Pentland Floating Offshore Wind Farm

Section 36C and Marine Licence Variation Screening Report

Document No.	GBPNTD-ENV-PEN-CM-00012
Project:	Pentland Floating Offshore Wind Farm
Originator Company	HWL
Revision	03
Author	HWL
Date	08.10.2025

Revision History:

Revision	Date	Status	Author	Reviewed	Approved
01	22.05.2025	Draft	TWA	PEM	PEM
02	16.06.2025	Draft Final	TWA	CMS	PEM
03	08.10.2025	Final submission	TWA	CMS	PEM

Table of Contents

Glossary of Project Terms **3**

Acronyms and Abbreviations **5**

1 Introduction **7**

1.1 Background 7
1.2 Document Structure 8

2 Consultation **9**

3 Proposed Variation **11**

3.1 Overview 11
3.2 Consented Development 12
3.3 Need for the Variation 15
3.4 Legislative Context 15

4 EIAR Comparison **16**

4.1 Revised Project Parameters 16
4.2 Environmental Receptor Comparison 19

5 Recommendations **31**

5.1 Environmental Receptor Comparison 31
5.1.1 Ornithology Addendum 31
5.1.2 SLVIA Comparison 32

6 Ornithology Modelling Update **32**

6.1 Introduction 32
6.1.1 Project Alone Effects 33
6.1.2 In combination Effects 34

7 SLVIA Comparison **36**

7.1 Introduction 36
7.2 Project-alone Effects 37
7.3 Cumulative Effects 38

8 Screening Conclusions and Recommendations **39**

References **41**

Appendix 1 – Updated Ornithological Modelling **42**

Appendix 2 – SLVIA Comparison **43**

Glossary of Project Terms

Key Terms	Definition
Current Project Consents	The consents granted for the offshore components of the PFOWF in April 2024, including the Section 36 Consent (as varied), the Offshore Wind Farm Marine Licence (as varied) and the Offshore Transmission Infrastructure Marine Licence (as varied).
Highland Wind Limited	The Developer of the Project and the Applicant for the associated consents and licences.
Offshore Export Cable(s)	The cable(s) that transmits electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OECC)	The area within which the Offshore Export Cable(s) will be located.
Offshore Transmission Infrastructure Marine Licence	The Marine Licence granted by Scottish Ministers under the Marine (Scotland) Act 2010 on 28 June 2023 in respect of the Offshore Transmission Infrastructure, and varied by Scottish Ministers on 03 April 2024.
Offshore Wind Farm Marine Licence	The Marine Licence granted by Scottish Ministers under the Marine (Scotland) Act 2010 on 28 June 2023 in respect of the PFOWF Array, and varied by Scottish Ministers on 03 April 2024.
Original Application	The Section 36 consent application and supporting documents, submitted to Scottish Ministers by HWL on 11 August 2022.
Original Consents	The consents granted for the offshore components of the PFOWF in June 2023, including the Section 36 Consent, the Offshore Wind Farm Marine Licence and the Offshore Transmission Infrastructure Marine Licence.
Original EIAR	The original Environmental Impact Assessment Report submitted in August 2022 in support of the PFOWF consent application
Original RIAA	The Report to Inform Appropriate Assessment completed in June 2023 in respect of the Original Application.
Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s) (the 'Offshore Development')	All offshore components of the Project (WTGs, inter-array and Offshore Export Cable(s), floating substructures, and all other associated offshore infrastructure (i.e. those below mean high water springs) required during operation of the Project, for which HWL has obtained consent.
PFOWF Array	All WTGs, inter-array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the PFOWF Array Area, excluding the Offshore Export Cable(s).
PFOWF Array Area	The area within which the WTGs will be located.
PFOWF (the 'Project')	The combined Offshore Development and Onshore Development.
Project Marine Licences	The Offshore Wind Farm Marine Licence and the Offshore Transmission Infrastructure Marine Licences, as varied.
Section 36 Consent	Consent granted by Scottish Ministers under section 36 of the Electricity Act 1989.
Section 36C Variation	Variation made to an existing Section 36 Consent under the Electricity Act 1989, under Regulation 42 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended).

Key Terms	Definition
Variation 01	The variation application made by HWL under section 36C, submitted in October 2023 and granted in April 2024, to refine project parameters and to extend the operational life of the Project.
Variation 02	The current Section 36C variation application and the subject of this document.
Wind Turbine Generator Footprint Area	The Wind Turbine Generator (WTG) footprint area comprises the area of sea surface occupied by the infrastructure at or above sea level (i.e. the WTGs and associated floating substructure).

Acronyms and Abbreviations

AA	Appropriate Assessment
AEOSI	Adverse Effect on Site Integrity
AON	Apparently Occupied Nests
COP	Copenhagen Offshore Partners
CRM	Collision Risk Modelling
DBS	Dogger Bank South
DSRL	Dounreay Site Restoration Limited
DSLP	Design Specification and Layout Plan
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Electro Magnetic Field
GW	Gigawatt
GVA	Gross Value Added
HAT	Highest Astronomical Tide
HRA	Habitat Regulations Appraisal
HWL	Highland Wind Limited
IFP	Instrument Flight Procedure
INNS	Invasive Non Native Species
INTOG	Innovation and Targeted Oil and Gas
km	Kilometre
LAT	Lowest Astronomical Tide
m	Metre
MW	Megawatt
ML	Marine Licence
MD-LOT	Marine Directorate Licensing and Operations Team
NCC	North Caithness Cliffs
NM	Nautical Mile
NS	NatureScot
OECC	Offshore Export Cable Corridor
OTI	Offshore Transmission Infrastructure
OWF	Offshore Wind Farm

PFOWF	Pentland Floating Offshore Wind Farm
PPP	Planning Permission in Principle
PVA	Population Viability Analysis
RIAA	Report to Inform Appropriate Assessment
REZ	Renewable Energy Zone
RPM	Revolutions Per Minute
RSPB	Royal Society for the Protection of Birds
S36	Section 36
SAR	Search and Rescue
SLVIA	Seascape Landscape and Visual Impact Assessment
SPA	Special Protection Area
THC	The Highland Council
WTG	Wind Turbine Generator
UK	United Kingdom

1 Introduction

1.1 Background

The Pentland Floating Offshore Wind Farm (PFOWF) (the 'Project') is a test and demonstrator offshore wind farm, located approximately 7.5 km off the coast of Dounreay, Caithness. The aim of the Project is to test and demonstrate new technologies and solutions to support floating offshore wind farm development in Scotland, the UK and worldwide.

Highland Wind Limited (HWL) was awarded Section 36 Consent (the 's36 Consent') under the Electricity Act 1989 by the Scottish Ministers on 28 June 2023 for the offshore components of the Project. Marine Licences for the Offshore Wind Farm (OWF) and the Offshore Transmission Infrastructure (OTI) (together the 'Project Marine Licences') were also awarded by the Scottish Ministers on 28 June 2023 under the Marine (Scotland) Act 2010.

On 11 October 2023, HWL applied to Scottish Ministers to vary the s36 consent granted for the Project under s36C of the Electricity Act 1989 (Variation 01). Variation 01 also sought to vary the associated Project Marine Licences, under section 30(7) of the Marine (Scotland) Act 2010. Variation 01 was required to refine the design parameters of the Project in response to detailed design activities and to extend the operational life of the Project consents from 10 to 25 years. The varied consents were awarded to HWL by Scottish Ministers on 03 April 2024 to include the s36 consent (as varied) and the associated Project Marine Licences (MS-00010578 (OWF) and MS-00010577 (OTI)). These are the Current Project Consents and define the design parameters for the consented project.

The onshore components of the Project (above mean low water springs (MLWS)) were the subject of a separate application to the Highland Council (THC) under the Town and Country Planning (Scotland) Act 1997. Planning Permission in Principle (PPP) for the onshore components was granted on 30 January 2023.

HWL intends to request an additional variation to the s36 Consent (as varied) under s36C of the Electricity Act 1989 and the associated wind farm Marine Licence (as varied) (MS-00010578), under section 30 of the Marine (Scotland) Act 2010 (Variation 02). This variation is required to refine the wind turbine generator (WTG) parameters for the Project to secure the flexibility necessary to respond to evolving market conditions and WTG design and supply chains. The drivers behind this include current and projected WTG availability, global supply chain dynamics, and to provide greater stability and reliability of floating foundations. These changes have also reduced uncertainty in the impact assessments by allowing more accurate modelling of the potential final project design scenarios. This report has been prepared to request a Screening Opinion from Marine Directorate's Licensing and Operations Team (MD-LOT) with respect to the s36C variations proposed and as set out within this document.

The Variation 02 application will demonstrate that, HWL is committed to ensuring that there will be no appreciable difference in environmental effects from the proposed WTG refinements to those assessed in the Environmental Impact Assessment Report (EIAR) submitted in August 2022 (HWL, 2022a) (the 'Original EIAR'), and Variation 01 submitted in October 2023 (HWL, 2023). There will be no additional or greater significant effects from the proposed variation and any change in effect will be so small as to be insubstantial. Therefore, the proposed variation does not constitute an EIA development and an EIA is not required.

It is acknowledged by HWL that concerns were raised by NatureScot (NS), MD-LOT and the Royal Society for the Protection of Birds (RSPB) regarding the original Report to Inform Appropriate Assessment (HWL, 2022b) (the 'Original RIAA') for the Project, and potential in-combination adverse effects on site integrity (AEOSI) for puffin and kittiwake features of the North Caithness Cliffs (NCC) Special Protected Area (SPA). Variation 01

demonstrated that the proposed design refinements, which included reducing the number of WTGs from seven to six turbines and extending the operational life of the Project from 10 to 25 years, did not result in any AEOSI for puffin and kittiwake features of the NCC SPA.

The Habitats Regulations Appraisal (HRA) process falls outside of the requirements of this Screening Report. However, to ensure previous concerns on protected sites are considered, HWL has prepared an addendum to this Screening Report (Appendix 1) which addresses the proposed WTG design refinements and the potential implications of these for ornithological features. This addendum provides updated ornithological modelling for kittiwake features of the NCC SPA and demonstrates that there is no appreciable difference in potential effects on kittiwake features of the NCC SPA from those which were approved in Variation 01 for the consented Project. It should also be noted that there is no change to the WTG Footprint Area for Variation 02 and, therefore, there will be no change to displacement impacts for any species from those which were approved for the consented Project.

