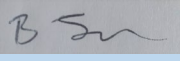
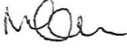




White Cross Offshore Wind Farm: Project Environmental Management & Monitoring Plan (PEMMP)

WHX001-FLO-CON-ENV-PLN-0003



Document Code:	WHX001-FLO-CON-ENV-PLN-0003	
Version Number:	A1	
Date:	28/06/2024	
Prepared by:	Becky Jones	
Checked by:	Melina Jack	
	Oliver Gardner	<i>Electronic Signature</i>
Owned by:	Flotation Energy	

Version Number	Reason for Issue / Major Changes	Date of Change
A1	For approval	28/06/2024

Table of Contents

1. Introduction	10
1.1 Project Description	10
1.2 Overview of the Project Environmental Management and Monitoring Plan	11
1.3 Consultation	12
1.4 General Guiding Principles for the Proposed Monitoring	13
2. In Principle Proposals for Monitoring	15
2.1 Engineering and Design Related Monitoring	16
2.2 Marine and Physical Processes	17
2.3 Marine Water and Sediment Quality	23
2.4 Benthic and Intertidal Ecology	24
2.5 Fish and Shellfish Ecology	28
2.6 Marine Mammal and Marine Turtle Ecology	29
2.7 Offshore Ornithology	36
2.8 Commercial Fisheries	37
2.9 Shipping and Navigation	38
2.10 Marine Archaeology and Cultural Heritage	43
3. References	47

Table of Tables

Table 2-1: In Principle Monitoring Proposed – Marine and Physical Processes	20
Table 2-2: In Principle Monitoring Proposed – Benthic and Intertidal Ecology	27
Table 2-3: In Principle Monitoring Proposed – Marine Mammal and Marine Turtle Ecology	33
Table 2-4: In Principle Monitoring Proposed – Shipping and Navigation	40
Table 2-5: In Principle Monitoring Proposed – Marine Archaeology and Cultural Heritage	45

Glossary of Acronyms

Acronym	Definition
AC	Alternating Current
AEZ	Archaeological Exclusion Zone
AfL	Agreement for Lease
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practical
CEMP	Construction Environmental Management Plan
DC	Direct Current
DSC	Digital Selective Calling
EIA	Environmental Impact Assessment
EMF	Electromagnetic Frequency
ES	Environmental Statement
FIRO	Fishing Industry Representative
FLO	Fisheries Liaison Officer
FLOW	Floating Offshore Wind
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
GPS	Global Positioning System
HSE	Health and Safety Executive
km	Kilometre
Km²	Square kilometre
LPA	Local Planning Authority
m	Metre
MCA	Maritime and Coastguard Agency
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MMMP	Marine Mammal Mitigation Protocol
MWs	Megawatts
NDC	North Devon council
NE	Natural England
NPPF	National Planning Policy Framework
NtMs	Notice to Mariners
OCEMP	Outline Construction Environment Management Plan
OECC	Offshore Export Cable Corridor
OEMRP	Outline Entanglement Monitoring and Remediation Plan
OFTO	Offshore Transmission Owner
O&M	Operation and Maintenance
OSP	Offshore Substation Platform

Acronym	Definition
OUNMP	Outline Underwater Noise Monitoring Plan
PEMMP	Project Environmental Management and Monitoring Plan
ROV	Remotely Operated Vehicle
SNCB	Statutory Nature Conservation Body
TCE	The Crown Estate
TJB	Transition Joint Bay
UKC	Under Keel Clearance
UXO	Unexploded Ordnance
VHF	Very High Frequency
WCOW	White Cross Offshore Windfarm
WCOWL	White Cross Offshore Wind Ltd
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator

Glossary of Terminology

Defined Term	Description
Agreement for Lease	An Agreement for Lease (AfL) is a non-binding agreement between a landlord and prospective tenant to grant and/or to accept a lease in the future. The AfL only gives the option to investigate a site for potential development. There is no obligation on the developer to execute a lease if they do not wish to.
Applicant	White Cross Offshore Windfarm Limited (WCOWL).
Cumulative effects	The effect of the Project taken together with similar effects from a number of different projects, on the same single receptor/resource. Cumulative Effects are those that result from changes caused by other past, present or reasonably foreseeable actions together with the Project.
Department for Business, Energy and Industrial Strategy (BEIS)	Government department that is responsible for business, industrial strategy, science and innovation and energy and climate change policy and consent under Section 36 of the Electricity Act.
Engineer, Procure, Construct and Install	A common form of contracting for offshore construction. The contractor takes responsibility for a wide scope and delivers via own and subcontract resources.
Environmental Impact Assessment (EIA)	Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning.
Export Cable Corridor	The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NG Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor (OECC).
Front end engineering and design	Front-end engineering and design (FEED) studies address areas of windfarm system design and develop the concept of the windfarm in advance of procurement, contracting and construction.
Generation Assets	The infrastructure of the Project related to the generation of electricity within the Windfarm Site, including wind turbine generators, substructures, mooring lines, seabed anchors and inter-array cables.
High Voltage Alternating Current	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
In-combination effects	In-combination effects are those effects that may arise from the development proposed in combination with other plans and projects proposed/consented but not yet built and operational.
Jointing bay	Underground structures constructed at regular intervals along the Onshore Export Cable Corridor to join sections of cable and facilitate installation of the cables into the buried ducts.

Defined Term	Description
Landfall	Where the offshore export cables come ashore.
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing electrical earthing links.
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean low water springs	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean sea level	The average tidal height over a long period of time.
Mitigation	<p>Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels.</p> <p>For the purposes of the EIA, two types of mitigation are defined:</p> <ul style="list-style-type: none"> • Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA • Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant impacts. Additional mitigation is therefore subsequently adopted by OWL as the EIA process progresses.
National Grid Onshore Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of the electrical transformers.
National Grid Connection Point	The point at which the White Cross Offshore Windfarm connects into the distribution network at East Yelland substation and the distributed electricity network. From East Yelland substation electricity is transmitted to Alverdiscott where it enters the national transmission network.
Offshore Development Area	The Windfarm Site (including wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and OECC to MHWS at the Landfall. This encompasses the part of the project that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009.
Offshore Export Cables	The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall.
Offshore Export Cable Corridor (OECC)	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall.

Defined Term	Description
Offshore Infrastructure	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009.
the Offshore Project	The Offshore Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the Windfarm Site (e.g. wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required).
Offshore Substation Platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore Transmission Assets	The aspects of the project related to the transmission of electricity from the generation assets including the Offshore Substation Platform (as applicable)) or offshore junction box, OECC to MHWS at the landfall.
Offshore Transmission Owner	An OFTO, appointed in UK by Ofgem (Office of Gas and Electricity Markets), has ownership and responsibility for the transmission assets of an offshore windfarm.
Onshore Development Area	The onshore area above MLWS including the underground onshore export cables connecting to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland. The onshore development area will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990.
Onshore Export Cables	The cables which bring electricity from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland.
Onshore Export Cable Corridor	The proposed onshore area in which the export cables will be laid, from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection point at East Yelland.
Onshore Infrastructure	The combined name for all infrastructure associated with the Project from MLWS at the Landfall to the NG grid connection point at East Yelland. The onshore infrastructure will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990.
Onshore Transmission Assets	The aspects of the project related to the transmission of electricity from MLWS at the Landfall to the NG grid connection point at East Yelland including the Onshore Export Cable, the White Cross Onshore Substation and onward connection to the NG grid connection point at East Yelland.
the Onshore Project	The Onshore Project for the onshore TCPA application includes all elements onshore of MLWS. This includes the infrastructure associated with the offshore export cable (from MLWS), landfall, onshore export

Defined Term	Description
	cable and associated infrastructure and new onshore substation (if required).
White Cross Offshore Windfarm Limited	White Cross Offshore Windfarm Ltd (WCOWL) is a joint venture between Cobra Instalaciones Servicios, S.A., and Flotation Energy Ltd.
the Project	the Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100 Megawatts (MWs). It encompasses the project as a whole, i.e. all onshore and offshore infrastructure and activities associated with the Project.
Project Design Envelope	A description of the range of possible elements that make up the Project design options under consideration. The Project Design Envelope, or 'Rochdale Envelope' is used to define the Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect.
Safety zones	A marine zone outlined for the purposes of safety around a possibly hazardous installation or works / construction area.
Service operation vessel	A vessel that provides accommodation, workshops and equipment for the transfer of personnel to turbine during OMS. Vessels in service today are typically up to 85m long with accommodation for about 60 people.
Transition joint bay	Underground structures at the Landfall that house the joints between the offshore export cables and the onshore export cables.
Transition piece	The transition piece includes various functionalities such as access for maintenance, cable connection for the energy of the turbine and the corrosion protection of the entire foundation.
White Cross Offshore Windfarm	100MWs capacity offshore windfarm including associated onshore and offshore infrastructure.
White Cross Onshore Substation	A new substation built specifically for the White Cross project. It is required to ensure electrical power produced by the offshore windfarm is compliant with NG electrical requirements at the grid connection point at East Yelland.
Wind Turbine Generators (WTG)	The wind turbine generators convert wind energy into electrical power. Key components include the rotor blades, nacelle (housing for electrical generator and other electrical and control equipment) and tower. The final selection of project wind turbine model will be made post-consent application.
Windfarm Site	The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present.
Works completion date	Date at which construction works are deemed to be complete and the windfarm is handed to the operations team. In reality, this may take place over a period of time.

