NORTH FALLS

Offshore Wind Farm

MARINE CONSERVATION ZONE ASSESSMENT

Appendix 3: In Principle Measures of Equivalent Environmental Benefit Review

Document Reference No: 004284887-06
Date: May 2023
Revision: 06

In Principle Measures of Equivalent Environmental Benefit Review

May 2023

NORTH FALLS

Offshore Wind Farm

Project	North Falls Offshore Wind Farm
Sub-Project or Package	Consenting
Document Title	In Principles Measures of Equivalent Environmental Benefit Review
Document Reference	004284887-06
Revision	06
Supplier Reference No	PB9244-RHD-ZZ-OF-RP-YE-0091

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
01	31/01/22	Draft for client review	CM	GK	-
02	01/04/22	Draft for client review	CM	GK	-
03	21/04/22	For submission to ETG	CM	GK	TA
04	27/03/2023	Draft for legal review	HF	GK	-
05	21/04/2023	Draft for NFOW review	HF	GK	-
06	28/04/2023	Final	HF	SB/GK	DH/TC/AP

Contents

Tables

Plates

Figures (Volume II)

Glossary of Acronyms

AfL	Agreement for Lease
DCO	Development Consent Order
DEEP	Dornoch Environmental Enhancement Project
Defra	Department for Environment, Food & Rural Affairs
ETG	Expert Topic Group
GGOW	Greater Gabbard Offshore Wind Farm
ha	Hectares
HRA	Habitats Regulations Assessment
IFCA	Inshore Fisheries and Conservation Authority
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
KKE	Kentish Knock East
MCAA	Marine & Coastal Access Act
MCZ	Marine Conservation Zone
MCZA	Marine Conservation Zone Assessment
MEEB	Measures of Equivalent Environmental Benefit
MMO	Marine Management Organisation
MPA	Marine Protected Area
NFOW	North Falls Offshore Wind Farm Ltd
nm	nautical miles
NORI	Native Oyster Restoration Initiative
OSPAR	Oslo/Paris Convention - Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore Wind Farm
OWIG	Offshore Windfarm Industry Group
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
RWE	RWE Renewables UK Ltd
SAC	Special Area of Conservation
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSER	Scottish and Southern Energy Renewables
WTG	Wind Turbine Generator

Glossary of Terminology

Array areas	The two distinct offshore wind farm areas which together comprise the North Falls Offshore Wind Farm.
Array cables	Cables which link the wind turbine generators and the offshore substation platform.
Interconnector cable	Cable between the northern and southern array areas
Offshore export cable corridor	The corridor of seabed from array areas to the landfall within which the offshore export cables will be located.
Offshore export cables	The cables which bring electricity from the offshore substation platform to the landfall.
Offshore project area	The overall area of the array areas and the offshore export cable corridor.
Offshore substation platform	A fixed structure located within the array areas, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.

1 Introduction

1.1 Background

1. The North Falls Offshore Wind Farm (hereafter 'North Falls' or 'the Project') is a proposed extension to the existing Greater Gabbard Offshore Wind Farm (GGOW), located over 20km off the East Anglian coastline. When operational, North Falls would have the potential to generate renewable power from up to 72 wind turbines.
2. Like GGOW, North Falls is split into two boundaries (the southern and northern array areas) to facilitate a shipping route. Within these array areas, wind turbine generators (WTGs), array cables and offshore platforms (substations) will be installed.
3. The Applicant, North Falls Offshore Wind Farm Ltd (NFOW) is a consortium between Scottish and Southern Energy Renewables (SSER) Ltd and RWE Renewables UK Ltd (RWE), both of which are highly experienced developers.
4. In February 2017, The Crown Estate launched an opportunity for existing wind farms to apply for project extensions. This opportunity closed in May 2018 and in August 2019, The Crown Estate concluded a plan-level Habitats Regulations Assessment (HRA) for the proposed extension projects and confirmed that Greater Gabbard Extension (now North Falls) would be among seven that would be awarded an Agreement for Lease (AfL).
5. The southern array area of North Falls overlaps with 8km^2 of the Kentish Knock East Marine Conservation Zone (MCZ) which was recommended for designation by Defra in 2018 (Defra, 2018) and designated in 2019, after the identification of the North Falls array areas.
6. During site selection of the offshore export cable corridor, NFOW has committed to avoiding designated sites as far as possible, including avoiding the Kentish Knock East MCZ.

1.2 Purpose of this document

7. The MCZ Assessment (MCZA), provided with the Preliminary Environmental Information identifies a risk of hindering the conservation objectives of the Kentish Knock East MCZ. A review of mitigation measures is underway with the aim of reducing impacts on the MCZ and the MCZA will be updated and submitted with the Development Consent Order (DCO) application. This document provides a review of potential Measures of Equivalent Environmental Benefit (MEEB) that could be implemented to provide equivalent benefit to the habitats of the MCZ affected by North Falls, if required.
8. If required, an In-Principle MEEB Plan will be submitted with the DCO application, which will:
    - Demonstrate the feasibility of potential measures;
    - Describe the approach to plan, deploy and monitor the preferred MEEB option(s) post consent; and

- Outline the information that will be required in the post-consent MEEB Plan.

9. In the event the Secretary of State is unable to reach a conclusion of no significant risk of North Falls hindering the conservation objectives of the MCZ (either alone or in-combination), a requirement may be included in the DCO for the submission and approval of a MEEB Plan for the Kentish Knock East MCZ, prior to the commencement of works within the MCZ.

2 Legislation and guidance

2.1 Marine and Coastal Access Act 2009

10. The UK Marine & Coastal Access Act (MCAA) (2009) establishes a range of measures to manage the marine environment, including establishing MCZs. The MCZ network protects rare, threatened or broadscale habitats. Broadscale habitats represent the range of major habitat types and associated biological communities found in the UK.

11. Section 126 of the MCAA places specific duties on relevant public bodies in undertaking their licensing activities where they are capable of hindering the conservation objectives of an MCZ.

12. To undertake its marine licensing function, the Marine Management Organisation (MMO) has introduced a three-stage sequential assessment process for considering impacts on MCZs, in order for it to deliver its duties under Section 126 of the MCAA. The MCZA process is similar to, but separate from, the HRA process. The stages of MCZA are presented in Plate 2.1 below.

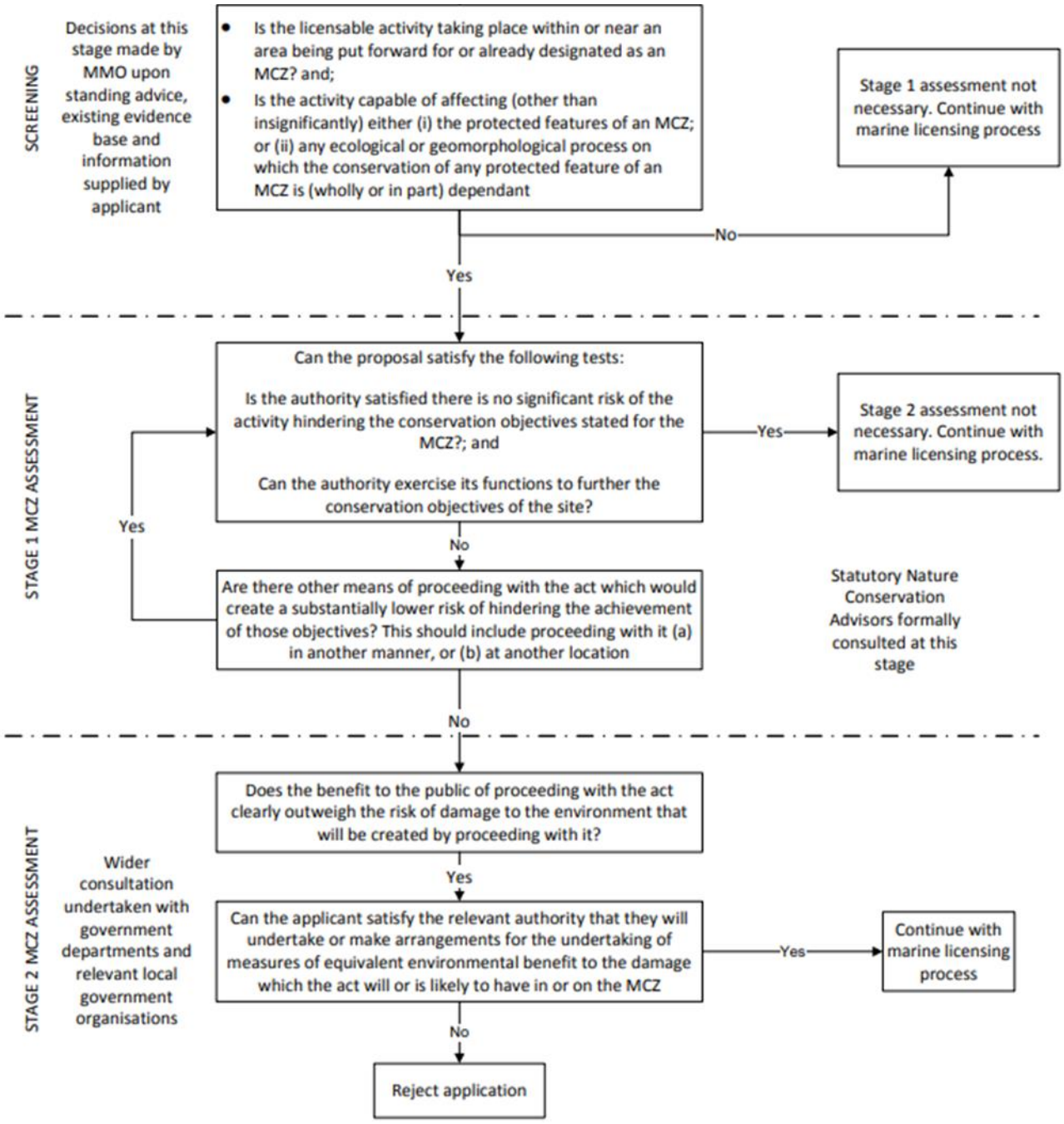

Plate 2.1 MCZ Assessment Process (source: MMO, 2013)

13. With regard to MEEB, Part 5, Chapter 1, Section 126 (7) of the MCAA 2009 states:

"although the person seeking the authorisation is not able to satisfy the authority that there is no significant risk of the act hindering the achievement of the conservation objectives stated for the MCZ, that person satisfies the authority that—

(a) there is no other means of proceeding with the act which would create a substantially lower risk of hindering the achievement of those objectives,

(b) the benefit to the public of proceeding with the act clearly outweighs the risk of damage to the environment that will be created by proceeding with it, and

(c) the person seeking the authorisation will undertake, or make arrangements for the undertaking of, measures of equivalent environmental benefit to the damage which the act will or is likely to have in or on the MCZ."

14. If required, Parts (a) and (b) will be addressed in a separate report. Therefore, this document focuses only on MEEB that may be required under Section 126(7)(c) of the MCAA.

2.2 Guidance on MEEB

15. Department for Environment, Food & Rural Affairs (Defra) has published for consultation a draft document setting out best practice guidance for developing compensatory measures in relation to Marine Protected Areas (MPAs) (Defra 2021a). This draft guidance sets out the following principles that compensation/MEEB should satisfy:

- *"Link to the conservation objectives for the site or feature and address the specific damage caused by the permitted activity;*
- *Focus on providing the same ecological function for the species or habitat that the activity is damaging OR, where this is not technically possible, provide functions and properties that are comparable to those that originally justified designation;*
- *Not negatively impact on any other sites or features;*
- *Ensure the overall coherence of designated sites and the integrity of the MPA network; and*
- *Be able to be monitored to demonstrate that they have delivered effective and sustainable compensation for the impact of the project. The monitoring and management strategy must require further action to be taken if the compensation is not successful."*

16. In relation to the second bullet point above, the guidance provides a hierarchy approach (shown in Table 2.1).

Table 2.1 MEEB hierarchy (source: Defra, 2021a)

Hierarchy of Measures	Description
1. Address same impact at same location	Address the specific impact caused by the permitted activity in the same location (within the site boundary)
2. Same ecological function different location	Provide the same ecological function as the impacted feature; if necessary, in a different location (outside of the site boundary)
3. Comparable ecological function same location	Provide ecological functions and properties that are comparable to those that originally justified the designation in the same location as the impact
4. Comparable ecological function different location	Provide ecological functions and properties that are comparable to those that originally justified designation; if necessary, in a different location (outside of the site boundary)

2.3 Energy Bill 2023

17. The Energy Bill includes a provision for establishment of a Marine Recovery Fund, into which payments may be made by Offshore Wind Farm (OWF) projects and from which payments may be made towards compensation measures for adverse environmental effects of OWFs. It is expected this could also apply to MEEB. Subject to this regulation, there may be the potential for a payment into the fund and the Applicant will continue to monitor progress of the Energy Bill and have regard to any legislative changes when preparing its DCO application. The Applicant is also open to considering other forms of strategic compensation, should they become available.

