Environmental Impact Assessment Report
Volume 4: Outline Scour Protection Plan

MarramWind Offshore Wind Farm

December 2025

MarramWind

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1. Introduction

1.1 Overview

1.1.1.1 This Outline Scour Protection Plan (SPP) has been produced along with the Environmental Impact Assessment (EIA) Report and aims to outline the approach to managing scour risks associated with the MarramWind Offshore Wind Farm Project (hereafter referred to as 'the Project').

1.1.1.2 The Outline SPP applies only in the offshore environment below Mean High Water Springs (MHWS). It does not include any onshore scour protection.

1.1.1.3 The outline SPMP is related to the mitigation measure M-028 of **Volume 3, Appendix 5.2: Commitments Register.**

1.2 Project background

1.2.1.1 MarramWind Offshore Wind Farm is wholly owned by ScottishPower Renewables UK Limited (SPR).

1.2.1.2 The Project is a proposed floating wind farm located in the North Sea, with a grid connection capacity of up to 3 gigawatts (GW). The location of the Project is determined by the Option Area Agreement (OAA), which is the spatial boundary of the Northeast 7 (NE7) Plan Option within which the electricity generating infrastructure will be located. The NE7 Plan Option is located north-east of Rattray Head on the Aberdeenshire coast in north-east Scotland, approximately 75 kilometres (km) at its nearest point to shore and 110km at its furthest point. An Option to Lease Agreement (OLA) for the Project within the NE7 Plan Option was signed in April 2022.

1.2.1.3 A summary of the Project is provided in **Volume 1, Chapter 1: Introduction** and a comprehensive description of the Project is provided in **Volume 1, Chapter 4: Project Description.**

1.2.1.4 In March 2024, National Grid Electricity System Operator Limited published the Beyond 2030 report, which presented the ScotWind elements of the Holistic Network Design Follow Up Exercise. This report confirmed that the full 3GW connection for the Project will be connected to the Scottish and Southern Electricity Networks (SSEN) Netherton Hub at Longside, to the west of Peterhead.

1.2.1.5 The Project's offshore infrastructure, located seaward of MHWS, may include the following:

- wind turbine generators (WTGs), including floating units (platforms and station keeping system);
- array cables;
- subsea distribution centres;
- subsea substations;
- offshore substations;
- reactive compensation platform(s) (RCPs) (if required); and
- offshore export cables to connect the wind farm area to the landfall(s).

1.2.1.6 The EIA Report accompanies applications for offshore consents, licences and permissions for the Project to Marine Directorate - Licensing Operations Team (MD-LOT) under Section 36 (s.36) of the Electricity Act 1989, the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009, for the offshore infrastructure seaward of MHWS.

1.2.1.7 The EIA Report also accompanies an application to Aberdeenshire Council for planning permission in principle consent under The Town and Country Planning (Scotland) Act 1997, for the onshore infrastructure landward Mean Low Water Springs (MLWS).

1.2.1.8 There are four sets of EIA regulations applicable to the Project: the Electricity Works (EIA) (Scotland) Regulations 2017 for offshore generating stations requiring s.36 consent; the Marine Works (EIA) (Scotland) Regulations 2017 and the Marine Works (EIA) Regulations 2007 for marine licence applications within Scottish territorial waters (0-12 nautical miles) and offshore waters (12-200 nautical miles) respectively; and the Town and Country Planning (EIA) (Scotland) Regulations 2017 for planning applications submitted to Aberdeenshire Council for onshore infrastructure located landward of MLWS.

1.3 Purpose of the Outline SPP

1.3.1.1 The purpose of the SPP is to outline the key principles of managing the protection of the assets of the floating offshore wind farm and the transmission system of the Project from the effects of scour and hazards (e.g. snagging of anchors, pipe, cable and cable crossings), immediately following construction and during the operation and maintenance (O&M) phase of the offshore wind farm. The assets that could be affected by scour and hazards include:

- station keeping system, including anchors;
- platform foundations in relation to the offshore substations, RCP(s);
- subsea structures, e.g. subsea substations and subsea distribution centres;
- array cables dynamic section, typically near touchdown locations;
- array cables static section and export cables; and
- landfall horizontal directional drilling (HDD) exit location.

1.3.1.2 This Outline SPP has been developed taking into account feedback provided from consultees as part of the MarramWind Scoping Opinion (MD-LOT, 2023), where it was highlighted that management plans should be adequate to be used as mitigation measures where they are key to reducing impacts.

