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Dear Sir/ Madam,

## WDC comments on Hornsea Offshore Wind Farm (Zone 4) – Project Two Application

### Summary

The area of Hornsea Offshore Wind Farm (Zone 4) – Project Two is located adjacent to important and critical habitat areas for cetaceans, in particular harbour porpoises and minke whales, and within the potential harbour porpoise SAC. It is anticipated that the potential harbour porpoise SACs, including the one within which Hornsea Offshore Wind Farm (Zone 4) – Project Two is partially located, will be designated by end of 2015; therefore construction is likely to begin after the SAC's have been designated. As a result we would wish it to be considered as a harbour porpoise SAC for the purposes of this application.

WDC has considerable concerns regarding the impacts on cetaceans, especially harbour porpoises, minke whales and white-beaked dolphins, resulting from the development of Hornsea Offshore Wind Farm (Zone 4) – Project Two. Our primary concern surrounds the intense noise pollution resulting from pile driving during construction, for all cetacean species in the region. Site specific surveys carried out by the Applicant have shown the area to be incredibly important for harbour porpoise, this combined with the potential SACs, and the known impacts of pile driving on harbour porpoises, we object to use the use of pile driving for construction.

Alternative foundation types should be adequately assessed as they will have different impacts on the area e.g. the installation of gravity bases will generate much lower noise levels than pile driving, therefore greatly reducing the impact on cetaceans.

Our concerns are particularly related, but not isolated, to noise especially during the construction phase as this is the stage where there is the greatest potential to negatively impact cetaceans. Noise pollution has the potential to displace animals and populations, interfere with normal behaviour and, at very high intensities, be physically damaging. All cetaceans are offered 'strict protection' under the Habitats Directive.

Due to the importance of the site for cetaceans, the potential impacts and given the considerable uncertainties that remain if developments are allowed to proceed our key recommendations – a full list is in annex 1 - for Hornsea Offshore Wind Farm (Zone 4) – Project Two are:

- That foundations requiring pile driving are not an option for construction.
- Further assessments are made on alternative foundations to fully understand the potential impacts on marine mammals, and prey species;

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- That a robust impact monitoring strategy (Marine Mammal Monitoring Plan) is developed for the range of species that can reasonably be impacted and a report provided within a reasonable timeframe;
- That the monitoring strategy is appropriate to consider cumulative impacts of other developments that may impact the populations ;
- Activities should be halted when marine mammals approach within a specified distance of operations (mitigation zone).
- Ground-truthing of modelled noise assessment data should be undertaken.
- Should any incident that results in mortality occur during construction, activities should be halted immediately until an investigation can be completed.

### General Comments

WDC are endeavouring to assist with the environmentally sustainable development of marine renewable energy in the UK. Whilst welcoming the Governments' commitment to renewable energy generation, particularly noting the potential consequences of climate change for cetaceans<sup>1</sup>, we have serious concerns about current levels of uncertainty and the possible negative impacts these developments, both individually and cumulatively, may have on cetaceans (whales, dolphins and porpoises) in UK waters (James, 2013).

We recognise the timeframes within which the industry is required to build in order to meet targets is tight and we also recognise the existing technological limitations in using alternative sources to pile driving as well as the lack of established mitigation measures, however, the requirement to understand and mitigate impacts to ensure strict protection of European Protected Species (EPS), including all cetacean species, remains.

We recognise that worse case scenarios have been used when assessing the impact on marine mammals and believe this to be appropriate given the considerable unknowns surrounding the development of the wind farm, but as they are deemed realistic, they should be treated accordingly.

### Location of Hornsea Offshore Wind Farm (Zone 4) - Project Two offshore wind farm

Hornsea Offshore Wind Farm (Zone 4) - Project Two wind farm lies adjacent to two areas that have been identified as an important habitat in particular for harbour porpoises (Clark *et al.* 2010., Dolman *et al.* 2013), an area of importance for minke whales (Clark *et al.* 2010) and the Dogger Bank candidate SAC designated for its sandbank habitat.

JNCC have noted that 'the Dogger Bank region is an important location for the North Sea harbour porpoise population and as such they are included as a non-qualifying feature'. They also note that 'Sand eels are abundant on the flanks of the bank and provide a food resource for ... cetaceans'.

As an Annex II species of the Habitats Directive, requiring that Special Areas of Conservation (SAC) be established for their protection (Green *et al.* 2012), it is anticipated that potential harbour porpoise SACs, including the one within which Hornsea Offshore Wind Farm (Zone 4) – Project Two is partially located, will be designated by end of 2015; therefore construction is likely to begin after the SAC's have been designated. As a result we would wish it to be considered as a harbour porpoise SAC for the purposes of this application.