3 Consultation

18. This review has been informed by consultation undertaken on the Draft Outline in Principle MEEB Plan Review, submitted to the Seabed Expert Topic Group (ETG) in April 2022. Responses to feedback from Natural England and the MMO is outlined in Table 3.1 below.

19. Further stakeholder feedback received during the Section 42 consultation will be used to refine the screening of potential MEEB and determine which MEEB to progress to a final In Principle MEEB Plan to support the Stage 2 MCZA and DCO application, if required.

Table 3.1 Summary of Consultation on the Draft In Principle MEEB Plan to date

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
Natural England	25th May 2022	1	Natural England welcomes the consideration of MEEB at this early stage by the North Falls OWF [offshore wind farm] project. The result of the habitat surveys will be key to determining which habitats and communities will be impacted, and how they will be impacted. Until we have that information, progression of a 'reef creation' type option may be rather hasty as it may not offset the impacts on mixed sediment, coarse sediment and subtidal sand. Therefore, we do not agree with the 'likely' categorisation of the options in Table 5.1 in the North Falls MEEB Review document.	The outputs of the benthic site characterisation survey have been used to inform the MCZA. A summary of the impacts of North Falls is provided in Section 4.4. This In Principle MEEB Review has been refined to take account of the preliminary MCZA and will continue to be refined throughout the pre-application process for North Falls to account for consultation feedback and to develop the most suitable MEEB options, if required.
Natural England	25th May 2022	2	We advise that further consideration be given to the conservation objectives for those MCZ features which may be impacted to help inform potential MEEB options. We also advise discussion with the Offshore Windfarm Industry Group (OWIG) who are considering potential strategic options for delivering benthic compensation/MEEB. We envisage that further consideration of MEEB as part of the pre-application process will continue.	A summary of the relevant impacts from the MCZA is provided in Section 4.4. The MCZA considers the conservation objectives for the MCZ features that may be impacted by North Falls. This In Principle MEEB Review has been refined to take account of the preliminary MCZA and will continue to be refined throughout the pre-application process for North Falls to account for consultation feedback and to develop the most suitable MEEB options, if required. NFOW will continue to engage with the OWIG on suitable MEEB.
Natural England	25th May 2022	3	Point 9 (1.2) Purpose of this Document - *"If required, an In-Principle MEEB Plan will be submitted with the Development Consent Order (DCO) application, which will: • Demonstrate the feasibility of potential measures; • Describe the approach to plan, deploy and monitor the preferred MEEB option(s) post consent; and • Outline the information that will be required in the post-consent MEEB Plan."* Natural England (NE) advises that more detailed information/commitments will be required pre consent than is proposed here. In particular demonstrating that any proposed MEEB is secured and deliverable. We refer you to NE's compensation checklist which, according to DEFRA's compensation best	Should an In-Principle MEEB Plan be required for submission alongside the DCO application, this will be developed with reference to Natural England's compensation checklist to ensure that a sufficient level of detail is presented in the MEEB Plan.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
			practice guidance 2021, is also relevant to MEEB as MCZs are given equal weighting to SPAs/SACs [Special Protection Areas/Special Areas of Conservation].	
Natural England	25th May 2022	4	Point 10 (1.2) Purpose of this Document - *"The Applicant expects that, in the event the Secretary of State is unable to reach a conclusion of no significant risk of North Falls hindering the conservation objectives of the MCZ (either alone or in-combination), a requirement will be included in the DCO for the submission and approval of a MEEB Plan for the Kentish Knock East MCZ, prior to the commencement of works."* Please see our comment above.	As above, should an In-Principle MEEB Plan be required for submission alongside the DCO application, this will be developed with reference to Natural England's compensation checklist to ensure that a sufficient level of detail is presented in the MEEB Plan.
Natural England	25th May 2022	5	Point 17 (2.2) Guidance on MEEB - "*In relation to the second bullet point above, the guidance provides a hierarchy approach (shown in Table 2.1)."* Natural England advises that prior to the compensation hierarchy being acted upon, there should be full consideration of the mitigation hierarchy to ensure that the project has avoided, reduced and mitigated the impacts as much as possible. For example, Hornsea Project Three (HP3) committed to remove all infrastructure from Markham's Triangle MCZ.	Full consideration is being given to the mitigation hierarchy (avoid, reduce, mitigate). During site selection of the offshore cable corridor, NFOW has committed to avoiding designated sites as far as possible, including avoiding the Kentish Knock East MCZ. As discussed in Section 1.1, the Kentish Knock East MCZ was designated after identification of the North Falls array areas and so a review of mitigation measures is underway with the aim of reducing impacts on the MCZ and the MCZA will be updated and submitted with the Development Consent Order (DCO) application.
Natural England	25th May 2022	6	Point 24 (3.2) Conservation Objectives - "*Kentish Knock East MCZ was designated in 2019 to maintain subtidal sand in a favourable condition and recover subtidal coarse sediment and subtidal mixed sediments to a favourable condition."* We would advise, therefore, that the MEEB needs to ensure that there is no further deterioration of these habitats and should in fact be helping to restore the features.	Section 6 outlines the potential impacts of MEEB options. Only measures which would not cause further deterioration of the features of the MCZ would be taken forward.
Natural England	25th May 2022	7	Point 28 (3.4) Existing Pressures on the Kentish Knock East MCZ - *"During the Kentish Knock East recommended MCZ survey undertaken in 2014, manmade litter/debris was observed at two stations within the Kentish Knock East MCZ, including fishing twine/rope and blue plastic (Defra, 2015)."*	The 'Kentish Knock East rMCZ Post-survey Site Report' (Defra, 2015) noted that manmade litter/debris (fishing twine/rope and blue plastic) at two stations in the MCZ was observed during

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
			Please can this point be clarified? Is it stating that historically litter has been located within the site?	the 2014 survey. This result indicates that manmade litter/debris is present in the site.
Natural England	25th May 2022	8	Point 29 (3.4) Existing Pressures on the Kentish Knock East MCZ - *"The following gears are known to be used within the site: • Bottom trawls; • Mid-water trawls; • Dredges; • Hooks and lines; • Nets; and • Pots and traps"* It is unclear whether this is suggesting that there may be ghost fishing gear/litter present at this site, or that there are fishing pressures on this site, or both? Please can this be clarified?	This statement suggests that the MCZ is subject to fishing pressure. See response above, which notes that marine litter/debris, including from fishing activity, is known to be present in the MCZ.
Natural England	25th May 2022	9	Section 4.1.1. Address Same Impact at Same Location – Removal of Marine Debris and/or Litter Within the Kentish Knock East MCZ Natural England advises that this option will not provide the necessary compensation measure alone, but could form part of a package alongside something much more substantive or, alternatively, a positive Net Gain option. As with our advice to the Secretary of State (dated 21 January 2022) on Hornsea Project Three, it is challenging to demonstrate that these options will offset habitat loss.	Noted. NFOW has screened-in this option, noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ. Please refer to Section 5.1.1 for further information.
Natural England	25th May 2022	10	Point 33 (4.1.1) Address Same Impact at Same Location - Removal of Marine Debris and/or Litter Within the Kentish Knock East MCZ - *"Therefore, the removal of debris/litter would provide direct environmental benefit to the value of the MCZ by removing a pressure on the feature(s) affected by North Falls, as well as reducing pressures on the wider ecosystem which are supported by the MCZ."* Natural England disagrees with this statement, as noted in point 7 above, this could form part of a package alongside more substantive measures or Net Gain. Please note that, this advice is also consistent with the advice given to other extension round projects considering MEEB within an MCZ.	Noted. In consideration of Natural England's point 7 and 8, NFOW has screened-in this option, noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ.
Natural England	25th May 2022	11	Point 34 (4.1.1) Address Same Impact at Same Location - Removal of Marine Debris and/or Litter Within the Kentish Knock East MCZ - *"The measure requires survey(s) to identify anthropogenic debris/litter and then retrieval of the debris/litter. Consultation would be undertaken with Natural England to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection, following completion of the MCZA. The method for retrieval would also be agreed with Natural England following identification of the debris/litter post consent."*	Please see responses above. NFOW has screened-in this option noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
			Please see our comment above. There is unlikely to be any agreement on litter removal as a standalone option.	
Natural England	25th May 2022	12	Points 35-37 (4.1.1) Address Same Impact at Same Location – Removal of Marine Debris and/or Litter Within the Kentish Knock East MCZ - *(35) "This measure has been legally secured as HRA compensation by Hornsea Project Three (HOW03) and Norfolk Boreas to compensate the deployment of external cable protection on the sandbank feature of a Special Area of Conservation (SAC). HOW03 is required to deliver the following: • Sandbanks Implementation Plan: o Survey an area of 41.80ha in one SAC and 2.77ha in another which will subject to marine debris removal; o Engagement with fishermen through marine debris awareness events and measures to facilitate the rapid recovery of lost fishing gear; • A Steering Group to oversee the Sandbanks Implementation Plan. (36) Norfolk Boreas is required to deliver the following: • A benthic implementation and monitoring plan to deliver the retrieval of 8.3 hectares (ha) marine debris; and • A benthic steering group to oversee the benthic implementation and monitoring plan. (37) It is anticipated that the survey(s) and removal of debris could be undertaken in the period between consent and construction."* Given the challenges that have been faced by regulators and developers in delivering this measure, there is no guarantee of regulator support for this option going forward. Furthermore, we strongly encourage consideration of other options with better ecological merits for the interest feature of the site.	Please see responses above.
Natural England	25th May 2022	13	Section 4.1.2. Address Same Impact at Same Location - Extension to Kentish Knock East MCZ Protecting additional seabed is something that we believe could be considered as MEEB. However. It will be challenging to achieve this at this particular site given the surrounding anthropogenic pressures. Therefore, there is a third option to consider, which is ensuring the coherence of the designated site network. This is something NE has some thoughts on which would involve an industry partnership project, more details will be provided once we are able to provide them.	While NFOW acknowledge that there are areas to the northwest and to the southwest of the MCZ that are constrained by aggregate production areas, there remains potential to extend the MCZ to the south. Therefore, this option has been screened-in for further consideration as MEEB (see Section 6.1.2) and would be subject to discussion with Natural England. Designation of features in an alternative location to ensure coherence of the designated site network is also screened-in for further consideration as MEEB (see Section 6.2.2).