1.3.1.3 This SPP is a ‘live’ document and as such it will be further developed post-consent in consultation with the regulatory bodies and stakeholders, such as MD-LOT, Marine Directorate Science, Evidence, Data and Digital (formerly Marine Scotland Science) and NatureScot, once project design has been finalised and the relevant condition discharged.

1.4 Implementation of the Final SPP

1.4.1.1 The Outline SPP will be submitted to the Scottish Ministers / Licensing Authority and other stakeholders in relation to monitoring compliance with the specific requirements of the relevant consent conditions. A Final SPP will be issued post consent following further engineering progress / definition and in line with the discharge of the relevant condition(s).

1.4.1.2 During construction activities the Final SPP will be monitored by the Project’s Construction Manager (or equivalent), Environmental Manager (or equivalent) and MD-LOT. Scour

protection will also be monitored during the operational phase of the Project and any remedial requirements will be in accordance with the Final SPP.

1.5 Scope of Outline SPP

1.5.1.1 The Outline SPP will cover the following:

- scour protection design including:
  - design objectives;
  - protection measures;
  - material selection;
- scour risk assessment; and
- installation methodology.

1.6 Other related implementation plans

1.6.1.1 The Outline SPP will be developed with consideration of the content and requirements of other relevant Implementation Plans. These are set out in **Table 1.1** below with details of the linkages.

Table 1.1 Other related implementation plans to the Outline SPP

Implementation plan	Linkage with Outline SPP
Project Environmental Monitoring Programme	The **Project Environmental Monitoring Programme** will set out the Applicant's commitments to monitoring the potential effects of the Project on key receptors and provide detail on how that monitoring will be delivered across all stages of the Project (pre-construction, construction, O&M, and decommissioning). **Volume 4: Outline Project Environmental Monitoring Programme** has been submitted with the application.
Offshore Invasive Non-Native Species (INNS) Management Plan	**Volume 4: Outline Offshore Invasive Non-Native Species Management Plan** aims to secure specific measures to avoid, reduce or remedy likely significant adverse effects associated with INNS.

2. Scour Protection

2.1 Overview

2.1.1.1 A characterisation geophysical survey of the Option Agreement Area (OAA) was conducted in 2022, with the offshore export cable corridor being completed in 2023. A shallow geotechnical characterisation survey was also completed in the array and the offshore export cable corridor in 2023. There will be additional geophysical and geotechnical surveys to further characterize the site during the design phase of the project, as well as throughout the pre-construction, O&M phases, as required.

2.1.1.2 Bathymetry within the OAA varies between the maximum water depth recorded as 133.7 metres (m) relative to lowest astronomical tide (LAT) and the shallowest area was recorded as 87.8m LAT. For the export cable corridor, the maximum water depth is 123.4m LAT.

2.1.1.3 The assessment for scour will be undertaken during the design process, and will vary depending on final design types, e.g. type of offshore substation foundation, type of restraint for dynamic array cable and trench depth of cables. A maximum volume of scour protection assumed is included within the tables in this section.

2.2 Scour protection design objectives

2.2.1.1 Physical processes at the wind farm array and along the cable corridor will influence the effects of scour on the generating and transmission assets, as listed in **paragraph 1.2.1.5**. Therefore, depending on metocean conditions, scour protection may be required around offshore infrastructure to protect against currents and waves that may cause erosion of the seabed.

2.2.1.2 The process for developing the scour protection design will follow the below steps:

- Design of scour protection:
  - utilise existing characteristic survey data to inform concept design of the offshore infrastructure, with particular focus on anchor design and offshore substation foundation design(s) and suitability of seabed for cable burial;
  - Front End Engineering Design studies, of which one of the aims will be to conclude on infrastructure layout;
  - assess draft final layouts against geophysical and metocean data, noting scour potential risk zones will be identified based on sediment type, current velocities and bathymetric features, to conclude on final layouts; and
  - identify if there are gaps in survey data that would require additional surveys either pre or post construction.
- Complete further pre-installation geoscience data surveys, if required, to further inform preparation of the SPP.
- Produce detailed SPP for submission and approval by MD-LOT prior to construction.
- Post-installation surveys to confirm scour protection installation, as / if deemed necessary.
- Survey of assets will be undertaken periodically during the O&M phase of the project, if deemed necessary. The timing and frequency of any surveys will be determined post construction and will be informed by previous asset surveys and their output.

