Beatrice Offshore Windfarm

Environmental Statement Addendum

Annex 6C Information to Support

European Protected Species (EPS) Licensing

Beatrice Offshore Wind Limited

Supporting Information in respect of European Protected Species Licensing

DRAFT

1. BACKGROUND

1.1 Beatrice Offshore Wind Limited (**BOWL**) has applied for the necessary project consents (the **Project Consents**) under the Electricity Act 1989, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 to construct and operate a proposed offshore wind farm (the **Wind Farm**) and the associated transmission works (**OfTW**) (including offshore electricity substations (**OSPs**)) (together the **Project**) within the Moray Firth, off the east Caithness coastline.

1.2 In order to undertake piling operations to install foundations in the course of the Wind Farm and OSP construction (the **Licensable Construction Operations**), as described in Section 7: Project Description of the Original Environmental Statement submitted in April 2012, which accompanied the applications for the Project Consents (the **Original ES**), BOWL has been advised by Marine Scotland that a European Protected Species licence (**EPS Licence**) under regulation 44 of the Conservation (Natural Habitats, &c.) Regulations 1994 (the **1994 Regulations**) may be required to ensure no offence is committed pursuant to regulation 39 of the 1994 Regulations. This supporting information is submitted in support of BOWL's applications to the Scottish Ministers (acting through Marine Scotland) for the Project Consents and seeks to demonstrate, should the Project Consents be granted, the information that would be provided in an EPS Licence application, if required. An application for an EPS Licence authorising the Licensable Construction Operations for the duration of the construction of the Project (the **Application**) would only be made in the event that the Project Consents have been granted and it has been determined that the Licensable Construction Operations are necessary.

1.3 In preparing this supporting information, BOWL has had regard to the following SNH guidance documents[1]:

1. Interpreting the legal purpose at Regulation 44(2)(e) of the Conservation (Natural Habitats, &c.) Regulations 1994;

2. Interpreting Regulation 44(3)(a) of the Conservation (Natural Habitats, &c.) Regulations 1994; and

3. Application for a licence relating to European protected species: Guidance notes on providing supporting information.

1.4 An EPS Licence can only be granted for specific purposes set out in regulation 44 of the 1994 Regulations. If an EPS Licence is required, the Application would be made for the following purpose: "*imperative reasons of overriding public interest including those of a social or economic nature*" within the terms of regulation 44(2)(e). For the Application to be granted, the 1994 Regulations provide that the Scottish Ministers will need to be satisfied that (within the terms of regulation 44(3)):

1. the Licensable Construction Operations are for a purpose which constitutes "*imperative reasons of overriding public interest including those of a social or economic nature*" (the **Overriding Public Interest Test**);

2. there is no satisfactory alternative to the Licensable Construction Operations (the **No Satisfactory Alternatives Test**); and

[1] Available at http://www.snh.gov.uk/protecting-scotlands-nature/species-licensing/european-species-licensing/

3. the Licensable Construction Operations will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range (the **Favourable Conservation Status Test**).

1.5 This supporting information provides an overview of the proposed Project and the Licensable Construction Operations and then provides material to indicate how compliance with each of the three tests may be demonstrated in support of the Application, if an EPS Licence were to be required.

1.6 BOWL has been advised by Marine Scotland that the EPS Licence may be required in respect of bottlenose dolphins, harbour porpoise, minke whales and other cetacean species likely to occur within the Moray Firth.

2. PROJECT OVERVIEW

2.1 The Project is described in Section7:Project Description of the Original ES, as supplemented by Section 4: Amended Project Description of the addendum to the Original ES (the **ES Addendum**). The description covers a range of parameters within which the final Project must be constructed (this range of design parameters is referred to as the **Rochdale Envelope**). A summary of the Rochdale Envelope is set out below.

2.2 The Wind Farm is to be located within a site of approx 131 sq km (19 km long and 9 km wide) on the north-westernmost point of the Smith Bank in the Outer Moray Firth. It is at a distance of approximately 13.5 km from the east Caithness coastline, 25 km from Wick. The OfTW include cables, OSPs and other structures within the Wind Farm site and also the cables to connect the Wind Farm to an onshore substation, up to the landfall point. The cable corridor will run from a point on the south edge of the Wind Farm Site continuing almost due south for 65 km to a landfall point on the line of the Mean High Water Spring, west of Portgordon. The width of the cable corridor varies from 575 m to 1.54 km.

