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Seagreen Alpha and Seagreen Bravo Offshore Wind Farms Project Environmental Monitoring Programme

Section 36 Consent Condition 26 and Marine Licence Condition 3.2.1.1

For the approval of Scottish Ministers

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Consent Plan Overview

Purpose of the Project Environmental Monitoring Programme

This Project Environmental Monitoring Programme (PEMP) has been prepared to address the specific requirements of the relevant conditions attached to the Section 36 (S36) Consents and Marine Licences (collectively referred to as the consents), issued to Seagreen Wind Energy Limited (hereafter referred to as Seagreen) in 2014, for the Seagreen Alpha and Seagreen Bravo Offshore Wind Farms (OWFs) and the associated Offshore Transmission Assets (OTA).

Seagreen Alpha and Seagreen Bravo OWFs and OTA are collectively referred to as 'the Seagreen Project'. This PEMP has been prepared to discharge consent conditions for the Seagreen Project simultaneously.

The overall aims and objectives of the PEMP are to outline and define the approach Seagreen, its survey contractors and advisors will take with respect to environmental monitoring during the pre-construction, construction and post-construction phases of the project.

It should be noted that the PEMP is a 'live' document and will be regularly reviewed and updated in consultation with the Licensing Authority with FTRAG, to reflect the status of the Seagreen project monitoring requirements and to identify the appropriateness of ongoing monitoring.

Scope of the PEMP

The scope of the PEMP is to set out the plans for pre-construction, during construction (if required) and post-construction monitoring activities taking place seaward of Mean High Water Springs (MHWS) in relation to:

1. Birds;
2. Sandeels;
3. Marine fish;
4. Diadromous fish;
5. Benthic communities;
6. Seabed scour and local sediment deposition; and
7. Marine mammals.

Structure of the PEMP

The PEMP is structured as follows:

- | | |
|-----------|---|
| Section 1 | Provides an overview of the project and the consent requirements in relation to the PEMP and describes the process for updating the PEMP. |
| Section 2 | Sets out the purpose, scope and objectives of the PEMP. |
| Section 3 | Describes the measures for ornithology monitoring. |
| Section 4 | Describes the measures for sandeels, marine fish and diadromous fish monitoring. |
| Section 5 | Describes the measures for monitoring benthic communities. |
| Section 6 | Describes the measures for monitoring scour and local sediment deposition. |
| Section 7 | Describes the measures for monitoring marine mammals. |
| Section 8 | Demonstrates compliance with the original application and the commitments made. |

PEMP Audience

The PEMP will be submitted to the Scottish Ministers/Licensing Authority for approval, in consultation with the relevant stakeholders, as required by the relevant consent conditions.

Compliance with this PEMP will be monitored in line with Seagreen's consents compliance management framework. The key role responsible for monitoring compliance with the PEMP include Seagreen's Ecological Clerk of Works (ECOW) and Seagreen's Environmental Manager. All survey contractors will be required to adhere to the requirements of the PEMP in carrying out monitoring surveys, data analysis and reporting.

Copies of the PEMP are to be held in the following locations:

- Seagreen's head office;
- Seagreen's construction office and marine coordination centre; and
- at the premises of any Contractor (as appropriate), including the Seagreen ECoW, acting on behalf of Seagreen.

1. Introduction

1.1 Consents and Licences

Seagreen Wind Energy Limited (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 under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. Together, the Seagreen Alpha and Seagreen Bravo OWFs and the OTA collectively comprise 'the Seagreen Project'.

In 2018, following application by Seagreen, the existing 2014 consents for the Project Alpha and Project Bravo OWFs were varied by Scottish Ministers. This Project Environmental Monitoring Programme (PEMP) is seeking to discharge conditions of the S36 consents and the OTA Marine Licence.

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 WTGs, their foundations and associated array cabling), together with associated infrastructure of the OTA (Offshore Substation Platforms (OSPs), 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 1.0.

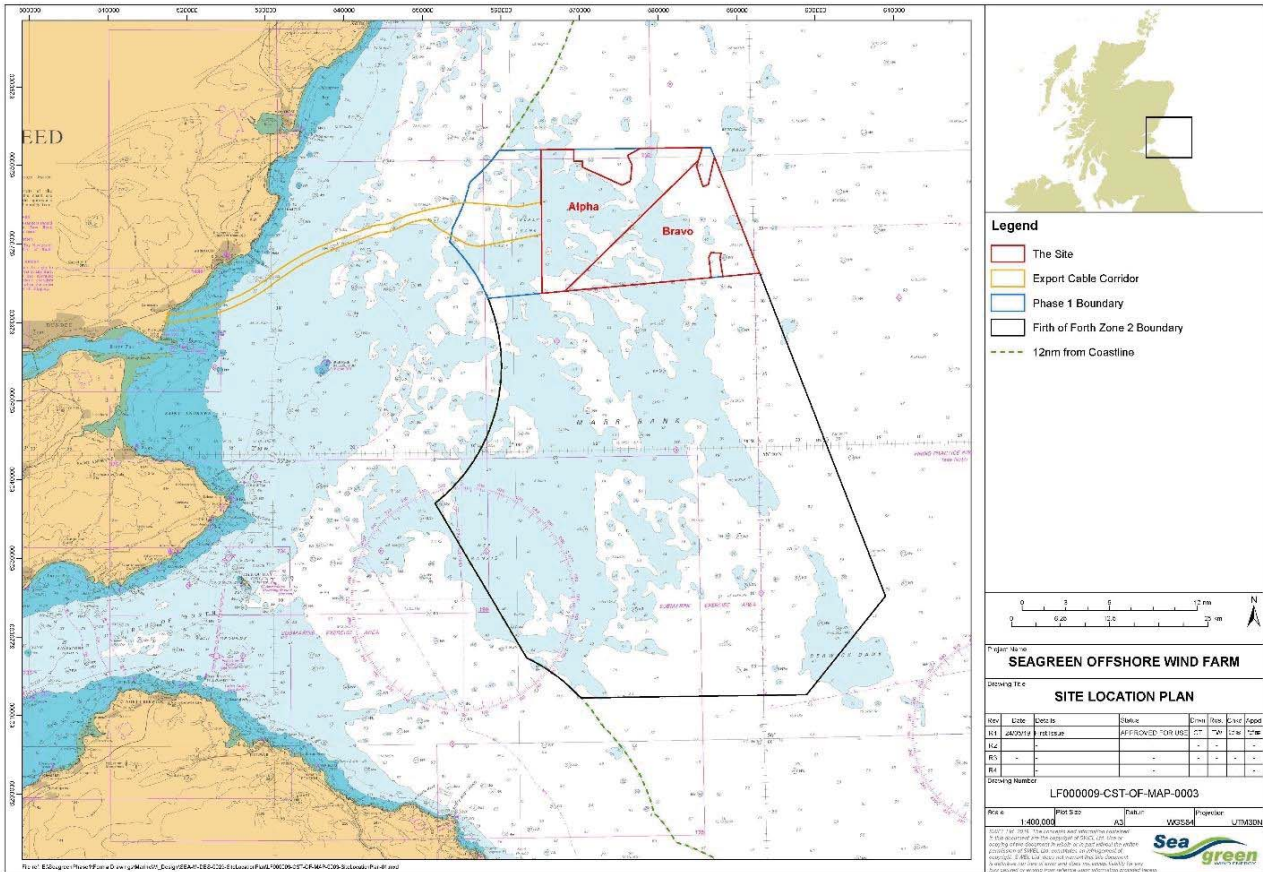


Figure 1.0 - Project Location

1.3 Consent and Licence Requirements

The Seagreen Project benefits from the following consents:

- the S36 Consents;
- the Wind Farm Marine Licences; and
- the OTA Marine Licence.

This PEMP has been prepared to satisfy the criteria of the S36 Consent condition 26 and OTA Marine Licence condition 3.2.1.1 as set out in Table 1.1. The PEMP describes the pre-construction, during construction (if required) and operational monitoring activities for consultation and approval by Scottish Ministers. This PEMP does not address monitoring during the decommissioning phase as this will be subject to a separate assessment at an appropriate time which will inform any requirements for monitoring.

This PEMP has been prepared to discharge consent conditions for Seagreen Alpha and Seagreen Bravo, as well as the discharge of the OWF/OTA Marine Licence conditions simultaneously. It should be noted that this PEMP, revision 1, is intended to provide full details to demonstrate compliance with the relevant S36 Consent conditions and the discharge of the OWF/OTA Marine Licence conditions, in so far as it relates to the pre-construction phase. The PEMP will be revised and updated at intervals as the project progresses to

the construction and operation phases and further information becomes available from the monitoring programmes described.

Table 1.1 - Consent Conditions to be discharged by the PEMP

Consent Condition Reference	Condition Text	Reference to relevant Section of this PEMP
Seagreen Alpha S36 Condition 26/ Seagreen Bravo S36 Condition 26	The Company must, no later than 6 months prior to the Commencement of the Development, submit a Project Environmental Monitoring Programme (PEMP), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, RSPB Scotland, WDC, ASFB and any other ecological advisors or organisations as required at the discretion of the Scottish Ministers.	This document sets out the PEMP for approval by Scottish Ministers
	The PEMP must be in accordance with the Application as it related to environmental monitoring.	See section 8 and Appendix C
	The PEMP must set out measures by which the Company must monitor the environmental impacts of the Development. Monitoring is required throughout the lifespan of the Development where this is deemed necessary by the Scottish Ministers. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.	This PEMP presents the planned monitoring See technical sections 3 to 7
	Monitoring must be done in such a way as to ensure that the data which is collected allows useful and valid comparisons between different phases of the Development.	See technical sections 3 to 7
	Monitoring may also serve the purpose of verifying key predictions in the Application.	See technical sections 3 to 7 and section 8
	In the event that further potential adverse environmental effects are identified, for which no predictions were made in the Application, the Scottish Ministers may require the Company to undertake additional monitoring. The Scottish Ministers may agree that monitoring may be reduced or ceased before the end of the lifespan of the Development.	N/A
	The PEMP must cover, but not be limited to the following matters: a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and post-construction monitoring surveys for: 1. Birds; 2. Sandeels; 3. Marine fish; 4. Diadromous fish;	This PEMP presents the planned monitoring For Birds, including participation in regional or national strategic monitoring see Section 3.