1.2 Document Structure

This document sets out the proposed variations to the s36 Consent (as varied), alongside justification as to why the proposed variations are required. This document also reviews the Original EIAR and Variation 01 application and considers whether the proposed additional design refinements could result in any significant effects which are new or materially different to those of the consented Project. This is based on MD-LOT's Guidance Note: Application for Variation of Section 36 Consents[1].

To support this request for Screening Opinion and review of the proposed design refinements, HWL has undertaken consultation with key stakeholders including MD-LOT, NatureScot and The Highland Council (THC). A summary of the consultation undertaken and how this report has had regard to any comments received is provided in this document.

The remaining document structure is set out as follows:

- Consultation
- Proposed variations and legislative context
- EIA Comparison
- EIA recommendations
- Ornithological Analysis
- SLVIA Comparative Analysis
- Conclusions and Recommendations
- Appendices

[1] MS-LOT (2019). Energy consents: applications for variation of section 36 consents guidance. Available at https://www.gov.scot/publications/applications-variation-section-36-consents/documents

2 Consultation

In developing this request for Screening Opinion, HWL has undertaken consultation with key stakeholders including MD-LOT, NatureScot and THC, to present the proposed approach to the Variation and supporting modelling undertaken, and to understand any key concerns raised.

Table 2.1presents a summary of consultation undertaken and highlights how this report has had regard to any comments received.

Table 2.1. Consultation undertaken

Consultee	Consultation and Date	Summary of Consultation Undertaken	Addressed in this Report
MD-LOT	Meeting - 01 May 2025 Presentation of the proposed variation design refinements, ornithology modelling and assessments undertaken.	MD-LOT confirmed no comments on the presentation provided or minutes circulated.	MD-LOT comments are noted, no updates to this Screening Report are required.
NatureScot and MD-LOT	Meeting – 06 May 2025 Presentation of the proposed variation design refinements, ornithology modelling and assessments undertaken.	NatureScot requested confirmation of the Band Option used and avoidance rates applied. NatureScot confirmed this was a useful presentation with results clearly presented in the manner NatureScot would want to see for the proposed Variation. NatureScot requested sight of detailed modelling reports to understand how the models were run, confirmation of the approach to in-combination assessment and how conclusions of 'no appreciable difference' have been reached. MD-LOT confirmed it would be helpful to see the modelling report, details of the modelling undertaken and the approach for any in-combination assessment.	Revised ornithological modelling report (document reference: GB203907) was provided to MD-LOT and NatureScot on 21 July 2025 for review and comment. This report is provided as Appendix 1 to this document. This Screening Report has been drafted to include detailed information on ornithological modelling undertaken and approach to in-combination assessment.
MD-LOT	Reports issued – 21 July 2025 SLVIA comparative assessment (document reference: 250609), supporting wirelines and cumulative wirelines. Revised Ornithological Modelling Report (document reference: GB203907).	MD-LOT confirmed 25 July 2025 that it had no comments on the revised ornithological modelling or SLVIA wirelines at this time and will defer to NatureScot's advice. MD-LOT highlighted that, as of 27 June 2025, West of Orkney Wind Farm is consented and the colouring used for the project in the 50 km Study Area Figure should be updated. MD-LOT requested clarity on the proposed consent variation wording.	MD-LOT's confirmation that it will defer to NatureScot's advice are noted. West of Orkney Wind Farm has been updated within the SLVIA cumulative Study Area figure as requested. HWL provided proposed consent variation wording to MD-LOT by email 28 July 2025.

NatureScot	Reports issued – 21 July 2025 SLVIA comparative assessment (document reference: 250609), supporting wirelines and cumulative wirelines Revised Ornithological Modelling Report (document reference: GB203907).	NatureScot confirmed 12 August 2025 that: - It does not consider that the proposed variation would raise issues of National Interest in relation to its landscape, visual or cumulative effects. This is not to say that the development would not result in significant landscape or visual effects, rather that NatureScot does not judge these effects to meet the threshold in respect of its national remit for landscapes. - There is no change to the footprint between the first (V01) and section variation (V02), therefore the impact on Puffin at North Caithness Cliffs (NCC) SPA is expected to remain unchanged, and puffin displacement does not need to be reassessed. - The approach taken for the distributional response modelling is reasonable, however, the results are not significant enough to affect NatureScot conclusions. - For the Project alone values are not significantly lower than those consented for Variation 01. - Conclusion for the in-combination assessment of V02 scenarios remains the same as for the consented V01 values, i.e. NatureScot conclude that there will be no adverse effect on site integrity (AEOSI) of the NCC SPA in respect to kittiwake. - Confidence in conclusions would be improved if the 95% confidence intervals could be provided. - HWL should seek clarification from MD-LOT on the approach to in-combination assessment.	Comments and conclusions from NatureScot are welcomed. The revised ornithological modelling report and this Screening Report includes 95% confidence intervals, as requested, to support the conclusion of no AEOSI for kittiwake features of NCC SPA. The revised ornithological modelling report presents distributional response modelling, based on both 0 km and 2 km boundary for comparison. HWL requested confirmation from MD-LOT 14 August 2025, that the approach to in-combination assessment for the variation application is appropriate and proportionate.
MD-LOT	Meeting 7 August 2025 HWL requested confirmation of Screening timelines and potential to submit s36 consent variation application without Screening.	MD-LOT confirmed 19 August 2025 timelines and process for provision of a Screening Opinion. MD-LOT confirmed the variation application would fall under section 13 of Schedule 2 of The Marine Works (EIA) (Scotland) Regulations 2017. Based on the details received to date, MD-LOT does not consider the thresholds and criteria associated with section 3j of schedule 2 to be met or exceeded by the works as changed or extended from what has already been authorised. Therefore, MD-LOT advises that HWL can apply to vary its marine licence without first undergoing	MD-LOT confirmation of screening timelines and ability to apply for the variation without first undergoing screening or submitting an EIA report is noted.

		screening or submitting an EIA Report alongside its application.	
THC	Meeting 4 August 2025 Presentation of the proposed variation design refinements, and assessments undertaken.	THC confirmed it does not see an issue with the small increase in turbine size in terms of landscape and visual effects and the question of materiality would rest on the ornithological assessments and NatureScot's feedback on the proposals. THC confirmed it would review the application once received and would provide feedback.	THC comments are noted.
MD-LOT	Email – 19 August 2025	MD-LOT confirmed 19 August 2025 it sees no obvious issue with the proposed consent variation wording and highlights that it is for HWL to ensure that the wording accurately reflects the works being applied for.	MD-LOT confirmation of consent variation wording is noted and this is presented in Section 8 of this Screening Report.
MD-LOT	Email – 07 October 2025	MD-LOT amended previous advice provided on the 07 August 2025 (see above) to confirm that the variation application should be screened against both The Marine Works (EIA) (Scotland) Regulations 2017 and The Electricity Works (EIA) (Scotland) Regulations 2017 to provide the most robust means of assessing whether or not an Environmental Impact Assessment is required for the V02 application.	MD-LOT's updated advice is noted. This has been captured within Section 3.4 - Legislative Context.

3 Proposed Variation

3.1 Overview

HWL is seeking consent from the Scottish Ministers to vary the current s36 Consent (as varied) under the Electricity Act 1989 for the Project, to refine the WTG parameters for the Project, to enable an increase in rotor diameter and a decrease in air gap, to secure the flexibility required for WTG supply and greater stability of floating foundations. Through discussion with WTG suppliers and consideration of actual machines available to the Project, the proposed variation also includes associated reductions in blade width, revolution speed (rpm) and operational time, informed by further analysis of site specific data.

The design refinements proposed will enable the construction of one of three potential WTG design scenarios that are under consideration for the Project. Each of the three design scenarios has a proposed number of WTGs, rotor diameter and air gap and it should be noted that only one design scenario will be constructed with that scenario confirmed and approved within the Project's Design Specification and Layout Plan (DSLP) prior to construction.

The proposed parameter refinements are set out below, noting that parameters will vary within this design envelope, depending on the WTG design scenario under consideration:

- Increase in rotor diameter from 1 x WTG with rotor diameter of 220 m and 5 x WTGs with rotor diameter of 250 m, to a maximum of 6 x WTGs with rotor diameter 260 m;

- Reduction in air gap from 35 m to a minimum of 28 m;
- Reduction in blade width from 7 m to a maximum of 6.93 m;
- Reduction in rpm from 8 to a maximum of 6.61; and
- Reduction in operational time from an average of 95% (operational) and 5% (downtime) to an average of 88% (operational) and 12% (downtime).

The three WTG design scenarios under consideration for the Project are:

1. Design Scenario 1: 6 x WTGs with rotor diameter 260 m and air gap of 30 m
2. Design Scenario 2: 5 x WTGs with rotor diameter 260 m and air gap of 28 m
3. Design Scenario 3: 6 x WTGs with rotor diameter 236 m and air gap of 28 m

With reference to the Current Project Consents as varied in 2024, no changes are proposed to the maximum tip height or hub heights of the WTGs, no changes are proposed to the WTG footprint area (the area within the Array that the WTGs are located), and no changes are proposed to associated infrastructure, including number of floating foundations, number of mooring lines, anchors/piles, cables or cable or scour protection.

HWL is also requesting that the associated wind farm marine licence (licence number ML-00010578) is varied by the Scottish Ministers under section 30 of the Marine (Scotland) Act, to reflect amendments to the s36 Consent.

3.2 Consented Development

The current s36 Consent (as varied) permits the development of a test and demonstration floating Offshore Wind Farm (OWF) in the Pentland Firth, located as shown on Figure 2.1. The s36 Consent includes the following key parameters:

- The construction and operation of an offshore energy generating station with a generating capacity of around 100 megawatts (MW). The offshore generating station shall be comprised of up to:
    - Five floating offshore WTGs with:
        - A maximum hub height of 190 m above Highest Astronomical Tide (HAT);
        - A maximum height to blade tip of 300 m above HAT;
        - A maximum rotor diameter of 250 m;
        - A minimum blade tip clearance from mean sea level (MSL) of 35 m;
    - One floating offshore WTG with:
        - A maximum hub height of 190 m above Highest Astronomical Tide (HAT);
        - A maximum height to blade tip of 300 m above HAT;
        - A maximum rotor diameter of 220 m;

        - A minimum blade tip clearance from mean sea level (MSL) of 35 m;
    - Six associated floating substructures;
    - Nine mooring lines for each floating substructure, 54 in total;
    - Nine anchors or piles for each floating substructure, 54 in total;
    - Seven inter-array cables (dynamic and static); and
    - Associated scour and cable protections.

