

Outer Dowsing Offshore Wind

Outline Documents

8.2 Outline Offshore Operations and Maintenance Plan

Date: February 2025

Document Reference: 8.2

Pursuant to APFP Regulation: 5(2)(q)

Rev: 2.0

Company:		Outer Dowsing Offshore Wind		Asset:		Whole Asset	
Project:		Whole Wind Farm		Sub Project/Package:		Whole Asset	
Document Title or Description:		Outline Offshore Operations and Maintenance Plan					
Internal Document Number:		PP1-ODOW-DEV-CS-PLA-0017_02		3 rd Party Doc No (If applicable):		N/A	
Rev No.	Date	Status / Reason for Issue	Author	Checked by	Reviewed by		Approved by
1.0	March 2024	DCO Application	GoBe	GoBe	Sheperd and Wedderburn		Outer Dowsing
2.0	February 2025	Deadline 4a	GoBe	GoBe	Sheperd and Wedderburn		Outer Dowsing

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Acronyms & Definitions

Abbreviations / Acronyms

Abbreviation / Acronym	Description
ANS	Artificial Nesting Structures
ASVs	Autonomous Surface Vessels
AUV	Autonomous Underwater Vehicles
CAA	Civil Aviation Authority
CTV	Crew Transfer Vessel
DCO	Development Consent Order
dML	deemed Marine Licence
DoB	Depth of Burial
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
GT R4 Limited	The Applicant. The special project vehicle created in partnership between Corio Generation (a wholly owned Green Investment Group portfolio company), Gulf Energy Development and TotalEnergies.
MBES	Multi-Beam Echo Sounder
MCAA	Marine and Coastal Access Act
MMO	Marine Management Organisation
O&M	Operation and Maintenance
ODOW	Outer Dowsing Offshore Wind, trading name of GT R4 Limited
OOMP	Outline Offshore Operations and Maintenance Plan
ORCP	Offshore Reactive Compensation Platform
OSS	Offshore Substation
PEMP	Project Environmental Management Plan
SNCB	Statutory Nature Conservation Bodies
SOV	Service Offshore Vessel
SSS	Side Scan Sonar
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

Terminology

Term	Definition
Array area	The area offshore within which the generating station (including wind turbine generators (WTG) and inter array cables), offshore accommodation platforms, offshore transformer substations and associated cabling will be positioned, including the ORBA.
Baseline	The status of the environment at the time of assessment without the development in place.
deemed Marine Licence (dML)	A marine licence set out in a Schedule to the Development Consent Order and deemed to have been granted under Part 4 (marine licensing) of the Marine and Coastal Access Act 2009.

Term	Definition
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Environmental Impact Assessment (EIA)	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 EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.
Inter-array cables	Cable which connects the wind turbines to each other and to the offshore substation(s) , which may include one or more auxiliary cables (normally fibre optic cables).
Intertidal	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS)
Landfall	The location at the land-sea interface where the offshore export cables and fibre optic cables will come ashore.
Offshore Export Cable Corridor (ECC)	The Offshore Export Cable Corridor (Offshore ECC) is the area within the Order Limits within which the export cable running from the array to landfall will be situated
Offshore Reactive Compensation Station (ORCP)	A structure attached to the seabed by means of a foundation, with one or more decks (including bird deterrents) housing electrical reactors and switchgear for the purpose of the efficient transfer of power in the course of HVAC transmission by providing reactive compensation
Offshore Substation (OSS)	A structure attached to the seabed by means of a foundation, with one or more decks and a helicopter platform (including bird deterrents), containing— (a) electrical equipment required to switch, transform, convert electricity generated at the wind turbine generators to a higher voltage and provide reactive power compensation; and (b) housing accommodation, storage, workshop auxiliary equipment, radar and facilities for operating, maintaining and controlling the substation or wind turbine generators
Onshore Infrastructure	The combined name for all onshore infrastructure associated with the Project from landfall to grid connection.
Outer Dowsing Offshore Wind (ODOW)	The Project.
Order Limits	The area subject to the application for development consent, The limits shown on the works plans within which the Project may be carried out.
Pre-construction and post-construction	The phases of the Project before and after construction takes place.
Preliminary Environmental	The PEIR was written in the style of a draft Environmental Statement (ES) and provided information to support and inform the statutory

