MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Offshore in-principle monitoring plan

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Image of an offshore wind farm

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Glossary

Term	Meaning
Applicant	Morgan Offshore Wind Limited.
Development Consent Order	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Environmental Impact Assessment	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the Environmental Impact Assessment (EIA) Directive and EIA Regulations, including the publication of an Environmental Statement.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Morgan Generation Assets: Generation Assets.
Inter-array cables	Cables which connect the wind turbines to each other and to the offshore substation platforms. Inter-array cables will carry the electrical current produced by the wind turbines to the offshore substation platforms.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for a DCO to apply for a 'deemed marine licence' as part of the DCO process.
Morgan Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables, scour protection, cable protection and offshore substation platforms forming part of the Morgan Offshore Wind Project: Generation Assets will be located.
Morgan Offshore Wind Project: Generation Assets	This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations/maintenance and decommissioning).
National Policy Statement(s)	The current national policy statements for energy published by the Department for Energy Security & Net Zero in 2024.
Offshore Substation Platform	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Palaeolandscapes	Terrestrial landscape features of a past geological age.
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.

Acronyms

Acronym	Description
AFBI	Agri-Food and Bioscience Institute
AIS	Automatic identification system
AtoN	Aid to Navigation
DCO	Development Consent Order
DESNZ	Department for Energy Security & Net Zero
dML	Deemed Marine Licence

Acronym	Description
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HRA	Habitats Regulations Assessment
LAT	Lowest Astronomical Tide
MCA	Maritime and Coastguard Agency
MHWS	Mean High Water Springs
ML	Marine Licence
MMO	Marine Management Organisation
MU	Management Unit
NRA	Navigational Risk Assessment
NPS	National Policy Statement
OIPMP	Offshore In-Principle Monitoring Plan
OSP	Offshore Substation Platform
ROV	Remotely Operated Vehicle
SNCB	Statutory Nature Conservation Body
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
VMS	Vessel Monitoring System

Units

Unit	Description
kg	Kilogram
km	Kilometre
km^2	Kilometre squared
m	Metre
nm	Nautical mile

1 Offshore In-Principle Monitoring Plan

1.1 Overview of the Offshore In-Principle Monitoring Plan

1.1.1.1 This Offshore In-Principle Monitoring Plan (OIPMP) has been produced to present and agree the objectives of any monitoring measures required within the deemed marine licences (dMLs) within the draft DCO (Document Reference C1). This document aims to:

- Compile relevant offshore monitoring as identified in the Environmental Impact Assessment (EIA) process
- Establish the objectives of this monitoring
- Present the guiding principles and framework through which monitoring activities associated with the construction and operation of the Morgan Generation Assets will be delivered.

1.1.1.2 This document provides assurance that necessary offshore monitoring associated with the Morgan Offshore Wind Project: Generation Assets (hereafter referred to as the Morgan Generation Assets) will be formally managed. It is intended that this document will provide the basis for further discussions with the Marine Management Organisation (MMO) and the relevant Statutory Nature Conservation Bodies (SNCBs) to agree the exact detail, including timing and methodologies for any offshore monitoring that is required by the deemed marine licence(s) within the draft DCO (Document Reference C1). It should be noted that the final detailed plans for monitoring work will not be produced until closer to the time that the licensed activities will be undertaken (following final scheme design). These will be agreed with MMO (as required by the conditions of the dMLs within the draft DCO (Document Reference C1)) in consultation with their statutory advisors where necessary.

~~1.1.1.2~~1.1.1.3 The OIPMP has been updated at Deadline 5 to include further detail on relevant adaptive measures that will be undertaken in response to monitoring findings.

1.2 Description of the Morgan Generation Assets

1.2.1.1 The Morgan Generation Assets is located in the east Irish Sea. The Morgan Array Area (i.e. the area within which the offshore infrastructure will be located) is 280 km^2 in area and is located 22.22 km (12 nm) from the Isle of Man coastline, 37.13 km (20.1 nm) from the northwest coast of England and 58.5 km (31.6 nm) from the Welsh coastline (Anglesey) (when measured from Mean High Water Springs (MHWS)). The Morgan Array Area is located wholly within English offshore waters (beyond 12 nm from the English coast).

1.2.1.2 A marine licence (ML) is required before carrying out any licensable marine activities under the Marine and Coastal Access Act 2009. The MLs for activities located in English offshore waters will be deemed under the DCO. The dMLs will cover works related to the offshore wind farm generation infrastructure (wind turbines, Offshore Substation Platforms (OSPs), foundations, inter-array cables and interconnector cables). This Offshore In-Principle Monitoring Plan is secured in the dMLs within the Draft DCO.

1.2.1.3 A detailed description of the Morgan Generation Assets is presented in Volume 1, Chapter 3: Project description of the Environmental Statement (Document Reference F1.3). Key parameters of the Morgan Generation Assets are outlined in Table 1.1.

