Hornsea Three Sandbank Implementation Plan

Appendix Two: Environmental Monitoring Plan for Impacts Associated with Cable Protection

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Document Control

Document Properties	
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Document Number	07126576_A
Title	Appendix 2: Environmental Monitoring Plan for Impacts Associated with Cable Protection

Version History

Date	Version	Status	Description / Changes
26/07/21	1.0	Draft	First draft for consultation with the Steering Group
24/09/21	2.0	Draft	Second draft for consultation with the Steering Group
01/12/21	3.0	Final	Final draft for submission to the Secretary of State for approval

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Acronyms

Acronym	Definition
BEIS	Department for Business, Energy & Industrial Strategy
Cefas	Centre for Environment, Fisheries and Aquaculture
DCO	Development Consent Order
DDV	Drop Down Video
EMP	Environmental Monitoring Plan
MMO	Marine Management Organisation
NNSSR	North Norfolk Sandbanks and Saturn Reef
SAC	Special Area of Conservation
SBIP	Sandbank Implementation Plan
WNNC	The Wash and North Norfolk Coast

1 Introduction

1.1 Project background

1. A Development Consent Order (DCO) was awarded to Hornsea Three on 31st December 2020.

2. Part 2 of Schedule 14 of the Hornsea Three DCO (the DCO) outlines the required benthic compensation measures which must accord with the Sandbanks Compensation Strategy[1] and be drafted into separate Sandbank Implementation Plans (SBIPs) for the North Norfolk Coast (WNNC) Special Area of Conservation (SAC) and North Norfolk Sandbanks and Saturn Reef (NNSSR) SAC and submitted to the Secretary of State for approval.

3. The SBIPs should include those requirements listed in Schedule 14 Part 2 requirement 13 which includes:

> *(e) an Environmental Monitoring Plan to include: appropriate surveys to assess the effects of cable protection on sediment movement and epifauna assemblages during the operation of the Project, to improve the evidence base for assessing the impacts of offshore windfarm cable installation and rock protection for future projects; and appropriate surveys to monitor the recovery of the areas of the NNSSR and the WNNC impacted by cable protection, post-decommissioning.*

1.2 Purpose of this document

4. This Environmental Monitoring Plan (EMP) presents the proposed approach and methodologies in relation to monitoring of the cable protection deployed within NNSSR and WNNC SACs pursuant to requirement 13 (e). This document is being submitted to the Secretary of State for approval, as Appendix Two of the NNSSR and WNNC SBIPs.

5. It should be noted that whilst the requirements for this EMP are different than those in the Hornsea Three Deemed Marine Licenses (DMLs) (DCO Schedules 11 and 12) and the survey methodologies may differ to a certain extent, the survey campaigns may be coordinated to ensure efficient use of resource e.g., vessel use. Further, data collected may be used for dual reporting purposes under this EMP and the DMLs (for example the geophysical survey undertaken Year 1 post-instalment is likely to collect data which will be reported under this EMP and to discharge requirements under the DMLs.

6. This EMP outlines monitoring that Hornsea Three will undertake to:

- Assess the potential effects of cable protection on sediment movement and epifauna assemblages within the NNSSR and WNNC SACs during the operation of Hornsea Three;
- Improve the evidence base (for environmental impact assessment of offshore windfarm cable installation and rock protection for future projects); and
- Monitor the recovery of the areas of the NNSSR SAC and the WNNC SAC impacted by cable protection, post-decommissioning.

7. This EMP secures the survey specification, including frequency of surveys, and the process for identifying sample locations.

8. The environmental monitoring specification considers both marine processes (in relation to potential impacts on sediment movement) and benthic survey requirements (in relation to potential impacts to epifaunal assemblages). Hornsea Three note that the two are closely linked, and therefore the results from one aspect will be used to either interpret or inform the results from the other.

2 Consultation

2.1 Pre-approval consultation

9. Hornsea Three drafted and distributed for consultation to the benthic compensation Steering Group (SG) an Environmental Monitoring Technical Note (06951697_A) outlining the proposed monitoring approach to meet requirements of 13 (e) of Schedule 14 Part 2 of the DCO. Further information in regard to this

[1] EN010080-003190-HOW03_CON02_Appendix2A_SandbanksCompensationStrategy.pdf (planninginspectorate.gov.uk)

consultation, and how those consultation responses have informed this EMP, is provided in the Consultation Summary (07124534_A) submitted alongside the SBIPs.