2.2.1.3 As the project will be built out in phases, the SPPs may also be produced relevant to each project phase.

2.3 Scour protection measures

2.3.1.1 The following sections explain the anticipated protection measures to be used for scour protection, during the construction phase, and if necessary, during the operational phase, to mitigate the effects of scour, and to minimize the release of suspended sediments, and the potential for seabed level change in the vicinity of the wind turbine anchors.

2.3.1.2 The max design scenario for scour protection is provided in **Volume 1, Chapter 4: Project Description**, and repeated below for ease in **Table 2.1** to **Table 2.3** noting that the final quantities and extent of scour protection will be dependent on current speed, sediment type, anchor and foundation types, thus final quantities will be determined post-consent..

2.4 Offshore substation foundation infrastructure scour assumptions

2.4.1 Overview

2.4.1.1 For descriptive details of the infrastructure, reference should be made to **Volume 1, Chapter 4: Project Description.**

2.4.2 Anchors

2.4.2.1 Driven piles, drag embedment anchors, and suction anchors are the different anchors options being considered for the Project.

2.4.2.2 Scour protection will not be applied at anchor locations. Instead, anchors will be designed to accommodate any expected scour. Installation of scour protection at an anchor location would negatively impact both the anchor and the mooring line.

2.4.3 Offshore substations and reactive compensation platforms

2.4.3.1 Scour protection may be necessary around the platform legs.

2.4.3.2 Traditional scour protection methods, such as rock placement and localised mattresses and bags would be utilised in the event of scour on the offshore substations and RCPs.

2.4.4 Subsea structures

2.4.4.1 With the water depth and metocean conditions obtained from the two-year metocean / wind data, it is not expected that scour will occur on the subsea structures that are on the seafloor. Therefore, scour protection in the form of rock placement / mattresses is not anticipated, but if conditions change or scour protection is required upon further investigation, then this may take the form of suction skirts which will be integrated into the structure design.

Table 2.1 Foundation infrastructure scour assumptions

Infrastructure	Max area of scour protection (per foundation)	Max volume of scour protection (per foundation)	Max number of structures	Max volume of scour protection in OAA / offshore export cable corridor
Offshore substation and RCP	Max 15m radius from each leg.	500m^3	4 offshore substations; and 2 RCPs	2,000m^3 in OAA; 1,000m^3 along offshore export cable corridor.

2.5 Cable infrastructure scour assumptions

2.5.1 Overview

2.5.1.1 For descriptive details of the infrastructure, reference should be made to **Volume 1, Chapter 4: Project Description.**

2.5.2 Array cable dynamic section

2.5.2.1 The dynamic section of the array cables are largely within the water column and extend from the floating structure to the seafloor. Minimal scour protection is included for the touchdown locations, and it is included within the array cable protection assumptions.

2.5.2.2 Traditional scour protection methods such as rock placement and localised mattresses and bags are abrasive and can be damaging to the array cables, therefore the design will focus on how to minimise / negate scour from array cable motions and remove requirement for traditional scour protection. Alternative options may be considered.

2.5.3 Array cable static section

2.5.3.1 Connected to / transitioned from the dynamic section of the array cable will be the static section of the array cable. This will be laid on the seabed and where hazard protection is required for the array cables, it is expected that these will be trenched and buried below seabed.

2.5.3.2 Where trenching depth cannot be achieved other protection measures, such as rock placement or localised concrete mattresses and bags will be used. **Table 2.2** Array cable protection assumptionscovers the total volume and amount of rock placement and concrete mattresses that has been estimated for both trenching and scour protection.

Table 2.2 Array cable protection assumptions

Parameters	Indicative design envelope	
	14MW WTG	**25MW WTG**
Number of cables	225	126

Parameters	Indicative design envelope	
	14MW WTG	**25MW WTG**
Secondary protection considered for areas that cannot be trench and / or scour protection	Rock placement. Localised: concrete mattresses and bags.	Rock placement. Localised: concrete mattresses and bags.
Total array cable length	680km	530km
Length of unburied cable	136km (assuming a worst case of 20% of cable length cannot be buried).	106km (assuming a worst case of 20% of cable length cannot be buried).
Cable protection type and volume	1,122,000m^3 of rock; or 22,666 mattresses; or a combination of both.	874,500m^3 of rock; or 17,667 mattresses; or a combination of both.