1. Introduction

1.1 Project Description

1. The Windfarm Site will be located approximately 52km north-west of the Cornwall and Devon coastline and covers an area of approximately 50km². The Offshore Project will have a generating capacity of up to 100MWs with 6-8 no. floating Wind Turbine Generators (WTG).
2. The Offshore Export Cable will make Landfall above Mean High Water Springs (MHWS) at Saunton Sands in Devon, where it will be connected to the Onshore Export Cable via a Transition Joint Bay (TJB) located in Saunton Sands Car Park.
3. The Onshore Export Cable will travel approximately 8km at its maximum inland to a high voltage alternating current substation. This will include a crossing below the Taw Estuary via trenchless technology, assessed as part of the Onshore Environmental Statement. A new White Cross Onshore Substation will be constructed to accommodate the connection of the Offshore Project to the existing East Yelland substation and National Grid Connection Point.
4. The key generation assets associated with the Offshore Project and subject to both Marine Licence consent and consent under the Section 36 of the Electricity Act 1989 are as follows:
 - WTGs
 - Semi-submersible floating platforms
 - Subsea catenary mooring lines
 - Anchoring solutions (drag embedment anchors, suction anchor or pin piles)
 - Inter-array cables and associated cable protection
5. The key transmission assets associated with the Offshore Project and subject to Marine Licence consent are as follows:
 - Other associated offshore infrastructure, such as navigational markers
 - Offshore Substation Platform (OSP)
 - Offshore Export Cable (to MHWS at Landfall)
 - Other associated offshore infrastructure, such as navigational markers
 - Taw Estuary Crossing (between MHWS on the northern edge to MHWS on the southern edge)
6. A detailed description of the proposed development can be found in **Chapter 5: Project Description** of the **Offshore Environmental Statement (ES)**.

1.2 Overview of the Project Environmental Management and Monitoring Plan

7. White Cross Offshore Windfarm Ltd (WCOWL) have produced this Outline Project Environmental Management and Monitoring Plan (PEMMP) following submission of a Marine Licence application (MLA/2023/00113) in March 2023 and in consultation with the Marine Management Organisation (MMO). The purpose of the PEMMP is to outline the monitoring objectives anticipated to be required under the Marine Licence, to support the grant of consent for the Project and provide clarity to the MMO and all other relevant statutory consultees, on the rationale, limitations and deliverability of the monitoring requirements.
8. Post consent, a review of this PEMMP will be undertaken to ensure its updated in line with all condition requirements as set out in the Section 36 Consent and Marine Licence. When these exact conditions are known, the 'In Principle' terminology will be removed in the final PEMMP, and the monitoring approach for each requirement finalised with further details around the survey methodologies and programme for each monitoring objective.
9. WCOWL have been undertaking ongoing consultation with the MMO, in conjunction with its statutory nature conservation body (SNCB) advisor (Natural England (NE)) and its scientific advisor (Cefas), on the wider monitoring and consent requirements during the examination phase of the Marine Licence and Section 36 Consent Application. This draft PEMMP has been prepared following receipt of comments received from the various stakeholders and presents the basis and framework for further consultation post consent determination to agree further detailed methodologies and timings of the proposed monitoring.
10. A planning application (reference 77576) for the onshore elements of the Project was also submitted to North Devon Council (NDC) under the Town and Country Planning Act 1990 (TCPA) in August 2023 using the Rochdale envelope approach, and the final details of methods statements will be developed and provided following the grant of consent and progression of detailed design.
11. Agreeing guiding principles within this outline plan will facilitate ongoing discussions with key stakeholders, ensuring robustness in the final offshore plans and methodologies as these are refined in line with anticipated conditions set out following the Marine Licence determination period. This Plan also reinforces commitments as set out in the **Offshore ES** by the Project, and the Mitigation Register provided in **Appendix P** of the **ES Addendum**.

12. This Outline PEMMP sets out the in-principle monitoring proposals for the offshore marine environment only, referring to the land and seabed seaward of the MHWS for both generation and transmission elements of the Project. However, some elements of the onshore planning application are relevant to these monitoring proposals and the determination phases for both consents have been broadly aligned to facilitate both determinations at the same time. The PEMMP provides an assurance mechanism to the relevant regulatory authorities with in-principle monitoring proposals, ensuring the offshore monitoring activities associated with the construction and operation of the offshore Project infrastructure will be controlled and mitigated with the best available technologies and practices.
13. The relevant marine topics and receptors, as assessed in the **Offshore ES**, are set out below:
 - Marine and Physical Processes (Chapter 8);
 - Marine Water and Sediment Quality (Chapter 9);
 - Benthic and Intertidal Ecology Chapter (10);
 - Fish and Shellfish Ecology (Chapter 11);
 - Marine Mammal and Marine Turtle Ecology (Chapter 12);
 - Offshore Ornithology (Chapter 13);
 - Commercial Fisheries (Chapter 14);
 - Shipping and Navigation (Chapter 15); and
 - Marine Archaeology and Cultural Heritage (Chapter 16).

1.3 Consultation

14. Following submission of the Marine Licence and Section 36 Consent application and onshore planning application, NE raised comments with the MMO around the Project monitoring proposals during November 2023, which had not yet been established by the Project:

"Various plans are also required as part of the consenting phase, which includes the in-principal monitoring plan, cable burial risk assessment, Bentonite management plan, soil management plan and various others. These are required to ensure that the level of risk is sufficiently low and that mitigation measures are fit for purpose."
15. As a result WCOWL issued a Document Index listing the supplementary information that would be provided for additional statutory and public consultation, including an Outline PEMMP, that would be prepared and submitted as part of an ES Addendum Report for further clarification.

16. Further comments were raised by the MMO case office regarding the monitoring documentation as follows:

"I note that an In Principle Monitoring Plan, an Outline Project Environmental Monitoring Plan and an Outline Entanglement Monitoring and Remediation Plan will be provided. It would be good to understand how these work together. It is always best where possible to have all monitoring together, for clarity. NE have previously requested a summary of all mitigation and perhaps the same can be summarised for all monitoring."

17. Therefore it was agreed an overarching Outline PEMMP would be prepared comprising the In Principle Monitoring aspects, supported by detailed standalone project monitoring and mitigation documents such as the Outline Entanglement Monitoring and Remediation Plan (OEMRP) (Document ref. WHX001-FLO-CON-ENV-PLN-0002). The PEMMP ensures all the key project monitoring documentation and information is captured together in one place, aiding the update of individual plans for development into final plans as detailed design progresses. A detailed response to the specific points raised can be found in the Applicant's Response to Comments from Natural England document (provided in **Appendix A** of the **ES Addendum**).

1.4 General Guiding Principles for the Proposed Monitoring

18. WCOWL has, in the first instance, sought to avoid or reduce the potential for significant impacts as a result of the Project through the Environmental Impact Assessment (EIA) process. The ES and supporting documentation detail various commitments to mitigation measures already embedded in the Project design, in the Mitigation Register, as well as additional mitigation that will be applied during the construction, operation and maintenance (O&M), and decommissioning phases of the Project. These additional offshore (and onshore) mitigation measures will be refined in the detailed design process following consultation post consent, in agreement with the MMO and other relevant statutory consultees.
19. Monitoring has been included for receptors that key stakeholders have noted a limited assurance of a lack of significant residual impacts for, despite the proposed application of currently identified Project mitigations. This is particularly important when considering the use of a novel floating technology such as floating offshore wind (FLOW). For example, monitoring of the impacts of FLOW technology which are set out in the Project's OEMRP (Document ref. WHX001-FLO-CON-ENV-PLN-0002) and Outline Underwater Noise Monitoring Plan (OUNMP) (Document ref. WHX001-FLO-CON-ENV-PLN-0006). Further monitoring requirements may be identified and subsequently undertaken to provide further validation (where there is uncertainty) of other assessment conclusions for key sensitive environmental

receptors or features. All such monitoring will target impacts of concern should significant uncertainty remain.