	<p>5. Benthic communities; and</p> <p>6. Seabed scour and local sediment deposition.</p> <p>b. The participation by the Company in surveys to be carried out in relation to marine mammals as set out in the Marine Mammal Monitoring Programme (“MMMP”); and</p> <p>c. The participation by the Company in a National Strategic Bird Monitoring Framework (“NSBMF”) and surveys to be carried out in relation to regional and / or strategic bird monitoring including but not necessarily limited to:</p> <ol style="list-style-type: none"> 1. the avoidance behaviour of breeding seabirds around turbines; 2. flight height distributions of seabirds at wind farm sites; 3. displacement of kittiwake, puffin and other auks from wind farm sites; and 4. effects on survival and productivity at relevant breeding colonies 	<p>For Sandeels, Marine fish and Diadromous fish see section 4.</p> <p>For Benthic communities see section 5.</p> <p>For Seabed scour and local sediment deposition see section 6.</p> <p>For Marine Mammals see section 7.</p>
	<p>All initial methodologies for the above monitoring must be approved, in writing, by the Scottish Ministers and, where appropriate, in consultation with the Forth and Tay Regional Advisory Group (“FTRAG”) referred to in condition 27 of this consent.</p>	<p>Methodologies have been discussed and agreed with Marine Scotland. FTRAG have been consulted on all methodologies.</p> <p>See technical sections 3 to 7</p>
	<p>Any pre-consent surveys carried out by the Company to address any of the above species may be used in part to discharge this condition subject to the written approval by the Scottish Ministers.</p>	<p>See technical sections 3 to 7 and section 8</p>
	<p>The PEMP is a live document and must be regularly reviewed by the Scottish Ministers, at timescales to be determined by the Scottish Ministers, in consultation with the FTRAG to identify the appropriateness of on-going monitoring. Following such reviews, the Scottish Ministers may, in consultation with the FTRAG, require the Company to amend the PEMP and submit such an amended PEMP, in writing, to the Scottish Ministers, for their written approval. Such approval may only be granted following consultation with FTRAG and any other ecological, or such other advisors as may be required at the discretion of the Scottish Ministers. The PEMP, as amended from time to time, must be fully implemented by the Company at all times.</p>	<p>Section 1.6 and Appendix B</p>

	The Company must submit written reports and associated raw data of such monitoring surveys to the Scottish Ministers at timescales to be determined by the Scottish Ministers in consultation with the FTRAG. Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Scottish Ministers, or by such other party appointed at their discretion.	Planned reporting of monitoring outcomes is set out in technical sections 3 to 7
OTA Marine Licence, Condition 3.2.1.1	The Licensee must, no later than 6 months prior to the Commencement of the Works, submit a PEMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation by the Licensing Authority with the Joint Nature Conservation Committee (“JNCC”), Scottish Natural Heritage (“SNH”), the Royal Society for the Protection of Birds Scotland (RSPB Scotland) Whale and Dolphin Conservation (“WDC”), the Association of Salmon Fishery Boards (“ASFB”) and any other ecological advisors as required at the discretion of the Licensing Authority.	This document sets out the PEMP for approval by the Licensing Authority
	The PEMP must be in accordance with the Application as it relates to environmental monitoring.	See section 8 and Appendix C
	The PEMP must set out measures by which the Licensee must monitor the environmental impacts of the Works. Monitoring is required throughout the lifespan of the Works where this is deemed necessary by the Licensing Authority and specifically, monitoring for cable exposure, as specified in condition 3.2.2.10 parts f and g. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.	See technical sections 3 to 7. For cable exposure monitoring see section 6.
	Monitoring should be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Works.	See technical sections 3 to 7 and section 8
	Monitoring may also serve the purpose of verifying key predictions in the Application.	See technical sections 3 to 7 and section 8
	Additional monitoring may be required in the event that further potential adverse environmental effects are identified for which no predictions were made in the Application. The Licensing Authority may agree that monitoring may cease before the end of the lifespan of the Works.	N/A
	The PEMP must cover, but not be limited to the following matters: a. Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for:	This PEMP presents the planned monitoring

	<ol style="list-style-type: none"> 1. Diadromous fish; 2. Benthic communities; 3. Seabed scour and local sediment deposition; and 4. Sandeels (if using Gravity Bases). <p>b. The participation by the Licensee in surveys to be carried out the in relation to marine mammals as set out in the Marine Mammal Monitoring Programme.</p>	<p>For Diadromous fish and Sandeels see section 4.</p> <p>For Benthic communities see section 5.</p> <p>For Seabed scour and local sediment deposition see section 6.</p> <p>For Marine mammals, including participation in surveys as set out in the MMMP see section 7.</p>
	<p>All the initial methodologies for the above monitoring must be approved, in writing, by the Licensing Authority and, where appropriate, in consultation with the Forth and Tay Regional Advisory Group (“FTRAG”), referred to in conditions 3.2.2.18 and 3.2.3.10 of this licence.</p>	<p>Methodologies have been discussed and agreed with Marine Scotland. FTRAG have been consulted on the agreed methodologies.</p> <p>See technical sections 3 to 7</p>
	<p>Any pre-consent surveys carried out by the Licensee to address any of the above species may be used in part to discharge this condition.</p>	<p>See technical sections 3 to 7 and section 8</p>
	<p>The PEMP is a live document and must be regularly reviewed by the Licensing Authority, at timescales to be determined by the Licensing Authority, in consultation with the FTRAG to identify the appropriateness of on-going monitoring. Following such reviews, the Licensing Authority may, in consultation with the FTRAG, require the Licensee to amend the PEMP and submit such an amended PEMP, in writing, to the Licensing Authority for their written approval. Such approval may only be granted following consultation with FTRAG and any other ecological, or such other advisors as may be required at the discretion of the Licensing Authority. The PEMP, as amended from time to time, must be fully implemented by the Licensee at all times.</p>	<p>See section 1.6 and Appendix B</p>

	<p>The Licensee must submit written reports of such monitoring surveys to the Licensing Authority at timescales to be determined by the Licensing Authority in consultation with the FTRAG. Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Licensing Authority, or by such other party appointed at their discretion.</p>	<p>Planned reporting of monitoring outcomes is set out in technical sections 3 to 7</p>
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1.4 Linkages with other consent plans

A number of other consent conditions and consent plans have linkages with this document. These are set out in Table 1.2 with details of the linkages presented and cross referenced as appropriate.

Table 1.2: Linkages with other consent plans and relevant conditions

Reference	Linkage with the PEMP	Cross-reference in this PEMP
Consent Plans		
<p>Seagreen Alpha S36 Condition 11 / Seagreen Bravo S36 Condition 11 / Seagreen OTA Marine Licence, Condition 3.2.2.5</p>	<p>The Piling Strategy (PS) must include:</p> <p>c. Details of any mitigation and monitoring to be employed during pile-driving, as agreed by the Scottish Ministers</p> <p>The PS must, so far as is reasonably practical, be consistent with the EMP, PEMP and the CMS</p>	<p>See section 4 (Marine Fish Monitoring) See section 7 (Marine mammals monitoring)</p>
<p>Seagreen Alpha S36 Condition 14 / Seagreen Bravo S36 Condition 14</p>	<p>The Environmental Management Plan (EMP) must include:</p> <p>a. Mitigation measures to prevent significant adverse impacts to environmental interest, as identified in the ES and pre-consents and pre-construction surveys.</p> <p>The EMP must be informed, so far as is reasonably practical, by the baseline surveys undertaken as part of the Application and the PEMP.</p>	<p>The EMP is informed by baseline environmental surveys</p>
<p>Seagreen OTA Marine Licence, Condition 3.2.1.2</p>	<p>The Environmental Management Plan (EMP) must include:</p> <p>a. Mitigation measures to prevent significant adverse impacts to environmental interests, as identified in the Application and pre-consent and pre-construction surveys and include the relevant parts of the Construction Method Statement (CMS).</p> <p>The EMP must be informed, so far as is reasonably practical, by the baseline surveys undertaken as part of the Application and the PEMP.</p>	<p>The EMP is informed by baseline environmental surveys</p>

Reference	Linkage with the PEMP	Cross-reference in this PEMP
Seagreen Alpha S36 Condition 15 / Seagreen Bravo S36 Condition 15 / Seagreen OTA Marine Licence, Condition 3.2.2.8	The Vessel Management Plan (VMP) must, so far as is reasonably practicable, be consistent with the CMS, the EMP, the PEMP, the NSP, and the LMP.	The VMP will, as far as reasonably practicable, be consistent with the PEMP
Seagreen Alpha S36 Condition 16 / Seagreen Bravo S36 Condition 16 / Seagreen OTA Marine Licence, Condition 3.2.3.2	The Operation and Maintenance Programme (OMP) must, so far as is reasonably practicable, be consistent with the EMP, the PEMP, the VMP, the NSP, the CaP, and the LMP.	The OMP will, as far as reasonably practicable, be consistent with the PEMP
Seagreen OTA Marine Licence, Condition 3.2.2.10	The Cable Plan (CaP) must include: g. Measures to address exposure of any cables.	See section 6 (Scour and local sediment deposition monitoring)
Other Relevant Conditions		
Seagreen Alpha S36 Condition 27 / Seagreen Bravo S36 Condition 27	The Company must participate in any Forth and Tay Regional Advisory Group (“FTRAG”) established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish. Should a Scottish Strategic Marine Environment Group (“SSMEG”) be established (refer to condition 28), the responsibilities and obligations being delivered by the FTRAG will be subsumed by the SSMEG at a timescale to be determined by the Scottish Ministers.	See sections 3 to 7 (All technical sections)
Seagreen OTA Marine Licence, Condition 3.2.2.18, 3.2.3.10	The Licensee must participate in any FTRAG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish. Should a Scottish Strategic Marine Environment Group (“SSMEG”) be established (refer to condition 5.2.2.19 and 5.2.3.11), the responsibilities and obligations being delivered by the FTRAG will be subsumed by the SSMEG at a timescale to be determined by the Licensing Authority	See sections 3 to 7 (All technical sections)

Reference	Linkage with the PEMP	Cross-reference in this PEMP
Seagreen Alpha S36 Condition 28 / Seagreen Bravo S36 Condition 28 / Seagreen OTA Marine Licence, Condition 3.2.2.19, 3.2.3.11	The Company must participate in any Scottish Strategic Marine Environment Group (“SSMEG”) established by the Scottish Ministers for the purposes of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish.	SSMEG has not been established
Seagreen Alpha S36 Condition 29 / Seagreen Bravo S36 Condition 29 / Seagreen OTA Marine Licence, Condition 3.2.2.12	The Ecological Clerk of Works (ECoW) responsibilities include: b. provide advice to the Company on compliance with consent conditions, including the conditions relating to the CMS, the EMP, the PEMP, the OPS (if required), the CaP and the VMP. c. Monitor compliance with the CMS, the EMP, the PEMP, the PS (if required), the CaP and the VMP;	Consent plan overview and EMP
Seagreen Alpha S36 Condition 30 / Seagreen Bravo S36 Condition 30 / Seagreen OTA Marine Licence, Condition 3.2.1.3	The Company must, to the satisfaction of the Scottish Ministers, participate in the monitoring requirements as laid out in the ‘National Research and Monitoring Strategy for Diadromous Fish’ so far as they apply at a local level. The extent and nature of the Company’s participation is to be agreed by the Scottish Ministers in consultation with the FTRAG.	See section 4 (Diadromous fish monitoring)

1.5 Construction Management

Design embedded measures and adherence to good practice and guidance will be implemented throughout construction of the Seagreen Project. The implementation of such measures will be managed by the Contractor Environmental Advisors (CEAs), appointed by each key contractor throughout the duration of the construction period. The relevant CEA will provide progress reports to the Seagreen Ecological Clerk of Works (ECoW).