2.3 The Wind Farm lies entirely within Scottish Territorial Waters (up to 12 nautical miles). The OfTW lies mainly within Scottish Territorial Waters although a portion lies within Scottish Offshore Waters (12-200 nautical miles).

2.4 The Wind Farm comprises:

- up to 277 wind turbine generators (sufficient to generate up to 1,000 MW of electricity), spaced no less than 642 m apart with a maximum height to blade tip of up to 198.4 m and a minimum blade clearance of 25.4 m:
- inter-array cables;
- up to three meteorological masts;
- metocean equipment; and
- all foundations, substructures, fixtures, fittings, fixings, protections and cable crossings.

2.5 The proposed OfTW will comprise:

- up to three subsea export power cables, depending on the final Wind Farm design, approximately 65 km in length;
- up to three OSPs; and
- all foundations, substructures, fixtures, fittings, fixings, protections and cable crossings.

2.6 It is proposed that the operation of the Wind Farm will involve the generation of up to 1,000 MW of electricity.

3. THE LICENSABLE CONSTRUCTION OPERATIONS

3.1 If an EPS Licence were to be required, the Application would be made for the Licensable Construction Operations and in respect of bottlenose dolphins, harbour porpoises, minke whales and other cetacean species likely to occur within the Moray Firth.

3.2 Within the Rochdale Envelope there are a number of permutations for the development of the Wind Farm and OSPs, including for the Licensable Construction Operations. The scope and extent of the Licensable Construction Operations assessed in [Section 12: Wind Farm Marine Mammals of the Original ES (including the mitigation described in Section 12.4 and 12.6) and Section 6: Marine Mammals of the ES Addendum (including the mitigation described in Section 6.7)] is considered by BOWL to represent the worst case scenario within the Rochdale Envelope parameters in terms of effects (principally due to noise) on marine mammals including bottlenose dolphins, harbour porpoise and minke whales. It is therefore considered that this 'worst case scenario' for the Licensable Construction Options also represents an appropriate basis for this supporting information and is set out in the Table 1 below.

Table 1: Worst Case Scenario for Marine Mammals for the Wind Farm (as presented in Table 12.3 in the Original ES). Note: This only presents the worst case scenario for piling noise as other effects considered in the ES will not be relevant to the Application.

Potential Effect	Worst Case Scenario Assessed
Construction / Decommissioning	
Physical injury, displacement and behavioural effects resulting from pile driving.	Short-term typically up to five hours of actual pile driving for each pile; maximum blow force of 2300 kJ for a maximum of 277 3.6 MW turbines, with each foundation requiring four pin piles, each with a maximum of 2.4 m diameter. Total of 16,000 hammer strikes per foundation with soft start procedures built in to the modelling. 3 x 5 m meteorological mast monopile and 3 x 3 m pin pile OSPs also modelled in noise assessment. Up to two piling vessels operating concurrently at two locations at the western and south western most corners of the BOWL site to represent the closest locations to the SACs (see Figure 12.7 of the Original ES). Using a single vessel piling is assumed to occur continuously over a 3 year construction period; using two vessels, piling is assumed to occur continuously over a 2 year period. These estimates include weather downtime and transfer to and from ports. Noise from inter-array cable lay trenching - range of vessels using tools such rock cutter plough through to water jetting and standard ploughs.
Cumulative	
Cumulative effect	Moray Firth Round 3 Zone worst case scenario of up to six simultaneous pin pile jacket foundations with a maximum pile diameter of 3 m and optimum blow force of 1800 kJ.

4. TEST 1 - OVERRIDING PUBLIC INTEREST

Guidance

4.1 Scottish Natural Heritage (SNH) Guidance states that only public interests will be relevant for the Public Interest Test and generally, only where it is a long term interest. Examples of objectives that the Scottish Government consider to be relevant to meet the Public Interest Test are provided in the Guidance and include:

- where there is clear and demonstrable direct environmental benefit on a national or international scale;
- where failure to proceed would have unacceptable social and/or economic consequences; and
- where the project is of national importance, or, possibly, regional importance.

4.2 SNH Guidance states that, when determining an EPS Licence application, SNH will take into account whether an activity or development is required to meet, or contribute to meeting, a specific need such as maintaining the environment of Scotland's people (including sustainable development and renewable or green energy) and supporting economic or social development (including nationally important infrastructure development projects and employment).

Policy and Legislation

4.3 Renewable energy development enjoys widespread policy support in the UK, and Scotland in particular. Both the UK and Scottish Governments are committed to delivering a secure, sustainable energy supply with renewable energy, and offshore wind in particular, being a key component of that. The Project is also specifically recognised as being a significant contributor to achieving Scotland's and the UK's renewable energy and climate change targets and, as a consequence, to delivering a secure, sustainable energy supply.