The consented development is also detailed in The Scottish Ministers Decision Notice for the s36 Consent (as varied). For reference, the varied s36 Consent documents, the Original Consent Documents and the Original EIAR for Project can be accessed at: https://marine.gov.scot/ml/pentland-floating-offshore-wind-farm

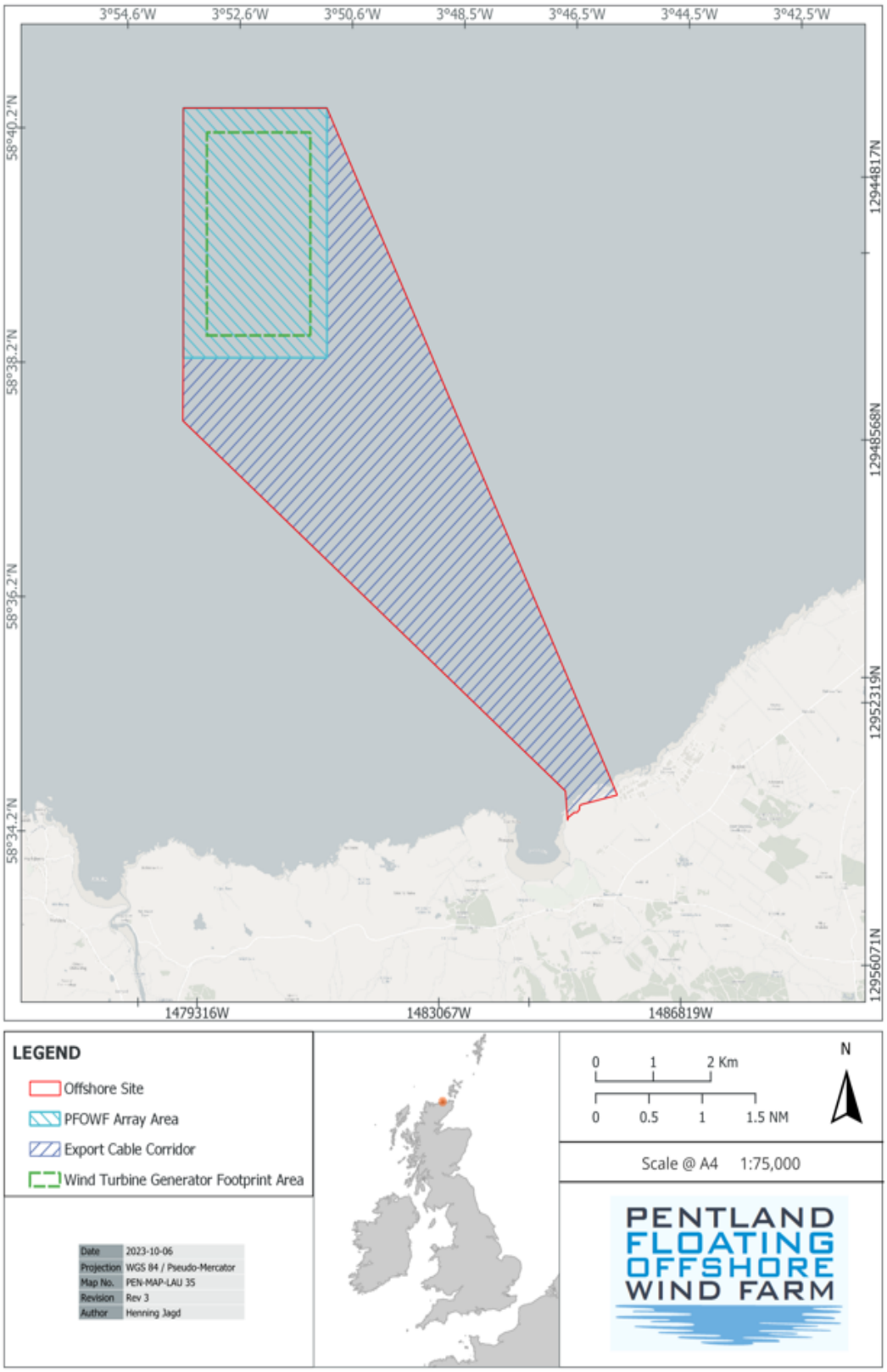


Figure 2.1 Consented Offshore Project Boundaries (Varied April 2024)

3.3 Need for the Variation

Since the Original Application and Variation 01, HWL has worked with its engineering teams to progress key workstreams, including fabrication of the floating foundations and discussions with WTG suppliers to understand the machines that will likely be available to the Project. This has resulted in the requirement for the Project to consider the next generation of WTG platforms coming to the market which requires an increase in the maximum rotor diameter, reverting back to that of the Original Application. This is to secure the necessary flexibility in WTG supplier and ultimately to enable delivery of energy at the lowest cost to the consumer. Detailed engineering design has also identified a need to lower the minimum blade tip clearance of the WTGs from that which was submitted in the Original Application and Variation 01, to maintain the required stability and reliability of the WTGs and floating foundations.

Discussions with WTG suppliers, alongside detailed analysis of metocean data now available to the Project, has also enabled further refinement of WTG parameters, based on actual turbine characteristics and site-specific information. This has reduced uncertainty in WTG design and informed final design, including the proposed changes to rotor diameter, alongside reductions in rpm, blade width and operational time.

These design refinements have resulted in the requirement for an additional variation to the Project consents to provide flexibility in WTG supply and to increase stability of floating foundations. This will require further refinement of WTG parameters to the previously consented and varied project parameters set out in the Original Consents and the Scottish Ministers' decision notice for the consented project and associated wind farm marine licence (ML-00010578).

As a test and demonstrator project the PFOWF will enable the development of floating offshore wind farms in Scotland, the UK and worldwide. The consent variation and design refinements proposed within this document will ensure that the environmental effects of the Project are minimised, while optimising Project design to ensure delivery at the lowest cost of energy to consumers. The innovations and technology trialled in the delivery of the Project will also be key to advancing the timely deployment of large-scale floating offshore wind in the UK, including the successful realisation of nearly 15 GW of floating capacity allocated under the ScotWind leasing round and up to 5 GW of additional floating capacity under the Innovation and Targeted Oil and Gas (INTOG) leasing round.

3.4 Legislative Context

Section 36 of the Electricity Act 1989 applies to proposals for any offshore generating station whose capacity exceeds 1 MW within Scottish territorial waters. Offshore generating stations also require a marine licence under the Marine (Scotland) Act, 2010 (between 0 and 12 nautical miles (NM)) or under the Marine and Coastal Access Act, 2009 (between 12 and 200 NM).

Section 20 of the Growth and Infrastructure Act, 2013 inserted a new s36C into the 1989 Act to provide for the making of variations to s36 consents. Prior to 2013, the 1989 Act did not provide for s36 consents to be varied.

The Electricity Generating Stations (Applications for Variation of Consent) (Scotland) Regulations 2013 ('the 2013 Regulations') came into force in December 2013. The 2013 Regulations were later amended by Regulation 42 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ('the Electricity Works EIA Regulations'). These regulations make provision for the content of a variation application and the consultation process to be followed with respect to section 36C applications.

In addition, where proposed works are located within the marine environment (i.e. within 0–12 nautical miles of the Scottish coast), the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the Marine Works EIA Regulations') also apply. These regulations set out the requirements for a Screening

Opinion request to determine whether the proposed works are an EIA project and must be complied with alongside the Electricity Works EIA Regulations when a section 36C application involves applicable marine infrastructure.

Under paragraph 3 of Schedule 2 of the Electricity Works EIA Regulations, and under paragraph 13 of Schedule 2 of the Marine Works EIA Regulations, any change to works already authorised which were subject to an EIA must be considered to determine whether that change may introduce a new significant effect or may increase or intensify an existing effect such that the effect would now be significant and, as such, an EIA is required. Where a proposed variation is unlikely to have significant environmental effects beyond those already identified for the authorised project, no EIA Report or process would be required in respect of the variation application.

The proposed consent variations fall under, and are submitted against, Schedule 2(3) of the Electricity Works EIA Regulations and Schedule 2(13) of Marine Works EIA Regulations. As such, MD-LOT will provide a Screening Opinion as to whether the variation is, or is not, an EIA project under these regulations. This report has been prepared to request a Screening Opinion from MD-LOT with respect to the s36C variation proposed and as set out within this document.

In considering whether the proposed variation (Variation 02) is an EIA Project, HWL highlights that the Project is committed to ensuring that there will be no appreciable difference in environmental effects from the proposed WTG refinements to those assessed in the Original EIAR (HWL 2022a), and Variation 01 (HWL, 2023). As set out in this report, there will be no additional or greater significant effects from the proposed variation and any change in effect will be so small as to be insubstantial.

HWL is also requesting that, should the variation of the s36 Consent be granted, the associated wind farm marine licence (Licence Number: ML- 00010578) is also varied by the Scottish Ministers under section 30 of the Marine (Scotland) Act 2010 to reflect amendments to the s36 Consent.

4 EIAR Comparison

This section of the report presents the detail of the proposed WTG parameter refinements and considers the potential implications of these on the receptor topics assessed within the Original EIAR and Variation 01 for the Project. In each case it is concluded whether receptor topics require additional consideration within the proposed s36C Variation Application.

4.1 Revised Project Parameters

As described in section 2.1, WTG parameters have been refined, through discussion with WTG suppliers and based on actual WTG machines available to the Project. This has identified an increase in rotor diameter and reductions in blade width and revolution speed (rpm) for specific WTGs, as well as a reduction in operational time versus downtime for the Project.