20. The EIA predicts the residual impact to a key species or environmental feature through:

- Linkages using the source > pathway > receptor model;
- Embedded and additional mitigations;
- Sensitivity to the effect;
- Magnitude of the effect; and
- Ecological / economic importance.

21. This section sets out the rationale behind the proposed monitoring, and guiding principles for the proposed in-principle monitoring are set out below:

- As stated in Paragraph 56 of the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government (2021)), all consent conditions, including those for monitoring, should be “necessary, relevant to planning and to the development to be permitted, enforceable, precise and reasonable in all other respects”. However the NPPF is more relevant to the Onshore Project consenting, and not directly relevant for offshore planning;
- Monitoring programmes for marine renewable energy technologies should support mitigation methods for potential impacts on sensitive environmental features, as set out in Section 3.2.25 of the UK Marine Policy Statement (HM Government, 2011). Section 3.3.25 outlines how marine Plans and the marine planning process need to be flexible in responding to emerging evidence about the impacts of new technologies, in particular how the monitoring and review arrangements for plans are important in this;
- In line with best practice, monitoring should have a clear purpose to provide clarity for specific questions or uncertainties where significant environmental impacts have been identified or cannot be ruled out (Cefas, 2012, Glasson et al., 2011 and OSPAR, 2008). Therefore, monitoring plans should be targeted with an identified aim, frequency, duration, and having clear outputs, providing robust datasets in line with the MMO’s monitoring recommendations (MMO, 2014);
- Monitoring should be focused around obtaining specific and relevant information to close any data gaps or uncertainties as opposed to being generic, and is particularly important in understanding significant impacts to the most sensitive receptors. However, the presence of a significant impact alone does not necessarily warrant a requirement for monitoring, and where there are none, monitoring

- should not be required as a condition of the Marine Licence or necessitate inclusion in this plan;
- Monitoring must be effective and able to be realistically deliverable and addressed by the Project. WCOWL acknowledge the MMO may require certain monitoring programmes to be adapted or amended if future gathered data suggests the existing or ongoing monitoring strategy is not fit for purpose, or its impacts are not as anticipated. The effectiveness of any monitoring may be reviewed during ongoing consultation;
 - Monitoring proposals should be designed around the latest best practice guidance and the most recent readily available environmental data for post-consent offshore windfarm monitoring; and
 - Monitoring may be undertaken pre- and post- construction, or over non-consecutive years to understand longer term trends if required. The scope and design of all monitoring may be adapted with an iterative approach following review or assessment of prior surveys and monitoring results, including any surveys conducted to inform the EIA, and proposed future surveys of varying scope which may be adapted around results of the monitoring outlined in this plan.
22. For each receptor, the residual impacts and key areas of uncertainty predicted within the White Cross Offshore Windfarm ES are summarised in Section 2. Monitoring has been proposed for impacts relevant to the marine topics and receptors listed in the ES, where considered necessary under the anticipated Marine Licence and Section 36 conditions, or where significant uncertainty remains in the assessment and monitoring was deemed beneficial following consultation discussions with key stakeholders.

2. In Principle Proposals for Monitoring

23. This section sets out the in-principle proposals for monitoring of the marine topics and receptors listed in **Section 1.2** to implement the monitoring conditions for White Cross Offshore Windfarm (WCOW). These are cross-referenced with the relevant anticipated conditions of the Marine Licence and Section 36 consent in tables that set out the monitoring requirements, following recent consultation during the determination period. The potential effects and receptors for which monitoring is considered necessary are detailed, linking these with the necessary related monitoring and management plans. Each topic has been divided into pre-construction, construction, and post-construction phases of monitoring. At this stage, the proposals are outline and will be developed further post consent during detailed design.

24. These proposals represent the outline approach to monitoring at the current time of writing, and it should be recognised that the outcomes of further surveys may alter ongoing monitoring requirements and methodologies, influencing the design of subsequent monitoring work in the future. These proposals may be refined as consultation progresses, the Project knowledge develops, and should other relevant studies become available. Given the consent application is still in the determination period, future alterations may also be required to this Plan on receipt of the Marine Licence and Section 36 conditions, when these have been issued by the MMO. Future monitoring requirements may therefore differ for WCOW from the Outline approaches presented within this plan.
25. This is cohesive with an adaptive and iterative approach to monitoring outlined in the guiding principles (**Section 1.4**) and in line with MMO guidance, and will be subject to ongoing discussions and agreements with the MMO and SNCBs. It is also acknowledged the MMO has authority to vary future Marine Licence conditions in this regard, and this Outline plan will be used as the basis for future ongoing consultee discussions, particularly around monitoring post consent.

2.1 Engineering and Design Related Monitoring

26. As well as the environmental surveys and monitoring proposed to specifically satisfy the Marine Licence and Section 36 conditions, a variety of additional studies may be undertaken by the Project for engineering and design purposes. Some of this work will coincide with the relevant environmental surveys anticipated to be conditioned, and WCOWL will seek to combine engineering and environmental surveys for monitoring wherever possible. The offshore engineering and design surveys required throughout the Project life cycle are listed indicatively, but not limited to:
 - Geophysical surveys;
 - Geotechnical surveys;
 - Unexploded Ordnance (UXO) survey and clearance;
 - Cable burial surveys;
 - Meteorological studies;
 - Footprint surveys; and
 - As-built surveys.
27. At the time of writing, a number of key marine environmental monitoring, mitigation and management plans have been produced for the engineering design of the Project which are referenced throughout this Plan. These standalone documents detail the Project embedded mitigations and environmental measures, additional mitigations and proposed monitoring. These are summarised below:

- Bentonite Management Plan;
 - Cable Burial Risk Assessment;
 - Cable Specification and Installation Plan;
 - Chemical Risk Assessment;
 - Decommissioning Plan;
 - Fisheries Liaison and Coexistence Plan;
 - Invasive Non-Native Species Plan;
 - Outline Cable Specification and Installation Plan;
 - Outline Construction Environmental Management Plan;
 - Outline Entanglement Monitoring and Remediation Plan (OEMRP);
 - Outline Offshore Operation and Maintenance Plan;
 - Outline Written Scheme of Investigation;
 - Outline Underwater Noise Monitoring Plan (OUNMP);
 - Marine and Intertidal Pollution Contingency Plan; and
 - Marine Mammal Mitigation Protocol.
28. A complete list of the embedded mitigation measures can be found in the Mitigation Register, provided in **Appendix P** of the **ES Addendum** (Document ref. WHX001-FLO-CON-ENV-REG-0001).

2.2 Marine and Physical Processes

2.2.1 Conclusions of the Environmental Statement

29. **Chapter 8: Marine Geology, Oceanography and Physical Processes** of the **Offshore ES** concluded that effects on the Devon Coast morphological receptor during the construction, operation and decommissioning phases of the Project are considered of **negligible adverse** and **not significant** in EIA terms. Assessment of cumulative effects also concluded the effects are no greater than **negligible adverse** significance.
30. As part of the Offshore Export Cable installation process at Landfall (up to MHWS) at Saunton Sands, a trench would be excavated and the sediment backfilled to re-instate the beach to its original morphology. The landfall activities would cause a temporary short-term cessation of longshore beach sediment transport, due to the presence of the trench and its potential to trap sediment. This activity would result in some localised and short-term disturbance, but there would be no long-term effect on sediment transport processes.
31. Monitoring of intertidal sediment levels both prior to and following cable installation will be undertaken (see **Table 2-1**); however, the details of the methodology of

intertidal sediment level monitoring are not yet known as they will be informed by future consultation with the MMO, NDC and relevant SNCBs. The final PEMMP will provide final details.