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
Natural England	25th May 2022	14	Section 4.2.1 Same Ecological Function Different Location – Removal of Marine Debris and/or Litter at an Alternative Marine Protected Area We would advise that this option will have the same issue as the within site option, which is that of not offsetting habitat loss. In addition, it will be challenging to demonstrate the 'success' of this MEEB.	NFOW has screened-in this option noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ. Removal of marine debris/litter could offset the habitat loss associated with the footprint of wind turbines, scour protection and external cable protection, as well as providing wider ecological benefits.
Natural England	25th May 2022	15	Section 4.2.2 Same Ecological Function Different Location – Designation of Feature in Different Location Please see comment on 4.1.2 - this is something the OWIG is considering	Noted. NFOW will continue to engage with OWIG
Natural England	25th May 2022	16	Section 4.3.1. Comparable Ecological Function Same Location – Management of Fisheries within the Kentish Knock East MCZ Overall, Natural England believes that habitat improvement through the removal of anthropogenic pressures could be considered as compensation from an ecological perspective. However, fisheries management measures are challenging to demonstrate as being additive as they should already be occurring as part of site management. We advise that a better option would be to consider the removal of redundant infrastructure which is surface laid where there is no other mechanism for removal.	This MEEB option could be delivered as part of strategic compensation measures delivered by the relevant authorities and has therefore been screened-in for further consideration as MEEB.
Natural England	25th May 2022	17	Section 4.3.2. Comparable Ecological Function Same Location – Enhance Biodiversity – Planting of Biogenic Features within the MCZ - *"Therefore, the creation of biogenic features could provide an enhanced value and function compared with sedimentary features by supporting additional biodiversity. Biogenic reefs and beds can also provide wider ecosystem benefits, such as carbon sequestration and improving water quality."* We advise that this is only relevant if 'reef' communities are being lost/changed as a result of the project. For example, the creation of reef would not offset impacts to sandbanks.	Creation of sediment habitat is not considered possible given the potential for existing marine conditions to rapidly erode any artificially created sediment features. However, as discussed in Section 4.2, the primary value of subtidal sediment is associated with the biological communities of the sediment habitat and the role of these communities in supporting the wider ecosystem, including fish, marine mammals, and seabirds. As *Sabellaria spinulosa* reef, oyster beds and horse mussel beds are relevant biotopes for the MCZ on Natural England's Advice on Operations

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
				for subtidal mixed sediments, these biogenic features may form suitable MEEB options. Please refer to Section 5.3.1 for further details.
Natural England	25th May 2022	18	Section 4.3.2.1 Comparable Ecological Function Same Location – *Sabellaria* Reef For this to be considered as MEEB there would need to be clear demonstration that this priority habitat is a feature of the site and is being impacted by the development. In addition there are other reefs such as Oyster Beds which may be considered more appropriate	As *S. spinulosa* reef is a relevant biotope for the MCZ on Natural England's Advice on Operations for subtidal mixed sediments, planting of *S. spinulosa* is, in theory, a suitable MEEB option. However, given the current limited understanding of planting *S. spinulosa* reefs or the success of such measures, with studies either hypothetical or undertaken under controlled laboratory conditions, this MEEB option has been discounted from further consideration, in favour of alternative solutions. Please refer to Section 5.3.2.1 for further information.
Natural England	25th May 2022	19	Section 4.3.2.2 Comparable Ecological Function Same Location – Native Oyster Beds Please refer to our advice for *Sabellaria* above.	Native oyster (*Ostrea edulis*) beds are a relevant biotope for the MCZ on Natural England's Advice on Operations for subtidal mixed sediments, and planting native oyster beds therefore constitutes MEEB. As there are numerous examples demonstrating that planting of native oyster beds in the UK has been successful, this this option has been taken forward for further consideration as MEEB. Please see Section 5.3.2.2 for further information.
Natural England	25th May 2022	20	Section 4.3.3 Enhance Biodiversity – Artificial Reef This measure has been discounted at other MCZs. How would this offset the impacts to coarse sediment, mixed sediment and subtidal sand?	This MEEB option has been discounted from further consideration (see Section 5.3.3).
Natural England	25th May 2022	21	Section 4.4.1 Comparable Ecological Function Different Location – Enhance Biodiversity – Planting of Biogenic Features in a Different Location	Planting of biogenic features outside the MCZ could provide enhanced value and function to the MPA network, compared to the habitat loss within the MCZ. Biogenic features could include

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
			We would again query how this would offset impacts to coarse sediment, mixed sediment and subtidal sand? How will the success of maintaining the MPA [Marine Protected Area] network be demonstrated?	oyster or beds, as these are relevant biotopes for the designated features of the MCZ. A monitoring plan will be developed and implemented in consultation with Natural England to monitor the success of the MEEB initiative.
Marine Management Organisation	21st June 2022	22	**2. Marine litter removal/debris within the MCZ** 2.1. Regarding the proposal for removal of marine litter from within the Kentish Knock East MCZ (KKE MCZ), more information is required at this stage on the size of area proposed for litter removal. The area of overlap between the North Falls OWF and KKE MCZ is 8 km2 (800 hectares) compared to 41 hectares due to be surveyed in a Special Area of Conservation as HRA compensation for Hornsea Project Three OWF, as stated in line 35 of the report (paragraph 4). Assuming litter would be surveyed and removed from within the 100m buffer around each of the proposed 71 wind turbine generators (WTGs), a total area of approximately 71 hectares would be subject to marine litter removal within the KNE MCZ. It must be noted that if this assumption is accurate, a proportion of the 71 hectares area subject to marine litter removal would then be directly impacted by WTG Infrastructure should the application be successful. Alternatively, an equivalent area within the KKE MCZ (or another Marine Protected Area), where no infrastructure is planned, could be subject to litter removal.	Quantification of the potential impact on the MCZ is provided in Section 4.4. NFOW has screened-in debris removal, noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ.
Marine Management Organisation	21st June 2022	23	2.2. The marine litter and debris proposal is one of the more favoured proposals from a coastal processes point of view, the MMO require further clarification on what would be considered 'sufficient litter/debris'. Whether that is proportional to the full 8 km2 region of KKE MCZ or to the footprint of the infrastructure (wind turbines, scour protection and external cable protection)?	If this measure is taken forward, NFOW would undertake further consultation with the MMO and Natural England to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection, following completion of the MCZA. NFOW has screened-in debris removal, noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
Marine Management Organisation	21st June 2022	24	2.3. Also, regarding the expected quantity of litter for removal; is it expected that this amount will be sufficient to compensate the proposed infrastructure, e.g., cable protection. The MMO would consult with the Statutory Nature Conservation Bodies (SNCBs) regarding considerations when deploying cable protection infrastructure in OWFs within Marine Protected Areas.	Noted. As above, NFOW would undertake further consultation with the MMO and Natural England to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection, following completion of the MCZA. NFOW has screened-in debris/litter removal, noting that this option could form part of a suite of measures comprising the MEEB Plan for the Kentish Knock East MCZ.
Marine Management Organisation	21st June 2022	25	2.4. The MMO requires further clarification on whether there will there be any categorisation regarding litter type and if there is a proposed size cut off for litter removal? Has the applicant considered carrying out an investigation (perhaps in collaboration e.g., with a university) into associated marine fauna which has colonised removed litter?	NFOW would consult with the MMO on categorisation of litter/debris removed and required investigations.
Marine Management Organisation	21st June 2022	26	2.5. Although the MMO appreciates the immediate benefits of removing marine litter from the sea and welcome some of the proposed initiatives such as marine debris awareness events and fishers' engagement for removal of lost fishing gear, in the context of fish receptors, it is unclear that the removal of marine litter and debris within the MCZ would compensate impacts on fish such as habitat lost or disturbance. It also should be noted that there are already obligations and legal requirement for fishermen in relation to debris removal and sometimes the removal of colonised marine litter could have greater impact than doing nothing. Therefore, at this stage, the MMO do not agree that removal of marine litter could necessarily benefit the loss of fish habitats.	For the purposes of this review, the MEEB option of removing marine debris/litter has been considered due to previous agreement of this option for Hornsea Project Three, Norfolk Boreas and Norfolk Vanguard, and the removal of debris/litter would provide environmental benefit to the value of the MCZ by removing a pressure on the feature(s) affected by North Falls (see Section 5.1.1). It is noted that this option could form part of a suite measures to provide equivalent benefit.
Marine Management Organisation	21st June 2022	27	**3. Proposed extension to KNE MCZ or designating a feature in a different location.** 3.1. The MMO recognise that KKE MCZ, was designated in 2019 to maintain subtidal sand in a favourable condition and recover subtidal coarse sediment and subtidal mixed sediments to a favourable condition. The primary value of subtidal sediment (coarse, mixed and sand) is assumed to be associated with the biological communities supported by these features and the role of this community in the wider ecosystem	Noted.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
Marine Management Organisation	21st June 2022	28	3.2. With regards to a proposed extension to KKE MCZ (or designation of a different location to compensate the loss of habitat within in KKE MCZ), this would require a similar habitat mapping methodology to that of Mitchell and Curtis, 2015 i.e., Multi- Beam Echosounder with backscatter collection, ground truthing grab samples, updated habitat map and appropriate confidence score (Lillis, 2016). Then, the proportions of the designated features may not be equivalent to those within the area of overlap between the North Falls OWF and the KKE MCZ. Following the site selection process and development of site documentation for any proposed extension to the KKE MCZ (or different area), the coverage of identified broadscale habitats (BSH) may not be equivalent to those currently designated within the area of overlap. As stated in the Marine Conservation Zone assessment document (paragraph 4), *'consideration would be given to developing an area of an appropriate scale that could deliver meaningful conservation of the designated feature'*. The MMO would consult with the relevant SNCBs regarding the potential issues that may arise if the area of a protected feature e.g., a BSH within a designation MCZ, increases or decreases in size because of any new designation	The extent of the area to be extended/designated in comparison to the area lost/changed by Project infrastructure would be informed by the MCZA and consultation with the relevant stakeholders. Consideration would be given to developing an area of an appropriate scale that could deliver meaningful conservation of the designated feature. The Applicant could provide financial support and/or technical assistance and surveys to support the site selection, designation process and site management in order to deliver MEEB for the Project. Please refer to Section 5.1.2 for further information.
Marine Management Organisation	21st June 2022	29	3.3. Although not a designated feature of the KKE MCZ, *Sabellaria spinulosa* reef was present within the site boundary (Mitchell and Curtis, 2015). It may be reasonably expected that the existing population would colonise suitable habitats and negate the requirement to attempt planting (or re-planting), which has limited evidence of success, provided the established reefs are not negatively impacted by the development.	*S. spinulosa* is a relevant biotope for the subtidal mixed sediments designated in the MCZ, and therefore has potential to enhance the biodiversity of the designated feature. However, planting of *S. spinulosa* biogenic features has been discounted as a MEEB option as there is limited understanding or knowledge of the success of such measures. Please refer to Section 5.3.2.1 for further information.
Marine Management Organisation	21st June 2022	30	3.4. The MMO recognise that more information is needed related to the site selection, relevant features to be protected as well as socio-economic impacts on the coastal communities (e.g., fisheries displacement issues) to make an informed decision. Therefore, the MMO would need to consult with NE [Natural England] and JNCC [Joint Nature Conservation Committee] as relevant authorities with expertise in this area to provide further comments on the appropriateness of the proposed measures.	Noted. If this MEEB is progressed, NFOW would consult with the MMO, Natural England, JNCC and other relevant statutory stakeholders to develop appropriate MEEB prior to DCO.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
Marine Management Organisation	21st June 2022	31	3.5. There is little information provided within the document of current tidal conditions or the general trends in sediment transport, therefore it is hard to conclude the scale of impact of the construction nearby and within the KKE MCZ. However, as the KKE MCZ only overlaps a small portion of the North Falls array (8 km^2), is there any reason an exclusion zone from development has not been considered within the North Falls array for this section? Whilst there would most likely still be a need for monitoring of the KKE MCZ from the nearby impacts of infrastructure, it would result in less disturbance of the subtidal sand and coarse sediment. Potential changes to sediment pathways and suspended sediment concentrations would still affect the KKE MCZ but on a much smaller scale then if development were to occur within the KKE MCZ.	A review of the offshore array area boundaries, taking into account a range of constraints, will be completed following receipt of the preliminary environmental information (PEI) consultation feedback. NFOW will continue to engage with relevant stakeholders with regard to offshore boundaries.
Marine Management Organisation	21st June 2022	32	**4. Fisheries management** 4.1. Regarding fisheries management measures put forward, the MMO note that the reduction of fishing pressure on the MCZ is being proposed and that this will be done in collaboration with the MMO and Kent & Essex Inshore Fisheries and Conservation Authorities (KEIFCA).	Noted.
Marine Management Organisation	21st June 2022	33	4.2. The MMO appreciate that early engagement with KEIFCA has been considered. If this measure was to be taken forward, due to the high importance of the fishing activity (e.g., sole and plaice fisheries), and the great number of offshore infrastructures developed in the area, limiting professional and recreational fishers access to historic fishing grounds and impacting coastal communities' livelihoods, the MMO recommend that socio-economic research is undertaken to investigate key potential socio-economic impacts such as displacement and loss of fishing grounds resulting from multiple developments co-existing in the same area, including compensation measures and future predictions.	In recognising that the measure does not provide comparable ecological function to offset the potential impacts of habitat loss and colonisation caused by the Project on the designated features in the MCZ, this option has been discounted from further consideration.
Marine Management Organisation	21st June 2022	34	**5. Enhanced Biodiversity** 5.1. Both the Native Oyster Restoration and artificial reef proposals would constitute a change in habitat and subsequently change the functional role of the seabed at that location and would require the relevant approvals and understanding of the predicted changes to the benthic habitat. The MMO would need to consult with the SNCBs and consider the licensing and monitoring requirements of such developments / installations.	Noted. Native oysters are listed as a relevant biotope on Natural England's Advice on Operations for subtidal mixed sediments. Therefore, this option does not constitute a change in habitat or functional role for the features in the MCZ. Please refer to Section 5.3.2.2 for further information.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
				The planting of artificial reefs has been discounted from further consideration (see Section 5.3.3).
Marine Management Organisation	21st June 2022	35	5.2. An exemption exists within the Marine and Coastal Access Act 2009, for the production and cultivation of shellfish. This exemption however is very specifically worded and the applicant would need to satisfy themselves that proposed works were to fit within this. If they are unable to satisfy themselves then a marine licence may be required for the works.	Noted.
Marine Management Organisation	21st June 2022	36	5.3. In regard to 'enhanced biodiversity' measures such as planting of biogenic features (e.g., *Sabellaria spinulosa* reefs or oyster beds) within the MCZ and/or North Falls array, the MMO agrees that, to some extent, the creation of new habitats might benefit wider ecosystem features and support biodiversity. However, in the context of fish receptors, the habitat lost might not necessarily be beneficial by the new habitat created. Careful consideration is needed in terms of the suitability of this measure as the creation of an artificial reef structure involves the modification of existing fish habitat.	The potential MEEB provided by planting of biogenic features (which are relevant biotopes for the MCZ) will provide enhanced biodiversity for the designated features of the MCZ: • Subtidal coarse sediment; • Subtidal mixed sediments; and • Subtidal sand. Please refer to Section 5.3.2 for further information.
Marine Management Organisation	21st June 2022	37	5.4. The placement of artificial structures will result in a permanent loss of benthic habitat that may serve as a spawning or nursery ground habitat and a foraging habitat for fin-fish species. Therefore, consideration should be given to the fin-fish species that are known to use the area proposed for the artificial reef structure, to determine whether any of the species are dependent on the site for part or all of their life stages e.g., benthic dwelling or benthic spawning fish species.	As discussed in Section 5.3.3, artificial reef as a MEEB option has been discounted from further consideration.
Marine Management Organisation	21st June 2022	38	5.5. If this option was to be taken forward, the MMO would expect to see the construction details of these structures (e.g., materials, dimensions) and how these are going to be installed and at which locations to help us identifying potential impacts on fish receptors. Also, the MMO recommend using evidence from studies of artificial reef placement to help inform on the likely changes to the habitat, and ideally any changes in the composition of species at the site should be monitored once the reef structure is in place.	As above, artificial reef as a MEEB option has been discounted from further consideration.
Marine Management Organisation	21st June 2022	39	5.6. From a physical processes view, depending on the size and placements of the artificial reef and oyster restoration beds, these could change the composition of the seabed, disrupting the sediment pathways with a potential	Noted. Native oyster beds are a relevant biotope for the designated features of the MCZ.

