

Hornsea Project Three  
Offshore Wind Farm



## Hornsea Project Three Offshore Wind Farm

Appendix 17 to Deadline I submission –  
Applicant's Response to Ex.A Question Q1.2.103

Date: 7<sup>th</sup> November 2018

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## 1. Introduction

- 1.1 This provides the full response from the Applicant to Ex.A question Q1.2.103, a summary of which is provided in the Applicant's response to Deadline I:

*Effects on the integrity of The Wash and North Norfolk Coast SAC and the North Norfolk Sandbanks and Saturn Reef SAC have been considered in relation to each of the impacts identified for the individual phases of the development.*

*Please provide an assessment of the cumulative impact on the integrity of these SACs across the lifetime of the proposal.*

- 1.2 The Applicant notes that while the assessments presented in Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement (APP-062) and the Report to Inform Appropriate Assessment (RIAA; APP-052) were undertaken on an impact by impact basis, repeat disturbance during the construction and operation and maintenance phase was considered and presented and the Applicant would refer the Ex.A to the Applicant's response to Natural England's Relevant Representation (RR-097), as submitted in the Applicant's response to Deadline I. In order to provide clarity and fully address the Ex.A question, additional narrative has been provided within this note to summarise the assessment of impacts to The Wash and North Norfolk Coast Special Area of Conservation (SAC) and the North Norfolk Sandbanks and Saturn Reef SAC as a result of cable installation across the lifetime of the project.
- 1.3 The following note includes signposting to the relevant sections of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and the RIAA where impacts have been identified and assessed for individual phases to demonstrate that all effects over the full lifetime have been considered and are not predicted result in an adverse effect on site integrity for either SAC.

## 2. The Wash and North Norfolk Coast SAC

### Pre-construction and construction phase

- 2.1 As discussed in Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, approximately one to two years prior to the start of construction of Hornsea Three, pre-construction activities may be required within The Wash and North Norfolk Coast SAC. These may include sandwave clearance activities (including deposition of sandwave clearance material) and boulder clearance. As described in Table 2.22 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and Table 5.6 of the RIAA, the maximum design scenario assumes that sandwave clearance may affect up to a 30 m wide corridor of seabed along the entire length of export cables within the SAC (i.e. 66.6 km). The maximum design scenario, inclusive of deposition of sandwave material and vessel anchor placements, predicted temporary habitat loss of up to 2,356,714 m<sup>2</sup> (i.e. 0.22% of the total area of The Wash and North Norfolk Coast SAC). The maximum adverse scenario is precautionary as it assumes that sandwave clearance is required throughout the extent of cable corridor within the SAC. In the more likely event that sandwave clearance is required over a shorter length of the Hornsea Three offshore cable corridor, the extent of temporary habitat loss would be reduced as boulder clearance and cable burial activities are associated with narrower corridors of disturbance as described below.
- 2.2 As discussed in paragraph 2.11.1.71 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and Appendix A of the RIAA, there may be discrete areas within the SAC in which sandwave clearance will not be required but boulder clearance may be required. This will not, however, contribute to any additional temporary habitat loss as the process will effectively redistribute boulders and cobbles either side of the 25 m boulder clearance corridor. Following the pre-construction sandwave and boulder clearance activities, additional temporary disturbance of benthic habitats is predicted within a smaller 15 m wide corridor of seabed (within the 30 m corridor affected by sandwave clearance) as a result of the subsequent cable installation during the construction phase.