32. The potential area of sand wave levelling equates to approximately only 3.9% of the total area of sand waves along the Offshore Export Cable Corridor (OECC). Hence, effects on the surrounding environment are small because natural changes to the sand waves, through the active physical processes, are far greater than the quantities of sand that would be extracted. Also, the sediment moved during sand wave levelling would be deposited close to its original location and so there would be no net loss of sediment.
33. Potential impacts during construction installation activities for the buried cables (trenching and sand wave levelling) would cause temporary disturbance of the seabed. This could release sediment into the water column resulting in increased suspended sediment concentrations and changes to seabed levels from deposition. Where the cable is buried, the cable would be installed mainly in sand (or coarser sediment). Sand wave levelling and seabed preparation would also be through mainly sand. The amount of fine sediment recorded from samples along the corridor is on average less than 7%. Therefore, dispersion of fine sediment from the areas of burial and sand wave levelling would be very low. The cables themselves would be buried at the landfall throughout the operational life of the project. This design would have limited effect on bedload sediment transport and hence the magnitude.
34. The increases in suspended sediment concentrations would be short in duration and is most likely to be within the range of natural variability in the system (e.g., during storms, suspended sediment concentrations will naturally be higher than during calm periods). Over time, the suspended sediment would disperse, either through settling of coarser sediments rapidly to the seabed close to the point of disturbance or, for finer sediments, as they become entrained within a plume within the water column and widely dispersed by tidal and wave action.
35. Furthermore, with the construction affecting different sections of the corridor progressively over time (rather than being simultaneous along the whole corridor) the impact is localised, although this will be most concentrated in areas where sand wave levelling is undertaken.
36. Where cable burial would not practicably be achievable within some areas occupied by bedrock or other hard substrate and at cable/pipeline crossing locations, cable protection measures, such as rock armour or concrete mattresses, would be provided to surface-laid cables. The impacts relate to potential for interruption of

sediment transport. If bedrock is exposed at the seabed then the seabed is likely to be static and have no mobile sediment or transport potential. Where the cables are buried, there would be no protrusions from the seabed associated with cable protection measures. There would be no impact on bedload sediments and sediment transport, and hence geomorphological change (erosion and accretion). Embedded mitigation measures are presented in the Outline Cable Specification and Installation Plan (OCSIP) (Document ref. WHX001-FLO-CON-ENV-PLN-0007), which outlines the Project commitments related to cable installation, sandwave clearance, cable protection plans, and monitoring of seabed recovery. Site preparation, cable burial and cable protection deployment measures will be defined in the final CSIP and it will set out the proposed monitoring of the recovery of the areas where cables are buried, and proposed remediation if impacts do occur.

37. The seabed in the vicinity of the turbines will be swept by the catenary action of the mooring lines for each turbine. If there is sediment present on the seabed (rather than exposed bedrock) then this will be entrained into suspension in the water column. However, the sediment is sand or slightly gravelly sand across the Windfarm Site and so much of this would fall to the seabed shortly after disturbance. Only the finest fractions will reside in the water column for short durations and in the lower layers of the water column. Increases in suspended sediment concentrations is most likely to be within the range of natural variability in the system, with ambient concentrations at the Windfarm Site of up to 5mg/l on average. Also, during storms, suspended sediment concentrations will naturally be higher (by several magnitudes) than during calmer periods.
38. Considering the physical separation between anchors at each turbine, and the relatively deep water depths, there is unlikely to be sufficient current energy acting on the seabed, during both calm and storm conditions, to generate significant quantities of scour (if any) around each of the mooring anchors.

2.2.2 In Principle Monitoring

39. **Table 2-1** provides information on the monitoring requirements for marine and physical processes. The proposed monitoring is precautionary given negligible adverse or no effects were identified, and will be discussed and agreed with the MMO in consultation with the SNCBs. Pre- and post- construction geophysical surveys are proposed to monitor sediment levels both prior to and following subsea cable installation. In addition, monitoring of intertidal sediment levels both prior to and following cable installation is proposed.

Table 2-1: In Principle Monitoring Proposed – Marine and Physical Processes

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
<p>Impacts on the form and function of the coast and seabed, due to buried cable, mooring system, and Offshore Substation Platform installation and decommissioning.</p> <p>Impacts on suspended sediment concentrations and deposition due to buried cable, mooring system, and Offshore Substation Platform installation, and physical presence of the infrastructure.</p> <p>Impacts on bedload sediment transport and seabed morphological change due to cable protection.</p> <p>Changes in seabed topography, including scour processes</p>	<p>Devon Coast and Lundy Island</p> <p>Physical environment and associated receptor groups (e.g. marine ecology)</p>	Pre-construction	<ul style="list-style-type: none"> Engineering and design Purposes Bathymetry and seabed feature identification Establish a baseline prior to commencement of construction (and therefore, seabed preparation works) for post-construction physical process monitoring. Standard monitoring requirement as agreed with the MMO and SNCBs Input to benthic and ecological surveys 	<p>Each effect will be managed with standard and best practice methodologies.</p> <p>Offshore: A comprehensive geophysical survey to encompass the areas where construction activity is planned, both within the Windfarm Site and along the OECC, up to Mean Low Water Springs (MLWS).</p> <p>Intertidal: The details of intertidal sediment level monitoring are not yet known as they will be informed by future consultation with the MMO, NDC and relevant SNCBs. The final PEMMP will provide final details.</p>	<p>A pre-construction geophysical survey was undertaken between June and August 2022 to inform the EIA (refer to ES Chapter 8: Marine Geology, Oceanography and Physical Processes).</p> <p>Further pre-construction surveys may be required, which would be used as a baseline to support engineering design and Marine Licence requirements.</p>

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
Impacts on intertidal sediment level			<ul style="list-style-type: none"> Establish a baseline intertidal sediment level prior to open cut trenching across intertidal to install cable. 		
		Post-Construction	<ul style="list-style-type: none"> Structural integrity / engineering (scour) Cable burial depth To test prediction that sandwave features will recover to a new equilibrium following cable installation works, and to test that there will be no significant effects on sediment transport processes following installation of cable 	<p>Offshore: A geophysical survey to assess any changes in seabed topography. A post-construction survey may be carried out within the Windfarm Site and OECC which could be used to verify desk-based assessment of scour potential. Further surveys may be required if significant differences are found between the scour modelled and recorded. Potential locations subject to monitoring, which may be at a non-consecutive frequency, would be confirmed following completion of detailed design and in consultation with the MMO and SNCBs. Monitoring would end if no impacts are recorded or there is evidence of recovery.</p> <p>Intertidal: The details of intertidal sediment level monitoring are not yet known as they will be informed by future consultation with the</p>	Scope of surveys, programme and the methodology for monitoring purposes to be submitted to the MMO for approval prior to the commencement of the survey works, in accordance with timescales required by the Marine Licence conditions.

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
			<p>protection measures.</p> <ul style="list-style-type: none"> Establish a post-construction intertidal sediment level to understand sediment level recovery. 	MMO, NDC and relevant SNCBs. The final PEMMP will provide final details.	

2.3 Marine Water and Sediment Quality

2.3.1 Conclusions of the Environmental Statement

40. **Chapter 9: Marine Water and Sediment Quality** of the **Offshore ES** concluded that no significant effects on water quality of the marine water column receptor were identified, with all effects assessed as of **negligible** significance. Assessment of cumulative effects also concluded the effects are no greater than **negligible** significance.
41. The Offshore Project is located within an open coastal area within the Bristol Channel, characterised by low suspended sediment concentrations and sandy coarse sediments. Sediment chemical analysis of samples taken from within the Windfarm Site and along the OECC show that the sediments are relatively uncontaminated, with only marginal exceedances of AL1 and the lower OSPAR BAC guideline level value. Any exceedances are only just above the lower guideline level value and present in a discreet area along the cable route, not within the Windfarm Site. Additionally, sediment suspension released via scour is only predicted to give rise to release of very small volumes of material so there is very low potential of contaminated sediment being suspended.
42. Sediments are not predicted to remain in suspension for long periods of time given that the seabed material is predominantly sand and as such will settle quickly and be a temporary impact. Therefore, the risk to the water column for partitioning to occur (the transfer of contaminants bound to sediment particles to being dissolved into the water column) is reduced.
43. Activities which may release sediment into the water column include seabed preparation works and the installation of cables. There is also potential for sediments to be re-suspended by the scouring effects of the catenary action of the mooring lines and around the foundations of the mooring anchors. However, particle size analysis of the sediments within the Windfarm Site show that the sediments are dominated by sand. As such, any sediment suspended during the operation and maintenance of the Windfarm Site will fall out of suspension shortly after disturbance. Only the finest fractions will reside in the water column and in these cases for short durations and in the lower layers of the water column. Additionally, the total volume of sediment that could be disturbed is relatively low. In any case, scour is only likely to occur during higher energy conditions (i.e., storms) where the baseline suspended solids concentrations in the water column are already likely to be higher so the effect of the Project's scour potential is negligible.

44. The management of the risk of chemical spills and leaks are addressed by the Outline Marine and Intertidal Pollution Contingency Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0004). Additionally, a Bentonite Management Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0012) has been prepared outlining mitigation measures to be undertaken in the unlikely event of a 'frac-out' incident occurring, i.e. the release of bentonite drilling fluid onshore, which could enter the marine environment. The Chemical Risk Assessment (Document ref. WHX001-FLO-CON-ENV-RSA-0001) establishes the control, use, storage, transport, and reporting requirements of chemicals during the construction, operation and maintenance phases.

2.3.2 In Principle Monitoring

As no significant effects are expected, no further monitoring is required or proposed for marine water and sediment quality.