Table 1.1: Key parameters for the Morgan Generation Assets.

Parameter	Value
Morgan Array Area (km^2)	280
Average water depth (m Lowest Astronomical Tide (LAT))	-38.27
Maximum number of wind turbines	96
Maximum blade tip height above LAT (m)	364
Maximum number of Offshore Substation Platforms (OSPs)	4
Maximum length of inter-array cables (km)	390
Maximum length of interconnector cables (km)	60

1.3 General principles and guidance

1.3.1 Guidance

1.3.1.1 There are a number of guidance documents and reviews to draw on when considering the overarching principles in marine environmental monitoring. Of particular relevance to offshore wind farms is the independent review of post-consent environmental monitoring data undertaken by Fugro EMU Ltd on behalf of the Marine Management Organisation (MMO) (MMO, 2014a) and the MMO's subsequent recommendations (MMO, 2014b).

1.3.2 Principles

- Paragraphs 2.8.84 and 2.8.85 of the National Planning Statement (NPS) for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero (DESNZ), 2023) states that:

  'Monitoring must measure and document the effects of the development and the efficacy of any associated mitigation or compensation. This will enable an assessment of the accuracy of the original predictions and improve the evidence base for future mitigation and compensation measures enabling better decision-making in future EIAs and Habitats Regulations Assessments (HRAs).'

- Monitoring should have a clear purpose and be designed to provide answers to specific questions where significant environmental impacts have been identified (Cefas, 2012; Glasson *et al*., 2011; OSPAR, 2008). As such (and in- line with the MMO's recommendations for targeted monitoring (MMO, 2014b)), monitoring proposals should have an identified frequency (and/or duration) and confirmed outputs, which provide statistically robust datasets designed to address the hypothesis being tested

- The presence of a significant impact identified in the EIA should not, in itself, lead to a requirement for monitoring. Monitoring should address significant evidence gaps or uncertainty relevant to the Morgan Generation Assets, where it is realistic for those gaps to be filled or uncertainty reduced significantly. Monitoring should

also be targeted at those features considered to be particularly sensitive to the impacts of the development, especially where these features are of economic or environmental importance. MMO (2014b) advise that the greatest focus should be placed on impacts of concern for which the highest uncertainty remains. Such targeted monitoring is more likely to answer key uncertainties than broad scale/generic monitoring approaches

- Proposals for monitoring should be based, where relevant, on the best practice and outcomes of the latest review of environmental data (i.e. best available evidence) associated with post-consent monitoring of licence conditions of offshore wind farms (MMO, 2014b)
- An iterative approach should be taken whereby the scope and design of any new monitoring work should be based on a review of the findings of any preceding phases of monitoring or relevant survey work, including surveys carried out in support of the EIA for the Morgan Generation Assets. It is acknowledged that the MMO may require amendments to individual monitoring programmes if the evidence indicates the existing monitoring programme is not fit for purpose and/or impacts are not as predicted
- Where site specific monitoring is undertaken pre- and post-construction it may be relevant to consider undertaking monitoring over non-consecutive years
- Under certain circumstances for addressing specific uncertainties it may be more appropriate to adopt a strategic approach to the monitoring. Strategic monitoring (potentially with the boundaries of the Morgan Generation Assets) may be considered where contributing to the answering of a broader question (that is still linked to the relevant receptors) is likely to offer greater ability to address key questions than any site-specific monitoring may achieve. Such strategic work may need to be de-coupled from any specific phase of the Morgan Generation Assets.

1.4 Consultation

1.4.1.1 Table 1.2: presents key topics raised during consultation activities undertaken for the Morgan Generation Assets relevant to monitoring.

Table 1.2: Key topics raised during consultation activities.