The ECoW will review and approve consent plans and will oversee and monitor compliance with consent conditions. The ECoW will be an independent party and will provide regular reporting on compliance monitoring, good practice and mitigation measures, both to Seagreen and to MS-LOT throughout pre-construction and construction phases of the Seagreen Project.

Full details of the construction management procedures, including environmental compliance, monitoring and reporting and roles and responsibilities are provided in the Offshore Construction Environmental Management Plan (Offshore CEMP).

1.6 Updates and Amendments

Updates to the PEMP might be required, for example, due to changes to the proposed construction methodology (that require additional management or mitigation measures, or changes to measures already proposed), new environmental sensitivities identified by monitoring prior to construction, or following construction, emerging guidance, or new legislative requirements. Updates may also be required following review by MS-LOT, in consultation with FTRAG.

The change management process for any updates required to the PEMP, including resubmission of consent plans for approval, is outlined in Appendix B.

2. Scope and Objectives of the PEMP

The overall objective of this PEMP is to collate and describe the approaches to environmental monitoring, to satisfy the requirements of the S36 and Marine Licence consent conditions. This PEMP generally cross references the detailed monitoring plans prepared by Seagreen and agreed with Scottish Ministers and stakeholders' post-consent, and their subsequent outputs when available, for each required topic or receptor.

This PEMP therefore provides an overall description of the environmental monitoring programme to be undertaken by Seagreen. Further details regarding specific topics or receptors can be obtained through reference to the relevant Seagreen documents that are identified in the PEMP.

All Seagreen personnel and Seagreen's Contractors (including their Sub-Contractors) involved in the Seagreen Project are required to comply, as a minimum, with the PEMP, where appropriate.

2.1 Structure of this document

The remainder of this document presents the information required to fulfil the criteria set out in the conditions of the S36 Consents and Marine Licences, as detailed in Section 1.2. The PEMP has been structured accordingly as follows;

- Section 3 - Provides a summary description of the agreed ornithology monitoring strategy and references to the detailed description of this;
 - Section 4 - Provides a summary description of the monitoring strategy for fish and references to detailed description of the justification where it has been agreed that no monitoring is required;
 - Section 5 - Provides a summary description of the monitoring strategy for benthic communities and references to the detailed description of this;
 - Section 6 - Provides a summary description of the monitoring strategy for seabed scour and local sediment deposition and references to the detailed description of the justification where it has been agreed that no monitoring is required;
 - Section 7 - Provides a summary description of the agreed marine mammals monitoring strategy and references to the detailed description of this; and
 - Section 8 - Demonstrates compliance with the original application, the 2012 Offshore Environmental Statement (ES) and Addendum and commitments made, with reference to Appendix C.

3. Ornithology monitoring

3.1 Introduction

The Ornithology Monitoring Strategy (OMS), report LF000009-CST-OF-REP-0016 (Seagreen, 2019a) sets out the proposed monitoring which will be carried out for seabirds for the Seagreen Alpha and Seagreen Bravo wind farm sites. This is based on the FTRAG Ornithology (FTRAG-O) sub-group’s determination of bird monitoring priorities for the Forth and Tay offshore wind farms (FTRAG-O, 2016), and the ES and Addendum (Seagreen, 2012; Seagreen 2013).

3.2 Consent Requirements

Consent conditions relevant to seabird monitoring are summarised in Table 3.1.

Table 3.1: Consent Conditions relevant to monitoring seabirds.

Condition Reference	Condition	Status
<i>Seagreen Alpha and Seagreen Bravo Section 36 Condition 26</i>	<p>The PEMP must cover, but not be limited to:</p> <p>a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and post-construction monitoring surveys for</p> <p>1. <i>birds</i></p>	<p>The OMS (LF000009-CST-OF-REP-0016) describes the planned ornithology monitoring by Seagreen. This was issued to FTRAG-O and discussed at a meeting on 2nd July 2019.</p> <p>See section 3.5</p>
<i>Seagreen Alpha and Seagreen Bravo Section 36 Condition 26</i>	<p>The PEMP must cover, but not be limited to the following matters:</p> <p>c. The participation by the Company in a National Strategic Bird Monitoring Framework (“NSBMF”) and surveys to be carried out in relation to regional and / or strategic bird monitoring including but not necessarily limited to:</p> <p>1. <i>the avoidance behaviour of breeding seabirds around turbines;</i> 2. <i>flight height distributions of seabirds at wind farm sites;</i> 3. <i>displacement of kittiwake, puffin and other auks from wind farm sites; and</i> 4. <i>effects on survival and productivity at relevant breeding colonies</i></p>	<p>The NSBMF has been superseded by the Scottish Marine Energy Research (ScotMER) Programme which includes an ornithology specialist research group. Currently the ScotMER Ornithology Evidence Map identifies potential research gaps. Seagreen will investigate with MS, SNH and RSPB potential opportunities to support the ScotMER programme through delivery of studies under the OMS, to further understanding of the interaction of priority seabirds with offshore wind farms.</p>

Condition Reference	Condition	Status
<i>Seagreen Alpha and Seagreen Bravo Section 36 Condition 27</i>	The Company must participate in any Forth and Tay Regional Advisory Group (“FTRAG”) established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology,	The Company is a member of FTRAG and is in the process of finalising the scope of work for the monitoring strategy for birds which will be presented for approval to the next FTRAG-O meeting (on 2 nd July 2019).
<i>Seagreen Alpha and Seagreen Bravo Section 36 Condition 28</i>	The Company must participate in any Scottish Strategic Marine Environment Group (“SSMEG”) established by the Scottish Ministers for the purposes of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology,	SSMEG has not been established.

3.3 Consultation

Stakeholder engagement has been carried out with MS, SNH and RSPB, and between the Forth of Tay offshore wind farm developers, all within the framework agreed by FTRAG-Ornithology subgroup in 2016 (see Section 6.5).

These initial discussions have focussed to date on developing a shared approach to pre-construction surveys over the April 2019 to March 2020 monitoring period. An outcome of these discussions has been a joint note (dated 28th February 2019) to combine aerial surveys over all three sites, to provide consistent data collection and sampling. The responses from SNH, MS and RSPB following circulation of the 28th February briefing note were supportive of the coordination attempts (SNH 14th March, MS 13th March and RSPB 6th March, respectively). The Forth and Tay developers have therefore continued to liaise over monitoring, to ensure, as far as is practical, that aerial survey coverage is coordinated.

The OMS takes account of these informal discussions and was be formally presented at the FTRAG Ornithology subgroup meeting on 2nd July 2019.

3.4 Aims and Objectives

The aims and objectives of pre-construction, and post-construction ornithology monitoring surveys are focused on the operational period and on key species, as previously discussed and agreed through the FTRAG Ornithology subgroup (FTRAG-O, 2016), to:

- Determine the extent of displacement or barrier effects around the WTGs for kittiwake, puffin and razorbill;
- Determine flight heights, avoidance behaviour and collision risk to gannet and kittiwake;

- Monitor seabird colonies (number of birds, and productivity) to assess if there are detectable changes in productivity or population attributable to effects of Seagreen Phase 1 from displacement, barrier effects or collision: and
- Compile an up-to-date pre-construction baseline against which post construction monitoring can be compared, to test the predictions within the Environmental Statement, and to identify any detectable changes.

Construction monitoring may be considered, but this is dependent on construction phasing, the detail of which is not finalised at this time.

3.5 Proposed Monitoring Strategy

The ornithology subgroup of FTRAG (FTRAG-O) was established to agree appropriate bird monitoring for the Firth of Forth and Tay OWFs. Through a series of meetings following the grant of consent in 2014, agreement was reached on key species, SPAs and potential impacts that needed to be the focus for monitoring programmes (FTRAG-O, 2016). The relative importance of each SPA for each OWF was agreed between stakeholders, as were the potential effects that would need to be monitored (collision, displacement, barrier effects and resulting population effects). The FTRAG-O output gives clear guidance on the monitoring objectives appropriate to each Forth and Tay OWF, for the bird monitoring Conditions to be met. The Seagreen OMS (LF000009--CST-OF-REP-0016) has applied these priorities to the Seagreen Alpha and Seagreen Bravo wind farm projects.

The OMS is divided into pre-construction and operational monitoring phases, although consideration will be given to targeted monitoring during construction, if required by MS and SNH.

3.5.1 Pre-construction monitoring

Pre-construction monitoring will firstly comprise monthly digital aerial surveys, as agreed with consultees, to obtain baseline data from which to test for displacement and barrier effects once the OWFs are operational. Following discussions with other parties (see Section 6.3), monthly aerial surveys are taking place across all three Forth and Tay sites. Surveys of Seagreen Alpha and Seagreen Bravo started in March 2019 and will continue monthly to March 2020.

The second component of pre-construction monitoring will be colony-based monitoring at Fowlsheugh and St. Abb's Head from April to August 2020. This is to provide baseline data to test for population effects from displacement, barrier effects and collision. Parameters to be monitored include nesting, hatching, provisioning, and fledging rates and will involve field observation by a surveyor on site monitoring activity over the breeding season, with a focus on kittiwake but also including razorbill, herring gull and puffin.