2.4 Benthic and Intertidal Ecology

2.4.1 Conclusions of the Environmental Statement

45. **Chapter 10: Benthic and Intertidal Ecology** of the **Offshore ES** concluded that no significant effects on benthic habitats and species receptors within the benthic ecology study area were identified, with all effects assessed as of **negligible** residual effect.
46. Any residual effects on benthic and intertidal ecology during the construction, operation, maintenance, and decommissioning phases of the Offshore Project will be generally localised in nature, being restricted to the Offshore Project and immediate surrounding area.
47. The benthic and intertidal study area (which encompasses the Windfarm Site) extends seaward (west) from the Devon coastline, at the mouth of the rivers Taw and Torridge, and encompasses Bideford Bay and Lundy Island. Seabed sediments across the Windfarm Site and OECC are dominated by sand and mixed sediment. Benthic communities corresponding to these sediment types were recorded, consistent with typical communities found in the Celtic Sea.
48. To inform the assessment, site-specific offshore surveys were undertaken between May and July 2022 as agreed with the statutory consultees. This acquired environmental camera and seabed sample data, established the baseline environmental conditions and identified sensitive habitats and species. Four areas

(Saunton Sands north and south, Crow Point and East Yelland) were selected for intertidal surveys.

49. The survey included sample collections for benthic habitat data across the Windfarm Site and OECC. Sampling methods included grab samples and drop-down video transects. The grab samples were analysed for physico-chemical properties and macrofaunal identification. Sediment samples were collected in order to separate infauna specimens from the substrate, which were identified prior to release.
50. A full reef habitat assessment was conducted on images from the site-specific survey to determine whether habitats met the definitions of Annex I reef habitats. No honeycomb worm *Sabellaria alveolata* were identified within any of the intertidal survey areas. No biogenic reef habitat was observed across the offshore survey area despite individuals of Ross worm *Sabellaria spinulosa* being found in the grab samples. The tube aggregations observed at these stations were not deemed to meet the reef qualifying criteria.
51. Two marine faunal Invasive Non-Native Species (INNS) listed on Schedule 9 of the Wildlife and Countryside Act 1981 and Aquatic alien species and the WFD¹ were identified within the Offshore Development Area: *Goniadella gracilis* (a polychaete) and *Crepidula fornicate* (slipper limpet). While it is acknowledged that the introduction of hard substrate may provide an initial stepping-stone for INNS to spread, the risk of spread of INNS (as well as the management of introduction and disturbance) will be mitigated by employing the range of measures presented in the Outline Invasive Non-Native Species Management Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0009). With mitigations in place, it is not expected INNS will be introduced by the Offshore Project and there will negligible impact significance across all phases of the Project. Nevertheless, as a precautionary measure, the Outline INNS Plan lists investigating the feasibility of monitoring marine growth on semisubmersible substructures as a possible measure: this is in response to a request for the Project to consider the potential for colonisation of the semisubmersible structures by both INNS and native taxa.
52. The assessment of cumulative effects from the Offshore Project and other developments and activities with sufficient public information concluded that due to the distance of all the projects assessed, any additive impacts across the region will

¹<https://www.wfd.uk.org/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20classification%20of%20alien%20species%20working%20paper%20v7.6.pdf>

be small scale and localised with no pathway for cumulative effects on benthic ecology.

2.4.2 In Principle Monitoring

53. **Table 2-2** provides information on the possibility of monitoring INNS colonisation on semisubmersible substructures for benthic and intertidal ecology. The commitment for monitoring is not yet confirmed given its feasibility has not yet been established. While this is not a confirmed commitment to undertake monitoring, it is noted here given the requirement for future consultation with the MMO, NDC and relevant SNCBs on the feasibility of such monitoring.
54. It should be noted that any monitoring is precautionary given that negligible residual adverse effects were identified.

Table 2-2: In Principle Monitoring Proposed – Benthic and Intertidal Ecology

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
Colonisation of introduced artificial substrate including INNS	Benthic ecology	Post-construction	<ul style="list-style-type: none"> Concern raised by SCNBs that semi-submersible substructures could be colonised by INNS 	<p>Each effect will be managed with standard and best practice methodologies.</p> <p>O&M ROV maintenance visits will take place regularly. It is possible that monitoring of marine growth build-up on semi-submersible structures can be included in the scope of these surveys. However, it is not possible to offer further detail on the feasibility of identifying INNS at this stage. Therefore, at this time only a commitment to investigate the feasibility of this monitoring is possible.</p>	The Invasive Non-Native Species (INNS) Plan details the measures to be undertaken (Document ref. WHX001-FLO-CON-ENV-PLN-0009)

2.5 Fish and Shellfish Ecology

2.5.1 Conclusions of the Environmental Statement

55. **Chapter 11: Fish and Shellfish** of the **Offshore ES** concluded that no significant effects on fish and shellfish ecology were identified, with all effects assessed as of **negligible** residual effect.
56. The Fish and Shellfish Ecology Study Area (incorporating the Offshore Project) is located in the southern section of the outer Bristol Channel. The area extends seaward (west) from the Devon coastline, at the mouth of the rivers Taw and Torridge, encompassing Bideford Bay and Lundy Island.
57. A variety of commercially and ecologically important fish and shellfish species are present across the area, classified into elasmobranchs, demersal fish, pelagic fish, shellfish, and migratory species receptor groups. Some regions of the Offshore Project also have the potential to act as spawning and nursery grounds for a range of species across receptor groups.
58. For the assessment of impacts related to underwater noise and vibration, receptors were categorised into fish with a swim bladder used in hearing, fish with a swim bladder not used in hearing, fish with no swim bladder, fish eggs and larvae, and shellfish.
59. Assessment of cumulative effects from the Offshore Project and other developments concluded that as predicted residual effects arising from the Offshore Project are negligible, cumulative effects with other developments would be negligible.

2.5.2 In Principle Monitoring

60. As no significant effects are expected following assessment, no further monitoring or independent surveys are considered necessary for fish and shellfish ecology based on this outcome.
61. However, underwater operational noise monitoring is proposed, as detailed in the OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006) which is discussed in more detail in **Section 2.7.2**. Although this is predominantly to understand if novel FLOW technology emits noise that could cause behavioural changes in marine mammals, the results of such monitoring will also aid future fish and shellfish assessments for FLOW projects.
62. Noise monitoring will be undertaken using hydrophone technology specifically designed to collect noise measurements in high flow tidal sites. The current

methodology of which has been set out in the OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006). All outcomes and findings will be discussed and shared with the MMO and relevant statutory consultees in accordance with the reporting strategy that is expected to be developed in the post-consent detailed design process.

2.6 Marine Mammal and Marine Turtle Ecology

2.6.1 Conclusions of the Environmental Statement

63. **Chapter 12: Marine Mammal and Marine Turtle Ecology** of the **Offshore ES** concluded that effects on marine mammal and marine turtles during the construction, operation and decommissioning phases of the Project are considered to be of **negligible to minor adverse** effect, or no effect. This was concluded following appropriate mitigation being taken into account (i.e., the Draft Marine Mammal Mitigation Protocol (MMMP) (**Appendix 12.C** of the Offshore ES which has been updated and provided as **Appendix V** of the **ES Addendum** (Document ref. WHX001-FLO-CON-CAG-PLN-0001)). The Draft MMMP provides mitigation measures for two impacts: underwater noise during piling (construction) and entanglement risk (construction and operation).
64. Assessment of cumulative effects also concluded the effects are no greater than **minor adverse** significance.
65. The key marine mammal and marine turtle species across the Offshore Project area are considered to be harbour porpoise, bottlenose dolphin, striped dolphin, common dolphin, humpback whale, grey seal and leatherback turtle.
66. Piling during installation of floating WTGs is considered the worst-case for these marine species in respect of underwater noise levels during construction, which has the potential to cause injury or disturbance. UXO clearance detonations which may be undertaken within the Offshore Project area are also capable of emitting noise levels which have the potential to cause injury or disturbance to marine mammals. However, a separate UXO clearance plan, a separate marine licence and a separate MMMP must be organised for these activities during the pre-construction phase. This is because the numbers of potential UXO to be detonated (if any) is not known at this stage, and a detailed UXO survey is required to establish this.
67. It's proposed that each piling event (if this method is selected in detailed design) would commence with a soft-start at a lower hammer energy followed by a gradual ramp-up for at least 20 minutes up to 80% of the maximum hammer energy required (the maximum hammer energy is only likely to be required at a few of the

piling installation locations). The soft-start and ramp-up will allow time for mobile species to move away from the area before the maximum hammer energy with the greatest noise impact area is reached. The soft-start and ramp-up procedure, along with other mitigation measures for piling, is detailed in the Draft MMMP.