Consultee	Date	Ref.	Consultee comment	Response/where addressed in this MEEB
			to disrupt the wider KKE MCZ area on a longer term. In general, these schemes would make minimal changes to wider physical processes, such as tidal and wave conditions.	
Marine Management Organisation	21st June 2022	40	**6. Other Comments** 6.1. Although the information contained on fish ecology and fisheries within the MEEB document is rather limited, the MMO have provided some comments for each of the above measures proposed from our scientific advisors. Consultation would also be required with Natural England (NE) and the Joint Nature Conservation Committee (JNCC) to provide further comments on the adequacy of the measures.	Noted. Consultation will be undertaken with the relevant stakeholders to agree MEEB, if required.
Marine Management Organisation	21st June 2022	41	**7. Summary** 7.1. To conclude it is unclear how the proposed measures would compensate impacts on fish or fish ecology, such as habitat lost or disturbance. There are many uncertainties regarding the adequacy of the proposed measures to compensate impacts on benthic habitats and fish receptors.	Noted. The MEEB options presented in this review are proposed to maintain/recover subtidal sand in a favourable condition and recover subtidal coarse sediment and subtidal mixed sediments to a favourable condition. Discussion on the feasibility and extent of options required will continue with the MMO and Natural England to agree sufficient MEEB to offset the impacts of the Project, if required.
Marine Management Organisation	21st June 2022	42	7.2. However if these measures were to be taken forward, the MMO would require more information on the methods to be used, evidence-based studies to support the assessment conclusions (particularly in UK waters), construction details of artificial structures (e.g., materials, dimensions) to be used, construction and installation methods, as well as locations to help us identify potential impacts on fish receptors and environmental baseline studies to fully understand the potential impacts of the scheme on fisheries, benthic ecology and physical processes.	As above, should an In-Principle MEEB Plan be required for submission alongside the DCO application, this will be developed with reference to Natural England's compensation checklist to ensure that a sufficient level of detail is presented in the MEEB Plan.

4 Kentish Knock East MCZ

20. The Kentish Knock East MCZ is predominantly an inshore site (within the territorial sea limit) with a small offshore section outside the territorial sea limit. It therefore lies within the remit of Natural England and the JNCC.

21. The MCZ is located in the outer Thames Estuary on the east coast of England and covers an area of 96.4km^2. Figure 4.1 presents the location of the MCZ and habitats mapped during the 2014 Defra Kentish Knock East recommended MCZ Subtidal Verification Survey[1].

[1]JNCC MPA Mapper. Available at https://jncc.gov.uk/mpa-mapper?zoom=12&centre=1.793,51.658&layerIds=56,74,55,45&baseLayerId=-2&activeFilters

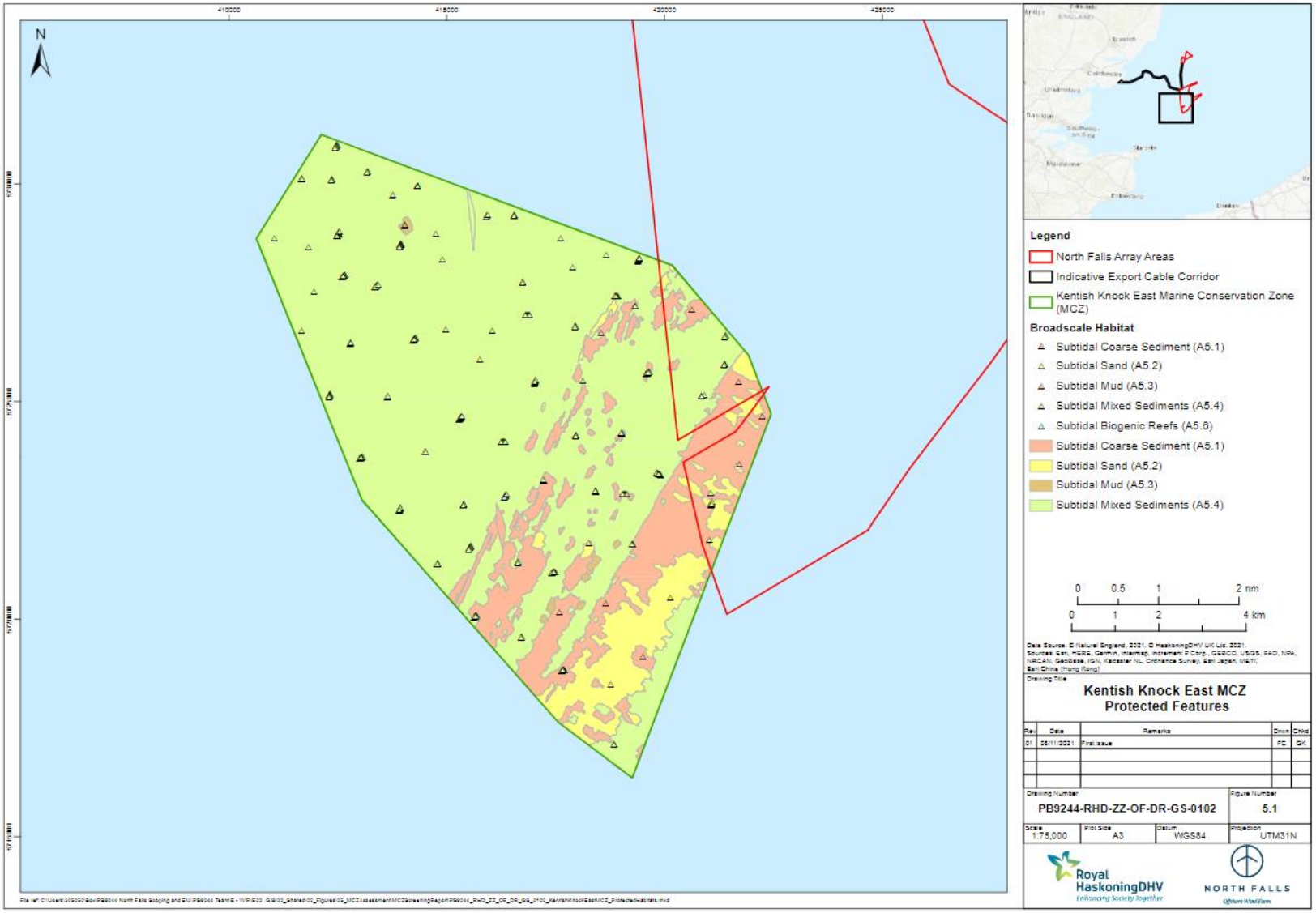

Figure 4.1 Location of broad-scale habitats in Kentish Knock East MCZ

4.1 Conservation objectives

22. Kentish Knock East MCZ was designated in 2019 to maintain subtidal sand in a favourable condition and to recover subtidal coarse sediment and subtidal mixed sediments to a favourable condition. The conservation objectives of the Kentish Knock East MCZ are that the protected habitats (Natural England, undated):

- *"are maintained in favourable condition if they are already in favourable condition*
- *be brought into favourable condition if they are not already in favourable condition*

For each protected feature, favourable condition means that, within a zone:

- *its extent is stable or increasing*
- *its structure and functions, its quality, and the composition of its characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that its condition remains healthy and does not deteriorate*

For the feature of geological interest, favourable condition means that, within a zone:

- *its extent, component elements and integrity are maintained*
- *its structure and functioning are unimpaired*
- *its surface remains sufficiently unobscured for the purposes of determining whether the conditions in paragraphs (1) and (2) are satisfied.*

Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery.

Any alteration to a feature brought about entirely by natural processes is to be disregarded when determining whether a protected feature is in favourable condition."

4.2 Value and function of the relevant protected features

23. There is currently little guidance or information on the value or function of subtidal coarse sediment; subtidal mixed sediments; and subtidal sand. These are broadscale habitats designated due to being representative of habitats found throughout UK waters. The Kentish Knock East MCZ Factsheet (Defra, 2019) discusses the importance of the MCZ, focussing on the range of sediment types, from fine sand through to coarse gravel and pebbles.

24. The primary value of subtidal sediment (coarse, mixed and sand) is assumed to be associated with the biological communities supported by these features and the role of this community in the wider ecosystem.

25. Areas of sandy, mixed and coarse substrates typically support prey species for marine mammals, fish and seabirds. The function of the habitat is associated with

the prevailing physical processes, allowing the natural development of the community. The value and function will be further informed by the MCZA.