Term	Definition
Information Report (PEIR)	consultation process during the pre-application phase.
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Statutory consultee	Organisations that are required to be consulted by the Applicant, the Local Planning Authorities and/or The Planning Inspectorate during the pre-application and/or examination phases, and who also have a statutory responsibility in some form that may be relevant to the Project and the DCO application. This includes those bodies and interests prescribed under Section 42 of the Planning Act 2008.
Subsea	Subsea comprises everything existing or occurring below the surface of the sea
The Applicant	GTR4 Limited (a joint venture between Corio Generation (and its affiliates), TotalEnergies and Gulf Energy Development), trading as Outer Dowsing Offshore Wind
The Project	Outer Dowsing Offshore Wind, an offshore wind generating station together with associated onshore and offshore infrastructure.
Wind turbine generator (WTG)	A structure comprising a tower, rotor with three blades connected at the hub, nacelle and ancillary electrical and other equipment which may include J-tube(s), transition piece, access and rest platforms, access ladders, boat access systems, corrosion protection systems, fenders and maintenance equipment, helicopter landing facilities and other associated equipment, fixed to a foundation

Reference Documentation

Document Number	Title
6.1.3	Project Description;
6.1.7	Marine Physical Processes;
6.1.8	Marine Water and Sediment Quality;
6.1.9	Benthic Subtidal and Intertidal Ecology;
6.1.10	Fish and Shellfish Ecology;
6.1.11	Marine Mammals;
6.1.12	Offshore and Intertidal Ornithology;
6.1.14	Commercial Fisheries;
6.1.15	Shipping and Navigation;
6.1.18	Marine Infrastructure Other Users

1 Introduction

1.1 Purpose of this Document

1. This Outline Offshore Operations and Maintenance Plan (OOMP) has been drafted with specific reference to the interpretation of the definition of “maintain” within the Outer Dowsing Offshore Wind (ODOW) Draft Development Consent Order (DCO):
 - “maintain” includes inspect, upkeep, repair, adjust, and alter and further includes remove, reconstruct and replace (including replenishment of cable protection), but does not include the removal, reconstruction or replacement of foundations associated with the offshore works, to the extent assessed in the environmental statement; and “maintenance” must be construed accordingly.
2. The purpose of this Outline OOMP is to provide an outline of reasonably foreseeable offshore maintenance activities and the broad approach to be taken for each activity.
3. A Final OOMP will be prepared following post-consent detailed design. The requirement for this OOMP derives from deemed Marine Licence (dML) Conditions.
4. Deemed marine licences for the Project pursuant to the provisions of the Marine and Coastal Access Act (MCAA) 2009 are being sought as part of the application for the DCO in accordance with Section 149A of the Planning Act 2008, with the MMO acting as a statutory consultee to the DCO process.
5. The final OOMP will include details of the:
 - Operation and maintenance phase requirements of the relevant offshore elements of the Project, including equipment, structures and associated infrastructure, in accordance with design and manufacturer recommendations;
 - Operational health, safety and environment management;
 - Accessibility and constraints;
 - Location and logistical set up of the operation and maintenance base;
 - Anticipated requirements for spare parts; and
 - Planning of scheduled and coordination of unscheduled maintenance.

1.2 Overview

6. During the operational period (anticipated to be approximately 35 years), scheduled and unscheduled monitoring and maintenance activities will be required. The maintenance activities will be categorised as either preventative or corrective maintenance.
 - Preventive maintenance will be undertaken according to a service schedule,
 - Corrective maintenance will be needed to cover unexpected repairs, component replacements, retrofit campaigns and breakdowns.