68. Entanglement is the potential risk of marine mammals and marine turtles getting caught within the WTG mooring lines and dynamic cables as a primary cause; as a secondary cause, becoming entangled in fishing gear caught within the WTG mooring lines and dynamic cables; and as a tertiary cause the potential risk of marine animals, who are trailing fishing gear, to swim in close proximity to the subsea infrastructure, allowing the trailing gear to become entangled.
69. The final MMMP will ensure embedded mitigation measures are in place to minimise the risk of any physical or permanent injury to marine mammals and marine turtles throughout all project phases. Currently, as well as providing detailed information on mitigation against auditory injury and disturbance from piling, the Draft MMMP provides a commitment to develop appropriate mitigation measures against the risk of entanglement and signposts to a standalone monitoring proposal designed to understand the risk of entanglement in the first instance (OEMRP (Document ref. WHX001-FLO-CON-ENV-PLN-0002)). Surveys and monitoring will be undertaken on the mooring systems and turbines during maintenance activities to ensure no material such as discarded nets, ropes or other debris is present, which could increase risk of entanglement for marine mammals and marine turtles or interfere with the optimal operation of the turbines.
70. Similarly, although not referenced in the Draft MMMP, the Project is committing to monitoring operational underwater noise (see the OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006)) to understand if novel FLOW technology emits noise that could cause behavioural changes in marine mammals.
71. With regards to exposure to Electromagnetic Fields (EMF) and its effects on marine mammals and turtles, cables are likely to be buried to a target depth of between 0.5 - 3.0m. This is a similar range to the DECC Guidelines (2011) which advise a 0.6m - 1.5m depth in order to reduce the potential for effects relating to EMF during operation. Further detail on target burial depths are provided in the Updated Cable Burial Risk Assessment (CBRA) provided in **Appendix U** of the **ES Addendum** (Document ref. WHX001-FLO-CON-ENG-RSA-0001).

2.6.2 In Principle Monitoring

72. The OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006) has been prepared for the operational phase of the WTGs. The main sources of sound generated during

the operation of wind turbines are aerodynamic and mechanical; although there is also the potential for a noise that has been associated with 'cable snaps' to be present during the operation of the wind turbines. This is thought to be related to tension release in mooring systems. However, there is inconclusive evidence that the snapping noise is generated by either WTGs or subsea infrastructure.

73. Pre-construction noise monitoring will establish a baseline underwater noise level/acoustic environment and post construction monitoring will collect data on noise emitted into the water column, to determine the noise profile around the subsea infrastructure. It is proposed that the methodology for post construction monitoring will repeat (as closely as possible) the methodology undertaken to establish the baseline acoustic environment. This will involve collecting baseline data over a continuous 8-hour duration via a boat-based survey using 'Drifting Ear' methodology, specifically designed for monitoring noise in high flow tidal environments. Post construction monitoring will collect data on noise emitted from subsea infrastructure, to determine the noise profile around the structure. Data collection will be repeated during different times of the year to ensure the data collected is as representative of year-round environmental conditions and wind speeds in the area. However, the exact data collection methodology is yet to be determined and will be developed in consultation with the relevant SNCBs post-consent.
74. Entanglement risks will be monitored through the Outline OEMRP (Document ref. WHX001-FLO-CON-ENV-PLN-0002). Monitoring of 'snagged' debris on cables, mooring lines and WTGs will be undertaken throughout the operation and maintenance phase of the Offshore Project as part of planned and unplanned maintenance visits. Data collected in these visits will provide an understanding of the risk of possible entanglement of marine mammals in marine debris. At this stage it is proposed that data collection is undertaken by continuous monitoring by load cells attached to the mooring devices, and the use of a Remotely Operated Vehicle (ROV); however, it is acknowledged that the sensitivity of normal mooring monitoring systems is unlikely to detect fishing gear or even entangled megafauna (i.e., the function of both load cells and ROV surveys is predominantly to assess the performance of the subsea infrastructure during operation). To address this, WCOW are collaborating with companies that are developing emerging technologies which may be suitable for monitoring entanglements in mooring lines by the time WCOW is installed and operational.

75. The exact methodology will be confirmed in the final Plans as detailed design progresses. Any fishing gear or marine debris caught in the Offshore Projects infrastructure will be removed to prevent any risk of entanglement.
76. The final MMMP, OEMRP and OUNMP will be finalised in the pre-construction period based upon the best available information and detailed design methodologies. All will be submitted to the MMO for approval in advance of works.
77. Vessel movements, where possible, will follow set established vessel routes and hence areas where marine mammals and marine turtles are accustomed to vessels, and kept to the minimum number that is required to reduce any increased collision risk. The Outline Construction Environmental Management Plan (OCEMP) (Document ref. WHX001-FLO-CON-ENV-PLN-0010) provides further information on the proposed good practice and code of conduct that will be undertaken by vessel operators to reduce any risk of collisions with marine mammals and marine turtles, as well as pollution prevention measures.
78. **Table 2-3** provides information on the monitoring requirements for marine mammal and marine turtle ecology. The proposed monitoring is additional to the embedded mitigation detailed in the Draft MMMP, and will be discussed and agreed with the MMO in consultation with the SNCBs.

Table 2-3: In Principle Monitoring Proposed – Marine Mammal and Marine Turtle Ecology

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
Behavioural disturbance effects from operational noise Physical or mortal injury effects from entanglement on mooring lines or dynamic cables	Marine mammals	Pre-construction	<ul style="list-style-type: none"> Monitoring as required under the OUNMP Underwater noise profiling to facilitate future understanding of noise contribution to the baseline underwater environment from operational subsea infrastructure (including snapping). Ensure best practice measures followed to minimise injury and mortality risk to marine mammals 	OUNMP provides early monitoring proposals, but final monitoring details will be informed by future consultation with the MMO and relevant SNCBs. The final PEMMP will also provide final details.	Scope of monitoring, programme and the methodology to be submitted to the MMO for approval prior to the pre-construction phase, in accordance with any timescales required by the Marine Licence conditions. OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006)
		Construction	<ul style="list-style-type: none"> Monitoring of entangled snagged material and entangled marine 	Load cells attached to mooring devices and subsea cables for continuous monitoring.	Scope of monitoring, programme and the methodology to be submitted to the MMO for approval prior to the construction phase, in accordance with any

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
			<p>megafauna on subsea infrastructure (while waiting to be installed) in order to both remediate the entanglement and gather data on the entanglement risk profile.</p>	<p>Mooring lines will be checked by ROV during both planned and unplanned maintenance activities.</p> <p>Possible novel dynamic monitoring system technology may become available by the construction phase, which could be tested by the Project.</p> <p>OEMRP provides early monitoring proposals, but final monitoring details will be informed by future consultation with the MMO and relevant SNCBs. The final PEMMP will also provide final details.</p>	<p>timescales required by the Marine Licence conditions.</p> <p>OEMRP (Document ref. WHX001-FLO-CON-ENV-PLN-0002))</p>
		Post- Construction	<ul style="list-style-type: none"> Monitoring as required under the OEMRP and OUNMP Underwater noise monitoring during operation of the Project to facilitate understanding of noise contribution from subsea infrastructure to the baseline underwater environment. 	<p>Load cells attached to mooring devices and subsea cables for continuous monitoring.</p> <p>Mooring lines will be checked by ROV during both planned and unplanned maintenance activities.</p> <p>Possible novel dynamic monitoring system technology may become available by the operational phase, which could be tested by the Project.</p> <p>OEMRP provides early monitoring proposals, but final monitoring details will</p>	<p>Scope of monitoring, programme and the methodology to be submitted to the MMO for approval prior to the commencement, in accordance with any timescales required by the Marine Licence conditions.</p> <p>OUNMP (Document ref. WHX001-FLO-CON-ENV-PLN-0006)</p> <p>OEMRP (Document ref. WHX001-FLO-CON-ENV-PLN-0002)</p>

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
			<ul style="list-style-type: none"> Monitoring of entangled snagged material and entangled marine megafauna on subsea infrastructure in order to both remediate the entanglement and gather data on the entanglement risk profile. Ensure best practice measures followed to minimise injury and mortality risk to marine mammals 	be informed by future consultation with the MMO and relevant SNCBs. The final PEMMP will also provide final details.	

