



Project Title	Seagreen Wind Energy Ltd
Document Reference Number	LF000009-CST-OF-PRG-0004

Operations and Maintenance Programme (Offshore Transmission Assets)

OTA Marine Licence 04678/19/0, Condition 3.2.3.2

For approval of the Scottish Ministers

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Table of Contents

1.	Introduction	6
1.1	Consents and Licences	6
1.2	Project Description.....	6
1.3	Consent and Licence Requirements.....	8
1.4	Linkages with Other Consent Plans.....	10
1.5	Document and Change Management Process.....	13
2.	Overview of Assets	14
2.1	Offshore Transmission Assets	14
2.2	O&M Base and Marine Co-ordination Centre	14
2.3	Supervisory Control and Data Acquisition System (SCADA)	17
2.4	Key Operation Programme Milestones.....	17
3.	Approach to Safety, Health and the Environment.....	18
3.1	Introduction	18
3.2	Asset Management System	18
3.3	Environmental Management System	19
4.	Operation and Maintenance Activities.....	20
4.1	Maintenance Requirements	20
4.2	Routine Service Activities.....	20
4.3	Unscheduled Maintenance Activities	23
4.4	Major Component Repairs.....	23
5.	Environmental Sensitivities and Good Working Practices.....	25
5.1	Environmental Sensitivities.....	25
5.2	Good Working Practices.....	26
6.	Compliance with the ES and ES Addendum.....	27
7.	References	28
	Appendix A – OMP List of Abbreviations and Definitions	29
	Appendix B – OTA OMP Change Management Procedure.....	31
	Appendix C – Good Working Practice Guidance	32
	Appendix D – Summary of O&M Activities (as proposed in ES and ES Addendum) (OTA)	34

Purpose of the Programme

This Operations and Maintenance Programme (Offshore Transmission Assets) (OTA OMP) is submitted to address the specific requirements of the relevant conditions attached to the Marine Licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 on 10 October 2014, as amended by the revised Marine Licence granted by the Scottish Ministers on 6 March 2019 (reference 04678/19/0) in respect of the Seagreen Offshore Transmission Assets (OTA) associated with the Seagreen Alpha and Seagreen Bravo Wind Farms (OWFs) (as varied, the 'OTA Marine Licence').

Seagreen Alpha and Seagreen Bravo OWFs and the OTA are collectively referred to as the 'Seagreen Project'.

The overall aims and objectives of the OTA OMP are to set out the procedures and good working practices for the operation and maintenance (O&M) of the Seagreen OTA infrastructure. A separate OMP (LF000009-CST-OF-PRG-0001) has been prepared for the O&M of the Seagreen OWF infrastructure.

The OTA OMP demonstrates that operations and maintenance procedures to be employed align with those set out within the Environmental Statement (ES) and ES Addendum.

Operations and Maintenance Programme Overview

Structure of the Plan

The OTA OMP is structured as follows:

Section 1	Provides an overview of the consent requirements that underpin the content of this OTA OMP, identifies linkages with other consent plans and describes the process for making updates and amendments to the programme
Section 2	Provides an overview of the OTA
Section 3	Describes the approach to safety, health and environmental management and the Environmental Management System (EMS)
Section 4	Describes and provides indicative timings for routine servicing and maintenance activities, and sets out potential unscheduled activities that are anticipated during the operational lifecycle of the assets
Section 5	Describes relevant environmental sensitivities to be considered when planning and O&M activities, and good working practices to be adopted
Section 6	Demonstrates compliance with the original application
Section 7	Lists applicable reference documents used to inform this OTA OMP
Appendix A	Lists the abbreviations and defines terms used in the OTA OMP
Appendix B	Sets out the OTA OMP Change Management Procedure
Appendix C	Lists good practice guidance applicable to offshore wind operations and maintenance

Scope of the Plan

This OTA OMP covers, in line with the requirements of the consent conditions, the following in relation to the Seagreen OTA:

- The management systems to be implemented during the O&M of the offshore transmission assets;
- A description of the activities to be undertaken during the O&M phase
- The good working practices to be adopted for O&M of the OSPs, substructures and export cable network, and
- The environmental sensitivities which may affect the timing of the O&M activities

Plan Audience

This OTA OMP will be submitted for approval to the Scottish Ministers in consultation with other stakeholders, in relation to monitoring compliance with the specific requirements of the relevant consent conditions.

Compliance with this OTA OMP will be monitored by Seagreen's Site Operations Manager and Environmental Advisor, Seagreen's appointed Contractors and the Marine Scotland Licensing and Operations Team (MS-LOT).

Copies of this OTA OMP are to be held in the following locations:

- Seagreen's head office;
- Seagreen's construction office and Marine Coordination Centre;
- at the premises of any Contractor acting on behalf of Seagreen in relation to O&M activities; and
- aboard any vessel engaged in the O&M of the OTA.

Following transfer of the OTA and the OTA Marine Licence to the Offshore Transmission Owner (OFTO), it shall be the responsibility of the OFTO to implement this OMP - and all other associated Consent Plans that apply to the OTA - in full

1. Introduction

1.1 Consents and Licences

Seagreen Wind Energy Ltd (hereafter referred to as 'Seagreen') was awarded Section 36 Consents (S36 Consents) under the Electricity Act 1989 by Scottish Ministers in October 2014 for Seagreen Alpha and Seagreen Bravo Offshore Wind Farms (OWFs).

Marine Licences for Seagreen Alpha OWF, Seagreen Bravo OWF and the Offshore Transmission Asset (OTA) were also awarded by Scottish Ministers in October 2014 (subsequently varied) under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. In addition, a Marine Licence was granted in 2019 (and subsequently varied in 2020) providing an alternative landfall cable installation method. Together, the Seagreen Alpha and Seagreen Bravo OWFs and the OTA collectively comprise 'the Seagreen Project'.

On 12 December 2019, the Bravo Marine Licence was transferred from the name of Seagreen Bravo Wind Energy Limited (SBWEL) into the name of Seagreen Alpha Wind Energy Limited (SAWEL).

1.2 Project Description

The Seagreen Project is located in the North Sea, in the outer Firth of Forth and Firth of Tay region and comprises the OWFs (the wind turbine generators (WTGs), their foundations and associated array cabling connecting the WTGs to the Offshore Substation Platforms (OSPs)), together with associated infrastructure of the OTA (the OSFs, their foundations and the offshore export cables), to facilitate the export of renewable energy to the national electricity transmission grid. The location of the Seagreen Project is shown in Figure 1.1.

The Seagreen Project will consist of the following key components:

- 150 WTGs comprising;
 - 114 WTGs installed on three-legged steel jackets, each installed on suction bucket caissons;
 - 36 WTGs installed on up to four-legged steel jackets, each installed on pin pile foundations;
- Two OSFs, each installed on up to 12 pin pile foundations; and
- A network of inter-array subsea cables as detailed below;
 - Circa 300 km of 66KV inter-array cables to connect strings of WTGs on suction bucket caissons together and to connect these WTGs to the OSF;
 - Circa 55 km of inter array cables to connect strings of WTGs on piled foundations together and to connect these WTG to the OSF;
 - Circa 3 km of interconnector cable to connect the two OSFs; and
 - Inter-array cables will be buried where possible and where burial is not possible cable protection will be provided

Three 200kV subsea export cables, totalling circa 190 km in length, to transmit electricity from the OSF to the landfall at Carnoustie and connecting to the onshore export cables for transmission to the onshore substation and connection to the National Grid network at Tealing, Angus. Export cables will be buried where possible and where burial is not possible cable protection will be put in place.

Installation of the WTGs will be phased, with Stage 1 covering installation of the 114 WTGs on suction bucket caisson jacket foundations with associated array cabling, and Stage 2 covering installation of the 36 WTGs on piled jacket foundations with associated array cabling. Installation of the OSPs will also be phased with one OSP (foundations and topsides) installed in Stage 1, and the second OSP (foundations and topsides) installed in Stage 2.