7. Preventative and corrective maintenance activities will require access to the wind turbine generators (WTGs) 365 days per year.
8. Several different vessel types may be required for Operation & Maintenance (O&M) activities. This may include crew transfer vessels, specialised vessels for specific works (including jack-up vessels or cable laying vessels), survey vessels and autonomous surface vessels (ASVs).
9. Maintenance staff can access the windfarm from a range of O&M vessels (e.g. crew transfer vessels, supply vessels, and/or helicopters or could be maintained using an offshore base (such as an accommodation platform, accommodation vessel, Service Offshore Vessel (SOV), or mother ship).
10. The O&M base (onshore, offshore or both) will be determined by the O&M strategy following final decision (i.e. post-consent) when the technical specifications of the development are known, including the location of the O&M port(s) and the WTG type.
11. During the operational phase of the Project there will be no scheduled preventative maintenance of the subsea cables, however corrective maintenance, including repairs and/or replacements may be required should a cable fail or be damaged. Periodic surveys will be undertaken to ensure the cables remain buried and/or are sufficiently protected and, if they do become exposed, then corrective maintenance will be undertaken (such as deployment of cable protection or reburial). Any cable protection to be installed following completion of construction in locations where cable protection was not installed during construction must be deployed within 10 years of completion of construction unless otherwise agreed by the MMO in writing, as secured in Condition 21 of Schedule 10 and 11 of the draft DCO (document reference 3.1).
12. The Environmental Impact Assessment (EIA) includes an assessment of expected maintenance activities based on experience and best practice, however additional consents or licences may be required during the life of the Project for unforeseen activities.
13. The operational impacts are assessed in the offshore technical chapters of the Environmental Statement (ES) (Volume 1, Chapters 7 to 32).

2 Background

14. The Project array area (within which the generating station will be located) is approximately 436km² and lies approximately 54km east of the Lincolnshire coast at its closest point. The Offshore Export Cable Corridor (ECC) runs from the array area towards the Lincolnshire coastline and makes landfall at Wolla Bank.
15. The Project will include both offshore and onshore infrastructure including an offshore generating station (windfarm), Offshore Substations (OSS), export cables to landfall, Offshore Reactive Compensation Platforms (ORCPs), onshore cables, connection to the electricity transmission network, ancillary and associated development and areas for the delivery of up to two Artificial Nesting Structures (ANS) and the creation and recreation of a biogenic reef (if these compensation measures are deemed to be required by the Secretary of State) (see Volume 1, Chapter 3: Project Description for full details).
16. The full list of Offshore infrastructure is as follows:
 - Up to 100 wind turbine generators (WTGs);
 - Up to four small or two large Offshore Substations (OSS);
 - One accommodation platform;
 - 377.42km of Inter-array cables;
 - Up to 6 circuits (124.75km) of Offshore Interlink Cable;
 - Up to 4 circuits (440m) of Offshore Export Cable;
 - Up to two Offshore Reactive Compensation Platforms (ORCPs);
 - Up to two Artificial Nesting Structures (ANS); and
17. Further detail of how the Project will be constructed, operated, maintained, and decommissioned, as well as a detailed description of the key components of the Project can be found in Part 6, Volume 1, Chapter 3: Project Description.

3 Discharging the Consent Condition

18. The list of activities to be undertaken during the O&M phase is provided in Table 1.1. This O&M list will be updated for the final OOMP and approved by the MMO as part of the discharge of the dML conditions..
19. For each activity, a 'traffic light system' will be used to indicate which can be carried out under the dMLs:
 - **Green** indicates that an additional marine licence is not required, however notification should be provided to the MMO on works being undertaken;
 - **Amber** indicates that an additional marine licence may be required in the extremely unlikely event that proposed works exceed those assessed within the ES, or described within the DCO; or a certain time period after completion of construction has elapsed; or
 - **Red** indicates that an additional marine licence could be required, dependent on the type of works to be undertaken.
20. Additional activities not identified in this Outline OOMP may, if relevant, require future consents such as a Marine Licence under the MCAA 2009. Such activities would be discussed with the MMO prior to being undertaken, as appropriate.