2.7 Offshore Ornithology

2.7.1 Conclusions of the Environmental Statement

79. **Chapter 13: Offshore Ornithology** of the **Offshore ES** that effects on offshore ornithology ecological receptors during the construction, operation and decommissioning phases of the Project are considered of **negligible to minor adverse** effect. Assessment of cumulative effects also concluded the effects are **negligible**.
80. To support the impact assessment, a monthly offshore digital aerial survey was carried out between July 2020 and June 2022, capturing high-resolution photographic still imagery as well as a comprehensive desk study considering all known and relevant literature.
81. The key ornithological receptors identified in the study area were Kittiwakes, Great black-backed gulls, Common gulls, Herring Gulls, Lesser black-backed gulls, Sandwich tern, Common tern, Great skua, Guillemot, Razorbill, Puffin, Fulmar, Manx shearwater and Gannet. For all species, the assessment concluded no further mitigation is required in respect of disturbance and displacement, barrier effects, collision risk, entanglement, or indirect impacts (such as impacts on prey species), neither at the Windfarm Site itself or along the OECC.
82. As no significant effects are expected following assessment, no further monitoring or independent surveys are considered necessary for offshore ornithology based on this outcome.

2.7.2 In Principle Monitoring

83. Embedded mitigation for the Offshore Projects design includes annual monitoring of anchor/moorings (by use of ROV for example), to identify any entanglement hazards on the substructures throughout the lifetime of the Offshore Project. These measures have been adopted to reduce the potential for adverse effects on offshore ornithology receptors as well as marine mammals (see **Section 2.6**).
84. As no significant effects are expected, no further monitoring is required or proposed for offshore ornithology.

2.8 Commercial Fisheries

2.8.1 Conclusions of the Environmental Statement

85. **Chapter 14: Commercial Fisheries** of the **Offshore ES** concludes that effects on commercial fisheries receptors during the construction, operation and decommissioning phases of the Project are considered of **negligible to minor adverse** significance. Assessment of cumulative effects also concluded the effects are no greater than **minor adverse** significance.
86. Specific impacts that were assessed to commercial fisheries included potential reduced access to established fishing grounds, displacement leading to increased fishing pressure on adjacent grounds, increased steaming distance, interference with fishing activities, obstructions on the seabed and commercially exploited species.
87. The assessment found that due to location and small size of the Offshore Project relative to the locations and extent of fishing grounds, at national fleet level none of the potential impacts would be at levels of significance that would require direct mitigation. At the local level, a limited number of local vessels operating static gears would require relocation from the OECC during the installation phases of the export cable would require direct mitigation. In the case of these vessels, appropriate evidence-based cooperation agreements will be sought with the vessel owners in line with Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) Guidance to effectively mitigate this potential impact.
88. Embedded mitigation measures include appointing a Fisheries Liaison Officer (FLO), issuing Notices to Mariners (NtMs) a week prior to works, designing a minimal cable burial depth of 0.5m and limiting cable protection to essential areas. An updated Outline Construction Environment Management Plan (OCEMP), which includes spill prevention measures and a Waste Audit Statement (**Annex 1**) has also been prepared and will be updated pre-construction. The final CEMP will be implemented during the construction phase which will include an Emergency Spill Response Plan, Waste Management Plan, Marine Mammal Mitigation Protocol (currently in draft form; **Appendix V** of the **ES Addendum** (Document ref. WHX001-FLO-CON-CAG-PLN-0001)), Fisheries Liaison and Coexistence Plan (**Appendix 14.C** of the **Offshore ES** (Document ref. FLO-WHI-PLA-0017)) and Fisheries Management and Mitigation Strategy (as committed to in **Chapter 14: Commercial Fisheries** of the **Offshore ES**).

89. Additional mitigation measures will include designing project vessel transit routes to avoid areas of static fishing gear deployment (once ports have been delected to support the Project), as well as engagement with a locally experienced Fishing Industry Representative (FIR) through the FLO.

2.8.2 In Principle Monitoring

90. Given the lack of significant effects on commercial fisheries receptors, no impact driven commercial fisheries monitoring is proposed. The Project Fisheries Liaison and Coexistence Plan, presented in **Appendix 14.C** of the **Offshore ES** (Document ref. FLO-WHI-PLA-0017), will address the interaction of licensed activities with fishing activities, ensuring fishing fleets are notified prior to commencement of any licenced activities.

2.9 Shipping and Navigation

2.9.1 Conclusions of the Environmental Statement

91. **Chapter 15: Shipping and Navigation** of the **Offshore ES** concludes that effects on shipping and navigation receptors during the construction, operation and decommissioning phases of the Project are considered of **negligible to moderate adverse** significance. Assessment of cumulative effects also concluded the effects are moderate to negligible.
92. Impacts on Under Keel Clearance (UKC) and snagging risk and impacts on allision scored the highest (**moderate adverse** significance) driven by hazard consequence should an incident occur. However, in both instances the frequency of occurrence was considered unlikely and with embedded mitigation in place, both hazards are assessed to be As Low As Reasonably Practical (ALARP) and are therefore not **significant** in EIA terms, due to the implementation of measures to inform other sea users and to manage vessel traffic associated with the Project.
93. The impact of the export cable on vessel safety and activities was assessed as of **minor adverse** significance, with the most likely snagging risk presented by fishing along the export cable route and at landfall. The cable is intended to be fully buried up to a depth of 3m, or where this is not possible, protected using other measures such as rock armouring. Embedded mitigations in the form of cable burial and adequate protection would mitigate the risk of snagging reducing the frequency of occurrence.
94. Embedded mitigation measures include NtMs, site marking and charting and application of safety zones during construction, maintenance and decommissioning,

aids to navigation, buoyed construction area, vessel standards (including inspections and audits), Cable Burial Risk Assessment (CBRA) as provided in **Appendix U** of the **ES Addendum** (Document ref. WHX001-FLO-CON-ENG-RSA-0001), and having a Marine and Intertidal Pollution Contingency Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0004) in place. Should any exposure of damage of buried cables be identified during routine operation and maintenance inspections, the Kingfisher Information Service will be notified (as well as the NtM).

95. Additional mitigation was identified for the impacts on turbine breakout on vessel safety, reducing the effects from minor to **negligible** residual significance. This includes Global Positioning System (GPS) tracking of each WTG with geofenced alarms to identify excursion from site, fitting with dormant AIS (Automatic Identification System) transponders which can be remotely activated were a turbine to breakout (providing greater visibility to navigating vessels) and having emergency arrangements such as an agreement with towage providers in place to recover a turbine were it to breakout.

2.9.2 In Principle Monitoring

96. The Fisheries Liaison and Coexistence Plan presented in **Appendix 14.C** of the **Offshore ES** (Document ref. FLO-WHI-PLA-0017) provides detailed information to fishermen such as the site export cable route location for upload into fish plotters. The Marine and Intertidal Pollution Contingency Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0004) will be adopted to ensure the potential for release of pollutants from construction and operation and maintenance activities is minimised. This includes planning for accidental spills and responding to all potential contaminant releases in emergency scenarios. Site monitoring is to comprise continuous watch by multi-channel very high frequency (VHF), including Digital Selective Calling (DSC), to ensure incidents are responded to swiftly.
97. All impacts identified can be reduced to ALARP and lower with the implementation of additional mitigation measures and proposed monitoring presented in **Table 2-4**.

Table 2-4: In Principle Monitoring Proposed – Shipping and Navigation

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
Impact of export cable on vessel safety and activities, and under keel clearance and snagging risk	Marine traffic	Pre-construction	<ul style="list-style-type: none"> Engineering and design Purposes Bathymetry and seabed feature identification Establish a baseline prior to commencement of construction (and therefore, seabed preparation works) Results from the survey will be used to inform the Outline Cable Specification and Installation Plan (Document ref. WHX001-FLO-CON-ENV-PLN-0007) and CBRA, which will inform design of any cable 	<p>Each effect will be managed with standard and best practice methodologies.</p> <p>A comprehensive geophysical survey to encompass the areas where construction activity is planned, both within the Windfarm Site and along the OECC, up to Mean Low Water Springs (MLWS).</p> <p>A pre-construction geotechnical survey in the Windfarm Site area and along the export cable route will be conducted to determine depth of burial of cable and requirement for cable protection.</p>	<p>A pre-construction geophysical survey was already undertaken between June and August 2022 to inform the EIA (refer to Chapter 8: Marine Geology, Oceanography and Physical Processes of the Offshore ES). Further pre-construction surveys may be required.</p> <p>Further pre-construction geophysical / geotechnical surveys may be required, which would be used as a baseline to support engineering design and Marine Licence requirements.</p>

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
			<p>protection. The CBRA will establish feasibility of cable burial along the length of the cable route.</p> <ul style="list-style-type: none"> • Standard monitoring requirement as agreed with the MMO and SNCBs • Input to benthic and ecological surveys 		
		Post-Construction	<ul style="list-style-type: none"> • Engineering and maintenance purposes • Post construction geophysical surveys will be used to ensure cables or other exposed subsea elements are not left exposed and/or unmarked in order to, 	A post-construction geophysical survey will be required to assess subsea elements.	Scope of surveys, programme and the methodology for monitoring purposes to be submitted to the MMO for approval prior to the commencement of the survey works, in accordance with timescales required by the Marine Licence conditions.