4.3 Existing pressures on the Kentish Knock East MCZ

26. During the Kentish Knock East recommended MCZ survey undertaken in 2014, manmade litter/debris was observed at two stations within the Kentish Knock East MCZ, including fishing twine/rope and blue plastic (Defra, 2015).

27. A variety of fishing gear is used within the MCZ (bottom trawls, mid-water trawls, dredges, hooks and lines, nets, and pots and traps) (see Volume III, Appendix 14.1 of the North Falls Preliminary Environmental Information Report (PEIR)).

28. A 260km long high voltage power cable runs through the south of the Kentish Knock MCZ, between the Isle of Grain (in Kent) to Maasvlakte (near Rotterdam). The operational and technical management of the cable is undertaken by BritNed Development Ltd, a joint venture of British energy company National Grid and TenneT subsidiary NLink International (KIS-ORCA, 2021).

4.4 Potential impacts of North Falls

29. The preliminary Stage 1 MCZA for the Kentish Knock East MCZ concludes that there is a risk of hindering the conservation objectives of the Kentish Knock East MCZ as a result of the following potential impacts:

- Permanent/long term habitat loss; and
- Colonisation of foundations, scour protection and cable protection.

30. This document sets out measures with the potential to deliver equivalent benefit to the MCZ features that could be affected by North Falls, taking into account the current benefit provided by these features (Section 4.2). Sections 4.4.1 and 4.4.2 provide a summary of the findings of the MCZA with respect to these impacts.

4.4.1 Permanent/long term habitat loss during operation

31. Permanent habitat loss would be a consequence of foundations and array/interconnector cable protection in the overlap of the MCZ and the southern array. The North Falls southern array area overlaps the following features of the MCZ:

- Subtidal coarse sediments;
- Subtidal mixed sediments; and
- Subtidal sand.

32. The impact of permanent/long term habitat loss has been defined using the following pressure identified by Natural England's Advice on Operations for the Kentish Knock East MCZ:

- Physical change (to another seabed type)

33. The total permanent/long term habitat loss within the Kentish Knock East is 0.64km^2 (0.66% of the MCZ which spans 96.4 km^2), this is accounting for foundation footprints with associated scour protection, and array and interconnector cable protection. Assuming the unlikely event that all infrastructure was placed on a single protected feature, the maximum extent of permanent habitat loss for each of the Kentish Knock East MCZ features is as per below:

- Subtidal coarse sediment – 4.31 % of feature;
- Subtidal mixed sediment – 0.86 % of feature; and
- Subtidal sand – 8.68 % of feature, however given the small extent of this feature within the MCZ, it is highly unlikely that all the Project's infrastructure would be placed within this feature.

34. Subtidal coarse sediment, sand and mixed sediment seabed would be replaced by, or buried beneath, foundations or array/interconnector cable protection in localised areas. In these locations, the sediment types would be replaced by artificial hard substratum, creating areas of habitat with a similarity to circalittoral rock or infralittoral rock. Therefore, there would be a reduction in the extent and distribution of the three broadscale marine habitat features.

35. The installation of infrastructure on sediment habitats will potentially result in localised mortality of associated biological communities and their replacement, over time, by a community of different species composition and with different key structural and influential species. All sediment biotopes recorded in the overlap between the MCZ and the south array have been identified by Natural England's Advice on Operations as having a high sensitivity to physical change to another seabed type with no resistance and very low resilience to the pressure.

36. Based on the relevant pressures, receptor sensitivity and assessment of impacts against the attributes of affected Kentish Knock East MCZ features it is concluded that the conservation objectives of maintaining subtidal sands and recovering subtidal coarse sediment and mixed sediment to favourable condition could be hindered by the risks of permanent / long term habitat loss during the operation of North Falls.

4.4.2 Colonisation of foundations, scour protection and cable protection during operation

37. During the operational phase, hard infrastructure that has been placed in the benthic environment is likely to be colonised by native and/or invasive non-native species (INNS). Non-native species may become invasive and displace native organisms by preying on them or out-competing them for resources such as food, space or both.

38. Whilst colonisation represents an increase in biodiversity, it is a change from sedimentary habitat to hard substrate. As previously noted, biological communities recorded in the overlap of the MCZ and the southern array are sensitive to the pressure 'Physical change to another sediment type'

39. The impact of colonisation is closely related to that of habitat loss as the sediment habitat is lost and replaced with the hard artificial substrate associated with the Project infrastructure.

40. Based on the relevant pressures, receptor sensitivity and assessment of impacts against the attributes of effected Kentish Knock East MCZ, it is concluded that the conservation objectives of maintaining subtidal sands and recovering subtidal mixed sediment and subtidal coarse sediment could be hindered by colonisation of foundations, scour protection and cable protection.

5 Screening of potential MEEB

41. The following sections provide a review of potential MEEB which could provide equivalent benefit to the features potentially impacted by North Falls.

5.1 Address same impact at same location

5.1.1 Removal of marine debris and/or litter within the Kentish Knock East MCZ

42. Removal of marine debris/litter could offset the footprint of wind turbines, scour protection and external cable protection, as well as providing wider ecological benefits. Marine debris/litter causes the following impacts, which would be removed or reduced as a result of debris/litter removal:

- A footprint on the seabed causing habitat loss and potential abrasion through any movement caused by natural processes.
- Marine litter can be consumed by marine fauna causing malnutrition;
- Breakdown of some marine litter can contribute to microplastic concentration in the water column and in the seabed, in turn leading to a reduction in water and sediment quality, as well as the potential for bioaccumulation within marine fauna; and
- Entanglement/entrapment of marine fauna causing injury or death.

43. Therefore, the removal of debris/litter would provide direct environmental benefit to the value of the MCZ by removing a pressure on the feature(s) affected by North Falls, as well as reducing pressures on the wider ecosystem which are supported by the MCZ.

44. Key sources of marine debris/litter include commercial fisheries and shipping.

45. The measure requires survey(s) to identify anthropogenic debris/litter and then retrieval of the debris/litter. Consultation would be undertaken with Natural England to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection, following completion of the MCZA. The method for retrieval would also be agreed with Natural England following identification of the debris/litter post consent.

46. This measure has been legally secured as HRA compensation by Hornsea Project Three, Norfolk Boreas and Norfolk Vanguard to compensate the deployment of external cable protection on the sandbank feature of a SAC. Hornsea Project Three is required to deliver the following:

- Sandbanks Implementation Plan:
  - Survey an area of 41.80ha in one SAC and 2.77ha in another which will subject to marine debris removal;
  - Engagement with fishermen through marine debris awareness events and measures to facilitate the rapid recovery of lost fishing gear;
- A Steering Group to oversee the Sandbanks Implementation Plan.

47. Norfolk Boreas and Norfolk Vanguard are each required to deliver the following:

- A benthic implementation and monitoring plan to deliver the retrieval of 8.3 hectares (ha) marine debris; and
- A benthic steering group to oversee the benthic implementation and monitoring plan.

48. It is anticipated that the survey(s) and removal of debris/litter could be undertaken in the period between consent and construction. The methodology for removal would be subject to approval by the Secretary of State and consulted on with Natural England and the MMO. Potential modes of delivery could include both marine debris/litter removal in areas of the MCZ impacted by the Project, as well as the wider MCZ, in line with the consultation feedback from the MMO (Table 3.1, ref. 22 and 23).

49. While consultation feedback from Natural England (Table 3.1, ref. 9 to 12) advises that removal of marine debris and/or litter may provide insufficient MEEB as a stand-alone option, NFOW could deliver this option as part of a suite of measures comprising the MEEB for the Kentish Knock East MCZ. This option has therefore been screened-in for further consideration as MEEB.

5.1.2 Extension to Kentish Knock East MCZ

50. This measure would entail the extension of the Kentish Knock East MCZ to expand the designation to further protect the relevant feature(s) at an extent beyond its current boundary, in order to compensate for the loss of habitat within the current Kentish Knock East MCZ boundary.

51. In relation to HRA, amendments to the National Site Network to provide compensation under HRA Derogation is possible in theory, as shown in Defra (2021). It is expected that this guidance would be equally applicable to MCZs, and states: "*The appropriate authorities must adapt the network where necessary given that the abundance and distribution of habitats and species within the network might evolve over time. They may need to designate new SACs or SPAs to achieve the network objectives. They may also need to amend existing SACs or SPAs. For example...to include an area which compensates for the loss of other areas within the network as a result of a plan*

or project proceeding for IROPI [Imperative Reasons of Overriding Public Interest] reasons".

52. The environmental benefits of designating habitat beyond the current boundary would be equivalent to the benefit provided to the existing habitats of the MCZ.

53. An extension to the Kentish Knock East MCZ would have to be delivered by the JNCC or Natural England, with Defra. The Applicant could provide financial support and/or technical assistance and surveys to support the site selection, designation process and site management in order to deliver MEEB for the Project.

54. This measure would be subject to the statutory designation process, including consultation with stakeholders and analysis of the socio-economic impacts of designation. It is therefore not certain that a recommended designation would be successful.

55. Defra (2013) shows the stages that were adopted during designation of the existing MCZs, following the processes set out in Plate 5.1 and Plate 5.2:

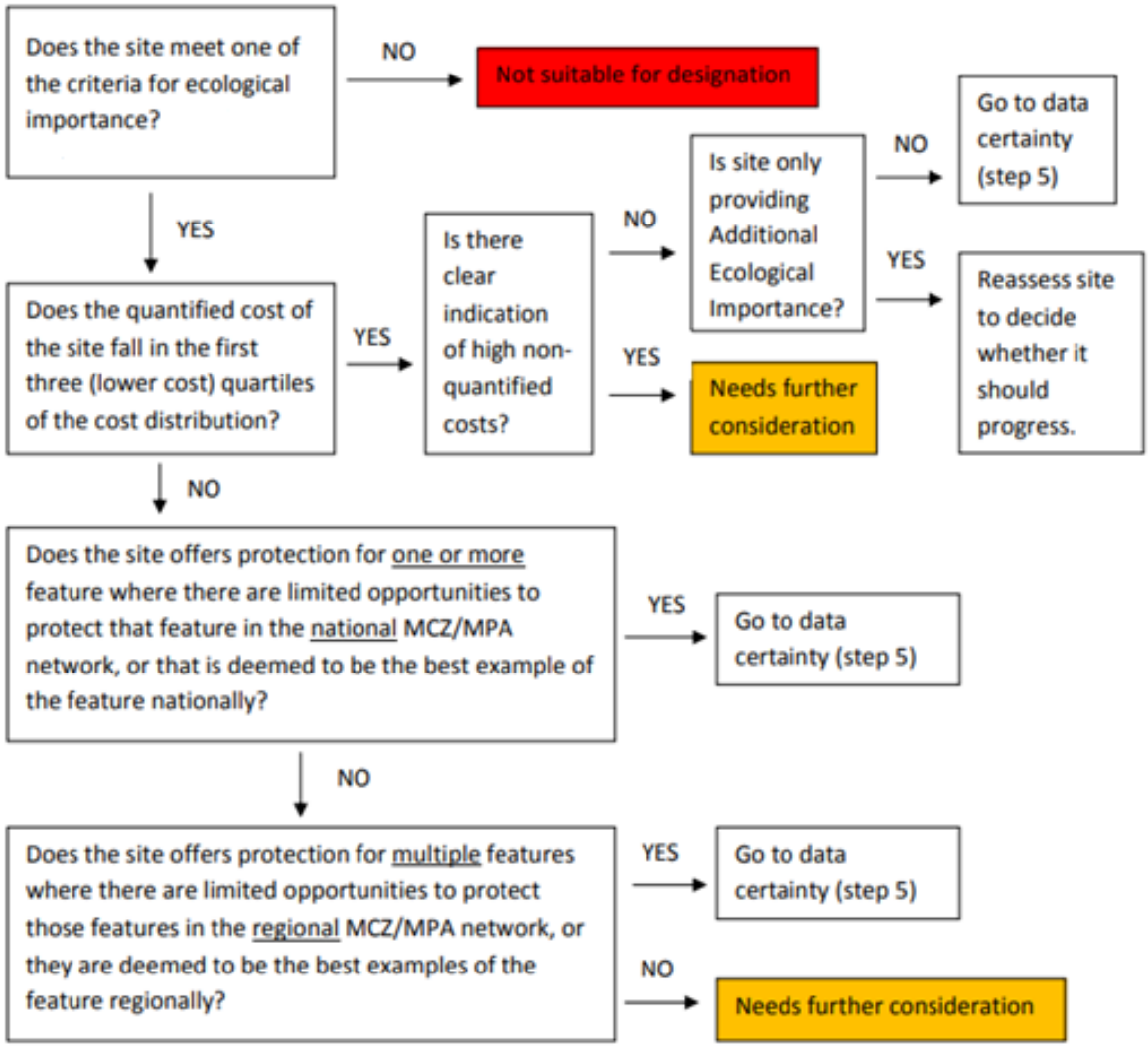

Plate 5.1 Example Flow chart - Ecological contribution and socio-economic considerations in designating an MCZ (source: Defra, 2013)

