMS.
- 4.10.4. In addition to these sources, the MMO advises the Proposer to consult with Southern and Sussex IFCAs regarding inshore fishing activity in the respective districts, which may improve the commercial fisheries evidence base. The Southern IFCA operates a 12 metre byelaw which limits the size of vessel that can fish within the district. As such, the fishing activity from the vessels, as have been identified in the scoping report, will not be captured by VMS data. Southern IFCA also operates a sightings procedure from its patrol vessel and may be able to provide details of this effort data if required to complement other fishing activity data. Also, the Southern IFCA is engaged in fisheries recovery programs for important shellfish species, particularly the native oyster, which have been mentioned in the protected species section of the report, but which also represents a historically important fishery within the Solent. They are working with a number of partners and have had previous success working with developers on mitigation projects where there is the potential to impact shellfish beds in the area. It may be appropriate to consider this further depending on the route and assessments of impact to the seabed in the area.
- 4.10.5. Analysis of this data, combined with the detailed fisheries liaison should give further insights into the nature of the inshore fisheries and may provide opportunities to avoid certain important areas or seasonal fisheries which occur in the area.
- 4.10.6. The MMO recommends seeking consultation with the industry at the earliest opportunity as the greater the level of consultation the greater the opportunity to mitigate against any impact to the fishing industry. The MMO also recommends working with members of the recreational fishing community. The Solent represents an important areas for both private anglers and for charter vessels providing a platform for recreational fishers.
- 4.10.7. Consultation with this sector will ensure that impacts to both the opportunities to fish recreationally and impacts to the species which are targeted recreationally are mitigated where possible. The Southern IFCA have advised that they may be able to assist with a number of initial points of contact within this sector.
- 4.10.8. If Figure 5.6.1 of the Scoping Report is to be used in the ES, it must be separated out into different charts for different fishing methods and vessel nationalities to make the figure(s) clearer and easier to interpret.

## **4.11. Archaeology / Cultural Heritage**



- 4.11.1. The MMO notes that in paragraph 3.1.5 of the Scoping Report specific attention is directed at the use of geophysical data to provide data to inform the ES and to provide baseline characterisation for the benthic and archaeological impact assessments. The MMO would add that geotechnical data acquisition which is sufficient to support palaeo-environmental analysis, is also directly relevant to the preparation of the ES, as explained in paragraph 5.9.17.
- 4.11.2. Paragraph 3.1.7 of the Scoping Report explains the action to remove seabed debris that might be considered a hindrance to cable installation and the MMO adds that archaeological assessment will be necessary prior to route clearance to ensure that any anomalies of known or possible archaeological interest are avoided. The MMO also notes the explanation in paragraph 3.1.9 that workboats could deploy Remotely Operated Vehicles (ROVs) or utilise geophysical survey and positioning equipment to monitor the progress of the works and we add that such measures should also be used to support anomaly investigation to aid determination of archaeological interest.
- 4.11.3. Section 5.9 of the Scoping Report sets out an approach to determine baseline conditions in reference to national desk-based sources of information (e.g. UK Hydrographic Office archives and the National Heritage List for England) and that assessment procedures will be informed by the relevant published professional guidance e.g. Chartered Institute for Archaeologists. The MMO notes the recognition in paragraph 5.9.6 regarding the high concentration of wreck (vessel or aircraft) associated with the Solent area.
- 4.11.4. The details regarding known wrecks, as set out in paragraph 5.9.10 provides a starting point for the assessment exercise including action to corroborate available national and local historic records with geophysical data acquired for this proposed development (i.e. as set out in paragraph 5.9.19).
- 4.11.5. The ES must clearly explain the processes and procedures for data analysis and interpretation that enables identification of possible impact that might be direct or indirect, negative or positive. Following this analysis the ES must set out the full set of necessary mitigation measures, such as preparation of an archaeological WSI, should consent be obtained. It is the purpose of a WSI to steer the final design of this interconnector cable project in reference to the full suite of survey techniques that will be employed at that stage. Other appropriate mechanisms must then be explained, such as the use of an archaeological reporting protocol should any discoveries occur during implementation (this risk is clearly explained within paragraph 5.9.15) and how all relevant project documentation used by any contractor or sub-contractor will utilise the reporting protocol and spatially identify any Archaeological Exclusion Zones.
- 4.11.6. Section 5.9 of the Scoping Report gave insufficient attention to the potential to encounter either unknown or known heritage assets at the proposed cable landfall at Eastney (near Portsmouth, Hampshire), with particular reference to any aspects of the proposed project (e.g. as described in the paragraphs under “Landfall cable installation and protection”) that may

occur within defined area of Fort Cumberland scheduled monument (and Grade II\* listed building) or in close proximity to this scheduled monument. An appropriate assessment of risk and planning of survey work must be provided in the ES, given that there are surviving remains of both Fort Cumberland and the earlier Eastney Fort that exist as upstanding structures and as buried archaeological deposits, both within and immediately outside the scheduled areas.

