Project Title	Seagreen Wind Energy Ltd
Document Reference Number	LF000009-CST-OF-PLN-0009

Offshore Transmission Asset Cable Plan

Marine Licence MS-00010078 Condition 3.2.2.10

Marine Licence MS-00010028 Condition 3.1.1

for the approval of Scottish Ministers

Rev	Date	Reason for Issue	Originator	Checker	ECoW	Approver
06	16/11/2022	Approved for Use	[Redacted]			

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Consent Plan Overview

Purpose of the Plan

This Offshore Transmission Asset (OTA) Cable Plan (CP) is submitted (i) by Seagreen Wind Energy Limited on behalf of Seagreen Alpha Wind Energy Limited (SAWEL) and Seagreen Bravo Wind Energy Limited (SBWEL) to address the specific requirements of the relevant conditions attached to the OTA 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) and 10 October 2022 (reference MS-00010078) 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); and (ii) by Seagreen Wind Energy Limited 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 on 21 November 2019 (reference 07050/19/0) in respect of the Alternative Landfall Cable Installation Methodology (Alternative Landfall Cable Installation Methodology Marine Licence) as amended by the revised Marine Licences granted by Scottish Ministers on 24 February 2020 (ref 07050/20/0), 18 August 2021 (ref MS-00009445),28 April 2022 (ref MS-00009749) and 30 September 2022 (ref MS-00010028).

The overall aims and objectives of the OTA CaP are to set out: the proposed location of the cables and proposed cable laying techniques; summarise survey work that will inform routing; provide details of Annex 1 habitat surveys to inform micro-siting and installation techniques; technical specifications of all cables; burial risk assessment, and measures to address cable exposure during the lifetime of the OTA. The OTA CaP also sets out construction procedures and good working practices for the installation of the Seagreen OTA infrastructure. The OTA CaP demonstrates that the construction procedures to be employed align with those set out within the Environmental Statement (ES), ES Addendum and Environmental Report (ER) for the Alternative Landfall Cable Installation Methodology, and that construction related mitigation measures detailed within the ES, ES Addendum and ER will be applied during installation.

All Seagreen Contractors (including their Sub-Contractors) involved in the Seagreen OTA Project are required to comply with this OTA CaP through conditions of contract.

Scope of the Plan

This OTA CaP covers, in line with the requirements of the consents conditions, industry standards and good practice, the following:

- Location details of subsea export cables and interconnector cable and cable laying techniques;
- Details of pre-construction surveys including geophysical, geotechnical and benthic habitat surveys conducted to inform cable routing;
- Pre-construction surveys for Annex 1 habitat;
- Technical specification of subsea export cables and interconnector cable, including details of Electromagnetic Field (EMF) attenuation and mitigation methods;
- A burial risk assessment to ascertain if burial depths can be achieved and provision of suitable protection measures where this is not possible;
- Methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the sea bed is deployed; and
- Details of how construction related mitigation steps proposed in the ES, ES Addendum and ER for the Alternative Landfall Cable Installation Methodology are to be delivered.

Structure of the Plan

The OTA CaP is structured as follows:

Section 1&2	Provides an overview of the Seagreen Project and the consent requirements that underpin the content of this OTA CaP. It also sets out the purpose, objectives and scope of the OTA CaP and sets out the process for making updates and amendments.
Section 3	Details cable locations for both subsea export cables and interconnector cable.
Section 4	Sets out pre-construction surveys.
Section 5	Provides detailed technical specifications for subsea export and interconnector cable, including electromagnetic attenuation, protection and shielding.
Section 6	Provides the cable burial risk assessment.
Section 7	Discusses methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the sea bed is deployed;
Section 8	Sets out procedures required to identify risk areas of exposure and the methodologies used to remediate exposed areas.
Section 9	Demonstrates compliance with the ES, ES Addendum and ER, and commitments made.
Section 10	Lists the references made within this OTA CaP.
Appendices	Appendix A – List of Abbreviations and Definitions
	Appendix B – The OTA CaP Change Management Process
	Appendix C – Compliance with ES Parameters and Processes
	Appendix D – Summary of Mitigation Commitments

Plan Audience

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

Compliance with this OTA CaP will be monitored by: Seagreen's Ecological Clerk of Works (ECoW); Seagreen's appointed Contractors; Seagreen's Environmental Manager; and the Marine Scotland Licensing and Operations Team (MS-LOT).

Copies of the OTA CaP 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 (as appropriate), including the Seagreen ECoW, acting on behalf of Seagreen; and
- Aboard any vessel engaged in the OTA construction phase.

1. Introduction

1.1 Consents and Licences

Seagreen Wind Energy Limited (SWEL, 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), as varied. Marine Licences for Seagreen Alpha and Bravo OWFs and the Offshore Transmission Asset (OTA) (together the 'Marine Licences') were also awarded by Scottish Ministers in October 2014, as varied, 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 Seagreen Alpha and Seagreen Bravo Marine Licences were varied by Scottish Ministers. Subsequently, in 2019, the OTA Marine Licence was also varied by Scottish Ministers. In addition, a Marine Licence was granted in 2019 providing an alternative landfall installation method which was subsequently varied in February 2020, August 2021,April 2022 and September 2022. Latterly in 2019, the Seagreen 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), together with associated infrastructure of the OTA (Offshore Substation Platform OSP, their foundations and OSP Interconnector and the offshore export cable), 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 comprised of:
    - 114 WTGs installed on three-legged steel jackets, each installed on suction bucket caissons; and
    - 36 WTGs installed on up to four-legged steel jackets, each installed on pin pile foundations.
- Two OSPs, each installed on up to 12 pin pile foundations;
- A network of inter-array subsea cables, comprised of:
    - Circa 300 km of inter-array cables to connect strings of WTGs on suction bucket caissons together and to connect these WTGs to the OSPs;
    - Circa 55 km of inter-array cables to connect strings of WTGs on piled foundations together and to connect these WTG to the OSPs; and
    - Circa 3 km of interconnector cable to connect the two OSPs.
    - Inter-array cables will be buried where possible and where burial is not possible cable protection will be provided

- Up to three subsea export cables, totalling circa 190 km in length, to transmit electricity from the OSP 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. Subsea export cables will be buried where possible and where burial is not possible cable protection will be provided.

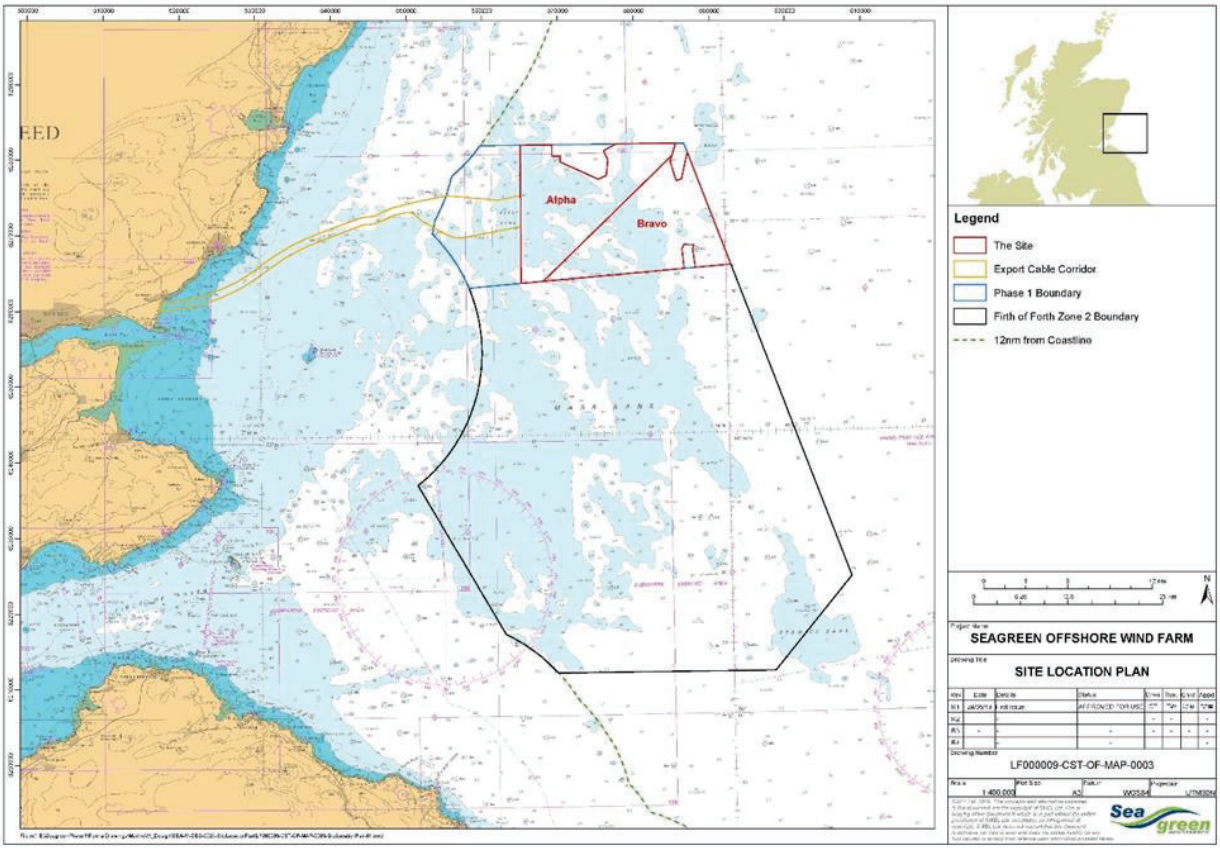


Figure 1.1: Project Location.

1.3 Consent and Licence Requirements

This OTA CaP has been prepared to discharge condition 3.2.2.10 of the OTA Marine Licence (MS-00010078), as set out in Table 1.1. A separate OWF CaP will be prepared for the OWF assets (LF00009-CST-OF-PLN-008).

Table 1.1: Consent Conditions to be discharged by this OTA CaP.

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the OTA CaP
OTA Marine Licence (MS-00010078)	Condition 3.2.2.10	The Licensee must, no later than 6 months prior to the Commencement of the Works submit a CaP, in writing to the Licensing Authority for their written approval.	This document sets out the OTA CaP for approval by the Licensing Authority and is submitted more than 6 months prior to Commencement of Works.
		Such approval may only be granted following consultation by the Licensing Authority with the Ministry of Defence (MOD), the Joint Nature Conservation Committee (JNCC), Scottish Natural Heritage (SNH), the Maritime and Coastguard Agency (MCA), and the Scottish Fisherman's Federation (SFF) and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.	To be undertaken by the Licensing Authority.
		The CaP must be in accordance with the Application.	Section 9 – Compliance with the ES and ES Addendum Appendix C – Compliance with ES parameters and processes Appendix D – Summary of Mitigation Commitments
		The CaP must include the following: a) Details of the location and cable laying techniques for the cables; b) The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;	Section 3 – Cable Location and Installation Techniques Section 4 – Pre-construction Surveys

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the OTA CaP
		c) A pre-construction survey for Annex 1 habitat and priority marine features to inform cable micro-siting and installation methods in consultation with the Licensing Authority and their advisors; d) Technical specification of all cables, including a desk based assessment of attenuation of electro-magnetic field strengths and shielding; e) A burial risk assessment to ascertain if burial depths can be achieved. In locations where this is not possible then suitable protection measures must be provided, including structural grade 40 concrete 200 mm thick at Danger Area D604; f) Methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the seabed is deployed; and g) Measures to address exposure of any cables.	Section 4 – Pre-construction Surveys Section 5 – Technical Cable Specifications Section 6 – Cable Burial Risk Assessment Section 7 – Cable Protection Requirements Section 8 – Cable Exposure Monitoring
Marine Licence (Alternative Landfall Cable Installation – MS-00010028)	3.1.1	[…] The Licensee must ensure that, where the Works authorised by the licence are carried on as an alternative to nearshore cable laying operations under marine licence number 04678/14/0, that the works authorised by the licence are appropriately covered in the plans submitted under marine licence number 04678/14/0. Such plans are PEMP, EMP, DP, CoP, CMS, VMP, NSP, CaP, OMP, LMP and PS, as required by conditions 3.2.1.1, 3.2.1.2, 3.2.1.7, 3.2.2.3, 3.2.2.4, 3.2.2.8, 3.2.2.9, 3.2.2.10, 3.2.3.2, 3.2.2.14, and 3.2.2.5 of marine licence number 04678/14/0.	Alternative Landfall Cable Installation techniques are outlined in this OTA CaP in Section 3.2.7 and this OTA CaP is complaint with the relevant conditions.

1.4 Linkages with other Consent Plans and Consent Conditions

Condition 3.2.2.10 of the OTA Marine Licence (see Table 1.1) does not explicitly identify linkages between this OTA CaP and other Consent Plans. However, other conditions require that several other Consent plans

be consistent with the OTA CaP; the OTA Construction Method Statement (CMS) (Condition 3.2.2.4) and the OTA Operation and Maintenance Programme (OMP) (Condition 3.2.3.2).

