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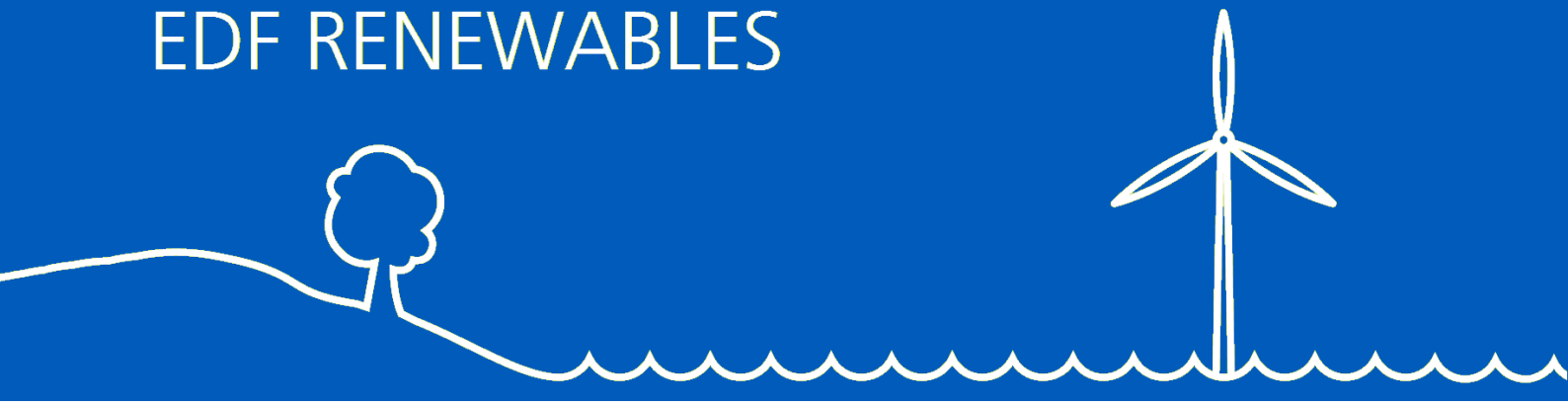

Neart na Gaoithe Offshore Wind Farm

Offshore Decommissioning Programme

Revision 4.0

June 2020

NNG-NNG-ECF-PLN-0016

NnG OFFSHORE WIND

EDF renewables

Neart na Gaoithe Offshore Wind Farm

Offshore Decommissioning Programme

Pursuant to Section 36 Consent Condition 3 and the Generating Station and Offshore Transmission Works Marine Licences Condition 3.2.1.3

For the approval of the Scottish Ministers

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Acronyms and Abbreviations

TERM	DESCRIPTION
AC	Alternating Current
AIS	Automatic Identification System
BATNEEC	Best Available Technology Not entailing Excessive Economical Costs
BEIS	Department for Business, Energy and Industrial Strategy
BPEO	Best Practicable Environmental Option
CoS	Chamber of Shipping
CRC	Control Reporting Centre
DP	The Decommissioning Programme; to be submitted by the Company to the Secretary of State under section 105(2) of the Energy Act 2004 (as amended)
EIA	Environmental Impact Assessment
FTRAG	Forth and Tay Regional Advisory Group
HES	Historic Environment Scotland
HSE	Health, Safety and Environment
HVAC	High Voltage Alternating Current
IMO	International Maritime Organisation
JNCC	Joint Nature Conservation Committee
LARS	Lower Airspace Radar System
MCA	Maritime and Coastguard Agency
MoD	Ministry of Defence
MS-LOT	Marine Scotland Licensing Operations Team
MW	Megawatt
NLB	Northern Lighthouse Board
NM	Nautical Mile
MGN	Marine Guidance Note

TERM	DESCRIPTION
NtM	Notices to Mariners
OFTO	Offshore Transmission Operator
O&M	Operation and Maintenance
OSP	Offshore Substation Platform
OSPAR (Convention)	The Convention for the Protection of the Marine Environment of the North-East Atlantic
PSR	Primary Surveillance Radar
RAF	Royal Air Force
RAP	Recognized Air Picture
RYA	Royal Yachting Association
SAC	Special Area of Conservation, protected sites classified in accordance with the EC Habitats Directive.
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SNH	Scottish Natural Heritage
SPA	Special Protection Area, protected sites classified in accordance with the EC Birds Directive
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention of Law on the Sea

Defined Terms

TERM	DESCRIPTION
Addendum	The Addendum of Additional Information submitted to the Scottish Ministers by NnGOWL on 26 July 2018.
Application	The Environmental Impact Assessment Report, Habitats Regulations Appraisal Report and supporting documents submitted to the Scottish Ministers by NnGOWL on 16 March 2018; the Addendum of Additional Information submitted to the Scottish Ministers by NnGOWL on 26 July 2018 and the Section 36 Consent Variation Report dated 08 January 2019.
Company	Neart na Gaoithe Offshore Wind Limited (NnGOWL) (Company Number SC356223).

TERM	DESCRIPTION
Consent Conditions	The terms that are imposed on the Company under the Offshore Consents that must be complied with.
Consent Plans	The plans, programmes or strategies required to be approved by the Scottish Ministers (in consultation with appropriate stakeholders) in order to discharge the Consent Conditions.
Contractors	Any Contractor/Supplier (individual or firm) working on the Project, hired by NnGOWL.
EIA Report	The Environmental Impact Assessment Report, dated March 2018, submitted to the Scottish Ministers by NnGOWL as part of the Application.
Inter-array Cables	The offshore cables connecting the wind turbines to one another and to the OSPs.
Interconnector Cables	The offshore cables connecting the OSPs to one another.
Maine Guidance Note	A collection of active marine guidance notes, published by the Maritime and Coastguard Agency (MCA).
Marine Licences	The written consents granted by the Scottish Ministers under the Marine (Scotland) Act 2010, for construction works and deposits of substances or objects in the Scottish Marine Area in relation to the Wind Farm (Licence Number 06677/19/0) and the OfTW (Licence Number 06678/19/1), dated 4 June 2019 and 5 June 2019 respectively.
Offshore Consents	The Section 36 Consent and the Marine Licences.
Offshore Export Cable Corridor	The area within which the offshore export cables are to be located.
Offshore Export Cables	The offshore export cables connecting the OSPs to the landfall site.
OfTW	The Offshore Transmission Works comprising the OSPs, offshore interconnector cables and offshore export cables required to connect the Wind Farm to the Onshore Transmission Works at the landfall.
OfTW Area	The area outlined in red and blue in Figure 1 attached to Part 4 of the OfTW Marine Licence.
OnTW	The onshore transmission works from landfall and above Mean High Water Springs, consisting of onshore export cables and the onshore substation.
Project	The Wind Farm and the OfTW.
Section 36 Consent	The written consent granted on 3 December 2018 by the Scottish Ministers under Section 36 of The Electricity Act 1989 to construct and operate the Wind Farm, as varied by the Scottish Ministers under Section 36C of The Electricity Act 1989 on 4 June 2019.
Section 36 Consent Variation Report	The Section 36 Consent Variation Report submitted to the Scottish Ministers by NnGOWL as part of the Application as defined above on 08 January 2019.

TERM	DESCRIPTION
Subcontractors	Any Contractor/Supplier (individual or firm) providing services to the Project, hired by the Contractors (not NnGOWL).
Wind Farm	The offshore array as assessed in the EIA Report including wind turbines, their foundations and inter-array cabling.
Wind Farm Area	The area outlined in black in Figure 1 attached to the Section 36 Consent Annex 1, and the area outlined in red in Figure 1 attached to Part 4 of the Wind Farm Marine Licence.

Consent Plans

CONSENT PLAN	ABBREVIATION	DOCUMENT REFERENCE NUMBER
Decommissioning Programme	DP	NNG-NNG-ECF-PLN-0016
Construction Programme and Construction Method Statement	CoP and CMS	NNG-NNG-ECF-PLN-0002
Piling Strategy	PS	NNG-NNG-ECF-PLN-0011
Development Specification and Layout Plan	DSLP	NNG-NNG-ECF-PLN-0003
Design Statement	DS	NNG-NNG-ECF-PLN-0004
Environmental Management Plan	EMP	NNG-NNG-ECF-PLN-0006
Operation and Maintenance Programme	OMP	NNG-NNG-ECF-PLN-0012
Navigational Safety Plan and Vessel Management Plan	NSP and VMP	NNG-NNG-ECF-PLN-0010
Emergency Response Cooperation Plan	ERCoP	NNG-NNG-ECF-PLN-0015
Cable Plan	CaP	NNG-NNG-ECF-PLN-0007
Lighting and Marking Plan	LMP	NNG-NNG-ECF-PLN-0009
Project Environmental Monitoring Programme	PEMP	NNG-NNG-ECF-PLN-0013
Fisheries Management and Mitigation Strategy	FMMS	NNG-NNG-ECF-PLN-0008
Marine Archaeology Reporting Protocol	MARP	NNG-NNG-ECF-PLN-0005
Construction Traffic Management Plan	CTMP	NNG-NNG-ECF-PLN-0014

1 Introduction

1.1 Background

1. The Neart na Gaoithe Offshore Wind Farm (Revised Design) received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 03 December 2018 and was granted two Marine Licences by the Scottish Ministers, for the Wind Farm and the associated Offshore Transmission Works (OfTW), on 03 December 2018. The S36 consent and Wind Farm Marine Licence were revised by issue of a variation to the S36 Consent and Marine Licence 06677/19/0 on 4 June 2019, and the OfTW Marine Licence by the issue of Marine Licence 06678/19/1 on the 5 June 2019. The Wind Farm and the OfTW are collectively referred to as 'the Project'; the S36 Consent and associated Marine Licences are collectively referred to as 'the Offshore Consents'.

2. The purpose of this Decommissioning Programme (DP) is to satisfy the requirement for a programme for decommissioning to be submitted to the Scottish Ministers, for approval, prior to the start of construction.

1.2 Consent Conditions

3. Submission and approval of this DP, by the Scottish Ministers, will satisfy the requirements of Condition 3 of the S36 Consent and Condition 3.2.1.3 of the OfTW Marine Licence and Wind Farm Marine Licence, as set out in Table 1-1 below. It will also satisfy the requirements set out in Section 105 of the Energy Act 2004, presented in Table 1-2, to which the Project is subject.

Table 1-1: Relevant S36 Consent and OfTW Marine Licence consent conditions

CONSENT	CONDITION REFERENCE	REQUIREMENTS
Section 36 Consent	Condition 3	There must be no Commencement of Development unless a Decommissioning Programme ("DP") has been submitted to and approved in writing by the Scottish Ministers. The DP must outline measures for the decommissioning of the Development, restoration of the seabed and will include without limitation, proposals for the removal of the Development, the management and timing of the works and, environmental management provisions. The Development must be decommissioned in accordance with the approved DP, unless otherwise agreed in writing in advance with the Scottish Ministers.
OfTW Marine Licence and Wind Farm Marine Licence	Condition 3.2.1.3	There must be no Commencement of the Works unless a DP has been submitted to and approved in writing by the Licensing Authority. The DP must outline measures for the decommissioning of the Works, restoration of the seabed and will include without limitation, proposals for the removal of the Works, the management and timing of the works and, environmental management provisions. The Works must be decommissioned in accordance with the approved DP, unless otherwise agreed in writing in advance with the Licensing Authority. This licence does not permit the Decommissioning of the Works, for which a separate marine licence is required.

Table 1-2: Legislative requirements of this DP with respect to Section 105 of the Energy Act 2004

LEGISLATION	REQUIREMENTS	WHERE ADDRESSED
Energy Act 2004, Section 105	(a) must set out measures to be taken for decommissioning the relevant object;	Section 5
	(b) must contain an estimate of the expenditure likely to be incurred in carrying out those measures;	Appendix A
	(c) must make provision for the determination of the times at which, or the periods within which, those measures will have to be taken;	Section 10
	(d) if it proposes that the relevant object will be wholly or partly removed from a place in waters regulated under this Chapter, must include provision about restoring that place to the condition that it was in prior to the construction of the object; and	Section 13
	(e) if it proposes that the relevant object will be left in position at a place in waters regulated under this Chapter or will not be wholly removed from a place in such waters, must include provision about whatever continuing monitoring and maintenance of the object will be necessary	Section 14

1.3 Structure of this Decommissioning Programme

4. This document is structured in line with the recommendations presented in Department for Business, Energy and Industrial Strategy (BEIS) guidance (BEIS, 2019), and as summarised in Table 1-3 below. Any future updates to this DP will take into consideration recommendations included in BEIS guidance (or any guidance subsequently produced by Scottish Ministers).

Table 1-3: Summary of DP contents

SECTION NUMBER	SECTION TITLE	SUMMARY OF CONTENTS
1	Introduction	Introduction of the Project and consent and other legislative requirements relevant to this DP.
2	Executive summary	A summary highlighting the essential features of the DP.
3	Background information	Relevant background information including an overview of Project infrastructure to be decommissioned; and, a summary of environmental conditions across the Wind Farm and OfTW Areas.
4	Description of items to be decommissioned	A full description of all Project infrastructure that will require decommissioning.
5	Description of proposed decommissioning measures	A description of the proposed approach to decommissioning the Project.
6	Environmental Impact Assessment	Details of the Environmental Impact Assessment (EIA) that was prepared for the Project and its consideration of decommissioning activities.

