Inch Cape
OFFSHORE LIMITED

Inch Cape Offshore Wind Farm:

Decommissioning Programme

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Acronyms & Abbreviations

Acronym	Term
ADR	Air Defence Radar
ALARP	As Low As Reasonably Practical
BAT	Best Available Technologies
BATNEEC	Best Available Technique Not Exceeding Excessive Cost
BEIS	(Department of) Business, Energy, and Industrial Strategy
BPEO	Best Practicable Environmental Option
BSB	Below Seabed
CaP	Cable Plan
CD	Chart Datum
CDM	Construction Design Management
DECC	Department for Environment and Climate Change
DP	Decommissioning Programme
DSLP	Design Specification Layout Plan
DTS	Distributed Temperature Sensing
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan

Acronym	Term
FTRAG	Forth & Tay Regional Advisory Group
GUS	Get Up Safe
GW	Gigawatt
HRA	Habitats Regulations Appraisal
HSE	Health, Safety and Environment
HVAC	High Voltage Alternating Current
IAC	Inter-Array Cable
ICCP	Impressed Current Cathodic Protection
ICOL	Inch Cape Offshore Limited
IMO	International Maritime Organisation
kV	Kilovolts
LEA	Life Extension Assessment
M	Meters
MoD	Ministry of Defence
MHWS	Mean High Water Springs
mLAT	Meters relative to Lowest Astronomical Tide
MS-LOT	Marine Scotland License and Operations Team
MP	Monopile
MPA	Marine Protected Area

Acronym	Term
OEM	Original Equipment Manufacturer
OfTI	Offshore Transmission Infrastructure
OFTO	Offshore Transmission Owner
OfTW	Offshore Transmission Works
OnTW	Onshore Transmission Work
OSP	Offshore Substation Platform
OSPAR	Oslo – Paris (Convention for the protection for the marine fauna of the Northeast Atlantic
PEMP	Project Environmental Management Plan
PSR	Primary Surveillance Radar
PTS	Permanent Threshold Shift
RNA	Rotor Nacelle Assembly
RYA	Royal Yacht Association
ROV	Remote Operated Vehicle
RRH	Remote Radar Head
SAC	Special Area of Conservation
SACP	Sacrificial Anode Cathodic Protection
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SSC	Suspended Sediment Concentration

Acronym	Term
SWL	Safe Working Load
TBC	To Be Confirmed
UKHO	UK Hydrographic Office
UNCLOS	United Nations Convention on the Laws of the Sea
UXO	Unexploded Ordnance
WTG	Wind Turbine Generator

Glossary

Defined Term	Meaning
Development Area	The area for the Offshore Wind Farm, within which all WTGs, inter-array cables, OSPs, and the initial part of the Offshore Export Cable and any other associated works must be sited. As stipulated in the Crown Estate agreement for lease.
Development	Relates to the Inch Cape Offshore Transmission Works (OfTW) and the Inch Cape Wind Farm
Development and Onshore Transmission Works (OnTW)	Relates to the offshore and onshore elements – e.g., what would normally be called the Project: Inch Cape Wind Farm Offshore Transmission Works (OfTW); and Onshore Transmission Works (OnTW)
Inch Cape Offshore Wind Farm	A component of the Development, comprising wind turbines, their foundations and substructures, and Offshore Export Cables.
Inter-array cables	The electricity cables, which are not transmission voltage, between each WTG and between WTGs and OSPs.
Offshore Export Cable	The subsea, buried, or protected electricity cables running from the offshore wind farm substation to the landfall and transmitting the electricity generated to the onshore cables for transmission onwards to the onshore substation and the electrical grid connection.
Offshore Export Cable Corridor/ Export Cable Corridor	The area within which the Offshore Export Cables will be laid out with the Development Area and up to Mean High Water Springs
Offshore Substation Platforms (OSPs)	The platform structures offshore that contain High Voltage or Extra High Voltage switching equipment, including transformers, switchgear, and other electrical components required to control power system switching.
Offshore Transmission Works (OfTW)	A component of the Development, comprising OSPs and their foundations and substructures, and Offshore Export Cables.
Onshore Transmission Works (OnTW)	All works required for the onshore element of the Project, typically including the onshore substation, cable transition pits, cable jointing pits, underground electricity transmission cables connecting to the Onshore Substation, and further underground cables required to facilitate connection to the national grid. This includes all permanent and temporary works required.

Executive Summary

On the 22nd July 2020, Inch Cape Offshore Limited (ICOL), was granted consent under Section 36 of the Electricity Act 1989 to construct and operate the Inch Cape Offshore Wind Farm. ICOL also received two marine licenses under the Marine and Coastal Access Act 2009 and Marine (Scotland) Act 2010 for the Inch Cape Offshore Wind Farm (06781/19/0) and the associated Offshore Transmission Infrastructure (OfTI) (06782/19/0).

This Decommissioning Programme (DP) is submitted by ICOL for approval in line with developer obligations within the received notice under Section 105(2) of the Energy Act 2004 Decommissioning of Offshore Installations from Marine Scotland Licensing and Operations Team (MS-LOT) on 20th August 2020 and, together with condition 3 of the Section 36 Consent and corresponding condition 3.2.1.3 of the 06781/19/0 and 06782/19/0 marine license(s). The latter requires ICOL to submit, for approval by Scottish Ministers, a Decommissioning Programme setting out the measures to be taken in connection with the decommissioning of the offshore installations specified in Schedule 1 of the notice.

The onshore (inland from Mean High Water Springs (MHWS)) aspects of the Project (OnTW) and their associated decommissioning requirements fall under the Town and Country Planning (Scotland) Act 1997 and therefore are not considered within this DP.

This document constitutes a DP for the Development. ICOL has prepared this DP to allow regulatory authorities and key stakeholders to comment on proposals for how the infrastructure comprising the Inch Cape Offshore Wind Farm and OfTI will be decommissioned. Following consultation, responses will be taken into consideration and the DP will be updated accordingly.

Potential effects of decommissioning proposals presented in this DP have been informed by information presented in the Environmental Impact Assessment Report (EIAR) (Volumes I-III) submitted as part of the Section 36 Consent, associated marine license applications, and subsequent variations.

ICOL has prepared this DP in advance of the Development design being finalised. Therefore, this presents design information available at the time of writing. Future revisions of the DP will provide refined descriptions of the items to be decommissioned.

The proposed removal extent and methodologies set out in this DP adhere to the existing UK and international legislation and guidance notes and have regard to decommissioning best practice. Methods outlined are presented based on currently available technology.

Summary of proposals for decommissioning the development.

Development Component*	Proposed Decommissioning
WTGs	Complete removal from site.
OSP (topside)	Complete removal from site
Foundations (WTG & OSP)	Foundations to be cut at such a depth below the surface of the seabed that remaining parts do not pose a hazard for vessels even if sediments relocate. The appropriate depth will depend on the seabed conditions, currents, and presence of scour protection at the time of decommissioning. All cut sections will be completely removed from site and returned to the quayside for onward disposal/recycling, as per the details given in Section 4.
Inter-array Cables	Removal from site. Final proposals will be subject to review and final approval based on finding from pre-decommissioning surveys and assessments.
Offshore Export Cables	Removal from site. Final proposals will be subject to review and final approval based on finding from pre-decommissioning surveys and assessments.
Cable/Scour protection	Any scour protection materials around foundations would be removed as required to facilitate foundation removal, but that further removal of scour protection would be subject to survey, review and assessment closer to the decommissioning period. However, the current extent of scour protection is not currently known and will be further detailed in future revisions. Further details provided in Section 4.

*The Met Mast located within the Development Area is covered by a separate marine licence (04483/19/0) and therefore is not covered within this DP.

In considering a suitable approach towards development of this DP, ICOL have sought to adhere to the following key principles:

- Remediation.
- Legacy.
- Safety First (Focussing on the safety of sea and subsea marine stakeholders).
- Environmental Impact - Minimising impacts to the environment as far as practicable.
- Access- Maintaining the rights and safety of other marine users.
- Polluter pays.
- Reuse and recycle.
- Practicable and Cost Appropriate.

In conjunction with public, stakeholder and regulatory consultation, the DP is submitted in compliance with national and international regulations and Scottish Government Guidelines. The schedule outlined in this document is for a 2-year decommissioning project programme due to begin at the end of the planned operational lifetime of the wind farm, currently expected to be 35 years after commencement of construction, in 2059.

1 Introduction

1.1 Purpose of this Document

1 This document outlines Inch Cape Offshore Limited's (ICOL) proposed decommissioning approach and has been submitted for approval by Scottish Ministers under the requirements of Section 105 of the Energy Act 2004 and as required by the Inch Cape Offshore Wind Farm Section 36 Consent condition 3, Generating Station Marine Licence (06781/19/0) condition 3.2.1.3 and Offshore Transmission Infrastructure (OfTI) Marine Licence (06782/19/0) condition 3.2.1.3.

2 This document relates to the decommissioning of the Inch Cape Offshore Wind Farm and associated offshore transmission assets (not including the Met Mast[1]).

3 The onshore aspects of the Project (OnTI) and their associated decommissioning requirements fall under the Town and Country Planning (Scotland) Act 1997 and therefore are not considered within this Decommissioning Programme (DP).

1.2 Project Status

4 ICOL are developing the Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Work (OfTW), hereafter referred to as the Development. In 2014, the Scottish Ministers granted ICOL Section 36 and Marine Licence consents for the construction and operation of an offshore Wind Farm and a marine licence for the construction and operation of the OfTW. The licences granted to ICOL in 2014 (along with those for other Forth and Tay projects, Seagreen Alpha and Bravo and Neart na Gaoithe) were subject to a petition for judicial review in early 2015. A decision was made by the UK Supreme Court in November 2017 to uphold the Scottish Ministers' decisions to grant the offshore consents.

5 In 2018, ICOL submitted a new application with a revised design that would allow the development of a project that could utilise progressions in turbine technology since the 2014 consent. The revised design was aimed at reducing the environmental impacts and increasing the cost competitiveness of the project, primarily by reducing the overall number of turbines and increasing the height of the turbines being installed. Section 36 and Marine Licence Consents for the revised design were granted by Scottish Ministers in 2019.

6 Since the consent for the revised design was received, ICOL have also sought variations to the existing consents, firstly to allow for increased maximum generation capacity of 1000 MW (variation approved July 2020) and secondly to remove the maximum generation capacity from the Section 36 consent (approved July 2021).
In July 2022, ICOL was successful in securing a Contract for Difference (CfD) award, an important milestone for the Development.

[1] The Met Mast located within the Development Area is covered by a separate marine licence (04483/19/0) and therefore is not covered within this DP.

7 A separate variation application for the Section 36 Consent and Marine Licence 06781/19/0, to optimise wind farm efficiency and enable utilisation of the best available technological solution, was submitted to Marine Scotland Licensing and Operations Team (MS-LOT) in December 2022. Following further detailed design and site investigations future consents may be required. Such changes will be detailed in future updates to this DP.

1.3 Scope of the Decommissioning Programme

8 The DP has been produced for the purpose of satisfying project Section 36 consent and Marine Licence conditions (outlined in Table 1.1). Updates to the document will be undertaken where necessary during the operational period of the Development to reflect changes in guidance, policy, and available technology.

9 In addition, Table 1.1 outlines where in this document the specific requirements of the consent condition are met.

10 It applies to the decommissioning of Wind Farm and OfTW assets below Mean High Water Springs (MHWS). Once constructed, the offshore transmission assets will be divested to the offshore transmission owner (OFTO). It is anticipated that liabilities for the decommissioning of the OfTW assets will be transferred to the OFTO.

11 The DP covers decommissioning activities related to key components of the Development, including foundations, wind turbine generators (WTG), offshore substation platforms (OSP), scour protection (if required), export cable and inter-array cabling. This document also outlines ICOLs approach to the management of decommissioning, including remediation and post decommissioning surveys.

12 The information provided in this document is based on the current understanding of how the development would be decommissioned using best available technologies (BAT) and best practice at the time of writing. There is a general assumption that at the proposed time of decommissioning, BAT and best practice guidelines will have advanced.

13 This DP is a live document and will be reviewed regularly and updated as outlined in Section 1.6. Updates to the document will be undertaken where necessary during the operational period of the Development to reflect changes in guidance, policy, and available technology.

Table 1-1: Consent Conditions Relevant to the Decommissioning Programme

Reference	Condition	Relevant Section
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.	This document has been produced to satisfy this condition. **Methods and timings for removal of infrastructure are outlined in Section 4.3.** **Methods for managing the decommissioning process are outlined in Section 4.3.** **Environmental Management Provisions are outlined in Section 4.5.**
Generating Station Marine Licence Condition 3.2.1.3 Offshore Transmission Infrastructure (OfTI) 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.	This document has been produced to satisfy this condition. **Methods and timings for removal of infrastructure are outlined in Section 4.3** **Methods for managing the decommissioning process are outlined in Section 4.3** **Environmental Management Provisions are outlined in Section 4.5**

1.4 Relevant Guidance and Legislation

14 The following key documents have also informed this DP:

- Decommissioning of Offshore Renewable Energy Installations in Scottish Waters or in the Scottish Part of the Renewable Energy Zone under the Energy Act 2004 Guidance notes for industry (in Scotland) (July 2022);
- Decommissioning of offshore renewable energy installations under the Energy Act 2004: Guidance notes for industry (England and Wales), BEIS, March 2019;
- Guidelines for Environmental Risk Assessment and Management – Green Leaves III, Defra, November 2011;
- OSPAR Guidance on Environmental Considerations for Offshore Wind Farm Development, 2008;
- Energy Act 2004; and

- United Nations Convention on the Law of the Sea (UNCLOS), 1982.

1.5 Linkages with other documents

15 This DP forms one of several documents which are required to be submitted for approval by Scottish Minsters. Whilst there are no stipulated linkages with other documents within the Section 36 Consent or Marine Licence conditions, it is recognised that by its nature, there are links with the documents outlined in Table 1.2.

16 To reduce repetition between documents, where detailed information is not deemed fundamental to the understanding of the key objectives of this document, a summary of information may be provided with a reference to where more detailed information is provided in a separate document. Table 1.2 provides an overview of which consent documents are referenced within this document.

Table 1-2: Linkages with other consent plans

Plan/Programme	Relevance of Plan/Programme	Status
Design Specification Layout Plan (DSLP)	The DSLP will provide approved design parameters for the Inch Cape Wind Farm, including final number and proposed locations of WTGs and OSPs.	Q1 2023 - In production
Cable Plan (CaP)	The CaP will provide approved design details for the proposed locations of inter-array and export cables, including any details on burial depths and scour protection requirements.	Q1 2023 – In production
Environmental Management Plan (EMP)	The EMP will provide details of environmental management procedures that will be employed during construction, operation and decommissioning of the Development. The EMP will be regularly reviewed and updated.	Q1 2023 – In Draft
Project Environmental Management Plan (PEMP)	The PEMP will provide details of proposed pre-construction and operational monitoring methods. The results of these methods will be used to inform reviews and updating of the Decommissioning Programme.	Q1 2023 – In Draft

1.6 Review Process of Decommissioning Programme

1.6.1 Timings for Reviews

17 Several factors have the potential to influence the proposed approach to decommissioning, and these factors are likely to change during the lifetime of the Development. Factors influencing the decommissioning approach include but are not limited to:

- Technological advances/new methodologies for decommissioning activities;
- Improved understanding of decommissioning through experience;
- Significant expected cost reductions/increases;

- Changes in health and safety legislation or best-practice;
- Changes in the surrounding human environment;
- Changes in legislation; and/or
- Changes in environmental best practice.

18 Regular reviews of the DP will be scheduled. Each review will consider whether there are any internal or external factors that may have affected the methods or costs from those outlined in the approved DP.

19 BEIS (2019) and Scottish Government (2022) guidance on decommissioning of offshore renewable energy installations recommends annual reviews of financial aspects of the DP. It is highly unlikely that significant changes that would influence the DP would occur on an annual basis, and therefore the resource required to undertake an annual review would be considerable. ICOL propose that a review of the DP within 2 years of the approval of the previous version of the DP would be appropriate to capture any changes in market or available technology that may result in a formal update of the DP. ICOL currently propose that annual reviews of the financial aspects of the DP commence as the project approaches 2059[2].

20 In addition to reviews indicated above, the following reviews will be undertaken at key times in the development's lifecycle:

- A review of the DP following provision of as-built data and post-construction reporting to Marine Scotland.
- During assignation of the OfTW assets during OFTO process. Whilst it is understood that assignation does not automatically transfer decommissioning liabilities to the OfTO, it is ICOLs intention to negotiate responsibility as part of this process. The DP will be updated to clearly reflect agreed technical or financial responsibilities.
- 12-18 months before the first security provision is due, focusing on any changes that may affect the costs or assumptions of the financial securities.
- The DP will be reviewed as part of the pre-decommissioning preparation (Best Practicable Environmental Option (BPEO) and EIA if required). At this stage, more detailed information regarding methodologies, scheduling, communication protocols and mitigation (if required) will be included.

1.6.2 Process Following a Review

21 ICOL will undertake an internal review and determine whether an update to the DP is required. Where ICOL determines no formal update is required, ICOL will notify Marine Scotland-Licencing and Operations Team (MS-LOT) that an internal review has been

[2] Currently 35 years after commencement of construction.

undertaken, the reasons why this was undertaken and that ICOL are not intending to submit an updated DP for approval.