2.5.4 Export cables

2.5.4.1 Similar to the static section of the array cables the intent is to trench and bury the export cables below seabed. Where trenching depth cannot be achieved other protection measures, such as rock placement and localised concrete mattresses, bags or steel split pipe will be used. **Table 2.3** covers the total volume and amount of rock placement and concrete mattresses that has been estimated for both trenching and scour protection.

Table 2.3 Export cable protection assumptions

Parameters	Indicative design envelope
Grid transmission route length offshore	130–140km depending on the offshore substation and landfall location(s)
Number of offshore cable trenches (maximum)	5
Cable protection locations	Worst case assumes 20% of length requires rock placement.
Cable protection type	Rock placement. Localised: concrete mattresses, bags or steel split pipe.
Cable protection volume	1,155,000m^3
Cable protection volume for crossings	119,000m^3

2.5.4.2 In addition, there are currently 16 known cable crossings required along the offshore export cable corridor out with the OAA. An additional six crossings have been included as a contingency, for potential cable discoveries post-consent and / or due to the competitive nature of the nearshore area. It is possible that additional crossings may be necessary if other developments are constructed ahead of the Project. An assumption of another six crossings is considered within the OAA itself to enable the offshore export cables to exist in close vicinity to each other. The total number of crossings to be included is 28.

2.5.4.3 **Volume 1, Chapter 4: Project Description** details the current locations and provides a typical crossing design arrangement. Crossings often utilise more than one secondary protection and can utilise rock placement, concrete mattresses, bags and steel split pipe on a single crossing. **Table 2.4** covers the parameters of cable crossings.

Table 2.4 Cable crossings parameters

Parameters	Indicative design envelope
Number of cable crossings	28 (per cable trench).
Permanent crossing dimensions (including rock placement) (length x width)	150m x 11m.
Permanent crossings area (including rock placement)	1,650m^2
Crossing protection volume	850km^3 per crossing.

2.5.5 Landfall

2.5.5.1 At the submarine HDD exit pits, rock bags / mattresses, or stabilising structures or weight collars / split steel pipe may be used to temporarily pin the HDD ducts prior to cable installation. Burial of the cable is the intent, but similarly rock placement / mattresses may be used post installation should scour protection be required. The quantities for landfall are included within the overall export cable corridor quantities in **Table 2.3**.

2.5.6 Optimised protection

2.5.6.1 The protection design will consider not only the protection for the infrastructure but also impact on other key stakeholders. The optimisation of protection design will consider:

- minimum disruption to commercial fishing using bottom gear (trawls, dredges);
- minimum height in shallow waters to avoid creating a navigation hazard;
- maximum resilience to cable damage from fishing activity; and
- maximum protection of cable against dragging of ships / anchors.

2.5.6.2 It should be noted that technology may be developed by the time of construction such that remedial protection measures are available that may enhance biodiversity. The use of such measures are being considered and will be detailed within the **Nature Positive Plan** on an area-by-area basis. Such measures may be used in conjunction with other remedial protection measures

2.6 Scour risk assessment

2.6.1.1 The EIA Report has assessed the potential impacts relating to scour protection during the installation, O&M, and decommissioning phases of the Project. These assessments have been carried out based on the maximum design relevant to a given potential impact, drawing specific details from **Volume 1, Chapter 4: Project Description.**

2.6.1.2 The risk assessment has identified that the offshore export cable corridor is planned to be routed through the Southern Trench Marine Protected Area (MPA) which has burrowed mud as a feature. The Project will minimise impact on burrowed mud habitat of the MPA in line with NatureScot's Conservation and Management Advice (NatureScot, 2025).

2.6.1.3 *"Reduce or limit pressures, minimise the footprint of new cables and pipelines within areas of burrowed mud habitat. Early discussion of siting, design and construction is recommended to reduce the potential of impacts. Key details which should be discussed will include pre-application surveys, siting and installation techniques*". (NatureScot, 2025)

2.6.1.4 This will be done post consent once further engineering definition is known. The Project will remain within the Project Red Line Boundary.