- 4.11.7. In reference to the advice already provided by Historic England regarding the EIA Scoping Report for the proposed Aquind interconnector cable (*Eastney Beach, Request for EIA Scoping – UK/France HVDC Interconnector; Landfall and Cable Routing*), the MMO advises that all options to choose a route that will not impact the Fort (either physically impact or impact it through development within its setting) are to be explored as part of this EIA exercise and reported through the ES.
- 4.11.8. The MMO advises the Proposer of the obligation to report any recovered wreck material to the MCA Receiver of Wreck, and to take any recovered wreck to a UK port only. A significant breach of this legislation may also constitute an offence under UK law.

## 4.12. Navigation / Other Users of the Sea

- 4.12.1. The MMO notes that the Scoping Report includes a chapter on Human Environment (Shipping and Navigation) which states that a Navigational Risk Assessment (NRA) will be undertaken as part of the EIA. The NRA must include a baseline study, which summarises the available background navigation data and focuses on any key shipping routes and / or anchoring areas and fishing activity in the vicinity of the cable corridor. It must be noted that a considerable amount of recreational boating activity in this area, particularly during the summer months when it likely that this cable will be laid and this must be factored into the NRA.
- 4.12.2. The NRA must also include appropriate risk mitigation measures and a detailed methodology, to ensure the risk remains reduced to 'As Low As Reasonably Practicable' (ALARP). This must include assessments on collision risk, emergency response, marking and lighting during the works and the promulgation of Notices to Mariners.
- 4.12.3. The NRA must include considerations for the effects on vessel navigation and communication equipment, as well as any electromagnetic deviation on ships compasses. The MMO will accept a three degree deviation for 95% of the cable route. For the remaining 5% of the route no more than five degrees will be attained. The MMO would however expect a deviation survey post the cable being laid; this will confirm conformity with the consent condition (if given). The data must also be provided to the UKHO via a

hydrographic note (H102), as they may want a precautionary notation on the appropriate Admiralty Charts.

- 4.12.4. Particular attention must be paid to cabling routes and burial depth for which a Burial Protection Index study must be completed and, subject to the traffic volumes, an anchor penetration study may be necessary. Any consented cable protection works must ensure existing and future safe navigation is not compromised, accepting a maximum of 5% reduction in surrounding depth referenced to Chart Datum.
- 4.12.5. Noting that part of the cable route will transit through the South-Western end of the Dover Traffic Separation Scheme (TSS), a specific Navigation Risk Assessment for the area to be laid within the TSS must be provided in the ES. This will need to include a specific methodology with regards to the cable laying operation, and must be compliant with the International Regulations for Preventing Collisions At Sea 1972 (COLREGs).
- 4.12.6. The MMO notes that the current proposal seeks to lay a section of the pipe through a Separation Area. Under COLREGS Rule 10(e), this area is provisioned for vessels transiting in/out of a TSS, and for vessels in emergency distress, plus also fishing vessels. The use of trawlers and anchors also increases the risk of a cable strike before burial is complete.
- 4.12.7. Rule 10(l) allows for an exemption for a “vessel restricted in her ability to manoeuvre” (defined in Rule 3 to include a cable laying vessel) during a specific cable laying operation. However this exemption may not extend to guard vessels, unless an exemption under Rule 10(k) (vessels engaged in the maintenance of the safety of navigation) can also be sought. The MMO advises the Proposer to undertake full consultation with MCA Dover CNIS, so that operations can be safely managed.
- 4.12.8. The COLREGs are an internationally-accepted treaty and enshrined under UK law. Contraventions of the COLREGs may also constitute an offence and may be liable to prosecution by the MCA Enforcement Unit. Implications of these rules must also be considered within the ES for any future survey or maintenance work both prior and after completion.
- 4.12.9. The MMO notes that the cable route transits through part of the NAB VTS area, which is managed by ABP Southampton in co-ordination with HM Queen’s Harbour Master at Portsmouth.
- 4.12.10. Cable laying operations are likely to impact traffic routes into the Solent area, and so the MCA-chaired NAB VTS area User Group must be fully consulted with at an early stage. The User Group includes other local stakeholders including ferries, dredging operators, harbour authorities, fishing associations and the RYA.
- 4.12.11. Particular emphasis must also be placed on considering any impacts to local military operations out of Portsmouth.

