

## **Vattenfall Wind Power Ltd**

### **Thanet Extension Offshore Wind Farm**

Annex B to Appendix 15 to Deadline 6 Submission:  
Responses to Natural England on the potential  
sand wave clearance and displacement of material  
from Goodwin Sands pMCZ

Relevant Examination Deadline: 6

Submitted by Vattenfall Wind Power Ltd

Date: May 2019

Revision A

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Date of Approval:	May 2019
Revision:	A

Revision A	Original Document submitted to the Examining Authority
N/A	
N/A	
N/A	

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## 1 Applicant's response to requested information

### 1.1 Introduction

- 1 This note has been drafted to accompany the final draft of the Technical Topics Statement of Common Ground (SoCG) between the Applicant and Natural England with regards potential loss of material from the proposed Goodwin Sands MCZ (Goodwin Sands pMCZ). This note has been submitted to Natural England for consultation prior to submission following an action taken by the Applicant during the meeting held with Natural England (2<sup>nd</sup> May 2019).
- 2 This note should be read in conjunction with Annex A to Appendix 15 of the Applicant's Deadline 6 Submission which also accompanies the final draft SoCG.

### 1.1 Requested Information

- 3 Natural England requested further information on the likelihood of sediment retention within Goodwin Sands pMCZ (primarily direction of sediment transport in the vicinity) and the potential volume of sediment which could be required for disposal from sand wave clearance in the Goodwin Sands pMCZ.
- 4 The Applicant is seeking consent to clear sand waves within the Order Limits, including the section which intersects the Goodwin Sands pMCZ. The Applicant has committed to dispose of the material either within the Goodwin Sands pMCZ (within the Order Limits) if practicable or within 500 m of the site. The need for flexibility relates to the practicality of disposing of material in close proximity to where it is being cleared to allow cable related sand wave clearance; the Applicant considers 500 m to be the closest practical distance that avoids the material infilling the area cleared too quickly. The Applicant has subsequently secured this commitment in the revised Schedule of Mitigation (Appendix 52 to the Applicant's Deadline 6 Submission).
- 5 Following discussions with the Applicant via email on this commitment, the Applicant highlighted that there is a general northward movement of bedforms (i.e. sand waves) in a northerly direction from the Goodwin Sands pMCZ. However, this note seeks to provide further clarity on sediment transport in the region (northern section of the pMCZ), as it is especially complex owing to the presence of a area of convergence of sediment transport directions.

- 6 Natural England highlighted this may lead to a loss of sediment and asked for confirmation that any sediment disposed of within 500 m of the Goodwin Sands pMCZ would be retained within the site through natural processes, i.e. not lost from the MCZ system. This note also identifies that the sediment is likely to be retained within the wider Goodwin Sands system, if not the pMCZ, as is demonstrated by the presence of Goodwin Knoll and the sand banks present. This note also seeks to provide the requested clarification and further evidence to compliment Appendix 32 of the Applicant's Deadline 5 Submission and to confirm that this would be the case.

## 1.2 Sediment Transport in the proximity of Goodwin Sands pMCZ

- 7 The key chapter of relevance is the Marine Geology, Oceanography and Physical Processes (hereafter referred to as physical processes) Chapter of the Environmental Statement (PINS Ref APP-043/ Application Ref 6.2.2), and the associated annex (PINS Ref APP-070/ Application Ref 6.4.2.1) which considered changes in sediment transport and sediment transport pathways that may arise from the project.