4.4 The following paragraphs set out some key policy support for renewable energy projects in general, and for the Project in particular:

4.4.1 The UK Marine Policy Statement 2011 (**UKMPS**) is currently the only marine policy document in effect for the area in which the Wind Farm and OfTW are situated. It includes a presumption in favour of granting consent for sustainable development. A proposal for renewable energy generation is undoubtedly a sustainable form of development therefore there is a presumption in favour of granting consent. However, this has to be weighed against the environmental impacts including the extent to which development will impact on the ecosystem and other activities taking place within the marine environment.

4.4.2 Scotland's National Marine Plan, which is still in draft form, provides that a key priority under the heading of renewables is to "*provide 10 Giga Watts of capacity by 2020 in place and under construction*", the majority of which is expected to be offshore wind. This draft Plan gives clear support in principle to the Project and states that evidence suggests that environmental issues could be addressed through appropriate mitigation measures at project level. A broader finding is that implementing the draft plan could have "*a major and permanent beneficial impact on climate, as it would help to reduce Scotland's greenhouse gas emissions and contribute to future renewable energy targets set by the EU.*"

4.4.3 Scotland's Seas – Blue Seas, Green Energy, published in March 2011, is a sectoral marine plan relating to wind energy developments. It was developed from a draft plan which was subject to a Strategic Environmental Assessment (**SEA**) which assessed ten options for wind energy development, including the Project. The SEA findings in relation to the Project were that it could be progressed between 2010 and 2020 if appropriate environmental mitigation is implemented. Key issues were identified which required to be addressed through appropriate mitigation measures at project level. This Marine Plan, although it has no statutory force, gives unambiguous support in principle to the development of the Project.

4.5 The Project will also deliver a significant proportion of the current renewables target for 2020. The Project will potentially generate up to 1,000 MW of electricity from wind and will therefore make a significant contribution towards the UK Government's 29 GW target set out in the UK Renewable Energy Roadmap 2011. These targets have been adopted to help address the effect of climate change, meet the legal targets contained within the Climate Change Act 2008 and the Climate Change (Scotland) Act 2009, comply with the EU Renewable Energy Directive and meet other EU and international targets and legal obligations. This potential beneficial impact was identified in the SEA for Blue Seas, Green Energy as being of overriding importance, potentially sufficient to outweigh any negative impacts.

4.6 In addition to helping to meet renewables targets, the Project will also generate significant amounts of electricity from wind thereby reducing the need to rely on resources such as gas and coal which are often imported. The Project will therefore make a significant contribution towards the goal of improving energy security which is key to achieving the Scottish Government's central purpose, sustainable economic growth in Scotland. The UK Low Carbon Transition Plan, which presents the Government's plan to tackle climate change, also notes that the development of renewable energy proposals will improve energy security.

Conclusions

4.7 The Licensable Construction Operations are a solution to a fundamental and essential step required for the Project; securing the Wind Farm and OSPs' foundations to the seabed. Applying the relevant guidance, it is clear that renewable energy developments (of which the Project is a significant example) are specifically recognised by SNH as the types of development which can fulfil the requirements of the Overriding Public Interest Test. It is also clear the Project meets all the objectives set out in the SNH Guidance in that it will make a significant contribution to curbing Scotland and the UK's greenhouse gas emissions (required to meet both Scotland and the UK's national and international legal obligations) and will provide a significant and secure supply of electricity which is fundamental to the nationally important aim of delivering and supporting sustainable economic growth in Scotland and the UK. The overriding public importance of the Project is further supported by the clear UK and Scottish policy support for renewables in general, and the Project in particular. BOWL therefore considers that the Licensable Construction Operations clearly meet the Overriding Public Interest Test.

5. TEST 2 - NO SATISFACTORY ALTERNATIVES

5.1 Regulation 44(3) would require the Scottish Ministers to be satisfied that there is no satisfactory alternative before they could issue an EPS Licence for the Licensable Construction Operations. The Rochdale Envelope includes potential alternatives to the Licensable Construction Operations which are discussed in Section 6: Site Selection and Consideration of Alternatives and 7: Project Description of the Original ES.

5.2 If it is determined that the Licensable Construction Operations are the preferred option among the potential alternatives within the Rochdale Envelope and an EPS Licence is required, BOWL would explain why the other potential alternatives are not satisfactory. This explanation would be made with reference to the SNH Guidance referred to above and would likely

consider alternative layouts, scales and programme for the Licensable Construction Operations.