22 Following a review where ICOL determines that a formal review of the DP is required, MS-LOT will be informed and consulted with to determine whether the update constitute a material or non-material change from the approved version of the DP.

a) If the changes are determined to be non-material, (such as minor changes to methodology), an updated version of the DP will be submitted to MS-LOT only for consultation and approval.

b) If changes are determined to be material (such as significant changes to financial aspects, timings, or infra-structure) it is anticipated wider consultation will be required and MS-LOT will advise on the consultation processes.

23 Changes in financial assumptions between reviews may result in the cost estimates for decommissioning increasing or decreasing. Where a review results in an increase in cost estimate, it is understood that ICOL may be required to increase security provisions accordingly. However, it is also assumed that, provided ICOL can evidence a decrease in cost estimate sufficiently, there will be the ability to reduce overall securities in line with revised cost estimates. It is anticipated that any review resulting in a change in financial costs, is likely to require approval from Scottish Government Finance Committee (or equivalent at the time of review) prior to approval.

1.7 Limitations of Decommissioning Programme

24 Due to the required timescales for consultation on, and subsequent approval of the DP, ICOL has prepared this DP in advance of the Project reaching Financial Close and Final Design and therefore reflects the design of the wind farm at the time of writing.

1.8 Decommissioning Programme Verification

25 Due to the specialist nature of developing the contents of the DP, ICOL have engaged with a third-party industry consultancy via an Owners Engineer Framework. The scope of this involvement is to:

- Compile and verify decommissioning methodologies based on BAT; and
- Verify the programme and cost basis for the DP.

2 Background Information

2.1 Project Overview

27 The Development will be located approximately 15 to 22 km (eight to 12 nautical miles) off the Angus coastline, to the east of the Firth of Tay in water depths ranging from 40 m to 59 m at Lowest Astronomical Tide (LAT). The area for the Wind Farm (Development Area), will contain all 72 WTGs, inter-array cables (66 kV), one OSP, and the initial part of the Offshore Export Cable and any other associated works.

28 The Offshore Export Cable Corridor will contain the two 220 KV offshore export cables. The Offshore Export Cable Corridor extends for approximately 85 km between the landfall point at Cockenzie in East Lothian and the Development Area and is 1.4 km across at the widest point, reducing to approximately 250 m at the landfall. The Development is anticipated to have a total installed capacity of up to 1.1 GW.

29 The location and extent of the Development Area and Offshore Export Cable Corridor is shown in Figure 2.1.

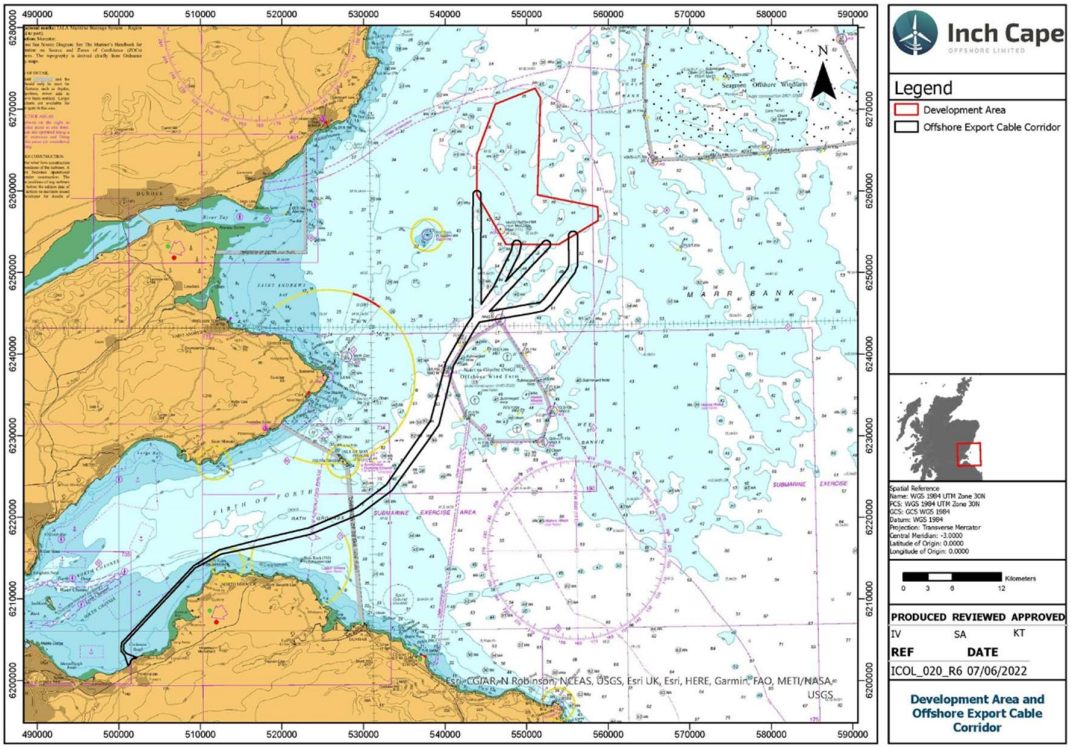

Figure 2.1 Location and extent of the Development Area and Offshore Export Cable Corridor

30 Key components of the Development are summarised in Section 3.1.

2.2 Site Characteristics

31 A range of surveys have been completed by ICOL during project development to establish the physical and biological characteristics of the Development Area and

Offshore Export Cable Corridor. These surveys and desk-based assessments informed the EIA for the Development and are reported as part of the Environmental Impact Assessment Report (EIAR) and Scoping reports for the Development. These reports form the basis of the information presented in this Section of the DP.

2.2.1 Physical Environment

2.2.1.1 Metocean, Wave Climate and Tides

32 Metocean and tidal characteristics of the Development Area are provided below in Table 2.1.

Table 2-1: Metocean Conditions in the Development Area

Parameter	Dimension
Estimated Average Mean Wind Speed	9.6-.9.7 m/s
Water Depth Range	35.5 – 63.5 m Chart Datum (CD)
Tidal Currents	Peak springs 0.6-0.7 m/s Peak neap 0.3-0.4 m/s
Mean tidal Range	4.6 m

33 Waves within the Development Area are most frequently from a north-easterly direction (22.5 degrees) with significant wave heights up to 6.2 m recorded by in situ instrumentation. Waves also arrive from both the south-eastern and south-western quadrants, but these form only a minor component of the wave direction spectrum.

2.2.1.2 Sediment Regime and Bathymetry

34 The seabed around the Development Area has undulating bathymetry and is characterised by two main sandbank areas, one in the northwest and a shallower bank in the centre of the Development Area. These sandbank areas have a relief of approximately 12 m – 17 m above the surrounding seabed. Deeper areas of water are present in pockets around the Development Area, notably the south and the east.

35 The tidal current regime is not sufficiently powerful to generate significant sediment transport on either the spring or neap tidal phases. Fine and medium sand are generally predominant sediment types in the Development Area and are transported by the tidal currents but only during spring tides and only during higher current speeds in the tidal cycle.

36 The main sediment type along the Offshore Export Cable Corridor is muddy sand, although there is some variability depending on location.

2.2.1.3 Geological Characteristics

37 The morphology of the development area is essentially convex and gently undulating. Localised changes are generally due to sediment transport and accumulation. Gravel banks, sand waves, and areas of mega ripples have been identified.

38 Seabed sediments are interpreted to comprise Sand and Sandy Gravel. Occasional boulders and some minor items of debris are present.

39 The shallow deposits within the vicinity of the Development Area consist of Quaternary sediments deposited during the Holocene and Pleistocene (glacial) geological epochs. Quaternary deposits are underlain by Permian and Devonian bedrock.

2.2.2 Biological Environment

2.2.2.1 Benthic ecology

40 There are no designated sites with benthic ecology interest features identified within the Development Area or Offshore Export Cable Corridor, although the Firth of Forth banks Marine Protected Area (MPA) does border the Development Area. The 2014 Environmental Impact Assessment (EIA) concluded that there was no potential connectivity with nearby Special Areas of Conservation (SAC)s or MPAs with benthic ecology interest features or The Aberlady Bay Local Nature Reserve.

41 The EIA baseline surveys, biotope mapping and desktop reviews identified the presence of the following habitats within the Development Area:

- *Mysella bidentata* and *Thyasira* spp. in circalittoral muddy mixed sediment (SS. SMxCMxMysThyMx) (classification for the majority of the Development Area).
- Venerid bivalves in circalittoral coarse sand or gravel (SS.SCS.CCS.MedLumVen); and
- Offshore circalittoral coarse sediment (SS.SCS.OCS).

42 It was also identified that Icelandic cyprine (*Artica islandica*), which is a Priority Marine Feature and listed on OSPARs list of threatened or declining species (Annex V) may be present within the Development Area and Offshore Export Cable Corridor. This species is located in the nearby Firth of Forth Banks MPA within which it is a Protected Feature.

43 Sub-tidal surveys undertaken along the Offshore Export Cable Corridor in 2010 and 2012, as well as geophysical interpretation biotope mapping, were used to characterise the seabed. The following habitats were identified within the Offshore Export Cable Corridor:

- Seapens and burrowing megafauna in circalittoral fine mud (SS.SMu.CFiMu.SpnMeg) (dominant mud/sand biotope);

- Muddy sand habitats, including:
  - Circalittoral muddy sand (SS.SSa.CMuSa)
  - SS.SMx.CMx
  - SS.SMx.CMx.MysThyMx
- Circalittoral coarse sediment (SS.SCS.CCS); and
- Stony Reef, including:
  - Brittlestars on faunal and algal encrusted exposed to moderately wave-exposed circalittoral rock (CR.MCR.EcCr.FaAlCr.Bri);
  - *Alcyonium digitatum, Pomatoceros triqueter*, algal and bryozoan crusts on wave-exposed circalittoral rock (CR.MCR.EcCr.FaAlCr.ADig);
  - Faunal and algal crusts with *Pomatoceros triqueter* and sparse *Alcyonium digitatum* on exposed to moderately wave-exposed circalittoral rock (CR.MCR.EcCr.FaAlCr.Pom);
  - *Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (SS.SMx.CMx.FluHyd);
- *Cerianthus lloydii* with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment (SS.SMx.CMx.ClloMx.Nem).
- Intertidal habitats at Cockenzie with route to impact:
  - Pelvetia canaliculata and barnacles on moderately exposed littoral fringe rock (LR.MLR.BF.PelB);
  - Chthamalus spp. on exposed upper eulittoral rock (LR.HLR.MusB.Cht.Cht);
  - Fucus spiralis on exposed to moderately exposed upper eulittoral rock (LR.MLR.BF.FspiB);
  - Laminaria digitata on moderately exposed sublittoral fringe bedrock (IR.MIR.KR.Ldig.Ldig).

44 Analysis of medium-term data sets undertaken for the 2014 EIA suggested that the sediment regime and associated biological habitats within the Development Area and Offshore Export Cable Corridor appeared to be relatively stable.

2.2.2.2 Natural Fish and Shellfish

45 Fish species known to be present within the Development Area which were considered within the 2018 EIA due to their potential sensitivity to construction activities are cod (*Gadus morhua*), herring (*Clupea harengus*), allis shad (*Alosa alosa*) and sprat (*Sprattus sprattus*). Of these species, cod and herring are most commonly recorded within catch landings from ICES rectangles 42E7 and 41E7 in which the Development Area lies.

46 Whilst the Development Area is within an area which is classified as being a high intensity nursing area for herring, a review of data (Inch Cape EIAR Appendix 9A, 2018) determined that the Development Area is unlikely to be an important area for spawning habitat, although there may be some isolated areas of sub-prime habitat. The Development Area is within an area of cod spawning and nursery grounds. Cod are likely to spawn within the Development Area but unlikely to represent a substantial aggregation of the species.

47 There are no designated sites for migratory fish species within the Development Area, however, it is recognised that there is the potential for migratory species to pass through the Development Area during migrations to and from designated sites along the east coast of the UK.

2.2.2.3 Marine Mammals

48 The Development Area does not overlap with any sites designated for marine mammals; however, the 2018 EIAR and Habitats Regulations Appraisal (HRA) considered the potential for individuals from four SACs considered to have potential connectivity with the Development, these were;

- Berwickshire and North Northumberland Coast SAC (grey seal *Halichoerus grypus*);
- Firth of Tay and Eden Estuary SAC (harbour seal *Phoca vitulina*);
- Isle of May SAC (grey seal *Halichoerus grypus*); and
- Moray Firth SAC (bottlenose dolphin *Turisops truncatus*).

49 Harbour porpoise (*Phocoena phocoena*) are the most common species known to be present within the Development Area and Offshore Export Cable Corridor, Minke whale *(Baleanoptera acutorostrata*) and white-beaked dolphin (*Lagenorhynchus albirostris*) are also commonly recorded off the Firths of Forth and Tay and have the potential to be present within the Development Area and offshore sections of the Offshore Export Cable Corridor. Bottlenose dolphins, whilst commonly recorded off the Firths of Forth and Tay, are typically recorded near the coast and less likely to be present within the Development Area itself.

50 Grey seal and harbour seal are both present in the area surrounding the Development Area and Offshore Export Cable Corridor, however, neither species are recorded as being present within the Development Area in significant numbers, it is, therefore, unlikely that the Development Area or Offshore Export Cable Corridor represents important habitats for these species.

2.2.2.4 Ornithology

51 The following Special Protected Areas (SPA) for seabirds were considered within the 2018 EIA and HRA based on maximum foraging ranges for interest features known to be present in the Development Area;

- Forth Islands SPA;
- Fowlsheugh SPA;
- Buchan Ness to Collieston Coast SPA;
- St Abb's Head to Fast Castle SPA; and,
- Outer Firth of Forth and St Andrews Bay Complex SPA (SPA[3]).

52 Site specific survey information from the Development Area and two-kilometre buffer demonstrated that protected bird species associated with the above SPAs were using this part of the sea. Populations of breeding birds associated with these SPAs use the Development Area. Species that were considered within the 2018 EIAR are;

- Northern gannet (*Morus bassanus*);
- Atlantic puffin (*Fratercula arctica*);
- Razorbill (*Alca torda*);
- Guillemot (*Uria aalge*);
- Black-legged kittiwake (*Rissa tridactyla*); and
- European herring gull (*Larus agentatus*).

53 The Offshore Export Cable Corridor transverses the St Andrews Bay Complex SPA and there are small areas of inter-tidal area at the landfall which wading birds may utilise.

2.2.3 Human Environment

2.2.3.1 Seascape, Landscape, and Visual

54 Once constructed, turbines in the Development Area will be visible from a wide range of coastal receptors, primarily coastal settlements with unobstructed views, but also inland receptors that have an elevated platform. Turbines will be visible from locations in Aberdeen, Angus, Fife, and East Lothian, including the Fife Coastal Path, the A92 and sections of the main rail line between Carnoustie and Arbroath. Viewpoints provided alongside the 2018 EIAR will be updated to reflect the final parameters as provided in the Design Specification Layout Plan (DSLP).

2.2.3.2 Cultural Heritage and Archaeology

55 The Development Area and Offshore Export Cable Corridor have been heavily used by vessels and aircraft for centuries. There are a number of known wrecks within or adjacent to the Development Area, however, none of these are designated cultural heritage sites. Pre-construction unexploded ordinance (UXO) surveys will be

[3] The Outer Firth of Forth and St Andrews Bay Complex SPA has now been designated. However, at the time of the EIAR, the site was proposed, not designated.

undertaken and used to inform the presence of cultural heritage assets and a Written Scheme of Investigation will be implemented to reduce the risk of impacts to unknown artefacts during construction. It is not considered likely that submerged prehistoric landscapes are present in the Development Area or Offshore Export Cable Corridor.

56 There are several designated sites or historical sites along the Fife and Angus coasts which were considered within the 2018 EIAR in relation to changes in setting. The Bell Rock Lighthouse is a Category A listed structure off the coast of Angus and is 8 km from the Development Area.

2.2.3.3 Commercial Fishing

57 Fishing activity within the Development Area and Offshore Export Cable Corridor is a combination of static gear fishing and trawling. Fishing activity is prevalent, particularly within the Forth of Firth. Key fishing activities are:

- Creel fishery (lobster and crab);
- Scallop fishery;
- *Nephrops* fishery; and
- Squid fishery.

58 Scallop and creel are the most dominant types of fishing within the Development Area with *Nephrops* fishing being the most dominant fishery along the cable corridor. The squid fishery is more variable, with the highest fishing intensity for this fishery to the north of the Development Area, but this varies from year to year.

59 There is considerable seasonal and inter-annual variation in fishing activity, the most fishing activity in the Development Area and OfTW is generally July to October, with some periods of increased creel fishing in December and March.

2.2.3.4 Shipping and Navigation

60 Vessel traffic within the Development Area and Offshore Export Cable Corridor is generally cargo vessel or fishing vessel activity, with tankers also relatively common in the Forth of Firth. Other than fishing, commercial vessel activity within the Development Area is generally low with some individual vessels transiting through. One of the busiest routes is for vessels travelling from the Firth of Forth to northern Scotland, which passes adjacent to the Development Area. Vessels travelling from the Firth of Forth to European (or global) ports intersect with the Offshore Export Cable Corridor. Dedicated anchorage locations are situated within the Firth of Forth.