Since the submission of the Original Application the Project has gained high fidelity information for the Array Area including wind speed data from deployed FLiDAR and hindcast datasets, as well as detailed information related to WTG cut-in (wind speed at which the rotors will start rotating) and cut-out speeds (wind speed at which the rotors will stop rotating to preserve integrity in high wind speeds) for the WTGs available. This has allowed the operational time versus downtime percentages to be refined, reflective of the time that wind speeds will be either too low or too high, to allow the turbines to rotate. This is combined with detailed information on downtime associated with servicing and repair scenarios, based on asset management and maintenance regimes of existing WTGs, to provide an accurate description of operational time versus downtime compared to the Original Application and Variation 01.

For each of the WTG design scenarios the cut-in and cut-out speeds are the same and differences between operational and maintenance activities are not discernible. Therefore, the same operational/downtime is applied in each design scenario.

Table 4.1 details the proposed design refinements to the WTG parameters for the three WTG design scenarios under consideration and compares these parameters to the Original Application and Variation 01 (highlighted in blue). Table 3.1 also highlights where the proposed changes to the parameters would require the wording of the s36 Consent and/or the marine licences to be varied.

Table 4.1. Proposed Parameter Variations

Parameter	Original Consent	Consented Project	Proposed Variation 02 (WTGs)			Proposed Consent Parameter	Proposed s36 Amendment	Proposed ML Amendment
			Scenario 1	Scenario 2	Scenario 3			
Number of WTGs	7	6	6	5	6	6	Text to be amended within s36 Consent	Text to be amended within OWF ML 00010578
Rotor diameter (RD) (m)	260	1 x WTG RD 220 m 5 x WTG RD 250 m	260	260	236	260	Text to be amended within s36 Consent	Text to be amended within OWF ML 00010578
Minimum blade tip clearance (m)	35	35	30	28	28	28*	Text to be amended within s36 Consent	Text to be amended within OWF ML 00010578
Rotor Swept Area (m^2)	316,673	283,448	318,557	265,464	262,461	318,557	No amendment to the wording of the s36 Consent required	No amendment to the wording of the ML required
Blade width (m)	9	7	6.93	6.93	5.1	6.93	No amendment to the wording of the s36 Consent required	No amendment to the wording of the ML required
rpm	10	8	6	6	6.61	6.61	No amendment to the wording of the s36 Consent required	No amendment to the wording of the ML required
Estimated WTG operational/downtime (%)	5/95	5/95	12/88			12/88	No amendment to the wording of the s36 Consent required	No amendment to the wording of the ML required
WTG footprint Area (km^2)	10	5.85	5.85			5.85	No amendment to the wording of the s36 Consent required	No amendment to the wording of the ML required

*As described in Section 2.1, Variation 02 is proposed to allow the selection of one of three WTG design scenarios within a design envelope. Where Scenario 1 is selected (6 x WTGs with rotor diameter of 260m), air gap will be a minimum of 30 m. Where Scenario 2 or 3 are selected (5 x WTGs with rotor diameter of 260 m, or 6 x WTG with rotor diameter of 236 m), air gap will be a minimum of 28 m.

4.2 Environmental Receptor Comparison

The following section considers the implications of the proposed WTG design refinements on each environmental receptor topic assessed within the Original EIAR and Variation 01 Application. This considers the three different WTG design scenarios and associated maximum or minimum parameters defined.

In considering the proposed design refinements, the following points should be noted:

- No changes are proposed to the maximum WTG number and therefore the number of floating substructures, mooring lines, anchors and inter-array and export cables remains the same as for the consented project;

- No changes are proposed to the WTG footprint area defined in the consented project, therefore there will be no increase in displacement impacts on any species;

- The Project is committed to ensuring that there is no appreciable difference in effects due to the proposed WTG refinements, the proposed parameter changes remain acceptable in terms of population level impacts to kittiwake features of the NCC SPA, and as a result, there will be no AEOSI. Full details of updated ornithological modelling are provided in Appendix 1 of this Screening Report.

Table 4.2 summarises the environmental receptor topics and associated significance of effect previously assessed within the Original EIAR and Variation 01 for the consented project, and considers whether this has the potential to change as a result of the proposed additional variations and, if so, whether further information is required to understand the implications of such changes.

Table 4.2. Proposed Design Refinements to Project Parameters and Implications for Receptors previously assessed

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
Marine Physical Processes	<u>Construction/Decommissioning</u> - Increase in suspended sediment concentration - Loss/alteration of seabed characteristics <u>Operation and maintenance</u> - Changes to wave and tide regime - Changes to sediment transport regime - Introduction of scour - Impacts on fronts and stratification	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> No significant adverse effects were identified on marine physical processes within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on marine physical processes compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIA and Variation 01 remain valid.	No
Water and Sediment Quality	<u>Construction/Decommissioning</u> - Disturbance and release of contaminated sediments or radioactive particles in - Changes in water and sediment quality and status due to accidental release of contaminants or radioactive particles - Changes in water and sediment quality and status due to risk of Invasive Non-native Species (INNS) settlement and redistribution <u>Operation and maintenance</u> - Changes in water quality due to operational cleaning and painting	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> No significant adverse effects were identified on water quality within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on water and sediment quality compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIA and Variation 01 remain valid.	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
Benthic Ecology	Construction/Decommissioning - Damage from placement of infrastructure (cables, moorings, anchors on the seabed) - Suspension of sediments from the installation of marine infrastructure - Disturbance of contaminated sediments - Introduction of marine invasive non-native species (INNS) - Deposition of drill cuttings Operation and maintenance - Hydrodynamic changes leading to scour and abrasion around subsea infrastructure - Introduction of marine INNS - Colonisation of subsea infrastructure - Impact to benthic communities from any EMF and thermal load from cables	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	Design Refinements No significant adverse effects were identified on benthic ecology within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on benthic ecology compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIA and Variation 01 remain valid.	No
Fish and Shellfish Ecology	Construction - Disturbance or damage to sensitive species due to underwater noise from construction activities - Direct habitat loss due to disturbance of spawning and nursery grounds from construction activities - Effects of increased sedimentation / smothering on fish and shellfish - Temporary burial of seabed from drill cuttings - Potential accidental release of pollutants Operation and maintenance - Habitat loss of spawning and nursery grounds due to presence of anchors and cables on seabed	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	Design Refinements No significant adverse effects were identified on fish and shellfish ecology within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on fish and shellfish ecology compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIA and Variation 01 remain valid.	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	- Effects of EMF from cables on sensitive species - Fish aggregation around the floating structure and associated infrastructure - Ghost fishing (lost fishing gear) becoming entangled in installed infrastructure				
Marine Mammals and Other Megafauna	<u>Construction/Decommissioning</u> - Noise related impacts to marine mammals from construction activities - Noise related impacts to basking sharks from low-frequency construction noise <u>Operation and maintenance</u> - Noise related impacts to marine mammals during operation and maintenance - Entanglement risk to marine mammals and basking sharks - Collision risk to marine mammals and basking sharks - Displacement or barrier effects - Long term habitat change	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> No significant adverse effects were identified on marine mammals and other megafauna within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on marine mammals or megafauna compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIA and Variation 01 remain valid.	No
Marine Ornithology	<u>Construction/decommissioning</u> - Disturbance/displacement/exclusion due to construction/decommissioning noise or physical presence of vessels - Barrier effects due to physical presence of vessels and construction/decommissioning equipment - Change in habitat/prey availability during construction/decommissioning	Negligible to Minor Effects No risk of significant additional collision impacts arising from the Offshore Development Residual Effects Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the	<u>Design Refinements</u> No significant adverse effects were identified on marine ornithology within the Original EIAR or Variation 01. The proposed design refinements result in a small increase in rotor diameter for design scenarios 1 and 2, with a reduction in WTG number for scenario 2 and a reduction in rotor diameter for scenario 3. As a result, design scenarios 2 and 3 provide a rotor swept area that is less than that of	Yes An addendum is provided with this Screening Report (Appendix 1), that demonstrates there is no appreciable difference in effects due to the