Date	Consultee and type of response	Topics raised	Response to topic raised and/or where considered in the application
01 June 2023	Isle of Man Government	Underwater noise impacting fish and shellfish receptors of Volume 2, Chapter 3: Fish and shellfish of the Environmental Statement (Document Reference F2.3). Further mitigation: '…further mitigation is currently being investigated to minimise risks of significant impacts if piling occurs during the herring spawning season.' Agree that this is appropriate, and recommend specific consultation with AFBI on herring spawning, and inclusion of Isle of Man Government (DEFA) due to developing interest in the fishery and relevant herring legislation covering the proposed array area.	The implementation of piling soft-start and ramp-up measures is set out Volume 2, Chapter 3: Fish and shellfish of the Environmental Statement (Document Reference F2.3). In addition, the project plans to develop an Underwater Sound Management Strategy post-consent and in discussion with stakeholders to support reduction of the impact magnitude associated with underwater sound from piling; see the Outline underwater sound management strategy (Document Reference J13). Monitoring relevant to fish and shellfish is considered in Table 3.43 of Volume 2, Chapter 3: Fish and shellfish of the Environmental Statement (Document Reference F2.3).
06 February 2023	Isle of Man Government	Will monitoring of fishing patterns during and post-construction be undertaken to confirm these conclusions? This may be important to the Isle of Man, particularly if displaced vessels also hold Manx licences.	No monitoring of fishing patterns post construction is proposed. However, the Applicant has made a commitment to annually review for the first five years of the operations and maintenance phase Vessel Monitoring System (VMS) and landings data to contribute to the evidence base for fishing activity in and around offshore wind farms. This commitment is secured within the Outline fisheries liaison and co-existence plan (Document Reference J10).
6 February 2023	Isle of Man Department of Infrastructure	Monitoring of the cables and their burial status to reduce snagging risk. Annual reviews for the first five years of the operational phase, to review VMS data and landings data to identify whether there are any changes to fishing activity within the Morgan Array Area.	Monitoring relevant to commercial fisheries is considered in Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement (Document Reference F2.6). An Offshore Construction Method Statement post-consent with details of cable monitoring to reduce snagging risk will be prepared. The Applicant has made a commitment to annually review for the first five years of the operations and maintenance phase of VMS and landings data to contribute to the evidence base for fishing activity in and around offshore wind farms. This commitment is secured within the Outline fisheries liaison and co-existence plan (Document Reference J10).

Date	Consultee and type of response	Topics raised	Response to topic raised and/or where considered in the application
06 April 2023	NFFO and WFA	A monitoring plan to monitor the scallop fishing fleet over a five-year period does not fall into any of the “Avoid, Minimise, Mitigate” categories. What are the protocols to be followed if an effect is observed?	The Applicant has made a commitment to Annual review for the first five years of the operations and maintenance phase of VMS and landings data to contribute to the evidence base for fishing activity in and around offshore wind farms. If changes are identified this will be discussed with commercial fisheries stakeholders. This commitment is secured within the Outline fisheries liaison and co-existence plan (Document Reference J10).
31 May 2023	MMO	The MMO would expect the effects on benthic ecology receptors to be monitored, to determine whether the predictions of the Environmental Statement (ES) are accurate, especially when sensitive features are potentially at risk. Once more additional information is provided regarding ‘fragile sponge and anthozoan communities on rocky habitats’ the MMO will be able to advise whether monitoring is required.	No significant effects have been concluded as a result of the Morgan Generation Assets alone or cumulatively with other projects and so no monitoring has been proposed. Monitoring related to undertaking maintenance activities is outlined in Volume 1, Chapter 3: Project description of the Environmental Statement (Document Reference F1.3). Any suitable data available from this monitoring will be reviewed for the identification of INNS in accordance with the INNS Management Plan which will be included in the Offshore Environment management Plan (EMP; subject to data quality). See Volume 2, Chapter 2: Benthic subtidal ecology of the Environmental Statement (Document Reference F2.2) and section 1.7 of this document for further details. Additional information and data regarding the ‘fragile sponge and anthozoan communities on rocky habitats’ has been provided in Volume 4, Annex 2.1: Benthic subtidal ecology technical report of the Environmental Statement (Document Reference F4.2.1).
31 May 2023	MMO	The MMO agrees with the best-practice measures that have been outlined in Section 4.2.6.1 of the scoping report for fisheries and fish ecology, all of which are appropriate. The requirement for further mitigation or monitoring will be determined on the outcome of the EIA process, which I agree is appropriate.	Monitoring relevant to fish and shellfish is considered in Volume 2, Chapter 3: Fish and shellfish of the Environmental Statement (Document Reference F2.3). Based on the outcome of the assessment no monitoring is suggested.

1.5 In-principle proposals for monitoring

1.5.1 Approach

1.5.1.1 This document outlines the rationale behind the proposed monitoring, with a view to reducing uncertainty when drafting the final plans post grant of a DCO. Following an iterative approach, it should be recognised that increased knowledge and understanding based on survey outcomes may influence the design of subsequent monitoring work. The focus, requirements and methodologies for future monitoring for the Morgan Generation Assets may therefore differ from the outline approach presented in this document. Any such future modifications to monitoring approaches will be the subject of ongoing consultation between the Applicant, MMO and its statutory advisers. This document can be varied as required by MMO, in consultation with the Applicant.

1.5.1.2 Topics which do not state relevant monitoring measures are not considered in this report, except where the Applicant has made further commitments post-application. The topics which stated relevant monitoring measures and for which the Applicant has made further commitments post-application are discussed in this document and are listed as follows:

- Physical processes
- Benthic subtidal ecology
- Fish and shellfish ecology
- Marine mammals
- Commercial fisheries
- Shipping and navigation
- Marine archaeology and cultural heritage.

1.5.1.3 For each topic, a table is presented which details:

- The potential effects and receptor(s) for which monitoring is considered necessary
- Monitoring objectives
- The approach to monitoring
- Residual effect
- Links to other monitoring
- Method of securing monitoring
- Rationale.