Seabird tagging will be an accompanying aspect undertaken at St Abb's and Fowlsheugh, to produce insights into foraging distribution of key species (focussing on kittiwake). The work at both locations is subject to final arrangements with RSPB and National Trust for Scotland and may potentially involve collation and synthesis of pre-existing long-term seabird datasets at these sites so that resulting time series can be used as a baseline against which to assess changes identified during operational monitoring.

To further facilitate monitoring at Fowlsheugh and given the RSPB site manager’s work in this field already, support will potentially be provided to RSPB in development of drone applications for seabird counts.

3.5.2 Construction monitoring

Monthly aerial surveys during construction may be considered based on the construction programme, if required, for a key period (notably chick rearing, over May to July).

3.5.3 Post-construction monitoring

The scope and methods for post-construction monitoring will be considered in liaison with MS, SNH, RSPB and FTRAG-O prior to the operational phase. It is proposed to continue monthly aerial surveys once Seagreen Phase 1 is operational, for two years for the March to October period (the key periods identified by FTRAG-O). To monitor collision risk, the method will be confirmed prior to operational phase, depending on available technology at the time. The objective, however, will be to investigate flight activity to inform collision risk, by collecting evidence on macro, meso and micro avoidance.

3.6 Reporting

Following completion of the pre-construction survey, a Pre-construction Ornithology Report will be produced and submitted to MS-LOT.

The reporting approach for the operational phase will be determined in liaison with MS, SNH, RSPB and FTRAG-O at the time.

3.7 Programme

Details of the bird monitoring survey programme are summarised in Table 5.3 3.2.

Table 3.2: Programme of Monitoring for Birds

Development Stage	Monitoring	Type of Data
Pre-construction	Distribution. Foraging	Aerial surveys. Tracking
Construction (tbc)	Distribution (tbc). Foraging (tbc)	Aerial surveys (tbc). Tracking (tbc)
Post-construction	Distribution. Collision risk	Aerial surveys. Tracking

4. Sandeels, Marine Fish and Diadromous Fish Monitoring

4.1 Introduction

The monitoring approach for sandeels, marine fish, and diadromous fish is set out in report LF000009-CST-OF-REP-0025, Seagreen Fish Monitoring Plan (Seagreen, 2019b). This report considers the key species identified within the ES (Seagreen, 2012), namely herring, sandeels and Atlantic salmon. It has been informed by a comprehensive review of monitoring requirements, undertaken by RPS on behalf of Seagreen, as well as feedback received from consultees as summarised in Section 4.3 Table 4.2. Full details of the monitoring plan are presented in report LF000009-CST-OF-REP-0025, with the following sections summarising the consent requirements, consultation carried out to date, monitoring strategy, reporting and programme.

4.2 Consent Requirements

Consent conditions relevant to monitoring sandeels, marine fish and diadromous fish are summarised in Table 4.1, together with an overview of status of each requirement.

Table 4.1: Consent conditions relevant to monitoring Sandeels, Marine fish and Diadromous fish.

Condition Reference	Condition	Status
Seagreen Alpha S36 Condition 26/ Seagreen Bravo S36 Condition 26	The PEMP must cover, but not be limited to: a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and postconstruction monitoring surveys for 1.... 2. sandeels 3. marine fish 4. diadromous fish.	The monitoring plan for sandeels, marine fish, and diadromous fish has been agreed with MS-LOT, MSS, SNH and with FTRAG (see Table 4.2) See Section 4.4.1 for marine fish See Section 4.4.2 for sandeels See Section 4.4.3 for diadromous fish
Seagreen Alpha S36 Condition 30/ Seagreen Bravo S36 Condition 30	Seagreen must: ...to the satisfaction of the Scottish Ministers, participate in the monitoring requirements as laid out in the 'National Research and Monitoring Strategy for Diadromous Fish' so far as they apply at a local level. The extent and nature of the Company's participation is to be agreed by the Scottish Ministers in consultation with the FTRAG.	The NRMSDF has been superseded by the Scottish Marine Energy Research (ScotMER) Programme which includes a specialist research group in relation to diadromous fish. The ScotMER Diadromous fish Evidence Map was published on 5 th June 2019. Seagreen will investigate with Marine Scotland the potential for participation in relevant strategic studies to contribute to the ScotMER programme.

Condition Reference	Condition	Status
Seagreen OTA Marine Licence, Condition 3.2.1.1	The PEMP must cover but not be limited to: <i>a) Pre-construction, construction (if considered appropriate by the Scottish Ministers) and postconstruction monitoring surveys as relevant in terms of the Application and any subsequent surveys</i> for: <i>1. diadromous fish</i> <i>4. sandeels (if using Gravity Bases).</i>	The monitoring plan for sandeels, marine fish, and diadromous fish has been agreed with MS-LOT, MSS, SNH and with FTRAG (see Table 4.2) See Section 4.4.1 for marine fish See Section 4.4.2 for sandeels See Section 4.4.3 for diadromous fish

4.3 Consultation

A summary of the consultation carried out in relation to the development of the monitoring strategy for sandeels, marine fish and diadromous fish, including key stakeholder engagement meetings, is presented in Table 4.2.

Table 4.2: Summary of consultation.

Date	Stakeholder	Summary of discussion	Reference
21/03/2019	MS-LOT, MSS	Marine and Migratory Fish monitoring strategy post-consent consultation meeting and presentation on approach to marine fish monitoring. Strategy agreed by MSS.	Seagreen Marine and Migratory Fish Monitoring Strategy LF000009-CST-OF-REP-0019
21/03/2019	SNH	Email from SNH confirming that the overall approach to monitoring of marine fish, sandeels and migratory fish is appropriate, and they are content with what is proposed. SNH agree that contributing to the ScotMer Evidence Map priorities for migratory species will be important.	Email from SNH to Seagreen received 21 st March 2019
27/03/2019	FTRAG, MSS	Issue of the Marine and Migratory Fish Monitoring Strategy report.	Seagreen Marine and Migratory Fish Monitoring Strategy LF000009-CST-OF-REP-0019

Date	Stakeholder	Summary of discussion	Reference
15/04/2019	FTRAG, MSS	Acceptance of the strategy by FTRAG and MSS via e-mail 15 th April 2019	Seagreen Marine and Migratory Fish Monitoring Strategy LF000009-CST-OF-REP-0019
24/06/2019	FTRAG	Discussion and agreement of marine and migratory fish monitoring plan at FTRAG meeting on 24 th June 2019.	Meeting minute LF000009-CST-OF-MOM-0020

4.4 Proposed Monitoring Strategy

4.4.1 Marine fish

Due to the available evidence and the current good understanding within the offshore wind industry of potential impacts in relation to marine fish, generic pre- and post-construction monitoring is not proposed for the Seagreen Project. There is a high degree of confidence that potential impacts from underwater noise on marine fish will not be significant. Full justification for this approach is detailed in Section 3.4.1 of the marine fish monitoring plan (LF000009-CST-OF-REP-0025) and this has been agreed by Marine Scotland, SNH and FTRAG as noted within Table 4.2.

Instead, Seagreen intends to draw on the data collected as part of the marine mammal monitoring plan (Section 7), which will include underwater noise monitoring through extension of the East Coast Marine Mammal Acoustic Study (ECOMMAS) acoustic arrays to provide site specific data. The data collected will provide insights into the actual noise produced during the installation of foundations and will be compared with predicted noise levels from the 2012 Offshore ES and updated baseline data gathered post consent and noise modelling studies for herring and salmon.

4.4.2 Sandeels

The ES (Seagreen, 2012) concluded no significant impacts on sandeel populations, with a high degree of confidence in this assessment. Combined with the available evidence and the current good understanding within the offshore wind industry of the limited potential impacts and the potential for sandeel populations to recover, generic pre- and post-construction monitoring for sandeels is not proposed for the Seagreen Project. Full justification for this approach is detailed in Section 3.4.2 of the marine fish monitoring strategy document (LF000009-CST-OF-REP-0025) and this has been agreed by Marine Scotland, SNH and FTRAG as noted within Table 4.2.

It should also be noted that the gravity base foundation option is no longer being considered for the project final design. This was considered to be the worst case for impacts on sandeels within the ES. Therefore, issues regarding potential habitat loss in this context are significantly reduced and no longer relevant in respect of monitoring requirements.

4.4.3 Diadromous fish

The 2012 Offshore ES concluded no significant impacts on migratory fish populations, including Atlantic salmon populations, with a high degree of confidence. In combination with the available evidence and the improved understanding within the offshore wind industry, generic pre- and post-construction monitoring for migratory fish is not proposed for the Seagreen Project. Full justification for this approach is detailed in Section 3.4.3 of the marine fish monitoring strategy document (LF000009-CST-OF-REP-0025) and this has been agreed by Marine Scotland, SNH and FTRAG as noted within Table 4.2.

The NRMSDF cited under Condition 30 of the Section 36 consents has been superseded by the ScotMER programme which includes a specialist research group in relation to diadromous fish. The ScotMER Diadromous fish Evidence Map was published by Marine Scotland on 5th June 2019¹. The available evidence does indicate the possible presence of migrating Atlantic salmon smolts or returning adults within the site, Seagreen will therefore investigate with Marine Scotland the potential for participation in relevant strategic studies to contribute to the ScotMER programme, with the aim of furthering understanding of the ecology and behaviour of Atlantic salmon and other migratory species, (e.g. sea trout, lamprey species) in relation to offshore wind farm construction and operation.

4.5 Reporting

4.5.1 Marine fish

The results of any comparison between predicted and observed construction noise levels will be reported to MS-LOT following construction.

4.5.2 Sandeels

No monitoring is proposed.

4.5.3 Diadromous fish

No monitoring is proposed. Any reporting requirements for diadromous fish will be confirmed following confirmation of any agreed Seagreen participation in relevant strategic studies through the ScotMER programme.

4.6 Programme

4.6.1 Marine fish

The monitoring programme for marine fish is summarised in Table 4.3.

¹ <https://www2.gov.scot/Topics/marine/marineenergy/mre/research/diadromous/EvMap>

Table 4.3: Programme – Marine Fish.

Phase	Monitoring	Type of Data
Pre-construction	None Required	n/a
Construction	Underwater noise monitoring (ECOMMAS extension)	Noise measurements recorded during construction
Post-construction	None Required	n/a

4.6.2 Sandeels

No monitoring is proposed.