1.5 Construction management

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 (LF000009-CST-OF-PLN-0014 - Offshore CEMP).

1.6 Updates and Amendments

Should any updates to this OTA CaP become necessary, the change management process for any such updates, including resubmission of consent plans for approval, is outlined in Appendix B – The OTA CaP Change Management Procedure.

2. Scope and Objectives of the OTA CaP

This OTA CaP has been prepared to address the specific requirements of the relevant conditions attached to the OTA Marine Licence issued to Seagreen in 2014 (subsequently varied in 2019 and 2022) for the Seagreen OTA project and the Marine Licence issued to Seagreen in 2019 for the Alternative Cable Landfall Installation Methodology (subsequently varied) and applies to all construction as required to be undertaken prior to the final commissioning of the works. The overall objective of this OTA CaP is to set out the location of, and installation and management procedures, for the subsea export cables and OSP interconnector cable. The OTA CaP includes the following:

a) Location details of subsea export cables and interconnector cable and cable laying techniques;
b) Details of pre-construction surveys including geophysical, geotechnical and benthic habitat surveys conducted to inform cable routing;
c) Pre-construction surveys for Annex 1 habitat;
d) Technical specification of subsea export cables and interconnector cable, details of Electromagnetic Field (EMF) attenuation and mitigation methods;
e) A burial risk assessment to ascertain if burial depths can be achieved and provision of suitable protection measures where this is not possible;
f) Methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the sea bed is deployed;
g) Measures to address exposure of any cables and;
h) Details of how construction related mitigation steps proposed in the ES, ES Addendum and ER for the Alternative Landfall Cable Installation Methodology are to be delivered.

3. Cable Location and Installation Techniques

3.1 Location

The alignment of the three subsea export cables will commence at the first OSP and travel west along the seabed towards the landfall site at Carnoustie. As the cables approach the coastline they will pass through the intertidal area to meet the Onshore Transmission Works (OnTW) approximately 100m above Mean High Water Springs (MHWS). As the cable route passes through the intertidal zone towards the OnTW the cables will pass though intertidal sediments and a rock revetment at the interface with the coast (the rock revetment was installed as a coastal protection feature).

The interconnector cable is routed between the two OSPs which will be located in the middle of the OWF array site.

Due to the potential for micro siting, the final location of the export cables and the interconnector cable will be confirmed once installation has been completed. Route refinement and micro siting is ongoing and will be dependent on seabed conditions and location of sensitive features which will be further defined at the conclusion of pre-commencement survey activities. With regard to the three subsea export cable alignments, as the export cable approaches the coast and the Barry Buddon Danger Area exclusion zone, will be avoided where reasonably practicable.

The indicative location of the subsea export cables can be seen in Figure 3.1. The subsea export cables and subsea interconnector cable coordinates are provided in Table 3.1 and Table 3.2 respectively.

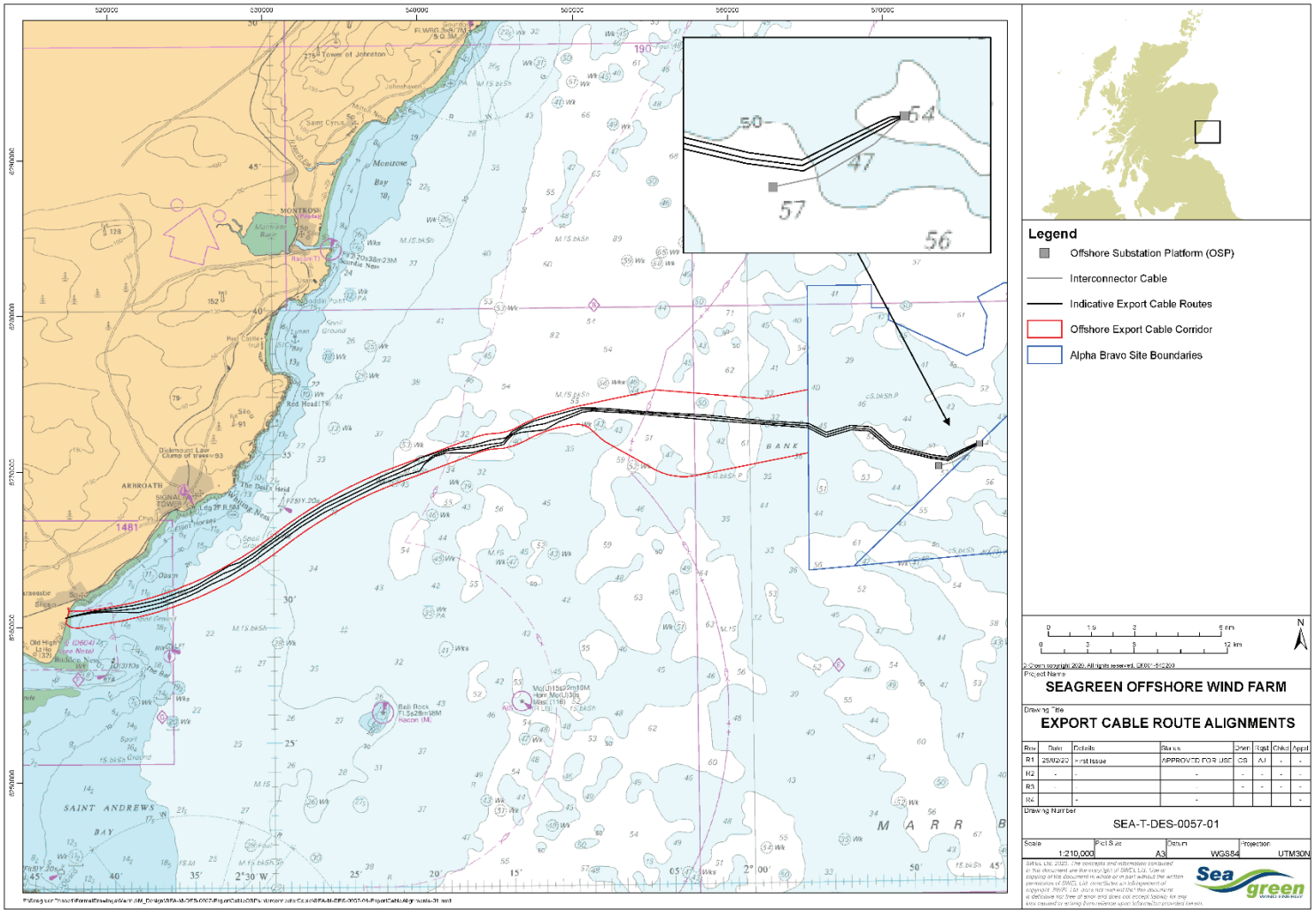


Figure 3.1: Export cable corridor, export cable alignments and interconnector cable alignments

Table 3.1: Indicative Export Cable Route Coordinates

Cable Route 1			Cable Route 2			Cable Route 3		
ID	Easting	Northing	ID	Easting	Northing	ID	Easting	Northing
1	517373.84	6260619.14	1	517374.80	6260613.73	1	517375.77	6260608.33
2	517382.82	6260620.59	2	517383.70	6260615.20	2	517384.60	6260609.75
3	517392.68	6260622.18	3	517397.17	6260617.34	3	517445.84	6260620.63
4	517441.33	6260640.15	4	517521.61	6260652.05	4	517519.57	6260641.04
5	517767.67	6260731.56	5	517762.58	6260719.85	5	517759.80	6260708.34
6	518023.28	6260803.45	6	518009.52	6260773.82	6	517991.53	6260751.59
7	519199.47	6261066.86	7	519196.20	6261014.30	7	518341.84	6260816.15
8	520246.23	6261219.35	8	520055.98	6261078.50	8	519169.74	6260970.64
9	521691.95	6261421.46	9	520797.24	6261105.01	9	520055.73	6260997.10
10	522875.30	6261686.33	10	521826.24	6261233.53	10	522087.87	6260980.11
11	523572.84	6261871.36	11	522874.03	6261436.84	11	523572.29	6261371.30
12	524642.31	6262275.25	12	523571.57	6261621.86	12	524641.76	6261775.19
13	525413.88	6262552.10	13	524641.04	6262025.75	13	525367.54	6262064.76
14	525971.62	6262810.33	14	525366.82	6262315.32	14	525863.11	6262291.74
15	527862.87	6263964.97	15	525862.38	6262542.30	15	526774.90	6262817.74
16	528545.39	6264176.11	16	527520.43	6263489.17	16	527567.49	6263147.41
17	529484.92	6264792.57	17	528219.95	6263763.36	17	527999.29	6263356.96
18	532559.18	6267029.87	18	529483.65	6264543.07	18	529484.37	6264292.51
19	534052.86	6267943.95	19	530018.59	6264987.33	19	530754.54	6265216.88
20	537641.81	6269717.80	20	530828.22	6265573.11	20	532558.63	6266529.82
21	539027.13	6270305.69	21	532557.91	6266780.38	21	534052.31	6267443.89
22	540011.51	6270794.38	22	534051.59	6267694.45	22	537641.26	6269217.74
23	540126.80	6270902.56	23	537640.54	6269468.30	23	539000.68	6269738.72
24	540378.49	6270994.32	24	539025.85	6270056.19	24	540168.55	6270082.60
25	542069.37	6271527.20	25	540309.36	6270639.04	25	540509.72	6270587.43
26	543610.97	6271736.84	26	540698.42	6270804.32	26	541147.33	6271024.60
27	544779.53	6272068.80	27	541035.03	6271088.93	27	541837.67	6271234.94
28	545712.93	6272214.09	28	542063.89	6271415.81	28	543544.43	6271256.00
29	545942.36	6272422.40	29	543587.26	6271596.96	29	544750.01	6271613.19
30	546124.55	6272629.96	30	544482.67	6271768.32	30	545572.35	6271790.34
31	546781.04	6272958.18	31	545500.49	6271925.06	31	545932.50	6272212.10
32	547516.97	6273308.37	32	545902.86	6272305.35	32	546182.19	6272437.42
33	547887.53	6273402.68	33	546128.11	6272490.00	33	546717.13	6272574.54
34	550531.18	6274129.97	34	546766.75	6272835.94	34	548250.86	6272740.87
35	551449.04	6274146.96	35	547763.69	6273048.70	35	549186.64	6273289.33
36	552313.74	6274103.98	36	548212.96	6273124.87	36	549766.51	6273505.31
37	553959.04	6273965.72	37	549888.67	6273731.83	37	550657.07	6273866.29
38	555270.95	6273872.41	38	550630.84	6274017.25	38	551356.24	6273965.36

Cable Route 1			Cable Route 2			Cable Route 3		
ID	Easting	Northing	ID	Easting	Northing	ID	Easting	Northing
39	558514.46	6273689.98	39	551472.33	6274047.48	39	552352.27	6273877.50
40	562618.48	6273308.67	40	554330.50	6273849.58	40	553411.30	6273829.46
41	565232.05	6273143.06	41	558534.91	6273569.31	41	558566.16	6273385.30
42	566367.60	6272566.03	42	562560.89	6273185.97	42	562588.04	6273065.33
43	567900.18	6273011.49	43	565201.06	6272999.94	43	565174.03	6272868.95
44	569231.50	6272922.49	44	566355.00	6272417.95	44	566338.22	6272280.78
45	570600.62	6271723.17	45	567904.36	6272868.77	45	567951.98	6272739.12
46	573121.87	6271131.96	46	569186.55	6272771.54	46	569124.18	6272659.55
47	574177.78	6270986.00	47	570539.00	6271624.00	47	570460.14	6271522.28
48	575051.00	6271431.65	48	573073.62	6271015.27	48	573068.37	6270918.01
49	575927.90	6271841.69	49	574174.71	6270872.98	49	574205.95	6270767.42
50	576225.74	6271869.76	50	575948.08	6271783.56	50	576004.61	6271735.40
			51	576225.74	6271869.76	51	576225.74	6271869.76

Table 3.2: Interconnector Cable Co-ordinates

Start				End			
ID	Latitude (ddm) WGS84	Longitude (ddm) WGS84	Depth (m) LAT	ID	Latitude (ddm) WGS84	Longitude (ddm) WGS84	Depth (m) LAT
SN-K15	56° 35.094' N	1° 45.537' W	55.2	SN-H13	56° 34.353' N	1° 48.126' W	54.8

3.2 Installation Techniques

3.2.1 Overview

Cable installation techniques for the subsea export cables (including landfall cable installation) and OSP interconnector, including equipment and specific methodologies, have been detailed in the OTA CMS (LF00009-CST-OF-MST-002) (Section 6 – Construction procedures, mitigation and good working practices). All activities described are in accordance with the installation methods assessed within the ES, ES Addendum and Environmental Report (ER). In general, the cables will be buried under the seabed. If burial is not possible, cable protection (e.g. rock protection or mattresses) will be installed.