SECTION NUMBER	SECTION TITLE	SUMMARY OF CONTENTS
7	Consultations with interested parties	The consultation process undertaken to support development and finalisation of the DP. Summary of Section 105 consultee comments.
8	Costs and Financial Security	Details an overall cost estimate of the proposed decommissioning measure and the financial security which the companies that are party to the programme propose to provide.
9	Schedule	Details of the proposed decommissioning time-scale.
10	Project management and verification	Information on how the DP will be implemented.
11	Site Remediation	Information on how the Wind Farm and OfTW Areas will be restored as far as practicable.
12	Post-decommissioning monitoring, maintenance and management of the site	Details of the post decommissioning monitoring/activities that will be required.
13	Supporting studies	Details of supporting studies that have been used to inform the DP.

2 Executive Summary

5. The Neart na Gaoithe Offshore Wind Farm (Revised Design) received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 03 December 2018 and was granted two Marine Licences by the Scottish Ministers, for the Wind Farm and the associated Offshore Transmission Works (OfTW), on 03 December 2018. The S36 consent and Wind Farm Marine Licence were revised by issue of a variation to the S36 Consent and Marine Licence 06677/19/0 on 4 June 2019, and the OfTW Marine Licence by the issue of Marine Licence 06678/19/1 on the 5 June 2019. The S36 Consent and associated Marine Licences are collectively referred to as 'the Offshore Consents'.

6. Neart na Gaoithe Offshore Wind Farm Ltd. (NnGOWL) is a wholly owned subsidiary of EDF Renewables. NnGOWL is seeking to develop the NnG Offshore Wind Farm, located in the outer Firth of Forth approximately 15.5 kilometres (km) east of Fife Ness. The Project will comprise a maximum of 54 wind turbine generators, with a maximum output of 450 MW. Two High Voltage Alternating Current (HVAC) Offshore Substation Platforms (OSPs) will collect the generated electricity and convert the electricity from 66kV to 220kV for transmission to shore by two subsea export cables, totalling approximately 74 km in length. 66kV subsea inter-array cables will connect the wind turbines in strings and the strings of wind turbines to the OSPs. The OSPs shall themselves be connected by means of a 66kV subsea interconnector cable.

7. A notice pursuant to section 105(2) and (5) of the Energy Act 2004 was issued to NnGOWL by the Scottish Ministers on 11 March 2019 requiring NnGOWL to submit to the Secretary of State (SoS) a Decommissioning Programme (DP) prior to construction of the Project. The responsibility in respect of decommissioning of offshore renewable energy installations was devolved to Scottish Ministers in April 2017. Therefore, responsibility for the approval of this DP will now be assumed by the Scottish Ministers.

8. The proposed measures set out in this DP adhere to the existing UK and international legislation and the latest guidance and have regard to decommissioning best practice. Methods outlined are presented based on currently available technology. It is expected that by the time of decommissioning, significant technological changes may result in different approaches to decommissioning activities and such changes will be reflected in future revisions of the DP.

9. The DP details the methods associated with the future end of life decommissioning of the Project. It has been prepared on the basis of known site characteristics and consent conditions. The DP is informed and supported by the Application and supporting documentation prepared for the Project. The Application documents provide detailed analysis of the baseline physical, biological and human environment, and present an assessment of the likely significant effects of the Project on the receiving environment, taking into account decommissioning provisions that are consistent with those presented in this document. Electronic copies of the Application documents can be accessed online, via the link given in Section 13.

10. In advance of decommissioning, the EIA will be reviewed to assess the potential impacts that may arise and are not covered in the initial EIA process and subsequent reviews. At this point, a decision will be made by NnGOWL, in consultation with the statutory authorities, as to whether a more detailed assessment of the likely significant effects of decommissioning is required.

11. A summary of the proposals for decommissioning the offshore components of the Project are outlined below:

PROJECT COMPONENT	PROPOSED DECOMMISSIONING MEASURES
Wind Turbines	Complete removal from site.
Turbine and OSP foundations	Entire jacket structure removed; pin pile foundations to be cut at such a depth below the surface of the seabed that the remaining parts do not pose a danger for shipping or fishing vessels, even if sediments should become relocated, and cut sections removed from site.
Inter-Array Cables	Complete removal from site
OSP Topsides	Complete removal from site.
Offshore Export Cables	Complete removal from site
Interconnector Cable(s)	Complete removal from site
Cable / Scour Protection	The decommissioning measures will be dependent on the type and quantity of cable and scour protection used. Where durable crushed rock is used it is likely that this will be left in-situ.

12. In considering appropriate decommissioning provisions NnGOWL has sought to adhere to the following key principles as set out in the BEIS guidance (BEIS, 2019) on decommissioning offshore renewable energy installations under the Energy Act 2004, namely:

    - Best Practicable Environmental Option (BPEO), which is the option with the most benefit or least damage to the environment as a whole at an acceptable cost. This involves balancing the reduction in environmental risk with practicality and cost of reducing the risk;
    - Consideration of the rights and needs of legitimate users of the sea;
    - Safety of surface and subsurface navigation; and
    - Health, Safety and Environment (HSE) considerations.

13. This document also provides a strategy for dealing with the decommissioned components. This will include recovered steel, copper and glass fibre composites. The proposed strategy will be to re-use and recycle as much material as possible.

14. The Project has an anticipated operational period of 25 years[1] following final commissioning, and in the absence of re-powering or extension of life, decommissioning would be required at the end of the operational period. The final schedule of decommissioning works will be determined once the DP has been reviewed by NnGOWL two years prior to the end of the operational period (approximately year 23 of operation). The timing of the review ensures that the project is sufficiently close to the commencement of decommissioning for the information, methods and legislation to be up to date at

[1] The anticipated operational period has been determined based on the 25 year duration of the Offshore Transmission Operator (OFTO) contract, and the basic lifecycle of the Wind Farm and OfTW components as specified by the respective manufacturers. At Year 23 of Operation the Project components will be assessed and the potential for repowering or extension of life considered with any required OFTO contract extensions being negotiated as required.

the point of decommissioning. It also allows sufficient time for any necessary assessments to be undertaken or consents to be obtained.

15. NnGOWL's approach to consultation on the DP follows the guidance set out in the BEIS guidance (BEIS, 2019) and is in accordance with the requirements of the Energy Act 2004. The draft DP was sent out for consultation on 7 August 2019 to a total of 19 stakeholders as agreed by the Scottish Ministers. Of the 14 stakeholders who responded to the consultation, eight provided comment with six stating they had no comments. Where stakeholders had provided comments these have been considered and presented, and where considered appropriate amendments have been suggested which have been incorporated in this version for submission to Scottish Ministers for approval prior to the commencement of Project construction.

16. Following guidance provided by Scottish Ministers, a cost estimate for the decommissioning works has been derived based on the equipment and personnel requirements and the duration of the works. Financial security has been carefully considered to ensure that the liability will be met and an approach to this has been set out for approval by the Scottish Ministers.

17. This DP is considered sufficient to meet the requirements set out under Section 105 of the Energy Act 2004; the submission of this DP for formal approval by the Scottish Ministers is also considered sufficient to satisfy the S36 Consent Condition 3 and Condition 3.2.1.3 of the Marine Licences.

3 Background Information

3.1 The Project

18. The Wind Farm Area is located to the northeast of the Firth of Forth, 15.5 km directly east of Fife Ness on the east coast of Scotland. The Wind Farm Area covers approximately 105 km^2. Offshore Export Cables will be located within the 300 m wide Offshore Export Cable Corridor, running in an approximately southerly direction from the Wind Farm Area, making landfall at Thorntonloch beach to the south of Torness Power Station in East Lothian.

19. Figure 3-1 shows the Wind Farm Area and Offshore Export Cable Corridor boundaries and cable route to shore.

20. The Offshore Consents allow for the construction and operation of the following main components, which together comprise the Project:

- Up to 54 wind turbines generating a maximum total output of around 450 MW;
- Up to 54 jacket substructures installed on pre-piled foundations, to support the wind turbines;
- Two alternating current (AC) substation platforms, referred to as Offshore Substation Platforms (OSPs), to collect the generated electricity and transform the electricity from 66 kV to 220 kV for transmission to shore;
- Two jacket substructures installed on pre-piled foundations, to support the OSPs;
- A network of inter-array subsea cables, buried and/or mechanically protected, to connect strings of turbines together and to connect the turbines to the OSPs;
- One interconnector cable connecting the OSPs to each other;
- Two buried and/or mechanically protected, subsea export cables to transmit the electricity from the OSPs to the landfall at Thorntonloch and connecting to the onshore buried export cables for transmission to the onshore substation and connection to the National Grid network; and
- Minor ancillary works such as the deployment of metocean buoys and permanent navigational marks.

21. It is currently anticipated that offshore construction will take approximately three years and will commence in Quarter 1 (Q1) 2020.

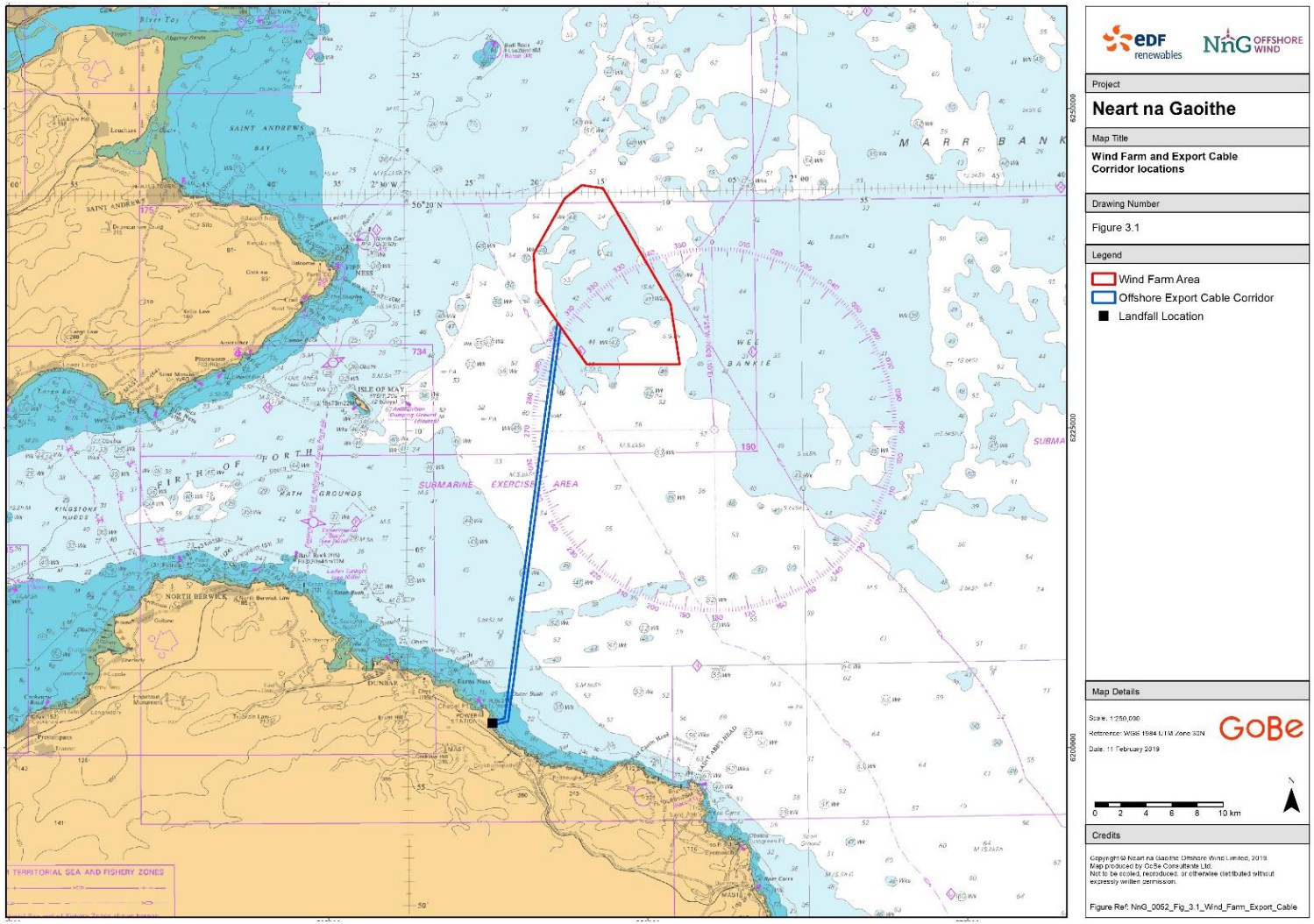

Figure 3-1: Wind Farm Area and Offshore Export Cable Corridor locations

3.2 Site Characteristics - Physical Environment

22. A range of surveys have been completed by NnGOWL to establish the physical characteristics of the Project site. These studies informed the Scoping process undertaken as part of the EIA process for the Project, and are presented in the EIA Report and Addendum or, in the case of those topics scoped out of the recent EIA, in the Original Application comprising the Environmental Statement (ES) (NnGOWL, 2012) and Supplementary Environmental Information Statement (SEIS) (NnGOWL, 2013), and form the basis for this section of the DP. The following sections provide a summary of information to inform consideration of the decommissioning provisions.