2.2 Post-approval consultation

10. Following approval of the EMP by the Secretary of State, the survey design will be secured. As agreed with BEIS and detailed in **Section 5**, the Marine Management Organisation (MMO) will become the regulator of the EMP and all further consultation on the EMP will be conducted with MMO, and the relevant Statutory Nature Conservation Bodies (SNCBs)[2]. All monitoring reports will be submitted to MMO for approval and no further submissions will be made to the Secretary of State in relation to the EMP.

11. Hornsea Three anticipate the requirements outlined in **Table 1** to require consultation with the MMO and, SNCBs as the project develops.

Table 1: Summary of post-approval consultation.

Hornsea Three project stage	Purpose of consultation
Following approval of pre-construction geophysical survey report[3]	• Agree pre-construction transect locations and appropriate survey schedule • Ensure alignment with the monitoring which will be undertaken to support the Hornsea Three Cable Specification and Installation Plan • The proposed transect locations will be based on a review of data from geophysical information taken along the proposed cable corridor to determine the homogeneity of the cable corridor within NNSSR and WNNC SACs in terms of the physical features and the presence/absence of any Annex I features. Where there is greater variability there may be more frequent transects proposed. • The pre-construction cable burial risk assessment will also be fed into this process and areas where the potential for secondary[4] cable protection is considered to be more likely will be included for consideration, where they fall outside of any protected areas.
Following installation of the transmission assets	• Agree operational transect locations based upon the locations within NNSSR and WNNC where cable protection is deployed • Proposed transect locations will be based upon proportionate survey design
Following completion of the transmission asset and cable protection decommissioning	• Agree post-decommissioning transect locations based upon the locations within NNSSR and WNNC where cable protection has been removed as part of decommissioning activities • Proposed transect locations will be based upon proportionate survey design

3 Aims of environmental monitoring

12. As set out in **Paragraph 3**, the overarching aim of the environmental monitoring is to assess the effects of cable protection on sediment movement and changes to / recovery of epifauna assemblages, improve the evidence base (for assessment of future projects) and to monitor the recovery of the areas of the NNSSR and the WNNC SACs potentially impacted by the deployment, and long term presence, of Hornsea Three cable protection. This will be achieved by examining the following hypothesis.

3.1 EMP monitoring hypothesis

3.1.1 Monitoring potential change in sediment movement

13. Hornsea Three note that the presence of cable protection will not be a complete barrier to the movement of the sandbanks within the SACs as any mobile sandbanks would migrate over the cable protection. The bathymetric surveys will be used to monitor the movement of sediment around the cable protection, including that of any mobile sandbanks, over time and provide evidence in relation to the functionality of

[2] This approach has been agreed with BEIS and MMO via email 12/07/21.
[3] Required under Hornsea Three transmission assets deemed Marine License
[4] Secondary cable protection refers to the placement of mattresses or rock over areas of installed cable which have not been sufficiently protected to ensure their integrity. Whilst mattressing is not permitted to be deployed within NNSSR or WNNC SAC under the DCO, the survey specification is replicable should it be implemented for other monitoring of mattress cable protection on other projects.

the impacted areas as part of the sandbank system. Other changes in sediment movement will also be monitored, such as scour, should they occur.

14. The surveys will aim to determine if any changes identified are occurring as a result of the presence of cable protection or as a result of natural cycles.

15. Hornsea Three will not conduct sediment modelling as part of this EMP as any effects on sediment movement will be local to the cable protection and therefore conducting far field assessments will not aid in delivering the aim of the EMP: improving evidence base in the assessment of future projects.