The scheduled dates for installation and commissioning of the project components are set out in the Offshore Construction Programme (LF000009-CST-OF-PRG-0002).

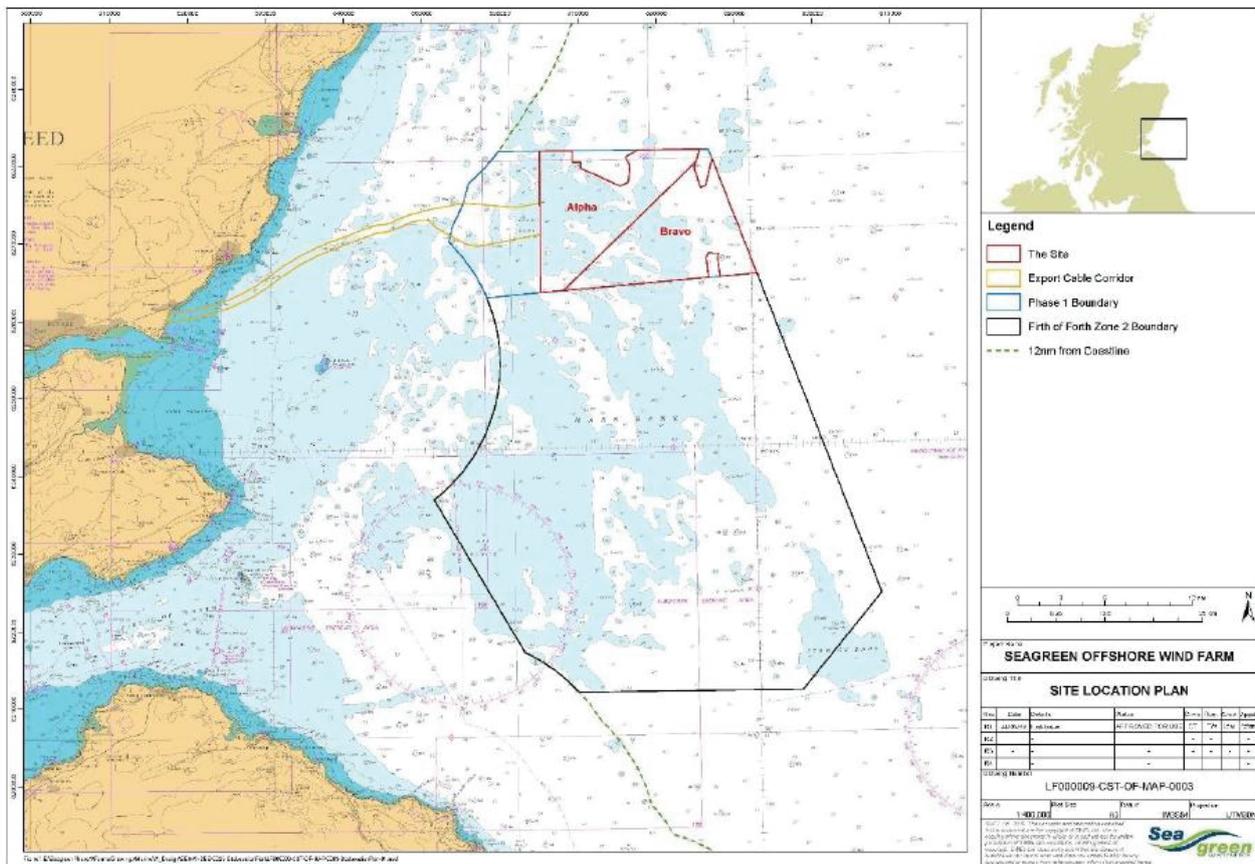


Figure 1.1 Seagreen Project Location

1.3 Consent and Licence Requirements

This OTA OMP has been prepared to discharge condition 3.2.3.2 of the OTA Marine Licence as set out in Table 1.1. Other conditions relevant to the OTA OMP are also listed.

Table 1.1 Consent conditions to be discharged by this Operation and Maintenance Programme

Consent document	Condition reference	Condition text	Reference to relevant section of this OMP
OTA Marine Licence (04678/19/0)	3.2.3.2	The Licensee must, no later than 3 months prior to the commissioning of the first OSP, submit an OMP, in writing, to the Licensing Authority for their written approval.	This document sets out the OMP (for the Offshore Transmission Assets) for approval by the Scottish Ministers.
		Such approval may only be granted following consultation by the Licensing Authority with the MOD, the JNCC, SNH, SEPA, MCA, NLB, Angus Council and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.	Consultation to be undertaken by the Scottish Ministers.
		The OMP must set out the procedures and good working practices for the operations and maintenance of the OSPs, substructures, and cable network of the Works.	Good working practices set out in Section 5.2 with O&M procedures set out in Section 4.
		Environmental sensitivities which may affect the timing of the operation and maintenance activities must be considered in the OMP.	Set out in Section 5.1. <i>See also: LF000009-CST-OF-PLN-0001 Operations Environmental Management Plan.</i>
		The OMP must, so far as is reasonably practicable, be consistent with the EMP, the PEMP, the VMP, the NSP, the CaP and the LMP.	Set out in Section 1.4.
Condition 3.2.4.9	Condition 3.2.4.9	The Licensee must operate and maintain the Works in accordance with the approved OMP.	This document sets out the OMP (for the Offshore Transmission Assets).
		Notification must be provided at least 3 months in advance of any maintenance of the Works where any additional deposits are required.	Set out in Section 4.

Consent document	Condition reference	Condition text	Reference to relevant section of this OMP
		In the event that these works are not assessed in the Application and are considered by the Licencing Authority as being material they will require further Marine Licences.	Set out in Section 4.

1.4 Linkages with Other Consent Plans

This OTA OMP document sets out the intended programme of O&M activities in relation to the Offshore Transmission Assets (offshore substation platforms and their substructures, and export cables). A separate related OMP document sets out the intended programme of O&M activities in relation to the Offshore Transmission Assets (WTGs and substructures, and inter-array cables) (see document LF000009-CST-OF-PRG-0001).

Condition 3.2.3.2 of the OTA Marine Licence (see Table 1.1) requires this OTA OMP to be so far as it is reasonably practicable, consistent with a number of other specifically named Consent Plans as follows (in the order listed in the licence condition):

- Environmental Management Plan (EMP)
- Project Environmental Monitoring Programme (PEMP)
- Vessel Management Plan (VMP)
- Navigational Safety Plan (NSP)
- Offshore Transmission Assets Cable Plan (CaP)
- Lighting and Marking Plan (LMP)

These, and other construction phase Consent Plans, will continue to apply alongside the OWF OMP between first commissioning and full commissioning, as construction and O&M activities will be carried out concurrently during this time. 'Commissioning' refers to the point of handover of the completed, operationally ready asset from the installation contractor to SWEL.

Prior to full commissioning, this OTA OMP will undergo a scheduled update during which O&M-applicable parts of a number of construction phase Consent Plans will be incorporated into this OTA OMP. This OTA OMP will then form a single source document. Figure 1.2 illustrates the process described above.