2.2.3.5 Civil and Military Aviation

61 There are no military exercise or danger areas (PeXA) within or adjacent to the Development Area or Offshore Export Cable Corridor. There are two reported historical Ministry of Defence (MoD) munitions disposal areas, approximately 2km from the

Offshore Export Cable Corridor to the east and southeast of the Isle of May. There is the potential for UXO to be present within the Development Area and Offshore Export Cable Corridor due to the proximity of the disposal site and military activity during World War 2. A pre-construction UXO survey will be undertaken to assess the risk and identify UXO present within the Development Area and Offshore Export Cable Corridor.

62 There is the potential for WTGs to be detectable on the Air Traffic Control Primary Surveillance Radar (PSR) at Royal Air Force Leuchars and Air Defence Radars (ADR) at Remote Radar Head (RRH) Buchan and RRH Brizlee Wood.

2.2.3.6 Subsea cables and pipelines

63 The following existing cables and pipelines have been highlighted during the consenting and engineering phase of the project:

- Existing cables: There are no known in-service or out of service existing cables within the Development Area or Offshore Export Cable Corridor.
- Existing pipelines: A National grid owned gas pipeline runs between Drumeldrie in Fife to Gullane in East Lothian.

64 The location of the pipeline in relation to the Offshore Export Cable Corridor is shown in Figure 2.2.

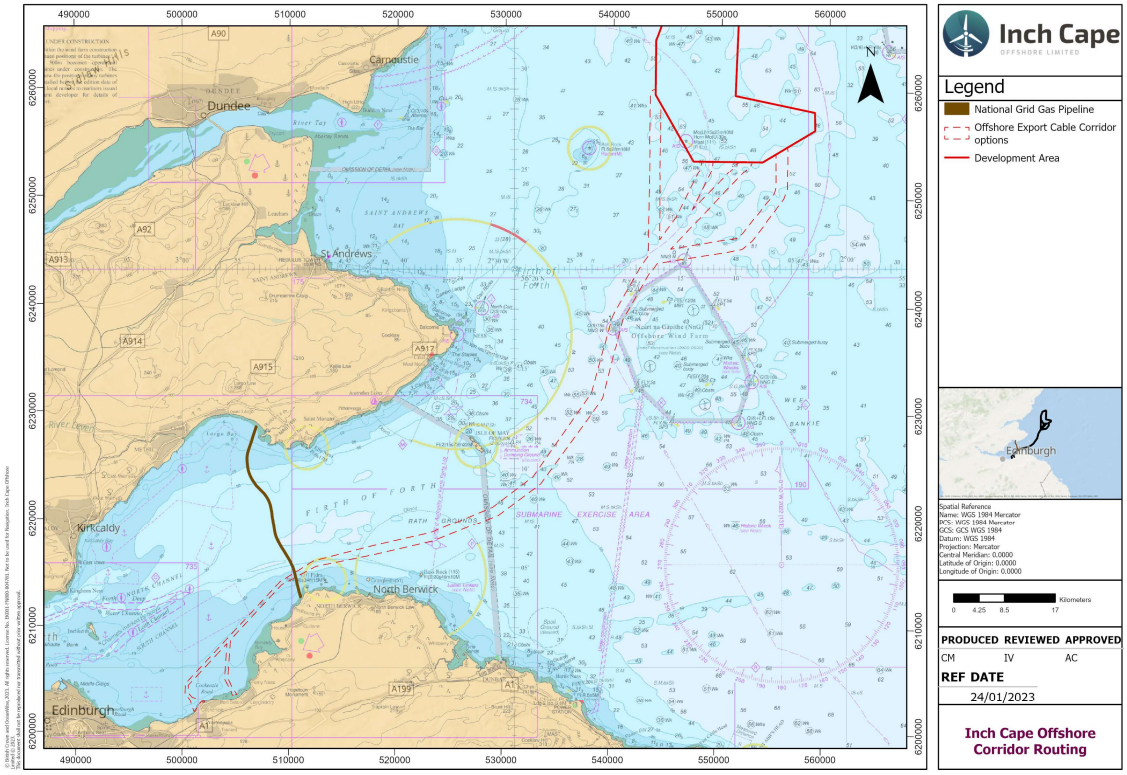

Figure 2.2 Existing Pipeline Location

2.2.3.7 Local/Construction Ports and Harbours

65 There are several ports and harbours located around the Angus coastline and wider surrounding area, including smaller fishing harbours and quaysides (such as Gourdon, Cowie, Arbroath, Crail, and Anstruther) and the larger ports used during the construction of the wind farm (for example Dundee).

66 The available port and harbour options associated with the scope of decommissioning activities will be assessed closer to the time of the works.

2.2.3.8 Offshore Wind Farms

67 The Seagreen Phase 1A offshore project site is situated to the northeast of the Inch Cape offshore site. The Seagreen export cable corridor heads south of the Inch cape offshore site and parallel with the Inch Cape export cable corridor, also terminating into the Cockenzie onshore sub-station. Further Seagreen project sites are in the planning phases, positioned to the southeast of the Inch Cape offshore site. However, no further details of these projects are known at the current time.

68 There are additional offshore wind farm projects at various stages of development and construction within the wider area (e.g., Neart na Gaoithe and Berwick Bank). The impact of these projects will be further assessed once further information is known as to potential impacts to ICOL decommissioning.

3 Description of Items to be Decommissioned

69 This section describes the key components of the Inch Cape Wind Farm and OfTI that will be decommissioned at the end of the operational period of the Development as defined in the Section 105 notice and in accordance with Condition 3 of the Section 36 Consent and condition 3.2.1.3 of the associated Marine Licences.

70 It should be noted that, following commissioning of the offshore wind farm, ownership of the associated OfTI assets (OSPs, OSP interconnector cable and offshore export cables) will be transferred to the Offshore Transmission Operator (OFTO). Responsibility for the decommissioning of these assets will therefore also be transferred to the OFTO.

3.1 Design Parameters

71 Table 3.1 provides dimensions of the current components of the Development to be installed, compared with the dimensions of components as assessed within the 2018 EIA.

Table 3-1: Relevant Design Parameters

Relevant Design Parameter	2018 EIAR Parameter	Current Design
Wind Turbine Generators (WTGs)		
Max number of WTGs	Between 40 and 72, depending on turbine parameters	72
Max Hub Height (mLAT)	152	155.6
Max Rotor Diameter (m)	250	236
Max Blade Tip Height (mLAT)	Up to 291	274
WTG Foundations		
Max number of WTG jackets	72	0
Max number of WTG monopiles	72	72
Foundation Type	Jackets (pin-piled and suction caisson), Gravity Base, Monopile.	Monopile
Maximum monopile diameter and length	12 m	10.5 m (at base)
Maximum monopile penetration depth	70 m	40 m
OSP		
Maximum number of OSPs	2	1
Maximum length and width of OSP Topside	100 m x 100 m	40 m x 27 m
Maximum length and width of OSP foundation jacket	100 m x 100 m	28.5 m x 28.5 m

Relevant Design Parameter	2018 EIAR Parameter	Current Design
Maximum number of piles for OSP foundation	16	8 (2 per leg)
Maximum seabed penetration depth for OSP foundation	60m	30m
Inter-array Cables (IAC)		
Maximum length of inter-array cables	190	150
Maximum number of IACs		72
Cable burial depth	Typically, 1.2 m but up to 3 m	Target depth is 1.2-1.5 m, unless burial risk assessment results confirm deeper burial is required.
Percentage of cable burial	90-100%	90-100%
Export Cables		
Total length of export cables	180 km	180 km
Maximum number of export cable	2	2
Cable burial depth	Typically, 1.2 m but up to 3 m	Target depth is 1.2-1.5 m, unless burial risk assessment results confirm deeper burial is required.
Percentage of cable burial	80-100%	80-100%

3.2 Overview of Components

72 The following section provides information on the individual components of the Development that will be installed and eventually decommissioned. Principles and methodologies for decommissioning each component is provided in Section 4.

3.2.1 Wind Turbine Generators (WTGs)

73 The project shall use up to 72 Vestas V236 15MW wind turbines with an outer blade tip diameter of 236 m, individual blade lengths of 115.5m, a hub height of 155.6 mLAT, a maximum tip height of 273.6 m LAT and a total swept area of approximately 43,744 m^2. The electrical interface between the inter-array cables and the WTGs shall be at the HV switchgear, located at the bottom of the tower.

74 The offshore WTG structure consists of a rotor-nacelle assembly (RNA) and a support structure to transfer the loads to the seabed. The support structure is divided into two main parts: the WTG tower (superstructure) and the monopile foundation (substructure). The connection between the tower and foundation is located at the top of the foundation and is referred to as the interface point. This is expected to be a bolted connection, potentially with tensioned bolts requiring specific consideration during their removal.

75 The main components of the WTGs to be decommissioned are summarised in Table 3-2.

76 An impression of the Vestas V236 WTG is shown in Figure 3.1 below, with the 82 locations in which a 72 WTG layout will be selected is shown in Figure 3.2 below[4].

Figure 3.1 Vestas V236 Wind Turbine Generator (WTG)

[4] A 72 turbine layout is currently being finalised within the 82 locations provided in Figure 3.2. Final locations are subject to ICOL being granted the appropriate consents variations currently being sought for reduced spacing and following this discharging the DSLP condition.

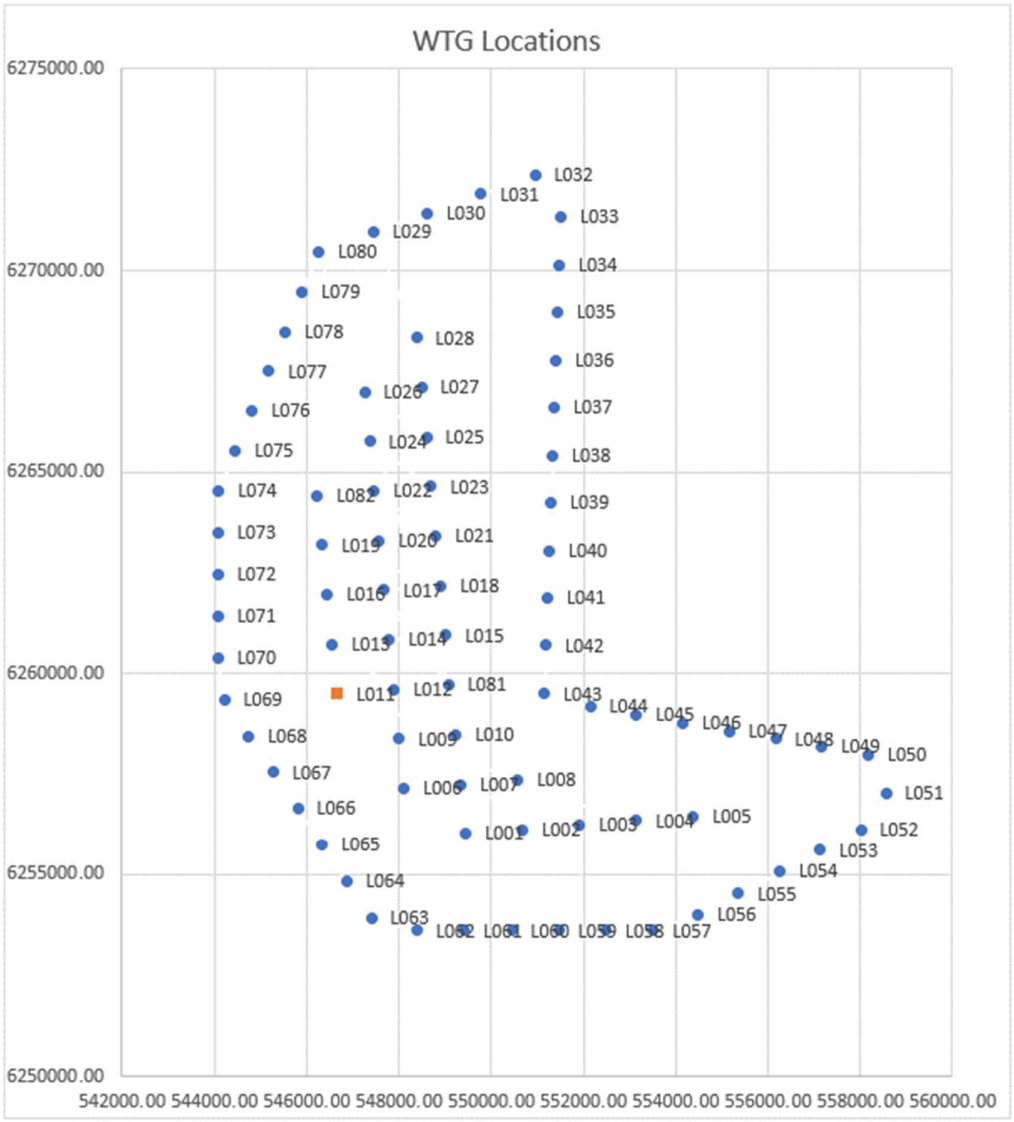

Figure 3.2 Preliminary WTG/Foundations layout and OSP location (L011)

Table 3-2: WTG components to be decommissioned

Installations* including stabilisation features	Number	Size & Weight (Te)	Location (s)	Comments/Status
WTGs	72	Nacelle – approx. 477T Blades and hub – approx. 332T (63T per blade) Tower – 737T	See Figure 3.2.	Provisional Wind Farm Layout provided indicates provisional WTG locations. No WTGs are installed yet.

3.2.2 WTG Foundations

77 The Wind Farm will require up to 72 foundations on which WTGs will be installed.

78 The WTG's will be supported by monopile-type (MP) substructures. The monopiles will be installed by impact driving. An integrated MP (also referred to as TP-less or a continuous MP) concept is being considered for all WTG positions. All secondary structures will be installed after the MP has been piled. This design is shown in Figure 3-3.

79 Additional secondary structures will consist of:

- (Up to) two anode bracelets for external sacrificial anode cathodic protection (SACP); an external working platform incorporating a laydown area;
- Internal Cathodic Protection system;
- Davit crane and Get up Safe (GUS) access hoist; and
- A self-supporting internal cage structure providing three internal platforms.

The GUS system will be the main access method with secondary access via walk-to-work gangways; therefore, no boat landing system is required. Internal corrosion protection will be provided by an internal Impressed Current Cathodic Protection (ICCP) system.

80 There is a potential for scour protection to be required around some monopile bases. If scour protection is required, it is anticipated that this would be either gravel/rock placement or mattress protection.

81 The main components of the WTG foundations to be decommissioned are summarised in Table 3-3.

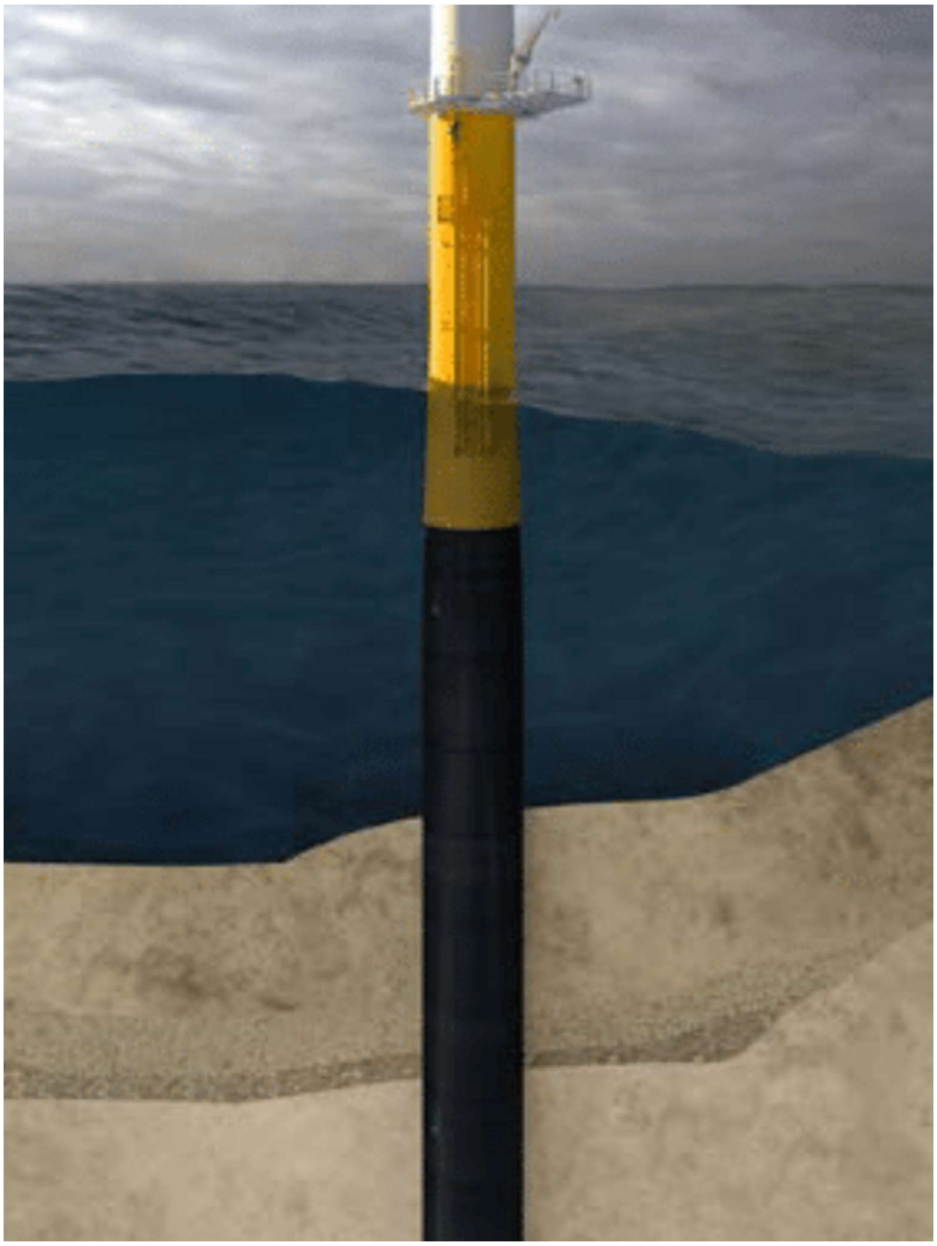

Figure 3.3 Conceptual design of TP-less WTG Foundation

Table 3-3: Foundation Parameters

Installations* including stabilisation features		Number	Size & Weight (Te)	Location (s)
Piled monopile foundations	Monopile foundation structure	Up to 72	Diameter: TBC Weight range: TBC Length range: TBC	See Figure 3-2

3.2.3 Offshore Substation Platform (OSP) and Support Structures

82 The Development will have a single OSP located within the Wind Farm and forming part of the project OFTO assets, along with the export cables.