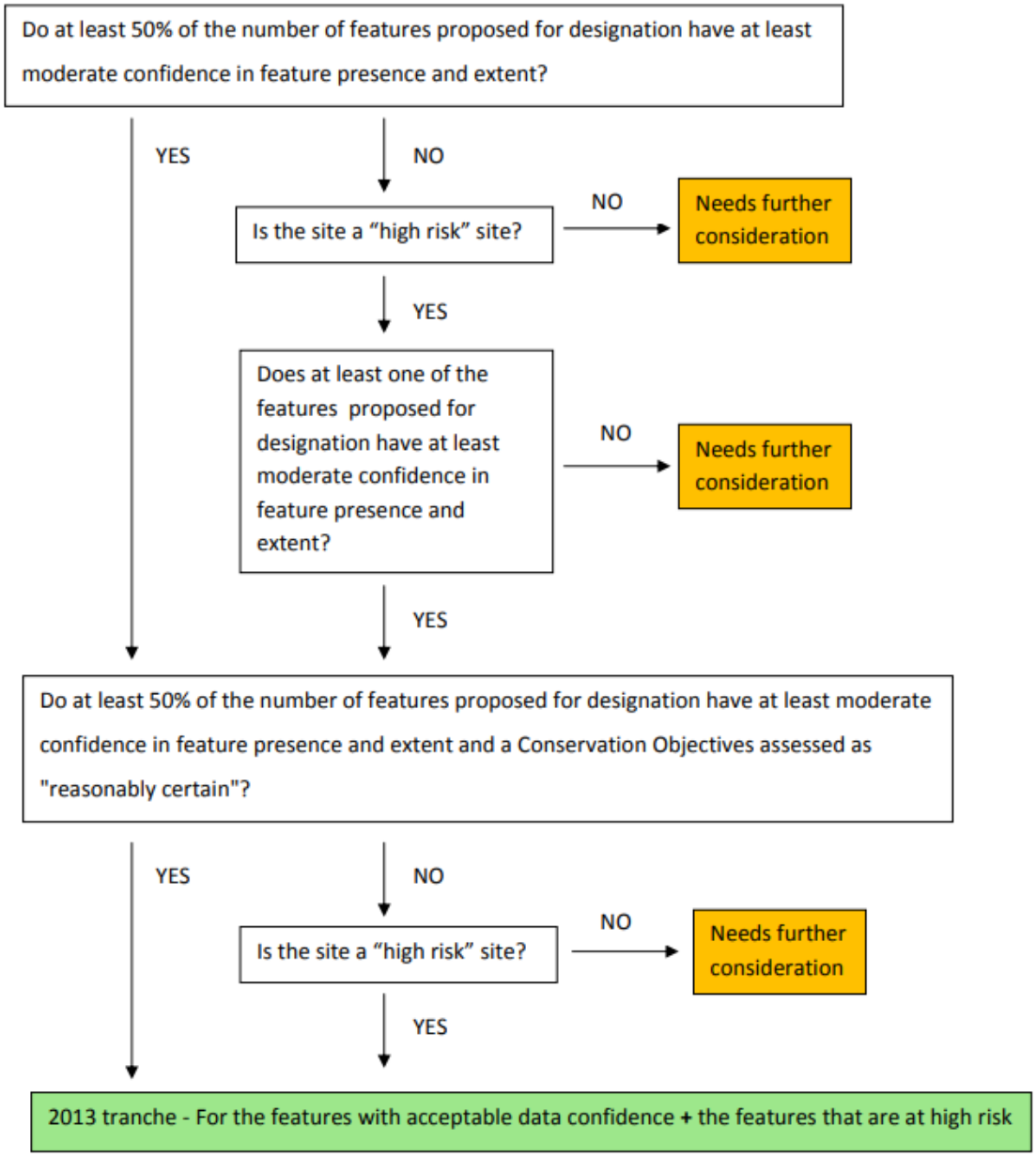

Plate 5.2 Example Flow chart - Data certainty (step 5 from Plate 5.1) considerations in designating an MCZ (source: Defra 2013)

56. It is recognised that the designation of the MCZ required a site selection exercise and therefore any extension would need to be informed by survey data to provide evidence to justify the extension.

57. Previous designations of MCZs have taken approximately two years between the provision of a recommendation from Natural England or JNCC and the finalisation of the designation by Defra (JNCC, 2019). It is estimated that the site selection

process and development of site documentation would take an additional two years prior to the submission of the recommended MCZ.

58. The extent of the area to be designated in comparison to the area lost/changed by Project infrastructure would be agreed with Natural England and the MMO. Consideration would be given to developing an area of an appropriate scale that could deliver meaningful conservation of the designated feature. This would likely be subject to the extent and condition of the habitat selected for designation and would therefore require agreement post consent, through the site selection process.

59. Consultation feedback from Natural England (Table 3.1, ref. 13) advised that while this option could provide the appropriate level of MEEB, anthropogenic pressures surrounding the site make an extension of the Kentish Knock East MCZ difficult. While NFOW acknowledge that there are areas to the northwest and to the southwest that are constrained by aggregate production areas, there remains potential to extend the MCZ, subject to further surveys assessing feasibility and presence of the designated features in this area. Discussion on suitable areas for extent would be held with Natural England and the MMO. This option has therefore been screened-in for further consideration as MEEB.

5.2 Same ecological function different location

5.2.1 Removal of marine debris and/or litter at an alternative Marine Protected Area

60. As discussed in Section 5.1.1, the removal of marine litter/debris that would not otherwise be removed provides a benefit to offset the placement of external cable protection. In this scenario, the removal of marine litter/debris would be from within similar habitats to the ones impacted by the project, but from another location, e.g., an alternative MCZ or SAC.

61. This measure would require input from external organisations, such as Natural England, MMO and the relevant Inshore Fisheries and Conservation Authority (IFCA), to aid in identification of a location(s) where litter/debris is an issue, followed by surveys to identify anthropogenic litter/debris for removal.

62. Section 5.1.1 should be referred to for further information, as the principles of this measure would be the same. This option has been screened-in for further consideration as MEEB.

5.2.2 Designation of feature(s) in different location

63. This measure would entail designation of an area not yet designated which contains the relevant feature(s), in order to provide protection of the feature to compensate the loss of habitat within the Kentish Knock East MCZ.

64. Previous MCZ site selection processes have identified areas which were subsequently not taken forward to designation. These may present areas which could be targeted for further consideration, subject to advice from Natural England and JNCC as to why they were previously discounted. For example, during the Tranche 3 MCZ designation process in 2019, 41 sites were put forward

for consideration, of which 13 sites were selected and designated. Following the assessment of network progress undertaken in Tranche Two, JNCC made a further review of what would be protected following that Tranche of MCZs. As a result of this network analysis in 2016, an approach was developed to identify new site options to complete the MPA network (JNCC, 2019). The discounted sites may therefore have been surplus at that time, rather than unsuitable.

65. Section 5.1.2 should be referred to for further information, as the principles of this measure would be the same. Designation of feature(s) in a different location will be screened-in for further consideration as MEEB, in accounting for the consultation advice from Natural England highlighting the potential for this MEEB option to contribute to coherence of the designated site network (see Table 3.1).

5.3 Comparable ecological function same location

5.3.1 Management of fisheries within the Kentish Knock East MCZ

66. As discussed in Section 4.3, an existing pressure on the Kentish Knock East MCZ is fishing. This MEEB would involve reducing the impact of fishing on the features of the MCZ through fisheries management measures. As described in Section 4.3, a number of fishing methods take place within the MCZ, including fishing methods which make contact with the seafloor, causing abrasion/disturbance of substates and substratum and changes in suspended solids affecting water quality. Reducing this impact would constitute MEEB to offset the footprint of wind turbines, scour protection and external cable protection, as well as providing wider ecological benefits.

67. The removal of pre-existing pressures on designated sites is the responsibility of the regulator, and therefore, the development of this measure would require input from the JNCC, Natural England and the MMO to enact a management measure, such as a fisheries byelaw. The extent of the area to be covered by such a byelaw to provide equivalent benefit to the recurring habitat disturbance from fisheries would be agreed with relevant stakeholders. As an indicative example, a 2:1 ratio would mean that a 0.64km^2 area of habitat loss would require a 1.3km^2 fisheries management area. A ratio, such as 2:1 recognises that the implementation of fisheries management measures does not guarantee that all areas covered will achieve a favourable condition and/or that there may be a time delay for the benefit to be realised.

68. This option could be delivered as part of strategic compensation measures delivered by the relevant authorities and NFOW could encompass additional support in aid of this, should this MEEB be taken forward, for example through research on socio-economic impacts of the measures and facilitating alternative livelihoods to mitigate the loss or displacement from fishing grounds. This is in line with MMO recommendations during consultation (see Table 3.1, ref. 33).

69. Therefore, this option has been screened-in for further consideration as MEEB if delivered as part of strategic compensation, by the relevant authorities.

5.3.2 Enhance biodiversity - planting of biogenic features within the MCZ

70. Creation of sediment habitat is not considered possible given the potential for existing marine conditions to rapidly erode any artificially created sediment features. Furthermore, any attempts to create sediment is likely to impact upon other protected features. However, as discussed in Section 4.2, the primary value of subtidal sediment is associated with the biological communities of the sediment habitat and the role of these communities in supporting the wider ecosystem, including fish, marine mammals, and seabirds. Therefore, the creation of biogenic features could provide an enhanced value and function compared with sedimentary features by supporting additional biodiversity. Biogenic reefs and beds can also provide wider ecosystem benefits, such as carbon sequestration and improving water quality.

71. Biogenic features found on sedimentary habitat in the southern North Sea could include *S. spinulosa* reef, native oyster beds, and horse mussel beds, all of which are relevant biotopes for the MCZ on Natural England's Advice on Operations for subtidal mixed sediments.

72. Should this measure be deemed to be appropriate, the extent of the area to be planted to provide equivalent benefit to the habitat loss would be agreed with Natural England. An indicative 2:1 ratio could be appropriate, in recognising that planting of biogenic features may not be 100% successful. The delivery of this measure would require a site selection exercise to identify a suitable location for planting. The developer would provide funding to complete this process, as well as commissioning appropriate experts to undertake planting and monitoring of the biogenic feature.

73. Planting could potentially be undertaken in proximity to turbine foundations, where commercial fishing is likely to be reduced, provided maintenance works are not inhibited. Any planting in proximity to turbine foundations would have to be developed post construction but could be legally secured prior to construction in accordance with the Defra (2021) draft Guidance.

5.3.2.1 *S. spinulosa reef*

74. *S. spinulosa* is a polychaete which under certain conditions establishes tubular reef structures which support increased biodiversity. *S. spinulosa* reef is found throughout the southern North Sea, including in the Kentish Knock East MCZ. It is therefore likely that suitable habitat exists to support the development of reef.

75. There has been relatively little investigation into planting of *S. spinulosa* reefs. Although it has not yet been trialled, several authors have explored the idea of biogenic reef restoration. For example, aggregated clusters of *S. spinulosa* collected from a colony on the Inner Westmark Knock sandbank in The Wash embayment have been found to develop well under laboratory conditions, demonstrating that *S. spinulosa* may be suitable for transplantation (Davies et al., 2009).