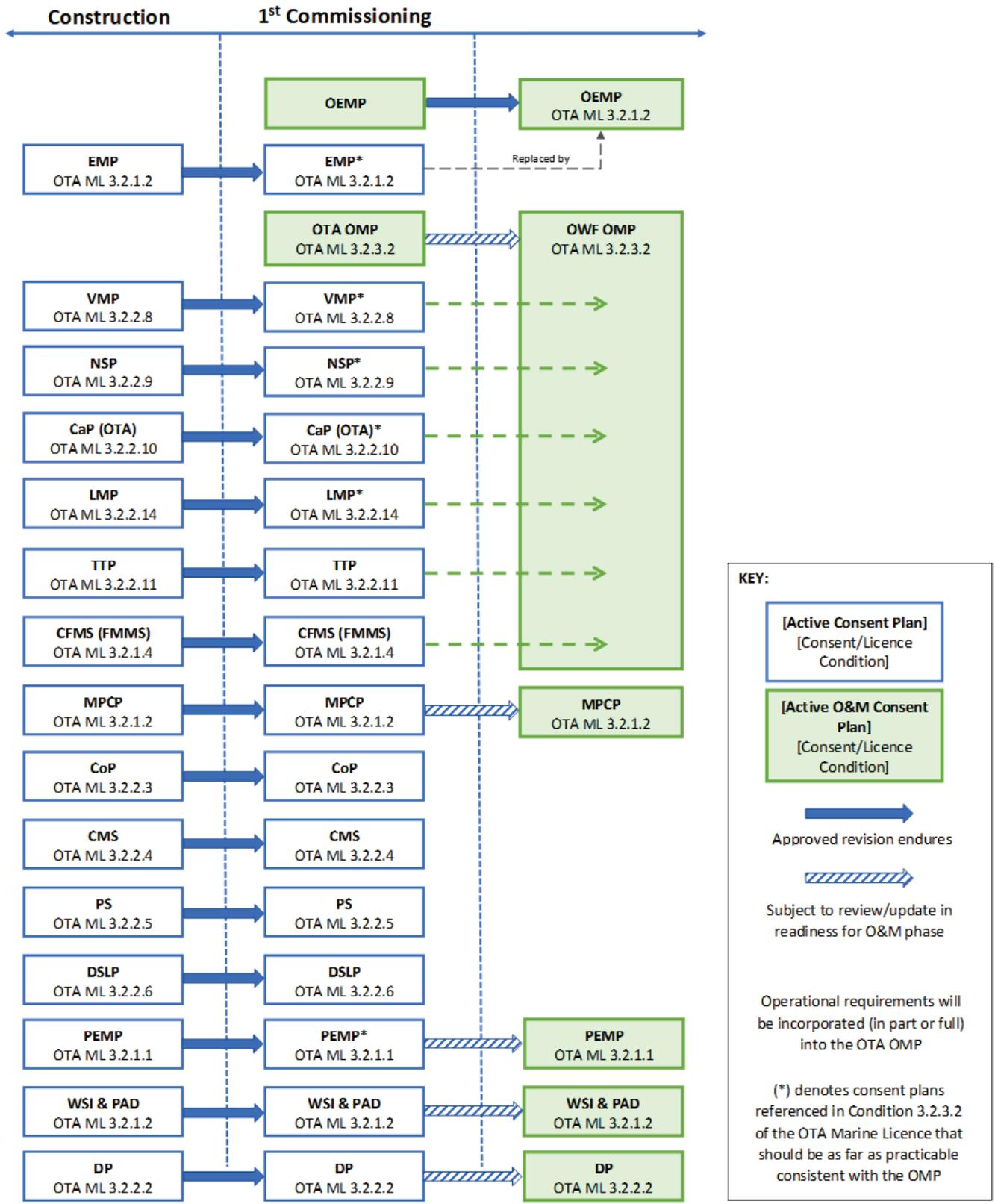
Between first and final commissioning, these Consent Plans (including those listed in Condition 16) have a link to the OMP in so far as they provide additional details on O&M activities (for example the OTA CaP and the VMP) and/or provide details on the control of O&M activities to mitigate or manage potential environmental impacts and impacts on other marine users (for example the NSP and the LMP). These Consent Plans are cross-referenced within this OMP as appropriate, however, the detail within these plans is not repeated within this OMP.

Table 1.2 summarises the linkages between this OMP and:

- Consent Plans that will be incorporated into this OMP following full commissioning (including those named in Condition 3.2.3.2 of the OTA Marine Licence)
- Consent Plans that will endure following full commissioning

Consent Plans that will endure into the O&M phase will be updated accordingly upon the completion of construction activities.

Figure 1.2 Active Consent Plans during the construction and operational phases



Note: The CoP, CMS, PS and DSLP are only applicable to the construction phase and as such will not endure beyond full commissioning. The Construction EMP will apply concurrently with the OEMP between first and full commissioning (to cover ongoing construction works). Both documents will be updated as necessary in accordance with section 1.5 of this document, and the equivalent section of the Construction EMP. After the end of construction, upon full commissioning of the development, only the OEMP will apply.

Table 1.2 Linkages between the OWF OMP and other Consent Plans

Consent Plan	Relevance to OTA OMP
Consent Plans to be incorporated into the OTA OMP upon final commissioning	
Vessel Management Plan (VMP) LF000009-CST-OF-PLN-0006	Provides details of ports and vessel transit routes associated with the construction and operation of the Wind Farm Assets. The VMP also outlines relevant environmental sensitivities and mitigation associated with vessel movements. Vessel activity associated with O&M activities and outlined within this OMP will be managed consistently with the procedures presented in the VMP.
Navigational Safety Plan (NSP) LF000009-CST-OF-PLN-0007	Sets out the navigational safety measures to be applied for the Wind Farm Assets including matters related to marine coordination, safety zones, routing, anchorages and notifications and communications for other sea users. The NSP will apply to all vessels involved in O&M activities. This OMP will therefore be implemented in accordance with the approved NSP.
Wind Farm Cable Plan (OWF CaP) LF000009-CST-OF-PLN-0008	Sets out Seagreen’s approach to monitoring for cable exposure and principles for developing overtrawl surveys where required. The O&M activities outlined within this OMP will be consistent with the procedures described in the OWF CaP.
Lighting and Marking Plan (LMP) LF000009-CST-OF-PLN-0010	Provides details of aviation and navigational lighting and marking of the Wind Farm Assets during construction and operation. The OMP will incorporate requirements for monitoring and mitigating any lighting failures associated with the lighting and marking strategy outlined in the LMP.
Traffic and Transportation Plan (TTP) LF000009-CST-OF-PLN-0015	Sets out traffic routes that may be affected by traffic generated by Construction of the Wind Farm Assets. Any impacts presented in the TTP will be reduced for O&M activities. Where major component repairs are required there may be occasional increases in traffic in line with the assessment presented in the RRP.
Fisheries Mitigation and Management Strategy (FMMS) LF000009-CST-OF-PLN-0011	Sets out the mitigation strategy relating to the commercial fishing industry in order to minimise or avoid effects on fishing.

Consent Plan	Relevance to OTA OMP
Consent Plans that will be updated and remain active after final commissioning	
Marine Pollution Contingency Plan (MPCP) LF000009-CST-OF-PLN-0012	Sets out the procedures to be followed in the event of a marine pollution incident or collision observed during O&M activities. The plan sets out statutory notification requirements and project-specific procedures to be followed in the event of an incident.
Project Environmental Monitoring Programme (PEMP) LF000009-CST-OF-PRG-0003	The PEMP provides an overview of the programme developed by Seagreen to monitor the environmental effects of the construction and operation of the OTA. The PEMP includes plans for benthic, scour, fish, bird and marine mammal monitoring. Where monitoring identifies any new information relating to environmental sensitivities, this may result in an update to the OMP, if required in accordance with the change management procedure set out in Appendix B.
Archaeology Written Scheme of Investigation (WSI) and Procedures for Archaeological Discoveries (PAD) LF000009-CST-OF-PLN-0002	The WSI sets out the mitigation procedures that must be followed in order to avoid damage to cultural heritage assets and targets of archaeological potential The PAD sets out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries whilst undertaking O&M activities.
Decommissioning Programme (DP) LF000009-CST-MA-PRG-0003	Sets out the strategy for decommissioning the OTA at the end of the operational lifecycle.
Operational Environmental Management Plan (OEMP) LF000009-CST-OF-PLN-0001	Details the environmental management framework for the operation of the OTA. The O&M activities described in this OMP will be undertaken in line with the environmental management measures described in the OEMP.

1.5 Document and Change Management Process

Should any updates to this OTA OMP become necessary, the change management process for any updates required to the OTA OMP including resubmission of Consent Plans for approval is outlined in Appendix B – The OTA OMP Change Management Procedure.