- 4.12.12. The MMO notes that the cable route through the English Channel will have a high probability of encountering unexploded ordnance (UXO) during laying operations. Appropriate safeguards should be put in place by the Proposer for safe disposal and mitigation where needed.
- 4.12.13. The proposed cable route passes through Langstone Harbour Board (LHB) Area of Pilotage Jurisdiction which is illustrated in the chart on the Langstone Harbour website:  
[http://www.langstoneharbour.org.uk/images/upload/files/commercial-pilotage\\_docs\\_pdf\\_336.pdf](http://www.langstoneharbour.org.uk/images/upload/files/commercial-pilotage_docs_pdf_336.pdf). Therefore, consultation must be undertaken with LHB.
- 4.12.14. The RYA coastal Atlas referred to in paragraph 5.8.19 of Appendix 1 of the Scoping Report is copyrighted and the data it contained is available under licence from the RYA. The table shown in Figure 5.8.3 of the Scoping Report is out of date.

### 4.13. Water Quality

- 4.13.1. The MMO disagrees with the Scoping Report's conclusion that marine water quality and Water Framework Directive (WFD) compliance can be scoped out of the EIA. All activities below Mean High Water Springs (MHWS) and within 1 nautical Mile offshore require an assessment of WFD compliance unless they are explicitly exempt.
- 4.13.2. A WFD assessment will be required for all elements of the works that fall within, or have the potential to affect, a WFD water body and any of the protected areas therein (including Bathing Waters and Shellfish Waters). An assessment of water quality impacts must also be included.
- 4.13.3. There are Bathing Waters and Shellfish Waters around the area of landfall. Any sediment disturbances that lead to increases in suspended solids in the water column could potentially affect compliance with the WFD. Suitable evidence of no likely impact will be required for any marine works. Hence, marine water quality and a WFD assessment must be included as a chapter in the ES.
- 4.13.4. The WFD assessment must follow the 'Clearing the Waters for All' guidance, which has been published on <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>. The WFD Assessment must comprise either:
- an explanation of why the activity has been screened out; or
  - an explanation of why all elements have been scoped out, ideally using the scoping template; or
  - an impact assessment. The size and scale of the WFD Assessment should be proportional to the risk posed by the potential works, but the

Proposer must demonstrate that they have assessed the risks and provided mitigation.

#### 4.14. Cumulative Impact Assessment

4.14.1. The EIA must identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. To conduct the assessment of cumulative and in combination effects, the following types of projects must be included (subject to the availability of information):

- Existing completed projects;
- Approved but uncompleted projects;
- Ongoing activities;
- Plans or projects for which an application has been made and which are under consideration by the consenting authorities; and
- Plans or projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.

4.14.2. All potential pathways linking this proposal with other plans or projects to designated features or sensitive receptors within the surrounding sites must be assessed.

4.14.3. Information on transboundary impacts and effects on the environment must be provided in the potential cumulative effects assessment.

4.14.4. A cumulative impact assessment is to be reported in the ES. Therefore, cumulative and inter-related effects on marine/estuarine and migratory fish as well as commercial fishing must be scoped into the assessment.

4.14.5. Within the cumulative assessment, aggregates dredging must be included in the list of projects/activities for assessment. There are several operational aggregate extraction sites off the South Coast and within the Eastern English Channel which are in proximity to the cable corridor. Further information regarding these sites can be obtained from the British Marine Aggregate Producers Association (BMAPA) at [bmapa@mineralproducts.org](mailto:bmapa@mineralproducts.org) or on their website: <http://www.bmapa.org/index.php>

4.14.6. Should any other projects come to light during the EIA process, these must also be included in the cumulative and in combination assessment of the EIA.

4.14.7. Further information regarding other projects within the general vicinity of the proposal can be found at the MMO Public Register: [https://marinelicensing.marinemangement.org.uk/mmofox5/fox/live/MMO\\_P](https://marinelicensing.marinemangement.org.uk/mmofox5/fox/live/MMO_P)

[PUBLIC REGISTER](#) . Information can also be found on the MMO Marine Information System: <http://mis.marinemanagement.org.uk/>

## 5. Conclusion

The topics highlighted in this scoping opinion must be assessed during the EIA process and the outcome of these assessments **must** be documented in the ES in support of the marine licence application and any associated planning application(s). This statement, however, should not necessarily be seen as a definitive list of all EIA requirements. Given the scale and programme of these planned works other work may prove necessary.