Natural England raised this issue in their relevant representation, section 4.2.3 and that "*the impacts on the proposed designated features of these sites will become a material consideration with relation to the Habitats Regulations Assessment for the project. This will require either further work during the examination process to assess the impacts on the sites*"

The construction of Hornsea Offshore Wind Farm (Zone 4) - Project Two has the potential to negatively impact these important habitats, and key prey species for the aforementioned cetacean species.

<sup>1</sup> - WDCS and WWF. 2007. Whales in Hot Water. The Impact of a Changing Climate on Whales, Dolphins and Porpoises: A Call for Action. Available at [http://www.wdcs.org/submissions\\_bin/whales\\_hot\\_water.pdf](http://www.wdcs.org/submissions_bin/whales_hot_water.pdf)

## EPS

In Chapter 4 of the ES refers to the EPS Guidance (JNCC *et al.* 2010) which states that “*For most populations of marine EPS in UK waters, the removal of tens, hundreds, and even thousands of animals for the most abundant species (e.g. harbour porpoise), would not result in detriment to the population at FCS*”.

This is a statement that WDC strongly disagrees with. The data available on the distribution and abundance of marine EPS is not of a sufficient scientific standard to enable reasonable estimates of population size, population units or status. Therefore the impacts on harbour porpoise populations as whole cannot be adequately assessed as required by habitats directive.

## Survey methodologies

We have reviewed the marine mammal surveys undertaken as described in Chapter 4 of the ES.

WDC believes that the methodology for boat based surveys used was not adequate for assessing marine mammal numbers. The methodology that was used, and detailed in Section 2.3 of Annex 5.4.1: Marine Mammal Technical Report, is designed for ornithology surveys. Marine mammal surveys that are developed as an add-on to boat based bird surveys are inadequately designed monitoring programmes that cannot provide a sufficient baseline to characterise the environment.

These site specific surveys carried out by the Applicant have shown the area to be incredibly important for harbour porpoise, with densities significantly higher than the surrounding area and wider North Sea. Due to the inadequate methodology as noted above, it is highly likely that the numbers under-represent the numbers of marine mammals in the area.

In section 4.5.1, Chapter 4 of the ES the Applicant has stated that SCANS surveys data have been used to assist with assessing populations, and potential impacts of Hornsea Offshore Wind Farm (Zone 4) - Project Two wind farm on marine mammals. However the SCANS surveys are only one seasonal snapshot in time, with a 10 year gap between collection of datasets. It is not therefore appropriate to be used for estimates of density and finer-scale information are required where such data are not available (Green *et al.* 2012).

WDC are concerned the area covered in the surveys is not adequate enough to fully assess the population of marine mammals that could be impacted by pile-driving. As covered below the impacts of pile-driving on cetaceans has the potential to range up to 80 km from the pile-driving site, much further than the area surveys by the applicant. The marine mammal study area extends to 10 km buffer from the Hornsea Zone, however studies have shown that the noise generated by pile driving causes behavioural changes in harbour porpoises up to 15 km from the source, and mask communication up to 40 km. A 15 km buffer minimum would have preferred for this application, especially due to the sensitive nature of the site for harbour porpoises, therefore WDC do not agree that the study area was sufficient to obtain adequate data on cetaceans that may be impacted by the development.

Due to the importance of the area for harbour porpoise, along with the lack of robust boat based surveys, and limited robust baseline data on harbour porpoise distribution, stock, genetics, population breeding and habitat use, it cannot be concluded the at impacts in Chapter 4 of the ES are correct, and the mitigation adequate. WDC are very concerned that there is insufficient and precise data on which to base impact assessments on cetaceans therefore leading to inaccurate and potentially misleading results.

## Potential impacts

We note in section 4.7 of Chapter 4 of the ES that harbour porpoise, minke whale white-beaked dolphin are determined as high valued ecological receptors (VERs) and believe this to be appropriate for the area.

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WDC is concerned about the potential for cetaceans to be disturbed and displaced, including by the noise introduced into their environment. Noise will be produced throughout the life of the development, including construction, operation and decommissioning, and from associated vessel traffic. Marine renewables impact on cetaceans in ways ranging from collisions to habitat displacement due to the effects of noise and disturbance.

The uncertainties around the consequences of behavioural impacts at a population level should also be considered. The Applicant references the DEPONDS project in section 4.6, Chapter 4 of the ES, for impacts on harbour porpoises; however the project is currently not advanced enough to draw meaningful conclusions.