1.5.1.4 For each topic, the tables are divided into sections for pre-construction monitoring, construction monitoring and post-construction monitoring. At this stage, no monitoring approaches are outlined for the decommissioning phase.

1.5.2 Engineering and design-related studies

1.5.2.1 Studies will be undertaken for engineering purposes in addition to the environmental monitoring required under conditions of the dML(s) within the draft DCO (Document

Reference C1). Some of these studies will overlap with the conditioned monitoring and, wherever possible, the Applicant will endeavour to combine surveys for monitoring purposes with those already being carried out for engineering purposes. These are:

- Geotechnical
- Unexploded ordnance (UXO) survey
- Remotely operated vehicle (ROV) survey
- Cable burial survey.

1.6 Physical processes

1.6.1 Conclusions of the Environmental Statement

1.6.1.1 The potential impacts of the Morgan Generation Assets on physical processes receptors have been assessed within Volume 2, Chapter 1: Physical processes of the Environmental Statement (Document Reference F2.1). All impacts were assessed as being of **no significance** in EIA terms following the application of appropriate measures adopted as part of the Morgan Generation Assets, therefore, in terms of physical processes, no specific monitoring is recommended beyond those related to undertaking maintenance activities outlined in Volume 1, Chapter 3: Project description of the Environmental Statement (Document Reference F1.3). Following stakeholder feedback, the Applicant has expanded this commitment to consider data from scheduled pre-construction and post construction surveys to inform sandwave recovery.

1.6.2 In-principle monitoring

1.6.2.1 Table 1.3 provides information on the monitoring commitments for physical processes.

Table 1.3: In-principle monitoring proposed for physical processes.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Pre-Construction and Post-Construction							
Potential effect on sandwave features from the installation of inter array / interconnector cables	Sediment transport and sediment transport pathways	To monitor changes to, and recovery of, sandwaves following the installation of inter array / interconnector cables.	Data from the pre-construction hydrographic and side scan sonar surveys to establish a baseline on the presence and nature of sandwaves within the Morgan Array Area. The monitoring plan will be prepared post consent and submitted to the MMO at least four months prior to the first pre-construction survey. The equivalent post construction hydrographic	Monitoring will adopt an adaptive approach in terms of reviewing the findings of the post consent surveys with the MMO and relevant statutory advisors, with the need for further monitoring actions to be discussed following that review.	Benthic subtidal ecology (Table 1.4), Commercial fisheries (Table 1.7), Shipping and navigation (Table 1.8), Marine archaeology and cultural heritage (Table 1.9).	Secured through ~~relevant~~ conditions 20(1)(c), 27 and 29 in the dMLs within the DCO (document reference C1).	To validate predications made in the Environmental Statement with regard to changes in physical processes in the Morgan Array Area and to provide information to be considered in the context of seabed mobility, seabed recovery and sandwave recovery.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
			and side scan sonar surveys will establish the change to / recovery of a representative sample of these features following sandwave clearance and cable installation activity. The duration of any such surveys will be informed by the results of the first post construction monitoring in discussions with the regulatory authority and its statutory advisors.				

1.7 Benthic subtidal ecology

1.7.1 Conclusions of the Environmental Statement

1.7.1.1 The potential impacts of the Morgan Generation Assets on benthic subtidal ecology receptors have been assessed within Volume 2, Chapter 2: Benthic subtidal ecology of the Environmental Statement (Document Reference F2.2). All impacts were assessed as being of **minor adverse** or lower significance following the application of appropriate measures adopted as part of the Morgan Generation Assets. Following stakeholder feedback, the Applicant has provided further detail on monitoring of impacts on sandwaves (Table 1.3) and expanded the commitments for benthic monitoring to utilise the scheduled pre-construction / post construction surveys to review data available to monitor for invasive non-native species (INNS) and colonisation of novel hard structures. The commitment to the monitoring of cables and their burial status has been amended within this section of the updated IPMP. This monitoring will be undertaken in line with industry best practice and is reflected in Table 1.7 and Table 1.8.