76. Transplantation of *S. spinulosa* aggregations was also suggested as a mitigation measure option in the case of the proposed White Sands offshore wind farm (Dickie et al., 2013). This report suggests that the aggregations could be removed, held in tanks during construction and then restored in protected areas

of the site such as turbine bases, or in other suitable locations such as within a Marine Protected Area or ‘no take zone’.

77. Given the current limited understanding of planting *S. spinulosa* reefs or the success of such measures, with studies either hypothetical or undertaken under controlled laboratory conditions, this MEEB option has been discounted from further consideration.

5.3.2.2 *Native oyster beds*

78. Native oyster *Ostrea edulis* beds support increased biodiversity and provide nursery grounds for juvenile fish and other species. They are also filter feeders, supporting water quality by removing impurities. In addition, studies (e.g., Fodrie *et al.* 2017) suggest that oyster beds have the capacity to deliver carbon sequestration, due to their use of carbon in producing the calcium carbonate shell.

79. While native oysters are not a designated feature of the MCZ, they are listed as a relevant biotope on Natural England’s Advice on Operations for subtidal mixed sediments.

80. Therefore, it is likely native oyster beds could provide a natural biogenic feature within the MCZ which provides an enhanced function to the sedimentary features of the MCZ in the form of increased biodiversity.

81. A number of oyster restoration projects are underway around the UK at various stages of development, including:

- The Dornoch Environmental Enhancement Project (DEEP) - Planting commenced in 2018 and provides evidence of successful seeding of native oyster beds in an area where beds had been extinct for over 100 years. The initial results demonstrated a high survival rate of up to 86% (DEEP, undated).
- Loch Craignish Native Oyster Restoration - Around 220,000 oysters have been planted in 2020/21.
- The Wales Native Oyster Restoration Project - Planting commenced in 2020 with an initial 25,000 oysters.
- Solent Oyster Restoration Project - 90,000 oysters planted below pontoons/marinas and 15,000 in Langstone harbour within The Solent.
- Essex Native Oyster Restoration Initiative (NORI) - Planting of around 45,000 oysters commenced in 2019.
- The Humber Estuary - Trials have successfully reintroduced 3,000 oysters.

82. These examples show that planting of native oyster beds in the UK has been successful to date. Therefore, this option has been taken forward for further consideration as MEEB.

5.3.2.3 *Horse mussel beds*

83. As with oyster beds, mussel beds support increased biodiversity by providing substratum for epiflora and epifauna, as well as crevices which represent a range

of fauna. Horse mussel *Modiolus modiolus* beds could by developed to provide enhanced ecological function at an alternative location.

84. Horse mussel is listed as a relevant biotope on Natural England's Advice on Operations for subtidal mixed sediments.

85. Horse mussel beds typically develop in areas of strong currents (Tyler-Walters, H. 2007; Tyler-Walters, H., 2008a). Horse mussel is typically found in the subtidal zone up to 280m depth.

86. It is likely that currents are relatively weak based on the findings at Greater Gabbard offshore wind farm, where average velocities of 0.4m/s were recorded at the seabed and therefore a location in the MCZ with suitable conditions would need to be identified through a site selection exercise. This option has been screened-in for further consideration as MEEB.

5.3.3 Enhance biodiversity - artificial reef

87. Artificial geogenic (rocky) reef structures could support biodiversity, providing enhanced ecological function in supporting the wider ecosystem. These could be structures placed on the seabed at a location to be determined by site selection or structures placed on the turbine foundations and/or scour protection.

88. However, this would cause further loss of sedimentary habitat and/or may not be additive to the colonisation that is expected on the turbine foundations being installed as part of the Project. Therefore, this option has been discounted from further consideration.

5.4 Comparable ecological function different location

5.4.1 Enhance biodiversity - Planting of biogenic features in a different location

89. As with Section 5.3.2, planting of biogenic features outside the MCZ, could provide enhanced value and function compared to the habitat loss within the MCZ. Biogenic features could include native oyster, horse mussel or seagrass beds.

90. The delivery of this measure would require a site selection exercise to identify a suitable location for planting, as well as establishing protection over the new habitat. An indicative 2:1 ratio could be appropriate, in recognising that planting of biogenic features may not be 100% successful. The developer would provide funding to complete these processes, as well as commissioning appropriate experts to undertake planting and monitoring of the biogenic feature.

5.4.1.1 *Native oyster beds*

91. Section 5.3.2 should be referred to for further information, as the principles of this measure would be the same following the identification of a suitable location for planting. This option has been screened-in for further consideration as MEEB.

5.4.1.2 *Horse mussel beds*

92. Section 5.3.2.3 should be referred to for further information, as the principles of this measure would be the same following the identification of a suitable location for planting. This option has been screened-in for further consideration as MEEB.

5.4.1.3 *Seagrass beds*

93. Seagrass beds are located in shallow waters and can support a diverse range of fauna and flora, as well as providing a nursery area for fish and shellfish. The status of seagrass beds in the UK is poor, with an outbreak of disease in the 1920/30s from which recovery has been limited. (Tyler-Walters, H. 2008b)

94. Seagrass beds have not been identified as relevant biotope for the designated features of the MCZ, and therefore, enhancing biodiversity by planting biogenic reefs in the form of seagrass beds does not provide MEEB. Therefore, this option has been discounted from further consideration.

5.5 Summary of screening of potential MEEB

95. Section 5 identified MEEB options to be screened-in for further consideration as MEEB, including measures that:

- Address the same impact in the Kentish Knock East MCZ:
    - Removal of marine debris and/or litter; and
    - Extending the MCZ.
- Provide the same ecological function in a different location:
    - Removal of marine debris and/or litter at an alternative MCZ; and
    - Designation of feature(s) in a different location.
- Provide comparable ecological function in the Kentish Knock East MCZ:
    - Management of fisheries; and
    - Planting of biogenic features (native oyster beds and horse mussel beds).
- Provide comparable ecological function in a different location:
    - Planting of biogenic features (native oyster beds and horse mussel beds) at an alternative MCZ/location.

96. These measures have been screened-in for further consideration as MEEB, as the measures:

- Have the potential to deliver the appropriate level of MEEB either in isolation or as part of a suite of measures;
- Have been identified as appropriate compensation for other offshore wind projects and/or have been demonstrated as realistically feasible to implement; and

- Take account of initial consultation feedback provided by Natural England and the MMO (see Table 3.1).

6 Impact Assessment of screened-in MEEB

97. Following on from the screening of potential MEEB, the proposed screened-in MEEB options have been assessed to determine the potential impacts of the implementation of MEEB options on other receptors.

6.1 Address the same impact at the same location

6.1.1 Potential impacts of removal of marine litter/debris within the MCZ

98. The worst case scenario impact as a result of removal of marine litter/debris is likely to be as a result of dredging or other removal methods, which would cause temporary physical disturbance to seabed sediments. It is expected that the impacts would be highly localised and targeted on areas of litter/debris identified during surveys. These areas would already be subject to habitat loss as a result of the marine litter/debris, although it is recognised that the temporary disturbance of removal would be on an area larger than the footprint of the litter/debris. No sediment is anticipated to be removed, and therefore the volume of designated sediment features will remain the same, while the surface area of designated features is increased. The methodology for removal of marine litter/debris would be designed to be sensitive to the designated sediments which will be restored as a result of the removal.

6.1.1.1 *Summary of potential impact*

99. Sediment movement will be a temporary, short term and highly localised impact, and therefore, the removal or marine litter/debris within the MCZ would have no adverse impact on receptors.

6.1.2 Potential impacts of an extension to the Kentish Knock East MCZ

100. In order to provide equivalent benefit, an extension to the Kentish Knock East MCZ would be expected to have the same management requirements as the existing designation. Fisheries management measures are not currently implemented in the Kentish Knock East MCZ and therefore it is unlikely the fisheries would be restricted within an extension area. It is therefore expected that there would be no adverse impact on fisheries, as a result of this potential MEEB.

101. Impacts on infrastructure and other marine user receptors may arise as a result of the extension. While NFOW acknowledge that there are areas to the west, northwest and southeast that are constrained by aggregate production areas, no relevant receptors have been identified to the north and south of the MCZ at this stage. The site selection exercise would avoid existing users and infrastructure and therefore, no adverse impact on infrastructure and other marine users is anticipated.

6.1.2.1 *Summary of potential impact*

102. The potential impacts of extending the MCZ are anticipated to have no adverse impact on infrastructure and other marine users, and negligible adverse impact on commercial fisheries.

6.2 Same ecological function different location

6.2.1 Potential impacts of removal of marine litter/debris at an alternative MPA

103. As described in Section 6.1.1, for removal of marine litter/debris within the MCZ, impacts of removal of marine litter/debris at an alternative MPA would also be highly localised and targeted on areas of litter/debris identified during surveys.

6.2.1.1 *Summary of potential impact*

104. The potential impacts would have no adverse impact on receptors in an alternative MPA, as with the option to remove marine litter/debris from within the Kentish Knock East MCZ.

6.2.2 Potential impacts of designation of feature in different location

105. The designation of the feature in a different location may give rise to potential impacts on the following receptors, including:

- Commercial fisheries, should fisheries management measures be implemented in the MCZ;
- Aggregate extraction operations;
- Subsea cables/subsea cable operators;
- Coastal development projects/measures;
- Tourism/recreation receptors;
- Archaeological heritage sites; and
- Oil and gas industry.

6.2.2.1 *Summary of potential impact*

106. As the location of the designation of the features is not known at this stage, it is not possible to assess the impact of this MEEB option, as it is subject to levels of activity by commercial fisheries, infrastructure and other marine users in the proposed location, and whether any restrictions on these activities would be implemented. The site selection exercise would seek to minimise impacts on commercial fisheries, and existing users and infrastructure and therefore no adverse effect is expected. As discussed in Section 6.1.2, fisheries management measures are not currently implemented in the Kentish Knock East MCZ and therefore in order to provide equivalent benefit, a new designation would be expected to have the same management requirements as the existing designation. It is therefore unlikely the fisheries would be restricted within an extension area.

6.3 Comparable ecological function same location

6.3.1 Potential impacts of managing fisheries in the MCZ

107. As discussed above, no fisheries management measures are currently implemented in the MCZ. This MEEB option could include fisheries management measures (e.g., bottom-towed gear restrictions in all or areas of the MCZ) to reduce abrasion and disturbance to the designated features in the MCZ. The potential impact on commercial fisheries depends on the range of operation, dependence on the area and availability of alternative grounds with respect to the area of restriction.

108. As the exact location and size of the area(s) that could be subject to fisheries management will be defined in consultation with relevant authorities it is not possible to provide an indication of potential impact.

6.3.1.1 *Summary of potential impact*

109. Potential impact is not known at this stage and would be re-assessed following consultation with relevant authorities should this measure be chosen as the preferred MEEB option.

6.3.2 Potential impacts of enhancing biodiversity - planting of biogenic features within the MCZ – Native oyster beds and/or horse mussel beds

110. As noted in Section 5.3.2, while native oysters and horse mussels are not a designated feature of the MCZ, they are listed as a relevant biotope on Natural England's Advice on Operations for subtidal mixed sediments.

111. Potential impacts may occur on commercial fisheries, other marine users and benthic ecology as a result of planting native oyster and horse mussel beds in the MCZ.

112. In order for the biogenic reefs to thrive and integrate into the natural benthic habitat, commercial fishing in areas where native oyster/horse mussel beds are planted would necessarily be restricted. However, as the scale of native oyster/horse mussel beds required to offset potential impacts of the North Falls Project would likely be small in the context of the operational ranges of commercial fishers active in the region, exclusion from the oyster bed area is anticipated to have negligible adverse impact on commercial fisheries. The impacts of this could potentially be minimised by developing the oyster/horse mussel beds within advisory safety zones around the wind turbines and/or offshore substation platforms.