- 2.3 The recovery of the benthic communities present within the SAC from the temporary habitat loss associated with sandwave clearance and disposal and cable burial is described in paragraph 2.11.1.74 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.5.1.11 of the RIAA. As discussed in Appendix A of the RIAA, historic and site specific data do not indicate the presence of Annex I Sandbanks which are slightly covered by sea water all the time coinciding with the Hornsea Three offshore cable corridor within the boundary of the SAC, although sub-features of this Annex I habitat (i.e. Subtidal Sand, Subtidal Mixed Sediment and Subtidal Coarse Sediment) are present, represented by the biotopes shown in Figure 4.28 of Volume 5, Annex 2.1: Benthic Ecology Technical Report of the Environmental Statement (APP-102). Similarly, the historic and site-specific data did not indicate the presence of Annex I Reefs within the Hornsea Three offshore cable corridor coinciding with the boundary of the SAC. The Applicant directs the Ex.A to the Applicant's response to Ex.A question Q1.2.12 which describes the characterisation of the baseline in the SAC and also the results of the recent drop down video survey (presented at Appendix 5 to the Applicant's response to Deadline I), which have validated the baseline presented in the Environmental Statement. Any residual risks to Annex I reef habitats would be managed by designed in mitigation measures, as discussed in the Applicant's response to Ex.A question Q1.2.12.
- 2.4 The recovery of the benthic communities associated with the subtidal sand sediments is likely to be high, as discussed in paragraph 2.11.1.25 and 2.11.1.75 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, with recovery anticipated within up to two years. For the coarse and mixed sediment communities present within The Wash and North Norfolk Coast SAC, the timeframes for recovery are predicted to be in the region of up to five years (see paragraph 2.11.1.30 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement).
- 2.5 Therefore, the benthic habitats are not predicted to have substantially recovered in the period between sandwave/boulder clearance and cable burial, hence cable burial is considered to be an extension of the original sandwave clearance disturbance rather than repeat disturbance. As discussed in paragraph 2.11.1.24 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, the communities associated with the sandy sediments are typical of high energy environments and are therefore naturally subject to, and tolerant of, high levels of physical disturbance. As noted in Table 2.14 and paragraph 2.11.1.18 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, Hornsea Three may be constructed over up to two phases, however following completion of cable installation there will be no potential for repeat direct physical disturbance to the footprint of seabed previously impacted by cable burial during the construction phase as this would pose a risk to the integrity of the cable.

2.6 For the majority of the length of the Hornsea Three offshore cable corridor that extends through The Wash and North Norfolk Coast SAC, the export cables are anticipated to be successfully buried and remain buried for the anticipated 35 year design life of Hornsea Three and therefore impacts to benthic habitats and features of the SAC will largely cease following cable installation, with recovery over the time periods outlined above. However, as discussed in paragraph 2.11.1.18 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, following cable installation there may be a requirement for some very localised remedial cable reburial works, during the construction phase, which would be undertaken within approximately one year of the initial cable laying works. For the same reasons as outlined above, is not considered to constitute repeat disturbance but rather an extension of the original disturbance activity within the original footprint with recovery following the timescales described above once the remedial burial works are complete. The recovery of the benthic communities in these areas is predicted to follow the same timescales as described above and in paragraph 2.11.1.30 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement.

### **Operation and maintenance phase**

2.7 Although the preference is always to bury the cables, there may be some localised areas within the SAC where burial fails and the installation of cable protection is required. Paragraph 3.6.10.7 of Volume 1, Chapter 3: Project Description of the Environmental Statement (APP-058) and Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement outline the precautionary maximum design scenario parameter that up to 10% of the total export cables within The Wash and North Norfolk Coast SAC may require protection due to ground conditions. As described in paragraph 2.11.2.22 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, this maximum design scenario is predicted to affect up to 46,200 m<sup>2</sup> of seabed within the SAC (i.e. a very small proportion of the total 2,356,714 m<sup>2</sup> affected during the construction phase; see paragraph 2.1 above), representing 0.004% at most of the total area of The Wash and North Norfolk Coast SAC. This would affect a small proportion of the Subtidal Sand, Subtidal Mixed Sediment and/or Subtidal Coarse Sediments sub-features of the Annex I sandbanks feature of the SAC, depending on where cable protection may be deployed.