### *Pile Driving*

WDC note that foundations requiring piling, particularly monopile foundations, are being considered for Hornsea Offshore Wind Farm (Zone 4) - Project Two. We strongly object to the use of pile driving for construction due to the noise levels generated by pile driving and the impacts on harbour porpoises in particular.

Noise levels during construction remain a key concern due to pile driving of monopile foundations. We recognise that worse case scenarios have been used when modelling the noise impact on marine mammals from pile driving and believe this to be appropriate given the considerable unknowns surrounding the development of the wind farm, but as they are deemed realistic, they should be treated accordingly.

Our primary concern surrounds the intense noise pollution resulting from pile driving for all cetacean species using the site. Reactions of harbour porpoises (*Phocoena phocoena*) to the pile driving process for wind development have been recorded at distances up to 15 km from the piling site (Carstensen *et al.*, 2006). Thomsen *et al.* (2006) found that the noise generated by the construction of offshore wind farms was loud enough to be audible by harbour porpoises beyond 80 km from the source and could mask communication at 30 – 40 km. Bottlenose dolphins could exhibit behavioural responses at distances of up to 40 km from pile driving locations (Bailey *et al.*, 2010).

The limited research conducted so far has shown the potential for pile driving to cause behavioural changes in harbour porpoises which leave the area during construction and in some instances did not later return to their usual numbers (Carstensen *et al.* 2006, Skeate *et al.*, 2012). Even where areas have been recolonised, it is not clear if these are the same animals returning or new animals moving into the area. The significance of such disturbance is not understood.

Currently there are no studies to demonstrate the potential impacts of pile driving on other cetacean species; however minke whales (*Balaenoptera acutorostrata*) are very vulnerable to the impacts of intense noise pollution. There was a significant decrease in northern minke whale sightings rates in western Scotland during periods of naval exercises (Parsons *et al.*, 2000). From recordings taken during pile driving in the Moray Firth, Bailey *et al.* (2010) suggested that northern minke whales, and other mid- and low-frequency hearing cetaceans, may exhibit behavioural disturbance up to 50 km away from the source.

WDC note that the maximum construction period of Hornsea Offshore Wind Farm (Zone 4) - Project Two would be 5 years, and the minimum 4 years, in table 4.17 of Chapter 4 of the ES and that marine mammals would be excluded from the site for the duration of the pile-driving.

This is potentially a very high impact in an area of interest for harbour porpoises. The average lifespan of a harbour porpoise is 8-10 years, reaching sexual maturity at 3-4 years and calving every 2 years; therefore the impact of pile driving for 5 years on the harbour porpoise population could be very high as it could cover the lifespan of a porpoise and potentially effect breeding and feeding activity.

WDC note that there could be 2 vessels driving piles at any one time, and that pile-driving will start at

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one site, and then continue at another (which may be adjacent to the pile already being driven or in another area of the wind farm). We are concerned that the cumulative impact assessment does not include pile driving commencing at a second location, whilst the first is still being driven. The impact of the second pile driving location on cetaceans is highly dependent upon the location of the second pile-driving site which is likely to have a different potential area of impact to the first, in addition having a second pile-driving location will increase the noise levels generated and could possibly have a cumulative impact. We recommend that the same consideration is given to marine mammals when the second pile-driving occurs as is given to the first.

WDC has concerns about the accuracy of the modelling identified in Chapter 4 of the ES. WDC note that Southall *et al.* (2007) has been used for noise modelling in the ES, we note that currently this is the only model available to developers, however there are many limitations to this modelling approach, the limitations of the methodology used by Southall are acknowledged in the Southall paper itself, and they are extensive. WDC are concerned that by using this model, and not taking into account current research noted above, that the impact ranges identified by the applicant are inaccurate and misleading.

Taking into account the potential impact ranges from pile driving, the importance of the site for cetaceans and the limitation of the noise modelling WDC are concerned that the conclusions on sensitivity to pile-driving of Chapter 4 of the ES aren't adequate for harbour porpoises in particular, but also other cetaceans. We would suggest that the sensitivity of these species to TTS and behavioural disturbance is higher than noted here and that the sensitivity should be raised.

#### *Operational noise*

Whilst it is anticipated that operational noise levels will be much lower than construction noise, there is no data available on operational noise impacts on marine mammals, so a long-term monitoring plan should incorporate operational noise impacts on cetaceans if the development goes ahead.

#### *Cumulative assessment*

The purpose of the CIA is to try and assess the effects of the development on the North Sea population of harbour porpoise in particular, therefore all other projects that have the potential to impact that population need to be considered. However the applicant has not screened all projects within the range of the North Sea harbour porpoise, specifically the Scottish offshore wind farms which fall into this category. These projects need to be included to give an accurate CIA.