4.6.3 Migratory fish

No specific monitoring is proposed. Potential Seagreen participation in relevant strategic studies is to be confirmed through investigation with Marine Scotland (see LF000009-CST-OF-REP-0025 Seagreen Fish Monitoring Plan).

5. Benthic Communities Monitoring

5.1 Introduction

The monitoring approach for benthic communities is set out in report LF000009-CST-OF-REP-0026, Seagreen Benthic Monitoring Plan (Seagreen, 2019c). Seagreen has committed to a benthic monitoring strategy which has been designed to specifically target potential impacts to key benthic habitats which were identified in the ES as having the highest sensitivity to construction impacts and which have the potential to be present within the Seagreen Alpha and Seagreen Bravo OWFs and OTA prior to construction (i.e. Annex 1 biogenic and geogenic reef habitats). Full details of the monitoring plan are presented in report LF000009-CST-OF-REP-0025, with the following sections summarising the consent requirements, consultation, aims and objectives, methodology, reporting and programme.

5.2 Consent Requirements

Consent conditions relevant to benthic monitoring are summarised in

Table 5.1 below, together with an overview of status of each requirement.

Table 5.1: Consent conditions relevant to monitoring Benthic Communities.

Condition Reference	Condition	Status
Seagreen Alpha S36 Condition 26/ Seagreen Bravo S36 Condition 26	The PEMP must cover, but not be limited to: <i>a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and post construction monitoring surveys for</i> <i>5. benthic communities</i>	The benthic monitoring plan has been agreed with MS-LOT, MSS, SNH and with FTRAG (see Table 5.2). Seagreen have appointed a contactor to undertake a review of the existing geophysical survey data to ascertain whether ground truthing for reef habitat is required.
Seagreen OTA Marine Licence, Part 3 Condition 3.2.1.1	The PEMP must cover but not be limited to: <i>a) Pre-construction, construction (if considered appropriate by the Scottish Ministers) and postconstruction monitoring surveys as relevant in terms of the Application and any subsequent surveys</i> <i>for:</i> <i>1. benthic communities</i>	The benthic monitoring plan has been agreed with MS-LOT, MSS, SNH and with FTRAG (see Table 5.2). Seagreen have appointed a contactor to undertake a review of the existing geophysical survey data to ascertain whether ground truthing for reef habitat is required.

5.3 Consultation

The benthic monitoring strategy has been informed by a comprehensive review of monitoring requirements across the Seagreen Project which was undertaken by RPS, on behalf of Seagreen.

The approach to benthic monitoring was presented to and discussed with MS-LOT, MSS and SNH and agreed in subsequent meetings and correspondence. A summary of the consultation carried out in relation to the development of the monitoring strategy for benthic communities, including key stakeholder engagement meetings, is presented in

Table 5.2.

Table 5.2: Summary of consultation.

Date	Stakeholder	Summary of discussion	Reference
22/02/2019	MS-LOT, SNH	Seagreen Benthic Monitoring Strategy document issued to stakeholders via email for review.	Seagreen Benthic Monitoring Strategy: LF000009-CST-OF-REP 0017
01/03/2019	SNH	Email from SNH confirming that the overall approach to benthic monitoring is appropriate and that there is no requirement for generic pre and post-construction monitoring and requesting confirmation that Modiolus reefs will also be considered.	Email from SNH to Seagreen received 1 st March 2019
05/03/2019	MSS, MS-LOT	Meeting (teleconference) to present and discuss the proposed benthic monitoring strategy.	Note of meeting in email from Seagreen to MS-LOT/MSS issued 5 th March 2019
18/03/2019	MSS	Email from MSS confirming that they are content with the benthic monitoring strategy on the basis that Modiolus beds are specifically added to the strategy.	Email from MSS to Seagreen received 18 th March 2019
18/03/2019	FTRAG	Seagreen Benthic Monitoring Strategy document issued to members of the FTRAG via email for review.	Seagreen Benthic Monitoring Strategy: LF000009-CST-OF-REP 0017
01/04/2019	MSS	Survey reports from the EIA benthic characterisation surveys issued to MSS, following request from MSS.	Email from Seagreen to MSS received 1 st April 2019
17/04/2019	MSS	MSS advice regarding the benthic monitoring strategy.	Letter received 17 th April 2019
06/05/2019	MSS	Seagreen response to MSS advice on benthic monitoring strategy.	Seagreen letter to MSS LF000009-CST-OFF-LET-0030
21/05/2019	MSS	Email from MSS confirming that they are content with the benthic monitoring strategy on the basis that the locations of drop-down video ground truthing locations and the final pre-construction survey report are provided to MS-LOT/MSS.	Email from MS-LOT to Seagreen received 21 st May 2019

Date	Stakeholder	Summary of discussion	Reference
24/06/2019	FTRAG	Discussion and agreement of benthic monitoring plan at FTRAG meeting on 24 th June 2019.	Meeting minute LF000009-CST-OF-MOM-0020

5.4 Aims and Objectives

The aims and objectives of the benthic monitoring surveys are to:

- Identify and delineate any Annex 1 biogenic (*Sabellaria* or *Modiolus*) or geogenic reefs present within the Seagreen Alpha and Seagreen Bravo OWF sites and OTA export cable corridor in order to ensure that direct impacts to reef habitats, if present, are avoided wherever reasonably practicable during construction; and
- Establish whether the location, nature and/or extent of reef features, if identified as present during the pre-construction surveys, changes following construction.

5.5 Monitoring Strategy

The ES concluded no significant impacts on benthic communities. Combined with available evidence and the current detailed understanding within the offshore wind industry of the limited potential impacts, generic pre- and post-construction monitoring is not being undertaken for the Seagreen Project. Full justification for this approach is detailed in Section 3.4.2 of the Seagreen Benthic Monitoring Plan (LF000009-CST-OF-REP-0026).

The strategy for benthic monitoring within the Seagreen Alpha and Seagreen Bravo OWF sites and along the OTA has, instead, been designed to specifically target impacts to key potentially sensitive benthic habitats which were identified in the ES. Justification for this is detailed in Section 3.4.1 of the Seagreen Benthic Monitoring Plan (LF000009-CST-OF-REP-0026). The following sections set out the targeted monitoring strategy for the pre-construction and post-construction phases.

5.5.1 Pre-construction monitoring

A data review will be undertaken to determine whether a pre-construction Annex 1 reef survey is required. In the first instance, the geophysical survey outputs for the Seagreen Alpha and Seagreen Bravo OWF sites and the OTA export cable corridor will be reviewed and interpreted by a suitably qualified and experienced marine ecologist / geophysicist, to identify any areas of potential reef features.

In the event that acoustic signatures synonymous with potential reef presence are identified from the geophysical data, these would be subject to further ground-truthing, via a pre-construction Annex I reef survey.

The pre-construction Annex I reef survey, if required, would utilise remote sampling techniques (e.g. drop-down video), to establish the presence or absence of any reef features, and where present to determine their extent.

5.5.2 Construction monitoring

It has been confirmed and agreed that there is no requirement for benthic monitoring during construction.

5.5.3 Post-construction monitoring

Seagreen will undertake a single post-construction Annex 1 reef survey in the event that both of the following criteria are met:

- Annex 1 reef habitats are recorded within the Seagreen Alpha and Seagreen Bravo OWFs and/or along the OTA corridor during the pre-construction survey; and
- If construction activity has occurred within any of the areas confirmed as reef habitat.

The methodology for any post-construction survey would be as described for the pre-construction survey.

5.6 Reporting

Seagreen will submit to, and discuss with, MS-LOT the results of the initial review of geophysical data and the location of any targets identified as requiring further investigation, via drop down video.

Following completion of the pre-construction survey, a Pre-construction Annex I Reef Survey Report will be produced and submitted to MS-LOT.

Seagreen will aim to issue all reports to MS-LOT within three months of survey completion.

5.7 Programme

Details of the benthic monitoring survey programme are summarised in Table 5.3.

Table 5.3: Programme – Benthic Communities.

Phase	Monitoring	Type of Data
Pre-construction	In the event that an Annex 1 reef seabed imagery survey is required, this survey will be undertaken no more than two years before the commencement of the offshore construction activities.	Geophysical survey outputs and DDV video sampling
Construction	None required.	n/a
Post-construction	The monitoring plan has been agreed and post construction monitoring will be undertaken, if required, as outlined in section 5.5.3. The programme for any post construction monitoring will be agreed with MS-LOT.	Geophysical survey outputs and DDV video sampling

6. Scour and Local Sediment Deposition Monitoring

6.1 Introduction

Two main principles underpin the strategy for the monitoring of scour, that is proposed to fulfil licence conditions. The first is that scour is primarily an engineering issue and the second is that scour is an issue where an adaptive monitoring approach is appropriate where there will necessarily be cross-over between outcomes from engineering required monitoring and any environmental monitoring required by licence conditions.

Initial development of a scour and local sediment deposition monitoring strategy for inclusion within the PEMP has included a thorough review of the baseline environment relevant to this subject (drawing on datasets and analysis available from project development to date), relevant industry guidance and monitoring commitments. In addition, careful consideration has been given to the availability of existing data of relevance to scour and sediment deposition and existing baseline data. On this basis no preconstruction monitoring is considered necessary.

Given the important linkages between the engineering aspects of the development and scour monitoring, a scour monitoring strategy for the construction and post construction phases will be developed in the context of the PEMP requirements at the point when the detailed engineering design of the project is completed, including design of any measures in relation to the potential for scour around installed structures. The strategy will be provided for consultation once the relevant engineering details are confirmed. At this stage, the following sections summarise the consent requirements, consultation undertaken to date, aims and objectives, methodology, reporting and programme.

6.2 Consent Requirements

Consent conditions relevant to monitoring seabed morphology and scour are summarised in Table 6.1.

Table 6.1: Consent conditions relevant to monitoring Scour and Sediment Deposition.