113. Whilst disturbance of the designated sediments may occur as a result of the planting of the native oyster/horse mussel beds, the potential for adverse impacts are anticipated to be short term and limited since cultch (i.e., shell material) and native oysters/horse mussels would be deployed on mixed sediment which is likely to include shell already. This therefore does not represent the introduction of a new substrate type, especially in considering that native oyster/horse mussel beds are a relevant biotope to subtidal mixed sediments.

114. With respect to the potential for introduction of INNS in planting of the native oyster/horse mussel beds, NFOW would establish a biosecurity plan, minimising the potential for spread of INNS.

115. No adverse impact is therefore predicted on benthic ecology, with regard to sediment disturbance and INNS.

6.3.2.1 *Summary of potential impact*

116. The potential impacts of planting native oyster/horse mussel beds in the MCZ would have no impact on benthic ecology or negligible adverse short term impact on commercial fisheries and other marine users.

6.4 Comparable ecological function different location

6.4.1 Potential impacts of enhancing biodiversity – planting of biogenic features in a different location - Native oyster beds and horse mussel beds

117. As described in Section 6.3.1 for planting of native oyster beds in the Kentish Knock East MCZ, the impacts of planting of native oyster beds at different location may include impacts on commercial fisheries, other marine users and benthic ecology. Similar impacts are anticipated for the planting of horse mussel beds.

118. Potential impacts on commercial fisheries and other marine users may occur as a result of restrictions on activity in areas where the native oyster or horse mussel beds have been planted, if required. The magnitude of the impact is subject to the level of activity in the given location.

119. It can be assumed that native oyster or horse mussel beds would only be planted in different locations which form a suitable habitat. Therefore, it can be assumed that the same impacts as identified for planting of biogenic features in the MCZ (6.3.2.1) will be applicable for planting of biogenic features in a different location. Therefore, no adverse impact on benthic ecology, with regard to sediment disturbance and INNS, is predicted.

6.4.1.1 *Summary of potential impact*

120. As the different location is not known at this stage, it is not possible to assess the impact of this MEEB option on commercial fisheries and other marine users as it is subject to levels of activity by these receptors.

121. For benthic ecology, impacts are anticipated to be as for impacts in the MCZ, which is no adverse impacts from short-term sediment disturbance or INNS.

7 Summary of MEEB Review

122. The options considered for the Kentish Knock East MCZ are summarised in Table 7.1.

Table 7.1 Summary of potential North Falls Measures of Equivalent Environmental Benefit

Hierarchy level (Defra, 2021b)	Possible measure and method	Proposed delivery mechanism/s	Deliverability	Spatial scale/location	Feasibility	Screened-in for further consideration as MEEB?	Impact on other receptors
Same function, same location	Removal of marine litter/debris within the MCZ	Survey to locate litter/debris. Agree removal method and license with MMO in consultation with Natural England. Commission removal of litter/debris.	This measure has been demonstrated to be legally securable by the Hornsea Three, Norfolk Vanguard and Norfolk Boreas DCOs.	The measure requires survey(s) to identify the locations of anthropogenic debris/litter. Consultation would be undertaken with the relevant statutory stakeholders to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection.	Uncertain Feasibility is subject to the presence of sufficient litter/debris to provide MEEB and/or delivery as part of a suite of compensation measures.	Yes Potential to deliver MEEB option stand-alone or as part of suite of compensation measures.	No adverse impact
Same function, same location	Extension to Kentish Knock East MCZ	Technical input and/or financial support to Statutory Nature Conservation Body (SNCB) to progress site designation of an extension to the existing MCZ.	Deliverability would be subject to identification of appropriate area and agreement with regulator/SNCB	The extent of the area to be designated in comparison to the area lost/changed by Project infrastructure would be agreed with Natural England and the MMO. Consideration would be given to developing an area of an appropriate scale that could deliver meaningful conservation of the designated feature.	Medium Feasibility is subject to confirming that suitable areas are available to be taken forward. At this stage, areas to the north and south of the existing Kentish Knock East MCZ are identified for potential extension.	Yes Option to extend subject to further surveys assessing feasibility and presence of the designated features in proximity to the existing Kentish Knock East MCZ.	No adverse impact, assuming no restrictions on activity in the designated area.
Same function, different location	Removal of marine litter/debris within the MCZ	As per removal of litter/debris within the MCZ, with an additional consultation phase to identify an appropriate location to target.	Deliverability would be subject to identification of a suitable location and quantum of litter/debris for clearance	The measure requires survey(s) to identify the locations of anthropogenic debris/litter. Consultation would be undertaken with the relevant statutory stakeholders to understand the extent of marine debris/litter which could deliver equivalent benefit to the placement of wind turbines, scour protection and external cable protection.	Uncertain Feasibility is subject to information from stakeholders/3rd parties to assist in identifying an area to target. If an area can be identified the feasibility is expected to be high.	Yes Potential to deliver MEEB option as part of suite of compensation measures.	No adverse impact
Same function, different location	Designation of feature in different location	Technical input and/or financial support to Statutory Nature Conservation Body (SNCB) to progress site designation of alternative location to existing MCZ.	Deliverability would be subject to identification of appropriate area and agreement with Regulator/SNCB	The extent of the area to be designated in comparison to the area lost/changed by Project infrastructure would be agreed with Natural England and the MMO. Consideration would be given to developing an area of an appropriate scale that could deliver meaningful conservation of the designated feature.	Uncertain Feasibility is subject to confirming that suitable areas are available to be taken forward. This would then be subject to the statutory designation process.	Yes Option to contribute to maintenance and extension of designated site network.	Unknown – subject to commercial fishing, infrastructure and other marine user pressure in the different location. Anticipated to have no adverse impact should no restrictions be placed on activity.
Comparable function, same location	Fisheries management measures	Financial contribution to support the implementation of fisheries management measures by the relevant regulator.	Would be delivered by relevant authorities as part of strategic compensation.	Extent of area would be agreed with relevant stakeholders.	Uncertain Feasibility is subject to government authorities supporting fisheries management measures.	Yes Option screened-in for further considered if delivered as part of strategic compensation.	Unknown – subject to the location and size of the area(s) to be managed, and fishing activity in the area under consideration.

Hierarchy level (Defra, 2021b)	Possible measure and method	Proposed delivery mechanism/s	Deliverability	Spatial scale/location	Feasibility	Screened-in for further consideration as MEEB?	Impact on other receptors
Comparable function, same location	Enhanced biodiversity - Planting of biogenic features within the MCZ and/or North Falls array	In order to deliver the planting of biogenic reef/beds, the developer would commission an appropriate organisation with experience and expertise in this field as well as undertaking the necessary permits and licencing Need to ensure beds are not damaged by commercial fisheries.	*S. spinulosa* reef Deliverability is subject to identifying a suitable area which could support biogenic features, however evidence suggests suitable habitat would be present in the region.	Scale to be agreed with relevant stakeholders.	Low Feasibility is low as understanding of planting *S. spinulosa* reefs or the understanding of the success of such measures is limited.	No Option discounted from further consideration due to low feasibility.	N/A
			Native oyster beds Deliverability is subject to identifying a suitable area which could support biogenic features, however evidence suggests suitable habitat would be present in the region.		Likely Native oyster beds have successfully been planted/restored in the UK. Evidence suggests suitable habitat would be present in the region.	Yes	No impact on benthic ecology; negligible adverse short term impact on infrastructure/other marine users and commercial fisheries.
			Horse mussel beds Deliverability is subject to identifying a suitable area which could support biogenic features, however evidence suggests suitable habitat would be present in the region.		Likely Evidence suggests suitable habitat would be present in the region.	Yes	
Comparable function, same location	Enhanced biodiversity - Deploy artificial reef within the MCZ and/or North Falls array	Site selection to identify a suitable location within the MCZ or North Falls array area, secure marine license, procure artificial reef, deploy and monitor.	Deliverability would be subject to securing a marine licence. Once deployed it is likely that a reef would become colonised and therefore enhance biodiversity	Scale would need to be agreed with relevant stakeholders, with consideration of potential further loss of sedimentary habitat and/or may not be additive to the colonisation that is expected on the turbine foundations being installed as part of the Project	Likely It is likely that an artificial reef would become colonised and therefore enhance biodiversity	No Option discounted as option does not deliver equivalent benefit.	N/A
Comparable function, different location	Enhanced biodiversity - Planting of biogenic features in a different location	In order to deliver the planting of biogenic reef/beds, the developer would commission an appropriate organisation with experience and expertise in this field as well as undertaking the necessary permits and licencing Need to ensure beds are not damaged by commercial fisheries.	Native Oyster Beds Deliverability is subject to identifying a suitable area which could support biogenic features and developing management measures to protect the feature	Scale to be agreed with relevant stakeholders.	Likely Native oyster beds have successfully been planted/restored in the UK. Evidence suggests suitable habitat would be present in the region.	Yes	Unknown – subject to commercial fishing pressure and other marine user/infrastructure activity in the given location. No impact to negligible adverse short-term impact on benthic ecology
			Horse mussel beds Deliverability is subject to identifying a suitable area which could support biogenic features and developing management measures to protect the feature		Likely Evidence suggests suitable habitat would be present in the region.	Yes	

8 References

Davies, A.J., Last, K.S., Attard, K. & Hendrick, V.J. (2009) Maintaining turbidity and current flow in laboratory aquarium studies, a case study using Sabellaria spinulosa. Journal of Experimental Marine Biology and Ecology, 370, 35-40
Dornoch Environmental Enhancement Project (DEEP) (undated). [Online] Available at: https://nativeoysternetwork.org/portfolio/deep/
Department for Environment, Food and Rural Affairs (Defra) (2018). Kentish Knock East Recommended Marine Conservation Zone; Consultation on Sites Proposed for Designation in the Third Tranche of Marine Conservation Zones. Available at: https://consult.defra.gov.uk/marine/consultation-on-the-third-tranche-of-marine-conser/supporting_documents/Kentish%20Knock%20East%20factsheet.pdf
Department for Environment, Food and Rural Affairs (Defra) (2019). Kentish Knock East Marine Conservation Zone. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914728/mcz-kentish-knock-east-2019.pdf
Department for Environment, Food and Rural Affairs (Defra) (2015). Kentish Knock East rMCZ Post-survey Site Report. Available at: http://sciencesearch.defra.gov.uk/Document.aspx?Document=13228_KentishKnockEastrMCZ_SummarySiteReport_V2.pdf
Department for Environment, Food and Rural Affairs (Defra) (2021). Changes to the Habitats Regulations 2017. Available at: https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017#:~:text=The%20appropriate%20authorities%20must%20adapt,amend%20existing%20SACs%20or%20SPAs%20.
Dickie I., McAleese L., Pearce B. and Treweek J.(2013) Marine Biodiversity Offsetting –UK Scoping Study. Report to The Crown Estate. ISBN: 978-1-906410-44-5
Fodrie FJ, Rodriguez AB, Gittman RK, Grabowski JH, Lindquist NL, Peterson CH, Piehler MF, Ridge JT. 2017 Oyster reefs as carbon sources and sinks. Proc. R. Soc. B 284: 20170891. http://dx.doi.org/10.1098/rspb.2017.0891
JNCC (2019). Marine Conservation Zones. Available at: https://jncc.gov.uk/our-work/marine-conservation-zones/#designation-process-tranche-3
KIS-ORCA (2021) Subsea cables. Available at: https://kis-orca.org/map/

OSPAR (2013) Guidelines on Artificial Reefs in relation to Living Marine Resources

Tyler-Walters, H. 2007. *Modiolus modiolus* Horse mussel. In Tyler-Walters H. and Hiscock K. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 04-04-2022]. Available from: https://www.marlin.ac.uk/species/detail/1532

Tyler-Walters, H. 2008a. *Mytilus edulis* Common mussel. In Tyler-Walters H. and Hiscock K. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 04-04-2022]. Available from: https://www.marlin.ac.uk/species/detail/1421

Tyler-Walters, H. 2008b. Zostera subg. *Zostera marina* Common eelgrass. In Tyler-Walters H. and Hiscock K. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. [cited 04-04-2022]. Available from: https://www.marlin.ac.uk/species/detail/1282