As required by Condition 3.2.2.3 of the OWF Marine Licence, Condition 3.2.3.5 of the OTA Marine Licence and Condition 3.2.1 of the Alternative Cable Installation at Landfall Marine Licence the safety of navigation will not be compromised by the Works. Seagreen shall ensure that the navigable depth is not reduced as a result of the Seagreen Project by more than 5% of stated chart datum unless otherwise agreed, in writing, with the Licensing Authority in consultation with the MCA and NLB.

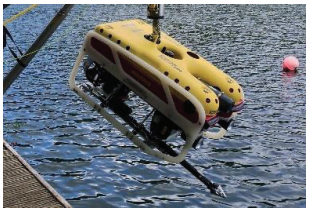
At the landfall open cut techniques will be utilised across the intertidal zone and through the rock revetment sea wall defence at Carnoustie to connect with the OnTW above Mean High Water Springs (MHWS). Rock protection and concrete mattresses will not be used to protect the cables in the nearshore (depths less than 7m and intertidal zone).

The following sections set out the installation techniques for the interconnector cable, subsea export cables and landfall cable installation.

3.2.2 Interconnector cable

The interconnector cable will be trenched and buried in the seabed, to a minimum depth of at least 0.5 m to provide protection to the cable. This will be carried out by either a subsea jet trenching tool or an engineered rock placement solution where trenching to the required depth has not been possible. The installation methodology for the interconnector cable is set out in Table 3.3.

Table 3.3: Installation methodology – OSP interconnector

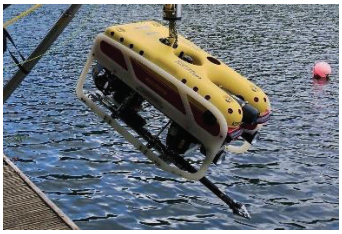
Equipment/Vessels	Methodology
Cable installation	
ROV:  Source: https://www.rovco.com/services/rov/ CLV:  Source: https://www.vanoord.com/activities/cable-laying-vessel	• The cable laying vessel (CLV) is pre-loaded with the subsea cable. • Cable is surface laid between the OSPs. • The Cable Protection System (CPS) is fitted to the cable end on board the CLV. • A remotely operated vehicle (ROV) will recover a pre-installed messenger wire within the J-Tube. The wire will be winched to deck and connected to the CPS. • The CLV will then pay out the cable, which is winched into the OSP. • On completion of the route length, the end of the cable is then cut, sealed and prepared for second end installation operations. • Cable testing will be performed at various stages during the cable lay operations.
Cable burial/jet-trenching and cable protection	
CapJet:  Source: Nexans Consent Requirements – Construction Method Statement LF000009-NEX001-REP-K22-001-01 Jet trenching and chain cutting hybrid tool:	• The OSP interconnector cable is trenched into the seabed to the target depth. • A jetting tool "Capjet" will inject water at high pressure into the sediment surrounding the cable. The seabed is temporarily fluidised and the cable is lowered. • Where jet-trenching is not possible due to the presence of stiff sediments, a hybrid tool capable of both chain cutting and jet trenching will be used. • If target depth has not been reached, a second trenching pass will be completed to improve the first pass.

Equipment/Vessels	Methodology
 Source: https://www.smd.co.uk/our-products/qtrenchers/qtrencher-1400/ Fall pipe vessel:  Source: Marine Traffic	• If necessary, an engineered cable protection solution will further protect any areas of cable not trenched to the required depth (rock armouring, concrete mattressing, or rock placement). • Rock protection is usually deposited by a fall pipe vessel.
Post installation surveys	
Survey Vessel / Cable Lay Vessel	• Immediately following installation, post installation surveys will be conducted to confirm target burial depths have been achieved or where cable protection measures will be required (as outlined above). During the period between the identification of the need for additional cable protection and completion of additional cable protection activities, a Guard Vessel will be on site to inform other marine users of activities within the area. • A further survey will be undertaken approximately 1-year post-installation to confirm the cables remain as installed. The frequency and scope of both this initial survey and further monitoring will be determined via a risk-based assessment which will provide a proportional indication of the risk of future cable exposure along the interconnector cable corridor.

3.2.3 Subsea export cables

The three export cables will be installed onto the seabed, followed by burial (trenching by jetting) to a target depth of at least 0.5 m, to provide protection to the cables. It should be noted that export cable installation will be completed in succession over an up to 7-month period (see Construction Programme LF000009-CST-OF-PRG-0002) and cable installation activities may be repeated three times (one for each cable alignment) as outlined in Table 3.4. The installation methodology for the subsea export cable is set out in Table 3.4.

Table 3.4: Installation methodology – subtidal export cables.

Equipment/Vessels	Methodology
Cable installation (to be repeated for each of the three cables)	
CLVs: C/S Nexans Aurora  Source: Nexans Consent Requirements – Construction Method Statement LF000009-NEX001-REP-K22-001-01 ROV:  Source: https://www.rovco.com/services/rov/	**Connection of subtidal export cable to HDPE pipe exit** • CLV is loaded with cable at the manufacturing facility and sails to site. • A dive team will be mobilised to prepare the HDPE pipe exit • The subsea cable is floated out from the vessel to the HDPE pipe exit. • The onshore winch wire will be connected to the cable through the HDPE pipe. The cable will be guided into the HDPE pipe. • The cable will be winched through the HPDE pipe. **Cable lay** • The cable is surface laid between the HDPE pipe exit and the OSP. **Cable pull-in at OSP** • The CPS is fitted to the cable end on board. (specific mechanical protection applied to protect the cable as it enters the OSP J- tube bellmouth). • A ROV will recover a pre-installed messenger wire within the J-Tube. The wire will be winched to deck and connected to the sealed cable end. • The cable will be winched into the OSP. Cable testing will be performed at various stages during the cable lay operations. Consideration will be given to limiting light spill (by directional lighting, directed downwards) from construction vessels involved in cable laying and related activities at night within 2km of the shore, to avoid visual intrusion at residential locations.
Wet storage of OSP cable end (contingency measure for all three cables)	
CLVs (see 'Cable installation' above)	• In certain circumstances (such as deteriorating weather conditions or reduced accessibility to the OSP), it may be necessary to 'wet store' up to approximately 500m of the OSP cable end on the seabed, for later recovery and pull-in to the OSP • Where the cable end is to be wet stored, the cable would be laid in its final position (see previous step) to within approximately 500m of the OSP

Equipment/Vessels	Methodology
	• The end section would be 'looped back' and laid parallel to the main cable length (within the consented cable corridor). TPAs may or may not be required for this operation • Burial of the main cable length would proceed in accordance with 'Cable burial and cable protection' step below. The 'wet stored' section would be shallow buried for protection and monitored by guard vessels • At the appropriate time, the wet stored section would be retrieved, cut to the correct length, laid in its final position and pulled into the OSP and buried • Any excess ('offcut') cable lengths may be wet stored in the same location for later retrieval and disposal at an onshore facility. The duration of any wet storage will be as short as reasonably practicable
Cable jointing (if required) (to be repeated for each of the three cables)	
CLVs (see 'Cable installation' above)	• Cable end is retrieved from the seabed to the CLV. • Cable jointing takes place on the vessel. • The jointed cable will then be lowered to the seabed. In certain circumstances this will result in a hairpin loop in the as-laid cable.
Cable burial and cable protection (to be repeated for each of the three cables)	
Jet trenching (indicative photo of equipment Table 3.3) Fall pipe vessel for installation of any rock protection (indicative photo of vessel in Table 3.3).	• The export cable is trenched into the seabed to the target depth using either a trenching or jetting tool. • A jetting tool will inject water at high pressure into the sediment surrounding the cable. The seabed is temporarily fluidised and the cable is lowered. • If target depth has not been reached, a second trenching pass will be completed to improve the first pass. • If necessary, an engineered cable protection solution will further protect any areas of cable (estimated approx. 19 km total length) not trenched to the required depth (armouring, or rock placement). • Rock will be deposited by a fall pipe vessel.
Post installation surveys	
Survey Vessel / Cable Lay Vessel	• Immediately following installation, post installation surveys will be conducted to confirm target burial depths have been achieved or where cable protection measures will be required (as outlined above). During the period between the identification of the need for additional cable protection and completion of additional cable protection activities, a Guard Vessel will be on site to inform other marine users of activities within the area. • A further survey will be undertaken approximately 1-year post-installation to confirm the cables remain as installed. The frequency and scope of both this survey and further monitoring will be determined via a risk-based assessment which will provide a

Equipment/Vessels	Methodology
	proportional indication of the risk of future cable exposure along the export cable corridor.

In accordance with MGN 654, Seagreen shall provide survey data to confirm as-laid cable alignments, cable burial depth, and rock protection locations, berm heights and cross-sectional profiles, to MCA and UKHO. The data will be supplemented by an explanatory report.

3.2.4 Landfall installation up to MHWS

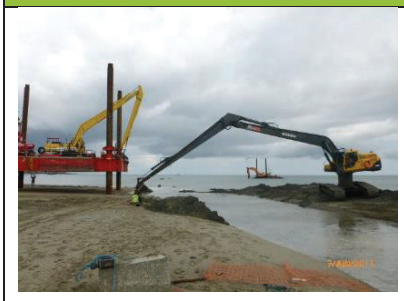
3.2.4.1 Open cut trenching

Export cable installation activities at the landfall, under the Alternative Landfall Cable Installation Methodology Marine Licence will consist of open cut trenching through the rock revetment. Three High Density Polyethylene (HDPE) pipes will be installed, with the three cables pulled through each of these pipes. Open cut trenching will be undertaken within two distinct zones below MHWS: namely the rock revetment and the initial extents (approximately 10m from the revetment) of the intertidal zone. From the pipe end, in the intertidal zone and across the subtidal zone, the installation technique will be jet trenching under the OTA Marine Licence.

Temporary sheet piling will be installed to maintain safe working conditions and subsequently trench boxes will be installed to aid the installation of the pipes and prevent trench collapse. The installation methodology for the landfall cable installation up to MHWS is set out in Table 3.6.

Table 3.6: Installation methodology – landfall installation up to MHWS (open cut trenching).

Equipment/Vessels	Methodology
Removal of rock armour	
Crawler crane, excavators and clamshell bucket/rock grapple Long Reach Excavator  Source: Seagreen LF00009-CST-REP-0021) Vibro-piling equipment – Leader Rig 	• Rock material from a local source will be transported to site via road. Rock will be utilised to establish working areas/platforms on the revetment to facilitate safe installation of sheet piling (see below). Material will remain on site for duration of works and will be incorporated into revetment reinstatement works outlined in Step 5. • 1-2m strip of rock armour removed from revetment to facilitate sheet piling installation • Install temporary sheet piling at sides of trench and toe of revetment using vibro piling • Removal of remaining rock revetment across trench area to facilitate trench excavation • Rock will be removed in layers to ensure effective reinstatement. • Stockpile material suitable for re-use. Transport remaining material to a licenced onshore disposal site using a licensed waste carrier.
Excavation of cable pipe trenches	
Jack-up mounted excavator/ Elevated backhoe excavator 	• Excavate trench within temporary sheet piles by mounted excavator. • Remove sediment in layers to ensure effective reinstatement. • Install trench boxes (within temporary sheet piling within the intertidal zone). • Install HDPE pipe (see below)

Equipment/Vessels	Methodology
 Source: Seagreen LF00009-CST-REP-0021) Temporary Trench boxes 	
Installation of HDPE pipes	
HDPE pipes  Source: Seagreen LF00009-CST-REP-0021)	• Install HDPE pull-in pipes to aid subsequent cable pull-in. • Pipes will be fitted with concrete collars to weigh them down. • Given seabed conditions, and project detailed design, HDPE pipes in the subtidal zone are not anticipated to be required. The seaward end of the pipes will be fitted with a messenger line and temporarily capped to allow cable pull-in. • Temporary ballast (e.g. concrete bags/clamps) may be attached to the pipe ends for stabilisation. • Concrete will be poured over the pipes for stabilisation underneath the rock revetment.
Reinstatement of cable pipe trench	
Elevated backhoe excavator (see excavation of cable pipe trenches)	• Remove trench boxes. • Backfill excavated material within sheet piles. • Site reinstated to original status.

Equipment/Vessels	Methodology
Replacement and reinstatement of rock armour	
Crawler crane and clamshell bucket/rock grapple (see removal of rock armour) Barge  Source: mmaoffshore.com	• Remove sheet piles. • Replace Geofabric rock under layer. • Replace and reinstate rock armour. Rock material utilised for working area/platforms during construction will be used for this purpose. It is anticipated that additional rock may also be required. Rock that is used to replace any material on the rock revetment will be either imported from Norway or from a UK quarry. The quarried material will be transported dry to reduce the potential risk of Invasive Non-Native Species. • A topographical survey will be carried out to confirm that the original profiles and bathymetry have been restored.
Cable pull-in	
Offshore vessel  Source: https://www.vanoord.com/activities/cable-laying-vessel	• Cable pulled through the HDPE pipes from the cable installation vessel towards the onshore jointing bay. • Burial of pipe ends to a minimum depth of 2 m.