3.2.1 Bathymetry

23. Bathymetry across the Wind Farm Area ranges from 40 m to 58 m below Lowest Astronomical Tide (LAT) (NnGOWL, 2012). The shallowest water is located in the southern half of the Area, along a linear ridge orientated northwest to southeast, which rises 2 m above seabed level to 40.5 m. The deepest water, at approximately 58 m, occurs in the west of the Wind Farm Area close to the boundary within a channel orientated northwest-southeast.

24. Water depths in the Offshore Export Cable Corridor reach 58 m LAT adjacent to the Wind Farm Area boundary (NnGOWL, 2012). Depths in the nearshore section of the Corridor out to approximately 2 km from the shoreline are highly variable due to the presence of exposed folded bedrock that comprises the seabed here. Further offshore, out to approximately 7 km, the seabed gradient decreases and is generally flat and featureless, especially where soft-sediment makes up the seabed surface. Linear ridges, comprising east-west outcropping igneous dykes, are notable from 7.2 km to 8.5 km in 45 m to 50 m depths. These features rise up to 3 m above the surrounding seabed. From 8.5 km to 25.7 km the seabed deepens gradually to approximately 50 m to 60 m. From approximately 25 km northward to the Wind Farm Area, the bathymetry shallows to 46 m LAT.

3.2.2 Geological Characteristics

25. Studies undertaken as part of the Original EIA reported that the sediments mainly comprise muddy sand, fine to very fine sand and gravelly sand (NnGOWL, 2012). These are underlain by Quaternary sediments, which reach up to 73 m thick in two palaeochannels that cross the site. The bedrock beneath this consists of Carboniferous limestones in the east and sandstones in the west. Along the Offshore Export Cable Corridor the sediment is mainly muddy sand, but this is interrupted by a series of igneous dykes about 10 km offshore. The seabed then transitions to bedrock at the coast, consisting of Carboniferous limestone.

3.2.3 Tidal Processes

26. The hydrodynamic conditions are relatively uniform across the Wind Farm Area and Offshore Export Cable Corridor, with a mean spring tidal range of 4.6 m. Current speeds reach approximately 0.6 m/s on the flooding mean spring tide, and 0.4 m/s on the flooding mean neap tide. The flood tide is stronger than the ebb tide. The 50-year return storm surge current is of comparable strength, at about 0.6 m/s. The absence of bedforms across the offshore site and along the cable route suggests little sediment transport and a relatively stable seabed, classed as ‘slightly mobile’.

3.2.4 Wave Regime

27. The Wind Farm Area and Offshore Export Cable Corridor receives waves most frequently from a north-northeasterly direction (22.5 degrees); mean wave periods range between 2 and 9 seconds; and significant wave heights are up to about 6 m (NnGOWL, 2012). Waves also arrive from both the southeastern and southwestern quadrants but these form only a minor component of the wave direction spectrum.

28. The wave climate across the proposed development area is uniform, with little spatial variation in either significant wave height or mean/peak wave period. The significant wave height is shown to vary between 1.2 m and 1.4 m (50%ile) and 5.2 m and 5.4 m (99%ile), with the mean wave period varying between 4.5 s and 5.0 s (50%ile) and 8.5 s and 9.0 s (99%ile), and peak wave period varying between 9.5 s and 10.0 s (50%ile) and 14.0 s and 15.0 s (99%ile).

3.3 Site Characteristics - Biological Environment

3.3.1 Benthic Environment

29. The dominant sediment type found in the Wind Farm Area is slightly gravelly muddy sand, although patches of coarser sediment (e.g., sandy gravel and gravelly sand) were also recorded within the Wind Farm Area. Offshore characterisation surveys undertaken to inform the EIA (NnGOWL, 2018) reported that the Wind Farm Area is characterised by the biotope complex SS.SMu.CSaMu (circalittoral sandy mud) with epifaunal species present including seapens (e.g., V*irgularia mirabilis*) and brittlestars (e.g., *Amphiura* spp.). Infaunal species include polychaetes (e.g., *Spiophanes bombyx*) and bivalves (e.g., *Mysella bidentata*, *Abra* spp. and *Nuculoma* spp.).

30. Video analysis indicated biotopes more typical of soft sediments with polychaete tubes, megafauna burrows, seapens (e.g., *Pennatula phosphoracea* and *V. mirabilis*) and *Chaetopterus* tubes. These features suggest the presence of the Priority Marine Feature 'burrowed mud' and the component biotope SS.SMu.CFiMu.SpnMeg (*Seapens and burrowing megafauna in circalittoral fine mud*), covering a proportion of the Wind Farm Area.

31. A series of rocky substrates corresponding to the exposure of the Wee Bankie Formation were also observed during video analysis with areas of a highly variable seabed comprising a mix of substrate habitat types. These included large boulders and cobbles supporting a mosaic of the biotopes CR.MCR.EcCr.FaAlCr.Pom (faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circalittoral rock) and CR.MCR.EcCr.FaAlCr.Adig (*A. digitatum, P. triqueter, algal and bryozoan crusts on wave-exposed circalittoral rock*).

32. The Offshore Export Cable Corridor is characterised by deep circalittoral mud and gravelly muddy sand, typical of the outer Firth of Forth. Further inshore, the cable route is characterised by deep circalittoral coarse sediment and low energy rock habitats.

33. The habitat complexes along the Offshore Export Cable Corridor closer to the Wind Farm Area comprised muddy sand biotope complexes. Further inshore, the area is characterised by coarse sediment (e.g, SS.SCS.CCS) comprising cobbles, pebbles, gravel and coarse sand. Conspicuous fauna identified from the video images comprised keel worms *Pomatoceros* spp. and crustaceans such as *Munida rugosa*.

34. Discrete areas of both the Wind Farm Area and the Offshore Export Cable Corridor supported dense areas of the brittlestar *Ophiothrix fragilis* which fitted the biotope SS.SMx.CMx.OphMx.

35. The offshore site does not overlap with any sites currently designated for benthic habitats.

3.3.2 Fish and Shellfish Ecology

36. The fish and shellfish assemblage within the Wind Farm Area and Offshore Export Cable Corridor is typical of coastal areas in this region of the North Sea (Barne et al., 1997; Eleftheriou et al., 2004).

37. Demersal species that inhabit the muddy sand and gravel habitats in the region include cod, haddock, monkfish, flatfish species and sandeel. Pelagic species that may be present in the area include herring, sprat and mackerel. Elasmobranchs such as lesser spotted dogfish, tope and thornback rays are also common within the wider region. A number of these species have feeding, nursery and spawning habitats that overlap with the Wind Farm Area and Offshore Export Cable Corridor (Coull et al., 1998; Ellis et al., 2012).

38. Freshwater riverine habitats along the east coast of Scotland and England support a number of migratory species that may pass through the wind farm area during the ocean-going phase of their lifecycle (Malcolm et al., 2010). Migratory species include Atlantic salmon, sea trout, eel and lamprey species.

39. A number of shellfish species are also typically found in the region and have distribution that overlaps the Project Area including Nephrops and squid.

40. Several of the fish and shellfish species found to characterise the region are of commercial importance locally and regionally, and many are also of conservation importance due to their rarity or sensitivity, such as Atlantic salmon which is a qualifying feature of a number of designated Special Areas of Conservation (SACs) on the east coast of Scotland and north east of England.

3.3.3 Marine Mammals

41. A series of marine mammal surveys were used to inform the EIA for the Project to determine the number and distribution of marine mammals within the Wind Farm Area. Visual boat surveys, acoustics surveys and aerial survey data was collected between 2009 and 2010 (NnGOWL, 2018).

42. Six species of marine mammals were recorded from the survey work: harbour porpoise, minke whale, white-beaked dolphin, killer whale and grey and harbour seal. The most abundant species recorded was harbour porpoise which was recorded regularly throughout the year. The second most frequently recorded marine mammal was grey seal with the majority of grey seal sightings in the spring and autumn periods. The remaining species, white-beaked dolphin, harbour seal and minke whale and killer whale, were recorded infrequently and in low numbers. There were no records of bottlenose dolphins during site-specific survey, however, due to the known distribution and presence of the resident Moray Firth population, it is considered likely that they will be present close to the Wind Farm Area to the north and west.

43. The results from the baseline surveys indicate that the Wind Farm Area does not support high numbers or densities of marine mammals.

3.3.4 Ornithology

44. Three years of monthly boat-based surveys were undertaken to inform the EIA for the Project between 2009 and 2012 (NnGOWL, 2018). A total of 29 seabird species were identified during the site-specific surveys. The three most abundant species recorded during the surveys were gannet, puffin and guillemot. Together these three species accounted for 62.3% of all birds recorded in the offshore site in Year 1, and 77.1% of all birds recorded in the offshore site in Year 2. All three species were recorded in all months.

45. Thirteen species of seabird were considered to be key species and were assessed in greater detail on account of the high numbers present at certain times of year, the likely high connectivity to Special Protection Areas (SPAs) (nine species), and their sensitivity to potential effects. These key species were fulmar, sooty shearwater, gannet, little gull, lesser-blacked gull, herring gull, great black-backed gull, kittiwake, Arctic tern, guillemot, razorbill, puffin and little auk. All other species occurred only sporadically and in low or very low numbers.

3.4 Site Characteristics - Human Environment

3.4.1 Seascape, Landscape and Visual

46. The offshore wind farm will be visible along the Angus, Fife and East Lothian coasts (NnGOWL, 2018). The EIA Report identified a number of key viewpoints and landscape receptors within this area. The wind turbines will be most visible from areas along the Fife coast and the Isle of May closest to the Wind Farm Area, with an open outlook towards the turbine array. The turbines are also visible by visual receptor groups at sea where they will be seen against a backdrop of the Fife coastline.

3.4.2 Marine Archaeology and Cultural Heritage

47. A desk-based study and archaeological assessment of geophysical and geotechnical survey data was carried out to identify potential archaeological assets that may be affected and to establish their current condition. This work also provided information upon which to base the assessment of archaeological potential (NnGOWL, 2012).

48. The desk-based assessment reviewed existing maritime records to identify potential wrecks in the Wind Farm Area or within the Offshore Export Cable Corridor and compared the locations with magnetic anomalies picked up in the geophysical survey of the site. There are nine recorded or charted wrecks and obstructions from the Seazone dataset located within the Wind Farm Area and one live wreck within the Export Cable Corridor.

49. Eight anomalies of high archaeological potential and seven of medium archaeological potential were identified across the proposed Wind Farm Area through the archaeological review of site-specific survey data. All eight anomalies of high archaeological potential are located within the wind farm footprint and correspond with six known wreck sites recorded in the SeaZone/UKHO records. The remains of two military submarines designated as Protected Places under the Protection of Military Remains Act 1986 were identified in the Wind Farm Area.

3.4.3 Shipping and Navigation

50. A shipping survey conducted in 2010 found that between 16 and 17 vessels per day pass within 10 NM of the Wind Farm Area, with an average of 2 per day passing though the wind farm (NnGOWL,2018). A busy shipping route lies to the south of the wind farm, intersecting the Offshore Export Cable Corridor. This is mainly used by tankers and cargo vessels heading in/out of the Firth of Forth. Navigational features include a general practice and submarine exercise area that overlies the Wind Farm Area and Offshore Export Cable Corridor, and the Forth Ports Ltd authority area which is 8.4 NM west of the wind farm.

51. The Wind Farm Area is north and east of areas of high fishing vessel activity and approximately 4 NM west of recreational racing and sailing areas. Some recreational craft may be seen during summer daylight hours on a route that passes through the Wind Farm Area; and two similar routes intersecting the Offshore Export Cable Corridor.

3.4.4 Commercial Fisheries

52. The principal fishing activities were identified through assessment of available AIS data and consultation with local fishery stakeholders to inform the EIA (NnGOWL, 2018). The active fisheries in the region are:

- Potting for crustacea species such as lobster, brown crab and velvet crab, and seasonally deploying hook and lines for mackerel;
- Bottom otter trawls targeting Nephrops using single or twin gears;
- Boat dredges targeting scallops; and,
- Other (hydraulic) dredging vessels targeting razor shell and soft-shelled clam

53. Consultation with fishermen suggested that fishing grounds for Nephrops coincide with the Wind Farm Area and Offshore Export Cable Corridor although the fishery primarily targets grounds further inshore. The Nephrops fishery also seasonally targets squid within the same area. Potting regularly occurs across the Wind Farm Area and Offshore Export Cable Corridor and is ubiquitous in the region. Vessels targeting this area are predominantly located within the Anstruther and Eyemouth Fishery Districts.