6. TEST 3 – FAVOURABLE CONSERVATION STATUS

6.1 In the event that the Application is made, BOWL would include an up to date assessment to demonstrate that the Licensable Construction Operations will not be detrimental to the maintenance of the population of bottlenose dolphins, minke whales harbour porpoise, and other cetacean species likely to occur within the Moray Firth at a 'favourable conservation status' in their natural range, taking into account the cumulative effects of the Moray Firth Round 3 Zone development.

6.2 The European Habitats Directive (which is given effect in the UK by, among others, the 1994 Regulations) includes the following definitions:

6.2.1 The 'conservation status' of a species means, "*the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations […]*"

6.2.2 The 'favourable conservation status' of a species means:

- "*population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*"

Bottlenose Dolphin (Tursiops truncatus)

Summary of Assessment in Original ES and ES Addendum

6.3 The assessment in the Original ES (as updated by the ES Addendum) concluded that noise arising from piling operations (i.e. the Licensable Construction Activities) is unlikely to cause death or physical injury to animals (see Section 12.5.1.1 of the Original ES). Noise modelling showed that acoustic injury in the form of permanent threshold shift (PTS), based on a fleeing animal, is predicted to occur out to a maximum of 500 m and therefore falls within the project design mitigation zone. Following the Joint Nature Conservation Committee (JNCC) (2010) guidelines, this will involve the use of dedicated marine mammal observers (MMOs) and passive acoustic monitoring (PAM) operatives with the aim of detecting animals within a 500 m mitigation zone prior to commencement of the piling (see Section 12.6 of the Original ES). The prediction of effects of PTS on bottlenose dolphin was based on a precautionary approach using the SAFESIMM model (see PTS onset; Section 12.2.7.9 of the Original ES and Section 6.6.1.1 of the ES Addendum).

6.4 The effect on this species which is most likely to occur, as identified in the Original ES, was the potential disturbance of animals out to a distance of 43.4 km from the source (Table 12.13 in the Original ES). The potential effect was assessed by overlaying the noise contours on the probability of occurrence of bottlenose dolphin map. A more accurate prediction of received noise levels was achieved by looking at the change over the area of potential effect in 5 dBht increments.

6.5 Due to the uncertainties associated with long term effects on this population in the Original ES, in preparing the ES Addendum, further population modelling was undertaken using a population viability analysis (PVA) to predict the distribution of population size after 25 years

following exposure of the population to piling noise. This was based on the best available demographic and life history parameters and assumed a stable or increasing population as a baseline (i.e. in line with the latest Site Condition Monitoring Report for the Moray Firth SAC; Cheney et al., 2012). Although there were a number of caveats highlighted with respect to the modelled estimates of bottlenose dolphin densities across the Moray Firth (see Section 6.6.1.1 of the ES Addendum), these densities were necessary to feed into the population modelling and were also the best estimates available at the time of modelling. In particular, the density estimates did not reflect the fact that bottlenose dolphins are more regularly encountered in groups as opposed to singularly. As a result, modelled density estimates across the Moray Firth were likely to overestimate numbers in offshore areas whilst recent work has provided robust empirical evidence that bottlenose dolphins rarely occur in offshore parts of the Moray Firth (Appendix 2 in Annex 12A of the Original ES: Bottlenose Dolphin Densities across the Moray Firth). For this reason, the assessment presents a range of estimates, based on lower, best and upper fit models as described in the ES Addendum (Section 6.6.1.1).

6.6 Different construction scenarios were modelled ranging from the worst case spatially (largest area of ensonification) to the worst case temporally (longest duration of piling). The model was run to predict the population of bottlenose dolphin after 25 years, to reflect the potential operational lifespan of the Wind Farm. The outputs of this modelling are summarised in Section 6: Marine Mammals of the ES Addendum (see Section 6.6.1.1), and the main conclusion was that for all modelled piling scenarios, in the long term, the population is predicted to be stable or increasing and therefore no long term effects on the Moray Firth bottlenose dolphin population were predicted (i.e. no significant long term negative effect under the EIA Regulations; Section 6.6.1.1 of the ES Addendum). Although the model is run over a 25 year period, this does not reflect the time to recovery, and based on the potential ecological effects on bottlenose dolphin in the Moray Firth and evidence from studies of operational wind farms in the North Sea, full recovery (to baseline levels) is likely to occur over the medium term (<3 years) with animals returning to the disturbed area immediately following cessation of the piling. The PVA was based on a range of different cumulative piling scenarios and therefore includes piling at both the Wind Farm and Moray Firth Round 3 Zone sites.