3.1.2 Monitoring potential change in epibenthic assemblages

16. The environmental monitoring specification has been specifically designed to identify potential changes in epibenthic assemblages resulting from the presence of cable protection. The results would also help to inform a greater understanding of any change in functionality of any sandbanks in the vicinity of the cable protection as a result of the presence of cable protection. The maintenance of the structure and function of the habitats, links to one of the Conservation Objectives of the WNNC[5] and NNSSR SACs[6]. The monitoring undertaken post-decommissioning would provide information regarding the recovery of the function of the sandbank habitat, another aspect of the Conservation Objectives for the site.

17. The surveys will aim to answer the following hypothesis:

- What are the initial / immediate changes to epibenthic assemblages following installation of cable protection?
- If colonisation occurs, do the epibenthic assemblages present on the cable protection differ from the surrounding sediments that were there prior to deployment of cable protection, and can succession rates be measured?
- Is colonisation (of the cable protection) related to sediment transport, and do the epibenthic assemblages on the cable protection function similarly to unimpacted sediment assemblages?

3.1.3 Monitoring recovery

18. As all the monitoring surveys are designed to be carried out to the same specification from pre-construction, through operation and post-decommissioning, the monitoring results will inherently identify recovery of the impacted environment. The surveys following Hornsea Three decommissioning will aim to demonstrate how quickly and to what extent the areas of the NNSSR and the WNNC impacted by cable protection decommissioning recover, and whether they return to a pre-construction state post-decommissioning.

3.1.4 Improving the evidence base

19. The monitoring surveys that will be carried out have been specifically designed to monitor and provide data on the potential significant changes in sediment movement and epibenthic assemblages as well as recovery of any impacted areas within the SACs resulting from the presence of secondary cable protection.

20. Surveys will be designed to be replicable in other areas by other developers, and therefore not specifically designed for the SACs, with the exception of any site-specific recoverability surveys, although these too are replicable. The surveys have been designed in this manner to further help improve the evidence base by allowing others to carry out appropriate surveys that investigate the potential impacts of offshore wind farm cable protection on habitats and marine processes. By collecting this specific data Hornsea Three aims to improve the evidence base, detailed further in **Section 3.2**.

3.2 Addressing evidence gaps

21. There have been various research projects undertaken in relation to effects of the presence of cable protection on the benthic environment, which include: Review of cable installation, protection, mitigation, and habitat recoverability (The Crown Estate, 2019); Mapping anthropogenic hard protection in the marine

[5] [redacted]

environment (MBIEG, 2020); and, Decommissioning of cable and scour protection and impact of hard protection on sediment MPAs (Natural England *in development*).

22. It is acknowledged that further data is required to address the evidence gaps, particularly in relation to the realised environmental impacts. Hornsea Three will provide data to help close these data gaps through the specifically designed monitoring campaign secured within this EMP. The environmental monitoring surveys will have very specific objectives in relation to the discharge of the DCO requirement 13 (e) (**Section 3.1**).

23. Objectives include better knowledge around the timescales of recovery (i.e. how fast does it occur and how long does it take) and also the nature of epifaunal assemblage change, as a result of the long term presence of cable protection on the seabed and in relation to the subsequent removal post-decommissioning (and how this could impact on the areas within the SACs relevant to Hornsea Three) as discussed in **Section 3.1**.

24. During the analysis of results and development of the findings the reporting will also draw on relevant results in reports available through the Offshore Wind Environment Evidence Register (OWEER) recently launched by the Crown Estate and developed by JNCC and Defra. The report published (The Crown Estate 2019) as a part of this work identifies that the main data gap for impacts relating to and resulting from cable protection is colonisation of epifauna on artificial substrate.

25. A recently published report from Defra (2021) reiterates that the potential ecological consequences arising from the presence of cable protection is a critical knowledge gap and determines that imagery-based survey data could help to fill this knowledge gap. The study investigated the use of ROV imagery, collated as part of cable protection asset integrity inspections, to support investigations of changes in epibenthic communities resulting from cable protection.

26. The methods of analysis did show that ROV data can be used to create 3D imagery-based models to enable quantitative analysis of epifaunal assemblages. This involves quantifying size and biomass of the epifauna inhabiting the hard substrates. The drawback of the ROV imagery is stated as the reliance on video footage over still imagery hence lower resolution of images. Defra conclude that HD video may prove to be a more useful tool than still imagery (Defra 2021).