As detailed in section 1.4, a scheduled update of this OMP will be completed prior to full commissioning to incorporate O&M elements of those Consent Plans that will not endure beyond the construction phase, as required.

2. Overview of Assets

2.1 Offshore Transmission Assets

The Offshore Transmission Assets that make up the Seagreen Project, and covered by this OTA OMP, consist of the following main components:

- Two Offshore Substation Platforms (OSPs) on jacket substructures each installed on pin-piled foundations (one each in Stage 1 and Stage 2)
- Three subsea 225kV export cables, each up to 63.4km in length connecting the Stage 1 OSP to landfall at Carnoustie, Angus
- One interconnector cable connecting the two OSPs (installed at Stage 2)

The OSP locations and interconnector cable route are shown on Figure 2.1. The export cable corridor is shown on Figure 2.2. The final asset locations will be confirmed upon full commissioning as required by condition 3.2.4.5 of the OTA Marine Licence.

Further details can be found in the OTA Development Specification and Layout Plan (LF000009-CST-OF-PLN-0005).

2.2 O&M Base and Marine Co-ordination Centre

The Offshore Transmission Assets shall be managed out of the Seagreen O&M base in Montrose. The base houses technicians and management personnel whilst Montrose Harbour provides dedicated quayside facilities for loading and unloading of crew transfer vessels (CTVs) and waste handling. The O&M base includes office and welfare facilities, spare part storage space, and also houses the Seagreen Marine Co-ordination Centre (MCC).

The Seagreen MCC shall provide the following key services:

- Work permit activation/deactivation
- Marine surveillance - vessel and personnel tracking
- Emergency response coordination
- Monitoring of the Supervisory Control and Data Acquisition (SCADA) system and HV switching (including alarm handling)

Figure 2.1 Layout of the Seagreen Alpha and Bravo Offshore Wind Farms, with the OSPs and interconnector cable marked

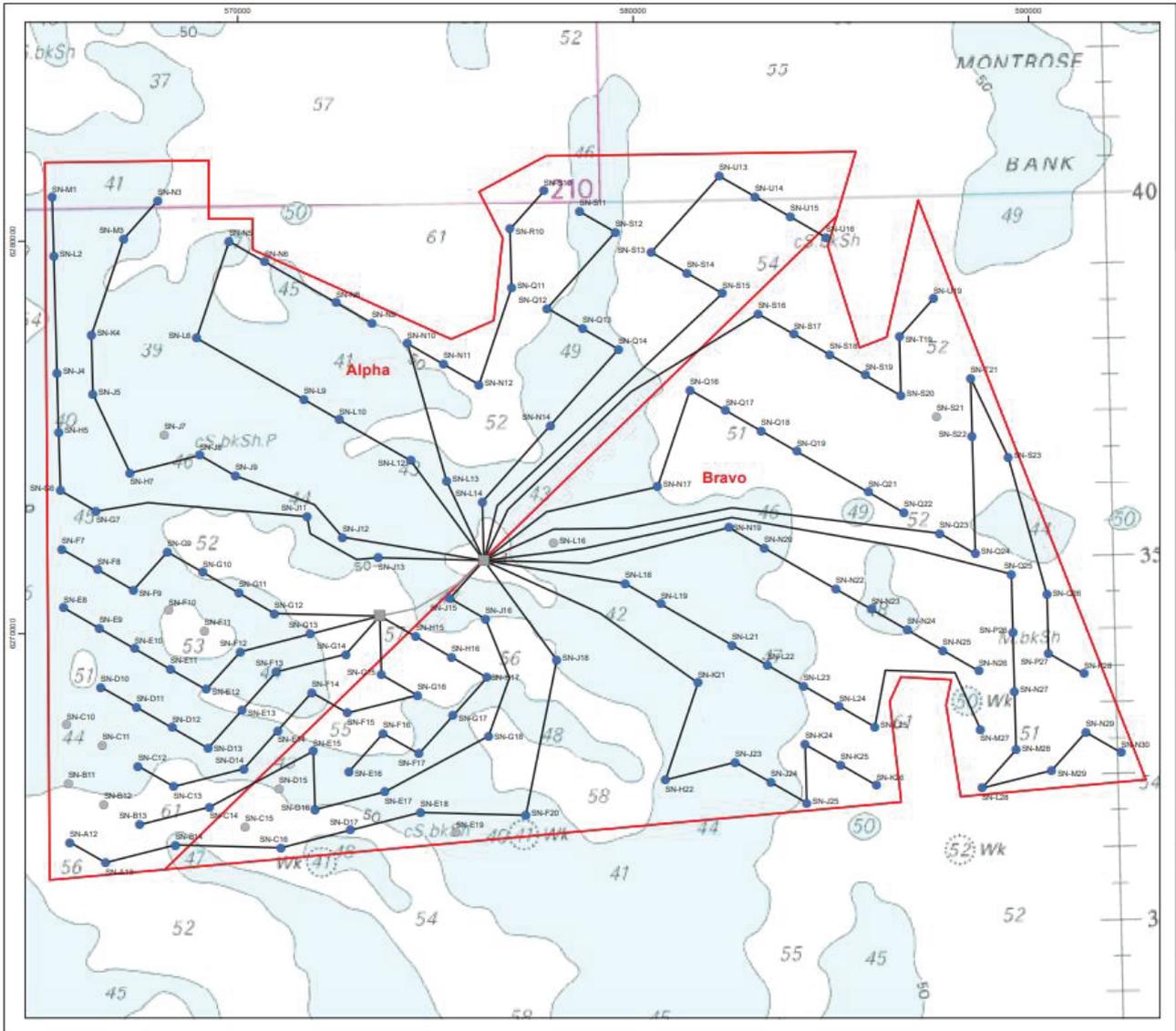
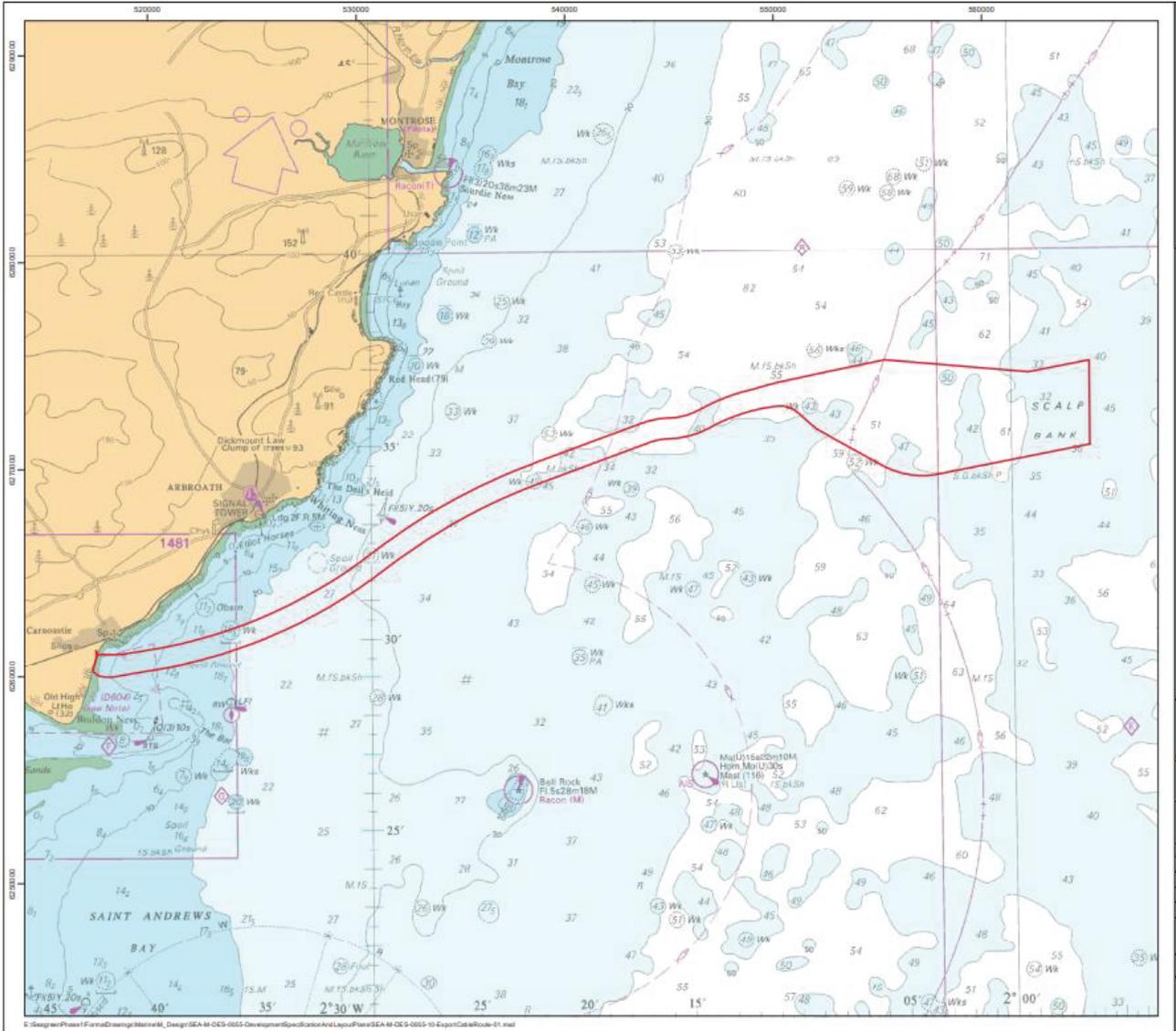