Table 1.1 Operations and Maintenance List

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?		
Wind turbines (Topside)								
Annual wind turbine maintenance	Generation	Yes	Assessed in the ES within the assumed maintenance activities per annum for scheduled and unscheduled maintenance.	ES Chapter 3 Project Description; ES Chapter 7 Marine Physical Processes; ES Chapter 8 Marine Water and Sediment Quality; ES Chapter 9 Benthic Subtidal and Intertidal Ecology; ES Chapter 10 Fish and Shellfish Ecology; ES Chapter 11 Marine Mammals; ES Chapter 12 Offshore and Intertidal Ornithology; ES Chapter 14 Commercial Fisheries; ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	No		
Wind turbine troubleshooting			There are several potential maintenance strategies for the wind turbines which will be determined by the final design and procurement of maintenance contractors.		No	No		
Wind turbine repair					The turbines would be maintained from shore using several different O&M vessels, or by adopting an offshore based logistics strategy.. A total of 2,480 annual round trips for all O&M vessels are predicted.	No	No	
Blade inspection						No	No	
Blade and hub repair						No	No	
Blade replacement						No	No	
Transition piece repair						No	No	
Transition piece maintenance					Helicopter visits: <ul style="list-style-type: none">Number of WTGs visits per year = 1440Number of WTG foundations visits per year = 440Number of crew transfer shifts per year = 388Total number of visits per year: 2,480	No	No	
Gearbox repair and replacement			Typical maintenance activities would include general wind turbine service; oil sampling/change; UPS (uninterruptible power supply) battery change; service and inspections of wind turbine safety equipment, nacelle crane, service lift, High Voltage (HV) system, blades.			No	No	
Generator repair and replacement						It is not anticipated that large components (e.g. wind turbine blades) would frequently require replacement during the operational phase, however the failure of these components is possible. Should this be required, large jack-up vessels may need to operate for significant periods to carry out these major maintenance activities.	No	No
Paint and repair							No	No
J-Tube and ladder cleaning								
Removal of organic material	Generation and Transmission	No	Marine growth and bird waste will accumulate on the offshore infrastructure and require cleaning using seawater or potable water.	N/A	No	No		
Cables (array, interlink and export)								
Cable inspection	Generation and	Yes		ES Chapter 3 Project Description;	No	No		

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
Placement of external cable protection in different locations to external cable protection installed during construction	Transmission		<p>During the life of the project, periodic geophysical surveys would be required to ensure the cables remain buried. If cables do become exposed, re-burial works would be undertaken.</p> <p>Post construction surveys in the initial 3-5 years are often dictated by the dML.</p> <p>In most cases in the event of a failure, the following operations will be carried out:</p> <p>Vessel anchor placement</p> <p>Exposing/unburying the damaged part of the cable,</p> <p>Cutting the cable</p> <p>For inter-array cables, it may be preferable to lift a whole length of a cable between two turbines, although this would be a rare occurrence.</p> <p>Lifting the cable ends to the repair vessel</p> <p>Jointing a new segment of cable to the old cable</p> <p>Lowering the cable (and joints) back to the seabed</p> <p>Cable burial, where possible</p> <p>Cables can become exposed due to moving sand waves or due to erosion of other soft/mobile sediment.</p> <p>Inter-Array Cables</p> <ul style="list-style-type: none"> ▪ Cable remedial burial events = 26 ▪ Maximum footprint of temporary seabed disturbance per remedial burial event = 210,000m². ▪ Maximum footprint of seabed disturbance per cable repair event = 15,000m². ▪ Footprint of seabed disturbance via jacking-up activities per cable repair event = 1,500m². <p>Interlink Cables</p> <ul style="list-style-type: none"> ▪ Cable remedial burial events = 9 ▪ Maximum footprint of temporary seabed disturbance per remedial burial event = 200,000m². ▪ Maximum footprint of seabed disturbance per cable repair event = 15,000m². 	<p>ES Chapter 7 Marine Physical Processes;</p> <p>ES Chapter 8 Marine Water and Sediment Quality;</p> <p>ES Chapter 9 Benthic Subtidal and Intertidal Ecology;</p> <p>ES Chapter 10 Fish and Shellfish Ecology;</p> <p>ES Chapter 11 Marine Mammals;</p> <p>ES Chapter 12 Offshore and Intertidal Ornithology;</p> <p>ES Chapter 14 Commercial Fisheries;</p> <p>ES Chapter 15 Shipping and Navigation;</p> <p>ES Chapter 18 Marine Infrastructure Other Users</p>	Potentially ¹	Yes
Replacement or addition to external cable protection in the same locations as external cable protection installed during construction					Potentially ¹ <small>Error! Bookmark not defined.</small>	Yes
Cable re-burial	Generation and Transmission				No	No
Cable repair					No	No
Cable inspection including geophysical surveys (MBES, magnetometer, SSS) and Depth of Burial (DoB) surveys to inspect subsea assets					No	No
Sub-bottom profiling (i.e. chirp or pinger)					No	No
Geotechnical survey					No	No