27. The monitoring secured within this EMP proposes the use of DDV for the monitoring and whilst the benefits of the ROV technique are shown, at this early stage of testing of the analysis techniques, the image quality from still images is preferred to ensure greater taxonomic certainty. Despite this difference in imaging technique selection, the monitoring secured in this EMP is aligned with the fundamental aspects of Defra's 2021 report: *Determining the potential implications of subsea cable protection to seabed assemblages*. In addition, DDV cameras are acknowledged to be more rugged than ROVs (JNCC, 2018 Remotely Operated Vehicles for use in marine benthic monitoring) so for the monitoring of the cable protection which requires transects to be completed (which would use rock), the DDV method is still proposed.

4 Environmental monitoring survey specification

4.1 Survey specification

28. As noted in **Section 3.1.3** the survey specification will be the same for pre-construction, operation, and post-decommissioning surveys. The survey specification will adopt a transect approach along the cable protection deployed within the SACs. The transect design is detailed in **Figure 1**.

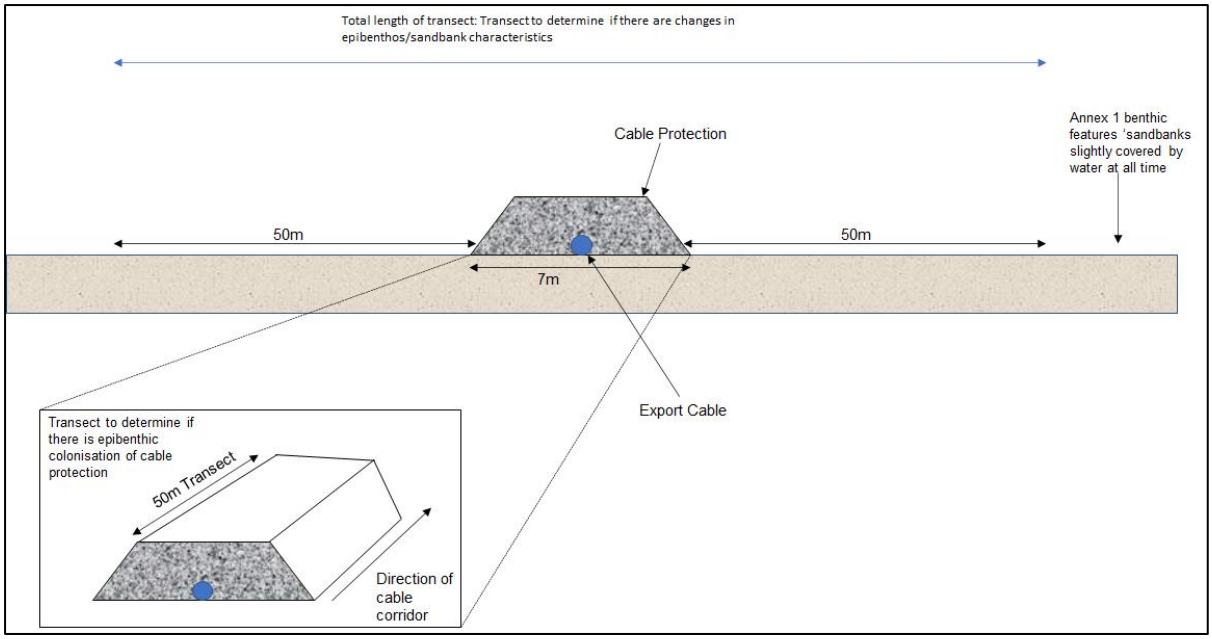

Figure 1: Indicative Transect Design.

29. The transects will commence 50m from the edge (at right angles from the cable route) of the proposed cable protection boundary, cross the cable protection berm (which will be a maximum width of 7 m[7]) and continue 50m away from the boundary of the cable protection berm on the opposite side. This would enable a gradient affect to be established away from the footprint of the cable protection. The 50 m transect length is considered to be sufficient to capture any potential changes, due to the presence of cable protection, given the expected levels of heterogeneity and that the sediment type within Hornsea Three export cable corridor is sand and mixed sediment which therefore settles out of suspension much faster than fine sediment introducing much more localised effects. These 50 m transects will therefore fully capture the gradient effect, and any potential changes, at a distance from the deployed cable protection.