4. Pre-construction Surveys

4.1 Surveys Conducted

A summary of the surveys carried out for the Seagreen Project is presented in Table 4.1.

Table 4.1: Pre-Construction Survey Summary.

Survey	Data Sources	Results
Geophysical	Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub Bottom Profiler (SBP)	In June and July 2011, a geophysical survey was completed by Osiris Projects along the proposed cable route corridors (Osiris Projects, 2011a, 2011b). Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), and sub-bottom profiler (SBP) data was acquired along the cable route. The bathymetry of the cable corridor was shown to range from approximately 0.0 m to 69.0 m water depth (LAT) (Figure 4.1). Interpretation of the data identified that the sediment generally comprised of sand and gravelly sand although rocky outcrops were also observed.
Benthic	Drop Down Video (DDV) Grab sampling, Epibenthic Beam Trawl	Environmental surveys of the cable route (IECS, 2011) were also completed in August 2011, involving the collection of DDV and grab samples (infaunal samples, particle size analysis, PSA) and epibenthic trawl samples. A total of 19 benthic sites were surveyed. Seabed habitats and faunal composition typical of this location were identified, with no evidence of biogenic reefs detected. Predictive sediment and habitat maps were generated from the geophysical survey and benthic survey data.
Annex 1 habitats	Annex 1 reef habitat Drop Down Video (DDV) survey	The geophysical and benthic data collected were integrated into a biological model, which was used to predict areas of potential biogenic reef habitats (LF00009-CST-OF-REP-0029). As no areas of biogenic reef had previously been identified, areas of cobbles and boulders were used as potential indicators in the model, resulting in conservative predictions with low confidence of the actual presence of biogenic reef structures. Three potential reef areas were identified by the model within the cable corridor, as shown in Figure 4.3. These areas were targeted by a pre-construction Annex 1 habitat survey in September 2020 (see Figure 4.2), as agreed with Marine Scotland (LF000009-CST-OF-SOW-0018). No evidence of biogenic reef was identified during the survey. Initial survey results suggest that the areas in red in Box C (Figure 4.2, i.e >0.6 probability of reef occurrence) would constitute medium resemblance stony reef and the orange areas (0.5-0.6 probability of reef occurrence) represent the less coarse cobbles and sandy patches in between. This would also correspond to what was mapped in the 2012 ES following the EIA characterisation survey. The survey report will be provided to MS-LOT when available.
Archaeological Surveys	Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub Bottom Profiler (SBP)	Baseline geophysical survey data was gathered for the 2012 ES and updated with information from the United Kingdom Hydrographic Office (UKHO) (reviewed 02/08/2019). These assessments have been used to identify and delineate marine archaeology and cultural heritage receptors and the appropriate buffer

Survey	Data Sources	Results
		zones around these receptors forming Archaeological exclusion zones (AEZs). There are a number of 50m and 100m AEZ's within the export cable corridor, however, the cable alignment has been designed to avoid these (Figure 4.3). Full details of these AEZs can be found in the Marine Archaeology WSI and PAD (LF000009-CST-OF-PLN-0002).

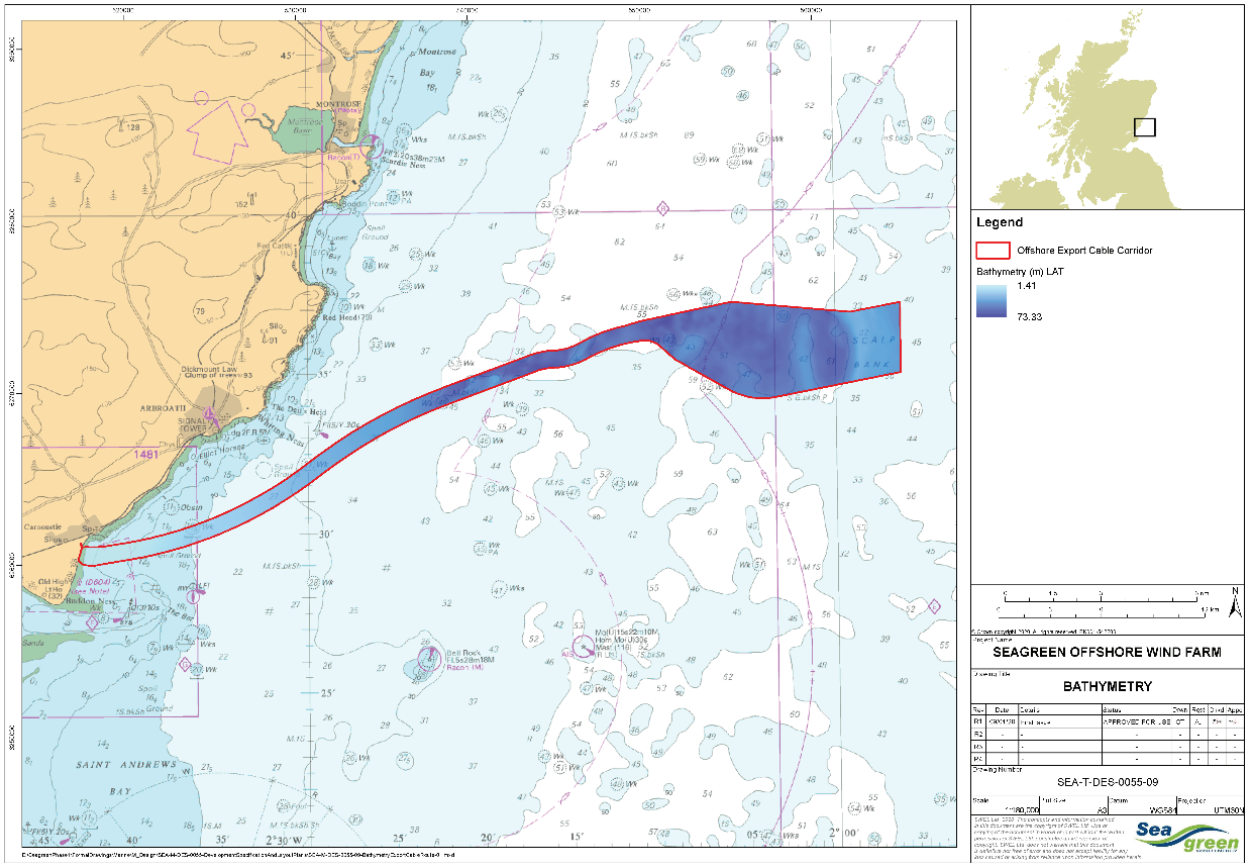


Figure 4.1: Cable corridor bathymetry data

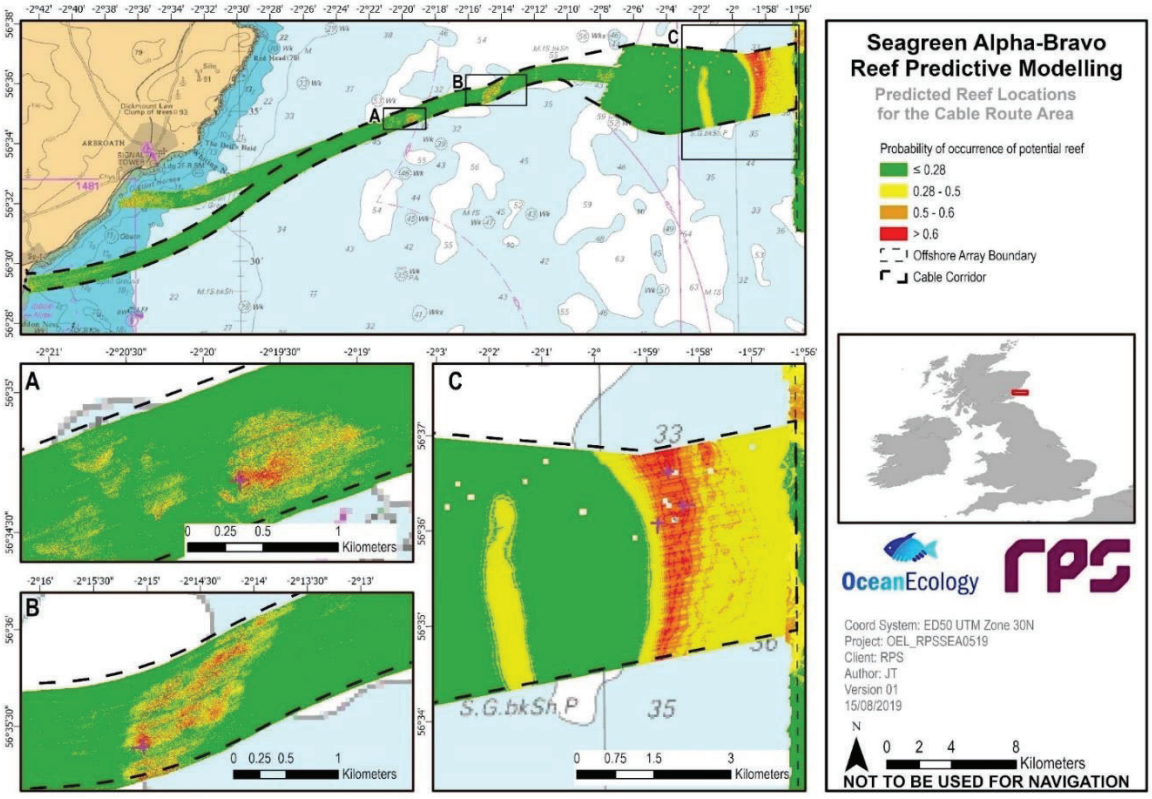


Figure 4.2: Subsea Export Cable Corridor predicted reef locations (OceanEcology, 2019)

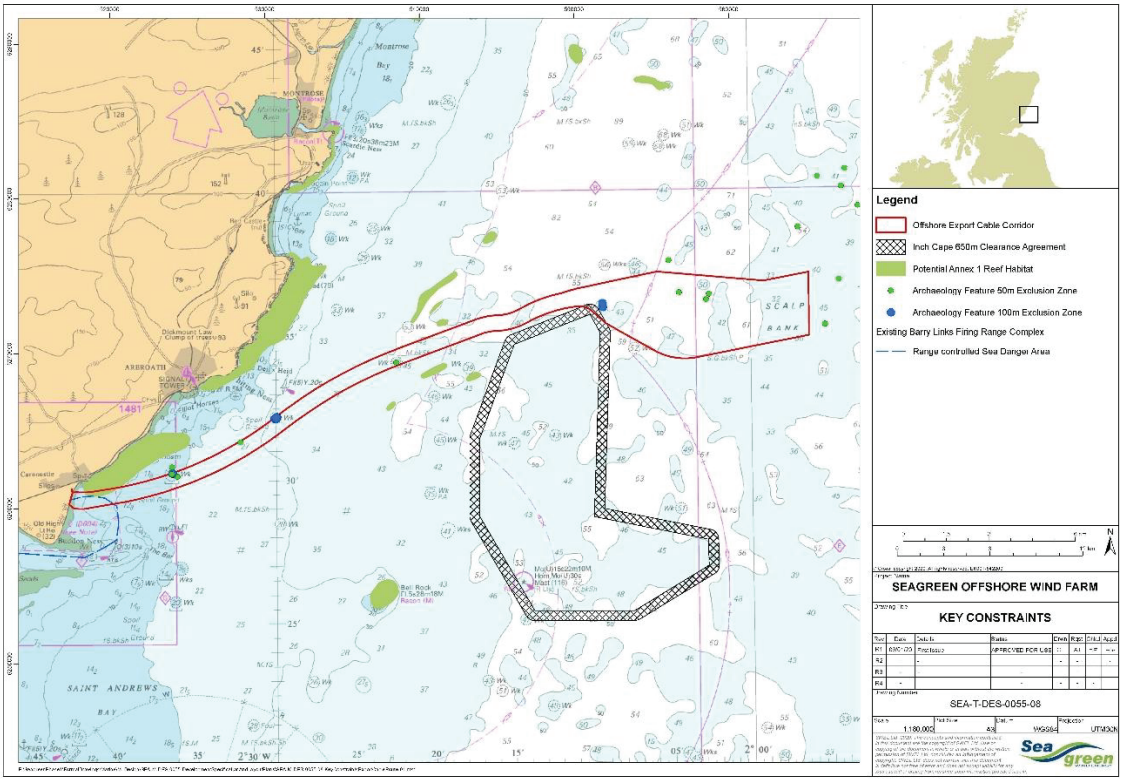


Figure 4.3. Cable corridor key constraints

5. Technical Cable Specifications

5.1 Cable Specifications

The OTA cable infrastructure consists of three subsea export cables and one interconnector cable. Three types of cable are required:

- Offshore 3-core aluminium cable (three cables, circa 63.2, 63.2 and 63.4 km in length) (see Figure 5.1 and Table 5.1);
- Landfall 3-core copper cable (circa 1-2 km in length) (see Figure 5.2 and Table 5.2); and
- OSP interconnector 3-core copper cable (circa 3 km in length) (see Figure 5.3 and Table 5.4)

Prior to the commencement of export cable installation it was estimated that more than 90% of the export cable length would be buried through trenching/jetting, with approximately 19 km requiring rock protection. Due to the dynamic nature of coastal processes in intertidal areas, cable protection measures such as rock armouring will not be used in the intertidal section of the landfall, as they have the potential to disrupt the natural coastal processes in the area (e.g. sediment movement via longshore drift). The cables in the intertidal area and in shallow waters are provided with weighted collars to prevent the risk of HDPE cable pipes floating to the surface in the event that storm wave induced liquification of beach sediment were to occur. Further details on the requirement for rock protection is provided in Section 7 0.