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
			amongst other things; reduce snagging risk to fishing gear		
Impacts of turbine breakout on vessel safety		Post-Construction	<ul style="list-style-type: none"> Health and safety Regulatory Expectations on Moorings for Floating Wind and Marine Devices (Health and Safety Executive (HSE) / Maritime and Coastguard Agency (MCA), 2017) To inform emergency arrangements should a turbine become displaced or break free 	<p>GPS tracking of each WTGs with geofenced alarms to identify excursion from site</p> <p>Turbines to be fitted with dormant AIS transponders which can be remotely activated were the turbine to break free, providing greater visibility to navigating vessels</p> <p>The moorings subject to the requirement of the Regulatory Expectations on Moorings for Floating Wind and Marine Devices (HSE/MCA, 2017) and inspections and monitoring will be carried out throughout the operational phase</p>	

2.10 Marine Archaeology and Cultural Heritage

2.10.1 Conclusions of the Environmental Statement

98. **Chapter 16: Marine Archaeology and Cultural Heritage** of the Offshore ES assesses that effects on archaeological and cultural receptors during the construction, operation and decommissioning phases of the Project are considered to be of **negligible** to **minor adverse** significance. Assessment of cumulative effects also concluded the effects are **negligible**.
99. Embedded mitigation measures include employing Archaeological Exclusion Zones (AEZs) for known heritage assets, Temporary AEZs where the extents of an anomaly are not fully visible, avoidance by micro-siting design following acquisition of geophysical data that would be acquired post consent and having a protocol in place for unexpected archaeological discoveries. Additional mitigation which will be included in the Outline Written Scheme of Investigation (WSI) involve watching briefs where seabed material is brought to the surface, or in the intertidal zone if open and cut trenching is used for cable installation, archaeological assessment of further geophysical data to be acquired post-consent and geoarchaeological assessment of geotechnical data acquired for the project.
100. Known archaeological receptors are not considered to be subject to significant cumulative impacts on the basis that they would be avoided where possible due to appropriate mitigation. Transboundary impacts to heritage assets will not occur due to the localised nature of disturbance which do not cross territorial borders.

2.10.2 In Principle Monitoring

101. Monitoring will be agreed with stakeholders prior to construction based on this Plan, and will take account of the final detailed design of the Offshore Project. The requirements for monitoring for archaeology and cultural heritage are set out in the Outline WSI. This comprises the archaeological assessment of post construction marine geophysical data with an assessment of AEZs confirming that impacts have not occurred during or post-construction and that the size and extent of the AEZs are fit for purpose. **Table 2-5** provides information on the monitoring requirements for marine archaeology and cultural heritage.
102. The Outline Offshore Archaeological Written Scheme of Investigation (WSI), provided in **Appendix 16.B** of the **Offshore ES** (Document ref. FLO-WHI-REP-0002-16) will be updated throughout the post-consent process (in consultation with Historic England, Devon County Council and NDC). This will ensure that the scheme of investigation is appropriate to the final project design and incorporates the results

of pre-construction monitoring surveys (such as the high-resolution swath bathymetric pre-construction surveys). Prior to construction commencing, the final WSI will be finalised and submitted to the MMO for approval and will remain live and be updated (in consultation with the MMO) based on outputs from any relevant site investigation works undertaken throughout the construction, operation and decommissioning phases as appropriate.

103. Further monitoring will be delivered by ensuring that future geophysical surveys and geotechnical campaigns throughout the life of the project are undertaken with archaeological input and that data derived from any such surveys is assessed for archaeological potential. The specification of any proposed pre-construction marine geophysical and geotechnical surveys whose primary aim is non-archaeological will be subject to advice from the retained accredited archaeologist. This will ensure that archaeological input is provided at the planning stage and will enable archaeological considerations to be accounted for without compromising the primary objective of the survey. The data acquired should be sufficiently robust to enable professional archaeological interpretation and analysis. Further surveys are required where there are currently data gaps, and under commitments by the project team to additional mitigation and investigations. A series of archaeological objectives will be established by the retained archaeologist for the acquisition of pre-construction data.
104. Any areas identified with geoarchaeological potential will be targeted during the geotechnical sampling campaigns and the results of the geoarchaeological assessment will be published to enhance the palaeogeographic knowledge and understanding of the area.

Table 2-5: In Principle Monitoring Proposed – Marine Archaeology and Cultural Heritage

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
All direct and indirect impacts on archaeological resource	Marine archaeological and heritage features	Pre-construction	<ul style="list-style-type: none"> To inform selection of appropriate mitigation 	<p>Further pre-construction surveys of the seabed where construction activity will take place. Survey scopes and data will be reviewed by an accredited archaeologist. Method statements will be drafted for geotechnical surveys by the archaeologist in consultation with Historic England for geoarchaeological assessment of geotechnical material.</p> <p>Pre-commencement surveys may include swath-bathymetric surveys and side-scan surveys, including geophysical surveys where possible, of the construction area including a buffer area around the site of each works. This should include the investigation and identification of seabed features of known and potential archaeological interest within the survey areas which may require the refinement, removal or introduction of AEZs, and to confirm any micro-siting requirements.</p> <p>An Outline offshore WSI has been compiled which makes</p>	<p>Appendix 16.B Outline Offshore Archaeological Written Scheme of Investigation (Document ref. FLO-WHI-REP-0002-16) of the Offshore ES.</p> <p>The chapter included baseline identification of marine archaeological features to inform the WSI and inform the establishment of AEZs, where required.</p> <p>Final pre-construction WSIs will be submitted to the MMO for written approval and consulted with Historic England.</p>

Potential Effect	Receptor	Monitoring Phase	Reasons for Monitoring	Monitoring Proposal	Details / Links
				provision for all archaeological mitigation that might be required in the pre-construction investigations.	
		Construction	<ul style="list-style-type: none"> To enable appropriate mitigation 	Specific requirements relating to monitoring during construction (including protocol for unexpected archaeological discoveries) as detailed in the WSI	Final pre-construction WSIs will be submitted to the MMO for written approval and consulted with Historic England.

3. References

Cefas. (2012). Guidelines for data acquisition to support marine environmental assessments of offshore renewable energy projects. Cefas contract report: ME5403 – Module 15. [Online] Available at: <https://eprintspublications.npl.co.uk/6121/1/mgpg133.pdf> [Accessed 03 January 2024].

Department for Communities and Local Government. (2019). [Online] Available at: <https://www.gov.uk/guidance/use-of-planning-conditions> [Accessed 03 January 2024].

Glasson J, Therivel R, Chadwick A. (2011). Introduction to Environmental Impact Assessment. 4th edition. The Natural and Built Environment Series. [Online] Available at: https://www.researchgate.net/publication/335467191_Introduction_To_Environmental_Impact_Assessment [Accessed 03 January 2024].

HM Government (2011). UK Marine Policy Statement. [Online] Available at: <https://assets.publishing.service.gov.uk/media/5a795700ed915d042206795b/pb3654-marine-policy-statement-110316.pdf>

Ministry of Housing, Communities and Local Government (2023). National Planning Policy Framework. [Online] Available at: https://assets.publishing.service.gov.uk/media/65829e99fc07f3000d8d4529/NPPF_December_2023.pdf [Accessed 05 January 2024].

MMO (2014). Review of Post-Consent Offshore Wind Farm Monitoring Data Associated with Licence Conditions MMO Project No: 1031. [Online] Available at: <https://assets.publishing.service.gov.uk/media/5a74a50fed915d0e8e399ddb/1031.pdf> [Accessed 03 January 2024].

National Physical Laboratory (2014). Good Practice Guide No.133: Underwater Noise Measurement. [Online] Available at: <https://eprintspublications.npl.co.uk/6121/1/mgpg133.pdf> [Accessed 05 January 2024].

Natural Environment and Rural Communities Act (2006). [Online] Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents>. [Accessed 05 January 2024]

OSPAR. (2008) Guidance on Environmental Considerations for Offshore Wind Farm Development. [Online] Available at: <https://www.ospar.org/work-areas/eiha/offshore-renewables> [Accessed 03 January 2024].

The Crown Estate (2021). Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects. Salisbury: Wessex Archaeology. [Online] Available at:

<https://www.thecrownstate.co.uk/media/3917/guide-to-archaeological-requirements-for-offshore-wind.pdf> [Accessed 05 January 2024]