WDC believe that even with these projects included, further mitigation measures are required to reduce the predicted behavioural impacts on harbour porpoise and minke whale that is predicted in the CIA.

As noted above WDC are concerned that the cumulative impact of pile driving at more than one location simultaneously during construction has not been taken into account, we recommend that the same consideration is given to marine mammals when the second pile-driving occurs as is given to the first.

In Natural England's relevant rep, section 5.2.2.2, they also comment on the cumulative impact assessment, stating the CIA does not reflect the impact on the whole North Sea harbour porpoise population, and the Applicant should also present figures for the impact on the population within the boundary that they screen the projects in, "*However, as the SCANS Block U has been used for the spatial assessment of impact, this population number should also be provided, in order to add the relevant context to any discussion, given the differing spatial scale (and therefore differing population estimates) of the MU and SCANS Block U. The reasoning for this is that there are many more activities and projects and, therefore, disturbance potential, that could be affecting the North Sea MU population of harbour porpoise (including, in terms of renewable energy alone, Navitus and Rampion offshore wind farms in*

*English waters, Scottish projects and those further afield in other European North Sea states) than considered in the assessment'.*

### **Mitigation methods**

Currently there are no proven mitigation methods for reducing noise generated during pile driving.

During 2011, Wilke *et al.* (2012) tested five different noise mitigation systems for reducing noise generated during pile driving at a test pile in the Baltic Sea, including various bubble curtains, fire hose curtains and a system that uses air bubbles with fixed, firm bubbles of defined size and shape that are connected to a net. All systems resulted in a reduction of the noise generated during pile driving. In relation to marine mammals the results showed that 'in the high-frequency range up to 5,000 Hertz, which is the most sensitive range for marine mammals, the reduction reaches values of up to 25 dB'. Overall the results showed a broad-band reduction of 7-9 dB SEL (Wilke *et al.*, 2012). Although these initial findings are encouraging, they have yet to be proven on a full-scale development.

WDC notes that the JNCC guidance (JNCC, 2010) has been detailed in Chapter 4 of the ES, it specifies, amongst other monitoring and mitigation measures, that soft-starts should be used. However, soft starts are only a reduction in sound source at the initiation of a piling event.

WDC do not consider 'soft-start' to be an adequate mitigation measure to ensure there are no significant impacts. Whilst a common sense measure, soft start is not a proven mitigation technique and so cannot be relied upon to mitigate impacts, especially for developments in close proximity to important habitat areas. Consideration of real-time mitigation measures should include acoustic barrier methods and other techniques.

The applicant states that any soft-start will take place for 30 minutes before ramping up to encourage marine mammals to leave the area, if they are required. As soft start of pile driving has not been proven as a mitigation measure, mitigation out to 700 metres must be in place for prevention of injury.

We are aware of the JNCC protocol for using MMO's to ensure that no marine mammals are within 500m of a pile driving site before commencing pile-driving; we also note the concerns raised that due to the distance from shore of Hornsea Offshore Wind Farm (Zone 4) - Project Two and the rapidly changing sea conditions and that the details of how these surveys will work are still being completed. We feel that 500m is not adequate considering the potential impact range on harbour porpoises from the site and that a range greater than 500m needs to be considered.

The mitigation methods proposed by the applicant may be good enough to reduce the threat of immediate death only. Until mitigation measures to reduce the noise of pile driving are tested for effectiveness, the best method is to avoid pile driving altogether and use alternative foundations. WDC find it unacceptable to have no further mitigation methods proposed to reduce impacts that have been found to be significant in Environmental Impact Assessment terms.

### **In-field monitoring**

**All in-field monitoring should be undertaken during construction and operation to ensure that the proposed population modelling impacts calculated in theory are accurate. Should any more negative impacts occur then the development should be halted. However we note that it is likely that any long-term negative impacts are unlikely to be documented during the timing of construction itself, unless these impacts are dramatic.**

### **Marine mammal monitoring programme**

WDC are aware that the applicant has plans for a marine mammal monitoring programme (MMMP) that will start during construction and continue during the first few years of operation at least. We are pleased to see plans for this programme and request that it continues through to the decommissioning phase and a few years after to fully assess the impacts on marine mammals.

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### **Decommissioning**

WDC note that section 4.6.395 in Chapter 4 of the ES refers to the decommissioning of the wind farm. We recognise that at the moment there are no plans to use explosives during the decommissioning of the wind farm. We strongly recommend this continues to be the case when the detailed plan is drawn up as the use of explosives in decommissioning has the potential to cause physical harm or be lethal to cetaceans (Prior and McMath, 2007).

Should consent be given, an annex of suggested license conditions is attached in annex 1.