30. Additional transects of 50m in length would be taken along the cable protection, crossing the longer transects at right angles, in order to monitor changes occurring on top of the cable protection.

31. The transect locations would firstly be characterised by seabed physical characteristics through geophysical survey (multi-beam echo sounder and side-scan sonar survey) to identify potential macro sedimentary changes (such as scour and sandwave migration), detailed in **Section 3.1.1**.

32. Following the geophysical surveys which will provide seabed characterisation, the benthic characterisation will be completed utilising a Drop-Down Video (DDV) survey undertaken along the same transects, shown in **Figure 1**. The DDV would be used to record any epibenthos along the transect, inferring change in epibenthic communities, detailed in **Section 3.1.2**, and would also inform further any large scale changes in sediment distribution visible within the survey data. The transects of 50m in length taken along the cable protection, crossing the longer transects at right angles, will infer changes as to the colonisation of the cable protection. Hornsea Three note that current and tidal conditions may influence the tracking of the DDV along the transect, which will be considered when determining the most appropriate survey season and survey timings (this will be confirmed with stakeholders as detailed in **Section 2.2**).

[7] As detailed within Hornsea Three Environmental Statement

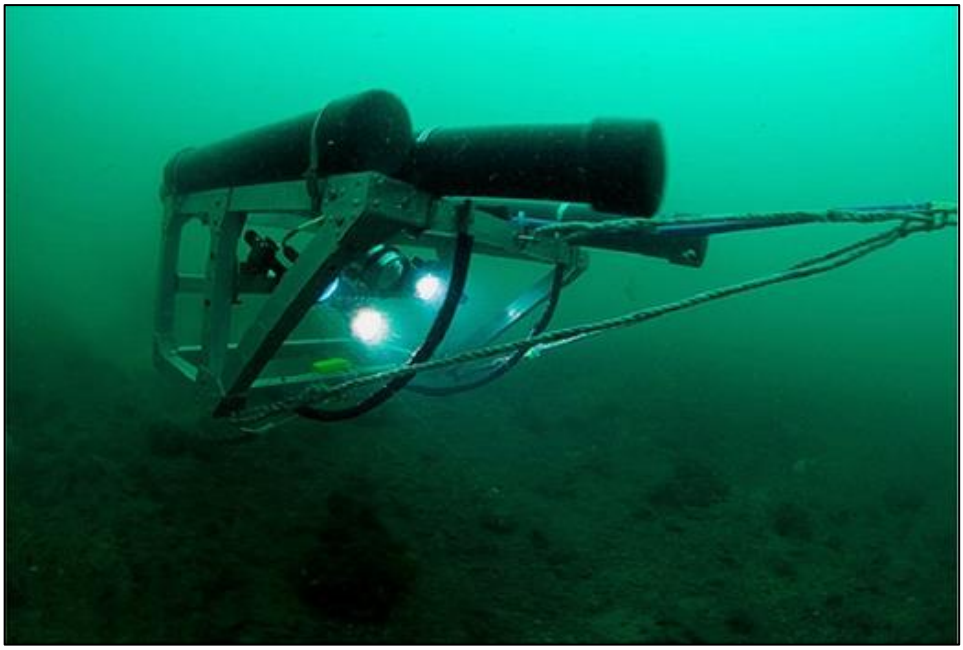

Figure 2: DDV recording epibenthos (Sheehan *et al.*, 2013).

4.1.1 Data analysis

33. All surveys will be undertaken by qualified third party contractors and the data collected will be processed according to all relevant standards for marine environmental monitoring surveys.

34. Data analysis of the results of the bathymetric monitoring surveys will be used to identify any changes in seabed morphology and determine the drivers for this change (presence of cable protection or natural changes), whilst the interpretation of the DDV by a qualified benthic specialist will allow for the identification of epibenthic species present within the survey transects, and quantification of epibenthos density and species abundance.