Mark Qureshi  
Marine Licensing Case Officer



## **Annex 1: NOAA Thresholds, UXOs and Marine Mammals – Natural England draft advice on requirement for EPS licence**

Natural England's previous advice around acoustic disturbance has been based on published research by Southall et al., 2007. However, new NOAA (National Ocean and Atmospheric Administration) thresholds were published in 2016 (National Marine Fisheries Service, 2016) superseding the Southall thresholds (Southall et al, 2007). Therefore they represent the most comprehensive and up to date scientific knowledge available to the UK SNCBs in helping to assess the impact of anthropogenic underwater sound on marine mammals. Currently, Natural England advise that NOAA thresholds should now be used in all assessments of underwater noise.

One area where this has made a difference in underwater noise impact assessments in the UK is with regards to unexploded ordinance (UXO) disposal. Both the Southall and NOAA thresholds use a dual criteria to assess underwater sound, using an unweighted peak pressure and a weighted threshold to account for the hearing frequencies of different species. Whilst it is usually accepted that the weighted threshold is best for assessing impacts on different species (which are sensitive to different frequencies), given the nature of an underwater explosion and the shock wave it generates, an explosion can cause hearing damage to an animal no matter their peak hearing frequency. Therefore the more precautionary of the two values should be used (generally the unweighted peak pressure). The change to the NOAA thresholds has meant that the Permanent Threshold Shift (hearing injury) zone from UXOs has increased in size from up to 1 km (based on the Southall thresholds), to up to 15 km for the largest, albeit rare, UXOs based on the NOAA thresholds.

The result of this much greater zone of potential injury is that mitigation needs to be put in place to displace animals for significant distances from the location of the UXO. Use of acoustic deterrent devices (ADDs) is likely to be an important part of this mitigation. The literature concerning ADDs suggests that while 100% exclusion for harbour porpoises can be achieved up to approximately 1 km from the ADD, beyond this distance, while significant reductions in harbour porpoise abundance is recorded up to 12 km, 100% exclusion cannot be guaranteed (e.g. Brandt et al., 2012; Brandt et al., 2013; Dähne et al., 2017). Brandt et al., 2012 conclude that *“these results also highlight that its application will not guarantee the safety of all animals, as not all individuals will react with avoidance reactions.”* The evidence for other species is limited, but a McGarry et al. report (2017) suggests that minke whales react strongly to ADDs, with all tracked whales (n = 15) moving away from an ADD when it was activated 1 km away from the animals. Previous experiments activating the ADD 500 m away from focal animals resulted in such strong reactions, the animals could no longer be followed post deployment of the ADD. There is no literature concerning effects of ADDs on UK dolphin species. Therefore in the absence of data across all species, and the apparent stronger reaction by minke whales, NE suggest that harbour porpoise are used as a proxy for all EPS species until more information becomes available.

All cetaceans in the UK are European Protected Species (EPS), this means that individual animals are protected throughout their range from death, injury and disturbance. Given the above conclusion, it is Natural England's view that based on

harbour porpoise as a proxy, 100% cetacean exclusion from the PTS injury zone cannot be guaranteed by the use of a single ADD, the risk of auditory injury cannot be considered as negligible, and an EPS licence for injury *must* be sought from the MMO.

It should be noted that discussions are ongoing between industry, regulators and SNCBs on the most appropriate suite of mitigation measures for UXO clearance (including the possible use of bubble curtains). Mitigation will depend on the size of UXOs likely to be encountered and the practicality of deployment of the mitigation measure, amongst other factors. SNCBs will provide advice on this on a case by case basis whilst seeking to ensure consistency in approach, meanwhile, the above advice with respect to the need for EPS licence will remain as standard.