54. Pittenweem is the principal fishing port in the area, followed by Dunbar and Eyemouth. Other ports that receive fewer catch landings are Crail, Methil and Leven, Anstruther, St Andrews, and West Wemyss.

3.4.5 Military and Aviation

55. The following primary surveillance radars are considered in this study: air traffic control radars; military air defence radars; precision approach radars; En-route radars; vessel traffic services radars; and meteorological radars. The EIA Report considered the Wind Farm Area to be potentially within range of the following radar systems (NnGOWL, 2018).

56. Leuchars Station operates a standard Watchman Primary Surveillance Radar (PSR), which is located on the airfield at the Station; the radar has an operating range of 40 NM (74.1 km) radius. The PSR is located approximately 18 NM (34 km) from the western edge of the Wind Farm Area and is utilised by Leuchars Station ATC in the provision of air traffic services to aircraft operating in and out of the airfield and the provision of a Lower Airspace Radar Service (LARS) below FL 100 to transitory civil and military aircraft within a radius of 40 NM (74.1 km) of the airfield every day of the year, 24 hours per day.

57. The MOD operates a series of fixed air defence radars (ADR) that feed into the Control and Reporting Centres (CRC) at RAF Boulmer and RAF Scampton, where the UK Recognised Air Picture (RAP) is produced. The nearest ADR to the Wind Farm Area is the Lockheed Martin TPS-77 equipped RRH Brizlee Wood located at Alnwick Moor Northumberland and the Lockheed Martin Type 92(B3), which has been upgraded to TPS-77 standard, at RRH Buchan Air Defence Radar (ADR). These systems are located within 91.7 and 127.7 km of the Wind Farm Area respectively. The Wind Farm Area is within the estimated operational range of 200 NM (370 km) of both these radar systems, however due to their individual strategic value to national security their exact operating parameters are not known

3.5 Nature Conservation Designations

58. A number of European designations are located along the east coast of Scotland and north east of England which have the potential to have connectivity to the offshore wind farm area. Information on those European designated sites considered in the Appropriate Assessment undertaken during the consenting of the Project is provided in Table 3-1. The location of those sites in closest proximity to the Wind Farm are shown in Figure 3-2.

Table 3-1: European designated sites considered in Appropriate Assessment

SITE	QUALIFYING FEATURES
Buchan Ness to Collieston Coast Special Protection Area (SPA)	• Fulmar (breeding) • Guillemot (breeding) • Herring gull (breeding) • Kittiwake (breeding) • Shag (breeding) • Seabird assemblage (breeding)
Fowlsheugh SPA	• Fulmar (breeding) • Guillemot (breeding) • Herring gull (breeding) • Kittiwake (breeding) • Razorbill (breeding) • Seabird assemblage (breeding)
Forth Islands SPA	• Arctic tern (breeding) • Common tern (breeding) • Cormorant (breeding) • Fulmar (breeding) • Gannet (breeding) • Guillemot (breeding) • Herring gull (breeding) • Kittiwake (breeding) • Lesser black-backed gull (breeding) • Puffin (breeding) • Razorbill (breeding) • Roseate tern (breeding) • Sandwich tern (breeding) • Shag (breeding) • Seabird assemblage (breeding)
St Abb's Head to Fast Castle SPA	• Guillemot (breeding) • Herring gull (breeding) • Kittiwake (breeding) • Razorbill (breeding) • Shag (breeding) • Seabird assemblage (breeding)
Outer Firth of Forth and St Andrews Bay Complex pSPA	• Red-throated diver (non-breeding) • Little gull (non-breeding) • Common tern (non-breeding and breeding) • Arctic tern (non-breeding and breeding) • Slavonian grebe (non-breeding) • Common eider (non-breeding) • Long-tailed duck (non-breeding) • Common scoter (non-breeding) • Velvet scoter (non-breeding) • Common goldeneye (non-breeding) • Red-breasted merganser (non-breeding) • Northern gannet (non-breeding and breeding) • Manx shearwater (breeding) • European shag (non-breeding and breeding) • Kittiwake (non-breeding and breeding) • Guillemot (non-breeding and breeding)

SITE	QUALIFYING FEATURES
	• Razorbill (non-breeding) • Puffin (non-breeding and breeding) • Black-headed gull (non-breeding) • Common gull (non-breeding) • Herring gull (non-breeding and breeding) • Seabird assemblage (non-breeding and breeding)
Moray Firth Special Area of Conservation (SAC)	• Bottlenose dolphin • Subtidal sandbanks
Firth of Tay and Eden Estuary SAC	• Common (harbour) seal • Estuaries • Intertidal mudflats and sandflats • Subtidal sandbanks
Isle of May SAC	• Grey seal • Reefs
Berwickshire & North Northumberland Coast SAC	• Grey seal • Intertidal mudflats and sandflats • Reefs • Sea caves • Shallow inlets and bays

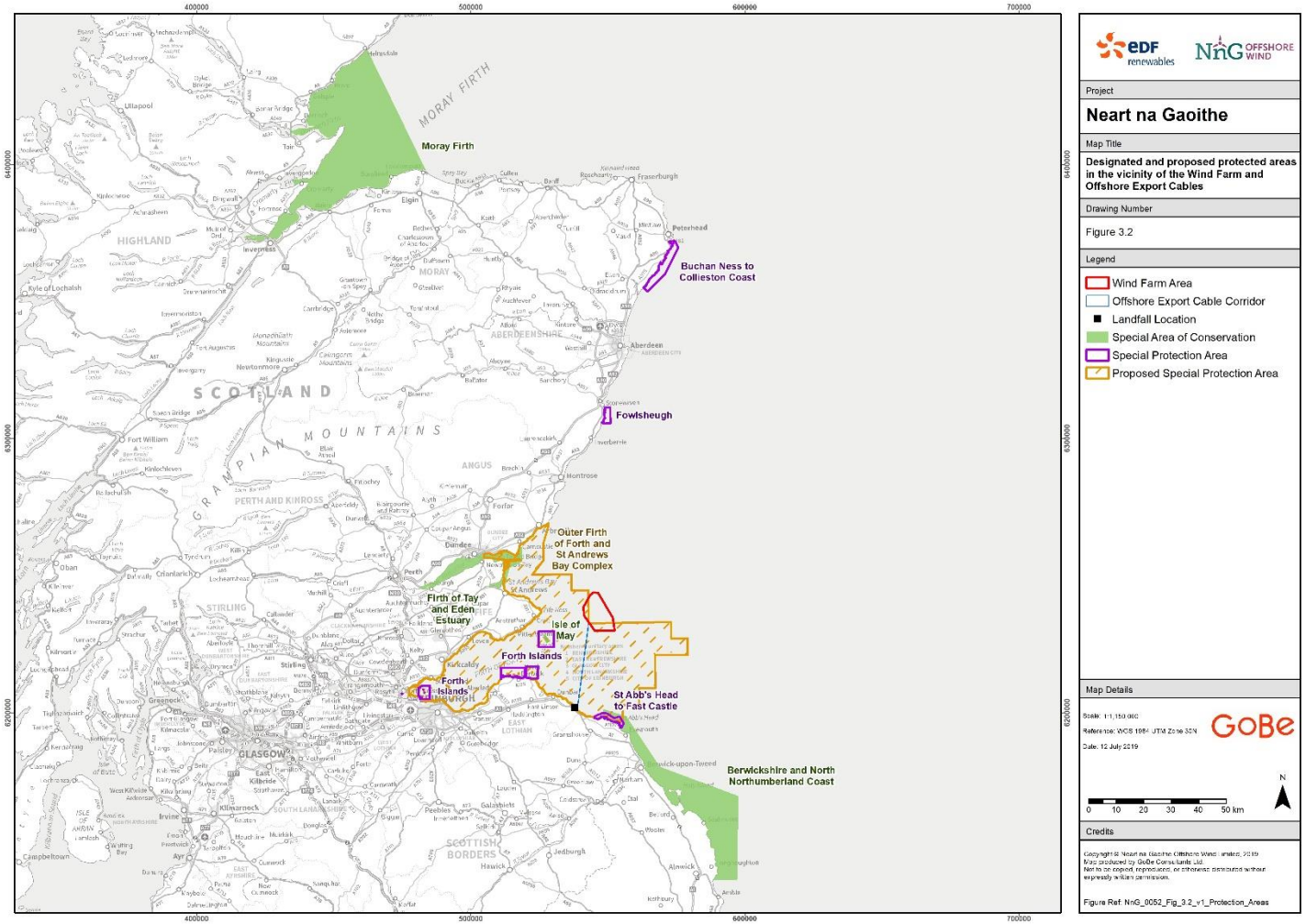

Figure 3-2: Designated sites considered within the Habitats Regulation Appraisal for the Project

4 Description of Items to be Decommissioned

59. The following elements of the Project will be decommissioned. Further details of the decommissioning process are set out in Section 5.

60. It should be noted that the OfTW assets (the OSPs, export cables and interconnector cables) will be sold to an OFTO and thereafter the responsibility for decommissioning in so far as it applies to the OfTW assets will transfer to the OFTO.

4.1 Wind Turbines

61. Horizontal axis wind turbines will be used which are made up of three main external components as follows.

- Rotor – comprised of the blades, hub, spinner and spinner bracket;
- Nacelle - housing the electrical generator, the control electronics, adjustable speed drive or continuously variable transmission; and
- Structural support - includes the tower and rotor yaw mechanism which allows the wind turbine rotor to turn against the wind.

62. The key parameters of the main wind turbine components to be decommissioned are summarised in Table 4-1.

Table 4-1: Key wind turbine components to be decommissioned.

COMPONENT	NUMBER
Wind turbine structural supports	54 towers, each in sections
Wind turbine nacelles	54 nacelles
Wind turbine rotors	54 x 3 rotor blades

4.2 Offshore Substation Platforms

63. Two OSPs will be installed to collect the generated electricity and convert the electricity for transmission to shore by the two export cables.

64. The main components to be decommissioned are summarised in Table 4-2. The OSP support structure will be as described for the wind turbines and summarised in Table 4-3.

Table 4-2 Summary of OSP components to be decommissioned

COMPONENT	NUMBER
OSP topsides	2 topsides

4.3 Foundations and Substructures

65. The wind turbine foundations and the OSP foundations will utilise a similar foundation solution and will comprise three pin piles attached by grouted connection to a jacket substructure.

66. The wind turbine jacket substructure will be of tubular steel lattice design with three legs. Transition pieces will be mounted on the jacket substructures during fabrication and will form the point of connection between the wind turbine tower and the support structure.

67. The OSP jacket substructure will be similar to the turbine jackets and will be of tubular steel lattice design with three legs. The cable deck will be mounted on the jacket substructure and will form the point of connection between the OSP topside and the support structure.

68. The main components to be decommissioned are summarised in Table 4-3.

Table 4-3: Wind turbine and OSP support structures to be decommissioned.

COMPONENT	NUMBER
Wind Turbine Foundation piles	54 x 3 piles
OSP Foundation piles	2 x 3 piles
Wind Turbine Jacket Substructure (including flanged wind turbine/jacket transition piece connection)	54 x 3 leg jacket structure
OSP Jacket Substructure (including cable deck connection to topside)	2 x 3 leg jacket structure
Grouted pile connection	54 x 3 leg jacket connections for turbines 2 x three leg jacket connections for OSPs.

4.4 Inter-Array Cables

69. The inter-array cables are the cables which connect the wind turbines to each other and to the OSPs. There will be 6 loops with 9 turbines per circuit. The first and last wind turbines in a circuit are connected by an inter-array cable to an OSP. The main components to be decommissioned are summarised in Table 4-4.

70. NnGOWL aim to bury the inter-array cables where practicable. It is therefore not currently anticipated that cable protection material will be needed. Only close-fitting mechanical protection between the

seabed and J-tubes is anticipated. The exception to this would be where the intended depth of cover (i.e. the thickness of material on top of the cable after installation) is not achieved during installation, in which case the cables will be mechanically protected.

Table 4-4 Summary of inter-array cabling to be decommissioned

COMPONENT	PARAMETERS
Inter-array cabling	3-core 66 kV aluminium armoured submarine cable circuits with an optical data cable within the cable bundle. Circa 95 km total length.

4.5 Export Cables and Interconnector Cable

71. Two HVAC export power cables will connect to the OSPs and will run to the transition joint bay near Thorntonloch where they will connect with the onshore export cables. A single interconnector cable will connect the two OSPs to each other. The main components to be decommissioned are summarised in Table 4-5.

72. As with the inter-array cables, the export and interconnector cables will be buried where practicable. Where the export cable passes over areas of hard seabed unsuitable for cable burial or where the depth of lowering cannot be achieved cable protection may be required. In addition, close fitting mechanical protection between the seabed and J-tubes is anticipated at the OSPs.

Table 4-5 Summary of export and interconnector cabling to be decommissioned

COMPONENT	PARAMETERS
Export cabling	2 x 3-core 220 kV aluminium and copper armoured submarine cable circuits with an optical data cable within the cable bundle. Circa 74 km total length.
Interconnector cable	3 core 66 kV copper armoured submarine cable. Circa 4 km total length.