2.7 Installation methodology

2.7.1.1 A rock placement vessel is a specialised marine vessel used to install protective or stabilising material - typically graded rock - on the seabed around offshore structures such as wind turbine foundations, pipelines, or cables. The methodology involves precision placement using dynamic positioning systems and advanced fallpipe technology, which allows rocks to be accurately deposited at targeted locations, even in deep water or challenging sea conditions. This process helps prevent scouring, enhances structural stability, and ensures long-term seabed integrity.

2.7.1.2 Concrete mattress, rocks and bag installation is typically carried out from a dynamically positioned construction vessel. The vessel is equipped with specialized deployment frames or cranes to lower the mattresses accurately onto the seabed. Operations are guided by real-time Remotely Operated Vehicle (ROV) monitoring to ensure precise placement, especially in areas with complex bathymetry or sensitive environmental conditions.

2.8 Summary

2.8.1.1 Details relating to scour and cable protection have been provided in **Volume 1, Chapter 4: Project Description** and potential impacts have been assessed. Some flexibility is required in terms of type and quantity of scour and cable protection during the pre-application phase and therefore the assessments have been carried out on a maximum design scenario basis.

2.8.1.2 Detailed requirements for scour and cable protection will be agreed post-consent as part of the Final SPP and Cable Burial Risk Assessment which will be submitted to MD-LOT for approval prior to construction.

3. References

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4. Glossary of Terms and Abbreviations

4.1 Abbreviations

Acronym	Definition
EIA	Environmental Impact Assessment
GW	Gigawatts
HDD	Horizontal Directional Drilling
km	kilometre
LAT	Lowest Astronomical Tide
m	metres
MD-LOT	Marine Directorate – Licensing Operations Team
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MPA	Marine Protected Area
NE7	North East 7
O&M	Operation and Maintenance
OAA	Option Agreement Area
OLA	Option to Lease Agreement
INNS	Invasive Non-Native Species
RCP	Reactive Compensation Platform
ROV	Remotely Operated Vehicle
s.36	Section 36

Acronym	Definition
SPP	Scour Protection Plan
SPR	ScottishPower Renewables UK Limited
SSEN	Scottish and Southern Electricity Networks
WTG	Wind Turbine Generator

4.2 Glossary of terms

Term	Definition
Array cables	Array cables are a crucial component of subsea infrastructure, particularly in offshore wind farms. They are used to connect wind turbines to the offshore substation, transferring power and auxiliary power when turbines are not generating.
Front End Engineering Design	An early design stage of a capital project that specifies technical requirements and investment costs prior to the detailed engineering design stage.
Marine Directorate- Licensing Operations Teams	Formerly known as Marine Scotland- Licensing operations Team, MD-LOT is the regulator for determining marine licence applications on behalf of the Scottish Ministers in the Scotland inshore region (between 0 and 12 nautical miles) under the marine (Scotland) Act 2010, and in the Scottish offshore region (between 12 and 200 nautical miles) under Marine and Coastal Access Act 2009.
Marine licence	Licence required for certain activities in the marine environment and granted under either the Marine and Coastal Access Act 2009 or the Marine (Scotland) Act 2010.
Marine Protected Area (MPA)	A Marine Protected Area is a legally designated zone in UK waters established to safeguard vulnerable species and habitats through restrictions on activities that could harm ecological integrity. MPAs include sites such as Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Marine Conservation Zones (MCZ), and their presence requires careful assessment and mitigation within Environmental Impact Assessments for offshore wind projects
Nature Positive Plan	A Nature Positive Plan is a strategic framework within the Environmental Impact Assessment (EIA) that sets out measures

Term	Definition
	to avoid, minimise, and compensate for biodiversity impacts, while actively enhancing ecosystems.
Offshore	Pertaining to the seaward side of the MLWS, and typically in reference to locations some distance from the coast.
Offshore Wind Farm	An offshore wind farm is a group of wind turbines generators in the same location (offshore) in the sea, which are used to produce electricity.
Onshore	Pertaining to the landward side of MHWS.
Planning Permission in Principle	Planning Permission in Principle is a type of planning application that allows a proposal to be assessed without requiring detailed plans of the layout, design, or finish of any buildings. It is typically used for larger developments, such as residential projects, where the specifics can be determined later.
Scottish Ministers	The devolved government of Scotland.
Scour	Scour is the process of sediment erosion and transport that occurs around marine structures under the action of water flow. The level of scour depends on the water flow and the seabed conditions.

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