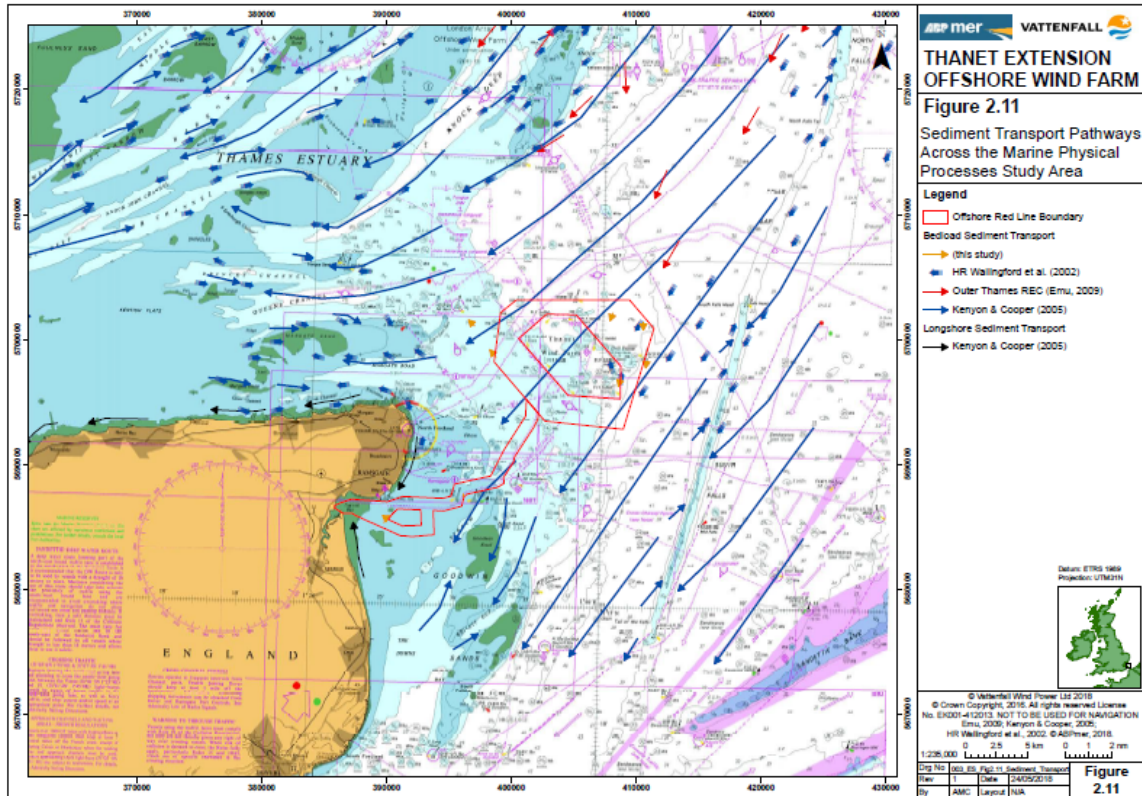
### Sediment transport patterns

- 8 As presented in in paragraph 2.7.49 and Figure 2.11 of the physical processes chapter there is a regional net south-westerly bed load transport in the Offshore Export Cable Corridor (OECC) including where the intersection of Goodwin Sands pMCZ is present. Therefore, sediment disposed of within 500 m of the Goodwin Sands pMCZ is anticipated in follow the broadscale patterns and be transported south and into the pMCZ site.
- 9 A convergence of sediment transport is created to the south of the OECC and the south-west of Goodwin Knoll, as presented in Figure 2.11 (of the ES chapter). This convergence, in the northern end of the Goodwin sandbank system is likely to result in localised variation of sediment transport, as indicated by the asymmetry of individual bedforms in the area, in both spatial (net bed load direction) and temporal scales (e.g. seasonal, inter-annual, or decadal). The precise location of this convergence, whilst hard to define, is likely to be to the south of the area of the OECC. The presence of the convergence, and the likelihood therefore of sediment being retained within the convergence of sediment transport pathways, is considered likely to result in material that is disposed of within 500 m of the pMCZ being retained within the Goodwin Sands pMCZ system following its transport back into the site by the bed load transport.

## **Mobile sand wave migration patterns**

- 10 As presented in paragraph 2.5.76 of the physical processes chapter the mobile bed forms (sand waves) within the OECC are typically on a south westerly to north easterly orientation and portray the local current regime. The observational evidence (in the form of bedform asymmetry analysis) from the OECC geophysical survey is limited although tentative evidence for a general northerly migration of bedforms is present just to the north of Goodwin Sands (see Section 8.2 of Application Ref 6.4.2.1). Figure 2.14 (of the physical processes chapter) presents that the area of the OECC which intersects Goodwin Sands may have small to medium sand waves and ridge crests present, which may require dredging to ensure successful installation of the export cables.

Figure 2.11: Sediment Transport Pathways Across the Marine Physical Processes Study Area



### 1.3 Potential volumes

- 11 The Applicant is unable to confirm whether sand wave clearance would be required within Goodwin Sands pMCZ as this would be subject to final design and as noted above the seabed forms are mobile and may alter between now and the final construction of the proposed project.
- 12 As presented in Figure 2.11 the sand waves in the area of interest were defined as small to medium sand waves. As described in paragraph 2.7.56 of the physical processes chapter, the sand waves present through the OECC are smaller than the features present within the array.
- 13 However, based on the assumptions applied in the ES an *indicative* reasonable worst case could be defined as:
- Assume medium sand waves (up to 25 m in length) (as per Figure 2.14 of the physical processes chapter);
  - 50% of the length requiring clearance (12.5 m) (to account for the trough of the wave)
  - 88 Potential features<sup>1</sup> (25 m length (wave length) / 2.2 km (maximum length of the widest section of the OECC intersection with Goodwin Sands pMCZ)
  - Volume: 88 Number of features x 12.5 m (length of feature requiring clearance) x 60 m<sup>3</sup>/m of sand wave clearance = 66,000 m<sup>3</sup>
- 14 This indicative volume is less than 5% of the total requested consent value for sand wave clearance for the project.
- 15 It should be noted that is an *indicative* maximum design estimate to provide context to the information provided in section 1.2 through reference to the assessed design envelope in the physical processes chapter.
- 16 .

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<sup>1</sup> This value has been calculated based on the assumptions of the sand wave lengths in the area and the maximum length of intersection with the Goodwin Sands pMCZ, i.e. 2.2 km / 25 m. It should be noted that this number has not been previously presented within the application documents or examination submissions. This value has been presented as a practical worst case and to aid in contextualisation of the effect considered in this clarification note.



## **1.4 Conclusions**

- 17 The Applicant has committed (and secured) that all sediment disturbed from Goodwin Sands pMCZ from sand wave clearance (if required) would be disposed of within 500 m of the site.
- 18 It is the Applicant's position that volume of sediment proposed to be potentially disturbed during sand wave clearance in Goodwin Sands pMCZ (if required) will not result in a hindrance for the site to meet its conservation objectives.
- 19 Following the Applicant's commitment to dispose of sediment within 500 m of Goodwin Sands pMCZ coupled with the net south westerly transport of the bedload; there would not be a net 'loss' of sediment from the Goodwin Sands pMCZ. Therefore, it is the Applicant's position that this commitment is appropriate and addresses Natural England's concerns raised regarding a loss of material from the site.
- 20 With the proposed mitigation measure to dispose of material within 500 m in place, combined with the overall small scale of effect there will be no net loss of sediment from the site and no hindrance to the site meeting its conservation objectives (should the site be formally designated).