Favourable Conservation Status

6.7 The bottlenose dolphin population within the Moray Firth is currently considered to be a stable or increasing population, as reported in the latest Site Condition Monitoring Report for the Moray Firth SAC (Cheney et al., 2012). Bottlenose dolphin modelling showed that there could be a temporary (i.e. during the piling phase) reduction in reproductive output of the bottlenose dolphin due to piling, as a result of behavioural displacement effects (Section 6.6.1.1 of the ES Addendum), though in the long term, the population is predicted to recover to baseline levels of a stable, or increasing population. This population will therefore continue to be "*maintaining itself on a long term basis as a viable element of its natural habitats*", as defined by the first favourable conservation status test.

6.8 The assessment in the Original ES predicted that, based on the best-fit dose-response curve, 19 individuals may be displaced per year over the three year, single piling scenario for the Wind Farm alone, or 20 individuals may be displaced per year over the two year, concurrent piling scenario at the Wind Farm (Table 6.5 in the ES Addendum). The range of displacement per year varies between 1 and 33 individuals based on the lower- and upper- fit dose response curves respectively.

6.9 Bottlenose dolphin generally occurs in coastal areas, with the majority of sightings occurring within the Moray Firth SAC and along the southern coast of the Moray Firth. Noise modelling showed that piling was predicted to primarily affect offshore areas (i.e. around the Wind Farm) and to the north coast of the Moray Firth since the noise contours did not extend into areas where there were higher probabilities of occurrence. Furthermore, piling at the Wind Farm is not predicted to create a barrier to bottlenose dolphin movement to the Moray Firth SAC from

the wider North Sea (Original ES, Section 12.9.4). Piling at the Wind Farm will therefore not reduce the range of this population of bottlenose dolphin, with the "*natural range of the species neither being reduced nor likely to be reduced for the foreseeable future*", as defined by the second favourable conservation status test.

6.10 As detailed above, the most important areas for bottlenose dolphin in the Moray Firth occur in coastal areas, along the south coast and particularly within the Moray Firth SAC, where the majority of individuals of this population occur. These areas will not be affected by piling noise at the Wind Farm with piling related behavioural effects only predicted to occur in offshore areas and along the north Moray Firth coast. The majority of habitat used by this bottlenose dolphin population will therefore not be affected. Furthermore, bottlenose dolphin population modelling has shown that in the long term the population is predicted to recover to baseline levels of a stable or increasing population following piling operations at the Wind Farm and the adjacent Moray Firth Round 3 Zone site. As such, it is predicted that the third favourable conservation status test, namely "*there is, and will probably continue to be, a sufficiently large habitat to maintain [bottlenose dolphin] populations on a long-term basis*", will be satisfied.

6.11 Piling at the Wind Farm is therefore not predicted to affect the favourable conservation status of bottlenose dolphin.

Harbour Porpoise (Phocoena phocoena)

Summary of Assessment in Original ES and ES Addendum

6.12 As detailed in Paragraph 6.3, the assessment concluded that noise arising from piling operations (i.e. the Licensable Construction Activities) is unlikely to cause death or physical injury to animals (see Section 12.5.1.1 of the Original ES). The assessment concluded that there would be a temporary negative effect of behavioural displacement on harbour porpoise during the piling phase (see Section 12.5.1.1 of the Original ES). For the spatial worst case scenario of concurrent piling, the number of individuals potentially displaced was estimated as 4,350. Based on recent SCANS estimates of the North Sea population of porpoises of 247,631 individuals (Hammond *et al.*, in press) the proportion of the population potentially displaced is 1.76%.

6.13 Harbour porpoise is an abundant, wide-ranging species, which spends much of the time in offshore waters, and is distributed throughout the waters of the British Isles. The assessment considered that temporary displacement during the construction phase is unlikely to have any biological significance on the population and the magnitude of effects was considered to be small. Due to the sensitivity and international conservation status of harbour porpoise, the significance was assessed as minor, and not significant in terms of the EIA Regulations. Long-term effects were considered unlikely to occur and therefore would not be significant.

6.14 Further evidence to support this conclusion has been detailed in the form of a review of relevant literature from monitoring studies of offshore wind farms in the North Sea. These include details on both short/medium-term responses to pile driving and long-term population effects, during construction and immediately post construction. This evidence is provided in Section 6: Marine Mammals of the ES Addendum (Section 6.6.1.1).