4.1.2 Identifying sample locations

35. Final sample locations have not been fully defined within this EMP as, at this stage in project development, it is not known which areas within the NNSSR and WNNC SACs will be subject to cable protection deployment. A general approach to defining sample locations is detailed below, and this approach is designed to be proportionate to the volume of cable protection deployed.

36. Hornsea Three have identified pre-construction sample locations using a worst-case assumption in terms of cable protection being deployed along 6% of the length of cables within the SACs, as secured as the maximum design envelope consented in the DCO. Transects will be located at a minimum of 1 km intervals along the cable corridor within the WNNC SAC (ten transect sample locations in total along the 11 km of cable corridor inside the SAC) and at 5 km intervals along the cable corridor within the NNSSR SAC (nine transect sample locations in total along the 47 km of cable corridor inside the SAC), with the potential to vary this spacing depending on the homogeneity of the sediment (i.e. greater homogeneity allows for wider sampling intervals). Greater homogeneity is expected within the NNSSR SAC and therefore more frequent sample locations have been included in the WNNC SAC to capture the greater potential for change. Pre-construction transect sample locations will be identified and agreed with stakeholders following the pre-construction geophysical survey, as detailed in **Section 2.2**.

37. Following completion of construction, the locations of cable protection deployed within the WNNC and NNSSR will be reported to the MMO, and SNCBs, as required under the DCO. Following this reporting, Hornsea Three will propose the locations for operational transect sample locations, as detailed in **Section 2.2**. Transect sample locations will be selected from those areas where cable protection has been

deployed, using the same frequency as the pre-construction transect locations[8] (1 km intervals in WNNC, 5 km intervals in NNSSR).

38. During operational monitoring, control transects may be selected to enable natural changes to be established and compared against observed changes in potentially affected areas. This approach will assist in the attribution of potential causes of change. Control transects would be chosen from areas surveyed during pre-construction but not subject to the deployment of cable protection during construction (confirmed following completion of construction). The number and location of control transects will be chosen from undisturbed areas within Hornsea Three cable corridor based on the type of habitat on which cable protection is deployed (inferred mainly from sediment type). If control areas are not feasible (i.e., no similar areas are identified from a review of the baseline data) then the gradient effect inherently provided by the transects would be relied upon in order to monitor change at given distances away from the source of impact[9]. This will depend on the extent and type of feature being monitored and the source of impact.

39. Hornsea Three anticipate that similar transect locations monitored during operation will be monitored post-decommissioning, however this would be agreed with stakeholders following confirmation of decommissioning strategy, as detailed in **Section 2.2**.

40. Hornsea Three note that should no cable protection be deployed within the SACs then the operational and post-decommissioning monitoring outlined in this EMP will by default not be required. Hornsea Three continue to work towards deployment of minimum cable protection and note that this monitoring requirement should not encourage deployment of cable protection where it is not required.

4.2 Pre-construction monitoring

41. Pre-construction monitoring surveys will be undertaken by Hornsea Three to provide a baseline against which monitoring will be undertaken during operation and post-decommissioning. Pre-construction monitoring requirements are secured in the Hornsea Three deemed Marine Licenses and Hornsea Three anticipate submitting pre-construction monitoring plans to the MMO for approval in 2022. These pre-construction surveys will include a pre-construction geophysical survey of the Hornsea Three offshore export cable corridor, which will be utilised to inform the pre-construction seabed characterisation for the remaining surveys detailed in this EMP.

42. Following completion of the pre-construction geophysical survey, the results will indicate appropriate locations for pre-construction transects to be targeted as detailed in **Section 4.1.2** to determine the pre-construction benthic characterisation.

43. The transect locations cannot be directly targeted in the locations where cable protection will be deployed as the locations of cable protection deployment will not be known until construction of Hornsea Three is complete. The deployment of cable protection will only occur in areas where the cable cannot be buried or adequately protected and, although the ground model will inform these areas to a certain extent, it is not possible to confirm exact locations of cable protection deployment until construction has been completed.

44. Therefore, the transect sample locations will be based on a review of data collected during the pre-construction geophysical survey to determine the homogeneity of the cable corridor in terms of the physical features. Where there is greater variability there may be more frequent transects, where there is less variability there may be fewer transects.