¹ Any cable protection authorised under the dMLs must be deployed within 10 years from the date of the grant of the Order, in areas where cable protection was not installed during construction, unless otherwise agreed by the MMO in writing.

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
			<ul style="list-style-type: none"> Footprint of seabed disturbance via jacking-up activities per cable repair event = 1,500m². Offshore Export Cables <ul style="list-style-type: none"> Cable remedial burial events = 31 Maximum footprint of temporary seabed disturbance per remedial burial event = 155,000m². Maximum footprint of seabed disturbance per cable repair event = 15,000m². Footprint of seabed disturbance via jacking-up activities per cable repair event = 1,500m². 			
Wind turbine foundations						
Foundation inspection	Generation	Yes	Vessel movements associated with these activities are contained within the maximum vessel movements per annum.	ES Chapter 3 Project Description ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	No
Foundation repair (Access ladder replacement; Foundation anode replacement; J-Tube repair/ replacement)					No	No
Foundation replacement			It is considered highly unlikely that replacement of a failed foundation should be required. Should such an occurrence take place then consent for the replacement of the failed foundation would be obtained from the MMO prior to commencement.	N/A	Yes	Yes
Replacement of or addition to scour protection installed during construction around foundations			Installation of remaining allowance for scour protection as per construction phase, up to the maximum, based on the following areas of scour protection for the worst-case number of wind turbines associated with the respective foundation type would be permitted: Monopile and scour protection footprints together are calculated as 4,425m ² using the WTG minimum size and 4,835m ² using the WTG maximum size. Gravity-base foundation and scour protection footprints together are calculated as 12,300m ² using the WTG minimum size and 14,900m ² using the WTG maximum size. Jacket on pin piles and scour protection footprints together are calculated as 1,100m ² using both WTG minimum and maximum sizes.	ES Chapter 3 Project Description; ES Chapter 7 Marine Physical Processes; ES Chapter 8 Marine Water and Sediment Quality; ES Chapter 9 Benthic Subtidal and Intertidal Ecology; ES Chapter 10 Fish and Shellfish Ecology; ES Chapter 11 Marine Mammals; ES Chapter 12 Offshore and Intertidal Ornithology; ES Chapter 14 Commercial Fisheries; ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	Yes

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
			Jacket on suction bucket and scour protection footprints together are calculated as 8,200m ² using the WTG minimum size and 9,300m ² using the WTG maximum size.			
Installation of scour protection in different locations to scour protection installed during construction (up to 10 years post construction)		Yes ²	The maximum footprint of scour protection (including the foundation area) for each of the foundation type options for wind turbines are as stated in the cell above.	N/A	Potentially ²	Yes
Addition of antifouling devices	Generation	Yes	<p>Anti-fouling devices such as passive bird scarers and bird spikes can be used on the offshore infrastructure to discourage birds and other animals from establishing themselves on or soiling the external surfaces.</p> <p>Such devices are required to ensure safe access and functionality of the infrastructure.</p> <p>It must be noted that the devices are not designed to actively or passively harm wildlife.</p>	N/A	No	No
OSSs, ORCP and Accommodation platform						
Inspections including geophysical surveys to inspect subsea assets.	Generation and Transmission	Yes	Vessel movements associated with these activities are contained within the maximum vessel movements per annum.	ES Chapter 3 Project Description; ES Chapter 7 Marine Physical Processes; ES Chapter 8 Marine Water and Sediment Quality; ES Chapter 9 Benthic Subtidal and Intertidal Ecology; ES Chapter 10 Fish and Shellfish Ecology; ES Chapter 11 Marine Mammals; ES Chapter 12 Offshore and Intertidal Ornithology; ES Chapter 14 Commercial Fisheries; ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	No
Sub-bottom profiling (i.e. chirp or pinger)			OSSs would typically require an average of 1 visit every two weeks, this is expected to be more during unscheduled maintenance.		No	No
General maintenance work, e.g. oil replacement, mechanical works, external surface preparation and protective coating repair/re-painting.			<p>Installation of remaining allowance for scour protection as per construction phase, up to the maximum, based on the following areas of scour protection for the worst-case number of wind turbines associated with the respective foundation type would be permitted:</p> <p>Monopile and scour protection footprints together are calculated as 4,425m² using the WTG minimum size and 4,835m² using the WTG maximum size.</p>		No	No
Offshore platform component replacement					No	No