Favourable Conservation Status

6.15 As detailed in the sections above, the proportion of harbour porpoise affected by piling at the Wind Farm (i.e. temporary displacement) is small, (i.e. 1.76% of the North Sea population). Although harbour porpoise are frequently recorded in the vicinity of the Wind Farm Site, Moray Firth is not likely to represent a particularly important habitat for the life history of harbour porpoise in the North Sea (i.e. there is no evidence that this part of the North Sea is particularly associated with breeding or nurturing of juveniles). Those harbour porpoise displaced from the Wind Farm Site and surrounding area are therefore likely to have considerable areas of alternative habitats within which they could relocate during piling

operations. Therefore, due to the small proportion of the population temporarily affected, and the availability of alternative habitats in the wider area, the North Sea harbour porpoise population is likely to continue "maintaining itself on a long term basis as a viable element of its natural habitats", as defined by the first favourable conservation status test.

6.16 As described in the Original ES (Section 12.5.1.1), harbour porpoise occur throughout UK waters and the North Sea and whilst piling operations at the Wind Farm Site will lead to temporary displacement of a small proportion of the North Sea population, extensive alternative habitat is expected to occur throughout the North Sea. As such, "*the natural range of [harbour porpoise] is neither being reduced nor is likely to be reduced for the foreseeable future*", as defined by the second favourable conservation status test.

6.17 Similarly, due to the small proportion of harbour porpoise habitat temporarily affected, the third favourable conservation status test is also expected to be fulfilled, i.e. "*there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis*".

6.18 Piling at the Wind Farm is therefore not predicted to affect the favourable conservation status of harbour porpoise.

Minke Whale (Balaenoptera acutorostrata)

Summary of Assessment in Original ES and ES Addendum

6.19 Minke whales occur in the Moray Firth during the summer months where they are often observed along the southern coastline from Spey Bay out to the outer reaches of the Firth. The assessment considered that there would be behavioural displacement during the piling phase, but only a small proportion of their potential range would be affected. The magnitude of effects was considered to be small and based on the sensitivity and international conservation status of minke whale, this could lead to an effect of minor significance, which is not significant in terms of the EIA Regulations. Long-term effects were considered to be unlikely, and are therefore not significant.

6.20 The ES Addendum further assessed the potential for injury to minke whale, using humpback whale as a proxy for the noise modelling, and concluded that noise levels which could elicit the onset of PTS would be relatively localised around the piling locations (see Section 6.6.1.1 of the ES Addendum). As with injury to other cetacean species, if the mitigation measures discussed in Paragraph 6.3 are employed, injury to minke whales as a result of piling operations is unlikely to occur.

6.21 Behavioural displacement of minke whale was predicted to occur as a result of piling operations at the Wind Farm. Based on minke whale density estimates provided by the SCANS II dataset for SCANS block J (i.e. 0.022 animals km^{-2}; Hammond *et al*., in press), up to 113 individual minke whale were likely to experience noise levels sufficient to cause strong avoidance (i.e. 90 dB_{ht}) and up to 329 individuals were likely to experience noise levels to cause significant avoidance by up to 50% of by all individuals (i.e. 75 dB_{ht}), over a 2 year construction period. This equated to 0.59% and 1.73% of the reference population, assuming a reference population of 18,958 individuals across the east and west coasts of Britain and Ireland (i.e. the most recent SCANS II estimate; Hammond *et al.*, in press). These estimates were considered precautionary as these are based on the total count of individuals within each noise threshold, rather than a dose-response relationship and this also assumes that piling is a continuous event over the entire construction period. Full details of the revised assessment on minke whale, based on the additional noise modelling, are presented in Section 6.6.1.1 of the ES Addendum.

6.22 Based on the noise modelling results and sensitivity assessment presented in the ES Addendum, a short to medium-term effect of moderate significance was predicted, with no

long-term significant effects, since the population is predicted to recover to baseline levels following cessation of piling.

Favourable Conservation Status

6.23 As detailed in the sections above, the proportion of minke whale affected by piling at the Wind Farm (i.e. temporary displacement) is small, (i.e. 1.73% of the European population of minke whale). Although minke whale are frequently recorded in the vicinity of the Wind Farm Site, the Moray Firth is not likely to represent a particularly important habitat for the life history of the European population of minke whale (i.e. there is no evidence that Moray Firth is particularly associated with breeding or nurturing of juveniles). Minke whale predicted to be displaced from the Wind Farm Site and surrounding area are therefore likely to have considerable areas of alternative habitats within the North Sea where they could relocate during piling operations. Therefore, due to the small proportion of the population temporarily affected, and the availability of alternative habitats in the wider area, the minke whale population around the coasts of Britain and Ireland is likely to continue "*maintaining itself on a long term basis as a viable element of its natural habitats*", as defined by the first favourable conservation status test.