83 The 66/220kV OSP incorporates a single offshore platform (topside) and jacket foundation. The OSP will receive the generated electricity from the inter-array cable system operating at 66kV. The voltage is stepped up at the OSP then exported to the onshore substation via 2 export cables operating at 220kV.

84 The OSP will be installed on a four-legged battered jacket foundation, which will be anchored to the seabed by pairs of 102" post-installed skirt piles driven through pile sleeves, to approximately 21 m depth below seabed (BSB) at each leg. The topside is a braced frame structure comprising two deck levels, with overall plan size of 45 m length x 38 m width and an outfitted height of 18 m. The jacket structure includes the Cable Deck and has plan base, to leg centres, of 36.4 m x 31.6 m and a height of 68.4 m above BSB. The jacket structure will also support 14 no, J-tubes for Export Cables (2 n.) / IACs (12 no.) and 2 no. boat landings for marine access.

85 The OSP topside is expected to contain the following components:

- Electrical control systems, including switch gear, transformers, cable, and associated plant;
- Communication equipment;
- Workshop for small repairs;
- Crane (s); 2T Safe Working Load (SWL) davit crane at Upper Deck and 2T SWL Hoist at Lower Deck to access the Cable Deck
- Small power generation; and
- Emergency accommodation, welfare facilities and HSE equipment.

86 There is a potential for scour protection to be required most likely around piling locations. If scour protection is required, it is anticipated that this would be either gravel/rock placement or mattress protection.

87 The components of the OSP to be decommissioned are summarised in Table 3.4 below.

Table 3-4: OSP components

Component		Number	Size & Weight (Te)	Location (s)
OSP Topside		1	45m (L) x 38m (W) x 18m (H)Approximate OSP topside Weight: 3400mT	L011 (see Figure 3-2) 55° 30' 19.07", 0° 19' 14.60"
OSP Jacket Foundation	Jacket Dimensions	1	Length 36.4m (at base) Width 31.6m (at base), [to leg crs so not inc. Mud mats] Height: 68.4m Weight: 2800mT	
	Piles	4 or 8	Diameter: 102” Total Length: ~21m BSB Weight: TBC	

88 An indicative example of an OSP showing its ‘topside’ (containing the substation plant) and its ‘jacket’ foundation and associated connection piles can be found in Figure 3-4 below.

Figure 3.4 Example of Offshore Substation Platform (OSP) jacket foundation

3.2.4 Inter-array Cables (IAC)

89 WTGs will be linked via radial strings at an operating voltage of 66kV, with 6 turbines per circuit giving a total of 12 strings with a total length of 150 km of cable. Inter-array cables will consist of three-core aluminium or copper electrical conductors, fibre optic communications cables, insulation, and armouring.

90 Optical fibres will be incorporated into the IAC design. It is expected that the design will employ a cable monitoring system such as Distributed Temperature Sensing (DTS), and IAC termination monitoring.

91 IACs will be buried to a target depth of 1.2 m as far as possible, and it is anticipated that 90-100 per cent of inter-array cable will be buried. Where inter-array cables cannot be buried due to seabed conditions or other constraints cable protection is likely to be required. Cable protection is anticipated to be either rock placement, a form of mattress or sand/grout bags.

92 The main components of the inter array cables to be decommissioned are summarised in Table 3.5.

Table 3-5: Inter Array Cable Components

Component	Number	Size & Weight (Te)
Inter array Cables	12 strings with total length no more than 190 km	3-core 66 kV armoured submarine cables Section: 1200 mm2 Diameter:201.5 mm Weight: 54kg/m in air

3.2.5 Offshore Export Cables

93 The OSP will be linked to the onshore substation via 2 x 220kV 3 phase export cables, with three cores each, designed and installed to accommodate the transmission of AC power. The export cable route is expected to approximately 85km in length. A total of 180km will be laid to account for routing and deviations.

94 A typical high voltage alternating current (HVAC) cable will be around 300 mm in diameter and will comprise of three copper or aluminium conductor cores with polymer insulation and a fibre optic cable bundle. The cable will be insulated, sheathed, and armoured.

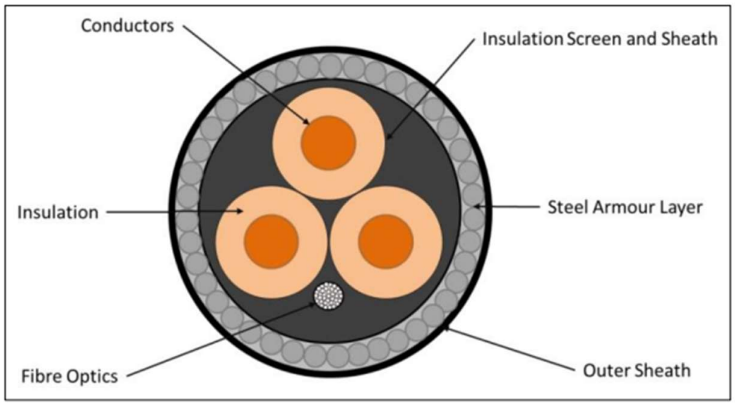

Figure 3.5 Cross Section of typical HVAC cable

95 Offshore Export Cables will be installed between the OSP and the onshore substation. Each of the Export Cables will be laid in separate trenches. Cable separation is generally four times the water depth with a minimum separation of 50 m. The exact parameters are to be confirmed.

96 Each cable will be installed in at least two discrete sections, nearshore and offshore, but jointed during construction. With each cable section potentially being of differing design.

97 The Offshore Export Cables will be installed using trenching or ploughing techniques to a target depth of 1.2m, although shallower/deeper burial depths may be used in discrete areas pending results of Cable Burial Risk Assessment (CBRA).

98 At the landfall, the Offshore Export Cables will be installed using open cut trenching due to the thermal resistivity of the cables.

99 It is anticipated that a minimum of one construction joint will be required for each export cable (between the nearshore and offshore cable sections) with further construction joints to be confirmed.

100 It is anticipated that a minimum of 80% of the Offshore Export Cable will be buried along the route, this includes discrete areas where surface protection is required, for example at cable crossings or areas where seabed conditions are not suitable for burial.

101 Further details on cable burial will be confirmed through the Cable Plan. The main components of the inter array cables to be decommissioned are summarised in Table 3.6 below.

Table 3-6: Inter Array Cable Components

Component	Number	Key Dimensions / Weight
Export Cables	2 offshore export cables, each measuring approximately 85km in length	Offshore: Single armoured submarine 3-core 220 kV cable per circuit (two circuits), consisting of copper conductors with an overall cross-sectional area of 2000 mm^2 Diameter: 297 mm Weight: 155 kg/m Nearshore: Potentially similar to the offshore cable details or Single armoured submarine 3-core 220 kV cable per circuit, consisting of copper conductors with an overall cross-sectional area of 2500 mm^2 Diameter: 305 mm Weight: 158kg/m

3.2.6 Cable and Scour Protection

102 The final scour protection requirements have not yet been determined. However, a summary of current scour protection design for the export cables is included below in Table 3.7. The worst-case scenario considered in the 2018 EIAR was that scour protection would be required for each foundation (WTG & OSP) as well as some sections of inter-array and Offshore Export Cables. However, the Development Area is generally an area of low sediment mobility and in practice limited scour protection may be required.

103 Scour protection around foundations, if required, is expected to consist of gravel and/or rock but may also consist of concrete mattress, or similar alternative. ICOL are

considering the use of environmentally friendly alternatives, such as low carbon concrete alternatives.

104 Measures to remove or retain scour protection may vary depending on area or method of deployment. A decision on the most suitable method for decommissioning will be agreed with consultees during pre-decommissioning consultation.

Table 3-7: Scour Protection

Scour protection component	Quantity of scour protection	Key Dimensions / Weights
WTG Foundations	TBC	TBC
OSP Foundations	TBC	TBC
IACs	TBC	TBC
Export Cables – Crossings	200no concrete mattresses	KP 17 & 60 cable crossings: Around 100 no concrete mattresses (pre and post lay) per crossing point (both cables)
Export Cables – Joints	70 no. concrete mattresses	Around 60-70 concrete mattresses per export cable joint (both cables)
Export Cables	Around 400,000tonnes of Loose / bagged rock	Various locations along export cable route

3.3 Layout of the Development

105 An indicative layout of the proposed development is provided in Figure 3-2. Figure 3-2 shows 79 potential WTG locations, and the proposed position of the OSP. There are currently 6 'spare' WTG locations within the layout. The final 72 turbine layout will be communicated through the approved DSLP.

106 Locations of inter-array and Offshore Export Cable installation is in the process of being determined and will be communicated through the approved CaP.

4 Description of Proposed Decommissioning Measures

107 Once the Inch Cape Offshore Wind Farm reaches the end of its operational life, decisions will need to be made as to the next steps for the Development. This section outlines options and methods that are currently available for decommissioning the Development, the guiding principles that will govern decommissioning, a description of how components would be removed and the rationale behind the proposed methodology.

108 This section provides methods based on currently available BAT, as known at the time of writing. It is anticipated that this section will be updated in future versions of the document to consider future understanding and available technologies at the time of decommissioning.

4.1 Decommissioning Options

109 There are several potential options available for the decommissioning of the Inch Cape Offshore Wind Farm at the end of its lifetime which are likely to be considered. ICOL intends to undertake a combination of analytical work, measurements, inspections and monitoring to understand the integrity of the wind farm during its operating life and assess whether some or all of it can continue to operate beyond its original design life, potentially delaying the decommissioning phase. This assessment will determine when provisions for the timing of the decommissioning will be required.

110 The results of the assessment have the potential to influence which decommissioning options may be followed. Once timescales for decommissioning have been confirmed, a Best and Practicable Environmental Options (BPEO) appraisal will be undertaken to determine the best viable option for decommissioning. The BPEO will take into consideration a variety of aspects, including commercial viability, environmental best practice and health and safety risks. A brief overview of potential decommissioning options is provided below in Sections 4.1.1 to 4.1.3.

4.1.1 Single Decommissioning Campaign

111 This scenario assumes that it is not financially or otherwise viable to continue operation of the Development in any form. Under this scenario, all assets will be shut down at a designated point in time. Once assets are shut down, a single decommissioning campaign to remove all components, followed by any remediation works required will be undertaken. This is currently assumed to be the most likely (and therefore baseline) option.

4.1.2 Step-down or Phased Decommissioning

112 This scenario assumes that it can be shown that a significant part of the Development remains safe and economically viable to continue operation beyond the point at which some assets of the Development reach the end of their economically viable life and require decommissioning. This could either be because some WTGs have the potential

to exceed their original operational lifecycle whilst some (such as periphery turbines) have not. Alternatively, it could be because some WTGs have worn more quickly than anticipated or suffered major component damage and become uneconomical to maintain.

113 Under this scenario, it is unlikely to be economical to decommission small numbers of WTGs as part of a separate campaign. As a baseline assumption, provided WTGs are structurally safe, ICOL would seek to defer decommissioning of individual WTGs to a point when the main decommissioning campaign is being undertaken. ICOL acknowledges that permission to defer decommissioning of un-operational WTGs would be required.

114 Should the removal of individuals or clusters of WTGs prior to the main decommissioning be required, or be economically viable, any resulting changes to maritime and aviation safety measures will be taken into consideration through consultation with MS-LOT and appropriate stakeholders. ICOL would ensure that appropriate navigational aids were in place until all assets are removed.

4.1.3 Decommissioning and Construction of a New Wind Farm

115 For this scenario, it has been assumed that offshore wind energy is still an economically viable option at the end of the operational life of the Development (approximately 2060. The Section 36 consent for the Development is for 50 years and therefore would expire in approximately 2078. Under this scenario, it is deemed unlikely that any components would be suitable for reuse, although a full assessment would be undertaken to identify whether components could be reused.

116 Whilst activities required to build a replacement wind farm would not be acceptable under the current Section 36 consent, environmental assessment within the EIA and Appropriate Assessment have considered the presence of a wind farm on the site for this time. Decommissioning the Development and construction of a replacement may be viable if the required permits and consents were approved.

4.1.4 Re-powering

117 In this scenario it is assumed that wind energy is still economically attractive in 2060, the technical integrity of the wind turbines continues to be monitored but is declining, and the electrical infrastructure and possibly the foundations remain sound. The operational lifetime of the electrical infrastructure could be up to 50 years, whilst experience from the oil and gas industry indicates that the lifetime of foundations can also be extended outside the design specifications.

118 By closely monitoring the structural integrity of the asset, it could be possible to re-use these parts of the system in a re-powering of the Wind Farm – that is fitting new wind turbines to the existing, or modified, foundations and electrical systems.

119 This scenario is not currently further progressed as it is felt that advances in wind turbines and grid infrastructure may make this option unviable.

4.2 Guiding Principles

120 Decommissioning of existing offshore wind assets in the UK is expected to increase from mid-2020's as the first commercial scale wind farms with 25-year operational phases begin to enter their decommissioning phases. To date, most experience in decommissioning of large offshore structures comes from the oil and gas industry, which while relevant, differs in scale and risk to the decommissioning of offshore wind farms. Early experience in decommissioning offshore turbines will come from the decommissioning of predecessor wind farms, for example, the Beatrice Demonstration and Blyth Offshore Wind Farm Projects. By the time ICOL is due for decommissioning, it is anticipated that considerable experience will have been gained.

121 Whilst decommissioning of offshore wind farms is at an early stage, general principles that will govern the decommissioning of the Development will be similar to the principles which govern construction and operational phases. In general, these are as follows:

a) **Remediation** –It is ICOLs' responsibility to undertake decommissioning of its assets at the end of their operational period, leaving the seabed in (as a minimum) the same condition as before the project was constructed.

b) **Legacy** – It is ICOLs' responsibility to ensure that the legacy of the asset does not interfere, prevent or impair the future use of the site and ongoing liabilities are minimised.

c) **Safety First** – Minimising impacts and risks to health and safety using best available technologies and methods. CDM requirements and ALARP principles to govern decision making.

d) **Environmental Impact** – Minimising impacts to the environment as far as practicable.

e) **Access/Navigation** – Maintaining and considering the rights and safety of other marine users, including but not limited to, subsea navigation, fishing activity, commercial navigation, and recreational navigation.

f) **Polluter pays** – It is ICOLs' responsibility to ensure that decommissioning and waste management provisions are in place and that it is ICOLs' responsibility to incur costs associated with environmental impacts.

g) **Reuse and Recycle** – It is ICOLs' responsibility to reduce waste and reuse materials in so far as is practically possible.

h) **Practicable and Cost Appropriate** – ICOL will ensure that commercial viability is maintained using the Best Available Technique Not Entailing Excessive Cost (BATNEEC) principle. ICOL will also ensure that solutions required to meet the above principles are practicable.

122 Guidance on decommissioning (BEIS 2019; Scottish Government 2022) requires that provision is allowed under the Decommissioning Programme that all infrastructure is removed to reduce/remove residual liabilities and under the principle of restoring the

seabed to its former (or improved condition). There is also a requirement to consider the UK's commitments under the United Nations Law of the Sea (UNCLOS) and International Maritime Organisations (IMO) standards and OSPAR (Convention for the Protection of the Marine Environment of the North East Atlantic).

123 Whilst ICOLs view is that removal of all infrastructure may not be the best option at the time of decommissioning, it is acknowledged that it is difficult to determine this with the required level of certainty at this point. Therefore, this decommissioning programme provides for removing all offshore components to be either re-used, recycled, or otherwise disposed of in an appropriate manner at a licenced facility in the UK.