5.1.1 Export cable specification

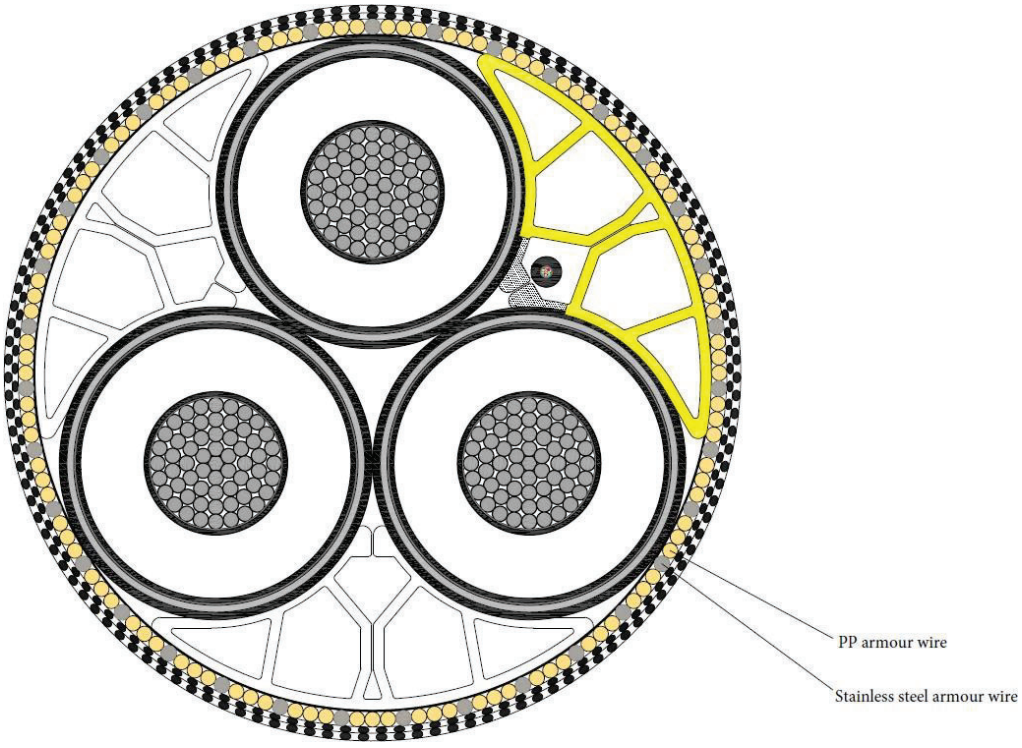


Figure 5.1: Offshore Export Cable Cross Section (Nexans, 2019a)

Table 5.1: Offshore Export Cable Specifications (Nexans, 2019a).

Parameter	Description	Nominal value
Cable impedance	Cable impedance at 90 °C conductor	(0.04 + j0.116) Ω/km
Zero impedance	Zero sequence impedance at 90 °C conductor	(0.38 + j0.068) Ω/km
Capacitance	Capacitance between conductor screen and insulation screen	0.204 µF/km
Short circuit current	Permissible thermal short circuit current in the conductor for one second (1) and in the metallic screen for one second (2)	(1) 114.3 kA (2) 3x18.2 kA
Diameter	Cable diameter	244 mm
Weight	Cable weight in air (1) and in water (2)	68 kg/m 29 kg/m
Bending radius	Minimum permissible bending radius for laying	3.7 m

The cables at the landfall will be buried in HDPE pipes through a rock revetment and the intertidal zone to a water depth of up to 3m (LAT) at the landfall at Carnoustie. From the termination of the HDPE pipe, burial using jetting will be undertaken to achieve a coverage of approximately 2.0 m depth to a water depth of 3 m (LAT). Below this water depth the target depth of cover will be 1.0 m.

5.1.2 Landfall cable specification

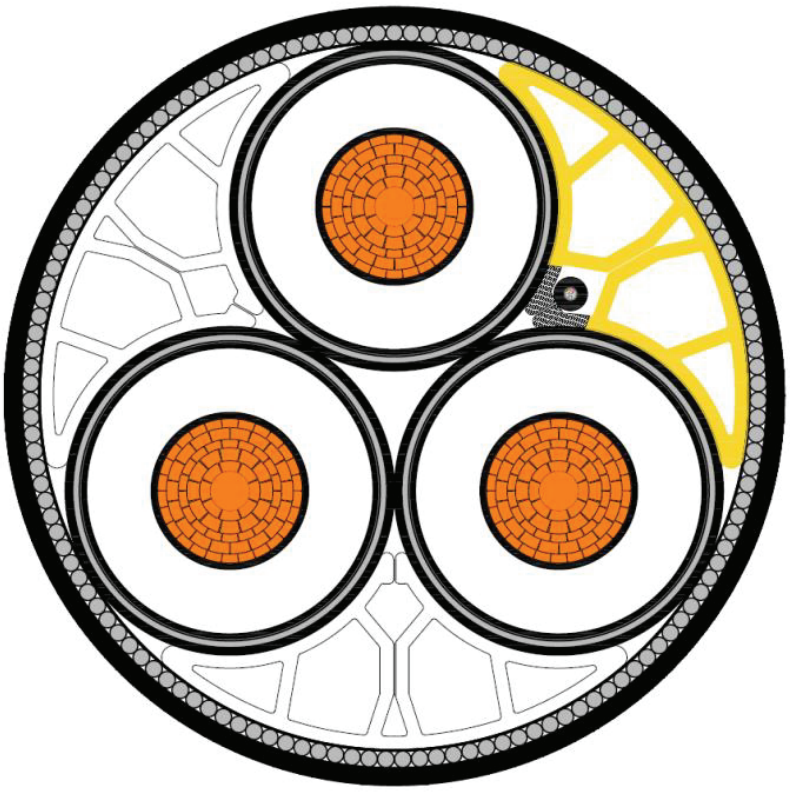


Figure 5.2: Landfall Cable Cross Section (Nexans,2019b)

Table 5.2: Landfall Cable Specifications (Nexans,2019b)

Parameter	Description	Nominal value
Cable impedance	Cable impedance at 90 °C conductor	(0.03 + j0.11) Ω/km
Zero impedance	Zero sequence impedance at 90 °C conductor	(0.16 + j0.09) Ω/km
Capacitance	Capacitance between conductor screen and insulation screen	0.228 µF/km
Short circuit current	Permissible thermal short circuit current in the conductor for one second (1) and in the metallic screen for one second (2)	(1) 258.8 kA (2) 3x18.7 kA
Diameter	Cable diameter	260 mm
Weight	Cable weight in air (1) and in water (2)	(1) 130 kg/m (2) 86 kg/m
Bending radius	Minimum permissible bending radius for laying	3.9 m

5.1.3 Interconnector cable specification

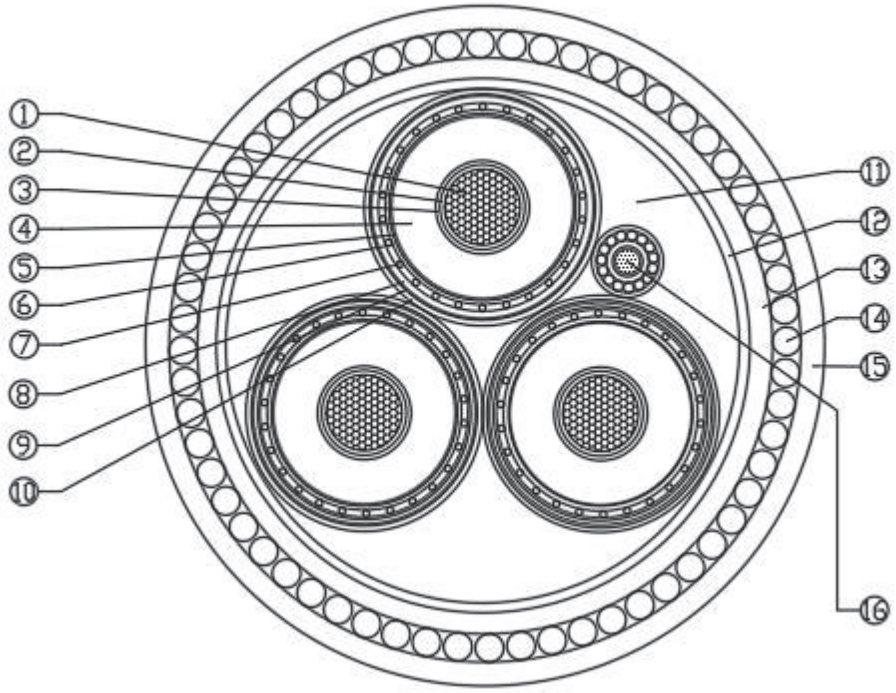


Figure 5.3: OSP Interconnector cable cross section (Helenic Cables, 2019)

Table 5.3: OSP interconnector cable key (Helenic Cables, 2019)

Component number	Description
1	Aluminium round stranded compacted class 2 according to IEC 60228 of nominal cross-section equal to 300 sq.mm, longitudinally water sealed.
2	Semiconducting tape applied with overlap.
3	Conductor non-metallic extruded screen: Extruded semiconducting compound.
4	Insulation: XLPE water-tree retardant according to IEC 60840 of 8.4 mm nominal thickness.
5	Core non-metallic extruded screen: Extruded semiconducting compound bonded to outer surface of insulation.
6	Semiconducting waterblocking tape(s) applied with overlap.
7	Metallic screen: Copper wires helically applied over each individual core. Nominal cross-section of copper wire screen excluding copper tape equal to 13 (sq.mm)
8	Semiconducting waterblocking tape(s) applied with overlap.
9	Radial water tightness: Aluminium polyethylene (AL/PE) laminated tape of 0.2 mm nominal thickness bonded to PE core sheath, longitudinally applied with overlap.

Component number	Description
10	Sheath: HDPE type ST7 of 3 mm approximate thickness and an extruded semiconducting compound serving as electrode for the DC voltage test of the sheath. Sheath colour: Black.
11	Extruded PVC profile fillers at the outer interstices between cores in order to give the cable a circular cross-section.
12	Binding tape(s) helically applied with overlap.
13	One layer of polypropylene yarns of approximate thickness of 2 mm.
14	Armour consisting of one layer of helically applied bitumen compound coated galvanized round steel wires of grade 34, class A, 4.5 mm, according to EN 10257-2.
15	Two layers of polypropylene yarns with total approximate thickness of 3.0 mm. Over the inner (first) layer bitumen compound is applied. Also, the outer (second) layer shall consist of black and yellow polypropylene yarns as to form a helical yellow stripe.
16	Armoured optical unit of 16 mm approximate diameter that consists of a stainless steel tube (containing 48 single-mode optical fibres), PE inner sheath, galvanized steel wire armour and PE oversheath

Table 5.4: OSP Interconnector cable specifications (Helenic Cables, 2019)

Parameter	Description	Nominal value
Zero impedance	Zero sequence impedance at 90 °C conductor	0.32+0.1i
Capacitance	Capacitance between conductor screen and insulation screen	0.26 µF/km (calculated based on nominal dimensions)
Short circuit current	Permissible thermal short circuit current in the conductor for one second (1) and in the metallic screen for one second (2)	(1) 28.8 kA /1s (non adiabatic calculation) Initial / Final Temperature: 90/250o (2) 2.5 kA/1s (non adiabatic calculation) Initial / Final Temperature: 80/250oC
Diameter	Cable diameter	145 mm (approx.)
Weight	Cable weight in air (1) and in water (2)	(1) 29.3 kg/m (2) 13.4 kg/m (flooded) 12.5 kg/m (unflooded)
Bending Radius	Minimum permissible bending radius for laying	2.2 m

5.2 Desk Based Electro-Magnetic Field Strength Attenuation Assessment

This section provides a summary of a desk-based assessment carried out by Nexans (2020) on behalf of Seagreen on the attenuation of electro-magnetic fields generated by the subsea export cables. Full details of this assessment can be found in Electro Magnetic Field Strength Attenuation Assessment (LF000009-NEX002-REP-H13-001-01). This report has been updated to include the minimum acceptable burial depth of 0.5m.