1.7.2 In-principle monitoring

1.7.2.1 Table 1.4 provides information on the monitoring commitments for benthic subtidal ecology.

Table 1.4: In-principle monitoring proposed for benthic subtidal ecology.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Post-construction							
Increased risk of introduction and spread of invasive non-native species (INNS)	Benthic subtidal ecology	To establish presence / absence of INNS around seabed infrastructure	Use of scheduled pre and post construction surveys to include ecological monitoring such as reviewing any suitable Drop Down Video (DDV) data available for the identification of INNS. A monitoring plan (which accords with the offshore in principle monitoring plan) to include details of proposed surveys and be submitted to the MMO at	If INNS are identified, then action will be taken following the adaptive approach set out in the Measures to Minimise INNS Plan within the Outline Offshore Environmental Management Plan (REP4-018). This will consider the feasibility of collecting samples of the communities colonising the seabed infrastructure for further analysis of INNS. The feasibility of the collection of such samples would be dependent on the	Physical processes (Table 1.3).	Secured through ~~relevant~~ conditions 20(1)(c), 20(1)(e)(vii), 27 and 29 in the dMLs within the DCO (document reference C1).	To validate the predictions made in the ES with regard to INNS.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
			least four months prior to survey commencement.	technical specifications of the equipment available at the time to undertake the surveys as well as health and safety considerations. Morgan Offshore Wind Limited commit to exploring this as an adaptive management measure which would be discussed with the MMO as part of the development of the monitoring plan post-consent.			
Colonisation of novel hard structures	Benthic subtidal ecology	To establish the colonisation around a representative sample of gravity base foundation structures.	Use of scheduled pre and post construction surveys to include ecological monitoring such as reviewing any suitable DDV data available for the identification of colonisation. A monitoring plan (which accords with the offshore in principle monitoring plan) to include details of proposed surveys and be submitted to the MMO at least four months prior to survey commencement.	No adaptive measures required. Monitoring is being undertaken as part of an evidence building programme and is not linked to a specific impact.	Physical processes (Table 1.3).	Secured through ~~relevant~~ conditions 20(1)(c), 27 and 29 in the dMLs within the DCO (document reference C1).	To establish an increased evidence base for colonisation on and around novel foundation types.

1.8 Fish and shellfish ecology

1.8.1 Conclusions of the Environmental Statement

1.8.1.1 The potential impacts of the Morgan Generation Assets on fish and shellfish ecology receptors have been assessed within Volume 2, Chapter 3: Fish and shellfish ecology of the Environmental Statement (Document Reference F2.3). All impacts were assessed as being of **minor adverse** or lower significance following the application of appropriate measures adopted as part of the Morgan Generation Assets. The Applicant has committed to monitoring of queen scallop within and around the Morgan Array Area.

1.8.2 In-principle monitoring

1.8.2.1 Table 1.5 provides information on the monitoring commitments for fish and shellfish ecology.

Table 1.5: In-principle monitoring proposed for fish and shellfish ecology.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Pre-construction and Post-construction							
Potential effects on queen scallop	Queen scallop (consideration will also be given to King scallop)	To establish a baseline of the presence of queen scallop within the core grounds in and around the Morgan Array Area and, post construction, to identify changes to queen scallop from the baseline conditions.	Pre and post-construction dredge surveys for up to five years post construction, to determine changes to queen scallop from baseline conditions based upon annual monitoring results. Whilst the focus of the monitoring is relating to effects on Queen scallop, consideration will also be given to presence of King scallop.	Further adaptive management will be discussed with the MMO and relevant fisheries stakeholders. If it is evident following a period of adaptive monitoring that the effect on Queen scallop is significantly worse than predicted in the ES, the Applicant will engage with the MMO and relevant stakeholders on an appropriate adaptive management intervention measure. Measures currently considered include stock enhancement in the form of scallop re-seeding (the laying of juvenile scallops (either from natural collection or hatchery reared) onto the	Commercial fisheries (Table 1.7).	Secured through ~~relevant~~ conditions 20(1)(c), 27 and 29 in the dMLs within the DCO (document reference C1). Note that additional marine licences may be required for any adopted adaptive management measures.	To validate predictions made within the EIA relating to impacts from the construction of Morgan Generation Assets on queen scallop. The monitoring will be cognisant of similar commitments on Mona Offshore Wind Farm, and where possible adopt aligned methodologies to ensure a more strategic approach is taken to the monitoring. This will serve to ensure a more

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
				seabed) as defined in Agri-food & Biosciences Institute (2020), however, the most suitable form of adaptive management will be agreed with relevant stakeholders and implemented at the time. The premise for the activation of scallop re-seeding will be that if following adaptive monitoring it can be evidenced that, when considered against the baseline / regional trends of scallop, there is a long term significant negative effect on scallop directly attributable to Morgan Generation Assets, the Applicant would implement a proportionate scallop re-seeding programme. The Applicant would ensure that the MMO and relevant fisheries stakeholders are aligned that this is the most pragmatic form of adaptive management at the time, which would be commensurate to the scale of impact.			comprehensive evidence base is established for these Irish Sea scallop grounds.

1.9 Marine mammals

1.9.1 Conclusions of the Environmental Statement

1.9.1.1 The potential impacts of the Morgan Generation Assets on marine mammal ecology receptors have been assessed within Volume 2, Chapter 4: Marine mammals of the Environmental Statement (Document Reference F2.4). All residual effects will be of **minor adverse** significance following the application of appropriate measures adopted as part of the Morgan Generation Assets. The Applicant has committed to carrying out construction monitoring in the event that driven or part-driven piled foundations are proposed, as set out in Table 1.6.