Condition Reference	Condition	Status
<p><i>Seagreen Alpha S36 Condition 26/ Seagreen Bravo S36 Condition 26</i></p>	<p>The PEMP must cover, but not be limited to:</p> <p><i>a. Pre-construction, construction (if considered appropriate by the Scottish Ministers) and postconstruction monitoring surveys for</i></p> <p>....</p> <p><i>6. Seabed scour and local sediment deposition.</i></p> <p>Condition 26 also notes that:</p> <p><i>Any pre-consent surveys carried out by the Company to address any of the above species may be used in part to discharge this condition subject to the written approval by the Scottish Ministers.</i></p> <p>And:</p> <p><i>The PEMP must be in accordance with the Application as it related to environmental monitoring</i></p>	<p>The proposed approach to monitoring for scour was discussed and agreed with FTRAG on 24th June 2019. (LF000009-CST-OF-MOM-0020)</p>

Condition Reference	Condition	Status
<p><i>Seagreen OTA Marine Licence, Condition 3.2.1.1</i></p>	<p>The PEMP must cover but not be limited to: <i>Pre-construction, construction (if considered appropriate by the Licensing Authority) and post-construction monitoring surveys as relevant in terms of the Application and any subsequent surveys for</i></p> <p><i>3. Seabed Scour and Local Sediment Deposition</i></p> <p><i>Monitoring should be done in such a way as to ensure that the data which is collected allows useful and valid comparisons as between different phases of the Works. Monitoring may also serve the purpose of verifying key predictions in the Application; and</i></p> <p><i>Any pre-consent surveys carried out by the Licensee to address any of the above species may be used in part to discharge this condition.</i></p> <p><i>Monitoring is required throughout the lifespan of the Works where this is deemed necessary by the Licensing Authority and specifically, monitoring for cable exposure as specified in condition 3.2.2.10 parts f and g.</i></p>	<p>The proposed approach to monitoring for scour was discussed and agreed with FTRAG on 24th June 2019. (LF000009-CST-OF-MOM-0020)</p>

6.3 Proposed Monitoring Strategy – Development of Scour

6.3.1 Pre-construction

Several pre-existing bathymetric data sets across the Seagreen Alpha and Seagreen Bravo OWF sites are available, including the GEMS (2010) geophysical survey, the MMT (2018) geophysical survey and sediment particle size data from a 2011 benthic survey.

Given the availability of bathymetric data across the site, and particularly the recent 2018 survey, there is considered to be a thorough and robust pre-construction baseline available with respect to scour monitoring and no further pre-construction surveys are proposed.

6.3.2 Construction

No survey or monitoring is required. Scour will take a period of time to develop following foundation installation, as such no during construction monitoring is required and this process is more appropriately monitored during the post construction phase.

6.3.3 Post-construction

A post installation survey strategy will be developed that is aligned with the engineering requirements of the project. A post installation survey undertaken as part of engineering requirements will be evaluated from a scour perspective. This assessment will be used to understand the magnitude and extent of scour and the requirements for and timing of any future monitoring.

6.4 Proposed Monitoring Strategy – Local Sediment Deposition

Based on a review of available information characterising the site, alongside the assessment of potential impacts presented in the ES and industry practice completed as part of developing this approach, no monitoring of local sediment deposition is proposed to be undertaken, over and above any monitoring associated with scour itself required for engineering purposes.

It is also highlighted that the gravity base foundation option is no longer being considered for the project final design, which was considered to be the worst case for sediment disturbance within the ES (Seagreen, 2012). The foundations for the project will now comprise either jackets with driven pin piles or jackets with suction piles.

6.5 Proposed Monitoring Strategy – OTA Monitoring to assess cable exposure

6.5.1 Pre-construction

Several pre-existing bathymetric data sets across the Seagreen Alpha and Seagreen Bravo OTA are available, including the Osiris (2011) bathymetry survey and 2006 UKHO data². Based on this data coverage, which will provide the pre-construction baseline for monitoring cable exposure post-construction, further pre-construction surveys along the OTA route are not proposed.

6.5.2 Construction

No survey or monitoring is required. The effects of local sediment deposition in relation to installed cables and other OTA Infrastructure will take a period of time to develop following construction. As such no during construction monitoring is required and this process is more appropriately monitored during the post construction phase.

6.5.3 Post construction

A post installation survey strategy will be developed in parallel to the development of the engineering aspects of the project.

6.6 Summary

Initial strategy development work has been undertaken and this has included a thorough review of available data (for example bathymetric data) relevant to the Seagreen Alpha and Seagreen Bravo OWF

² 2006 Wee Bankie to Gourdon bathymetry survey published by the UKHO available from the Admiralty Data Portal: <https://data.admiralty.co.uk/portal/apps/webappviewer/index.html?id=02dfdb1d1dd64ff9ba9109b3c3f1d7e1>

sites and OTA route. Based on this review, no further pre-construction monitoring for scour or local sediment deposition is proposed.

Scour is primarily an engineering issue and, as such, associated monitoring is closely linked to the engineering design aspects of the project. A monitoring strategy, based on engineering requirements, will be defined when sufficient design and construction details are available.

7. Marine Mammals Monitoring

7.1 Introduction

This section of the PEMP outlines Seagreen’s approach to monitoring of marine mammals in relation to the Development. Seagreen has committed to undertake pre-, during and post-construction marine mammal monitoring surveys to better understand the effect of construction activities associated with the Development on marine mammal populations in the vicinity of the Development, and validate assumptions made within the ES and RIAA.

7.2 Consent Conditions

Consent conditions relevant to marine mammal monitoring are summarised in Table 7.1 below. Condition 11c of the S36 consent for Alpha and Bravo and Condition 3.2.2.5 of the OTA Marine Licence requires the development of Piling Strategy (PS) to minimise the risk of injury to marine mammals. The PS is being developed separately is not be discussed further in this PEMP.

Table 7.1. Consent conditions requiring marine mammal monitoring.

Reference	Condition Summary	Status
S36 Consent Alpha and Bravo		
Condition 26 b PEMP	The PEMP must cover, but not be limited to the following matters: b. The participation by the Company in surveys to be carried out in relation to marine mammals as set out in the Marine Mammal Monitoring Programme (“MMMP”);	The Seagreen pre-construction MMMP has been submitted to MS-LOT and agreed with Statutory Consultees and the FTRAG MM sub group. The approach to the pre-construction MMMP is summarised in Section 7.4.2. The approach to the construction MMMP is detailed in Section 7.4.5. Final detailed monitoring design for the construction MMMP (CMMMP) will be confirmed based on the findings from the MMMP pre-construction monitoring and will consider the final foundation design and construction approach. The approach to the post-construction MMMP is described in Section 7.4.6.

Reference	Condition Summary	Status
Condition 27 FTRAG	The Company must participate in any Forth and Tay Regional Advisory Group (“FTRAG”) established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish.	Seagreen are represented on the Marine Mammal Subgroup of the FTRAG. A pre-construction Marine Mammal Monitoring Strategy document describing the proposed approach has been submitted to the FTRAG Marine Mammal Subgroup. Seagreen will seek confirmation on acceptance of the MMMP from the FTRAG subgroup at the forthcoming meeting in July 2019.
Condition 28 SSMEG	The Company must participate in any Scottish Strategic Marine Environment Group (“SSMEG”) established by the Scottish Ministers for the purposes of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, diadromous fish, marine mammals and commercial fish.	SSMEG has not been not established.
Marine Licence – Transmission Asset		
Condition 3.2.1.1.b PEMP	The PEMP must cover, but not be limited to the following matters: b) The participation by the Company in surveys to be carried out in relation to marine mammals as set out in the MMMP	The Seagreen pre-construction MMMP has been submitted to MS-LOT and agreed with Statutory Consultees and the FTRAG MM sub group. The approach to the pre-construction MMMP is summarised in Section 7.4.2. The approach to the construction MMMP is detailed in Section 7.4.5. Final detailed monitoring design for the construction MMMP (CMMMP) will be confirmed based on the findings from the MMMP pre-construction monitoring and will consider the final foundation design and construction approach. The approach to the post-construction MMMP is detailed in Section 7.4.6.
Condition 3.2.2.18 FTRAG	The Licensee must participate in any FTRAG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish.	Seagreen are represented on the Marine Mammal Subgroup of the FTRAG. A pre-construction Marine Mammal Monitoring Strategy has been submitted to the FTRAG Marine Mammal Subgroup. Seagreen will seek confirmation on acceptance of the MMMP from the FTRAG subgroup at the forthcoming meeting in July 2019.

Reference	Condition Summary	Status
Condition 3.2.2.19 SSMEG	The Licensee must participate in any SSMEG established by the Licensing Authority for the purpose of advising the Licensing Authority on research, monitoring and mitigation programmes for, but not limited to, diadromous fish, marine mammals and commercial fish.	SSMEG has not been established.

7.3 Approach to Monitoring of Marine Mammals

Seagreen have agreed a Marine Mammal Monitoring Programme, report LF000009-CST-OF-REP-0024 (Seagreen 2019d) that augments the existing MSS ECOMMAS programme. ECOMMAS is an ongoing deployment of arrays of acoustic monitoring equipment at stations along the east coast of Scotland to record marine mammal presence. The scope and objectives of both the pre-construction MMMP and the construction MMMP were developed by SMRU Consulting and agreed in consultation with MS-LOT, MSS and Scottish Natural Heritage.

The pre-construction MMMP has been submitted to the FTRAG marine mammal subgroup. The following organisations are represented on the FTRAG-MM: MS-LOT, MSS, Scottish Natural Heritage (SNH), Joint Nature Conservation Committee (JNCC) and Whale and Dolphin Conservation (WDC), Seagreen, Neart na Gaoithe and Inch Cape. The contents of the pre-construction MMMP were accepted by the FTRAG-MM at a meeting on 2nd July 2019.

Elements of the pre-construction MMMP are underway and ongoing, having commenced in March 2019, following formal approval of pre-construction monitoring proposals by MS-LOT.

A summary of the process by which the pre-construction MMMP has been agreed and approved is presented in Table 14.2 below. Agreement has been reached primarily via discussions with MSS, MS-LOT and SNH. Meeting agendas and minutes referred to in Table 7.2 can be obtained on the Scottish Government website at: <https://www2.gov.scot/Topics/marine/Licensing/marine/scoping/ftrag>.

Table 7.2. Summary of key consultation meetings and agreements for marine mammal monitoring.