In order to understand the magnetic fields produced by the cables, calculations were repeated four times (i.e. at four different heights) for each design. During calculations for each burial depth, the depth was kept constant while the horizontal distance was varied between -20 metres and 20 metres. In accordance with the burial depths considered for the Seagreen Project burial depth was set to 0.5m as the most conservative value (as this is the minimum burial depth and shallower than planned) and also at 1.0m, 2.5 m and 5 m to examine any changes with greater burial depth. The results for the offshore export cable are shown in Figure 5.4, while the results for the landfall export cable are shown in Figure 5.5.

It is worth noting that the conductor currents vary with time, which causes the magnetic fields to also vary with time. The field values shown in Figure 5.4 and Figure 5.5 are the peak values, which occur when the conductor closest to the seabed reaches its maximum current value of 1352 A. The maximum values are summarised in Table 5.5 and are considered to be worse case scenario for the system.

Table 5.5 Peak values for the offshore and landfall cables

Height	Offshore cable max flux density	Landfall cable max flux density
0.5m	109.4 µT	117.2 µT
1.0 m	25.9 µT	27.6 µT
2.5 m	3.99 µT	4.25 µT
5.0 m	0.99 µT	1.05 µT

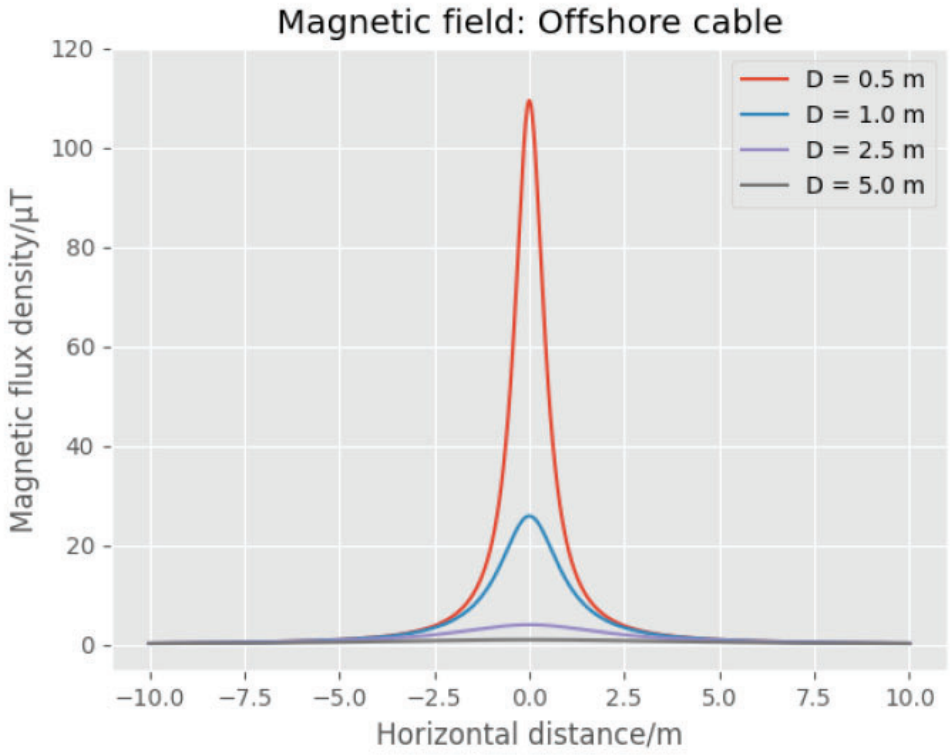


Figure 5.4: Magnetic field distribution for the offshore cable

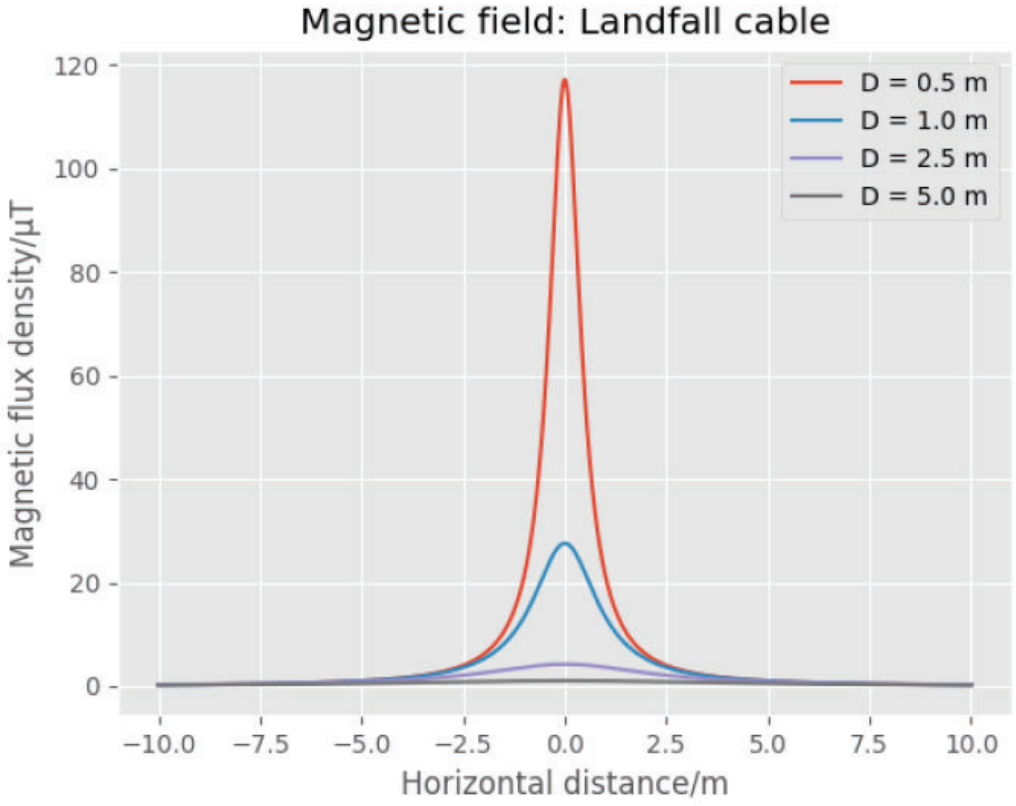


Figure 5.5: Magnetic field distribution for the landfall cable

6. Cable Burial Risk Assessment

6.1 Export Cable Burial Risk Assessment

An initial Cable Burial Risk Assessment (CBRA) was carried out for the Seagreen OTA Project by Nexans (LF000009-NEX001-REP-C12-001-01) based on pre-construction site investigation results. This involved an assessment of the risk of damage or exposure of the subsea export cables, considering the baseline environment along the cable route corridor. The process followed for the CBRA and a summary of the results are outlined below.

The activities and processes that have the potential to damage or expose cables were assessed. The CBRA focused on 4 major risk factors:

- Marine traffic
- Commercial fishing
- Sediment movement
- Sediment types and risk areas

The CBRA utilised marine data, including shipping traffic (e.g. type of ship/frequency of tracks across the cable route corridor), commercial fishing activity and sediment type/composition. The extent to which these factors are present in the cable route corridor determines the level of risk ascribed to sections of the cable. For example, where sediment composition is very soft, the penetration depth of some anchors is increased and therefore the risk to cables is higher in the event of an unplanned anchorage.

The CBRA was subsequently re-evaluated following an updated, probabilistic approach to shipping traffic and the likelihood of emergency anchoring (Report LF000009-NEX002-PLN-B14-001-01(Nexans, 2022)), following the industry standard guidance (Carbon Trust, 2015). This assessment provides a risk return period of the likelihood of an emergency anchor strike interacting with the cable at a range of burial depths and recommends a Depth of Lowering (DoL) required to protect against the occurrence. The overall risk return periods for an emergency anchor strike interacting with the cable at a range of different burial depths was determined and is line with DNV Risk Category 2. This corresponds to a risk return period of between 10,000 and 100,000 years and has been commonly used as the acceptable standard for offshore wind farm cables. The risk categories were developed by DNV for oil and gas pipelines and are considered to be conservative when considering wind farm power cables.

Other cable risks arise from seabed level change and from potential interaction and damage due to fishing activities in the area. The risk of damage due to fishing gear (anchoring from fishing vessels is included in the probabilistic assessment) is prevalent across the cable route. The maximum depth of penetration from typical fishing gear is typically between 0.2 and 0.3m, therefore the required burial should exceed this with an additional allowance for changing seabed levels over the lifetime of the cable to ensure this burial depth is present. Seabed sediment mobility along the cable route is expected to be minimal outside of the shore approach area.

Given the above, the following was therefore recommended in the CBRA for cable burial outside of the shore approach area:

- A target DoL of 1.0m is attempted for initial and remedial passes of the trencher for all three cables
- A minimum DoL of 0.5m is required to mitigate seabed mobility risk and the risk of interaction with fishing gear.

The minimum burial depth of 0.5m includes an allowance of 0.2m sediment mobility (including for seabed survey tolerances) in addition to the assumed maximum penetration depth of fishing gear. At this burial depth the risk of anchor strike is within acceptable levels (greater than 1 in 10,000 years). The offshore cable trenching operations will seek to achieve the 1m DoL. The minimum DoL of 0.5m defines the acceptable burial depth and thus determines the extent of rock protection that may be required following the trenching campaign. The installation of rock protection will maintain the overall risk profile.

In the nearshore area, from KP0.15 to KP3.00, there will be a grading of target burial depth from 2.75m to 1m as an allowance for the nearshore erosion, with the minimum burial depth noted to be equal to target in this area, as the seabed level is expected to reduce significantly throughout the lifetime of the project.

Rock placement locations will be confirmed following the completion of cable burial via the required marine safety information channels, (i.e. information will be provided via the NtM procedures, the FLO and via guard vessels strategically placed along the cable route during cable protection installation activities). Consultation meetings will be arranged with local fisheries stakeholders as required to enable direct communication of this information. Marine Scotland will also be informed of rock placement locations following completion of cable burial process.

The Marine Co-ordination Centre (MCC) will also be a focus of communication and will provide a weekly notice of operations detailing project activities. Where cable protection is required, it will be designed, as far as reasonably practicable, to minimise the risk of fishing gear snagging on the protection. Further details regarding specific engagement related to fisheries is provided in the FMMS (LF000009-CST-OF-PLN-0011).

6.2 Interconnector Cable Burial Risk Assessment

An additional Cable Burial Risk Assessment (CBRA) was also carried out for the interconnector cable by Cathie (LF000009-CAS001-REP-H05-015-01). This involved an assessment of the risk of damage or exposure of the interconnector cable by considering the baseline environment along the cable route.

The activities and processes that have the potential to damage or expose cables were assessed. The CBRA focused on 4 major risk factors:

- Fishing Equipment
- Mobile Sediments

- On-bottom Stability
- Emergency Anchoring

The CBRA utilised geophysical data, including geotechnical, bathymetry, seabed features and sub-bottom profiling alongside site specific data which included sediment mobility, potential unexploded ordinance (pUXO), fishing, wrecks, shipping (Automatic identification system, AIS), dredging and dumping, existing infrastructure and cable specifications. These factors are used to determine the level of risk ascribed to each section of the cable.

Table 6.2 presents the results of the analysis, including the unmitigated and mitigated level of risk and the mitigation is to be implemented for each risk level, including recommended burial depths. It is anticipated that the full length of the OSP interconnector will be buried to the target depth.

Table 6.1: Risks to interconnector cable and mitigation measures required

Risk	Unmitigated Risk Level	Mitigation	Mitigated Risk Level[1]	Recommended Burial Depth
Anchor Risk	ALARP	The proposed mitigation for this hazard is lowering burial depth to below anchor threat lines such that a return period/acceptable level of risk is achieved.	Acceptable	0.5 m - a uniform burial depth of 0.5m would provide an anchor risk return period in excess of 10,000 years.
Fishing Risk	Unacceptable	The proposed mitigation for this hazard is lowering to a depth below fishing threat lines such that a return period/acceptable level of risk is achieved.	Acceptable	0.2 m - 0.3 m – A minimum burial depth of 0.2 to 0.3m is recommended for sands/stiff clays and soft clays respectively.
Dredging Risk	Acceptable	No mitigation required	Acceptable	Not Applicable
Cable Stability Risk	ALARP	The proposed mitigation for this hazard is embedment to provide stability.	Acceptable	0.2 m - 0.3 m – An embedment 0.2 to 0.3m (w.r.t the bottom of cable)

[1] In establishing the frequency and consequence of the identified hazards, the acceptability level and requirement for mitigation is determined.