4.6 Cable and Scour Protection

73. NnGOWL will only install cable protection where necessary. It is hoped that complete burial will be achieved within the Wind Farm Area and along the Export Cable Corridor, however there may be certain areas of harder ground conditions where cables may require some form of protection. Should cable protection need to be installed, its decommissioning will be considered in the final DP, with an approach to decommissioning developed in accordance with the Guiding Principles outlined in Section 5 below.

74. Installed cable and scour protection will comprise one of the following solutions:

- Durable crushed or original rock of defined size range;
- Artificial fronds or seaweed;
- Concrete ‘mattresses’; and,

- Bags (high strength nylon fibre) of gravel, hardened sand-cement grout, or concrete (grout/concrete pre-filled and hardened onshore). The bag option may include a technique where the grout is introduced to the nylon fibre bag offshore through proprietary pipes (the bags being permeable to water but not to grout).

5 Description of Proposed Decommissioning Measures

75. This section provides an overview of the decommissioning options available and sets out the proposed approach to the decommissioning of the Project.

5.1 Decommissioning Options

76. NnGOWL has considered a number of options for the decommissioning of the Project; a brief summary of the options is set out below. When making a final decision on the approach to decommissioning towards the end of the lifetime of the Project, NnGOWL will look first at the health and safety considerations of each approach, then follow the most commercially viable Best Practicable Environmental Option (BPEO). Lessons learned during Construction and the results of monitoring of the integrity of Project assets during O&M will be taken into account during future updates of this DP.

77. The current preferred option for the decommissioning is set out in Section 5.3 below, which considers complete removal of installed infrastructure taking into account the guiding principles outlined in the BEIS Guidance (BEIS, 2018).

5.1.1 Decommissioning and construction of a new wind farm

78. For this scenario the assumption has been made that wind energy is still economically attractive at the point of decommissioning and the technical integrity of the Wind Farm is declining. If this were the case, installing new and more efficient technology is preferable to increasing the Operation and Maintenance (O&M) effort for any additional years of running time on the existing Wind Farm. Under such a scenario, subject to all necessary consents being granted, the existing Wind Farm would be decommissioned (following the process set out under Section 5.3 below) and a new wind farm constructed (with all appropriate consents having been obtained beforehand).

5.1.2 Re-powering

79. In this scenario it is assumed that wind energy is still economically attractive at the point of decommissioning, the technical integrity of the wind turbines is declining but the electrical infrastructure and possibly the foundations remain sound. The lifetime of the electrical infrastructure could be up to 50 years. Experience from the oil and gas industry indicates that the lifetime of foundations can also be extended outside the design specifications.

80. By closely monitoring the structural integrity of the asset, it could be possible, subject to any necessary consents being granted, to re-use these parts of the system in a re-powering of the Wind Farm – i.e. fitting new wind turbines to the existing foundation and electrical systems.

5.1.3 Step-down

81. This scenario assumes it is not profitable to invest in new technology but that most wind turbines will continue to perform sufficiently beyond the anticipated design lifetime of 25 years. Under this scenario, the Wind Farm would be decommissioned through a controlled step-down. In this case wind turbines would be gradually shut down as their technical integrity declines. A decommissioning campaign would be undertaken when the complete Wind Farm is shut down, but this could be undertaken in a phased manner if this was found to be more cost effective or if the prevailing regulatory regime required this approach. Any such step-down process would be set out for approval in the final DP.

5.2 Core Principles

82. Whichever approach is chosen, the decommissioning process will be in line with the following core principles as set out in the BEIS guidance (BEIS, 2019):

- Health and safety will be the first consideration.
- BPEO, which is the option with the most benefit or least damage to the environment as a whole at an acceptable cost. This involves balancing the reduction in environmental risk with practicality and cost of reducing the risk; and
- Consideration of other users of the sea - safety of surface and subsurface navigation.

83. Taking into account the UK's commitments under the United Nations Convention for the Law of the Sea (UNCLOS); International Maritime Organisation (IMO) standards and the work of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), NnGOWL's starting assumption in establishing the decommissioning requirements has been complete removal of all offshore components to shore for re-use, recycling or energy recovery through incineration at a licensed site. This assumption has been assessed for all components against the key principles presented above. In some instances, this option has not been considered appropriate and alternative options have been considered. These alternatives have also been assessed according to the above principles and the optimum solution selected.

84. The BEIS guidance (BEIS, 2019) recommends considering the application of the 'Comparative Assessment Framework' developed for the oil and gas industry and detailed within the Decommissioning of Offshore Oil and Gas Installations and Pipelines Guidance Notes (BEIS, 2018) to determine the best approach for decommissioning infrastructure where complete removal may not be the most appropriate option. Building on these core principles and the UK's commitment to international legislation detailed above, Table 5-1 describes the key objectives that will be considered in developing the final decommissioning strategy for the Project. Where an alternative to complete removal is being considered this adapted comparative assessment approach will be undertaken with reference to the objectives detailed in Table 5-1.

85. BEIS decommissioning guidance (BEIS, 2019) states that the choice of BPEO should be informed by an EIA. The EIA prepared in support of the application for NnGOWL's Offshore Consents (March 2018) has informed this DP. If necessary, more detailed assessment will be undertaken to accompany the application(s) for Marine Licence(s) which will be required for decommissioning of the Project.

Table 5-1 Assessment criteria for developing the proposed decommissioning programme for the Wind Farm and where appropriate, undertaking a Comparative Assessment of options

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	NNGOWL OBJECTIVES
Safety	**No harm to people**	NnGOWL is committed to adhering to the highest standards for health and safety throughout the lifecycle of the Project. NnGOWL seek to promote safe practices and minimise risk in the development and implementation of decommissioning solutions.
	Consider the rights and needs of legitimate users of the sea	NnGOWL respects the rights and needs of other users of the sea. Decommissioning activities will seek to minimise the impact on stakeholders and emphasis will be placed on clear, open communication.
Environmental	**Minimise environmental impact**	The BPEO, at the time of considering the precise decommissioning procedure, will be chosen in order to minimise impact on the environment at an acceptable cost.
	Maximise re-use of materials	NnGOWL is committed to maximising the re-use of waste materials and pays full regard to the 'waste hierarchy'.
Technical	**Ensure practical integrity**	Solutions that are necessary to achieve these objectives must be practicable.
Societal	**Promote sustainable development**	In decommissioning, NnGOWL will seek to ensure that, future generations do not suffer from a diminished environment or from a compromised ability to make use of marine resources.
	Adhere to the Polluter Pays Principle	NnGOWL's decommissioning and waste management provisions acknowledge our responsibility to incur the costs associated with our impact on the environment.
Economic	**Ensure commercial viability**	In order that commercial viability is maintained, the BATNEEC (Best Available Technique not Entailing Excessive Cost) decommissioning solutions will be sought.

86. The following sections detail the approach to decommissioning and provides an assessment of the decommissioning options in relation to the guiding principles set out in Table 5-1.

87. All work will follow the recommendations and requirements of the Construction (Design and Management) (CDM) Regulations 2015 (or applicable regulations at the time the work starts).

5.3 Proposed Decommissioning Process

5.3.1 Overview

88. In broad terms, decommissioning will involve the removal of the following Project infrastructure: turbines , OSPs, jackets and cables. Pin piles will be cut below the seabed with the grouted piles left in-situ.

89. The decommissioning measures that NnGOWL currently considers represent the best practicable environmental options are summarised in Table 5-2.

Table 5-2: Overview of decommissioning measures for main wind farm and OfTW components

PROJECT COMPONENT	PROPOSED DECOMMISSIONING MEASURES
Wind turbines	Complete removal from site.
Turbine and OSP foundations and substructures	Entire jacket structure removed; pin pile foundations to be cut at such a depth below the surface of the seabed that the remaining parts do not pose a danger for shipping or fishing vessels and cut sections removed from site.
OSP topsides	Complete removal from site.
Offshore Export Cables and Interconnector Cables	Complete removal from site.
Inter-Array Cables	Complete removal from site.
Cable / Scour Protection	The decommissioning measures associated with cable and scour protection will be dependent on the type and quantity of cable and scour protection used. The proposed decommissioning of cable / scour protection will be considered in future updates of the DP once the type and quantity of any installed protection is known.

5.3.2 Wind Turbines

90. The wind turbines will be completely removed. The removal of turbine components including blades, nacelle, and tower is likely to be a reversal of the installation process.

91. The general methodology for carrying out wind turbine decommissioning will be:

- De-energise wind turbines and isolate from the grid;
- Disconnection of power cables and related control and communication cables at the nacelle and tower base in preparation for offshore dismantling;
- Mobilise suitable heavy lift vessels to site;
- Remove turbine blades;
- Remove nacelle including the gearbox and generator;
- Remove turbine tower; and
- Transportation of all components to an onshore facility for processing.

92. Once onshore, components are likely to be processed as follows:

- All hazardous substances and fluids will be removed from the wind turbines (such as oil reservoirs and any hazardous materials and components). All such materials will then be disposed of in accordance with relevant regulations at the time of disposal;
- All steel components will be sold for scrap to be recycled. This forms the bulk of the wind turbine structures; and

- At the time of decommissioning all options for the recycling of the wind turbine blades (fibreglass) will be considered. Recycling or disposal, if required, will be carried out in accordance with the relevant regulations in force at the time of decommissioning.

93. Table 5-3 provides an assessment of the wind turbine decommissioning process against the guiding principles outlined in Table 5-1.

Table 5-3 Assessment of proposed wind turbine decommissioning process against guiding principles

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	NNGOWL COMMENTS
Safety	**No harm to people**	Safest option, involving standard procedures and minimal work offshore.
	Consider the rights and needs of legitimate users of the sea	Complete removal of wind turbines considered best long-term solution. Appropriate notification and consultation prior to temporary works to minimise disruption.
Environmental	**Minimise environmental impact**	Risk of spillage will be minimised by either removing all potential pollutants from the nacelle as part of a continuation of routine O&M measures or by ensuring that all potential pollutants are fully contained and controlled within the nacelle prior to being removed in a single lift. All subsequent dismantling takes place onshore thereby minimising potential for pollution incidents.
	Maximise re-use of materials	All dismantling of individual major components (i.e. nacelle) to take place onshore. Maximum potential for re-use or recycling.
Technical	**Ensure practical feasibility**	Known/tried and tested procedures and reduced risks due to minimising of offshore activity.
Societal	**Promote sustainable development**	Wind turbines and support structures completely removed from site ensures no ongoing environmental impacts and no restriction on future use of marine resources.
	Adhere to the Polluter Pays Principle	Consistent with this principle – full removal and disposal.
Economic	**Ensure commercial viability**	Most commercially viable solution – minimal works offshore and maximum potential for re-sale/re-use value from turbine components with minimum residual risk.

5.3.3 Offshore Substation Platforms

94. The decommissioning of the OSPs will follow a similar method as described for the wind turbines.

95. The complete OSP topside structure will be removed in a single lift, taken by suitable vessel to an onshore facility where the equipment and structure will be dismantled and the constituent parts processed for re-use, recycling and / or disposal.

96. Following the separation of the piles and the jacket, the jackets and foundations will be decommissioned as detailed under Section 5.3.4.1 and Section 5.3.4.2 respectively.

5.3.4 Foundations and Substructures

97. The following sections set out the proposed decommissioning approach for the foundations (pin piles) and substructures (jackets).

5.3.4.1 Jackets (including transition pieces and cable decks)

98. In order to maintain sufficient structural capacity, the jackets legs will have been embedded into the pin piles and sealed using grout. The proposed approach to the decommissioning of the jackets (wind turbines and OSPs) is to cut off the jacket legs at, or above the pin pile interface level to separate the jacket from the pin piles. Currently, abrasive diamond wire cutting is considered likely to be the preferred method for the cutting of the jacket legs, but other methods may be preferred at the time of decommissioning.

99. Following the separation of the jacket from the piles, it is anticipated that the jacket will be lifted off the piles by a heavy lift vessel and recovered and taken ashore for re-use or scrap recycling. In the case of the OSPs it may be necessary to first separate the cable deck from the jacket. In this case the OSPs will require two separate lifts to remove the cable deck and then the jacket. This will be dependent on the final OSP topside and jacket design.

100. Table 5-4 provides an assessment of the jacket substructure decommissioning process against the guiding principles outlined in Table 5-1.

Table 5-4 Assessment of proposed jacket substructure decommissioning process against guiding principles

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	NNGOWL COMMENTS
Safety	**No harm to people**	Heavy lift and removal to shore for disassembly minimises work offshore.
	Consider the rights and needs of legitimate users of the sea	Complete removal of structure considered best long-term solution. Appropriate notification and consultation prior to temporary works to minimise disruption.
Environmental	**Minimise environmental impact**	Minimal risk of environmental impact arising from jacket lifting and removal; subsequent dismantling or cutting would take place onshore thereby minimising potential for environmental impacts at sea.
	Maximise re-use of materials	Any dismantling to take place onshore. Maximum potential for re-use or recycling.
Technical	**Ensure practical feasibility**	Known/tried and tested procedures and reduced risks due to minimising of offshore activity.
Societal	**Promote sustainable development**	Jacket substructures completely removed from site and ensures that no ongoing environmental impacts and no restriction on future use of marine resources.
	Adhere to the Polluter Pays Principle	Consistent with this principle – full removal and disposal.
Economic	**Ensure commercial viability**	Most commercially viable solution – minimal works offshore and maximum potential for re-sale/re-use value with minimum residual risk.