124 There is a provision within the BEIS (2019) and Scottish Government 2022) guidance where exceptions to remove of all components can be made, providing robust justification can be given. Grounds for exceptions should be robust and consider HSE risk, unnecessary environmental impact, practicality, and/or cost. For example, DECC Guidance (DECC, 2011) notes that:

> *'Where an installation's foundations extend some distance below the level of the seabed, removing the whole of the foundations may not be the best decommissioning option, given the potential impact of removal on the marine environment, as well as the financial costs and technical challenges involved. In these cases, the best solution might be for foundations to be cut below the natural sea-bed level at such a depth to ensure that any remains are unlikely to become uncovered. The appropriate depth would depend upon the prevailing sea-bed conditions and currents. Contingency plans should be included in the decommissioning programme, to describe the action proposed if the foundations do become exposed'.*

125 Methods for removal of components, and justification for components to remain in-situ are provided in Section 4.4 below.

4.3 Proposed Decommissioning Process

126 The approach to decommissioning of the development described below builds on the guiding principles in Section 4.2.

127 In broad terms, decommissioning will involve the removal of the following Project infrastructure: WTGs, OSPs, jackets and cables.

128 The decommissioning measures that ICOL will have in place represent the best practicable environmental options.

4.3.1 General Sequence of Decommissioning Activities

129 It is anticipated that decommissioning activities would follow the sequence outlined in Table 4.1.

Table 4-1: Key decommissioning activities and sequence

Activity	Overview
Pre-decommissioning activities	
Establishment of Decommissioning Project team	Project management team to be established to lead and manage the decommissioning programme scope of works.
Review of existing Decommissioning Programme	Project team to conduct a review of the existing decommissioning programme and associated requirements/documentation to align on and define the scope of the project.
Contractor/key party procurement	Identification and procurement of the key parties and contractors required to carry out the decommissioning project.
Lifetime extension assessment (LeA)	Technical and economic assessment of assets to identify potential options for life extension, taking account of asset operating history, condition and analysis of structural integrity. This will be an ongoing process throughout the operational lifetime of the asset. The latest LeA information will be used to inform the review of the Decommissioning Programme. The decision to decommission will be triggered when the assessment indicates that safe and economical operation will not be feasible beyond a planned date (to be defined).
Licencing of decommissioning activities	Once decommissioning approach confirmed, undertake consultation with stakeholders and required permits are applied for, including undertaking BPEO and EIA (See Section 5.1).
Identification of decommissioning / recycling ports	Planning of decommissioning methodologies will require the identification of suitable waste disposal facilities for components. Multiple specialist facilities maybe required.
Pre-decommissioning surveys	Environmental and engineering surveys will be undertaken to inform decommissioning methodologies and EIA (See Section 5.1).
Decommissioning Activities	
Asset shut down	Individual assets will be shut down shortly before decommissioning commences. Different asset shut down approaches may be used.
WTG Removal	WTG removal will require a suitable heavy lift crane vessel to undertake blade removal, nacelle removal and tower removal. Components to be taken to shore for waste management.
Inter-array Cable Removal	Cable ends are to be disengaged from WTG and OSP. Either: ends of cables to be cut and buried with short sections removed and buried cable left in-situ. Or; full removal of cable will be undertaken, and cable removed to shore for waste management.
WTG Monopile Foundation Removal	Monopiles will be cut below the natural seabed level to ensure that they are unlikely to be uncovered. The appropriate depth will depend on the seabed conditions, currents, and presence of scour protection at the time of decommissioning. The decommissioned monopile removed to shore for waste management.
Export Cable Removal	Cable ends to be disengaged from OSP. Either: ends of cables to be cut and buried with short sections removed and buried cable left in-situ. Or; full removal of cable will be undertaken, and cable removed to shore for waste management.

Activity	Overview
OSP Removal	OSP topside to be disengaged from jacket foundation, lifted onto a vessel and removed to shore. Jacket legs are cut, and jacket removed. Pile stumps are removed to a below seabed. Decommissioned components are removed to a shore for waste management.
Cable and Foundation Scour	Decommissioning activities TBC pending finalised design information, as described in Section **Error! Reference source not found.**
Post-decommissioning activities	
Waste management	Once components are removed from site, they will be taken to suitable facilities for ongoing waste management of decommissioned components. Waste management will be compliant with requirements at the time of decommissioning and are expected to prioritise recycling and reuse of components.
Post – decommissioning surveys	Post-decommissioning surveys will be undertaken to confirm the removal of components and identify the state of remediation following removal of components. Requirements for ongoing monitoring will be defined by ongoing liabilities and remediation requirements.

130 The Wind Farm components have a design lifetime of 25 years. During the O&M phase, analytical work, measurements, inspections, and monitoring will be undertaken as part of an ongoing process, to assess their asset-specific lifetimes, which may exceed their original design lifetimes. The Development is consented for a period of 50 years, and whilst it is not expected to be possible to achieve 50 years of operation without major replacement of components, the Wind Farm is planned to remain in operation for 35 years, beyond the 25-year design life of the principal components. Once the lifetime extension assessment has identified, the point at which it is no longer viable to maintain the Development, the DP will be updated in well in advance to reflect the findings of that assessment.

131 Once the end of life is confirmed and decommissioning activities are scheduled, it is estimated that, depending on approach and vessel availability, it will take between 9 and 24 months to complete decommissioning activities. A decommissioning schedule is provided in Appendix A. The decommissioning schedule is based on a 2-year period as ICOL believe this is the best solution taking into account the work involved, commercial aspect and vessel/Contractor availability.

4.3.2 Lifetime Extension Assessment

132 As outlined in Table 4.1, during the operating life of the Development, the asset performance, operating history and condition will be monitored, and supported by analytical work to assess structural integrity, in order to give a technical and economic assessment of the remaining safe and economic life. The findings from this process will inform decisions about the optimal life of the asset, and hence when

decommissioning should commence. Once the timescale for decommissioning is known, the need for a BPEO and EIA would be confirmed with stakeholders.

4.3.3 WTG Removal

4.3.3.1 Decommissioning Method

133 It is anticipated that the dismantling of the 72 turbines will be undertaken using a heavy lift crane vessel (jack up or floating). Depending on the approach, removed components will be transported by the crane vessel (or other suitable transport vessel/barge) to an onshore facility where onward waste disposal would be facilitated from. The approach to transporting decommissioned components will be aimed at reducing vessel transits. Vessel type/size will be considered based on the technical requirements to handle the components, environmental impacts of vessel transits/operations, any consent/stakeholder consideration, and the overall duration and associated costs of the decommissioning programme.

134 All WTG Original Equipment Manufacturers (OEMs) provide type specific instructions for WTG component handling, installation, and removal. As such, the WTG OEM will be consulted prior to the decommissioning works to ensure all relevant/type specific documentation, processes and equipment are used for the decommissioning of the WTG components. This may include specific blade removal tools, lifting/rigging instructions/requirements and sea fastening instructions.

135 As far as possible, offshore cutting and welding operations will be minimised, and lubricants and oils will be left in-situ within components to minimise risk of spillage. As far as possible, re-usable sea-fastenings will be used to minimise waste.

136 Whilst it is feasible to disconnect, lift and remove both WTG and monopile foundations for each location in a single activity/vessel, the base case assumption used for ICOL is that the WTGs and monopile foundations would be removed in two separate campaigns, owing to the varying sea fastening requirements of the components. It is anticipated that WTG decommissioning will follow the outline sequence below:

- WTG shut down and readied for dismantlement (including electrical isolation of the WTG from grid power, assessment and mitigation of any internal fluids/hazardous items and preparation for lifting).
- Blades:
    a. It is expected that the blades would be individually removed, due to their size and the complexity of removing the entire rotor.
    b. It may be required to maintain grid power to the WTG during blade removal to allow rotation of the hub. If this cannot be done, temporary power may be provided from generators or the vessel to provide sufficient power for hub rotation.

c. Each blade would be rigged for lifting, unbolted from the hub (taking into account any tensioned bolts) and lifted back into the sea fastenings of the heavy lift/transport vessel.

d. In between each blade removal, the hub would be rotated and locked in position to allow for safe removal of the following blade.

e. It is assumed that the vessel used to transport the WTG components back to shore would be equipped with sea fastenings sufficient to maximise the numbers of decommissioned WTG components during each vessel transit.

- Rotor Nacelle Assembly (RNA):

f. It is expected that the Nacelle Assembly (nacelle and hub) would be removed from the WTG tower in a single lift.

g. Prior to any lifting activities, all power to the RNA will be removed, cables disconnected, and the Nacelle Assembly prepared for lifting from the WTG tower.

h. It is expected that dedicated lifting points within the Nacelle Assembly being re-used for its removal.

- WTG Tower:

i. It is expected that the WTG tower would be removed in a single lift, utilising connections to the flanges of the tower for lifting.

j. All connections between the WTG tower and the foundation would require to be disconnected and the tower rigged and prepared for lifting.

k. WTG tower lifted back to the transport vessel sea fastenings.

- Inspection of remaining foundation and installation of temporary navigational aids (as required).
- Recover personnel and equipment to vessel.
- Move to next WTG and repeat process.
- Return components to shore for onward decommissioning/disconnection and waste processing.

4.3.3.2 Offshore Spread

137 A vessel with crane capabilities able of achieving a hook height of approximately 160m in up to 55m of water will be required. It is anticipated that the most suitable vessels would be heavy lift vessels with either jack-up or floating capabilities, although other vessels with similar capabilities maybe available by the time of decommissioning. A separate barge vessel/s may be used for transportation of components.

138 Nacelles including hub are anticipated to weigh approximately 600 tonnes.

139 It is anticipated that blades, nacelles, and towers will be lifted using similar lifting equipment to that which was used during installation. Specialised equipment for lifting blades and nacelles is anticipated to have been kept available during the operational

phase, as it may occasionally be required for major maintenance tasks. Towers are typically lifted using tools that grip their top flanges and are fairly standard items.

4.3.3.3 Waste Management

140 Once removed, WTG components will be secured onto the lifting vessel or transport barge. Towers and nacelles are generally secured onto transport frames, and blades are generally stacked in blade racks, all of which are secured to the vessel deck with grillage and sea-fastenings. These will be designed to maximise space for storage to minimise the number of transits required.

141 Components will be transported to a suitable shore facility. Hazardous materials and fluids will be removed and disposed of in accordance with relevant regulations. Some components may be suitable for re-use, but most metallic components are expected to be sold and recycled. Composite or other mixed material components (such as the blades) will be disposed of according to regulations or reused if possible.

4.3.3.4 Assessment of Compliance with Principles

142 Table 4.2 provides an assessment of the WTG decommissioning process, in consideration with the guiding principles outlined in Section 4.2.

Table 4-2: Assessment of Decommissioning Method

Principle	Assessment
Remediation	Removal of WTGs is consistent with the principal that it is ICOLs' responsibility to return the environment to its former state once assets become redundant.
Legacy	Removal of WTGs is expected to be the preferred option for removing redundant structures and restoring site back to original condition ensuring no ongoing restrictions to further use.
Safety First	Whilst removal of WTGs represents a greater H&S risk to offshore personnel than non-removal, not removing WTGs represents a risk to other marine users and not considered a viable permanent option. Safety for offshore personnel can be managed through minimising offshore personnel as far as possible and ensuring works are planned and undertaken in a safe manner.
Access and Navigation	Removal presents the safest option, but the remaining foundations would require temporary marking with navigation aids, and notice to mariners (NtM), to advise of the hazards in place.
Environmental Impact	Use of heavy lift jack-up or similar vessel may result in some environmental impact, impacts would be reduced through minimising movements of jack-up barge and maximizing the available weather windows in which to carry out the work, thus reducing the overall programme of operations. Risk of fluid spills during decommissioning of the nacelle would be reduced

Principle	Assessment
	through use of BAT. Hazardous substances and fluids would be disposed of responsibly onshore reducing the risk of spill.
Polluter Pays	Proposed method is consistent with ICOLs' recognition that it is our responsibility to remove infrastructure.
Reuse and Recycle	Waste disposal techniques will seek to maximise reuse or recycle components as far as possible.
Practicable and Cost Effective	Known/tested procedures proposed, method is most cost-effective solution available.

4.3.4 Inter-array and Export Cable

4.3.4.1 Decommissioning Method

143 It is believed that at the time of decommissioning, a case may be made for cutting cables below the seabed and leaving buried inter-array cables, provided there was no risk of exposure in-situ and no long-term environmental implications. However, at this stage, ICOL acknowledge that the baseline assumption should provide provision to remove cables unless robust justification in keeping with best practice guidance is provided at the time of decommissioning. Therefore, methods and an assessment for both options are presented. Legislation and best practice guidance will be reviewed regularly and a BPEO assessment would be undertaken prior to decommissioning to determine the most appropriate option.

144 Details on proposed approach to decommissioning cable protection is provided in Section 4.3.7.

Option 1- Cutting Below Seabed

145 It is anticipated that where inter-array and export cables connect to the WTG and OSP jackets, these will need to be clamped and cut prior to the jacket or monopile being removed. Cutting would be undertaken and any exposed cable ends would be buried. Cable lengths connected to the jacket or monopile would be retained and removed during jacket or monopile decommissioning.

146 Prior to cutting and burying the cable ends in this scenario, any scour protection material impacting the ability to cut and bury the ends of the IACs would be removed (see Section 4.3.7).

147 Studies and inspections throughout the operational lifetime of the asset will be used to identify areas of cable where there is a risk of exposure. It is proposed that where a risk of exposure of cables over time is identified, cable in these areas would be removed where possible.

148 Buried cable would be exposed using a mass flow excavator (or similar) which would remove enough sediment to uncover the cable at the identified cutting point. An ROV

with cable cutting tool (hydraulic shears) would then be deployed and used to sever the cable. An assessment will be undertaken prior to decommissioning to determine whether excavations made during removal would be expected to naturally backfill or require mechanical remediation (such as use of a mass flow excavator).

Where areas at risk of exposure are identified, the above process would be used to remove sections of cable beyond the point where exposure is a risk. The locations of cable ends would be recorded, and monitoring[5] would be undertaken to confirm cable ends in these areas remain buried.

Option 2- Full Removal

149 If the BPEO determines that full removal of the inter-array cables and export cable is the most appropriate option, it is expected that a similar initial sequence as Option 1 would be undertaken to cut the cable from the WTG or OSP foundation.

150 Cable removal would be likely to be undertaken using either jetting and pulling/lifting technique or a reverse plough technique. Once recovered, cable would be secured on deck and transported to shore for waste management.

4.3.4.2 Offshore Spread

151 It is anticipated that a single vessel with dynamic positioning capabilities would be required. The vessel would be used to deploy work class ROVs, which would operate cutting tools and recovery clamps. The vessel would also be capable of deploying excavation equipment such as a mass flow excavator dredging spread.

152 If full removal of cable is being undertaken, a larger vessel capable of handling long lengths of cable and with greater lifting capacity would be required.

153 A separate vessel capable of work-to-work functions is likely to be required for crew going on to the foundation to disengage the cable from the foundation.

4.3.4.3 Waste Management

154 After removal (of either sections or full removal) decommissioned cables will be transported to a suitable waste disposal facility, where cables would be dismantled into constituent parts. It is anticipated that metal components of the cables would be able to be recycled. Non-metal components would be recycled as far as possible, where recycling is not practicable or possible, components will be disposed of in line with the regulations at the time of decommissioning.

155 Full removal of inter-array and export cable will increase the amount of material requiring waste management.

[5] The duration and amount of monitoring will be defined closer to the time of decommissioning pending any changes to the DP and the final method of managing the cables.

4.3.4.4 Assessment of Compliance with Principles

156 Table 4.3 provides an assessment of the inter-array and export decommissioning process, in consideration with guiding principles outlined in Section 4.2. This assessment assumes that for the cutting below seabed scenario, all cable left in-situ has been assessed as having no risk of re-exposure, and that regular monitoring will occur to confirm cable remains buried.

Table 4-3 Assessment of Decommissioning Method (Cables)

Principle	Option 1- Cutting Below Seabed	Option 2- Full Removal
Remediation	Leaving cables *in-situ* would mean minimal disturbance of seabed would be required. Seabed conditions would be expected to largely return to normal after construction and this method would leave the majority of recovered seabed intact. Any specific 'at risk of exposure' areas of cable could either be removed or further protected.	Fulfils requirements of principle to remove all infrastructure. Removal would result in seabed disturbance along export cable and inter-array cable length which would then need to recover post-decommissioning.
Legacy	Buried cables which are monitored to ensure they remain exposed there would be no risk to other maritime users. Aggregate/dredging activity not currently undertaken in the Development Area or OfTW therefore buried cables unlikely to create legacy issues.	Full removal would ensure no ongoing liabilities or restrictions on seabed use.
Safety First	For offshore personnel, cutting below seabed reduces the amount of offshore work required, thereby reducing HSE risks. Cable lengths being removed would be smaller and less of a risk during lifting activities. Buried cables would not present a risk to other maritime users, but cables left *in-situ* will need to be monitored to ensure they do not become exposed.	Removal of cable likely to represent higher risk to offshore personnel than Option 1 due to increased complexity in removing long length of cables (lifting, pulling under tension etc.). Full removal of cable would remove ongoing liabilities relating to other marine users.
Environmental Impact	Leaving cables *in-situ* would reduce amount of seabed disturbance required during inter-array and export cable decommissioning. Decommissioning would be smaller, reducing interactions with other marine users.	There would be disturbance to seabed along the cable route through reverse trenching and cable lifting activities. Full removal may require greater interaction with other marine users.
Polluter Pays	Cables left *in-situ* would not present a pollution risk.	Consistent with principal, however, additional waste management required for longer cables with energy use/disposal considerations.
Reuse and Recycle	Only removed sections would be able to be recycled.	Maximum reuse and recycling of material possible.
Practicable and Cost Effective	Most practicable option, removal of discrete sections of exposed cable common place. Lower cost than full removal.	Less practicable option, removal of cable represents significant technical challenge and increased cost, although could be mitigated through sale of scrap metal.