Figure 2.2 Export cable corridor



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2.3 Supervisory Control and Data Acquisition System (SCADA)

A SCADA system has been developed to provide an operator interface with the Offshore Transmission Assets. The SCADA system provides an interface to the OSP controllers and provides high-level performance and system information. The SCADA system will allow operatives to override automatic operation, adjust control parameters, and interrogate detailed operational and performance data.

The OTA SCADA system also provides remote monitoring and control of the MV/HV network allowing the complete network, or sections thereof, to be isolated or re-energised remotely. Data from the SCADA system and other monitoring devices will be integrated using a data historian to provide a robust historical data to support proactive maintenance strategies and a performance-driven approach.

Day-to-day monitoring and control of the SCADA system will be the responsibility of the Control Room Operator based at the Seagreen Control Room and MCC. The SCADA system will be configured to notify operatives (via alarms) if system issues arise. It will also be possible to log in to the SCADA systems via a remote internet connection.

If any system issues arise then the Control Room Operator has the capacity to initiate shutdown of the OSPs if necessary. When intervention with the dedicated OSP controller is necessary, the operator will inform the Operations Manager, who will coordinate any remedial action as required.

2.4 Key Operation Programme Milestones

Table 2.1 sets out the key operation programme milestones for the OTA. The dates set out here align with those in the Construction Programme (LF000009-CST-OF-PRG-0002) and are subject to change as the construction phase progresses.

Table 2.1 Key operation programme milestones

Milestone	Anticipated Programme
First WTG commissioned (start of project O&M phase)	March 2022
First OSP – first commissioning / first power exported	May 2022
Export cables installation complete	July 2022
First OSP – final commissioning	January 2023
Interconnector cable installation	May 2023
Second OSP installed and commissioned	August 2023
Final wind farm commissioning (end of project construction phase)	November 2023

3. Approach to Safety, Health and the Environment

3.1 Introduction

This and the following sub-sections are intended to summarise the key elements of the overarching Seagreen commitment to Safety, Health and Environment (SHE) management.

Seagreen is committed to undertaking the O&M of the OTA in a way that minimises the risks to SHE, insofar as reasonably practicable. For full details of Seagreen's overarching commitments relating to environmental management of the operation of the Seagreen Project, see LF000009-CST-OF-PLN-0001 Operations Environmental Management Plan (OEMP).

Seagreen will require that all O&M activities have been risk assessed and that adequate control measures and actions are in place to manage the risk to as low as reasonably practicable (ALARP).

Seagreen is approaching the management of technical risk by adoption of a technical Health & Safety Management Plan in line with ALARP principles and will be producing an Operational Safety Case which will be applied to the lifecycle of the assets.

The application of the technical Health & Safety Management Plan to the O&M phase of the assets provides the necessary input to the Operational Safety Case. The Operational Safety Case provides an effective argument, with referenced substantiation, that assets are safe to operate and maintain in terms of the management of associated Significant Accident Hazard (SAH) risks to levels that are ALARP.

The overall objective of this procedure is to provide sufficient information and guidance on the process, activities, and documentation required to effectively and demonstrably manage the SAH risks associated with O&M to a level that is ALARP.

Seagreen will integrate the process, activities, and documentation identified by the technical Health & Safety Management Plan, along with overarching company SHE policies, values and standards, via the Asset Management System (AMS).

3.2 Asset Management System

Seagreen will be implementing an overarching AMS. The AMS is a software solution specifically designed for managing physical assets through their life cycle.

The scope of the AMS shall cover the operational requirements associated with the O&M activities of the Wind Farm Assets and Transmission Assets (as described in Section 2) as well as the O&M base at Montrose.

The AMS shall include operational strategies which will govern Seagreen's approach to procurement and contract management, with the Seagreen SHE procedures required as standard through conditions of contract. The operational strategies will also govern the approach to work package management which covers such activities as the development of Risk Assessment Method Statements (RAMS) and the approach to Hazard Identification Risk Assessment (HIRA).

The AMS will include key O&M manuals, plans and procedures which will be implemented with support of the Health and Safety Management System and the Environmental Management System (EMS).

Further details on the emergency response during operations will be contained in a separate Emergency Response and Cooperation Plan (ERCoP) which will be developed in consultation with the Maritime Coastguard Agency (MCA) and therefore does not form part of this OMP.

3.3 Environmental Management System

In order to manage the environmental risks arising from the O&M of the OTA, an EMS shall be implemented.

The EMS includes processes designed to manage environmental impacts and secure environmental compliance and long-term sustainability. The EMS shall align with both the company Environmental Policy and the overarching AMS but shall also reflect the specific requirements of the consent conditions, environmental constraints, risks and opportunities specific to the OTA.

Full details of Seagreen's approach to the mitigation of site-specific environmental risks, consent and licence compliance and the management of contractor activity is set out in the Operations Environmental Management Plan (OEMP) (LF000009-CST-OF-PLN-0001).

This OMP, the OEMP, and the enduring Consent Plans (as illustrated in Figure 1.2) will form part of the suite of EMS documentation.

4. Operation and Maintenance Activities

4.1 Maintenance Requirements

To ensure the OTA operates safely and in an optimised state they are subjected to a number of routine maintenance activities that are carried out on a regular basis based on Original Equipment Manufacturer (OEM) recommendations and good industry practice. In addition, there are occasions when the OTA may require unscheduled visits to carry out repairs or other remedial works to return the assets to a serviceable condition.

If any maintenance works described in this section involve additional deposits¹ or other marine licensable activities (including any construction, alteration or improvement works), Seagreen will approach MS-LOT as far in advance of the proposed works as possible, to discuss the work plans and potential requirements for Marine Licences under the Marine (Scotland) Act 2010 and/or the Marine and Coastal Access Act 2009.

4.2 Routine Service Activities

All Offshore Transmission Assets are handed over to O&M with routine service recommendations and information detailing the level of servicing required. This information is used to plan and programme routine O&M activities, at appropriate frequencies.

4.2.1 OSP Jackets

The specific O&M requirements and methods for the jacket foundations are provided in the O&M Manuals issued by the jacket designers.

The proposed routine inspection and maintenance activities and their indicative frequencies are listed in Table 4.1.

Remedial repairs will be made where defects are identified by visual inspection and servicing activities listed in Table 4.1.

In addition, the seabed around the pin-piled jacket foundations will be monitored for scour development, in accordance with engineering requirements. A post-installation survey will be conducted, and the findings used to understand the morphological and bathymetric conditions, magnitude and extent of any scour that occurs, the requirements for and timing of any future monitoring and the need for any rectification measures.