5.3.4.2 Pin Piles

101. The proposed approach to the decommissioning of the pin piles (wind turbines and OSPs) is to cut off the piles below seabed level. Currently, abrasive diamond wire cutting is considered likely to be the preferred method for the cutting of the piles, but other methods may be preferred at the time of decommissioning. The material cut off from the pin piles will be recovered and taken ashore for scrap recycling.

102. Table 5-5 provides an assessment of the piled foundation decommissioning options against the guiding principles outlined in Table 5-1.

Table 5-5 Assessment of piled foundation decommissioning options against guiding principles

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	COMPLETE REMOVAL OF PILED FOUNDATIONS	CUTTING OF PILED FOUNDATIONS AT A DEPTH THAT DOES NOT POSE A DANGER TO OTHER SEA USERS
Safety	**No harm to people**	Significant excavation required to remove seabed material prior to pile recovery. Excavation of any overburden would need to be undertaken in the first instance to expose the pile at the rock layer requiring significant offshore activity. It may not be possible to remove the grouted piles within the rock layer although technology at the time of decommissioning will be considered. Breaking the grouted connection within the rock layer would require significant time resource and would therefore increase offshore activity. There may be a requirement for diver support associated with subsea cutting, excavation and lifting operations. Any diving operations would result in significant risk to dive teams.	Fewer activities to be undertaken over a shorter time period offshore, minimising risk to personnel. Post decommissioning site monitoring will identify any unlikely exposure with the result that safety risk is insignificant.
	Consider the rights and needs of legitimate users of the sea	Disadvantages to other users of the marine environment include disruption over a longer time period whilst the works are undertaken, and remaining scour holes associated with excavation.	Negligible risk presented providing adequate consultation and notification, cutting is to a sufficient depth, site is monitored post decommissioning and any unlikely exposure identified.
Environmental	**Minimise environmental impact**	Excavation pits over a wide area causing potentially significant impact to marine environment. Associated dumping of excessive volume of excavated waste material may be required. Disturbance would take place over long time period.	It is typical to cut piles 1m below the seabed. However, depth of cutting will be dependent on local ground conditions. The final depth of cutting will be determined prior to completing the final DP and take into consideration all available information at the time. Considerable excavation is required to cut below the seabed. Therefore, the depth of cutting should be informed by an assessment of impacts from the

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	COMPLETE REMOVAL OF PILED FOUNDATIONS	CUTTING OF PILED FOUNDATIONS AT A DEPTH THAT DOES NOT POSE A DANGER TO OTHER SEA USERS
			excavation diameter versus risks of foundations becoming exposed due to shifting sediments. By cutting below the seabed works would take place over reduced time period and involve less equipment, than complete removal. Seabed recovery time shorter than complete removal scenario.
	Maximise re-use of materials	Maximum amount of piled foundations potentially available for re-use.	Less foundation material available for re-use relative to complete removal.
Technical	**Ensure practical feasibility**	Not a practical solution: would require considerable excavation with associated storage or disposal of large volumes of waste. Breaking the grouted connection between the pile and the underlying rock layer may not be feasible; in the event that it is possible to disconnect the pile from the socket it would require extensive offshore operations.	Standard procedures and equipment.
Societal	**Promote sustainable development**	In the long-term complete removal affords maximum flexibility over use of seabed, though considerable impacts are likely over the whole site in short to medium term.	Providing remaining structures do not become exposed most future activities will not be affected. Seabed recovery is considered highly likely.
	Adhere to the Polluter Pays Principle	Consistent in principle, assuming a suitable disposal solution can be found for the excavated waste material and that the seabed can be restored.	Consistent, as remaining elements of piles remain in the seabed and therefore do not affect other sea users.
Economic	**Ensure commercial viability**	Not considered commercially viable - excavation and extreme lifting involves major equipment requirements over longer periods of time.	Considerably less expensive alternative to complete removal, involving minimal excavation and minimising environmental impacts.

5.3.5 Inter-array, Export and Interconnector Cables

103. The proposed approach to the decommissioning of the buried, subsea inter-array export and interconnector cables is to remove the infrastructure completely.

104. This will be completed by reversing the burial process and exposing the cables using jetting methods. Once the cables are exposed, grapples would be used to pull the cables onto the deck of a cable removal vessel. The cables would likely be cut to into manageable lengths and returned to shore for recycling of the suitable components and subsequent disposal.

105. Table 5-6 provides an assessment of the subsea cable decommissioning options against the guiding principles outlined in Table 5-1.

Table 5-6 Assessment of removal of subsea cable against guiding principles

ASSESSMENT CRITERIA	KEY CONSIDERATIONS	COMPLETE REMOVAL OF CABLES
Safety	**No harm to people**	It is acknowledged that there would be a greater risk to personnel compared to leaving in situ due to increased offshore operations, , however the risk is not considered excessive.
	Consider the rights and needs of legitimate users of the sea	Removal affords maximum flexibility over use of seabed.
Environmental	**Minimise environmental impact**	It is recognised that due to the considerable length of cable and the need for jetting techniques, removal would cause some disruption to the seabed and benthic habitats however, impacts will be comparable to those reported in the Original ES. As no infrastructure will be left in situ there will be no lasting impact on the environment.
	Maximise re-use of materials	Maximum material, e.g. aluminium, copper, potentially available for re-use.
Technical	**Ensure practical feasibility**	Removal is possible via exposure and recovery.
Societal	**Promote sustainable development**	Disturbance of the seabed in the short-medium term, although complete removal would allow flexibility over use of seabed in the longer term.
	Adhere to the Polluter Pays Principle	Consistent, assuming suitable disposal option is found for surplus cable components.
Economic	**Ensure commercial viability**	Costs associated with removal offset by recycling of scrap cable where appropriate.

5.3.6 Cable and Scour Protection

106. Where cable or scour protection is required during the construction or operational phase of the Project a determination of the decommissioning procedure will be presented in the final DP. For the purposes of this DP and in recognition of BEIS Guidance (BEIS, 2019), any protection installed around foundations or covering cables will be left in situ to preserve the marine habitat that will have established over the life of the wind farm, on the assumption that to do so would not have a detrimental impact on the environment, conservation aims, the safety of navigation and other uses of the sea.

107. The final decommissioning programme will review the type of cable protection installed, for example, concrete mattressing, rock dumping or gabion bags and the available technology at the time and will update the proposed decommissioning procedures accordingly taking into account the principles outlined in Section 5.2. Any options would be subject to a comparative assessment as undertaken for the other wind farm components.

5.4 Waste Management

108. NnGOWL is committed to maximising the re-use of waste materials and will give full regard to the 'waste hierarchy' which suggests that re-use should be considered first, followed by recycling, incineration with

energy recovery and, lastly, disposal. In any event, waste management will be carried out in accordance with all relevant legislation and with any necessary disposal taking place at licensed facilities. The proposed approach to disposal of the main components of the Wind Farm is set out in Table 5-7, but is subject to evolution of technology, change in regulations and demand for materials over the lifetime of the Project.

Table 5-7 Proposed disposal route for main Wind Farm and OfTW components

WASTE MATERIAL	PRE-TREATMENT	RE-USE/ RECYCLE/ DISPOSAL
Wind turbine and OSP support structures (jacket substructures and pin piled foundations)	Establish remaining design life.	Re-use by repowering with new/superior wind turbines or other renewable generation technology or dismantle and recycle the recovered material as much as possible.
Steel from wind turbine tower and nacelle removed to shore	Break down into transportable size.	Recycle.
Copper from power cables and transformers	Strip conductors from power cables and transformers.	Recycle.
Glass-fibre Reinforced Epoxy (GRE) from wind turbine blades	Break down into transportable size.	Recycle where facilities exist or disposal if no alternative.
Steel from OSP topsides	Break down into transportable size.	Recycle.
Used lubricants from wind turbine and OSPs	Filter.	Recycle.
Non-recyclable materials and fluids	None.	Incineration with energy recovery or disposal via landfill.

5.5 Lighting and Marking

109. In accordance with the requirements of the S36 Consent and Marine Licences, the appropriate marks and lights shall be exhibited during the decommissioning of the Wind Farm.

110. In relation to aviation safety, the shape, colour and character of the lighting will be compliant with the Air Navigation Order 2016 (or then current regulation or as otherwise directed by the Civil Aviation Authority).

111. In relation to navigational safety, lights and markings will be discussed with the Northern Lighthouse Board (NLB), in consultation with the Maritime and Coastguard Agency (MCA). In particular, the NLB will be consulted prior to decommissioning to specify any obstruction marking that may be required during the removal operations. In the event that any obstruction is left on site that may be considered to present a hazard to navigation the necessary marking specified by NLB shall be displayed. The final lighting and marking of the wind farm area will be in accordance with the MGN543 guidance or any current guidance in place at the time of decommissioning as advised by the MCA and NLB.

6 Environmental Impact Assessment

112. In support of the consent applications NnGOWL undertook an EIA, the findings of which are presented in the Application and supporting documentation.

113. In complying with the requirements of the EIA Directive, a lifecycle approach was taken in assessing the impacts of the Project and in seeking to mitigate and minimise the effect of the works. In all instances a 'worst case' design envelope approach was taken to the assessment. Decommissioning was also included in the EIA, as far as it could be predicted at the time.

114. NnGOWL will commence consultation in relation to the environmental impact of decommissioning three years in advance of the start of decommissioning. At that point the assessment presented in the Application documents will be reviewed taking account of the final decommissioning strategy under consideration. Subject to the results of this consultation, and provided that there have not been substantial changes to the baseline environment beyond those predicted in the Application documents, to the legislative process or to the methods proposed for decommissioning, it is not currently anticipated that an EIA will be required for decommissioning. The requirement for an EIA will be revisited at that time.

115. The consideration of the need for a new EIA will be considered against the relevant Environmental Impact Assessment Regulations in place at the time of decommissioning. If required, the decommissioning EIA will fill any information gaps in relation to these issues and would also describe the measures envisaged to avoid, reduce and, if possible, remedy any likely significant adverse impacts arising from the decommissioning process. The outcomes of the EIA will be used to consider the final decommissioning options that will be detailed in the DP.

7 Consultation with Interested Parties

7.1 Introduction

116. NnGOWL regards effective and open communication and consultation as essential elements to the successful development of the Project. These principles have been adopted during the development of this DP and will be applied throughout the lifecycle of the Project in further refining and amending the proposed strategy for decommissioning.

7.2 Consultation on the Draft Decommissioning Programme

117. Section 105(7) of the Energy Act 2004 provides that a notice given under Section 105 may require the recipient of the notice to carry out consultation specified in the notice before submitting a decommissioning programme.

118. The Section 105 notice issued to NnGOWL by Scottish Ministers on 11 March 2019 sets out those bodies to be consulted on this DP. The Section 105 notice identified a number of consultees who should receive a copy of this draft DP for comment. Key stakeholders identified in the Section 105 notice are as follows:

KEY STAKEHOLDERS DETAILED WITHIN THE SECTION 105 NOTICE	
Angus Council	Joint Nature Conservation Committee (JNCC)
Chamber of Shipping (CoS)	Maritime and Coastguard Agency
Dunbar Harbour Trust	North and East Inshore Fisheries Group
Dundee City Council	Northern Lighthouse Board (NLB)
Dundee Harbour	Royal Yachting Association (Scotland) (RYA)
East Lothian Council	Scottish Borders Council
Eyemouth Harbour	Scottish Environment Protection Agency (SEPA)
Forth Ports	Scottish Fisherman's Federation (SFF)
Fife Council	Scottish Natural Heritage (SNH)
Historic Environment Scotland (HES)	

119. The draft DP was issued to all stakeholders listed above on the 7 August 2019. Stakeholders were given 30 days to respond to the consultation, in line with the BEIS guidance, which meant consultation closed on the 6th September 2019. Comments received are summarised within this section with detail on how NnGOWL has addressed any issues raised.

120. The Financial Security Information (Appendix A) associated with the Decommissioning Programme will be subject to a separate consultation and approval process and was not be circulated as part of the Section 105 consultation. The approved Financial Security Information will form a confidential appendix to this document.

7.2.1 Section 105 Consultation

121. Table 7-1 below provides a summary of the consultees who provided comment and those who did not provide comments on the DP.

Table 7-1 Stakeholders listed in the Section 105 notice and summary of those who responded on the consultation of the draft DP

Stakeholder	Comment received during consultation on draft DP
Angus Council	✓
CoS	✓
Dunbar Harbour Trust	×
Dundee City Council	✓
Dundee Harbour	×
East Lothian Council	✓
Eyemouth Harbour	×
Forth Ports	×
Fife Council	✓
HES	✓
JNCC	✓
MCA	✓
North and East Inshore Fisheries Ground	×
NLB	✓
RYA (Scotland)	✓
Scottish Borders Council	✓
SEPA	✓
SFF	✓
SNH	✓

122. A summary of the consultation comments, the responses provided by NnGOWL and where they have been addressed by amendment to the DP (where relevant) is provided below in Table 7-2 . Full consultee correspondence are presented in Appendix B.