4.3 Operational monitoring

45. Monitoring surveys will be carried out at specific years during the operational lifetime of Hornsea Three to meet the aims outlined in **Section 3**. All operational monitoring surveys will follow the same specification as detailed in **Section 4.1** to ensure that the results are directly comparable.

[8] Frequency of transects will be confirmed post cable protection deployment.
[9] In this instance, transects may be widened from 50 m up to 100 m to collect data from a wider gradient

46. Surveys during operation will be carried out on the following schedule, repeated at the same time of year as the pre-construction monitoring survey:

- Year 1 (from time of installation): to capture any immediate changes from the installation of cable protection,
- Year 3: to monitor initial recovery/changes over time, and
- Year 5: to capture any final recovery/changes as it is expected that colonisation and recovery would have stabilised/ceased by this point in time following installation of the cable protection (see **Section 4.5**).

47. A year 10 may also be required to monitor any further changes should recovery not occur in the short or medium term. It is anticipated that the requirement for this would be confirmed with the MMO following the year 5 survey. Hornsea Three anticipate that recovery will be stabilised by year 5.

48. Hornsea Three note that the frequency of operational surveys is proposed to explore longer-term trends. The frequency of surveys will be reviewed following each survey year as part of the reporting of the monitoring results (as detailed in **Section 2.2**). If recovery is shown to be relatively rapid (when compared to control sites), then the frequency of future monitoring could be reduced (and potentially cease altogether if seabed level changes are interpreted to be driven by natural processes). Alternatively, should the monitoring demonstrate that no colonisation is taking place, further monitoring in relation to benthic characterisation may not be carried out.

4.3.1 Seabed characterisation

49. The marine processes monitoring data would provide observations on the early stages of post-cable protection placement on sediment movement and recovery. A comparison of the bathymetry images (from the geophysical survey) would provide a sufficient basis for a quantitative and statistically robust assessment of geometrical changes that have occurred and allow determination if these have occurred as a result of the protection, and any subsequent recovery, or are part of a natural cycle and not linked to the presence of the cable protection. This analysis would include:

- Characteristics of seabed morphology and bedforms, including their approximate size, shape, and orientation;
- The dimensions of the cable protection footprints;
- The nature and magnitude of any changes to seabed and sandwave morphology; and
- An interpretation of the nature and magnitude of change contributing to sediment movement.

4.3.2 Benthic characterisation

50. Benthic characterisation (to inform potential impacts on epifaunal assemblages) will identify any changes to the physical characteristics which could affect the structure and function of the sandbanks themselves and also which could affect the species associated with the sandbank habitats. These changes would be inferred from the geophysical monitoring data. Predictions based on habitat type and mobility through direct observation and comparison of epifaunal communities with surrounding areas would be inferred via DDV data analysis.

4.4 Post-decommissioning monitoring

51. Under the terms of the DCO, Hornsea Three are required to endeavour to recover all cable protection, to the extent it is demonstrated to be feasible pursuant to relevant survey(s) and method statement(s) to be carried out by Hornsea Three and approved by the MMO. The decommissioning of cable protection also has the potential to impact the benthic ecology in the SAC however the effectiveness of decommissioning of cable protection is still largely unknown (JNCC, 2017).

52. Following removal of the cable protection, it is intended that the monitoring surveys (a repeat of the operational phase monitoring using the same specification as set out in **Section 4.1.1**) will be carried out in year 1 (post-decommissioning/removal of cable protection), year 3 and year 5. These frequencies allow for a sufficient window of time for recovery to occur (**Section 4.5**). A year 10 survey may also be required to monitor recovery of impacted areas however it is anticipated that the requirement for this would be confirmed with the MMO following the year 5 survey.

53. Seabed characterisation and benthic characterisation would be conducted in the same manner as detailed in **Section 4.3.1** and **Section 4.3.2** respectively.

4.5 Recoverability

54. Although the recoverability[10] of sandbank habitat following installation and subsequent decommissioning of cable protection remains largely unknown, Hornsea Three has utilised evidence base to determine the most appropriate monitoring frequency as outlined in **Section 4.3** and **Section 4.4**.