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	- Increase in suspended sediment affecting visibility during construction/decommissioning <u>Operation and maintenance</u> - Collision risk with operational WTGs - Displacement impacts due to physical presence of WTGs - Barrier effects due to physical presence of WTGs - Entanglement with debris caught on mooring lines - Disturbance/exclusion due to marine noise and maintenance works - Change in habitat/prey availability due to physical presence of WTGs, scour and cable protection - Increase in suspended sediment from operations and maintenance work affecting visibility - Creation of roosting habitat or foraging opportunities		Original EIAR remain valid	the Original EIAR and Variation 01. The proposed design refinements for scenario 3 provide a small increase in rotor swept area compared to the Original EIAR and Variation 01. Minimum blade tip clearance is reduced for all three refined WTG design scenarios, whilst blade width, rpm and operational time are also reduced compared to both the Original EIAR and Variation 01, based on specific design and detailed site information. The WTG footprint area is less than the Original EIAR and the same as Variation 01 in all three WTG design scenarios and no new impacts are identified as a result of the design refinements proposed. HWL is committed to ensuring that there is no appreciable difference in effects due to the proposed WTG refinements, and the proposed parameter changes remain acceptable in terms of population level impacts to kittiwake features of the NCC SPA.	proposed WTG design refinements, and the proposed parameter changes remain acceptable in terms of population level impacts to kittiwake features of the NCC SPA.
Commercial Fisheries	<u>Construction/decommissioning</u> - Loss of access to fishing grounds due to the presence of vessels and safety zones - Displacement of fishing activity into other areas - Fishing gear entanglement with subsea structures, resulting in damage, loss of fishing gear or ghost fishing <u>Operation and maintenance</u>	Negligible to Tolerable with Mitigation Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the	<u>Design Refinements</u> No significant adverse effects were identified on commercial fisheries within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on commercial fisheries compared to	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	- Loss of access to fishing grounds due to floating platforms, associated moorings and safety zones - Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users due to floating platforms, associated moorings and safety zones - Fishing gear entanglement with floating subsea structures resulting in damage loss of fishing gear or ghost fishing		findings of the Original EIAR remain valid	those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIAR and Variation 01 remain valid.	
Shipping and Navigation	<u>Construction/decommissioning</u> - Vessel displacement due to construction / decommissioning activities leading to increased risk for third-party vessels and/or reduction in port access - Vessel to vessel collision risk between a third-party vessel and Project vessel - Vessel to structure allision risk due to the presence of new structures associated with the Project - Fishing gear interaction with subsea infrastructure - Reduction in under keel clearance due to subsea cables / cable protection leading to increased grounding risk <u>Operation and maintenance</u> - Vessel to vessel displacement due to presence of new structures leading to increased collision risk for third-party vessels and/or reduction in port access - Vessel to vessel collision risk between a third-party vessel and Project vessel	Broadly Acceptable to Tolerable with Mitigation Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design refinements</u> No significant adverse effects were identified on shipping and navigation within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on shipping and navigation compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIAR and Variation 01 remain valid.	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	- Vessel to structure allision risk due to the presence of new structures associated with the Project - Anchor interaction with subsea infrastructure - Fishing gear interaction with subsea infrastructure - Transiting vessel interaction with subsea infrastructure - Reduction in under keel clearance due to subsea cables / cable protection leading to increased grounding risk - Reduction in emergency response capabilities due to increased incident rate and/or reduced access for SAR responders				
Aviation and Radar	<u>Construction/decommissioning</u> - Potential impact on Wick airport IFPs - Potential impact on military low flying and UK SAR helicopter operations <u>Operation and maintenance</u> - Potential impact on Wick airport IFPs - Potential impact on military low flying and UK SAR helicopter operations	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> No significant adverse effects were identified on aviation and radar within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number and no increase to tip height. As a result, the potential obstacles to aviation and radar receptors will be the same as those assessed within Variation 01 and reduced compared to Original EIAR. No new impacts are identified as a result of the design refinements and therefore, the findings of the original EIAR and Variation 01 remain valid.	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
Seascape Landscape and Visual Amenity	<u>Construction/decommissioning</u> - Effect on seascape/landscape character and visual amenity due to the presence and activity of construction/decommissioning vessels - Effect on seascape/landscape character and visual amenity due to the installation of the offshore WTGs and floating substructures - Effect on visual amenity due to the use of artificial lighting to enable construction/decommissioning works during the hours of darkness <u>Operation and maintenance</u> - Effect on seascape/landscape character and visual amenity due to the presence of offshore WTGs and the movement of blades and presence of floating substructures - Effect on seascape/landscape character and visual amenity due to the use of aviation lighting on offshore WTGs during the hours of darkness over the 30-year life - Effect on seascape/landscape character and visual amenity due to the use of helicopters and maintenance vessels to service the Project over the 30-year life	Minor to Major/Moderate Residual Effect Significant The effects are found to be localised within the SLVIA Study Area, affecting an area of coast and landscape that currently has energy and onshore wind development. Localised nature of the effects means that the majority of landscape and visual receptors across the wider Study Area will either undergo Not Significant Effects or will be unaffected	Comparative assessment concluded, that despite improvements to visual appearance of WTGs on the horizon, there would be no change to the findings of the Original EIA and the findings of the Original EIAR remain valid.	<u>Design Refinements</u> The Original EIAR resulted in the identification of significant adverse effects on landscape and coastal character, landscape designations and some viewpoint locations. However, such effects were found to be localised and in no instances were these effects considered to be unacceptable. Variation 01 resulted in a reduction in WTG number from seven to six and a reduction in WTG footprint area which provided a reduction in extent of the array across the horizon. Under the three WTG design scenarios proposed for this variation there will be no increase in WTG number from Variation 01 and no changes to the WTG footprint area. The proposed variation will result in a slight increase in rotor diameter compared to Variation 01, however, in all three WTG design scenarios proposed, maximum rotor diameter, tip height and hub height remain the same or reduced compared to the Original EIAR. As a result, the potential impacts on seascape, landscape and visual amenity will be the same or reduced compared to those assessed within the Original EIAR. No new impacts are identified as a result of the design refinements and therefore, the findings of the Original EIAR remain valid. To understand the nature of the proposed design refinements on Seascape, Landscape and Visual receptors, a comparison of the proposed design	Yes Section 6 of this Screening Report provides a SLVIA comparative assessment, and demonstrates that there is no appreciable difference in effects due to the proposed WTG design refinements. Therefore, the proposed parameter changes remain acceptable in terms of SLVIA.

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
				refinements with Variation 01 and the Original EIAR is provided within this Screening Report.	
Marine Archaeology and Cultural Heritage	<u>Construction/decommissioning</u> - Loss of or damage to known marine and intertidal historic environment assets - Loss of or damage to unknown marine and intertidal historic environment assets - Loss of or damage to known submerged prehistoric landscapes <u>Operation and maintenance</u> - Loss of or damage to known marine historic environment assets - Loss of or damage to unknown marine historic environment assets - Loss of or damage to known submerged prehistoric landscapes - Long term changes to the setting of onshore historic environment assets that reduces their value	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	No significant adverse effects were identified on marine archaeology and cultural heritage within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result, there will be no change to the potential impacts on marine archaeology and cultural heritage compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are identified as a result of the WTG design refinements, and therefore the findings of the Original EIAR and Variation 01 remain valid.	No
Other Users of the Marine Environment	<u>Construction-decommissioning</u> - Disturbance of subsea cables - Disruption to DSRL remedial monitoring activities - Interference to the operations of Space Hub Sutherland <u>Operation and maintenance</u> - Disturbance of subsea cables - Obstruction of DSRL remedial monitoring activities - Adverse impacts on telecommunications systems	Negligible to Minor Effects Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> No significant adverse effects were identified on other users of the marine environment within the Original EIAR or Variation 01. Under the three WTG design scenarios proposed, there will be no increase in WTG number or the number of substructures, mooring lines, anchors, inter array and export cables, or scour/cable protection required. As a result there will be no change to the potential impacts on other users of the marine environment compared to those assessed within Variation 01 and impacts compared to the Original EIA remain reduced. No new impacts are	No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	- Interference to the operations of Space Hub Sutherland			identified as a result of the WTG design refinements, and therefore the findings of the Original EIAR and Variation 01 remain valid.	
Socioeconomics, Recreation and Tourism	<u>Construction/operation and maintenance and decommissioning</u> - Project activities leading to an effect on employment - Project activities leading to an effect on economic output (GVA) - Project activities leading to an effect on demand for housing, recreation resources and other local services - Project activities leading to an effect on the volume and/or value of tourism	Negligible to Major Effects (beneficial) Residual Effect Significant (beneficial) Negligible to Moderate Effects (adverse) Residual Effect Not Significant (adverse)	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> The Original EIAR resulted in the identification of significant beneficial impacts as a result of the Project in terms of employment within Caithness and the Highland area. No significant adverse effects were identified. No new impacts or changes of effect were identified through Variation 01. The proposed WTG design refinements will not change construction employment requirements or the construction programme. Therefore, no new impacts are identified as a result of the WTG design refinements proposed and the findings of the Original EIAR and Variation 01 remain valid.	No

Climate Change and Carbon	<u>Climate resilience review</u>
	- Direct impacts of climate change during the operation and maintenance phase on the Project
	  ○ Impacts of extreme weather events
	  ○ Impacts from changes in weather patterns or sea conditions
	  ○ Impacts from sea level rise and coastal erosion
	
	<u>In-combination Climate Impact Assessment</u>
	- Inter-related impacts of climate change and the Project on relevant receptors during the operation and maintenance phase
		<u>Climate Resilience Review:</u>
		
		No Significant Effects identified
		
		<u>In-combination Climate Impact Assessment:</u>
		
		No Significant Effects Identified
		
		<u>Blue Carbon Assessment:</u>
			No significant adverse effects were identified within the Original EIAR.
			
			No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid
				<u>Design Refinements</u>
				WTG number and associated project infrastructure remains reduced as for Variation 01, compared to the Original EIAR. The climate resilience of the Project to external factors will remain as assessed within the Original EIAR and Variation 01. Potential effects on blue carbon habitats also remain reduced. The Project will continue to make a positive contribution to the UK carbon budget, avoiding emissions that would have been associated with more carbon-intensive forms of electricity. The overall generating capacity of the Project is not changing and therefore estimates of generation and offset remain valid.
					No

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
	○ Inter-related impacts of extreme weather events ○ Inter-related impacts from changes in weather patterns or sea conditions ○ Inter-related impacts of sea level rise and coastal erosion <u>Blue Carbon Assessment</u> - Direct blue carbon habitat loss/disturbance from the place of the Project subsea infrastructure during the lifecycle of the Project - Cumulative effects from the Project and other projects resulting in blue carbon habitat loss/disturbance from the placement of subsea infrastructure <u>Carbon Assessment</u> - Impact of the Project on the global climate receptor utilising ○ Calculated carbon life cycle emissions resulting from the Project ○ The UK Carbon budgets as a proxy for the global climate	No Significant Effects Identified <u>Carbon Assessment:</u> No Significant Effects Identified		No new impacts are identified as a result of the WTG design refinements proposed and therefore, the findings of the Original EIAR and Variation 01 remain valid.	

Receptor Topic	Impacts Assessed in Original EIAR	Residual Effect Predicted in Original EIAR	Conclusion Variation 01	Implication of Proposed Additional Design Refinements	Further information required
Risk of Major Accidents and Disasters	<u>Internal Project Risks</u> - Lightning strikes - Major industrial accidents <u>Internal Project Risks</u> - Electrical systems failure - Marine Hazards - Subsea operations	Broadly Acceptable to Tolerable with Embedded Mitigation Residual Effect Not Significant	No significant adverse effects were identified within the Original EIAR. No new impacts are identified as a result of the design refinements and the findings of the Original EIAR remain valid	<u>Design Refinements</u> Within the Original EIAR and Variation 01 no risks were identified for the Project that could result in a major accident or disaster and no significant effects on receptors were identified, due to embedded mitigation and management plans in place. The proposed WTG parameter refinements will not result in any changes to embedded mitigations or to the risk of a major accident or disaster occurring. Therefore, the findings of the Original EIAR and Variation 01 remain valid.	No

5 Recommendations

5.1 Environmental Receptor Comparison

The environmental receptor comparison presented in Section 3, considers the potential effects of the proposed WTG design refinements on the environmental topics assessed within the Original EIAR and Variation 01 application. As set out in Table 4.2, the potential impacts on the majority of environmental receptors will remain the same as Variation 01 and reduced compared to the Original EIAR. No new impacts are identified as a result of the WTG design refinements proposed, and therefore, the findings of the Original EIAR and Variation 01 remain valid.