157 Whilst full removal of the cable would be expected to be the preferred option for meeting the requirements of some of the guiding principles (Remediation, legacy & reduce and recycle), with current best practice, it is less likely to be the preferred option for meeting others (safety first, environmental impact, polluter pays & practicable and cost effective). At this stage, ICOL would propose that overall, the most suitable method overall would be cutting cables and leaving in-situ however, the option which represents the best method for decommissioning will need to be determined further as part of a BPEO prior to decommissioning and this DP includes provision for both options.

4.3.5 OSP Topside Removal

4.3.5.1 Decommissioning Method

158 The single OSP will be installed onto a jacket foundation which will have four legs and will be installed using pin-piles. The topside will weigh approximately 3000 tonnes and be installed onto the jacket using a heavy lift vessel. For decommissioning, a heavy lift crane capable of lifting the topside will be required. A lifting strategy will need to be confirmed pre-decommissioning based on the integrity of the topside lifting points and infrastructure. It is anticipated that lifting points used for the construction phase will be suitable for lifting during decommissioning, there is the potential that a spreader frame may be required to aid lifting.

159 The OSP topside would be electrically and mechanically disconnected and made safe prior to lifting.

160 Prior to lifting of the topside, some ancillary components may need to be removed (cranes, communication equipment etc) to facilitate lifting. As far as possible, fluids and other hazardous substances would remain in situ to lifting to minimise the risk of leaks.

161 The topside would be disengaged from the jacket foundation and lifted onto either the back deck of the crane vessel or a barge. The topside would be placed on to a secure grillage for safe transport to the offloading port.

4.3.5.2 Offshore Spread

162 The removal of the OSP topside would require a vessel with a heavy lift crane capable of lifting the topside. It is likely that a separate barge with accompanying tugs will be used to remove the topside to the decommissioning port.

163 A lifting rig or spreader would be used to facilitate lifting the topside.

4.3.5.3 Waste Management

164 Once removed, the OSP topside would be secured for transit using grillage and sea-fastenings in a manner that prevents the loss of any residual liquids.

165 Components will be transported to a suitable shore facility. Hazardous materials and fluids will be removed and disposed of in accordance with relevant regulations. An assessment of components will be undertaken to determine which, if any, can be reused. Steel components are expected to be sold and recycled, unless it is determined that components can be reused. Mixed material components will be disposed of according to regulations or reused if possible.

4.3.5.4 Assessment of Compliance with Principles

166 Table 4.4 provides an assessment of the OSP top side decommissioning process, in consideration with guiding principles outlined in Section 4.2.

Table 4-4 Assessment of Decommissioning Method (OSP topside)

Principle	Assessment
Remediation	Removal of OSP topside is consistent with the principal that it is ICOLs responsibility to return the seabed to its former state.
Legacy	Removal of OSP topside is expected to be the preferred option for removing redundant structures and restoring site back to original condition ensuring no ongoing restrictions to further use.
Safety First	Whilst removal of OSP topside represents a greater risk to offshore personnel than non-removal, not removing OSP represents a risk to other marine users. Safety for offshore personnel can be managed through minimising offshore personnel as far as possible and ensuring works are undertaken in a safe manner.
Environmental Impact	Use of heavy lift vessel may result in some environmental impact; impacts would be reduced through minimising movement of vessel. Risk of fluid spills during decommissioning of the topside would be reduced through use of BAT. Hazardous substances and fluids would be disposed of responsibly onshore reducing the risk of spill.
Polluter Pays	Proposed method is consistent with ICOLs recognition that it is our responsibility to remove infrastructure.
Reuse and Recycle	Waste disposal techniques will seek to maximise reuse or recycle components as far as possible.
Practicable and Cost Effective	Known/tested procedures proposed, method is most cost-effective solution available.

4.3.6 Foundation &OSP Jacket Removal

4.3.6.1 Decommissioning Method

167 The OSP will be installed on jackets grouted onto pre-installed piles. In order to remove the jacket, either the jacket legs or the piles will require cutting.

168 It is currently proposed to cut the piles rather than the jacket legs. Piles will be accessible and able to be cut directly. Of currently available cutting technologies, the use of a diamond wire saw, or abrasive water jet appear to be the most feasible, however other methods may become available in future.

169 If required/in situ, scour protection material will be removed prior to foundation removal (see Section 4.3.7).

170 Currently, as piles will be driven to approximately 20-22m, excavation of piles would require considerable groundwork and excavation to 22m depth is not considered feasible. It is considered that removal of the piles to below the natural seabed level (to ensure that they are unlikely to be uncovered, the appropriate depth will depend on the seabed conditions, currents, and presence of scour protection at the time of decommissioning), and leaving the pile ends in-situ is the only practicable method unless a technology becomes available that allows for full removal. There are two potential approaches that will be considered to achieve this:

- Excavation of soil from around the base of the jacket foundation to expose several meters of pile, then cut piles, remove and back-fill hole (naturally or mechanically).
- Cutting of pile at the seabed level and removal of the jacket, then the use of an internal cutting tool to cut the pile at a depth several meters below the seabed surface. The pile stump would then be removed, and the hole allowed to backfill.

171 When the pile is driven, soil will remain within the pile at seabed level, some of this would need to be excavated to allow for removal of the pile stump. Once the pile has been removed, the remaining hole may backfill naturally or a minimal amount of backfill may be required. An assessment would be done prior to decommissioning to determine whether natural backfill is likely to be sufficient, and if necessary mechanical backfilling may be done.

172 After the jacket has been released from its piles, it is most likely that it will be lifted using a heavy lift crane with lift frame spread. Hook points on the jacket will be designed pre-construction to take the weight of the jacket when lifting during decommissioning, including any additional weight from marine growth.

173 Once lifted clear of the sea surface, it is likely that jackets will be placed onto a separate barge and securely fastened for transportation to port.

4.3.6.2 Offshore Spread

174 For the cutting of piles, it is anticipated that a vessel with multiple work class Remote Operated Vehicles (ROVs) equipped with cutting tools would be required. The vessel may also require enough lifting capacity to remove pile stumps.

175 For lifting the jackets, a vessel with heavy crane capabilities would be required. It is expected that a remotely operated lifting frame would be used. A separate barge with tugs may be used to transport the jackets to a suitable shore waste management facility.

4.3.6.3 Waste Management

176 Once removed from site, jackets would be transported to a suitable shore facility for waste management. Jackets are expected to be removed from offshore complete for disassembly onshore. The jackets are made of steel, and it is therefore expected that most, if not all, of the jacket structures will be reusable or recyclable.

4.3.6.4 Assessment of Compliance with Principles

177 Table 4.5 provides an assessment of the jacket decommissioning process, in consideration with guiding principles outlined in Section 4.2.

Table 4-5 Assessment of Decommissioning Method (Jackets)

Principle	Assessment
Remediation	Removal of jackets is consistent with the principal that it is ICOLs responsibility to return the seabed to its former state. Holes created when cutting piles below the seabed would naturally fill leaving seabed conditions in their original state.
Legacy	Removal of jackets is expected to be the preferred option for removing redundant structures and restoring site back to original condition. Pile ends between 3 m and-50 m below seabed surface are not considered a risk to future activities.
Safety First	Jacket structures are expected to be transported to shore in large sections for disassembly to reduce risk to personnel. Technology is not currently tried and tested that will allow for safe removal of pile ends and attempting to remove pile ends using current methods is likely to be considered a higher risk activity.
Environmental Impact	Use of jack-up or similar heavy lift vessel and excavation of pile stumps may result in some environmental impact, impacts would be reduced through minimising movement of jack-up barge. Using currently available techniques, excavation of seabed to remove pile ends below -3 m is likely to result in increased environmental impact due to the volume and area of excavation that would be required.
Polluter Pays	Neutral. Pile ends left *in-situ* would not result in pollution.
Reuse and Recycle	Waste disposal techniques will seek to maximise reuse or recycle components as far as possible.
Practicable and Cost Effective	Removal of jacket structures is a tried and tested method. There is not currently a practicable technique for removing piles below 3m penetration depth. Using current techniques, this is likely to be impractical and cost prohibitive.

178 This document assumes full removal of the jackets and piles above the seabed surface is expected to be required at the time of decommissioning. However, there is an ongoing debate on whether or not structures that develop or enhance the biological environment should be removed. This Decommissioning Programme will be updated to reflect guidance if it changes.

179 It is currently not considered practicable or safe to remove piles deeper than 3m below the seabed and there are no techniques currently tried and tested that would allow for

full removal of a pile driven to 50 m. It is therefore the current assumption that piles will be cut off below seabed surface and left in-situ. If technology advances or new technologies become available that mean full removal of a pile is practicable, the Decommissioning Programme will be updated to reflect this.

4.3.7 Scour and Cable Protection

180 The approach to using scour or cable protection has not yet been finalised. Decommissioning of cable protection is not anticipated to be required due to the high likelihood of being able to bury cables, and decommissioning methods will be dependent on the type of scour protection used. Where scour protection is required, the proposed decommissioning methods will consider the type of protection that has been installed, available technology and legislative guidance available at the time of decommissioning. Decommissioning methods proposed will be aligned with the guiding principles and the DP will be updated.

181 A BPEO undertaken prior to decommissioning will be undertaken to determine the preferred approach based on the final choice of scour protection.

4.4 Lighting and Marking

182 Lighting and Marking of the wind farm will be maintained during the decommissioning phase. Appropriate measures to ensure navigational (both maritime and aviation) safety will be agreed with the relevant stakeholders and regulators prior to decommissioning. Temporary lighting of partially decommissioned structures, crane vessels and the use of navigation aids are expected to be required.

183 The decommissioning programme will include final removal of any project met ocean or cardinal buoy markers using suitable vessels and standard buoys removal methodologies after completion of all offshore decommissioning activities.

4.5 Waste Management

184 Waste management of decommissioned components will be undertaken in accordance with waste management legislation at the time of decommissioning. Scotland's current legislation is strongly focused on reducing waste going to landfill and maximise the amount of waste being recycled, with an aim to sending zero waste to landfill. There is also a well-established waste hierarchy which considers reuse of materials as the preferred option, followed by recycling, incineration with energy recovery and disposal to landfill as a last resort. It is assumed that there will be similar requirements at the time of decommissioning.

185 ICOL expects that there will be significant residual value in the decommissioned components and will seek to maximise selling of scrap materials to offset net decommissioning costs.

186 Prior to decommissioning, waste facilities suitable for the waste management of the different component materials will be identified and decommissioning activities will be planned around transporting removed components to these suitable facilities.

187 All components removed during decommissioning will be transported to an identified offloading facility (preferably close to the target waste management facility), where they would either be dismantled to a size suitable for onward use or transported to a suitable recycling facility. Given the number of decommissioning activities anticipated in the UK North Sea by the time of Inch Cape decommissioning, it is likely that there will be suitable decommissioning facilities available along the Scottish east coast.

188 Steel from large structures such as WTGs, OSP topside, jackets large diameter monopile and pile sections will be assessed for reuse, and if not reusable, will be broken into manageable pieces and then transported to suitable recycling facility. Copper wire from cables from electrical systems will be recycled as far as practically possible. Non-metal components (such as glass fibre turbine blades) and plastics will be recycled as far as possible at suitable waste facilities. Fluids will also be recycled as far as possible. Where components are found to be non-recyclable, these will be treated in accordance with the waste hierarchy, with disposal to landfill being the last resort where all other options have been exhausted.

189 A full waste management plan will be developed prior to decommissioning will be undertaken to inform the BPEO.

5 Environmental Impact Assessment (EIA)

190 In support of the consent applications, ICOL undertook EIAs for the Development, initially as part of a Section 36 and Marine Licence application in 2014 (EIA 2014) and then a further application in 2018 (EIAR 2018) to reflect optimisations in the wind farm design.

191 The EIAs considered all aspects of the Development, including the potential impacts due to decommissioning activities. Due to the level of information available at the time, both EIAs were based on a 'Design Envelope', which considered parameters beyond which the actual final design of the wind farm would be, therefore, undertaking an impact assessment based on 'worst case scenarios' which are unlikely to be realised in the final design. Parameters used in the EIAs, compared with the final installed design are provided in Table 3.1. Based on the level of knowledge at that stage of development, assessments consider that impacts from decommissioning are likely to be similar or less than those during construction.

192 Section 36 and Marine Licence conditions granted for the Development, stipulate that those licences do not include decommissioning activities. As the EIA(s) that have already been done have considered impacts beyond what is proposed to be built, it is not currently proposed that a new EIA should be required for decommissioning, although the need for one will be determined through discussions with Marine Scotland following the end-of-life assessment.

193 It is proposed that information that is collected as part of post-construction surveys and operational monitoring will be analysed for environmental information, and this information will be used to update the Decommissioning Programme as it becomes available in line with the review cycle outlined in Section 1.6.

194 A full review of the environmental information within this plan will be required prior to decommissioning, and changes to baseline conditions, the marine environment, or legislation during the operational phase may result in an EIA being required. Therefore, it is proposed that results of the original EIA are consulted on with MS-LOT and Forth & Tay Regional Advisory Group (FTRAG), and if required, the assumption that an EIA is not required will be revisited prior to decommissioning.

195 In particular, the following will be reviewed in consideration of whether a new EIA is required:

- Understanding of the baseline environment at the time decommissioning is proposed. This would be primarily informed through planned engineering monitoring, but it is expected that this will also provide environmental information on the state of the marine environment around assets.
- A review of activities by other marine users which may have the potential to be affected by decommissioning.
- Consideration of the potential future uses of the site post-decommissioning.
- Seascape and visual impacts as a result of decommissioning.

196 It would be anticipated that if an EIA is undertaken for the decommissioning phase would focus on key information gaps and receptors potentially negatively affected and be used to identify mitigation effects and reduce any significant impacts.

5.1 Environmental Sensitivities

Tables 5.1 and 5.2 outline the specific environmental considerations and receptors during the decommissioning phase for the Wind Farm (Table 5.1) and OfTW (Table 5.2). Additional mitigation measures over and above those embedded are detailed in Table 5.3.

Table 5-1 Summary of Environmental Effects Development Area

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
Metocean and Coastal Processes	Modification to the seabed through removal of infrastructure (seabed features)	NF – Minor / Moderate FF – Negligible / Minor
	Modification to the hydrodynamic regime, sediment regime and seabed (geological)	NF – N/A FF – Minor / Moderate
	Modification to the hydrodynamic regime, sediment regime and seabed (non-geological)	NF – N/A FF - Negligible
Benthic Ecology	Direct temporary disturbance of seabed habitats caused by construction-based activities.	Minor to Minor / Moderate
	Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction-based activities.	Minor to Minor / Moderate
	Deposition of resuspended sediments leading to smothering.	Minor to Minor / Moderate
	Release of contaminants (PAH, PCB, organotins) bound in sediments.	Minor to Minor / Moderate
	Release of contaminants (metals) bound in sediments.	Negligible to Negligible / Minor
	Secondary impacts of decreased primary production due to increased SSC within the water column.	Negligible / Minor to Minor
Natural Fish and Shellfish	Direct temporary habitat disturbance.	Mobile fish species: Negligible / Minor Hearing specialists: Minor Prey species: Minor / Moderate Electro-sensitive elasmobranchs: Negligible / Minor SAC qualifying species: Minor / Moderate

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
		Shellfish: Negligible / Minor
	Indirect disturbance as a result of sediment deposition and temporary increases in SSC.	Mobile fish species: Negligible / Minor Hearing specialists: Minor Prey species: Minor / Moderate Electro-sensitive elasmobranchs: Negligible / Minor SAC qualifying species: Minor / Moderate Shellfish: Negligible / Minor
	Barrier effects, disturbance, or physical injury associated with construction noise.	Mobile fish species: Negligible / Minor to Minor Hearing specialists: Minor to Minor / Moderate Prey species: Minor to Minor / Moderate Electro-sensitive elasmobranchs: Negligible / Minor to Minor SAC qualifying species: Minor / Moderate to Moderate Shellfish: Negligible / Minor to Minor
Marine Mammals	Disturbance from increased noise (excluding piling and noise associated with geophysical survey).	Minor
	Disturbance from increased noise from geophysical systems.	Minor
	Displacement/Permanent Threshold Shift (PTS) from piling.	Minor to major in the medium term, minor in the long term.
	Collision risk and barrier effect from increased vessel movement	Minor
	Use of ducted propeller leading to risk of corkscrew injury	Harbour seals: moderate in the medium term, minor in the long term.