¹ See condition 3.2.4.9 of the OTA Marine Licence

Table 4.1 Routine inspection and maintenance activities – OSP jacket foundations (indicative and subject to confirmation before final commissioning)

Component	Activity	Indicative frequency
Painted areas of jacket (all 'above water' areas)	Visual inspection	Annual
	Cleaning (removal of marine growth and guano)	As required
Boat landing areas (including ladder and buffer tubes) – subject to marine growth and paint damage	Visual inspection ²	Prior to every CTV transfer
	Cleaning (jet wash)	As required
Ladders and working/access platforms	Cleaning (removal of marine growth and guano)	As required
Safety retracting lines (providing personal protection from falls from ladders)	Visual inspection ²	Prior to every use
	Service and re-certification	Annual
Davit crane (for transfer of materials from CTVs and for emergency evacuation of personnel)	Visual inspection ²	Prior to every use
	Service and re-certification ³	Annual
Operational lighting (for general illumination of the structure for safe access and egress)	Service	Annual
Aids to Navigation (lighting, ID marker boards and foghorns)	Service	Annual
Corrosion protection (CP) systems	Effectiveness checks	Every 5 years
Earth bonding	Integrity checks	Annual
Subsea sections of jacket structure	Visual inspection (by ROV)	Every 2 years
Welds	Inspection (sample)	Every 5 years (unless visual inspection indicates a defect)

4.2.2 OSP Topsides

The proposed routine inspection and maintenance activities and their indicative frequencies are listed in Table 4.2.

² Undertaken during routine maintenance/service visits to the OSP, not as a standalone task

³ A Written Scheme of Examination will be put in place to extend the 6-month inspection of the emergency man riding point on the crane

Remedial repairs will be made where defects are identified by visual inspection and servicing activities listed in Table 4.2.

Table 4.2 Routine inspection and maintenance activities – OSP topsides (indicative and subject to confirmation before final commissioning)

Component	Activity	Indicative frequency
HV gas insulated switchgear container	Visual inspection	6 monthly
MV gas insulated switchgear container	Visual inspection	6 monthly
Control container	Visual inspection	6 monthly
Transformer and sump	Visual inspection	6 monthly
Oil in water detector	Service	TBC
Radio mast	Visual inspection	6 monthly
Stairs, ladders and working/access platforms	Cleaning (removal of marine growth and guano)	As required

4.2.3 Export Cables and Interconnector Cable

Approximately one year following cable installation, an ROV survey will be undertaken to ensure that the cables remain as installed and to identify areas of cable at potential risk of exposure in the future. This survey will assess cable depth of burial and cable movement and identify areas of free spanning cable. Monitoring will focus on any ‘at risk’ areas identified. Subject to the findings of the surveys, the frequency of ongoing monitoring will be adapted to the appropriate level of exposure risk.

All export cables are fitted with a thermal monitoring system that features depth of burial monitoring in near real time which will raise alarms in the control room should any variation in burial be detected. The intention is that once this system is commissioned any physical survey would be by exception to areas identified as seeing a change in burial depth and not on a specific periodic time basis.

In addition, the condition of the cable protection system will be assessed at a frequency to be determined following installation, based on the risk of damage and/or failure.

Further detail on cable exposure monitoring is set out in section 8 of the OTA Cable Plan (LF000009-CST-OF-PLN-0009).

4.2.4 Landfall (below MHWS)

Annual visual inspections of the landfall area shall be conducted at a low spring tide to establish if any of the cable ducts have become exposed or damaged and to assess the condition of the reinstated revetment. Any necessary remedial actions will be discussed with Angus Council and MS-LOT.

4.3 Unscheduled Maintenance Activities

There will be occasions when the OTA will require unscheduled inspections, maintenance and/or repairs. These are typically undertaken where defects are identified during the routine activities listed in Tables 4.1 and 4.2 above. Unscheduled activities will be prioritised based on risk. For example, repairs to aids to navigation will be treated as a high priority to ensure the safety of other marine users and maintain the required operational availability. Similarly, personal safety equipment shall be treated as a high priority task. All unscheduled activity will be undertaken when weather and sea state conditions allow for a safe working environment.

Foreseeable unscheduled activities are summarised in Table 4.3 below. This table is not exhaustive, and all other works required to ensure integrity of the assets and their safe and efficient operation will be carried out as necessary.

Further details on cable exposure monitoring, reburial and cable failure are set out in the OTA Cable Plan (LF000009-CST-OF-PLN-0009).

Specialist contractors shall be appointed to undertake unscheduled maintenance of the OSP jackets, jacket-mounted equipment and export and interconnector cables.

Table 4.3 Indicative unscheduled maintenance activities

Jackets	Topsides	Cables (Export and Interconnector)
<ul style="list-style-type: none"> • Repair/replacement of safety retracting lines and other personal safety equipment • Repairs to davit crane • Repairs to lighting (operational and navigational) • Repairs to navigation aids (marker boards and foghorns) • Paint repairs • ROV surveys of subsea jacket sections • Removal of marine growth 	<ul style="list-style-type: none"> • MV/HV switchgear operations • Repairs to radio mast equipment • Repairs to SCADA, communications and battery equipment • Repairs to working platforms, handrails, lighting etc • Paint repairs 	<ul style="list-style-type: none"> • Remedial work to address exposed lengths of cable - reburial or rock placement • ROV surveys following a cable fault or possible damage (e.g. dragged anchor over cable trench)

4.4 Major Component Repairs

Major component repairs are considered to be unforeseen faults that could trigger emergency repairs requiring large component replacements and extensive remedial works.

For major maintenance works such as major component exchanges, Seagreen will approach MS-LOT as far in advance of the proposed works as possible, to discuss the work plans and potential associated Marine Licence requirements.

In relation to the OSPs, major component repairs could involve replacement of the entire topside, major topside components (containers/modules) or repairs to the jacket substructures. Such events would require mobilisation of specialist vessels. Timescales for repair works would largely be driven by the availability of replacement parts, specialist personnel, equipment and vessels.

In relation to the export and interconnector cables, major component repairs may involve the removal and/or replacement of cables. Where ROV surveys identify a fault on a cable, damaged sections may be replaced by cutting and removing the defective section and jointing in a replacement length of cable. Such activities would be performed by specialist cable vessels. Cable re-trenching and/or installation of protection would likely be required.

All major component repair and replacement works would be planned and notified in advance to marine stakeholders who may be affected by the works (including, but not limited to, local mariners, fisheries organisations, harbour authorities and HM Coastguard) via Notices to Mariners issued by the Seagreen MCC.

5. Environmental Sensitivities and Good Working Practices

5.1 Environmental Sensitivities

Environmental sensitivities within the wind farm lease area have been identified during baseline surveys and desk-based reviews to support the Environmental Statement (ES) and Supplementary Environmental Information Statement (SEIS) supported by additional survey work undertaken as part of the PEMP.

Potential impacts from routine O&M activities (as described in Section 4.2) are associated mainly with vessel movements and the presence of vessels within the wind farm lease area. Service and inspection works will predominately take place on the OSP structures with limited interaction with marine species and habitats. No periods of increased environmental sensitivity were identified in the ES and SEIS relevant to vessel disturbance from O&M activities and no significant effects were predicted.

Unscheduled activities and, in particular, some major component replacements and repairs will have a greater interaction with environmental receptors. Table 5.1 outlines key environmental sensitivities considered in respect of the O&M activities set out in Section 4.