Table 7-2 Summary of stakeholder comments on the draft DP and NnGOWL responses.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
ACO1	**Angus Council**	Confirmed no comments.	No response required.	N/A
COS1	**Chamber of Shipping**	Confirmed no comments.	No response required.	N/A
DCC1	**Dundee City Council**	Confirmed no comments.	No response required.	N/A
ELC1	**East Lothian Council**	East Lothian Councils interest in the decommissioning of the project is in avoiding adverse impacts on East Lothian arising from the continued physical presence of any part of the project beyond its useful life, in particular: • Impacts on the landscape and seascape of East Lothian; • Impacts on biodiversity of or enjoyed from East Lothian including birds and marine mammals; • Impacts on fishing vessels and recreational craft operating from East Lothian; • Polluting events which might affect East Lothian; • Avoiding any costs of decommissioning falling to individuals or organisations in East Lothian The Council requests that these interests are taken into account in approving the Decommissioning Plan and any revisions of it.	The proposed approach to decommissioning set out in the draft DP takes into account potential effects on the receiving environment, the characteristics of which are summarised in Sections 3.2 - 3.5 of the DP. Section 5.2 of the DP confirms that decommissioning proposals have been considered against a set of core principles, which take into account the potential adverse effects identified by East Lothian Council. The draft DP acknowledges that future iterations of the DP will similarly need to take into account effects on the baseline environment, noting that where there are substantial changes to the baseline, decommissioning proposals may need to be supported by an Environmental Impact Assessment (see Section 6 of the draft DP).	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
ELC2	**East Lothian Council**	The Decommissioning Plan contains Core Principles at paragraph 82. These include BPEO which is the option with the most benefit or least damage to the environment as a whole at an acceptable cost. The consent application for permission included EIA, which considered assessment of decommissioning including the removal of most or all structures under the seabed, unless otherwise approved. The Council considers that removal of turbines and other structures above the seabed must be a requirement. This follows the 'polluter pays' principle and avoids passing environmental and safety costs to future generations. Applying BPEO should not over-ride this requirement.	Decommissioning approaches have been comparatively assessed against the criteria set out in Table 5-1 of the draft Decommissioning Programme; one criterion is not considered more important than another. The removal of all structures above the seabed has been proposed by NnGOWL.	No amendments proposed.
ELC3	**East Lothian Council**	The Core Principles should include that 'no financial or environmental costs of decommissioning will fall on individuals or organisations other than the owner and/or operator of the NNG windfarm'	A Decommissioning Programme is required to be prepared to ensure that no liabilities for decommissioning fall on the taxpayer. The draft DP has been produced in accordance with this principle (and in accordance with Chapter 9 of the BEIS guidance) and as such, NnGOWL have confirmed financial securities are in place to Marine Scotland. These securities ensure that the burden of decommissioning will be covered by the Project owner, with the liability related to the future OFTO transferring to the OFTO at the point of asset transfer.	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
ELC4	**East Lothian Council**	The Council supports the proposed complete removal of turbines; however, to minimise the visual impact on the landscape and seascape there should be a systematic approach taken to the order in which turbines are removed. Our recommendation would be that the internal turbines are removed first, with the peripheral turbines removed last in a clockwise or anti-clockwise direction. This would mean that no new aviation lighting is required, as the existing peripheral lighting would be retained until last. This would also help it continue to read as a single windfarm gradually reducing in size.	The recommendation is acknowledged. At this stage of Project development (i.e. before infrastructure has been installed) we don't propose committing to a sequence of removal. When decommissioning plans are finalised near the end of the Project lifetime, such considerations will be taken into account, noting that the views of the Council will need to be balanced with recommendations and requirements of Marine Scotland and other stakeholders such as the Maritime and Coastguard Agency and Northern Lighthouse Board.	No amendments proposed.
ELC5	**East Lothian Council**	Where there is a 'Step down' process, turbines will be removed as they become unsafe or cease to operate, which could presumably be in any order. It is possible (depending on the order in which they fail) that the resulting design of the windfarm could have detrimental effects on landscape, seascape, biodiversity and navigational safety. This may also result in changes to lighting of the scheme and if this occurs the Council would request that it be consulted over any changes in lighting of the project. We therefore would not support a 'Step down' as an option for decommissioning.	The step-down approach is described in Section 5.1.3 of the draft Decommissioning Programme. Whilst turbines may shut down individually, the intention would be that decommissioning would commence only once all turbines were shut down. Phased decommissioning may be considered, but this would not involve removal of structures one at a time, and where considered, more detail on the approach would be provided in later iterations of the Decommissioning Programme.	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
ELC6	**East Lothian Council**	The Council accepts that at present the best approach to foundations below the level where they could present a hazard and cables is for them to be left in situ. It appears likely that this will remain the case. However, the option for all elements of the proposal including foundations, cables, reinstatement of cable routes these cables to be removed and their route reinstated should remain as an option (and so pricing for this included in any calculation of financial provision against decommissioning) as this may be the best option at the time of decommissioning.	The Decommissioning Programme will be revisited and updated at various points during the lifetime of the Project and decommissioning proposals will be finalised towards the end of the Project lifetime. All decommissioning approaches remain open to consideration during this period and paragraph 8 confirms technological changes will be considered in future revisions of the DP. Financial provisions have been made for cable removal. At this point in time, full removal of piles is not technically feasible. Information setting out financial provisions for decommissioning has been supplied to Marine Scotland.	No amendments proposed.
FCO1	**Fife Council**	Confirmed no comments.	No response required.	N/A
HES1	**Historic Environment Scotland**	We are content to agree with the document that the decommissioning programme will be reviewed prior to decommissioning activities taking place and that changes to the baseline including historic environment interests will inform the decision as to whether a new or updated EIA is required.	Noted and in agreement.	No amendments proposed.
HES2	**Historic Environment Scotland**	We consider significant impacts for our interests unlikely as long as the mitigation measures for the project remain in place and have no further comments to offer at this stage.	Noted and in agreement.	No amendments proposed.
JNC1	**Joint Nature Conservation**	JNCC has devolved advice on renewables projects in Scottish waters to SNH; SNH to comment.	No response required.	N/A

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
	Committee (JNCC)			
MCA1	**Maritime and Coastguard Agency**	We would expect the decommissioning to be carried out in accordance with Marine Guidance Note 543, particularly with regards to Annex 4 titled 'Safety and mitigation measures recommended for OREI during construction, operation and decommissioning'. This includes the consideration of marine navigational marking which should be discussed and agreed with the Northern Lighthouse Board. MGN 543 should be listed in your legislation and guidance section, and as far as I can see is not mentioned in the plan.	Noted and in agreement. The draft Decommissioning Programme has been updated to confirm adherence to MGN543.	Text amended at Paragraph 111.
MCA2	**Maritime and Coastguard Agency**	We would expect you to consider the impact of decommissioning on the safe navigation of vessels operating in the area and search and rescue capabilities, with appropriate mitigations assessed in accordance with MGN 543. The results and recommendations from the post consent monitoring arrangements should also be taken into consideration as part of this assessment.	Noted and in agreement; to be considered as final decommissioning plans are developed close to the end of Project lifetime.	No amendments proposed.
MCA3	**Maritime and Coastguard Agency**	In addition we would expect: 1) the Emergency Response Cooperation Plan (ERCoP) to be updated for the decommissioning works and submitted to MCA, as per rev 2 Annex 5 of MGN 543. We would expect any emergency response plans/arrangements to be updated in line with any change in methodology;	Noted and in agreement; to be considered as final decommissioning plans are developed close to the end of Project lifetime.	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
MCA4	**Maritime and Coastguard Agency**	2) Local users to be notified of the works as per Marine Licence requirements, including HM Coastguard;	Noted and in line with para121 of the draft Decommissioning Programme.	No amendments proposed.
MCA5	**Maritime and Coastguard Agency**	3) The UKHO to be notified for the update of nautical charts and publications;	Noted and in line with para121 of the draft Decommissioning Programme.	No amendments proposed.
MCA6	**Maritime and Coastguard Agency**	4) Any required hydrographic survey requirements are carried out post decommissioning as per MGN 543. This is detailed under iii. Post-decommissioning of all or part of the development: Cable route(s) and the area extending to 500m from the installed generating assets area; and	Noted and in agreement. The draft Decommissioning Programme has been updated to confirm adherence to MGN543.	Text amended at Paragraph 136.
MCA7	**Maritime and Coastguard Agency**	5) All maritime safety legislation must be followed.	Noted and in agreement.	No amendments proposed.
NLB1	**Northern Lighthouse Board (NLB)**	Northern Lighthouse Board have no objections to the draft document, and welcome Section 5.5 of the document, which creates provision for consultation between NnGOWL, NLB and Maritime and Coastguard Agency prior to any decommissioning work being conducted, with regard to the lighting and marking of any obstruction.	No response required.	N/A
RYA1	**Royal Yachting Association (Scotland) (RYA)**	Confirmed no comments.	No response required.	N/A

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
SBC1	**Scottish Borders Council**	Confirmed no comments.	No response required.	N/A
SEP1	**Scottish Environment Protection Agency (SEPA)**	SEPA will have no objection to this provided the devices and as much of the support infrastructure is removed and all waste materials are removed and reused, recycled or disposed of at a licensed onshore site. The seabed and/or shoreline should be restored to as near its former natural condition as possible on completion of the works.	NnGOWL is committed to maximising the re-use of waste materials and following the principles of the waste hierarchy as confirmed in Section 5.4 of the draft Decommissioning Programme. Commitment to site restoration is provided in Section 11 of the draft Decommissioning Programme.	No amendments proposed.
SFF1	**Scottish Fisherman's Federation (SFF)**	Page 13 refers to the plan being to cut cables and leave the buried in situ. Given the lack of clarity on the quantity involved or the effect of eroding cables, the SFF would object to this as the complete opposite of returning the seabed to its original condition. There is insufficient science to back this as ecologically sound practice, and recent experience of cable laying operations does not convince us that burial will be as good as claimed. Paragraphs 70, 72 refer to the same view.	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited in future iterations of the Decommissioning Programme.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.
SFF2	**Scottish Fisherman's Federation (SFF)**	Para 78 on p28, raises the possibility of a total infrastructure replacement, in which case it is imperative that all old cables are removed rather than further restricting seabed access. This is backed up by the statements about Health & Safety in P82, P29 and table 5.1 on p29.	See response to SFF3. Furthermore, should any of the decommissioning options described under Sections 5.1.1 to 5.1.3 become favourable in the future, the Decommissioning Programme would be updated to take account of this.	No amendments proposed.
SFF3	**Scottish Fisherman's**	Para 88 on P30 again claims all buried will be left in situ, but the mooted advances in technology should make it	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited	The DP has been amended throughout to confirm that the current position assumes complete removal