55. Recovery potential can draw widely on the results of extensive surveys in sedimentary habitats undertaken as part of the research associated with dredging activities. Such surveys show that recovery within mobile sandbank habitats is likely to occur relatively rapidly, particularly when compared to recovery in more stable sedimentary habitats. For example, a review by Wilber and Clarke (2007) showed that for most situations, recovery in sand and coarser sediment habitats (cobble, gravel) recovery times varied between 3 months and 4 years.

56. The duration for recovery will be dependent on many factors, including the stability of the habitat, sediment type before and after disturbance and species present in the affected area and the surrounding unimpacted area. Recovery of small areas of habitat within a wider area of the same habitat (such as is most likely with disturbance related to a cable corridor) is likely to be quicker as long as the remaining habitat does not change significantly. This is because the species will rapidly recolonise from adjacent areas. Given that the cable protection will be deployed in a mobile environment and is not anticipated to significantly change the habitat, this evidence base demonstrates that the monitoring frequencies Hornsea Three have proposed (year 1, year 3, year 5 and potentially year 10) are appropriate to answer the EMP monitoring hypothesis (**Section 3.1**).

5 Reporting monitoring results

5.1 Reporting deliverables

57. A concise standalone survey report will be prepared and submitted to MMO and SNCBs after each year of monitoring is undertaken. One survey report will be prepared which covers the NNSSR and WNNC SACs. Where relevant, the survey report will consider the results of previous surveys undertaken and will draw on results available from similar studies that may be available through OWEER. The consultation responses to each year of monitoring will feed into the adaptative management of the monitoring, as set out in **Section 5.3**.

58. The proposed structure of the monitoring report(s) is provided in **Table 2**.

Table 2: Proposed structure of monitoring reports.

Section	Description
Project summary	• Summary of Hornsea Three project development
Background	• Background to the project and monitoring requirements
Technical description	• Technical description of survey specification utilised.
Equipment calibration	• Detail regarding the calibration of the equipment.
Fieldwork summary	• Summary of survey period, extent of survey coverage achieved with respect to that planned, weather conditions, etc.
Data description and processing	• Description of the data collected and its processing.
Results	• Present the results from the monitoring
Discussion	• Discuss the findings from previous years of monitoring surveys have relevance

[10] Defined as "the ability of a habitat, community or individual (or individual colony) of species to redress damage sustained as a result of an external factor" (MarLIN Glossary, 2005)

Section	Description
References	• References cited

5.2 Supporting industry evidence base

59. To further increase the evidence base, all monitoring data and reports will be shared with the wider industry through the Crown Estate's Marine Data Exchange and on OWEER once they have been deemed to not be of any commercial sensitivity. Monitoring reports will also be provided to the benthic compensation SG and other relevant stakeholders for information.

60. Should Hornsea Three consider it appropriate, the data may be drafted into a peer reviewed published article in order to reach broader circulation in the academic community.

5.3 Adapting monitoring according to results

61. It is acknowledged that the monitoring needs to be flexible to take account of developments as the project progresses and that the individual monitoring programmes may need to be amended if the evidence indicates the existing monitoring programme is not fit for purpose and/or impacts are not as predicted. Equally the programmes could be required to be altered if the results show fewer impacts than anticipated and if recovery post-decommissioning is faster than excepted. This approach will allow for a monitoring programme that is adaptable and fit for purpose, providing the best data to inform the evidence base as the monitoring progresses.

62. Proposed amendments to the survey specification to allow for adaptive monitoring to occur such as any changes to the survey methodology or survey frequency will be discussed and agreed with the MMO and SNCBs, through consultation on and approval of the monitoring reports submitted after each survey as detailed in **Section 2.2.**

6 Licenses and legal requirements

63. The proposed survey specification will be subject to the relevant marine licensing requirements, which are currently anticipated to be as outlined in **Table 3**.

Table 3: Anticipated licensing requirements.

Survey Works	Compliance detail
Geophysical survey	• Submission of an exemption to MMO with supporting environmental information prior to each survey campaign
DDV transects	• Submission of a marine licence application prior to each survey campaign

7 References

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