² Unless the total area of scour protection installed for the chosen foundation type exceeds that assessed in the ES or a period of more than ten years has elapsed since the completion of construction then no additional marine licence is required

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
			Gravity-base foundation and scour protection footprints together are calculated as 12,300m ² using the WTG minimum size and 14,900m ² using the WTG maximum size. Jacket on pin piles and scour protection footprints together are calculated as 1,100m ² using both WTG minimum and maximum sizes. Jacket on suction bucket and scour protection footprints together are calculated as 8,200m ² using the WTG minimum size and 9,300m ² using the WTG maximum size.			
Foundation inspection			Vessel movements associated with these activities are contained within the maximum vessel movements per annum.		No	No
Foundation repair (Access ladder replacement; Foundation anode replacement; J-Tube repair/ replacement)					No	No
Foundation replacement		N/A	It is considered highly unlikely that replacement of a failed foundation should be required. Should such an occurrence take place then consent for the replacement of the failed foundation would be obtained from the MMO prior to commencement.	N/A	Yes	Yes
Replacement of or addition to scour protection around foundations installed during construction (up to 10 years post construction)		Yes	Installation of scour protection would be permitted for each individual OSS. Maximum number for offshore structures: Small OSSs = 4 ORCPs = 2 Accommodation Platforms = 1 OSS jacket on suction buckets and scour protection footprints are calculated together as 19,600m ² per OSS. ANS GBS and scour protection footprints are calculated as 12,300m ² per structure.	ES Chapter 3 Project Description; ES Chapter 7 Marine Physical Processes; ES Chapter 8 Marine Water and Sediment Quality; ES Chapter 9 Benthic Subtidal and Intertidal Ecology; ES Chapter 10 Fish and Shellfish Ecology; ES Chapter 11 Marine Mammals; ES Chapter 12 Offshore and Intertidal Ornithology; ES Chapter 14 Commercial Fisheries; ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	Yes

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
Installation of scour protection in different locations to scour protection installed during construction (up to 10 years post construction)		Yes ³	The maximum footprint of scour protection (including the foundation area) for each of the foundation type options for OSSs are as stated in the above cell.	N/A	Potentially ³	Yes
Removal of organic material		No	Organic material will accumulate on the offshore infrastructure, this must be regularly removed to protect the exterior of the offshore infrastructure components.	N/A	No	Yes
Addition of antifouling devices		Yes	Anti-fouling devices such as passive bird scarers and bird spikes can be used on the offshore infrastructure to discourage birds and other animals from establishing themselves on or soiling the external surfaces. Such devices are required to ensure safe access and functionality of the infrastructure. It must be noted that the devices are not designed to actively or passively harm wildlife.	N/A	No	No
Artificial Nesting Structures						
Inspections including seabed surveys	Generation	Yes	Maximum number of seabed surveys in lifetime = 39 Maximum number of painting events (lifetime quantity) = 39 Maximum number of component replacement events = 39 Access ladder replacement = 8 Anode replacement = 8 Maximum number of marine growth and bird waste cleaning (lifetime quantity) = 78 Number of visits for general maintenance - 210	ES Chapter 3 Project Description ES Chapter 12 Offshore and Intertidal Ornithology Part 7 Report to Inform Appropriate Assessment	No	No
General maintenance work, e.g. oil replacement, mechanical works, external surface preparation and protective coating repair/re-painting.					No	No
Removal of organic material					No	
Other						
Crane inspection and repair	Generation and Transmission	Yes		ES Chapter 3 Project Description; ES Chapter 7 Marine Physical Processes;	No	