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
		Grey seals: minor both in the medium and long term
	Accidental pollution events.	Minor
	Changes in prey availability.	Minor
Ornithology	Direct Disturbance.	Negligible
	Indirect effects on birds via prey species.	Razorbill – Minor (breeding season) Common tern – Mino r/ Moderate (breeding season) Arctic tern – Minor / Moderate (breeding season) All other species – Negligible
Seascape, Landscape and Visual Receptors	Construction activities in the development area may affect key characteristics of seascape and/or landscape character, landscape designations and visual amenity.	Assessed as less than 'worst case scenario' for operation and maintenance phase and therefore not considered in detail
Cultural Heritage and Marine Archaeology	Damage or removal of heritage features from direct physical impacts.	Minor
	Damage or removal of features.	Minor
Commercial Fisheries	Direct temporary habitat disturbance.	Negligible / Minor (Scallops, *Nephrops,* crab & lobster, squid, sea trout) Minor / Moderate (Salmon)
	Indirect disturbance as a result of sediment deposition and temporary increases in suspended sediment concentrations (SSC).	Negligible / Minor (Scallops, *Nephrops,* crab & lobster, squid, sea trout)

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
		Minor / Moderate (Salmon)
	Barrier effects disturbance or physical injury associated with construction noise.	Negligible / minor to moderate (salmon)
	Temporary loss or restricted access to fishing grounds.	Moderate / Major (scallop) Minor / Moderate (squid, creel)
	Safety issues for fishing vessels (all fisheries).	No safety risks (providing contractors adhere to requirements)
	Obstacles on seabed (all fisheries).	No safety risks
	Increased steaming times to fishing grounds (all fisheries).	Minor
	Displacement of fishing activity into other areas.	Moderate (Scallop fishery) Minor / Moderate (squid and creel)
	Interference to fishing activities arising from navigational conflict (all fisheries).	Minor
Shipping and Navigation	Vessel to vessel collision risk.	Commercial Vessels: Negligible/Minor Commercial Fishing Vessels: Negligible/Minor Recreational Vessels: Negligible/Minor
	Allision with partially constructed structures.	Commercial Vessels: Negligible/Minor Commercial Fishing Vessels: Negligible/Minor Recreational Vessels: Negligible/Minor
	Fishing gear snagging on partially constructed structures.	Commercial Fishing Vessels: Negligible/Minor

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
	Increased transit times and distances.	Commercial Vessels: Negligible/Minor
Military and Civil Aviation	Leuchars Station Primary Surveillance Radar (PSR)	Minor
	Remote Radar Head (RRH) Brizlee Wood and RRH Buchan ADRs	Minor
Socioeconomics and Tourism	Decommissioning employment.	Negligible / Minor (positive)
	Wider economic impacts.	Minor (positive)
	Tourism and recreation visual impacts.	Up to Minor / Moderate
	Tourism accommodation impacts.	Minor
Other Human Considerations	Temporary disturbance or displacement due to vessel presence and decommissioning activities	Marine Recreational Activity: Moderate Unexploded Ordnance: Minor
	Direct temporary disturbance of the seabed caused by decommissioning based activities	Marine Recreational Activity: Minor Unexploded Ordnance: Minor

Table 5.2 Summary of Environmental Effects Offshore Export Cable

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
Metocean and Coastal Processes	Modification to the seabed through removal of infrastructure (seabed features)	NF – Minor FF - Negligible
	Modification to the hydrodynamic regime, sediment regime and seabed (geological)	NF – N/A FF - Negligible
	Modification to the hydrodynamic regime, sediment regime and seabed (non-geological)	NF – N/A FF - Negligible
Benthic Ecology	Direct temporary disturbance of seabed habitats caused by construction-based activities.	Minor to Minor / Moderate
	Indirect impacts of temporary increases in suspended sediment concentrations (SSC) from construction-based activities.	Minor to Minor / Moderate
	Deposition of resuspended sediments leading to smothering.	Minor to Minor / Moderate
	Release of contaminants (PAH, PCB, organotins) bound in sediments.	Minor to Minor / Moderate
	Release of contaminants (metals) bound in sediments.	Negligible to Negligible / Minor
	Secondary impacts of decreased primary production due to increased SSC within the water column.	Negligible / Minor to Minor
	Potential release of pollutants from construction plant	Minor to Minor / Moderate
	Introduction of NIS	Minor / Moderate to Moderate
Natural Fish and Shellfish	Direct temporary habitat disturbance via Export Cable Installation	Mobile fish species: Negligible / Minor Hearing specialists: Minor Prey species: Minor

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
		Electro-sensitive elasmobranchs: Negligible / Minor SAC qualifying species: Minor / Moderate Shellfish: Negligible / Minor
	Indirect disturbance as a result of sediment deposition and temporary increases in SSC.	Mobile fish species: Negligible / Minor Hearing specialists: Minor Prey species: Minor Electro-sensitive elasmobranchs: Negligible / Minor SAC qualifying species: Minor / Moderate Shellfish: Negligible / Minor
	Disturbance of physical injury associated with construction noise (Export Cable installation)	Mobile fish species: Negligible / Minor Hearing specialists: Minor Prey species: Minor Electro-sensitive elasmobranchs: Negligible / Minor SAC qualifying species: Minor / Moderate Shellfish: Negligible / Minor
Marine Mammals	Disturbance from increased noise (non-geophysical survey).	Minor
	Disturbance from increased noise from geophysical survey systems.	Minor
	Collision risk and barrier effect from increased vessel movement	Minor
	Use of ducted propeller leading to risk of corkscrew injury	Minor for both harbour and grey seals
	Accidental pollution events.	Minor
Ornithology	Direct habitats loss (all species)	Negligible

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
	Indirect impacts on birds via prey species (all species).	Negligible
	Direct disturbance (all species)	Negligible
Seascape, Landscape and Visual Receptors	Presence of installation vessels and related works and trenching of cable at landfall location may affect seascape character area, designated landscape and visual amenity.	Temporary significant effects
Cultural Heritage and Marine Archaeology	Damage or removal of heritage features from direct physical impacts (Known maritime features, unconfirmed locations of shipwrecks and known intertidal heritage assets).	Minor
	Damage or removal of heritage features from direct physical impacts (Potential (currently unknown) submerged prehistory.	Moderate
	Damage or removal of features.	Minor
Commercial Fisheries	Direct temporary habitat disturbance.	Negligible / Minor (scallop, *Nephrops,* crab & lobster, squid, sea trout) Minor / Moderate (salmon)
	Indirect disturbance as a result of sediment deposition and temporary increases in suspended sediment concentrations (SSC) via Export Cable installation.	Negligible / Minor (scallop, *Nephrops,* crab & lobster, squid, sea trout) Minor / Moderate (salmon)
	Disturbance or physical injury associated with construction noise (Export Cable Installation)	Negligible / minor to moderate
	Temporary loss or restricted access to fishing grounds.	Moderate (*Nephrops*) Minor / Major (scallop) Minor / Moderate (squid, creel)

Topic	Aspect	Residual predicted effect in 2013 ES as updated by 2018 EIAR
	Safety issues for fishing vessels (all fisheries).	No safety risks (providing contractors adhere to requirements)
	Obstacles on the seabed (all fisheries)	No safety risks
	Increased steaming times to fishing grounds (all fisheries)	Minor
	Displacement of fishing activity into other areas	Moderate (*Nephrops*) Minor / Moderate (scallop ,squid, creel)
	Interference with Fishing Vessels arising from Navigational Conflict	Minor (scallop, Nephrops, squid) Minor / Moderate (crab & lobster)
Shipping and Navigation	Vessel to vessel collision risk.	Commercial Vessels: Negligible/Minor Commercial Fishing Vessels: Minor/Moderate Recreational Vessels: Negligible/Minor
	Snagging risk	Commercial Fishing Vessels: Minor/Moderate
Socioeconomics and Tourism	Decommissioning employment.	Negligible / Minor (positive)
	Wider economic impacts.	Minor (positive)
	Tourism and recreation visual impacts.	Up to Minor / Moderate
Other Human Considerations	Temporary disturbance or displacement due to vessel presence and construction activities	Marine Recreational Users: Moderate/ Major (Sailing only) Military PEXAs: Moderate
	Direct temporary disturbance of the seabed caused by decommissioning based activities	Marine Recreational Activity: Minor Subsea cables and pipelines: Moderate Unexploded Ordnance: Minor

Table 5.3: Mitigation Measures related specifically to decommissioning

Receptor	Mitigation Measures
Commercial Fisheries	500 m 'rolling' safety zones around working areas during construction, decommissioning and major maintenance activities will be applied for. will be undertaken with relevant stakeholders to ensure effective implementation and management of safety zones.
Shipping & Navigation	500 m 'rolling' safety zones around working areas during construction, decommissioning and major maintenance activities will be applied for. Consultation will be undertaken with relevant stakeholders to ensure effective implementation and management of safety zones.
	An Emergency Response Co-operation Plan (ERCoP) will be established for the Development and put in place for the construction, operations, and maintenance (O&M) and decommissioning phases. The ERCoP will be based upon the MCA template and prepared in consultation with the MCA SAR safety branch.
Aviation	The Wind Farm will be designed, operated and decommissioned as per MGN 543, including Annex 5 which details 'Standards and procedures for generator shutdown and other operational requirements in the event of a SAR, counter pollution or salvage incident in or around an Offshore Renewable Energy Installation (OREI)'. An Emergency Response Co-operation Plan (ERCoP) based on the MCA template and site Safety Management Systems, in consultation with the MCA will be created. Procedures will be the followed in the event of an emergency during all phases of the Development.

5.2 Next Steps

197 ICOL will commence consultation in relation to the Environmental Impact of decommissioning three years in advance of the start of decommissioning. The EIA presented in the Application documents will be reviewed taking account of the final decommissioning strategy proposed.

198 Subject to the results of the consultation, and if 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.

6 Consultation and Interested Party Consultation

199 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.

200 The Section 105 notice issued to ICOL by Scottish Ministers on 20th August 2020 sets out those bodies which must be consulted with on this DP. Key stakeholders identified in the Section 105 notice include:

- NatureScot (previously Scottish Natural Heritage)
- Scottish Environment Protection Agency (SEPA)
- Relevant Local Authority
- Maritime and Coastguard Agency
- Northern Lighthouse Board
- Scottish Fishermen's Organisations / Inshore Fishery Groups
- Relevant Harbour Authority
- Royal Yacht Association (RYA) Scotland
- Chamber of Shipping

201 *Note - These are standard consultees, but MS-LOT will refer to marine licence consultee for other relevant and appropriate stakeholders that should be consulted and will advise ICOL.*

6.1 Pre-Submission Consultation

202 An overview of pre-submission consultation undertaken on the DP to date is outlined in Table 6.1.

Table 6-1: Pre-submission consultation

Consultee	Details of Consultation	Actions Taken
Marine Scotland Licencing and Operations (MS-LOT)	Meeting on 5th of February; 2019. Initial discussion on requirements of decommissioning programme.	ICOL to produce DP with sufficient time for 18-month sign-off, in line with Business, Energy, and Industrial Strategy (BEIS) guidance.
MS-LOT and Scottish Natural Heritage (SNH)	Meeting on 21st August; 2019. ICOL present preliminary assumptions for inclusion in financial model and discuss elements to be left *in-situ*	ICOL to review financial model and technical assumptions based on discussions and provide robust justification for leaving elements *in-situ*.

6.2 Consultation

203 The DP will be issued to all stakeholders listed in Section 6 above and all will be given 30 days to respond to the consultation (unless otherwise agreed), in line with the BEIS guidance. All comments received will be summarised within this section with detail on how ICOL has or will address any issues raised.

204 The Financial Information (within Confidential Annex IC02-INT-EF-OFC-003-INC-ANX-001) associated with the DP will be subject to a separate consultation and approval process and will not be circulated as part of the Section 105 consultation.

6.3 Ongoing Consultation and Notifications

205 Throughout the Project lifespan, the DP may be revised periodically as new information relevant to the decommissioning programme comes 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 1.6).

206 At the time of decommissioning, ICOL will issues Notices to Mariner (NtMs) and other navigational warning 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.

7 Costs

207 The decommissioning cost information required by Scottish Minsters has been provided in a Confidential Annex (IC02-INT-EC-OFC-003-INC-ANX-001). These costs set out the estimated cost of decommissioning (based on costs at the time) in accordance with Marine Scotland's guidance.

208 ICOL has carried out internal verification of the costs provided within this DP, based on the experience within the project team. However, ICOL has also engaged the services of a third-party industry consultancy, via an Owners Engineer Framework, to independently verify the costing provided based on their previous experience and knowledge.

8 Financial Securities

209 Information of financial securities required by Scottish Ministers are also provided in Confidential Annex (IC02-INT-EC-OFC-003-INC-ANX-001).

9 Schedule

210 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.

211 At this stage it is anticipated that decommissioning would commence at year 35 after final commissioning of the Development, in line with Section 36 Consent and Marine Licence conditions (but noting the options set out in Section 4.3). The DP will be reviewed periodically throughout the operational phase of the Wind Farm in accordance with the BEIS Guidance (BEIS, 2019) and Scottish Government's Consultation Guidance (Scottish Government, 2022), or the relevant guidance at the time. A final review of the DP is expected to commence two years prior to the anticipated start date of the decommissioning operations.

212 It is anticipated that the full decommissioning of the Development will take approximately 24 months to complete. Offshore decommissioning and onshore dismantling of the decommissioned infrastructure would run in parallel.

213 An outline decommissioning schedule is provided in Appendix A.

10 Project Management and Verification

214 A Project Management team will be appointed by the Operator to manage suitable sub-contractors for the removal of the installation and monitor/confirm their alignment to the requirements of this DP and other regulatory/legal obligations. Standard procedures for operational control and hazard identification and management will be used and in line with the Operators own Project Management systems and procedures. The Management team will monitor and track the process of consents and the consultations required as part of this process. Any changes in detail to the offshore removal programme will be discussed and agreed on with Scottish Ministers.

215 Internal reviews of the DP will be undertaken throughout the lifetime of the Development. The review schedule will be agreed on with MS-LOT taking account of the review points suggested in both the BEIS Guidance (BEIS, 2019) and the Scottish Government's Consultation Guidance (Scottish Government, 2022). A summary of these review points is provided below:

- Post-construction report will be submitted to Scottish Ministers within one year of completion of construction. This report should include information on any issues raised during construction that may impact eventual decommissioning methods and costs.
- A comprehensive review 12-18 months before the first security provision is due to identify any changes in assumptions on costs and risks where these might affect the size or timings of financial securities.
- Annual reviews to be carried out from payment of the first security to ensure the financial security provision is on track. Any changes that could affect these financial security provisions are to be reported to Scottish Ministers; and
- Consultation on the EIA required to inform the final decommissioning proposals should be commenced at least 3 years prior to commencing decommissioning with a final comprehensive review of the DP carried out at least two years prior to commencement of decommissioning.

216 Once the Development is nearing the end of its operational period (anticipated to be 3 years prior to commencing decommissioning activities), ICOL 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.

217 Following completion of the decommissioning works, a Decommissioning Report will be submitted to Scottish Ministers. 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 multibeam, 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.
- Reference to any future monitoring and maintenance set out in the DP.
- The project HSE File, compiled during construction and passed to the O&M team/s during the life of the wind farm, will be utilised during the decommissioning works, and supplementary to this DP, to provide pertinent information as to the residual risks associated with the wind farm project and assets. This will be applicable for both the OFTO and Non-OFTO wind farm assets.

11 Post Decommissioning Activities

11.1 Sea-bed clearance

218 It is ICOL's responsibility to ensure that, unless otherwise agreed, the seabed is returned to its original state as far as practicably possible. As discussed below in Section 11.3, ICOL will submit a post-decommissioning report and collect the evidence required to confirm that the seabed is clear of debris, or that debris that has been deposited during decommissioning activities that present a hazard are identified and where possible recovered. The process of seabed clearance would be independently verified, either through a 3rd party review of activities (for example using an Environmental Clerk of Works (ECoW) or similar person) or through contracting an independent party.

219 The area required to be surveyed to evidence seabed clearance would be agreed with stakeholders as part of pre-decommissioning consultation. It is anticipated that the focus of the survey will be locations where assets were installed. A survey radius around each structure removed will be agreed depending on the proposed methodology. For example, if a single jack-up barge is being used at each location, it is proposed that a smaller survey radius is likely to be required. To cover the area of any potential jack up vessel placement, and the foundation itself, it is likely any survey radius would be in the region of 150-200m. For sections of cables removed, the distance to be surveyed either side of the cable location would be agreed depending on the methodology but would be anticipated to be within 20m of the centre point of the cable location.

220 Clearance of seabed debris would be limited to debris from activities relating to the Development. MS-LOT and other relevant stakeholders will be notified of any notable obstructions that are identified but not attributed to the Development.

11.2 Restoration of the Site

221 ICOL is committed to restoring the seabed of the Development to its original condition (or better) prior to construction, within the framework of best practice at the time of decommissioning and as far as practicably possible. The possibility to enhance the seabed will also be considered.

222 Where it is agreed that components are to be left in-situ ICOL will ensure that they are suitably buried or otherwise protected. ICOL recognises its responsibility in ensuring any left infrastructure does not present a hazard to other marine users, impede future uses for the site, and remains buried.