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
	Federation (SFF)	easy to remove even the buried cables. Table 5.2 further refers […not concluded]	in future iterations of the Decommissioning Programme.	of all inter-array, interconnector and export cables.
SFF4	**Scottish Fisherman's Federation (SFF)**	Table 5.3, P32 under the heading "Societal" avers that removing the turbines is sufficient to achieve "no restriction on future use of marine resources" but to leave cables behind is contrary to that and conflicts with Scotland's National Marine Plan which clearly expects sustainable fishing to continue.	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited in future iterations of the Decommissioning Programme. Any infrastructure remaining in the seabed would be monitored for exposure and actions taken should any hazard to other marine users be identified.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.
SFF5	**Scottish Fisherman's Federation (SFF)**	At various points in the DP, notably table 5.6 on P36, economic viability is cited as a reason for leaving buried cables, which is surely erroneous, if they can't afford to clean up, as in "Polluter Pays" the project should not be allowed to proceed. The same table states "consider the rights and needs of legitimate users of the sea" which should mean restoration to allow continued use by the food producing industry of fishing. Finally the claim is made that leaving bits of buried cable is benign environmentally, without proof we would beg to differ and renew our objection! The SFF would however welcome the developer investing in a scientifically valid study to prove that leaving buried sections is not harmful.	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited in future iterations of the Decommissioning Programme. Any infrastructure remaining in the seabed would be monitored for exposure and actions taken should any hazard to other marine users be identified.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
SNH1	Scottish Natural Heritage (SNH)	We have reviewed the draft plan in tandem with the BEIS (2019) guidance, in the absence of Scottish guidance, which we understand will be issued soon for consultation.	Noted.	No amendments proposed.
SNH2	Scottish Natural Heritage (SNH)	Our advice is based on the default position outlined in relevant obligations (e.g. IMO standards and OSPAR guidance) and emphasised in the BEIS guidance (2019) that any infrastructure placed in the marine environment should be designed with full removal as the default position.	Noted.	No amendments proposed.
SNH3	Scottish Natural Heritage (SNH)	Having reviewed the Neart na Gaoithe decommissioning draft plan, we advise that further consideration should be given to several aspects, including: Cost alone is not sufficient reason to avoid decommissioning fully and we question what constitutes an 'acceptable' cost;	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited in future iterations of the Decommissioning Programme.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.
SNH4	Scottish Natural Heritage (SNH)	The decommissioning of installed cables whether they are inter-array, interconnector or export will be similar to impacts during construction;	Impacts will depend upon the approach to decommissioning. The impacts of cable removal may be similar to those during construction, assuming no species of conservation importance have colonised the seabed along the cable routes. Leaving cables in-situ will not result in disturbance.	No amendments proposed.
SNH5	Scottish Natural Heritage (SNH)	Lessons learnt during the lifetime of the wind farm particularly during construction and O&M should be used	Agreed. The integrity of Project infrastructure will be monitored throughout the lifetime of the	Text amended at Paragraph 76.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
		to inform the final decommissioning strategy i.e. instances where exposure of cables occurs;	Project and the results of monitoring will inform decommissioning plans.	
SNH6	**Scottish Natural Heritage (SNH)**	We would encourage keeping track of and supporting advances in technology during the lifetime of the wind farm, to help facilitate ease of decommissioning. We think both the offshore wind and oil and gas industries could encourage greater collaboration and innovation to develop new techniques etc;	Agreed.	No amendments proposed.
SNH7	**Scottish Natural Heritage (SNH)**	Consideration of how climate change impacts could affect decommissioning should be prevalent throughout the DP development process, particularly to assess coastal and marine resilience and restoration;	Agreed. Prevailing environmental conditions will be taken into account in finalising decommissioning proposals towards the end of the lifetime of the Project.	No amendments proposed.
SNH8	**Scottish Natural Heritage (SNH)**	Within the context of the climate emergency and global biodiversity loss, principals of reduce, reuse, and recycle or for use in energy production are now more important than ever. The use of finite resources (e.g. copper, valuable minerals etc) within component parts of windfarm infrastructure in our view adds further weight to the need to decommission as fully as possible.	Agreed. As set out in Section 5.4 of the draft Decommissioning Programme, NnGOWL is committed to maximising the re-use of materials, where possible.	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
SNH9	**Scottish Natural Heritage (SNH)**	We are pleased to see that the draft DP has been structured to follow the model framework as set out in the recently updated BEIS (2019) guidance. We note the early nature of this iteration of the DP which is provided before the offshore wind farm has started construction. We therefore acknowledge the uncertainty around what infrastructure will be present on site that will need to be decommissioned and equally how this might be done. We recommend that clear records including with coordinates of materials deposited on the seabed etc. are provided to Marine Scotland to ensure adequate records over the lifetime of the wind farm of materials that will need to be considered for decommissioning.	Noted; conditions attached to the Project Offshore Consents require the reporting of such information to Marine Scotland.	No amendments proposed.
SNH10	**Scottish Natural Heritage (SNH)**	We advise that in the draft plan the option to fully remove has been discounted too prematurely in favour of alternative options. In particular we refer to the proposal to leave in situ the inter-array, export and interconnector cables (paragraph 86, Table 5-2).	It is understood that the approach to decommissioning should start with the presumption of full removal of all infrastructure. We disagree that this option has been discounted too prematurely. An assessment of alternative options (i.e. remove or leave in-situ) is presented for piles (see Tables 5-5 of the draft Decommissioning Programme). Full removal of piles is not currently a technically feasible option. Should this position change over the lifetime of the Project, future iterations of the Decommissioning Programme will reflect this. Regarding the approach to the decommissioning of cables, please see NnGOWL response to SNH3.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
SNH11	**Scottish Natural Heritage (SNH)**	Current methods for the decommissioning of pin piles are identified and will require the cutting below the seabed of these piles. We accept this is the only available option at this time, but as above consideration should be taken in future iterations of the plan of any advances in technology to remove such foundations.	Agreed, as confirmed in para101 of the draft Decommissioning Programme.	No amendments proposed.
SNH12	**Scottish Natural Heritage (SNH)**	The proposed approach outlines that buried subsea cables will be cut, sealed and left in situ - some of the justification for which (as outlined in Table 5-6) relates to 'disruption to the seabed and benthic habitats'. Installation of cables will also cause disruption and in the absence of any species of conservation importance having colonised in the intervening time period, we do not agree that this reasoning alone should preclude cables from being removed.	NnGOWL has revised the position in the draft Decommissioning Programme. It is currently assumed that all cables will be removed upon decommissioning. This position will be revisited in future iterations of the Decommissioning Programme. The seabed can be expected to have recovered during the operational lifetime of the Project and therefore removal of buried cable may cause disturbance. It is acknowledged throughout the draft Decommissioning Programme that the final approach to decommissioning will be decided towards the end of the lifetime of the Project (e.g. see para 76), based on the known status of the Project assets, available decommissioning techniques and prevailing environmental conditions at the time.	The DP has been amended throughout to confirm that the current position assumes complete removal of all inter-array, interconnector and export cables.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
SNH13	**Scottish Natural Heritage (SNH)**	Similarly, leaving protection around foundations or covered cables in order to preserve marine habitat on the assumption that to do so would not have a detrimental impact on the environment and conservation aims, needs to be assessed fully. This assessment needs to consider the extent of cable / scour protection used throughout the life of the windfarm, the conservation importance of the resulting benthic habitats and their species and the removal options available at the time. Determining now, at this early state, that there is a presumption that such protection (as well as all cabling) will be left, is therefore premature.	The foundation and jacket has been designed to be resistant to scour effects taking into account the physical processes present across the Wind Farm Area. It is not currently anticipated that any scour protection will be required around the turbine or OSP foundations; this is confirmed in Consent Plans. Similarly, seabed conditions have been taken into account in determining appropriate cable installation methods; NnGOWL propose to use different trenching and cutting techniques to suit the varied seabed conditions to maximise burial. Future iterations of the DP will consider any cable or scour protection required during construction and through the operational life of the Project and if necessary a comparative analysis will be conducted adhering to the core principles and criterion presented in Table 5-1.	No amendments proposed.
SNH14	**Scottish Natural Heritage (SNH)**	We note the consideration that a full EIA covering decommissioning is unlikely to be needed; we refer you to our early comments that if avoiding environmental harm is one of the principal drivers for leaving infrastructure in situ, we would expect this to be fully assessed and justified, whether this is in full formal EIA or not. And that, in line with the BEIS guidance (2019) we anticipate this is likely to require underwater surveys. Assessment should also take into account the need for any post-decommissioning mitigation measures (i.e. re-	Comments are noted and approaches to EIA, surveys and restoration of the site are set out in Sections 6, 11 and 12 of the draft Decommissioning Programme.	No amendments proposed.

REFERENCE	CONSULTEE	CONSULTEE COMMENT	NNGOWL RESPONSE	AMENDMENTS TO DP
		burial / protection) for the infrastructure that is left in situ.		

7.3 Ongoing Consultation and Notifications

123. Throughout the Project lifespan the DP may be revised periodically as new information relevant to the decommissioning strategy becomes available. Consultee bodies listed in the Section 105 notice, and any additional consultees identified by MS-LOT, will be provided with the opportunity to comment on the final decommissioning strategy prior to it being finalised. It is anticipated that the final revision process will commence two years prior to the initiation of decommissioning (see Section 10).

124. At the time of decommissioning, NnGOWL will issue Notices to Mariners (NtMs) and other navigational warnings of the position and nature of the decommissioning activities taking place. Efforts will be made to ensure that this information reaches mariners in the shipping and fishing industry as well as recreational mariners. The UK Hydrographic Office (UKHO) will be notified as appropriate on the progress and completion of the works.

8 Costs and Financial Security

125. The decommissioning cost and financial security information required by Scottish Ministers will be provided in confidence as an appendix to the DP; Appendix A (confidential) – Neart na Gaoithe Financial Security Information.

9 Schedule

126. A full decommissioning schedule will be provided closer to the point of decommissioning setting out the detailed programme of the proposed decommissioning works for consultation with the relevant authorities.

127. At this stage it is anticipated that decommissioning would commence at year 25 after final commissioning of the Project, coinciding with the end of the anticipated design life of the wind turbines (but noting the options set out in Section 5.1). The DP will be reviewed periodically throughout the operational phase of the Wind Farm in accordance with the BEIS guidance notes (BEIS, 2019). A final review of the DP is expected to commence at year 23, two years prior to the anticipated start date of the decommissioning operations.

128. It is proposed that the full decommissioning of the Project will take approximately 12 months to complete. Offshore decommissioning and onshore dismantling of the decommissioned infrastructure would run in parallel.

10 Project Management and Verification

129. NnGOWL intends to undertake internal reviews of the DP throughout the lifetime of the project. The review schedule will be agreed with MS-LOT taking account of the review points suggested in the BEIS Guidance. Once the Project is nearing the end of its operational period, NnGOWL will initiate a final review of the DP and finalise the detail of the decommissioning provisions. This will include project management arrangements, the schedule, costs and the verification processes to ensure decommissioning is completed.

130. Following completion of the decommissioning works a Decommissioning Report will be submitted to the appropriate regulatory authorities. In accordance with the BEIS guidance (BEIS, 2019) the decommissioning report will include:

- Confirmation that decommissioning has been carried out in accordance with the approved DP or an explanation of any major variances from the programme with supporting evidence (e.g. photographic evidence of infrastructure out of the water and / or survey footage of the seabed);
- Independent verification that decommissioning took place in accordance with the approved decommissioning programme and a statement detailing any deviations from the approved DP with justification;
- A compliance statement setting out how relevant regulations (environment, health and safety) have been complied with together with any instances of non-compliance;
- A cost breakdown to enable Scottish Ministers to understand the actual cost of decommissioning compared to the predicted cost and an explanation of any major variances from forecast costs;
- The results of any side-scan sonar surveys or other survey work undertaken to confirm that the seabed has been cleared as detailed in the final decommissioning programme;
- Where infrastructure is left in situ, evidence that it has been cut off, buried, or otherwise made safe and treated in accordance with the decommissioning programme.

11 Seabed Clearance and Restoration of the Site

131. Consistent with the decommissioning provisions detailed above, the key restoration work will relate to:

- Ensuring that foundations are cut below the natural level of the seabed (wind turbines and OSPs) and are made safe and adequately covered.

132. It is anticipated that upon completion of the decommissioning works, a survey will be undertaken to ensure that all debris has been removed. The survey will enable identification and recovery of any debris located on the seabed which may have arisen from activities related to the decommissioning process and which may pose a risk to navigation. NnGOWL proposes that an independent survey company complete the surveys and that they report in parallel to both NnGOWL and the Scottish Ministers. The results of these surveys will be issued to the Scottish Ministers for review and comment and circulated to stakeholders as agreed in advance with the Scottish Ministers.

133. The required survey area would be determined during the decommissioning phase of the Project, taking into account good practice at the time and the views of stakeholders. It is anticipated that the survey area would focus around the renewable energy installations i.e. the jacket substructure locations, as it is assumed that inter-array and export cables will be left in-situ. A 500 m survey radius around any oil and gas installation is currently considered to be best practice guidance for post-decommissioning surveys. However, due to the smaller footprint of the NnG installations NnGOWL proposes a smaller radius could be used, for example, 100 m (based on the area within which decommissioning of each structure would occur and within which jack up vessel would operate).

134. Analysis of any survey data gathered will also ensure that items for removal and disposal relate only to the Project. Consultation with relevant stakeholders will be conducted in the event that other anomalies of archaeological interest are identified during seabed clearance.

12 Post-decommissioning Monitoring, Maintenance and Management

135. Given that NnGOWL is not proposing to fully remove all of the Project infrastructure, some post-decommissioning activities may be required to identify and mitigate any unexpected risks to navigation or other users of the sea. This could be, for example, as a result of foundations becoming exposed through natural sediment movement. The requirement for and scope of such monitoring will be determined based on the scale of the remaining infrastructure, the risk of exposure and the risk to marine users.

136. Surveys are expected to comprise geophysical survey (such as swath bathymetry, sidescan sonar and magnetometer). Surveys will be undertaken in line with the final DP, and in line with survey scopes consulted on with the Scottish Ministers. Compliance with the DP will be verified by surveys upon completion of the works. The results of these surveys will be issued to Scottish Ministers. Any post-decommissioning hydrographic surveys will be undertaken in accordance with the requirements set out in the MGN543 or relevant guidance in place at the time.

137. If an obstruction on the seabed is identified following decommissioning which is attributable to the Project, it will be marked so as not to present a hazard to other sea users. The navigational marking will remain in place until such time as the obstruction is removed or no longer considered a hazard.

138. Details of the post-decommissioning monitoring, maintenance and management will be discussed with Scottish Ministers close to the point of decommissioning and will consider relevant guidelines and industry standard good practice at the time.

13 Supporting Studies

139. The EIA Report and the Addendum can be accessed online, on the Neart na Gaoithe Wind Farm website at: https://nngoffshorewind.com/downloads/

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Appendix A (confidential) – Neart na Gaoithe Financial Security Information

Appendix B – Section 105 Consultee Comments