2.8 An assessment of the long term habitat loss associated with cable protection within the SAC is made in paragraph 2.11.2.22 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.5.2.1 *et seq.* of the RIAA. The Applicant would highlight the commitment to employing sensitive cable protection measures, as outlined in Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement. These measures would facilitate some continued ecological functioning in areas where these are deployed, thus limiting the effects of long term habitat loss as compared to other cable protection measures (e.g. concrete mattresses, larger grain sizes etc.). The Applicant directs the Ex.A to the Cable Protection Clarification Note submitted to Natural England and presented at Appendix 6 to the Applicant's response to Deadline I, where supporting evidence for the use of sensitive cable protection is provided.

- 2.9 As discussed in paragraph 2.11.2.162 *et seq.* and Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, the maximum design scenario also assumes that some limited and highly localised cable reburial works may be required within the SAC over the 35 year design life of the project resulting in temporary habitat disturbance. The recovery of the benthic communities in these areas would be predicted to follow the same timescales as described above and in paragraph 2.11.1.30 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement.

### **Post-decommissioning**

- 2.10 It should be noted that currently, decommissioning plans for offshore wind farms typically propose that cables are left *in situ* during decommissioning and are not removed. For the purposes of the impact assessment presented in Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, the maximum design scenario assumed removal of all cables during the decommissioning phase. As discussed in paragraph 2.11.3.19 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, temporary habitat loss associated with the maximum design scenario for cable removal during decommissioning is likely to be of the same magnitude as during construction. Recovery of the benthic communities will follow these activities as described in paragraph 2.3 above.
- 2.11 The only impact which has the potential to continue beyond the decommissioning phase of the project will be the permanent habitat loss associated with cable protection remaining *in situ*. This is assessed in paragraph 2.11.3.49 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.5.2.1 *et seq.* of the RIAA.

### **Conclusion**

- 2.12 As summarised above, the majority of impacts associated with cable installation and maintenance over the 35 year design life of Hornsea Three will be temporary and reversible. For the vast majority of the seabed affected within The Wash and North Norfolk Coast SAC, once the cable is installed, there will be no repeat disturbance over the 35 year design life of Hornsea Three and the benthic communities will recover. For a small proportion of the cable length within The Wash and North Norfolk Coast SAC, there may be some repeat disturbance associated with cable reburial/repair works during the operation and maintenance phase, although the effects on Annex I features (and sub-features) will also be temporary and reversible. These temporary and reversible effects will therefore not represent an adverse effect on integrity of the site.
- 2.13 Although effects on Annex I habitats associated with the maximum design scenario for cable protection will last throughout the operation and maintenance phase and post-decommissioning, they are predicted to affect only a very small (0.004%) proportion of total area of The Wash and North Norfolk Coast SAC. The sensitive cable protection measures which are proposed for the project, to reflect the baseline environment of the SAC (i.e. the coarse sediment and mixed sediments sub-features of the Annex I sandbanks feature) will allow some ecological function to continue in the areas affected during the operation and maintenance phase, thus limiting the effects of long term habitat loss as compared to other cable protection measures (e.g. concrete mattressing, larger grain sizes etc.). The effects associated with cable protection will therefore not represent an adverse effect on integrity of the site.