6.24 As described in the ES Addendum (Section 6.6.1.1 of the ES Addendum), minke whale are widely distributed along the Atlantic coastline of Britain and Ireland as well as in the northern and central North Sea. Whilst piling operations at the Wind Farm site will lead to temporary displacement of a small proportion of this population, extensive alternative habitat is expected to occur along the Atlantic coastlines and throughout the North Sea. As such, "*the natural range of [minke whale] is neither being reduced nor is likely to be reduced for the foreseeable future*", as defined by the second favourable conservation status test.

6.25 Similarly, due to the small proportion of minke whale habitat temporarily affected, the third favourable conservation status test is also expected to be fulfilled, i.e. "there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis".

6.26 Piling at the Wind Farm is therefore not predicted to affect the favourable conservation status of minke whale.

Other Cetacean Species

Background Information

6.27 Other cetacean species likely to occur within the Moray Firth include common dolphin (*Delphinus delphis)*, white-beaked dolphin (*Lagenorhynchus albirostris)* and Risso's dolphin (*Grampus griseus*), all of which were recorded at low abundances during site specific marine mammal surveys (see Section 12 of the Original ES, section 12.3.2.4). Densities of these three dolphin species in the Moray Firth and at the Wind Farm Site were not estimated as there were too few sightings. For example, white-beaked dolphins were recorded in just two of the five site-specific visual surveys (aerial and boat based) in the study area with just two sightings made during the Aberdeen University aerial survey and three sightings during the MORL boat-based survey. Similarly, the total number of sightings over the five visual surveys for common dolphin were 10 (6, 3 and 1), and for Risso's dolphin were two (1 and 1) (Table 3.1 in Thompson and Brookes, 2011). This is in comparison to a total of 88 sightings of bottlenose dolphin and 659 sightings of harbour porpoise for the visual surveys.

6.28 Atlantic white sided dolphin (*Lagenorhynchus acutus*), which were not recorded during any of the five visual surveys, are also known to occur within the Moray Firth, though since the distribution of this species is primarily concentrated along western coasts of Britain and Ireland, this would only be likely to occur at low abundances in the Moray Firth (Reid *et al*., 2003).

Favourable Conservation Status

6.29 As discussed above, these dolphin species would only be expected to occur at low abundances in the Wind Farm Site and the wider Moray Firth, with these species primarily distributed to the west and north of Britain and Ireland. Only a small proportion of the European population of these species would therefore have the potential to be affected by piling at the Wind Farm (due to the low abundances recorded, it was not possible to accurately determine the number of individuals potentially affected). Furthermore, there is no evidence to suggest that the Moray Firth represents a particularly important habitat in the life history of the European populations of these dolphin species (i.e. there is no evidence that Moray Firth is particularly associated with breeding or nurturing of juveniles). White-beaked dolphin are known to occur at higher densities in deeper, colder waters of the central and northern North Sea (i.e. SCANS Blocks V and J) than the shallower, southern North Sea, though highest densities of this species are recorded off the west coast of Scotland (Hammond *et al.*, in press). Therefore, due to the small proportion of the population temporarily affected and the availability of alternative habitats in the wider area (e.g. to the west and north), the populations of these four dolphin species (i.e. common, white-beaked, Atlantic white-sided and Risso's dolphins) are likely to continue "maintaining itself on a long term basis as a viable element of its natural habitats", as defined by the first favourable conservation status test.

6.30 As described in the ES (Section 12, section 12.3.2.4), these dolphin species are widely distributed primarily along the Atlantic coastline of Britain and Ireland, with white-beaked dolphin also distributed throughout the northern and central North Sea. Whilst piling operations at the Wind Farm site may lead to temporary displacement of a small proportion of this population (primarily due to the low abundances of these species in the Moray Firth), extensive alternative habitat is expected to occur along the Atlantic coastlines and (for white-sided dolphin) throughout the North Sea. As such, "the natural range of [common, white-beaked, Atlantic white-sided and Risso's dolphins] is neither being reduced nor is likely to be reduced for the foreseeable future", as defined by the second favourable conservation status test.