However, the comparison has identified the requirement for further information for both ornithology and seascape, landscape and visual receptors to understand the potential implications of the proposed design refinements for these receptors and this is described in the following sections.

5.1.1 Ornithology Addendum

No significant adverse effects were identified on marine ornithology within the Original EIAR or Variation 01 application. The proposed design refinements result in a rotor swept area that is smaller than that presented in the Original EIAR and the Variation 01 application for WTG design scenarios 2 and 3, and a small increase in rotor swept area for WTG Scenario 1 (0.6% compared to the Original EIAR and 12% compared to Variation 01). Minimum air gap is reduced for all three WTG Scenarios, whilst blade width, rpm and operational time are also reduced, based on specific turbine machines and further analysis of site specific data. The WTG footprint area remains the same in all three WTG design scenarios and no new impacts are identified as a result of the design refinements proposed. To understand the implications of the proposed WTG design refinements on marine ornithology receptors an addendum is provided with this Screening Report (Appendix 1).This confirms that there is no appreciable difference in environmental effects and, therefore, there is no change in significant effects identified.

The Original RIAA for the Project concluded no AEOSI on conservation objectives for designated sites or qualifying features, either alone or in combination with other plans and projects. However, the Appropriate Assessment (AA) undertaken for the Project raised concerns with regards to collision risk and displacement effects and potential AEOSI for kittiwake and puffin features of the NCC SPA. In each case concerns raised by NS and MD-LOT on AEOSI for both kittiwake and puffin related to cumulative impacts arising in combination with other offshore wind farm developments which have already been consented. No AEOSI was identified resulting from the Project alone.

Variation 01 assessed the potential implications of the proposed design refinements on kittiwake and puffin features of the NCC SPA. Design refinements included a reduction in WTG number from seven to six, a reduction in WTG footprint area from 10 km^2 to 5.85 km^2 and an extension to the operational life of the Project from 10 to 25 years. The additional assessment provided within Variation 01 demonstrated that there would be no AEOSI on conservation objectives for either kittiwake or puffin features of the NCC SPA, as a result of the design refinements proposed.

The HRA process falls outside of the requirements of this Screening Report. However, to ensure previous concerns on protected sites are considered, Appendix 1 considers the proposed additional design refinements and the potential implications of these for ornithological features. The addendum focuses on kittiwake features of the NCC SPA which were identified as a concern when considered in combination with other plans and projects within the AA for the Original Application. There are no changes proposed to the WTG footprint area and therefore there will be no increase in displacement impacts to any species.

Updated ornithological modelling for kittiwake features of the NCC SPA is provided, and includes updated collision risk modelling (CRM), distributional response modelling and population viability analysis (PVA). While the WTG footprint area remains the same as the consented project, in response to noted conservatism within the Variation 01 AA, and recent empirical evidence of non-avoidance by kittiwake of areas around small offshore wind farms (Pollock et al., 2024), revised distributional response (displacement and barrier effects) modelling has also been undertaken using the SeabORD tool. This revision uses a smaller potential displacement area around the WTG footprint area (the 'Footprint border'), compared to modelling undertaken for Variation 01.

Results of the modelling are provided using both updated CRM alone, and updated CRM and distributional response modelling within PVA. In each case, the results demonstrate that there is no appreciable difference in environmental effects for kittiwake from those which were approved in Variation 01 for the consented project and any change in effect would be so small as to be clearly insubstantial.

5.1.2 SLVIA Comparison

The Original EIAR concluded some significant adverse effects on landscape and coastal character, landscape designations and some viewpoint locations. In each case, effects were found to be localised and in no instances were these effects considered to be unacceptable. Under the three WTG design scenarios the proposed WTG number remains lower than within the Original EIAR and the same as currently consented through Variation 01. Maximum rotor diameter, tip height and hub height also remain the same or reduced compared to the Original EIAR. As a result, the potential impacts on seascape, landscape and visual amenity will be the same or reduced compared to those assessed within the Original EIAR. No new impacts are identified as a result of the design refinements and, therefore, the findings of the Original EIAR remain valid.

To understand the nature of the design refinements proposed and potential implications for seascape and landscape receptors, a comparison of the proposed design refinements and the conclusions of the Original EIAR and Variation 01 is provided in Section 7 of this Screening Report, with further details provided in Appendix 2.

6 Ornithology Modelling Update

6.1 Introduction

This section summarises the potential environmental effects upon kittiwake features of the NCC SPA arising from the proposed additional design refinements to the Project. The proposed WTG design refinements which are relevant to ornithology include:

- Increase in rotor diameter from 1 x WTG with rotor diameter of 220 m and 5 x WTGs with rotor diameter of 250 m to a maximum of 6 x WTGs with rotor diameter 260 m;
- Reduction in air gap from 35 m to a minimum of 28 m;
- Reduction in blade width from 7 m to a maximum of 6.93 m;
- Reduction in rpm from 8 to a maximum of 6.61; and
- Reduction in operational time from 95% (operational) and 5% (downtime) to 88% (operational) and 12% (downtime).
- In all scenarios there is no change to maximum WTG footprint area.

To consider the effects of the proposed design refinements on kittiwake features of NCC SPA, Natural Power Consulting (NPC) have undertaken ornithological analysis of the proposed WTG design refinements for the three WTG design scenarios proposed and compared the results of these with the assessments presented in Variation 01. Updated ornithological modelling includes updated CRM, distributional response modelling (SeabORD) and PVA.

Full analysis is provided in Appendix 1, with the key findings summarised below.

6.1.1 Project Alone Effects

For the Project alone, annual collision impacts for kittiwake apportioned to NCC SPA for Variation 01 was **2.24**. Results for Variation 02 design scenarios are as follows:

- Design Scenario 1: 6 x WTGs with rotor diameter 260 m and air gap of 30 m: Annual collision impacts for kittiwake apportioned to NCC SPA are **2.87 (CI: 1.53 – 4.80).**
- Design Scenario 2: 5 x WTGs with rotor diameter 260 m and air gap of 28 m: Annual collision impacts for kittiwake apportioned to NCC SPA are **2.9 (CI: 1.55 – 4.82).**
- Design Scenario 3: 6 x WTGs with rotor diameter 236 m and air gap of 28 m: Annual collision impacts for kittiwake apportioned to NCC SPA are **2.79 (CI: 1.49 – 4.64).**

For the Project alone, PVA outputs for Variation 01 for kittiwake apportioned to NCC SPA provided a counterfactual of population size **(CPS) of 0.983 (CI: 0.937 – 1.030)** and a counterfactual of population growth rate **(CGR) of 0.999 (CI: 0.997 – 1.000)** over 25 years. PVA results for Variation 02 design scenarios, using updated collision risk modelling, are as follows:

- Design Scenario 1: 6 x WTGs with rotor diameter 260 m and air gap of 30 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.982 (CI: 0.936 – 1.033)** and a CGR of **0.999 (CI: 0.998 – 1.001)**.
- Design Scenario 2: 5 x WTGs with rotor diameter 260 m and air gap of 28 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.982 (CI: 0.936 – 1.033)** and a CGR of **0.999 (CI: 0.998 – 1.001)**.
- Design Scenario 3: 6 x WTGs with rotor diameter 236 m and air gap of 28 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.982 (CI: 0.935 – 1.033)** and a CGR of **0.999 (CI: 0.998 – 1.001)**.

Such differences in population predictions between Variation 01 and each of the design scenarios for Variation 02 would not be measurable against background levels of variability within the kittiwake population of NCC SPA.

When updated distributional response modelling (SeabORD) is considered alongside updated CRM, to account for precautionality within the assessments, PVA demonstrates a reduction in population level impacts for Variation 02 compared to Variation 01, over 25 years, for all design scenarios proposed:

- Design Scenario 1: 6 x WTGs with rotor diameter 260 m and air gap of 30 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.992 (CI: 0.946 – 1.043)** and a CGR of **1.000 (CI: 0.998 – 1.001)**.

- Design Scenario 2: 5 x WTGs with rotor diameter 260 m and air gap of 28 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.993 (CI: 0.944 – 1.044)** and a CGR of **1.000 (CI: 0.998 – 1.001)**.

- Design Scenario 3: 6 x WTGs with rotor diameter 236 m and air gap of 28 m: PVA outputs for kittiwake apportioned to NCC SPA provides a **CPS of 0.993 (CI: 0.945 – 1.042)** and a CGR of **1.000 (CI: 0.998 – 1.001)**.

As for Variation 01, the above CPS values should be considered in light of the precaution that is included within the assessments including:

- Recent counts of the NCC SPA kittiwake population (2023) are notably larger than those considered in relation to the consented Variation 01 application (which utilised count data from 2015 and 2016). In 2015/16 the NCC SPA population of breeding kittiwake was estimated to be 5,571 Apparently Occupied Nests (AON) (Burnell *et al.,* 2023), compared to the comparable figure of approximately 8,197 AON. The most important potential consequence of this updated colony count data in relation to Variation 02 Design Scenarios is associated with how PVA outputs are interpreted. Previously (for Variation 01), the kittiwake population of NCC SPA was viewed as rapidly declining, and this trend is likely to have weighed heavily in considerations as to whether predicted PVA output values would equate to potential AEOSI for that population. The rationale for this being that, where a population is declining, smaller levels of additional mortality would be required to compromise the conservation objectives regarding that feature of the SPA. Conversely, where a population is increasing, it follows that larger effects to the population would be required to compromise this conservation objective. Consequently, when the kittiwake population of NCC SPA is viewed as increasing instead of decreasing (or at least decreasing much more slowly than previously thought), it follows that lower (i.e less precautionary) PVA output values may be used to support decisions of no AEOSI.