### 3. North Norfolk Sandbanks and Saturn Reef SAC

#### Pre-construction and construction phase

- 3.1 As described above for The Wash and North Norfolk Coast SAC and in Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, pre-construction activities may be required within the North Norfolk Sandbanks and Saturn Reef SAC which may include sandwave clearance activities (and associated deposition of sandwave clearance material) and boulder clearance. As outlined in Table 2.19 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and Table 5.7 of the RIAA, the maximum design scenario assumes that sandwave clearance may affect a corridor of seabed of up to 30 m in width for up to 192 km of export cables within the SAC (i.e. 6 cables, each of up to 32 km length within the SAC). As discussed in paragraph 5.6.1.4 of the RIAA, this represents a very small (0.26%) proportion of the total Annex I habitat 'Sandbanks which are slightly covered by seawater all the time' within the SAC. The maximum design scenario is precautionary as it assumes that sandwave clearance is required throughout extent of cable corridor within the SAC. In the more likely event that sandwave clearance is required over a shorter length of the Hornsea Three offshore cable corridor, the extent of temporary habitat loss would be reduced as boulder clearance and cable burial activities would affect narrower corridors of disturbance as described in paragraph 3.2 below.
- 3.2 Cable burial during the construction phase is predicted to result in continued temporary habitat disturbance within a smaller 15 m wide corridor (within the 30 m corridor affected by sandwave clearance and/or 25 m corridor affected by boulder clearance).
- 3.3 The recovery of the benthic communities impacted by pre-construction activities and cable burial is discussed in paragraph 2.11.1.60 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement. With respect to the recovery of sandwaves, paragraph 5.6.1.8 of the RIAA and paragraph 2.11.1.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, states that these are predicted to recover to a new equilibrium over a period of months to years through natural sediment transport processes. Evidence to support this prediction is provided in paragraph 5.6.1.8 of the RIAA and paragraph 2.11.1.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, via the results of pre and repeated post construction monitoring of the recovery of sandwaves within the Race Bank offshore wind farm and offshore cable corridor. The Applicant would highlight that the Race Bank monitoring evidence has been re-examined and expanded on, in order to validate the predictions of the Environmental Statement, in a Sandwave Clearance Clarification Note which was submitted to Natural England in October 2018 and is presented at Appendix 11 to the Applicant's response to Deadline I.

- 3.4 With regards to the Annex I *Sabellaria spinulosa* reef feature of the SAC, the Applicant would note that, as discussed in paragraph 2.11.1.43 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, no Annex I reefs were identified during the site specific surveys of the Hornsea Three offshore cable corridor coinciding with the North Norfolk Sandbanks and Saturn Reef SAC. However, as discussed in response to Ex.A question Q1.2.18, as per best practice, and in response to a request by Natural England, an assessment of an impact occurring to potential future Annex I reef (should this develop prior to construction) within the North Norfolk Sandbanks and Saturn Reef SAC was undertaken as presented in paragraph 2.11.1.43 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement. The purpose of this core reef exercise was to provide a high-level risk assessment, as advised by Natural England in the Marine Processes, Benthic Ecology and Fish and Shellfish Ecology Expert Working Group (EWG) meeting on 23 February 2018, in order to 'future proof' the assessment to cover the possibility of *S. spinulosa* reef developing in the intervening time between the Hornsea Three characterisation and the pre-construction Annex I reef surveys. The sensitivity and recovery times of potential future Annex I *S. spinulosa* reef is presented in paragraph 2.11.1.64 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.6.1.14 of the RIAA. The Applicant would however highlight the mitigation measures outlined in Table 2.18 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement which states that, where possible, direct impacts to *S. spinulosa* reefs within the SAC will be avoided.
- 3.5 As noted in Table 2.14 and paragraph 2.11.1.18 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, Hornsea Three may be constructed over up to two phases, however following completion of cable installation there will be no potential for repeat direct physical disturbance to the footprint of seabed previously impacted by cable burial during the construction phase as this would pose a risk to the integrity of the cable.
- 3.6 For the vast majority of the length of the Hornsea Three offshore cable corridor that extends through The North Norfolk Sandbanks and Saturn Reef SAC, the export cables are anticipated to be successfully buried and remain buried for the anticipated 35 year design life of Hornsea Three and therefore impacts to benthic habitats and features of the SAC will largely cease following cable installation. However, as discussed above for The Wash and North Norfolk Coast SAC and in paragraph 2.11.1.18 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, following cable installation there may be a requirement for some very localised remedial cable reburial works during the construction phase which would be undertaken within approximately one year of the initial cable laying works. On the basis of timescales between cable burial and these remedial burial events, substantial recovery is not anticipated and so this activity is not considered to constitute repeat disturbance but rather an extension of the original disturbance activity within the original footprint with recovery following the timescales described above once the remedial burial works are complete.