1.9.2 In-principle monitoring

1.9.2.1 Table 1.6 provides information on the monitoring commitments for marine mammals.

Table 1.6: In-principle monitoring proposed for marine mammals.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
During construction							
Injury and disturbance from elevated underwater sound during piling	Marine mammals	To ensure the level of underwater sound generated from percussive piling is not greater than predicted, and if relevant establish the efficacy of any relevant mitigation (such as noise abatement systems (NAS))~~To ensure the level of underwater sound generated from percussive piling is not greater than predicted, and if relevant establish the efficacy of any relevant mitigation (such as NAS).~~	~~Measurements of underwater sound generated by the installation of the first four piled foundations of each piled foundation type and associated marine mammal monitoring, to be set out in the marine mammal mitigation protocol (MMMP).~~ Measurements of underwater sound generated by the installation of the first four piles of each piled foundation type to be installed, and	The results of the initial underwater sound measurements will be provided to the MMO within six weeks of the installation of the monitored piles. The assessment of this report by the MMO will determine whether any further underwater sound monitoring is required, or indeed if any further mitigation is required (as controlled through Condition 28(5) in the dMLs within the DCO. If, in the reasonable opinion of the MMO in consultation with	N/A	Secured through ~~relevant~~ conditions 20(1)(c), 20(1)(g) and 28 ~~-~~in the dMLs within the DCO (document reference C1).	To ensure that impacts on marine mammal receptors will not be worse than predicted it is necessary to be confident that the piling sound levels are within the levels predicted in the ES. It may (if relevant) also serve to provide information on the efficacy of any mitigation.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
			measurements of underwater sound generated by the installation of the first two piles where it is anticipated hammer energies greater than 3,000kJ may be required for installation, and associated marine mammal monitoring, to be set out in the marine mammal mitigation protocol (MMMP).	the relevant statutory nature conservation body, the assessment shows significantly different underwater sound modelling results to those assessed in the environmental statement, or failures in mitigation, all piling activity must cease until an update to the marine mammal mitigation protocol and further monitoring requirements have been agreed.			

1.10 Commercial fisheries

1.10.1 Conclusions of the Environmental Statement

1.10.1.1 The potential impacts of the Morgan Generation Assets on commercial fisheries receptors have been assessed within Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement (Document Reference F2.6). All impacts were assessed as being of **no significance** following the application of appropriate measures adopted as part of the Morgan Generation Assets. The commitment to monitoring of cable routes (in the array area) and their burial status has been included as this is considered industry best practice. The Applicant has also committed to monitoring of queen scallop within and around the Morgan Array Area.

1.10.2 In-principle monitoring

1.10.2.1 Table 1.7 provides information on the monitoring commitments for commercial fisheries.

Table 1.7: In-principle monitoring proposed for commercial fisheries.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Post-construction							
Loss or damage to fishing gear due to snagging	Fishing vessels	To monitor cables and their burial status to identify any areas of cable exposure and reduce snagging risk.	Periodic validation surveys of cable burial and protection to ensure specified requirements are met.	The results of this monitoring will inform whether any further action is required to reduce risks of snagging.	Shipping and navigation (Table 1.8)	Preparation of an Offshore Construction Method Statement post-consent with details of cable monitoring until the scheme is decommissioned. This plan is secured via ~~a~~ condition 20(1)(d) in the deemed marine licence~~(s)~~ within the draft DCO (Document Reference C1).	To understand whether cables associated with the Morgan Array Area have, or have the potential to have snagged fishing gear.
Loss or restricted access to	Fishing vessels	To identify whether there are any changes to fishing	Annual reviews for first five years of operations and maintenance phase, to review Vessel	If a change is identified it will be reported on and discussed with commercial fisheries stakeholders, to	N/A	Outline Fisheries Liaison and Coexistence Plan as part of an Offshore EMP is secured through condition 20(1)(e)(v) of	To contribute to the evidence base for commercial fishing