Risk	Unmitigated Risk Level	Mitigation	Mitigated Risk Level[1]	Recommended Burial Depth
Sediment Mobility Risk	Unacceptable	The most effective mitigation is to lower the cable below the mobile sediments.	Acceptable	0.1 m - Max of 0.1m allowance or the height of a sandwave where cables intersect these features.

The assessment of burial depth values was undertaken considering fishing, bottom stability and sedimentation and allowed for a safety margin of 0.1 m and a minimum practical burial depth of 0.5 m. Based on the results, the assessment recommended burial depths of 0.1 m to 0.5 m, in order to mitigate the potential risks identified across the OWF and for the location of the interconnector. It should be noted that burial depths of 0.5 m to 2.1 m, were assessed in the ES and the minimum burial depth for the interconnector cable will be 0.5 m.

7. Cable Protection Requirements

As noted in section 5.1, it was initially estimated that for approximately 10% of the subsea export cables the target burial depth (as originally defined) may not be fully achievable (following the process outlined in Table 3.4 including the second trenching pass). Following the CBRA update the target burial depth was adjusted to 1m, with a minimum acceptable burial depth defined as 0.5m. The effect of this change is to reduce the likely extent and volume of rock protection required. The CBRA confirms that the revised target burial depth continues to provide adequate protection of the cable. The revised target and minimum acceptable burial depths accord with the parameters presented and assessed in the 2012 ES.

The actual extent to which cable burial to target depth was achieved was confirmed by surveys undertaken immediately following the completion of cable installation.

In locations where target burial depth has not been achieved, cable protection (e.g. rock placement) will be required, as noted in Section 3 and Section 5.2.1. Rock protection volumes will be limited to that which is necessary to adequately protect the cable to sufficiently mitigate the cable burial risk levels as set out in Section 6.1. The 2012 ES described the potential safety risks associated with fishing in the vicinity of unburied or insufficiently buried cables as outside of acceptable limits until successful burial and protection was demonstrated. Where cable protection is required, it will be designed, in line with accepted industry standards to minimise, as far as reasonably practicable the risks of fishing gear snagging on the protection.

It is anticipated that the full length of the OSP interconnector (within the wind farm site) will be buried to the target depth determined as described in the CBRA process (set out in Section 6) to provide protection to both the cables and to other marine users (with the exception of short lengths where the cables approach the OSPs). In this event, no additional cable protection will be required.

Details of the as-installed cable locations and the location of any areas of cable protection will be made available to other marine users including commercial fishermen (in accordance with the FMMS), through the required marine safety information channels (i.e. information will be provided via the NtM procedures, the FLO and via guard vessels strategically placed along the cable route during cable protection installation activities). Consultation meetings will be arranged with local fisheries stakeholders as required to enable direct communication of this information. The Marine Co-ordination Centre (MCC) will also be a focus of communication and will provide a weekly notice of operations detailing project activities. Further details regarding specific engagement related to fisheries is provided in the FMMS (LF000009-CST-OF-PLN-0011).

Condition 3.2.2.10(f) of the OTA Marine Licence requires the OTA Cable Plan to include methodologies for over trawl surveys where mechanical protection of cables is used. Where target burial depth is not achieved and additional cable protection is installed Seagreen proposes that detailed geophysical surveys (e.g. high-resolution multi-beam echo sounder, side scan sonar, video) of the rock protection berms may be undertaken. The resulting high-resolution data from these surveys would enable the creation of detailed 3D digital terrain maps and 2D cross sections of the rock protection berms and the adjacent seabed. This will provide clear and complete information that can be made available to fishermen regarding the condition of the seabed at all locations where cable protection has been installed. Such surveys could be integrated into the ongoing cable inspection and monitoring regime.

In respect of the requirements of Condition 3.2.2.10(f), Seagreen will also undertake over trawl surveys of the rock protection berms at selected locations where fishing using seabed contacting trawl gear is shown to occur. In other locations, for example where static fishing gear is extensively deployed, it is taken that no over trawl surveys will be required. The locations and the extents of the over trawl surveys will be informed by the geophysical survey results, through currently available fishing activity data and through further post-construction consultation with fisheries stakeholders and agreed with MSLOT.

If over trawl surveys of the rock protection berms are considered to be reasonably necessary at any agreed locations, Seagreen will prepare a detailed survey specification that will include a description of the appropriate vessel to undertake the survey, the type, specifications and rigging configuration of the trawl to be deployed and the towing pattern to be followed. The parameters to be assessed would also be defined along with acceptable limits relative to normal towing characteristics. The appropriate safety risk assessment would also be undertaken. Seagreen proposes to discuss and confirm the full details of the over trawl survey approach with Marine Scotland, in consultation with fisheries stakeholders, following the completion of cable installation, taking into account the extent and type of mobile gear fishing activity shown to occur along the cable route. Seagreen will not undertake any further investigation in this respect where it is confirmed that the target burial depth has been achieved.

Following successful completion of cable installation and any over trawl surveys Seagreen expects that fishing activity will resume in the vicinity of the cables, with reasonable and appropriate practices, to avoid any risk to the vessel or damage to the cable. The subsea export cables, interconnector cable and installed cable protection will be subject to periodic inspection during the ongoing operational and maintenance phase (see Section 8 for further details). Monitoring outputs will be shared with fisheries stakeholders, to confirm cable burial and the condition of the seabed.

8. Cable Exposure Monitoring

8.1 Cable Exposure Inspection

Approximately one year following cable installation, a survey will be undertaken to ensure that that cable remains as installed and to identify areas of cable at potential risk of exposure in the future. 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.

Should any damage, decay or destruction of cables be identified, Marine Scotland, MCA, Kingfisher and the UKHO will be notified as soon as reasonably practicable and no later than 24 hours following the identification of any such damage, destruction or decay. In case of exposure of cables on or above the seabed, a NtM will be issued and notification to Kingfisher Information Service of the location and extent of exposure within three days following identification of a potential cable exposure.

8.2 Remedial Actions

In the event that the cable monitoring surveys identify a cable exposure, protection levels will be restored using ROV burial or by alternative means (e.g. rock placement), consented under a separate Marine Licence if required. The determination of whether burial is possible rather than using rock protection will be based on the nature and location of the exposure. Should additional rock protection be required; marine users will be notified via the standard Notice to Mariners procedures.

In the nearshore landfall area cable ducts will also be used to provide additional mechanical protection. However, in the event the cables/ducts become exposed, infrastructure would be reburied using similar methods to those used during the original installation. In the event that the duct becomes exposed at the final exit location there could also be an option to excavate it, and cut it to allow reburial of the pipe, and cable within it, to the desired depth below the seabed.

The details of remedial actions will be developed once the ducts and cables have been installed and will be described in the Operation and Maintenance Programme (LF000009-CST-OF-PRG-0004) for the Seagreen OTA Project, which will be submitted to the Licensing Authority no later than 3 months prior to the commissioning of the first OSP.

8.3 Cable Failure

In the event of cable failure, the failed cable sections will be recovered and replaced with cable and joints taken from contingency spare stocks. A specific complete replacement landfall section of cable will be held as a spare to allow timely replacement of this shallow water section. Replaced cable lengths will be protected by ROV burial or by alternative means (e.g. rock placement), consented under a separate Marine Licence if required.

9. Compliance with the ES and ES Addendum

9.1 Introduction

This section presents how the OTA CaP will be constructed in accordance with the construction methods Assessed in the ES, ES addendum and ER and that construction related mitigation proposed in the ES, ES Addendum and ER are to be delivered.

9.2 ES, ES Addendum and ER Commitments

Since award of development consent for Seagreen, the design of the project and the approach to installation has been substantially refined, as set out within this OTA CaP, the OTA CMS (LF000009-CST-OF-MST-0002) and in other relevant consent plans. To demonstrate compliance with those methods assessed within the ES and ES Addendum, Appendix C – Compliance with ES parameters and processes provides a tabulated comparison of project construction parameters and methodologies as presented in the ES, ES Addendum and Alternative Landfall Cable Installation Methodology Environmental Report (ER) with those detailed in this OTA CaP.

The ES, ES Addendum and ER for the Seagreen Project detailed a number of mitigation commitments specific to construction and installation activities. Appendix D - Summary of mitigation commitments presents the commitments made by Seagreen in the ES, ES Addendum and ER to mitigation measures relative to construction methods and processes set out in this OTA CaP. The table provides details of the commitments and a cross-reference to where each commitment is implemented.

A complete register of the mitigation, management and monitoring commitments made in the ES and ES Addendum and required by relevant consent conditions, is set out in the commitment's registers included as part of the Project Offshore CEMP (LF000009-CST-OF-PLN-0014).

10. References

Carbon Trust (2015). Cable Burial Risk Assessment Methodology, Guidance for the Preparation of Cable Burial Depth of Lowering Specification

Helenic Cables (2019). Cable Technical Design Report

IECS (2011). Firth of Forth (Round 3) Offshore Wind Farm Development: Drop Down Video Report. Report: ZBB776-DDV-D-2011, 82.

MCA (2021). MGN 654: Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response

Nexans (2019a). Offshore Export Cable - Datasheet TKRA 245 kV 3x1x1200mm2 Al + FO

Nexans (2019b). Offshore Export Cable - Datasheet TKRA 245 kV 3x1x1800mm2 Cu + FO

Nexans (2019c). Offshore Export Cable - Burial Risk Assessment

Nexans (2022). Burial Risk Assessment Plan, Report no. LF000009-NEX002-PLN-B14-001-01

OceanEcology (2019). Seagreen Offshore Windfarm Predictive Modelling of Potential Reef Habitat

Osiris Projects (2011a). Firth of Forth Offshore Wind Farm Export Cable Geophysical Survey Volume 1 - Operations Report October 2011, *1*, 33.

Osiris Projects (2011b). Firth of Forth Offshore Wind Farm Export Cable Geophysical Survey Volume 2 - Report October 2011, *2*, 36.

Table 10.1 Seagreen Document References

SWEL Document Number	Title
LF000009-CST-OF-PLN-0002	Marine Archaeological Written Scheme of Investigation & Protocol for Archaeological Discoveries
LF000009-CST-OF-PRG-0002	Offshore Construction Programme
LF000009-CST-OF-PLN-0014	Offshore Construction Environmental Management Plan
LF000009-CST-OF-MST-0002	Offshore Transmission Assets Construction Method Statement
LF000009-CST-OF-PLN-0008	Offshore Wind Farm Cable Plan
LF000009-CST-OF-PRG-0001	Offshore Wind Farm Operations and Maintenance Programme
LF000009-CST-OF-SOW-0022	Benthic Monitoring Strategy

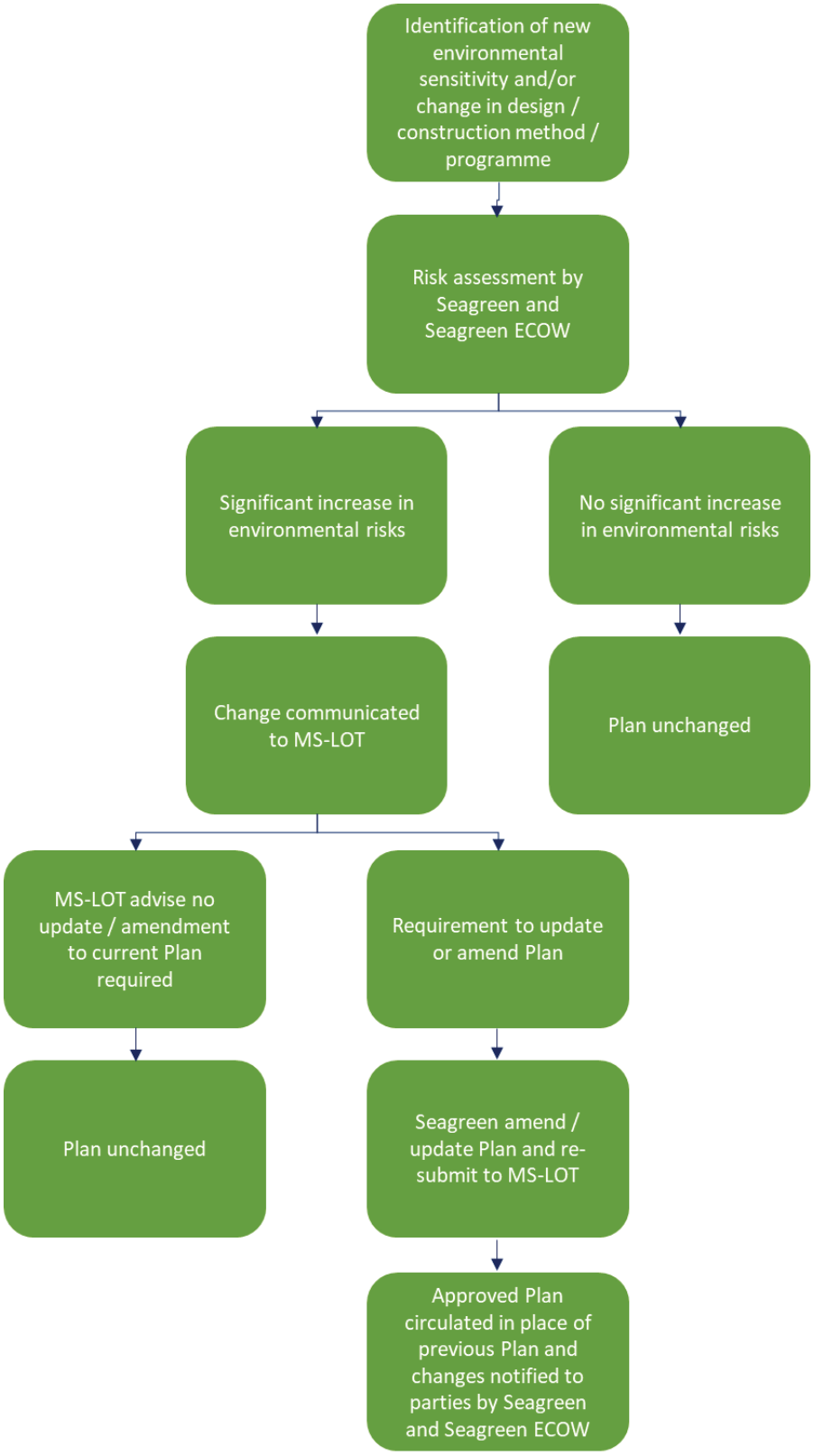
Appendix A – List of Abbreviations and Definitions