Date	Summary of discussion and agreements	Reference
25/01/2019	Pre-construction Marine Mammal Monitoring Strategy document issued to MS-LOT and stakeholders (MSS, SNH) for consultation.	Report LF000009-CST-OF-REP-0013
30/01/2019	Stakeholders respond to the pre-construction Marine Mammal Monitoring Strategy document	Email from SNH to Seagreen and MS-LOT
05/02/2019	Meeting to discuss the proposed pre-construction Marine Mammal Monitoring Strategy. Proposed Strategy agreed by stakeholders	Minutes LF000009-CST-OF-MOM-0011

Date	Summary of discussion and agreements	Reference
18/03/2019	Pre-construction Marine Mammal Monitoring Strategy issued to FTRAG Marine Mammals subgroup for consultation	Email from Seagreen to FTRAG MM subgroup
18/06/2019	Pre-construction Marine Mammal Monitoring Plan issued to FTRAG MM subgroup for formal agreement	Report LF000009-CST-OF-REP-0024
02/07/2019	Pre-construction Marine Mammal Monitoring Plan presented at FTRAG MM subgroup meeting and formal agreement reached with all members	Minutes in preparation

7.4 Marine Mammal Monitoring Programme

7.4.1 Overall objectives

The approach to pre-construction monitoring has been developed on the assumption that pile driving to install foundations will form part of the final construction design and baseline data collection has been progressed on this basis. Through discussion with MSS and SNH it was agreed that the primary focus for monitoring during the pre-construction and construction phases should be the effects of noise from foundation installation on the bottlenose dolphin population using the east coast of Scotland. In addition, potential effects on other cetaceans (harbour porpoises, other dolphin species and minke whales) across the region and at the wind farm site are also of interest. Pre-construction monitoring therefore focusses on collecting baseline data against which to monitor change. However, the scope of construction monitoring will be dependent on the final foundation design and construction approach.

7.4.2 Pre-construction MMMP

The primary aim of the pre-construction MMMP is to collect baseline data on the occurrence of bottlenose dolphin in the coastal area adjacent to the Seagreen Project. In addition, data will also be collected on the baseline occurrence of harbour porpoises, white-beaked dolphins and vocalising minke whales in the wind farm area and between the wind farm area and the coast. Ambient noise levels will also be measured.

7.4.3 Monitoring Survey Methodology

The data collection will be carried out using passive acoustic monitoring (PAM) and will be carried out in collaboration with Marine Scotland Science (MSS). Data collected over the pre-construction period will be integrated with data collected over previous years and from the wider ECOMMAS array.

Agreed pre-construction survey methods are detailed in the pre-construction MMMP (LF000009-CST-OF-REP-0024) and will consist of moored broadband noise recorders and cetacean detection devices (CPODs). These will be deployed in an array extending from the coastline into the wind farm site. The pre-construction surveys have been designed to complement existing datasets on the east coast of Scotland for bottlenose dolphin and other echolocating small cetaceans and minke whales, using equipment compatible with that previously deployed by MSS.

7.4.4 Reporting

The annual report for the 2019/2020 (pre-construction) monitoring year will be presented in Quarter 3 2020. The pre-construction interim reports for the 2019/2020 monitoring year will be circulated in Quarter 3 and 4 2019 and Quarter 2 2020.

7.4.5 Construction MMMP

The aims of the Construction MMMP will be to use the baseline data obtained from the pre-construction MMMP studies, to support studies of bottlenose dolphin behavioural responses to foundation installation activities and any broader scale changes in their distribution during the construction period. The Construction MMMP will consist of the continuation of the monitoring outlined above.

The objectives of the Construction MMMP are largely continuations of the Pre-construction MMMP (described above) and therefore it is likely that similar methodology will be adopted. The final detailed design of construction monitoring will be discussed and agreed via the FTRAG-MM and subject to approval by MS-LOT on behalf of Scottish Ministers in light of the pre-construction results and in relation to the final construction project design, although it is envisaged that the following objectives will be addressed:

- Assess the variability in the occurrence of bottlenose dolphins along the east coast of Scotland during construction of the wind farm. These data will be compared to baseline data and analysed in relation to predicted noise exposure, as determined by concurrent noise monitoring.
- Assess the variability in the occurrence of other cetacean species along the east coast of Scotland and across the wind farm site during construction of the wind farm. These data will be compared to baseline data and analysed in relation to predicted noise exposure as determined by concurrent noise monitoring

7.4.6 Post-Construction MMMP

The objective of post-construction monitoring would be to monitor the recovery of any changes detected during construction and if required, would likely adopt the same methodology as applied for the pre-construction and construction monitoring. The requirement for, and the scope of any post-construction MMMP will be informed by the outcomes of pre-construction and any construction monitoring, developed in consultation with the FTRAG-MM and subject to approval by MS-LOT on behalf of Scottish Ministers.

7.4.7 Additional relevant monitoring

A programme of monthly digital aerial surveys is being undertaken across the wind farm area between March 2019 and March 2020, as part of the ornithology monitoring programme. For further details on this programme, see Section 3 Ornithology Monitoring. The aerial surveys will also include overflights of the PAM array deployed under the MMMP.

Although these are primarily for monitoring ornithological interests, detections of marine mammal species will be processed and presented in survey reports and analysis. These data will provide a useful pre-construction validation of the baseline abundance and distribution of marine mammals, with respect to the species present and any seasonal variation in abundance and distribution.

7.5 Programme

The programme for all marine mammal monitoring surveys is detailed in Table 7.3.

Table 7.3: Summary of marine mammal monitoring programme

Development stage		
Pre-construction	Construction	Post-construction
Acoustic monitoring of vocalising cetaceans March 2019-July 2020 Ambient noise monitoring July 2019-July 2020	Exact monitoring scope and survey design will be informed by the results of the pre-construction monitoring and the final project design but is anticipated to involve continuation of the methodology adopted for pre-construction for acoustic monitoring of vocalising cetaceans and noise measurement throughout the construction period.	If required, monitoring methodology likely to be the same as that the methodology adopted for Pre-construction and construction monitoring. Monitoring scope and survey design will be informed by the results of pre and during construction monitoring, and discussed in FTRAG-MM.
Marine mammal detections during digital aerial surveys (part of the ornithology monitoring plan) March 2019-March 2020	If digital aerial surveys during construction are undertaken, marine mammal detections will be recorded.	If digital aerial surveys during operation are undertaken, marine mammal detections will be recorded.

8. Compliance with the Environmental Statement

8.1 Compliance with Methods Assessed in the ES and Addendum

The relevant conditions of the S36 Consent and the Marine Licences require that the Seagreen Project is constructed in accordance with the methods assessed in the ES and Addendum. The ES for the Seagreen project described the range of methods that could be applied during the construction of the Development. This was presented as a 'Rochdale Envelope' incorporating a variety of options in relation to the development design and the approach to installation. In each case, the worst-case design option was assessed in respect of each impact.

Since the grant of the consents for Seagreen, the design of the project and the approach to installation has been substantially refined, as set out within the relevant consent plans, which has informed the approach to monitoring as set out in this PEMP.

8.2 Delivery of Mitigation and Monitoring Proposed in the ES and Addendum

The ES and Addendum for the Seagreen project detailed a number of mitigation commitments specific to environmental monitoring. Appendix C presents the commitments made by Seagreen in the ES to

environmental and monitoring measures. The table provides details of the commitments and a cross-reference to where each commitment is implemented, as set out in this PEMP.

A complete register of the mitigation, management and monitoring commitments made in the ES and Addendum and required by consent conditions is set out in the commitment's registers included as part of the Project CEMP.

10. References

Reference	SWEL Document Number	Title
FTRAG-O (2016).	N/A	Seabird Monitoring for Forth and Tay Offshore Wind Farms – Discussion Document, March 2016 (unpublished internal FTRAG-O report).
Seagreen, 2012	A4MRSEAG-Z-DOC100-SPR-060	Seagreen Offshore Environmental Statement
Seagreen, 2013	A4MR-SEAG-Z-DEV275-SRP-233	Addendum to the Offshore Environmental Statement
Seagreen, 2019a	LF000009-CST-OF-REP-0016	Ornithology Monitoring Strategy
Seagreen, 2019b	LF000009-CST-OF-REP-0019	Seagreen Marine and Migratory Fish Monitoring Strategy
Seagreen, 2019c	LF000009-CST-OF-REP-0017	Benthic Monitoring Strategy
Seagreen, 2019d	LF000009-CST-OF-REP-0024	Pre-Construction Marine Mammals Monitoring Plan
In prep	LF000009-CST-OF-PLN-0001	Offshore Operational Environmental Management Plan
In prep	LF000009-CST-OF-PLN-0003	Offshore Piling Strategy
In prep	LF000009-CST-OF-PRG-0003	Offshore OWFs Environmental Monitoring Programme
In prep	LF000009-CST-OF-PLN-0006	Offshore Vessel Management Plan
In prep	LF000009-CST-OF-PLN-0008	Offshore Wind Farm Cable Plan
In prep	LF000009-CST-OF-PLN-0009	Offshore Transmission Assets Cable Plan