#### References:

- Brandt, M.J., C. Höschle, A. Diederichs, K. Betke, R. Matuschek, and G. Nehls. 2013. Seal scarers as a tool to deter harbour porpoises from offshore construction sites. *Mar. Ecol. Prog. Ser.* 475:291-302.
- Brandt, M.J., C. Höschle, A. Diederichs, K. Betke, R. Matuschek, S. Witte, and G. Nehls. 2012. Far-reaching effects of a seal scarer on harbour porpoises, *Phocoena phocoena*. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 23:222-232.
- Dähne, M., J. Tougaard, J. Carstensen, A. Rose, and J. Nabe-Nielsen. 2017. Bubble curtains attenuate noise from offshore wind farm construction and reduce temporary habitat loss for harbour porpoises. *Mar. Ecol. Prog. Ser.* 580:221-237.
- McGarry, T., Boisseau, O., Stephenson, S., Compton, R. (2017) Understanding the Effectiveness of Acoustic Deterrent Devices (ADDs) on Minke Whale (*Balaenoptera acutorostrata*), a Low Frequency Cetacean. ORJIP Project 4, Phase 2. RPS Report EOR0692. Prepared on behalf of The Carbon Trust. November 2017.
- Mikkelsen, L., L. Hermannsen, K. Beedholm, P.T. Madsen, and J. Tougaard. 2017. Simulated seal scarer sounds scare porpoises, but not seals: species-specific responses to 12 kHz deterrence sounds. *R Soc Open Sci.* 4:170286.
- National Marine Fisheries Service. 2016. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing underwater acoustic thresholds for onset of permanent and temporary threshold shifts. NOAA Technical Memorandum NMFS-OPR-55, Silver Spring, MD. 178.
- Southall, B.L., A.E. Bowles, W.T. Ellison, J. Finneran, R. Gentry, C.R. Green, C.R. Kastak, D.R. Ketten, J.H. Miller, P.E. Nachtigall, W.J. Richardson, J.A. Thomas, and P.L. Tyack. 2007. Marine mammal noise exposure criteria. *Aquat. Mamm.* 33:411-521.

## Annex 2: Fish and Shellfish Ecology and Fisheries References

Coull, K.A., Johnstone, R., and Rogers, S.I. 1998. Fisheries Sensitivity Maps in British Waters. Published and distributed by UKOOA Ltd.

Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J. 2012. Spawning and nursery grounds of selected fish species in UK waters. Science Series Technical Report, Cefas Lowestoft, 147: 56 pp.

Heessen, H.J.L., Daan, N. and Ellis, J.R., 2015. Fish atlas of the Celtic Sea, North Sea, and Baltic Sea. Wageningen: Wageningen Academic Publishers.

The International Council for the Exploration of the Sea (ICES). 2015. Sea bass (*Dicentrarchus labrax*) in Divisions IVb and c, VIIa, and VIId–h (Central and South North Sea, Irish Sea, English Channel, Bristol Channel, Celtic Sea). ICES Advice 2015, pp.7.

The International Council for the Exploration of the Sea (ICES). 2017a. Herring Assessment Working Group for the Area South of 62 deg N (HAWG), 14-22 March 2017, ICES HQ, Copenhagen, Denmark. ICES CM 2017/ACOM:07. 856 pp.

The International Council for the Exploration of the Sea (ICES). 2017b. Seabass (*Dicentrarchus labrax*) in divisions 4.b–c, 7.a, and 7.d–h (central and southern North Sea, Irish Sea, English Channel, Bristol Channel, and Celtic Sea). ICES Advice 2017, pp.8.

Marine Management Organisation (MMO). 2018. Bass Fishing Guidance. Available from: <https://www.gov.uk/government/publications/bass-industry-guidance-2018/bass-fishing-guidance-2018> (Accessed 5 April 2018).

MarineSpace Ltd, ABPmer Ltd, ERM Ltd, Fugro EMU Ltd and Marine Ecological Surveys Ltd., 2013a. *Environmental Effect Pathways between Marine Aggregate Application Areas and Sandeel Habitat: Regional Cumulative Impact Assessments*. A report for BMAPA.

MarineSpace Ltd, ABPmer Ltd, ERM Ltd, Fugro EMU Ltd and Marine Ecological Surveys Ltd., 2013b. *Environmental Effect Pathways between Marine Aggregate Application Areas and Atlantic Herring Potential Spawning Habitat: Regional Cumulative Impact Assessments*. Version 1.0. A report for the British Marine Aggregates Producers Association.

Pickett, G.D., Brown, M., Harley, B. and Dunn, M.R. 2002. *Surveying fish populations in the Solent and adjacent harbours using the CEFAS bass trawl*. Science Series Technical Report, CEFAS Lowestoft, 118: 16pp.

Rogers, S. I., Millner, R. S. and Mead, T. A. 1998. The distribution and abundance of young fish on the east and south coast of England (1981 to 1997). Science Series Technical Report, CEFAS, Lowestoft, (108), 130pp.

RPS. 2013. *East English Channel Herring Spawning Assessment*. Version 4. A report for The East Channel Association.