Term	Description
ALARP	As low as reasonably practicable
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 licences granted by the Scottish Ministers on 28 August 2018 (reference 04676/18/0) and 10 October 2022 (reference MS-00010075)
Alternative Landfall Cable Installation Methodology Marine Licence	Marine Licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 on 21 November 2019 (and subsequently varied) in respect of the Alternative Landfall Cable Installation Methodology
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 marines licence granted by the Scottish Ministers on 28 August 2018 (reference 04677/18/0) and 10 October 2022 (reference MS-00010076)
CBRA	Cable Burial Risk Assessment
CLV	Cable Lay Vessel
CMS	Construction Method Statement as required under Alpha and Bravo Section 36 Condition 11 and the Offshore Transmission Asset Marine Licence Condition 3.2.2.4
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
Contractor	The contractor as appointed by SWEL
Contractor Construction Environmental Management Plan	SWEL's Contractors are required to produce a Contractor Offshore CEMP detailing how the Contractor will, as a minimum, implement and deliver the commitments set-out in this. The Contractor offshore CEMP should detail measures specific to the Contractor's deliverables.
CoP	Construction Programme as required under Alpha and Bravo Section 36 Condition 9 and the Offshore Transmission Asset Marine Licence Condition 3.2.2.3
CPS	Cable Protection System
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.
EPS	European Protected Species
ES	Environmental Statement

Term	Description
JNCC	Joint Nature Conservation Committee
Landfall site	The point above MHWS where the OTA export cables connects to the OnTW
Licencing Authority	Marine Scotland acting on behalf of the Scottish Ministers
Licensee	Seagreen Wind Energy Ltd (Seagreen), a company with number 06873902 and having its registered office at No1 Forbury Place, 43 Forbury Road, Reading, United Kingdom RG1 3JH, on behalf of SAWEL and SBWEL in respect of the OTA Marine Licence and Seagreen Wind Energy Ltd a company with number 06873902 and having its registered office at No1 Forbury Place, 43 Forbury Road, Reading, United Kingdom RG1 3JH in respect of the Alternative Landfall Cable Installation Methodology Marine Licence
Marine Licences	Either or both of the OTA Marine Licence or the Alternative Landfall Cable Installation Methodology Marine Licence
MHWS	Mean High Water Springs
MS-LOT	Marine Scotland Licensing and Operations Team
O&M	Operation and Maintenance
OnTW	Onshore Transmission Works, from landfall consisting of onshore buried export cables and new transmission substation
OTA	Offshore Transmission Asset, comprising the OSPs and the transmission cable required to connect the Wind Farm Assets to the OnTW from the OSPs 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 on 10 October 2014, as amended by the revised marine licences granted by the Scottish Ministers on 6 March 2019 (reference 04678/19/0) and 10 October 2022 (reference MS-00010078) in respect of the OTA
OTA CaP	Cable Plan as required under the Offshore Transmission Assets Marine Licence Condition 3.2.2.10
OSP	Offshore Substation Platform means an alternating current Offshore substation platform which is a standalone modular unit that utilises the same substructure and foundation design as a wind turbine generator
OWF	Collective term used to describe the Wind Farm Assets and OTA
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
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

Term	Description
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
Seagreen	Seagreen Wind Energy Limited (SWEL), the parent company of Seagreen Alpha Wind Energy Ltd (SAWEL) and Seagreen Bravo Wind Energy Ltd (SBWEL), (company number 06873902) and having its registered office at No.1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
Site	The area outlined in red in both Figure 1 attached to the S36 consent Annex 1 and the figure contained in Part 4 of the Marine Licence
SNH	Scottish Natural Heritage
SRI	Seabed Rock Installation
SSE	Scottish and Southern Energy
Wind Farm Assets	The Offshore array development as assessed in the ES including WTGs, their substructures and foundations, and associated inter-array cabling
WTG	Wind turbine generator

Appendix B – The OTA CaP Change Management Procedure



Appendix C - Compliance with ES parameters and processes

Construction parameter/process	ES	OTA CaP
Subsea export cables		
Export cable voltage	AC 275 kV or DC 220 kV	HVAC 225 kV
Number of export cable trenches	Original Application ≤ 6 Alternative cable landfall ER - 3	3
Number of export cables	Original Application ≤ 6 Alternative cable landfall - 3	3
Cable separation distance	Alternative cable landfall ER 5-10m (through rock revetment) Up to 25m (intertidal and subtidal)	10m (through rock revetment) Up to 25m (intertidal and subtidal)
Maximum total length	Original application - 530 km	63.2km, 63.2km and 63.4km (total 189.8km)
Export cable corridor route width	1 – 4.5 km	1 – 4.5 km
Maximum length of cable which will require rock armoured or concrete mattress protection	Up to 26.5 km	Approximately 41.5 km
Export cable installation at the landfall	*Original application* Horizontal Directional Drilling (HDD) under coastal defence from above MHWS (ES) continued by ploughing or mechanical trenching across the intertidal area to meet the offshore works *Alternative cable landfall ER* Open cut trenching through rock revetment and through intertidal and nearshore subtidal zones	Open cut trenching through rock revetment and jet trenching through intertidal and nearshore subtidal zones.
Cable burial depth	Between 0.5 - 3 m	Minimum acceptable burial depth of 0.5m and maximum depth of 3m.
OSP Interconnector		

Construction parameter/process	ES	OTA CaP
Network of high voltage subsea power cables providing inter connection between OSPs	Circa 220 kV or above	Circa 220 kV or above
Cable installation techniques considered	• Cable plough • Jet trencher • Mechanical cutter	• Jet trenching • Mechanical cutter
Cable burial depth	Between 0.5 - 2.1 m	Minimum 0.5m and Maximum 2.1m

Appendix D - Summary of mitigation commitments

Table D.1: Overarching mitigation measures and good working practices as committed to in the ES and ES Addendum.

Source	Reference (ES chapter)	Details of commitment	Reference (this document)
ES September 2012	Project Description – 5.114	Once array and export cables have been laid, they will be buried within trenches or by rock placement as soon as is practicable.	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment
ES September 2012	Physical Environment – 7.273	Efforts will be made to optimise the length of cable that will achieve target burial depth and therefore the amount of cable protection required will be minimised.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Physical Environment – 7.281	Rock dumping and concrete mattresses will not be used to protect the cables in the nearshore (depths less than 7m and intertidal zone).	Section 3 – Cable Location and Installation Techniques
ES September 2012	Benthic Ecology and Intertidal Ecology - 11.200	The amount of rock, grout bags or mattresses used to protect the cable will be kept to the minimum amount (which may be less than the worst case estimate of 10% or 26.5km) necessary to ensure protection.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Benthic Ecology and Intertidal	Best practice measures will be employed by Seagreen, based on lessons learnt from equivalent cable installations across sandy shores, to ensure that the significance of potential impacts remain as negligible, these include:	Section 3 – Cable Location and Installation Techniques

Source	Reference (ES chapter)	Details of commitment	Reference (this document)
	Ecology - 11.214	• Limiting the number of vehicle operations across the intertidal area. • Ensuring that any vehicle operations keep to designated areas of minimal practicable size • Lay down of tracking if appropriate in areas of softer sand	
ES September 2012	Marine Mammals 13.512 and 13.516	The export cables will be shielded to meet industry standards and will be buried to a minimum of 0.5m.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Commercial Fisheries - 14.222	Export cables will be buried to a target depth of between 0.5 and 3m, where it is technically practicable to do so, which will reduce the risk to fishing vessels from snagging. In instances where adequate burial cannot be achieved an appropriate cable protection will be used.	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment Section 0 - Cable Protection Requirements
ES September 2012	Shipping and Navigation - 15.113, 15.145	Cables will be buried where possible. Where burial is not possible due to seabed conditions, other protection means such as concrete mattresses and rock dumping will be used to protect the cable (it is assumed that a maximum of 5% of cables will not be buried).	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment
ES September 2012	Seascape, landscape and visual amenity - 16.216	Within the export cable corridor, the construction activities close to residential receptors would be restricted to daylight or normal working hours. If there is night-time lighting less than approximately 2 km to the shore, best practice measures would be applied to ensure the lighting is not directed towards the shore (e.g. using boats between the works and shore only).	Section 3 – Cable Location and Installation Techniques

Source	Reference (ES chapter)	Details of commitment	Reference (this document)
ES September 2012	Archaeology & Cultural Heritage - 17.90	Where cultural heritage assets may potentially be subject to direct effects, infrastructure will be micro-sited/ re-routed and temporary exclusion zones will be implemented to prevent invasive activities, such as OSP and cable installation, and anchoring or deployment of jack -up legs. OTA exclusion zones of at least 100m will be established around those of high sensitivity HA10, HA12, HA18, HA19, HA28, HA35, HA47, HA60 and HA62. OTA exclusion zones of at least 50m will be established around those of medium sensitivity HA6, HA9, HA26, HA29, HA30, HA31, HA32, HA34, HA36-HA38, HA56, HA57, HA61, HA65, HA306, HA340 and HA345.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Socio Economics, Tourism & Recreation - 19.143	The export cables will be laid below the surface and hence will not result in any permanent change to the utilisation of the receptors as tourism or recreations resource (Barry Sands and Carnoustie Bay). Disruption caused by construction on the beach of the export cable will be for a maximum of 3 months. Access would be prevented for safety reasons for a temporary period of 3 months	Section 3 – Cable Location and Installation Techniques
ES September 2012	Mitigation and Monitoring – 22.12	Best practice guidance will be followed to ensure that potential damage to coastal environmental features by disruption of sediment transport is minimised throughout the proposed construction works. No rock dumping or surface protection of cables in shallow inshore water is necessary as cables will be buried.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Mitigation and Monitoring – 22.32	Consideration will be given to limiting light spill (by directional lighting, directed downwards) from construction vessels involved in cable laying and related activities at night within 2km of the shore, to avoid visual intrusion at residential locations.	Section 3 – Cable Location and Installation Techniques

Table D.2: Mitigation and good working practices specific to landfall installation.

Source	Reference (ES Chapter)	Details of commitment	Reference (this document)
ER – alternative cable landfall	Table 4.1	Rock that is used to replace any material on the rock revetment will be either imported from Norway or from a UK quarry. The quarried material will be transported dry to reduce the potential risk of Invasive Non-Native Species.	Section 3 – Cable Location and Installation Techniques
ER – alternative cable landfall	Table 4.1	The rock revetment will be reinstated following completion of the works. Initial inspection has determined that some additional rock may be needed. Rock materials removed from the rock revetment will, where practicable, be reused during reinstatement if this is possible. Rock that is used to replace any material on the rock revetment will be either imported from Norway or from a UK quarry. The quarried material will be taken from onshore and will be transported dry to reduce the potential risk of Invasive Non-Native Species.	Section 3 – Cable Location and Installation Techniques
ER – alternative cable landfall	Table 4.1	A topographic survey will be carried out to identify and map the contours of the seabed, beach and rock revetment prior to construction. Following reinstatement, a repeat topographical survey will be carried out to confirm that the original profiles and bathymetry have been restored.	Section 3 – Cable Location and Installation Techniques Section 4 – Pre-construction Surveys

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