### **Operation and maintenance phase**

- 3.7 As with The Wash and North Norfolk Coast SAC, the installation of cable protection may be required in discrete locations within the North Norfolk Sandbanks and Saturn Reef SAC in areas where burial fails. The precautionary maximum design scenario presented in Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement assumed that up to 10% of the total export cable within the SAC may require protection and that protection may also be required for up to 20 cable/pipeline crossings. An assessment of the long term habitat loss associated with cable protection and crossings within the SAC is made in paragraph 2.11.2.13 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.6.2.1 *et seq.* of the RIAA. Long term habitat loss is predicted to affect up to 497,400 m<sup>2</sup> of the Annex I Sandbank feature of the SAC (i.e. a small proportion of the total 9,305,800 m<sup>2</sup> predicted to be temporarily affected during the construction phase; see Table 2.19 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement), representing 0.01% of the total area of the North Norfolk Sandbanks and Saturn Reef SAC. As outlined in Table 2.27 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, up to 300,000 m<sup>2</sup> of this habitat loss is associated with the cable/pipeline crossings. The precise amounts of cable protection required in these areas (which may be less than above) would be confirmed post consent and in consultation with pipeline/cable operators. The remaining 197,400 m<sup>2</sup> of habitat loss associated with cable protection would only be required in the event that cable burial is not successful.
- 3.8 The Applicant would highlight their commitment to employing sensitive cable protection measures, as outlined in Table 2.14 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement which will allow for some ecological function to continue in the areas affected thus limiting the effects of long term habitat loss in contrast to other cable protection measures (e.g. concrete matting, larger grain sizes etc.). The Applicant directs the Ex.A to the Cable Protection Clarification Note submitted to Natural England and presented at Appendix 6 to the Applicant's response to Deadline I where supporting evidence for the use of sensitive cable protection is provided.
- 3.9 The potential for limited and localised cable reburial or repair works over the 35 year design life of the project is assessed in paragraph 2.11.2.158 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement. These activities are predicted to affect up to 849,851 m<sup>2</sup> of Annex I Sandbanks, which equates to 0.02% of the extent of this feature within the SAC. The recovery of the benthic communities in these areas would be predicted to follow the same timescales as described above and in paragraph 2.11.2.160 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement.

### **Post-decommissioning**

- 3.10 As discussed in paragraph 2.11.3.15 of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement, temporary habitat loss associated with the maximum design scenario for cable removal during decommissioning is likely to be of a similar magnitude as during construction. Recovery of the benthic communities will follow these activities as described in paragraph 3.3 above.

- 3.11 The only impact which has the potential to continue beyond the decommissioning phase of the project is permanent habitat loss associated with cable protection remaining in situ. This is assessed in paragraph 2.11.3.44 *et seq.* of Volume 2, Chapter 2: Benthic Ecology of the Environmental Statement and paragraph 5.6.2.1 *et seq.* of the RIAA.

### **Conclusion**

- 3.12 As discussed in paragraphs 2.12 and 2.13 above for The Wash and North Norfolk Coast SAC, the majority of impacts associated with cable installation and maintenance in the North Norfolk Sandbanks and Saturn Reef SAC will be temporary and reversible. Repeat disturbance during construction and the operation and maintenance phase will be minimal for the majority of the seabed affected by the initial cable installation and pre-construction activities and where it does occur, the effects will also be temporary and reversible. These temporary and reversible effects will therefore not represent an adverse effect on integrity of the site.
- 3.13 Although effects on Annex I habitats within the SAC, associated with cable protection, will last throughout the operation and maintenance phase and post-decommissioning, they are predicted to affect only a very small (0.01%) proportion of total area of the North Norfolk Sandbanks and Saturn Reef SAC. The sensitive cable protection measures which are proposed will allow some ecological function to continue in the areas affected during the operation and maintenance phase thus limiting the effects of long term habitat loss in contrast to other cable protection measures (e.g. concrete mattresses, larger grain sizes etc.). The effects associated with cable protection will therefore not represent an adverse effect on integrity of the site.