Table 5.1 Environmental considerations associated with O&M activities

Receptor	Sensitivities	Seasonal considerations
Benthic ecology	The impacts of maintenance of the OSPs and export cables, including the use of jack-up vessels, were considered to be negligible in the ES and SEIS due to the localised, infrequent short-term nature of disturbance of the benthos.	None identified
Fish and shellfish	The ES and SEIS noted sensitive periods during spawning for herring (August-September) and cod (April). However, potential significant effects were noted as a result of pile-driving noise and there will be no such pile-driving in the O&M phase. Effects in relation to O&M activities, including effects from major component repairs or replacements and vessel activity, were not identified as a primary concern and impacts were not assessed in the ES or SEIS.	None identified
Marine mammals	The impacts of vessel activity on marine mammals in the O&M phase were considered to be negligible in the ES and SEIS in terms of vessel noise. Effects in relation to other O&M activities were not identified as a primary concern and impacts were not assessed in the ES or SEIS.	None identified

Receptor	Sensitivities	Seasonal considerations
Ornithology	Effects in relation to O&M activities, including effects from major component repairs or replacements and vessel activity, were not identified as a primary concern and impacts were not assessed in the ES or SEIS.	None identified
Commercial fisheries	The impacts of vessel activity (CTV and SOV) on commercial fisheries in the O&M phase are likely to be minimal. However, fishing activity may be temporarily displaced during major maintenance and post-construction survey activity. The FMMS shall be followed at all times to manage interactions and mitigate impacts.	None identified

No specific sensitivities or seasonal considerations have been identified, both in the ES and subsequently. The results of the monitoring undertaken in accordance with the Project Environmental Monitoring Programme may indicate additional sensitivities which may necessitate changes to the O&M approach. In these cases, this OTA OMP will be updated accordingly.

Should additional marine licences be required for major maintenance activities, environmental assessments would be conducted prior to any licensable works commencing to ensure appropriate mitigations are in place for the duration of the works.

5.2 Good Working Practices

Seagreen will require that good working practice is applied by Seagreen personnel and contractors throughout O&M, seeking to minimise the risks to personnel, other sea users and the environment.

Good working practices applicable to O&M are set out in the approved Consent Plans detailed in Section 1.4 and Table 1.2.

There are a number of good practice guidance documents that have been produced for or apply in relation to the offshore renewables industry in recent years. Where relevant, Seagreen will require that such good practice is reflected in procedures and method statements produced by Seagreen personnel and contractors, noting that all such guidance shall be applied to the specific location/jurisdiction, design, operational requirements and ES commitments of the Seagreen project. Relevant industry guidance documents are listed in Appendix C.

The OEMP sets out a range of environmental management procedures to be applied throughout the O&M phase to manage and mitigate environmental risk. The OEMP will be relevant throughout the operational lifetime of the Wind Farm Assets from first commissioning until decommissioning. As set out in Section 1.4, the OEMP will be updated as required throughout the operational lifetime of the OWFs and OTA, as necessary and in accordance with section 1.5 of this document.

6. Compliance with the ES and ES Addendum

The relevant conditions of the S36 Consent require that the Seagreen Project be operated in accordance with the terms of the application, including the ES and ES Addendum.

The ES and ES Addendum for the Seagreen project detailed the proposed approach to O&M and included a number of mitigation commitments specific to O&M activities. Appendix D presents the commitments made by Seagreen in the ES and ES Addendum to mitigation measures in relation to O&M. The table provides details of the commitments and a cross-reference to where each commitment is implemented in this OMP or in other Consent Plans. A complete register of the mitigation, management and monitoring commitments made in the ES and ES Addendum, required by consent conditions is set out in the Commitments Registers included as part of the OEMP.

7. References

Table 7.1 Seagreen Document References

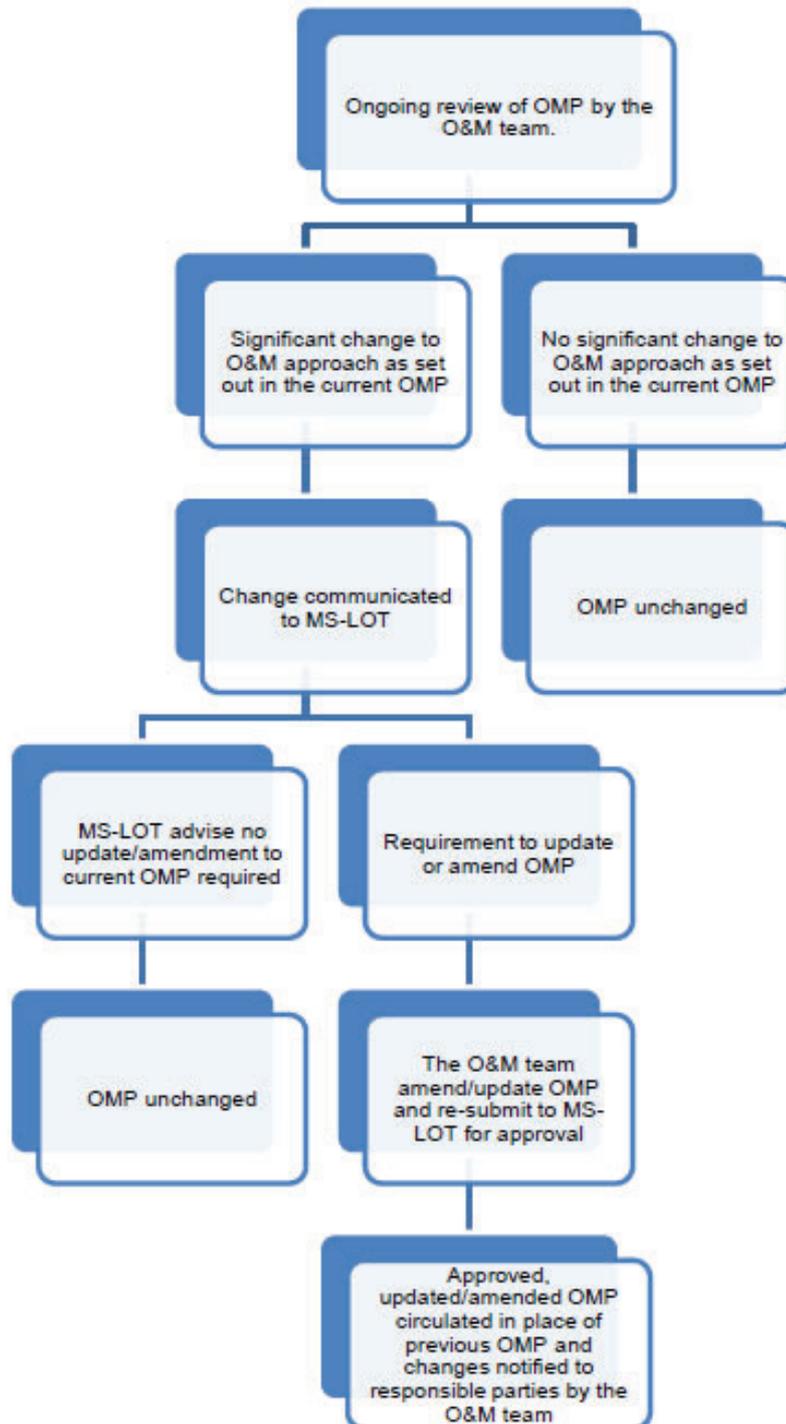
SWEL Document Number	Title
LF000009-CST-OF-PRG-0004	Offshore Wind Farm Assets Operations and Maintenance Plan
LF000009-CST-OF-PLN-0001	Operations Environmental Management Plan
LF000009-CST-OF-PLN-0014	Construction Environmental Management Plan
LF000009-CST-OF-PLN-0006	Vessel Management Plan
LF000009-CST-OF-PLN-0007	Navigational Safety Plan
LF000009-CST-OF-PLN-0009	Offshore Transmission Assets Cable Plan
LF000009-CST-OF-PLN-0010	Lighting and Marking Plan
LF000009-CST-OF-PLN-0015	Traffic and Transportation Plan
LF000009-CST-OF-PLN-0011	Fisheries Mitigation and Management Strategy
LF000009-CST-OF-PLN-0012	Marine Pollution Contingency Plan
LF000009-CST-OF-PRG-0003	Project Environmental Monitoring Programme
LF000009-CST-OF-PLN-0002	Marine Archaeology Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD)
LF000009-CST-MA-PRG-0003	Decommissioning Programme