6.31 Similarly, due to the small proportion of common, white-beaked, Atlantic white-sided and Risso's dolphin habitat temporarily affected, the third favourable conservation status test is also expected to be fulfilled, i.e. "there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis".

6.32 Piling at the Wind Farm is therefore not predicted to affect the favourable conservation status of common, white-beaked, Atlantic white-sided and Risso's dolphins.

7. MITIGATION MEASURES

7.1 As detailed in the Original ES (Section12.4), the project has been designed to incorporate a 'soft-start' procedure for piling activities during construction. In this way pile driving does not start at full power but builds up to full power, thereby allowing opportunity for animals to flee the area and minimising the risk of lethal effects or injury. These soft-start procedures will be for a period of no less than 20 minutes, as recommended by the JNCC pile driving protocol (JNCC, 2010), though a detailed protocol for soft-start will be designed as part of the construction programme and provided with the EPS Licence Application, should this be required.

7.2 Details of mitigation measures to be adopted to minimise effects on marine mammal species (including EPS) are presented in Section 12.6 of the Original ES.

7.3 The mitigation proposed for reducing the impacts of piling noise on marine mammals the measures described in the Original ES. In summary this involves the following measures, following the JNCC guidelines on reducing the risk of injury to marine mammals during piling:

- During all piling operations trained MMOs will use visual and where required, acoustic detection, to ensure that marine mammals are not within the direct injury zone (termed the 'mitigation zone' - as agreed with relevant Statutory Advisors). The use of MMOs will subsequently reduce the potential for injurious effects for any marine mammal species present in the mitigation zone;
- PAM will be particularly important for periods of poor visibility or night time conditions. PAM buoys will surround the piling location and detections will be sent back to the PAM operator on a dedicated vessel. The use of PAMs will subsequently reduce the potential for injurious effects for any marine mammal species present in the mitigation zone;
- ADDs are a particularly useful for mitigating impacts upon seals as a result of the difficulties associated with identifying and observing these species, particularly at night and during periods of poor visibility; and
- When piling commences a soft-start procedure will be employed and the force of piling will gradually be increased to alert marine mammals in the vicinity to the commencement of the operations and thus reduce the potential for injury on all marine mammal species.

7.4 In addition to the measures outlined above, BOWL is committed to reducing effects on marine mammals as a result of piling noise through the implementation of a range of additional measures during piling, which are outlined in Section 6.7 of the ES Addendum. These include:

- If concurrent piling operations are undertaken, vessels will operate at no more than 5 km from each other. The purpose of this will be to reduce the potential area of ensonification from that presented in the worst case, and the use of two vessels should also decrease the installation programme; and
- Upon receiving detailed geotechnical information, BOWL will develop a piling strategy with the aim of reducing effects on agreed species throughout the construction period. The current Rochdale Envelope currently allows for the use of hammer energy up to 2300 kJ, although the most likely scenario is that the largest hammer energy will not be required across the entire Wind Farm. Where possible the piling programme will determine what hammer energies are most likely to be used at specific locations in advance of any piling commencing, which will allow the development of a piling programme that has measures embedded within it to reduce the effects on marine mammals when compared to the worst case scenario presented in the Original ES and ES Addendum. This may include measures such as the spatial phasing of piling across the Wind Farm to reduce effects on the more sensitive parts of the Moray Firth during certain times of the year. As the detailed geotechnical information is not yet available, the specific measures which will be used cannot be defined. However, BOWL will continue discussions with Marine Scotland and relevant consultees in order to devise a piling strategy with the aim of mitigating certain impacts where possible

7.5 Reports detailing the piling activity and marine mammal mitigation will subsequently be sent to JNCC/SNH after the end of all the piling activity.

7.6 At present BOWL and the wider offshore wind industry are investigating a number of mitigation measures to reduce the effects of construction noise on marine mammals. Further details of mitigation measures, potentially including novel methods of reducing piling related effects, may therefore be included in the final EPS licence application, which will be submitted following consent.

8. CONCLUSIONS

8.1 This supporting information is submitted in support of BOWL's applications for the Project Consents and has sought to demonstrate, with reference to the three statutory tests in the 1994 Regulations and SNH Guidance, the information that would be provided in an EPS Licence Application, if required.

8.2 BOWL recognises that if an EPS Licence were to be required, further information would be required in support of the Application which cannot be provided at this time due to the current stage of the design process, in particular, in relation to the design and construction methods for the turbine and OSP foundations and the No Satisfactory Alternatives Test.

9. REFERENCES

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