- Post construction monitoring of Beatrice wind farm found no evidence of distributional responses by kittiwake (Trinder, 2023), although some flight height response was detected. Similarly, tracking studies of breeding kittiwake from the Buchan Ness to Collieston Coast SPA found no evidence of avoidance with buffer areas surrounding several small operational offshore wind farm projects off the Aberdeenshire coast (Pollock *et al.,* 2024). This evidence suggests that displacement impacts for this species are much smaller than modelling outputs and this is mirrored in sentiment expressed within the Appropriate Assessment for Variation 01 where Scottish Ministers highlighted that aspects of displacement assessment '…could be overly precautionary'.

6.1.2 In combination Effects

When considering the Project in-combination with other wind farm projects, for Variation 01, Scenario 4d (including PFOWF in addition to sites in the Moray Firth and selected other North Sea projects, but not Berwick Bank OWF) was agreed by NatureScot and the Scottish Ministers to be the most appropriate combination of developments for inclusion within in-combination assessment. With regard to in-combination Scenario 4d, for Variation 02, there is no appreciable difference to the Project alone effects identified for kittiwake features at NCC SPA compared with Variation 01.

When using updated CRM outputs, PVA demonstrates a maximum decrease in CPS of 0.001 over 25 years (**0.908** for all Variation 02 Design Scenarios compared to **0.909** for Variation 01), while CGR values remain

unchanged (**0.996**)[2]. When using updated CRM and SeabORD outputs PVA demonstrates a minimum increase in CPS of 0.009 (from 0.909 for Variation 01 to 0.918 for all Variation 02 Design Scenarios), while CGR increases from 0.996 for Variation 01 to 0.997 for all Variation 02 Design Scenarios[3].

The above values indicate that there is no appreciable change to Project alone impacts due to the design refinements proposed, and any increase in impacts will be so small as to be insubstantial. Therefore, the conclusions of any in-combination assessment will be unchanged from that presented in Variation 01 for the consented project.

For completeness, it is noted that several offshore wind farm projects with potential connectivity to the kittiwake population of NCC SPA have submitted consent applications since the submission of Variation 01. Those projects have, in accordance with the appropriate HRA process, considered either the Variation 01 or original consented designs (the latter, although superseded, is more conservative than the former) within their in-combination assessments. Consequently, the insubstantial changes to Variation 01 project alone impacts resultant from the design refinements proposed will not appreciably alter the conclusions of assessments submitted subsequent to Variation 01. Those projects are:

- Outer Dowsing Offshore Wind Farm
- Salamander Offshore Wind Farm (consented 21 August 2025)
- Ossian Offshore Wind Farm
- Caledonia Offshore Wind Farm
- Muir Mhòr Offshore Wind Farm
- Cenos Floating Offshore Wind farm
- West of Orkney Wind Farm (consented 27 June 2025)

Additionally, Berwick Bank OWF, for which application documents were submitted prior to Variation 01, has also recently received consent (31 July 2025). This consent is conditional upon the agreement of a derogation case which will include measures to compensate identified impacts resultant in AEOSI to the kittiwake feature of NCC SPA. Therefore, in accordance with recent NS recommendations, where compensated impacts are not included within in-combination assessment impact totals, it is assumed that Berwick Bank will not contribute to in-combination impacts for assessments relating to the kittiwake feature of NCC SPA. As such, consideration of Scenario 4d (i.e. without inclusion of Berwick Bank OWF) remains the most appropriate option for in-combination assessment.

It is also noted that the progression of Hornsea 4 OWF which was previously included as a component of in-combination Scenario 4d for Variation 01, has recently ceased (May 2025), and this project will not progress in its present form. Hornsea 4 OWF was estimated to contribute a total of 0.84 breeding adult kittiwake

[2] 95% Confidence Intervals were similarly comparable. Var 01: CPS CI = 0.863 – 0.955, CGR CI = 0.994 – 0.998; Var 02 DS 1: CPS CI = 0.865 – 0.955, CGR CI = 0.995 – 0.998; Var 02 DS 2: CPS CI = 0.865 – 0.955, CGR CI = 0.995 – 0.998; Var 02 DS 3: CPS CI = 0.863 – 0.956, CGR CI = 0.995 – 0.998.

[3] 95% Confidence Intervals were similarly comparable. Var 01: CPS CI = 0.863 – 0.955, CGR CI = 0.994 – 0.998; Var 02 DS 1: CPS CI = 0.873 – 0.963, CGR CI = 0.995 – 0.998; Var 02 DS 2: CPS CI = 0.872 – 0.965, CGR CI = 0.995 – 0.998; Var 02 DS 3: CPS CI = 0.873 – 0.966, CGR CI = 0.995 – 0.998.

mortalities to the NCC SPA population per annum. Impacts associated with Hornsea 4 OWF remain within Scenario 4d in relation to in-combination assessment for Variation 02, introducing an additional degree of conservatism to the outcomes of those assessments.

Since the submission of Variation 01, it is also noted that the Dogger Bank South Offshore Wind Farms, DBS East and DBS West, have, submitted a development consent order application to the Secretary of State which details the apportioning of a total of 1.8 breeding adult kittiwakes to NCC SPA. This application does not, however, include an in-combination assessment for impacts to kittiwake at NCC SPA (as it follows the assessment approach preferred by Natural England, given they are the primary SNCB for that project). Should these projects subsequently submit additional information in this regard, it is assumed that the Project would be considered within their in-combination assessment for impacts to kittiwake at NCC SPA.

It is also noted that Culzean Floating Pilot Project has submitted a Marine Licence variation to its consented design since the submission of Variation 01. Although this project has potential connectivity to the kittiwake population of NCC SPA, the Project comprises a single turbine and, therefore, total impacts to kittiwake are extremely small (<0.1 individuals per annum), and considerations of in-combination effects have not been required for this project.

Furthermore, a number of wind farm projects with potential connectivity to the kittiwake population of NCC SPA have submitted scoping documents since the submission of Variation 01. Should those projects submit consent applications, they will be required, in accordance with appropriate HRA process, to consider the PFOWF within their in-combination assessments. Consequently, the insubstantial changes to Project-only impacts resultant from the design refinements proposed will not appreciably alter the conclusions of future assessments.

Finally, where consent applications submitted after the submission of Variation 01 attribute non-negligible impacts to the kittiwake population of NCC SPA, it is assumed that those projects would be required to compensate for those impacts. Consequently, and in accordance with recent NS recommendations where compensated impacts are not included within in-combination assessment impact totals, it is assumed that those projects would not contribute to in-combination assessments relating to the kittiwake receptor of NCC SPA.

In conclusion, the proposed Project design refinements for Variation 02 and the reassessment of impacts for kittiwake features of the NCC SPA demonstrates that there is no appreciable difference in the level of effects identified from that which was accepted for Variation 01, and that any increase in impact will be so small as to be insubstantial. As for Variation 01, this supports a conclusion of no AEOSI for the NCC SPA.

7 SLVIA Comparison

7.1 Introduction

This section describes the key sensitivities and potential environmental effects upon seascape, landscape and visual receptors arising from the proposed additional design refinements to the Project. The proposed WTG design refinements which are relevant to SLVIA include:

- Increase in rotor diameter from 1 x WTG with rotor diameter of 220 m and 5 x WTGs with rotor diameter of 250 m to a maximum of 6 x WTGs with rotor diameter of 260 m;

- In all scenarios the maximum hub height and tip height remain the same as the Original Application and current s36 consent (as varied) (maximum hub height 190 m and maximum tip height 300 m).
- In all scenarios there is no change to the maximum WTG footprint area.

To consider the effects of the proposed design refinements on SLVIA, SLR Consulting have undertaken a comparison of the proposed WTG design refinements between the Variation 01 application and the Original EIAR. SLR acquired OPEN in 2024 and therefore assessment methodologies remain the same as those for Variation 01 and the Original EIAR. Comparative wirelines have also been developed to illustrate the differences in appearance between the Original Application, the currently consented project (incorporating Variation 01) and the proposed Variation 02, in respect of ten of the 14 viewpoints used within the original SLVIA assessment.

It should be noted the parameters essentially present a return to the parameters assessed within the Original EIAR, albeit with six turbines, as currently consented, instead of the seven included in the Original EIAR and s36 Consent. With respect to SLVIA, the effects of the original project parameters were considered to be acceptable.

The full comparison, including wirelines, is included in Appendix 2, with the key findings summarised below.

7.2 Project-alone Effects

The consented project (Variation 01) and the proposed Variation 02 comprise the same number of WTGs located in the same positions, and therefore, the focus of the comparative assessment is the incremental difference between the dimensions of the WTGs. A detailed comparative assessment of the consented project and Variation 02 is presented in Appendix 2, Table B, with conclusions summarised below.

The smaller dimensions of the one smaller WTG in the consented project, make it appear further away. While the increases in dimensions for Variation 02 for this WTG are more notable, these simply make the WTG appear the same size as the other WTGs and more part of the group than appearing more distant. This change, therefore, has a positive rather than a negative effect on the appearance of the WTGs, by increasing consistency between the WTGs. Comparative wirelines show the very limited difference that the potential incremental height increase of the WTGs would have, for all WTGs, and the findings of the comparative assessment are that these differences would not be sufficient to alter the rating of magnitude of change or change a not significant effect into a significant effect. This conclusion is consistent with the Variation 01 application which stated that, conversely, the incremental reduction in height would not alter the rating of magnitude of change or change a significant effect into a not significant effect.

The Variation 01 application presented a layout in which the WTGs were notably more compact than presented in the Original EIAR. As the Variation 02 WTGs are in the same locations as the WTGs for the consented project, the improvements of the reduced footprint are carried over into Variation 02 compared to the Original EIAR.

The other factor considered in the comparative assessment is the additional baseline influence from the Limekiln Wind Farm and Extension. This affects the assessment from viewpoints in which Limekiln Wind Farm and Extension have a notable close-range effect, establishing a context in which the influence of the more distant Project would be moderated.

7.3 Cumulative Effects

The cumulative assessment presented in this Screening Report provides a comparison with the assessment presented in respect of the Original EIAR. Information has been collected to present the current cumulative context in the Study Area (the associated 50 km around the Array Area), as defined for the Original Application and the Consented Project (Variation 01). A reassessment of the cumulative effects was not undertaken as part of the Variation 01 application, as there were no notable changes to the cumulative baseline at the time of application which would have notably altered the cumulative assessment.