We hope you find these comments useful and would be happy to discuss any of these comments further.

Yours Sincerely,



Vicki James  
Science Assistant

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## References

Bailey, H., Senior, B., Simmons, D., Rusin, J., Picken, G., and Thompson, P. M. 2010. Assessing underwater noise levels during pile driving at an offshore wind farm and its potential effects on marine mammals. *Marine Pollution Bulletin* **60**, 888–897.

Carstensen, J., Henriksen, O. D., and Teilmann, J. 2006. Impacts of offshore wind farm construction on harbour porpoises acoustic monitoring of echolocation activity using porpoise detectors (T-PODs). *Marine Ecology Progress Series* **321**, 295–308.

Dolman, S.J., Champion, A., Clark, J., Einfeld-Pierantonio, S., Green, M., Gregerson, S., Hodgins, N., Ritter, F., Tetley, M. and Hoyt, E. 2013. Making space for porpoises, dolphins and whales in UK seas: Harbour Porpoise Special Areas of Conservation as part of a coherent network of marine protected areas for cetaceans. A WDC Report.

Clark, J., Dolman, S. J., Hoyt, E. 2010. Towards Marine Protected Areas for Cetaceans in Scotland, England and Wales. A scientific review identifying critical habitat with key recommendations. A WDCS report.

Green, M., Caddell, R., Einfeld, S., Dolman, S., and Simmonds, M. 2012. Looking forward to 'strict protection': A critical review of the current legal regime for cetaceans in UK waters. A WDCS Science report.

James, V.C. 2013. Marine Renewable Energy: A Global Review of the Extent of Marine Renewable Energy Developments, the Developing Technologies and Possible Conservation Implications for Cetaceans. A WDC Report Available at <http://uk.whales.org/sites/default/files/wdc-marine-renewable-energy-report.pdf>

Parsons, E. C. M., Birks, I., Evans, P. G. H., Gordon, J. C. D., Shrimpton, J. H., Pooley, S. 2000. The Possible Impacts of Military Activity on Cetaceans in West Scotland. *European Research on Cetaceans* **14**, 185-191.

Prior, A., McMath, M.J. 2007. Marine Mammals and Noise from Offshore Renewable Energy Projects – UK Developments. In: Evans, P.G.H. (ed.) 2008. Proceedings of the ASCOBANS/ECS workshop: offshore wind farms and marine mammals: impacts & methodologies for assessing impacts. San Sebastian, Spain, 21st April 2007. ECS special publication series no. 49 Feb 2008.

Skeate, E.R., Perrow, M.R., and Gilroy, J.J. 2012. Likely effects of construction of Scroby Sands offshore wind farm on a mixed population of harbour *Phoca vitulina* and grey *Halichoerus grypus* seals. *Marine Pollution Bulletin* **64**, 872–881

Thomsen, F., Betke, K., Schultz-von Glahn, M., Piper, W. 2006. Noise During Offshore Wind Turbine construction and its effects on Harbour Porpoises (*Phocoena phocoena*) European Cetacean Society 20th Annual Conference.

Wilke, F., Kloske, K., and Bellman, M. 2012. ESRa – Evaluation of Systems for Ramming Noise Mitigation at an Offshore Test Pile.

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## Annex 1

Should consent be given to this proposed development, WDC suggests the following consent conditions:

- That pile driving is not used at all during construction.
- Further assessments are made on alternative foundations to fully understand the potential impacts on marine mammals, and prey species;
- Visual and acoustic monitoring should be ongoing throughout construction.
- Activities should be halted when marine mammals approach within a specified distance of operations (mitigation zone).
- Should any incident that results in mortality occur during construction, activities should be halted immediately until an investigation can be completed.
- Ground-truthing of modelled noise assessment data should be undertaken.
- That a robust impact monitoring strategy (Marine Mammal Monitoring Plan) is developed for the range of species that can reasonably be impacted and a report provided within a reasonable timeframe;
- That the monitoring strategy is appropriate to consider cumulative impacts of other developments that may impact the populations ;
- The Marine Mammal Protection Plan should be developed in consultation with scientists with expertise in the Natura species to ensure that monitoring of the harbour porpoise, minke whale and white beaked dolphin populations contribute to existing monitoring studies, to understand these species use the area and to assess any changes to site use and are appropriate to the level of works.
- Should any incident that results in mortality occur during construction, activities should be halted immediately until an investigation can be completed.
- Collected data are made available to government, and all stakeholders, and that acceptable levels of impact are clearly identified through the Marine Mammal Monitoring Plan and that an adaptive approach is applied, where development is halted should significant impacts be observed.

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