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
fishing grounds		activity within the Morgan Array Area.	Monitoring System (VMS/iVMS) data and landings data to identify whether there are any changes to fishing activity within and around the Morgan Array Area~~.~~, and, where there is change, to discuss with commercial fisheries stakeholders.	ascertain whether further monitoring is required.		the dMLs within the draft DCO (Document Reference C1).	activity and offshore wind.
Potential impacts on commercially important shellfish resources	Queen scallop (consideration will also be given to King scallop)	To establish a baseline of the presence of queen scallop within the core grounds in and around the Morgan Array Area and, post construction, to identify changes to queen scallop from the baseline conditions. Whilst the focus of the monitoring is on addressing concerns relating to effects on Queen scallop, consideration will also be given to presence of King scallop.	Pre and post-construction dredge surveys for up to five years post construction, to determine changes to queen scallop from baseline conditions based upon annual monitoring results.	Further adaptive management will be discussed with the MMO and relevant fisheries stakeholders If it is evident following a period of adaptive monitoring that the effect on Queen scallop is significantly worse than predicted in the ES, the Applicant will engage with the MMO and relevant stakeholders on an appropriate adaptive management intervention measure. Measures currently considered include stock enhancement in the form of scallop re-seeding (the laying of juvenile scallops (either from natural collection or hatchery reared) onto	Fish and shellfish ecology (Table 1.5).	Secured through ~~relevant~~ conditions 20(1)(c), 27 and 29 in the dMLs within the DCO (Document Reference C1). Note that additional marine licences may be required for any adopted adaptive management measures.	To validate predictions made within the EIA relating to impacts from the construction of Morgan Generation Assets on queen scallop. The monitoring will be cognisant of similar commitments on Mona Offshore Wind Farm, and where possible adopt aligned methodologies to ensure a more strategic approach is taken to the monitoring. This will serve to ensure a more comprehensive evidence base is established for these Irish Sea scallop grounds.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
				the seabed) as defined in Agri-food & Biosciences Institute (2020), however, the most suitable form of adaptive management will be agreed with relevant stakeholders and implemented at the time. The premise for the activation of scallop re-seeding will be that if following adaptive monitoring it can be evidenced that, when considered against the baseline / regional trends of scallop, there is a long term significant negative effect on scallop directly attributable to Morgan Generation Assets, the Applicant could implement a proportionate scallop re-seeding programme. The Applicant would ensure that the MMO and relevant fisheries stakeholders are aligned that this is the most pragmatic form of adaptive management at the time, which would be			

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
				commensurate to the scale of impact.			

1.11 Shipping and navigation

1.11.1 Conclusions of the Environmental Statement

1.11.1.1 The potential impacts of the Morgan Generation Assets on shipping and navigation receptors have been assessed within Volume 2, Chapter 7: Shipping and navigation of the Environmental Statement (Document Reference F2.7). All impacts were assessed as being of **minor adverse** or **lower significance** following the application of appropriate measures adopted as part of the Morgan Generation Assets, other than:

- Impacts to adverse weather routeing, assessed as **moderate adverse** for all phases (construction, operations and maintenance, and decommissioning)
- Impacts to commercial operators including strategic routes and lifeline ferries, which when assessed cumulatively with other existing and planned projects, plans and activities considered within the Cumulative Effects Assessment, assessed as **moderate adverse** for all phases.

1.11.2 In-principle monitoring

1.11.2.1 Table 1.8 provides information on the monitoring commitments for shipping and navigation.

Table 1.8: In-principle monitoring proposed for shipping and navigation.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Pre-construction							
Impact on under keel clearance	Marine traffic	To assess the level of under keel clearance within the Morgan Array Area	Bathymetric survey to IHO Order 1a standard that meets the requirements of MGN654, with data to be provided to the Maritime and Coastguard Agency (MCA) and the United Kingdom Hydrographic Office (UKHO).	Due to water depth at the Morgan Array Area adaptive measures are not anticipated for this objective.	Physical processes (Table 1.3), benthic subtidal and intertidal ecology (Table 1.4), marine archaeology (Table 1.9).	Secured through relevant conditions 20(1)(c), 27 and 29 in the dMLs within the DCO (Document Reference C1).	To validate predictions in the Environmental Statement on the impact of the Morgan Generation Assets on under keel clearance.
Construction							

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
All impacts on vessel routeing and safety	Marine traffic	To assess the extent to which the impacts predicted in the Navigational Risk Assessment (NRA) are accurate.	Construction monitoring of marine traffic (by automatic identification system (AIS)) with a report submitted annually to MMO, MCA and Trinity House. The report will assess the extent to which the impacts predicted in the NRA are accurate to ensure adopted risk controls are fit for purpose.	The results of this monitoring will inform whether any additional risk controls need to be put in place.	N/A	Condition 28 in the deemed marine licence~~(s)~~ within the draft DCO (Document Reference C1).	To ensure adopted risk controls are fit for purpose.
Impact on snagging risk to vessel anchor and fishing gear	Marine traffic	To monitor cables and their burial status to identify any areas of cable exposure and reduce snagging risk.	Periodic validation surveys of cable burial and protection to ensure specified requirements are met.	The results of this monitoring will inform whether any further action is required to reduce risks of snagging.	Commercial fisheries (Table 1.7)	Preparation of an Offshore Construction Method Statement post-consent with details of cable monitoring until the scheme is decommissioned. This plan is secured via ~~a~~ condition 20(1)(d) in the deemed marine licence~~(s)~~ within the draft DCO (Document Reference C1).	To understand whether cables associated with the Morgan Array Area have, or have the potential to have snagged fishing gear.
Post-construction							
Impact on allision (contact) risk to vessels	Marine traffic	To ensure constant functionality of Aids to Navigation (AtoNs) throughout the lifetime of the Morgan Generation Assets.	AtoN monitoring. Trinity House to be informed of any defects.	The results of this monitoring will identify appropriate action needed to address any defects.	N/A	Condition 20(1)(c) and 29 in the deemed marine licence(s) within the draft DCO (Document Reference C1).	To minimise the likelihood of allision.
All impacts on vessel routeing and safety	Marine traffic	To assess the extent to which the impacts predicted in the NRA are accurate.	Post-construction monitoring of marine traffic (by AIS) with a report submitted annually to MMO, MCA and Trinity House. The report will assess the extent to which the impacts predicted in the	The results of this monitoring will inform whether any further action is required to	N/A	Condition 20(1)(c) and 29 in the deemed marine licence(s) within the draft DCO (Document Reference C1).	To ensure adopted risk controls are fit for purpose.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
			NRA are accurate to ensure adopted risk controls are fit for purpose.	reduce risks of snagging.			
Impact on snagging risk to vessel anchor and fishing gear	Marine traffic	To monitor cables and their burial status to identify any areas of cable exposure.	Periodic validation surveys of cable burial and protection to ensure specified requirements are met.	The results of this monitoring will inform whether any further action is required to reduce risks of snagging.	Commercial fisheries (Table 1.7)	Preparation of an Offshore Construction Method Statement post-consent with details of cable monitoring util the scheme is decommissioned. This plan is secured via ~~a~~ condition 20(1)(d) in the deemed marine licence~~(s)~~ within the draft DCO (Document Reference C1).	To understand whether cables associated with the Morgan Array Area have, or have the potential to have snagged fishing gear.