³ Approval will be required prior to the installation of additional scour protection in different locations in the ES or a period of five years has elapsed since the completion of construction then no additional marine licence is required.

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
Fuel replenishment to Vessels			Vessel movements associated with these activities are contained within the maximum vessel movements per annum.	ES Chapter 8 Marine Water and Sediment Quality; ES Chapter 9 Benthic Subtidal and Intertidal Ecology; ES Chapter 10 Fish and Shellfish Ecology; ES Chapter 11 Marine Mammals; ES Chapter 12 Offshore and Intertidal Ornithology; ES Chapter 14 Commercial Fisheries; ES Chapter 15 Shipping and Navigation; ES Chapter 18 Marine Infrastructure Other Users	No	
Re-fuelling of generator on the OPs					No	
Grout and corrosion works (including cathodic protection inspection, grouting core samples and re-grouting)					No	
Repair, replacement and retro-fitting of cathodic protection					No	
Crane transfers of equipment from vessel to either wind turbines or to quayside O&M building or vice-versa					No	
UXO clearance via detonation		No	No UXO clearance events assessed during the operation and maintenance period.	N/A	Yes	Yes
Marine archaeology		Yes	It is assumed that all archaeology would have been already identified given the pre-construction survey requirement. It is unlikely that any new archaeology would be found during operation. There is potential that some identified features avoided during construction may be affected during maintenance activities if the footprint of works is larger (for example isolated features which have potential to be relocated). In this case, the Applicant will consult with Historic England and agree any action with the MMO	ES Chapter Offshore Archaeology and Cultural Heritage	No	Yes
Offshore and nearshore visual inspections		No	The use of video recording equipment and photography to record the condition of the subsea assets. Equipment may be mounted to Autonomous Underwater Vehicles (AUV) or held by a diver.	N/A	No	No
Use of artificial lighting			Artificial lighting will be provided to ensure health and safety of work personnel and other site users when natural light is inadequate or not available.	N/A	No	No

Potential offshore maintenance activity	Relevant dML	Assessed in the ES?	Realistic Worst Case assessed in the ES (for any activity outside those listed, the MMO should be notified)	Location in the application documents	Additional licence likely to be required?	Consultation required with the MMO and relevant SNCB?
			Artificial lighting will not impact the visibility or apparent colour of any safety signs or other safety-related items such as fire extinguishers. Artificial lighting also relates to the artificial illumination of emergency escape routes.			
Recovery of dropped objects		N/A	Dropped objects will be reported to the MMO using the Dropped Object Procedure Form. On receipt of the Dropped Object Procedure Form, the MMO may require relevant surveys to be carried out if reasonable to do so and the MMO may require obstructions to be removed from the seabed if reasonable to do so.	N/A	No	No
Rope access			Rope access work could be required to provide access for both routine and extraordinary operations.	N/A	No	No
Use of drones for offshore inspection		No	The use of drones for offshore inspections and the splash zone will require permission under the jurisdiction of the Civil Aviation Authority (CAA).	N/A	No	No
Groundwork activities as a result of jack-up operations			There will be up to 440 WTG foundations visits per year.	N/A	Potentially ⁴	Yes
Water use and discharge			Cleaning of the wind turbines and offshore platforms and their internal surfaces will be required for general maintenance. Where measures can be put in place to collect runoff, run-off water will be collected and will be handled in compliance with the local legislation and site requirements. All cleaning operations will be compliant with the Project Environmental Management Plan (PEMP).	N/A	No	No

⁴ If additional trips for licensable maintenance activity are required, a new licence will be sought.