Appendix A – OMP List of Abbreviations and Definitions

Term	Description
AC	Alternating Current
ADP	ALARP Design Procedure
ALARP	As low as reasonably practicable
AMS	Asset Management System
CMS	Construction Method Statement
Consent conditions	The terms that are imposed on Seagreen under the S36 Consents or Marine Licence(s) that must be fulfilled throughout the period that the consents or licences are valid
Consent Plan	Plan requiring approval by Scottish Ministers and as stated within the conditions of the Section 36 Consents and/or Marine Licence(s)
Contractor	A contractor appointed by to carry out O&M work packages
CoP	Construction Programme
CTV	Crew Transfer Vessel
DSLDP	Development Specification and Layout Plan
EMP	Environmental Management Plan
EMS	Environmental Management System
ERCoP	Emergency Response and Co-operation Plan
ES	Environmental Statement
HIRA	Hazard Identification and Risk Assessment
HV	High Voltage (220kV or above)
IAC	Inter-array cable
JNCC	Joint Nature Conservation Committee
kV	kilovolts
LMP	The Lighting and Marking Plan
Marine Coordination	The management and surveillance of people, vessels and offshore structures to ensure the safe preparation and execution of offshore activities, in order to minimise the probability of an incident, and to provide effective response if an incident does occur
Marine Licence	A written consent granted by the Scottish Ministers under Part 4 of the Marine (Scotland) Act 2010 and/or Part 4 of the Marine and Coastal Access Act 2009
MCA	Maritime and Coastguard Agency
MPCP	Marine Pollution Contingency Plan

Term	Description
MS-LOT	Marine Scotland Licensing and Operations Team
MV	Medium Voltage (33kV)
NLB	Northern Lighthouse Board
NSP	Navigational Safety Plan
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer. The OEM is a company that produced parts and/or equipment that now forms part of the Wind Farm Assets.
OEMP	Operations Environmental Management Plan
OFTO	Offshore Transmission Owner
OMP	Operation and Maintenance Programme
OSP	Offshore Substation Platform
OTA	Offshore Transmission Assets (as defined in the OTA Marine Licence): the OSPs, export cables up to Mean High Water Springs and interconnector cable
OTA CaP	Offshore Transmission Assets Cable Plan
OWF	Offshore Wind Farm
PAD	Protocol for Archaeological Discoveries
PEMP	Project Environmental Monitoring Programme
RAMS	Risk Assessment and Method Statement
ROV	Remotely Operated Vehicle
S36 consent	The written consent granted by the Scottish Ministers under Section 36 and Section 36A of the Electricity Act 1989
SAH	Significant Accident Hazard
SCADA	Supervisory Control and Data Acquisition
SEIS	Supplementary Environmental Information Statement
SHE	Safety, Health and Environment
SNH	Scottish Natural Heritage (now known as NatureScot)
TTP	Traffic and Transportation Plan
VMP	The Vessel Management Plan
Wind Farm Assets	The assets forming the Seagreen Alpha and Seagreen Bravo OWFs (as defined in the Section 36 Consents): the WTGs, their foundations, and the IACs up to - but not including - the OSPs
WTG	Wind Turbine Generator

Appendix B – OTA OMP Change Management Procedure



Note: ‘Significant’ changes to O&M approach may include changes to contracting arrangements, major emerging maintenance requirements based on manufacturer recommendations or results of ongoing monitoring, changes in response to incidents or asset failures, new/updated legislative requirements or industry good practice guidance. Seagreen will consult with MS-LOT with regard to the significance of any changes and the requirement to update this OMP.

Appendix C – Good Working Practice Guidance

Note: Where guidance listed here is revised, the most up to date version shall apply. As guidance develops, some guidance listed here may be superseded or become obsolete. While every effort will be made to keep this Appendix up to date, contractors are required to ensure they refer to the most up to date guidance and to any other guidance not listed here that is applicable to their work scope.

Publisher	Title	Scope
G+	Working at height in the offshore wind industry (2 nd edition - July 2018)	Covering design, construction, commissioning, and operation; designed to reduce the need for work at height; topic guidance sheets, covering common hazards, personal protective equipment, training and competence, fitness requirements, and the responsibilities of those procuring, supervising and undertaking work; with supporting information, such as regulatory requirements in selected EU countries (including the UK) and technical standards
	The safe management of small service vessels used in the offshore wind industry (2 nd edition - January 2018)	Cover working with vessels that have a gross tonnage of less than 500, such as crew transfer vessels, guard vessels, survey vessels and construction support vessels. The guidelines cover audit and inspection regimes for wind farm service vessels, operating procedures for routine marine operations, training and competence of crew and passengers, and safety equipment
	Integrated Offshore Emergency Response (IOER) – Good practice guidelines for offshore renewable energy developments (1 st edition – October 2019)	Guidance on identifying offshore renewables risks and planning and delivery of an effective emergency response
	Good practice guidelines – Offshore wind farm transfer (1 st edition – July 2020)	Guidance on executing safe transfers of personnel in an offshore wind farm
	Good practice guidelines for safe helicopter operations in support of the global offshore wind industry (1 st edition – February 2021)	Guidance on the planning and execution of safe helicopter operations for logistical support and emergency response in offshore wind farms

Publisher	Title	Scope
Energy Institute	UK Wind Turbine Safety Rules (4th edition - 2021)	A model template of rules and procedures to help formalise a safe system of work to manage the significant risks associated with a wind turbine
Renewables UK	Offshore Wind and Marine Energy H&S Guidelines (Issue 2 – 2014)	H&S guidelines for the offshore wind sector covering all phases of development and identifying risks and significant safety hazards and activities
	Safety Circular: Notices to Mariners. Guidance for Offshore Wind & Marine Projects (2013)	This Circular provides a short summary of the accepted scope and format for issuing Notices to Mariners
	FLOWW Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (2014)	Sets out best practice guidance on liaison between the offshore wind industry and the fishing industry
	Guidelines for Selection and Operation of Jack-ups in the Marine Renewable Energy Industry (Issue 2 - 2013)	Industry guidance aimed at jack-up owners, operators, developers and contractors engaged in site-investigation, construction, O&M of offshore wind and marine energy installations
	First Aid Needs Assessment – Guidance for renewable energy projects (2013)	Provide basic information on how duty holders can assess the provision of adequate and appropriate equipment, facilities and personnel to ensure employees receive proper attention if they are injured or taken ill at work.
	Vessel Safety Guide - Guidance for offshore renewable energy developers (2015)	Provides guidance and insight on the selection and maintenance of vessels through all phases of wind farm development
NatureScot	The Scottish Marine Wildlife Watching Code (2017)	A code of conduct for marine users who may encounter marine wildlife during their activities, aiming to minimise the risk of harm to marine wildlife and minimise disturbance
MCA	The Workboat Code (2014)	Construction standard for small workboats (<24m load line length) in commercial use

Appendix D – Summary of O&M Activities (as proposed in ES and ES Addendum) (OTA)

Source	Reference (ES Chapter)	Details of commitment	Implementation
ES September 2012	Project Description – 5.236	Unscheduled repair activities will range from attendance on location to deal with the resetting of false alarms to major repairs.	Section 4.3 – Unscheduled Maintenance Activities Section 4.4 – Major Component Repairs
ES September 2012	Project Description – 5.238	The Project Alpha and Project Bravo operators will have an O&M team in place for the day-to-day management and control of the OWF infrastructure. This is expected to be based in purpose built onshore O&M Control Centre facilities, ideally situated on the quayside at the chosen operations port location.	Section 2.2 - O&M Base and Marine Co-ordination Centre
ES September 2012	Project Description – 5.239	In order to manage the post consent and ongoing site monitoring requirements, it is likely that a combination of dive support vessels and ROVs will be used to undertake inspection of foundations, scour protection, cables and any other subsea infrastructure.	Section 4.2 – Routine Service Activities