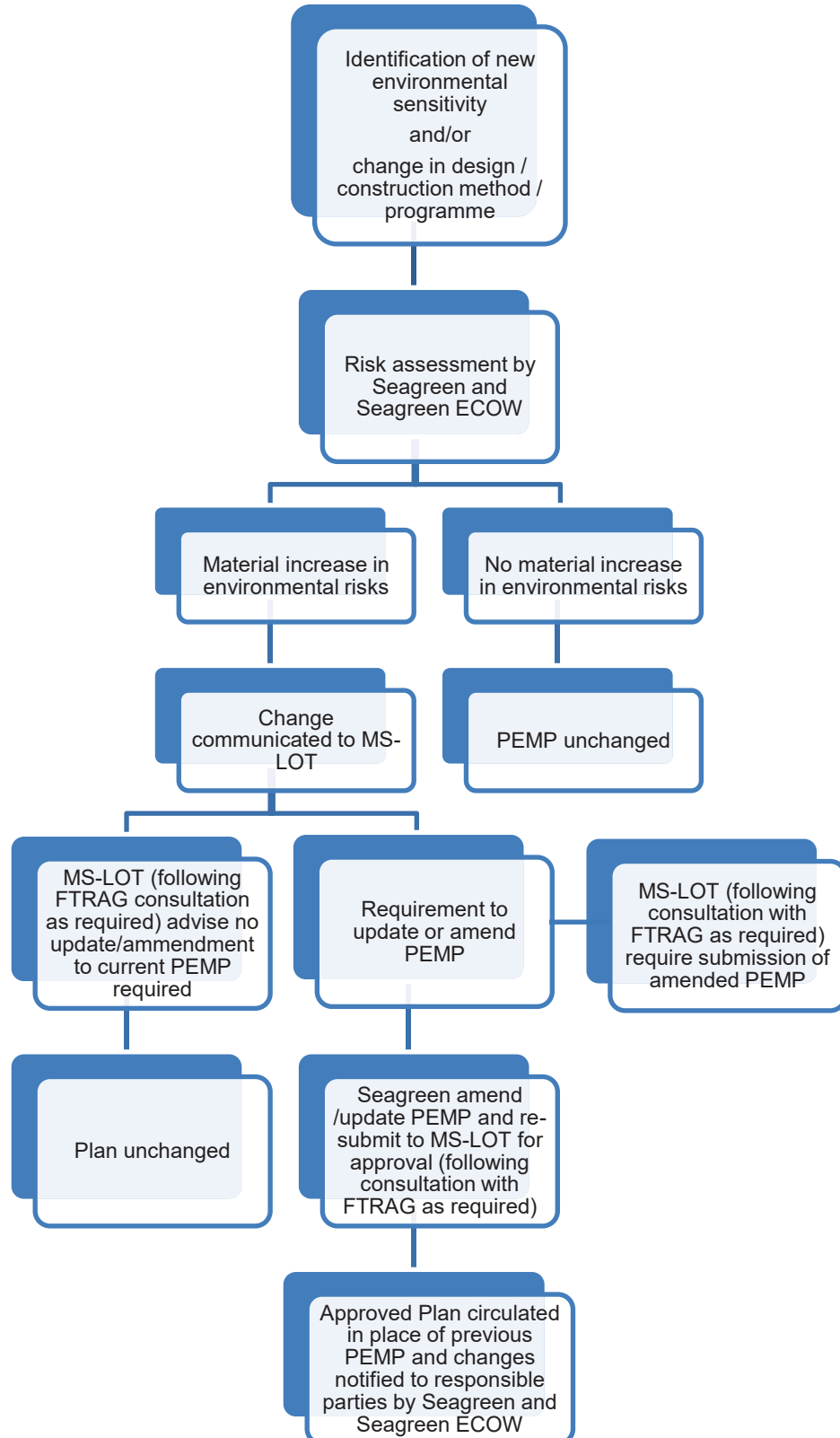
Appendix A – PEMP List of Abbreviations and Definitions

Term	Description
ASFB	Association of Salmon Fishery Boards (Now superseded by Fisheries Management Scotland, FMS)
Seagreen Alpha Marine Licence	Marine licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 in respect of Seagreen Alpha Wind Farm on 10 October 2014 as amended by the revised marine licence granted by the Scottish Ministers on 28 August 2018 (reference 04676/18/0)
Seagreen Bravo Marine Licence	Marine licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 in respect of Seagreen Bravo Wind Farm on 10 October 2014 as amended by the revised marine licence granted by the Scottish Ministers on 28 August 2018 (reference 04677/18/0)
commitments register	A register that sets out all commitments to manage and mitigate potential environmental impacts made by SWEL
(the) consents	Collective term used to describe the Section 36 consents and Marine Licences issued to SAWEL, SBWEL and SWEL
CEMP	Construction Environmental Monitoring Plan
Diadromous fish	Fish species that migrate between fresh and salt water
ECOMMAS	East Coast Marine Mammal Acoustic Study
ECOW	Ecological Clerk of Works as required under Alpha and Bravo Section 36 Condition 29 and the OTA Marine Licence Condition 3.2.2.12.
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Statement
SEIS and SEIS Erratum	The ES Addendum submitted to the Scottish Ministers by the Company on 18 October 2013 as part of the application for the consents
FTRAG	Forth and Tay Regional Advisory Group, required under Condition 27 of the S36 consent and Conditions 3.2.2.18 and 3.2.3.10 of the OTA Marine Licence
JNCC	Joint Nature Conservation Committee
Licensing Authority	Marine Scotland acting on behalf of the Scottish Ministers
Licensee	Seagreen Wind Energy Ltd (Seagreen), and having its registered office at Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ, on behalf of SAWEL and SBWEL
Marine Licences	The Wind Farm Marine Licences and the OTA Marine Licence
MHWS	Mean High Water Springs

Term	Description
MMMP	Marine Mammals Monitoring Programme
MS-LOT	Marine Scotland Licensing and Operations Team
MSS	Marine Scotland Science
NSBMF	National Strategic Bird Monitoring Framework
OMS	Ornithology Monitoring Strategy
OTA	Offshore Transmission Asset includes the transmission cable required to connect the Wind Farm to the onshore transmission works. This covers the OTMs and the cable route from the OTMs to the MHWS at the landfall at Carnoustie
OTA Marine Licence	Marine licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 in respect of the Seagreen Offshore Transmission Asset on 10 October 2014 as amended by the revised marine licence granted by the Scottish Ministers on 6th March 2019 (reference 04678/19/0)
OSP	Offshore Substation Platform means an alternating current offshore substation structure housing transformers and control equipment for the transmission of generated power through the wind farm export cables.
PEMP	Project Environmental Monitoring Programme as required under Alpha and Bravo S36 Condition 26 and the Offshore Transmission Assets Marine Licence Condition 3.2.1.1
RSPB	Royal Society for the Protection of Birds
PS	Piling Strategy, as required for approval under Condition 11 of the S36 consent and Condition 3.2.2.5 of the Marine Licence
S36 Consents	consent under section 36 of the Electricity Act 1989 granted by the Scottish Ministers on 10 October 2014 in respect of the Seagreen Alpha and Seagreen Bravo offshore wind farms, both as varied by the Scottish Ministers by decision letter issued pursuant to an application under section 36C of the Electricity Act 1989 on 28 August 2018
SAC	Special Area of Conservation
SAWEL	Seagreen Alpha Wind Energy Ltd (SAWEL) (company number 07185533) and having its registered office at No.1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
SBWEL	Seagreen Bravo Wind Energy Ltd (SBWEL) (company number 07185543) and having its registered office at No.1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
ScotMER	Scottish Marine Energy Research Programme
Seagreen Project	Collective term used to describe the Wind Farm Assets and Offshore Transmission Asset
SHE	Safety, Health, Environment

Term	Description
Site	The area outlined in red in Figure 1 attached to the S36 consent Annex 1 and the area outlined in red and the area outlined in red in the figure contained in Part 4 of the OTA Marine Licence
SNH	Scottish Natural Heritage
SPA	Special Protection Area, protected sites classified in accordance with Article 4 of the EC Birds Directive
SSMEG	Scottish Strategic Marine Environment Group, as required under Condition 28 of the S36 consent and Conditions 3.2.2.19 and 3.2.3.10 of the OTA Marine Licence
UKHO	United Kingdom Hydrographic Office
VMP	Vessel Management Plan, required under Condition 15 of the S36 consent and Condition 3.2.2.8 of the Marine Licence
WDC	Whale and Dolphin Conservation
Wind Farm Marine Licences	the Seagreen Alpha Marine Licence and the Seagreen Bravo Marine Licence
WTG	Wind turbine generator

Appendix B – Change Management Procedure



Appendix C – Seagreen Environmental Statement (ES) and ES Addendum Commitments

The following table presents the commitments made by Seagreen in the 2012 ES and in the 2013 Addendum to environmental monitoring of the Project. The table provides details of the commitments and a cross-reference to the relevant location in this PEMP where this is addressed.

Source	Reference (Chapter, page, paragraph)	Details of Commitment	Implementation
ES	Ch.7 Physical Environment, p67, 7.303	Seagreen will undertake monitoring if scour protection is used at the seabed adjacent to the substructures/foundations to confirm its suitability in limiting scour and assess the development of any secondary scour	See section 6.3

Source	Reference (Chapter, page, paragraph)	Details of Commitment	Implementation
ES	Ch.10 Ornithology, p127, 10.510	A monitoring programme should be developed in consultation with JNCC and SNH. The programme should be largely comparable with the baseline programme to allow direct comparison of density and population size.	See section 3.5

Source	Reference (Chapter, page, paragraph)	Details of Commitment	Implementation
ES	Ch.10 Ornithology, p127, 10.511	The continuation of tracking studies (Daunt et al., 2011a, b,c) is also recommended, both upon the same species and sites but also including other species/sites such as Razorbill and Guillemot from Fowlsheugh if at all possible. Otherwise, Kittiwake remains a priority species for investigation.	See section 3.5

Source	Reference (Chapter, page, paragraph)	Details of Commitment	Implementation
ES	Ch.11 Benthic and Intertidal Ecology, p73, 11.333 – 11.334	Seagreen is committed to development of a post construction monitoring plan, if appropriate and requested by the regulators. Any monitoring program will be designed in consultation with Marine Scotland and SNH to ensure it collects suitable data to answer appropriate questions raised during the project consenting process, in particular in relation to rare or important benthic habitats.	See section 5.5
ES	Ch.12 Natural Fish and Shellfish Resource, p103, 12.453 – 12.454	The Applicants make a commitment to development of monitoring plan if appropriate and requested by the regulators. Any monitoring survey programs will be agreed with Marine Scotland and SNH to ensure that they provide suitable data to answer the appropriate questions.	See section 4.4
ES	Ch.13 Marine Mammals, p152, 13.653	Seagreen will work with the Regulatory Authorities and their advisors (Marine Scotland, JNCC and SNH) as well as other key stakeholders in developing further an appropriate monitoring package.	See sections 7.3 and 7.4
ES	Ch.13 Marine Mammals, p152, 13.654	At a Project level the Marine Mammal Monitoring Programme will be developed in consultation with key regulators, advisors, academics and experts and will focus on undertaking data gathering which over time can provide a statistically robust data set, which builds on on-going research.	See section 7.4

Source	Reference (Chapter, page, paragraph)	Details of Commitment	Implementation
ES	Ch.13 Marine Mammals, p152, 13.655	During the development of Project Alpha and Project Bravo Seagreen will adopt the JNCC Guidelines (JNCC, 2010) to minimise the potential for fatal or non-auditory injury from pile driving.	To be addressed through the Piling Strategy
Addendum	Ch.3 Marine Mammals, p3-82, 3.362	A Marine Mammal Monitoring Protocol in line with the JNCC guidelines for minimising the impact of piling activities will be applied	To be addressed through the Piling Strategy
Addendum	Ch.4 Fish and Shellfish, p4-58, 4.304	Seagreen remains committed to engagement with MSS on the development of future studies, including potential monitoring effort	See section 4.4