1.12 Marine archaeology and cultural heritage

1.12.1 Conclusions of the Environmental Statement

1.12.1.1 The potential impacts of the Morgan Generation Assets on marine archaeology receptors have been assessed within Volume 2, Chapter 8: Marine archaeology and cultural heritage of the Environmental Statement (Document Reference F2.8). All impacts were assessed as being of **no significance** following the application of appropriate measures adopted as part of the Morgan Generation Assets. The impacts assessed include:

- Sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors
- Direct damage to marine archaeology receptors (e.g. wrecks, debris, submerged prehistoric receptors (palaeolandscapes and associated archaeological receptors)
- Direct damage to deeply buried marine archaeology receptors – submerged prehistoric receptors (e.g. palaeolandscapes and associated archaeological receptors)
- Alteration of sediment transport regimes
- Effects on historic seascape character
- Effects on settings of terrestrial designated historic assets.

1.12.2 In-principle monitoring

1.12.2.1 Table 1.9 provides information on the monitoring commitments for marine archaeology and cultural heritage.

Table 1.9: In-principle monitoring proposed for marine archaeology and cultural heritage.

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Construction							
Sediment disturbance and deposition leading to indirect impacts on marine archaeology receptors	Marine archaeology	To ensure the protection and recording of any significant archaeological material that may be	Development of, and adherence to, an Outline Offshore WSI including the establishment of PAD, which through the acquisition of relevant	Further site investigation, including archaeological input into specifications for, and archaeological analysis of, any post-	Physical processes (Table 1.3)	Outline Offshore WSI and PAD is secured by condition 20(2) and (3) within the deemed marine licence~~(s)~~ of the draft DCO and	To avoid any potential direct or indirect impacts on known or previously unknown sites of

Potential effect	Receptor	Monitoring objectives	Monitoring approach	Adaptive measure	Links to other monitoring	Method of securing monitoring	Rationale
Direct damage to marine archaeology receptors Direct damage to marine archaeology receptors (e.g. wrecks, debris, submerged prehistoric receptors (palaeolandscapes and associated Direct damage to deeply buried marine archaeology receptors – submerged prehistoric receptors (palaeolandscapes and associated archaeological receptors)		encountered throughout all phases of the Morgan Generation Assets To establish the appropriateness and effectiveness of Archaeological Exclusion Zones (AEZs) throughout all phases of the Morgan Generation Assets	spatial survey data, includes monitoring of AEZs. This monitoring will include the appropriateness of, and adjustments that need to be made to, AEZs during the lifetime of Morgan Generation Assets, where required ~~Further site investigation, including archaeological input into specifications for, and archaeological analysis of, any post-consent, geophysical survey, geotechnical survey, ROV survey to identify any sites of potential archaeological importance that may require further investigation, avoidance or engagement with the Statutory Historic Body.~~	consent, geophysical survey, geotechnical survey, ROV survey to identify any sites of potential archaeological importance that may require further investigation, avoidance or engagement with the Statutory Historic Body.		subsequent method statements produced by the Retained Archaeologist and approved by the Statutory Archaeological Curator in advance of works commencing	identified archaeological significance. To ensure the protection and, if necessary, recording of previously unknown sites/objects of archaeological significance affected by the development. To identify any sites of potential archaeological importance that may require further investigation, avoidance or engagement with the Statutory Historic Body.

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