223 A more detailed proposed approach will be provided in an updated DP prior to decommissioning.

11.3 Post-decommissioning Monitoring, Maintenance and Ongoing Management

224 ICOL recognise that in proposing to leave components in place, there would be an ongoing responsibility to undertake ongoing monitoring and management of left components to ensure that once buried any remaining components (or parts of components) stay buried and do not increase the risk of environmental impacts or impair the safety of other marine users.

225 As previously discussed, ICOL will undertake post decommissioning survey to confirm ensure that all components are removed (unless otherwise agreed) and the seabed is left in a state compliant with the terms of any decommissioning licencing.

226 Where structures are left in-situ, a monitoring programme will be proposed and accepted prior to decommissioning that will seek to address any key risks. It is expected that the focus of any ongoing monitoring will be to confirm that buried structures (pile ends and cables if left buried) remain buried. The monitoring programme will be informed by information collected during the operational phase of the wind farm, which will provide indications of the likelihood of exposure. Given the low sediment transport within the Development Area and OfTW, it is not expected that exposure will be a significant risk.

227 If a structure is found to have become exposed and presents a hazard, it will be marked, and information will be promulgated to relevant stakeholders. The exposed area will then be monitored and ongoing actions to manage the hazard will be agreed with stakeholders.

228 Monitoring survey methods and proposed schedules will be consulted on with MS-LOT and relevant stakeholders prior to decommissioning, once details of the proposed decommissioning approach are known, the DP will then be updated to reflect this consultation.

229 Following the completion of decommissioning works, ICOL will provide a post-decommissioning report to Scottish Ministers within 4 months of the completion of the decommissioning works. The post-decommissioning report is expected to consist of the following.

- Confirmation that components have been removed in accordance/compliance with the Decommissioning Programme, specifically in relation to any permitting/consent obligations.
- Confirmation of seabed clearance and information of the outcomes of decommissioning.
- Confirmation that the appropriate bodies have been made aware of the removal or otherwise of components.

- If any remains are left, confirmation will be provided of any navigational safety measures that have been implemented or any other monitoring, maintenance or mitigations required.
- A comparative analysis of predicted and actual costs.

12 Supporting Studies

230 To date, a number of site investigation and environmental studies have been undertaken to inform project design and which informed the EIA for the Inch Cape Offshore Wind Farm and the OfTI. The EIAR (submitted as part of the Application) includes a description of the potential effects of decommissioning on the receiving environment and also includes a list of desk based and site-specific studies undertaken. The EIAR and the Addendum can be accessed online, on the Inch Cape Offshore Wind Farm website at: Library - Offshore Wind Farm | Inch Cape Wind.

References

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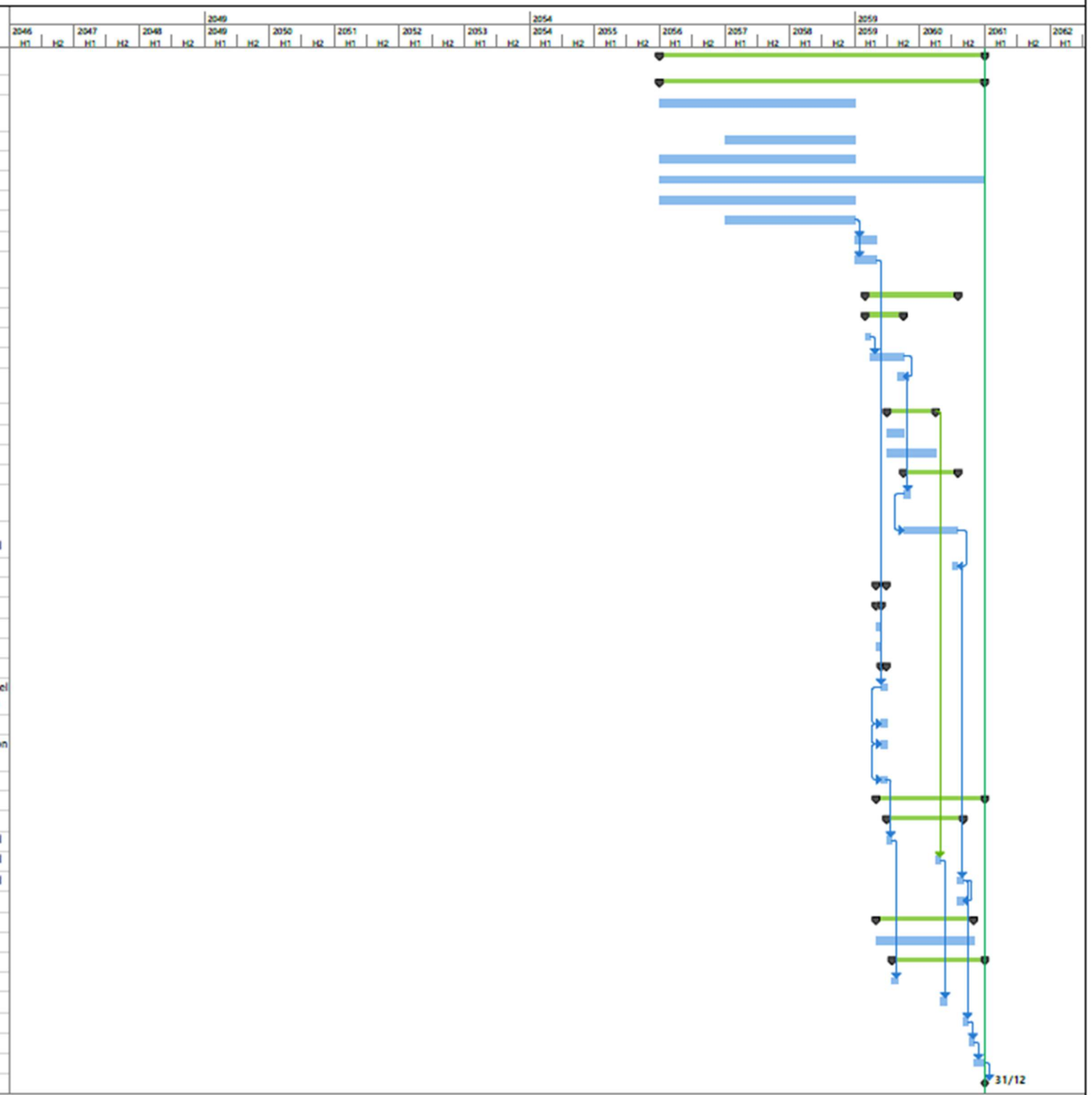
Appendix A – Draft Decommissioning Schedule and Base Assumptions

Barrington Energy

ICOL Decommissioning Draft Programme

ID	WBS	Task Name	Start	Finish	Vessel Allocation
1	ICOL1	**ICOL Draft Decommissioing Programme**	**01 Jan '56**	**31 Dec '60**	
2	ICOL1.17	**Pre Start Shared Scope Activities**	**01 Jan '56**	**30 Dec '60**	
3	ICOL1.17.1	Marine Scotland and Nature Scotland consultation re. impact of deocmmissioning work	01 Jan '56	02 Jan '59	
4	ICOL1.17.2	Decommissioning Programme detailed review inc any relevant studies	01 Jan '57	02 Jan '59	
5	ICOL1.17.3	Pre-decommissioning surveys, reports and consultations	01 Jan '56	02 Jan '59	
6	ICOL1.17.4	Operator Decommissioning Project Management team engagement	01 Jan '56	30 Dec '60	
7	ICOL1.17.5	Decommissioning scope development	01 Jan '56	02 Jan '59	
8	ICOL1.17.6	Contractor procurement process	01 Jan '57	02 Jan '59	
9	ICOL1.17.7	On site preparations for decommissioning commencement	03 Jan '59	30 Apr '59	
10	ICOL1.17.8	Preparation of temporary storage harbour/facilities for decommissioned components	03 Jan '59	30 Apr '59	
11	**ICOL1.19**	**Non OFTO Asset Removal**	**01 Mar '59**	**02 Aug '60**	
12	**ICOL1.19.4**	**WTG Removal**	**01 Mar '59**	**01 Oct '59**	
13	ICOL1.19.4.1	Mobilisation of heavy lift vessel for WTG removal	01 Mar '59	31 Mar '59	Heavy Lift Vessel
14	ICOL1.19.4.1	Removal of 72 no. WTGs	01 Apr '59	01 Oct '59	Heavy Lift Vessel
15	ICOL1.19.4.1	Demobilisation of heavy lift vessel for WTG removal & Re-Mob for Foundation Removal	02 Sep '59	01 Oct '59	Heavy Lift Vessel
16	**ICOL1.19.5**	**Array Cables Removal Options**	**01 Jul '59**	**30 Mar '60**	
17	ICOL1.19.5.5	Option 1: Cut and burial of 72 no. Inter Array Cables (IACs)	01 Jul '59	30 Sep '59	Cable Support Vessel
18	ICOL1.19.5.6	Option 2: Removal of 72 no. Inter Array Cables (IACs)	01 Jul '59	30 Mar '60	Cable Lay Vessel
19	**ICOL1.19.6**	**Foundations Removal**	**02 Oct '59**	**02 Aug '60**	
20	ICOL1.19.6.1	Mobilisation of heavy lift vessel & construction support vessel for WTG foundation removal	02 Oct '59	03 Nov '59	Heavy Lift Vessel
21	ICOL1.19.6.8	Removal of 72 no. WTG foundations	02 Oct '59	02 Aug '60	Heavy lift Vessel Construction Support Vessel
22	ICOL1.19.6.9	Demobilisation of heavy lift vessel for WTG foundation removal	02 Jul '60	02 Aug '60	Heavy Lift Vessel
23	**ICOL1.20**	**OFTO Asset Revoval**	**01 May '59**	**27 Jun '59**	
24	**ICOL1.20.7**	**Export Cables Removal**	**01 May '59**	**30 May '59**	
25	ICOL1.20.7.8	Option 1: Cut and burial of 2 no. Export Cables	01 May '59	30 May '59	Cable Support Vessel
26	ICOL1.20.7.9	Option 2: Removal of 2 no. Export Cables	01 May '59	30 May '59	Cable Lay Vessel
27	**ICOL1.20.6**	**OSP Removal**	**29 May '59**	**27 Jun '59**	
28	ICOL1.20.6.1	Preparation for removal of OSP Topside	29 May '59	27 Jun '59	Support vessels for personnel and equipment movements
29	ICOL1.20.6.1	Removal of OSP Topside	29 May '59	27 Jun '59	Heavy Lift Vessel
30	ICOL1.20.6.1	Preparation for removal of OSP Jacket Foundation	29 May '59	27 Jun '59	Support vessel for excavation work
31	ICOL1.20.6.1	Removal of OSP Jacket Foundation	29 May '59	27 Jun '59	Heavy Lift Vessel
32	**ICOL1.21**	**Post Decommissioing Shared Scope Items**	**01 May '59**	**31 Dec '60**	
33	**ICOL1.21.4**	**Sea Bed Clearance and Restoration**	**30 Jun '59**	**01 Sep '60**	
34	ICOL1.21.4.1	Sea Bed Clearance and Restoration - Post OSP Removal	30 Jun '59	29 Jul '59	Construction Support Vessel
35	ICOL1.21.4.1	Sea Bed Clearance and Restoration - Post Cables Removal	31 Mar '60	29 Apr '60	Construction Support Vessel
36	ICOL1.21.4.1	Sea Bed Clearance and Restoration - Post Foundations Removal	03 Aug '60	01 Sep '60	Construction Support Vessel
37	ICOL1.21.4.1	Buoy removal	03 Aug '60	01 Sep '60	Small Support Vessel
38	**ICOL1.21.5**	**Onshore Waste Management & Removal**	**01 May '59**	**29 Oct '60**	
39	ICOL1.21.5.4	Onshore waste management and removal/recycling	01 May '59	29 Oct '60	
40	**ICOL1.21.6**	**Post Decommissioining Surveys**	**30 Jul '59**	**31 Dec '60**	
41	ICOL1.21.6.1	Post Decommissioining Surveys - Post OSP Removal	30 Jul '59	28 Aug '59	Survey Vessels
42	ICOL1.21.6.2	Post Decommissioining Surveys - Post Cables Removal	30 Apr '60	31 May '60	Survey Vessels
43	ICOL1.21.6.2	Post Decommissioining Surveys - Post Foundations Removal	02 Sep '60	01 Oct '60	Survey Vessels
44	ICOL1.21.6.2	Post decommissioning survey results available	04 Oct '60	02 Nov '60	
45	ICOL1.21.6.2	Decommissioning Completion Report compilation and review	03 Nov '60	31 Dec '60	
46	ICOL1.21.6.2	Decommissioning Completion Report issued to Scottish Ministers	31 Dec '60	31 Dec '60	



Project: ICOL Draft Decommissi
Date: 24 Nov '22

Task · Split · Milestone · Summary · Project Summary · Inactive Task · Inactive Milestone · Inactive Summary · Manual Task · Duration-only · Manual Summary Rollup · Manual Summary · Start-only · Finish-only · External Tasks · External Milestone · Deadline · Progress · Manual Progress

Rev 2

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ID	Activity	Comments/Assumptions	Vessel/s
3	Marine Scotland and Nature Scotland consultation re. impact of decommissioning work	- 3 years prior to start of decommissioning	
4	Decommissioning Programme detailed review inc any relevant studies	- 2 years prior to start of decommissioning	
5	Pre-decommissioning surveys, reports and consultations		
6	Operator Decommissioning Project Management team engagement		
7	Decommissioning scope development		
8	Contractor procurement process		
9	On site preparations for decommissioning commencement	- Electrical system disconnections, permits, safety/CDM requirements	
10	Preparation of temporary storage harbour/facilities for decommissioned components		
13	Mobilisation of heavy lift vessel for WTG removal	- Assume 3 weeks, based on experience of multiple mobilisations, mobilisation of specialist component removal tools	Heavy lift vessel
14	Removal of 72 no. WTGs	- Assumption of 2 days per WTG + 25% weather = 144 Days + 29 Days = **173 Days**	Heavy lift Vessel
15	Demobilisation of heavy lift vessel for WTG removal	- Assume 3 weeks as demobilising from WTG and remobilising for foundations	Heavy lift Vessel
17	**Option 1:** Cut and burial of 72 no. Inter Array Cables (IACs)	- Assume this can follow WTG removal with a lag period - Assume 1 x IAC can be decommissioned per day + 25% weather = 72 Days + 18 Days = **90 Days**	Cable Support Vessel
18	**Option 2:** Removal of 72 no. Inter Array Cables (IACs)	- Assume this can follow WTG removal with a lag period to ensure no clash between teams - Assume 1 x IAC can be decommissioned and removed per 3 days + 25% weather = 216 Days + 54 Days = **270 Days**	Cable Lay Vessel
20	Mobilisation of heavy lift vessel & construction support vessel for WTG foundation removal	- Assume 3 weeks, utilising the same heavy lift vessel used for WTG removal (already included in above WTG vessel demob)	Heavy lift vessel
21	Removal of 72 no. WTG foundations	- Assumption of 3 days per foundation + 35% weather = 216 Days + 76 Days = **292 Days** - Assume consecutive use of heavy lift vessel from WTGs to foundations to benefit from reduced day rate for longer charter. - Construction support vessel to facilitate monopile seabed excavation and cutting prior to MP removal by heavy lift vessel - Potential exists to reduce decommissioning duration by procuring additional heavy lift vessel, but this will require additional mob/demob costs, additional quayside space and management.	Heavy lift Vessel Construction Support Vessel
22	Demobilisation of heavy lift vessel for WTG foundation removal	- Assume 1 week	Heavy lift Vessel
25	**Option 1:** Cut and burial of 2 no. Export Cables	- Assume this precedes OSP jacket removal - Assume 1 x EC can be decommissioned per week	Cable Support Vessel
26	**Option 2:** Removal of 2 no. Export Cables	- Assume this precedes OSP jacket removal - Assume 1 x EC can be removed per 2 weeks	Cable Lay Vessel
28	Preparation for removal of OSP Topside	- Assumption of 1 month to prepare at the OSP for its removal	Support vessels for personnel and equipment movements
29	Removal of OSP Topside	- Assumption of 1 day for removal lift - Weather including as the 1 day lift will be carried out on a suitable day within the month of June	Heavy lift Vessel
30	Preparation for removal of OSP Jacket Foundation	- Assumption of 1 week to prepare jacket for removal	Support vessel for excavation work
31	Removal of OSP Jacket Foundation	- Assumption of 1 day for removal lift - Weather including as the 1 day lift will be carried out on a suitable day within the month of June	Heavy lift Vessel
34, 35, 36	Seabed clearance and restoration	- Assume completed after removal of each component e.g. OSP, cables and WTG foundations	Construction Support Vessel
37	Buoy removal		Small support vessel
39	Onshore waste management and removal/recycling	- Assume 18 months duration for onshore waste removal operations	
41, 42, 43	Post decommissioning surveys completion	- Assume 2 months for subsea and bathymetry surveys - Assume surveys of OSP, cables and foundations completed after removal of each set of components	Survey vessel/s
44	Post decommissioning survey results available	- Assumption of 1 month to compile all survey results	
45	Decommissioning Completion Report compilation and review		
46	Decommissioning Completion Report issued to Scottish Ministers	- Completion of decommissioning +4m	