The methodology for the comparative cumulative assessment follows the methodology set out in the SLVIA of the Original EIAR. All operational and under construction wind farms have been included as part of the baseline situation. The cumulative effect of the Project in conjunction with the operational and under construction wind farms and other large-scale energy developments is also considered as part of the baseline in relation to the following cumulative scenarios.

- Cumulative Scenario 1 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction and **consented** wind farms and other large-scale energy developments.
- Cumulative Scenario 2 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction, consented and **application or appeal stage** wind farms and other large-scale energy developments.
- Cumulative Scenario 3 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction, consented, application and relevant **scoping stage** wind farms and other large-scale energy developments.

The most notable changes to the onshore cumulative context at Scenario 1 is the change in status of Limekiln Wind Farm from consented to operational and Limekiln Extension from application to operational. Strathy Wood and Strathy South have changed in status from consented to under construction. Offshore, the change in status of the West of Orkney Wind Farm is the most notable cumulative influence in this Scenario.

In Scenario 2 there has been some alteration to the onshore cumulative wind farm context with the removal of Drum Hollistan from the planning system and applications made for Melvich and Kirkton Energy Park (at appeal) to the west of the A897, south of Melvich Bay. The scoping stage Cairmmore Hill Resubmission also came forward as an application and is now at appeal. Scenario 3 also considers the addition of Ackron Resubmission (currently at scoping stage) as part of the cumulative context due to its proximity to the Consented Project and coastline. A detailed comparative assessment of Variation 02 and the Original EIAR is presented in Appendix 2, Table C, with conclusions summarised below.

Essentially the Project will be added into a cumulative context in which onshore wind farm development already has an influence and in which offshore wind farm development will also have an influence in Scenarios 1, 2 and 3. This baseline and cumulative influence generally moderates the additional influence of the Project, particularly as it comprises a very small number of WTGs, for example, compared to the much larger West of Orkney Wind Farm.

Although the status of some of the cumulative projects has changed and some onshore wind farm projects have been removed from, or added to, the planning system, the findings of the cumulative comparative assessment remain generally consistent with the SLVIA for the Original EIAR with only changes in the assessment of magnitude of change and no changes to the significance of effect. This is owing to a similar context in which the offshore cumulative context is defined by the West of Orkney Wind Farm, albeit changed in status from scoping to consented; and the onshore context is defined by a combination of Limekiln and

Extension, Baillie Hill and Forss, all of which have a presence and influence along the north coast of Caithness and Sutherland.

This is with the exception of the assessments for Viewpoint 1 Beinn Ratha, Viewpoint 2 Strathy Point Car Park and Viewpoint 3: Portskerra /Melvich where primarily the change in status of the Limekiln and Limekiln Extension onshore wind farms and the West of Orkney Wind Farm do result in some instances of change to the cumulative assessment. In the Scenario 1 assessment for Viewpoints 2 and 3 the magnitude of change is increased to medium resulting in a significant (moderate) effect. The cumulative magnitude of change in Scenario 2 is now assessed as medium for Viewpoints 1 and 2 resulting in moderate significant cumulative effects, which also largely occur as a result in the change in status of the West of Orkney Wind Farm.

It is highlighted that these are not new or additional effects of the Project as such effects were assessed for the Original EIAR when it was assessed in the cumulative context of West of Orkney Wind Farm in Scenario 3. Such effects were considered acceptable in the consenting of the Project, which had a larger footprint (and horizontal field of view) than Variation 02.

Furthermore, and in line with EIA requirements, any subsequent proposals for onshore or offshore wind farms within the study area will have to consider the cumulative effect with the Project. This was the case for the West of Orkney Wind Farm, which is now consented, and which considered the Project within its cumulative assessment (including the additional information submitted in October 2024). For this assessment the design parameters from the Original EIAR were used, i.e. seven WTGs up to 300 m tip height, over a larger geographical extent, which provides a more precautionary assessment, compared to Variation 02 which proposes a maximum of six WTGs.

8 Screening Conclusions and Recommendations

HWL is seeking to vary the existing s36 Consent (as varied) and associated wind farm marine licence for the Project to consent the following project parameters:

- Six floating offshore WTGs with:
    - A maximum hub height of 190 m above highest astronomical tide (HAT),
    - A maximum height to blade tip of 300 m above HAT,
    - A maximum rotor diameter of 260 m and,
    - A minimum blade tip clearance from mean sea level (MSL) of 28 m, save where six WTGs with a rotor diameter over 236 m are constructed, when it must be a minimum of 30 m).
- Six associated floating substructures;
- Nine mooring lines for each floating substructure, 54 in total;
- Nine anchors or piles for each floating substructure, 54 in total;
- Seven inter-array cables (dynamic and static); and
- Associated cable and scour protections.

Additional WTG design refinements include a reduction in blade width, rpm and operational time, as presented within this Screening Report.

This Screening Report has been submitted in support of an application to vary the s36 Consent under Section 36C of the Electricity Act 1989. It has provided an overview of the potential environmental effects of the updated project design by comparison with the consented project design as presented in Variation 01 and the Original EIAR.

The information presented in this Screening Report demonstrates that there will be no appreciable difference in environmental effects from the proposed WTG refinements for Variation 02, to those assessed in the Variation 01 application submitted in October 2023 and the Original EIAR submitted in August 2022. There will be no additional or greater significant effects from this proposed variation, than those previously assessed, and any change in effect will be so small as to be insubstantial. Therefore, the proposed variation does not constitute an EIA development and an EIA is not required.

Furthermore, with consideration of the Original RIAA for the Project and the addendum provided with Variation 01, the information provided with this Screening Report demonstrates that there would be no appreciable difference in Project effects for kittiwake features of the NCC SPA as a result of the design refinements proposed and, as for the consented project, this supports an assessment of no AEOSI.

References

Burnell D., Perkins A.J., Newton S.F., Bolton M., Tierney T.D., and Dunn T.E. (2023) Seabirds Count: a census of breeding seabirds in Britain and Ireland (2015 – 2021). Lynx Nature Books, Barcelona.

HWL (2022a). Pentland Floating Offshore Wind Farm, Environmental Impact Assessment Report.

HWL (2022b). Pentland Floating Offshore Wind Farm, Report to Inform Appropriate Assessment.

HWL (2023), Pentland Floating Offshore Wind Farm, Section 36C Variation Application Report.

MD-LOT (2023) Marine Directorate Licensing Operations Team's Assessment of the Project's Implications for Designated Special Areas of Conservation and Special Protection Areas In View of the Site's Conservation Objectives

MS-LOT (2019). Energy consents: applications for variation of section 36 consents guidance. Available at https://www.gov.scot/publications/applications-variation-section-36-consents/documents

Pollock C.J., Johnston D.T., Boersch-Supan P.H., Thaxter C.B., Humphreys E.M., O'Hanlon N.J., Clewley G.D., Weston E., Shamoun-Baranes J. and Cook A.S.C.P. (2024) Avoidance and attraction responses of kittiwakes to three offshore wind farms in the North Sea. Marine Biology, 171: 217.

Scottish Ministers (2023) Decision Notice for the Section 36 Consent for the Construction and Operation of the Pentland Floating Offshore Wind Farm

The Electricity Act 1989

The Electricity Generating Stations (Applications for Variation of Consent) (Scotland) Regulations 2013 ('the 2013 Regulations') December 2013

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ('the EIA Regulations')

The Marine and Coastal Access Act, 2009

The Marine Scotland Act 2010

The Marine Works (EIA) (Scotland) Regulations 2017 ('the Marine Works EIA Regulations'),

The Town and Country Planning (Scotland) Act 1997

Trinder, M. (2023). Beatrice Offshore Wind Farm: Year 2 Post construction ornithological monitoring report. Report from MacArthurGreen for BOWL.

https://marine.gov.scot/ml/pentland-floating-offshore-wind-farm (last accessed 16/05/25)

Black-legged kittiwake (Rissa tridactyla) | JNCC - Adviser to Government on Nature Conservation. Accessed 5 May 2025.

Appendix 1 – Updated Ornithological Modelling

Pentland Floating Offshore Wind Farm

Ornithology Assessment update

8 July 2025

OUR VISION

Working to create a world powered by renewable energy

natural power

Document history

Author	James Robbins, Principal Ecological Modeller Graeme Cook, Principal Ornithologist Chris Pendlebury, Director of Offshore Consenting & Environment	28/07/2025
Checked	Finlay Richardson, Senior Ecological Modeller, Virginia Iorio, Senior Ecological Modeller, Gillian Vallejo, Principal Ecological Modeller	28/07/2025
Approved	Graeme Cook, Principal Ornithologist Chris Pendlebury, Director of Offshore Consenting & Environment	16/09/2025

Client Details	
Contact	Tamsin Watt and Peter Moore
Client Name	Highland Wind Limited
Address	10 George Street, Edinburgh, EH2 2PF

Local Office:

Ochil House
Springkerse Business Park
Stirling
FK7 7XE
SCOTLAND
UK
Tel: +44 (0) 1786 542 300

Reg No: SC177881

Registered Office:

The Natural Power Consultants Limited
The Green House
Forrest Estate, Dalry
Castle Douglas, Kirkcudbrightshire
DG7 3XS

VAT No: GB 243 6926 48

Contents

1. Introduction 4
2. Methods 5
   - 2.1. Collision risk modelling 5
   - 2.2. Distributional response modelling 7
   - 2.3. Population Viability Analysis 9
3. Results 13
   - 3.1. Collision risk modelling 13
   - 3.2. Distributional response modelling 17
   - 3.3. Project-only impacts for use in population modelling 18
   - 3.4. In-combination impacts for use in population modelling 20
   - 3.5. Population modelling 22
4. Conclusions 24
5. References 26

1. Introduction

Highland Wind Limited (HWL) intends to request an additional variation to the Section 36 (s36) consent and the associated wind farm Marine Licence for the Pentland Floating Offshore Wind Farm (PFOWF 'the Project') granted in June 2023 and subsequently varied in April 2024 (Variation 01). This additional variation application (Variation 02) is required to refine the wind turbine generator (WTG) parameters for the Project to secure the flexibility required to respond to evolving market conditions and WTG design and supply chains. The drivers behind this include current and projected WTG availability, global supply chain dynamics, and to provide greater stability and reliability of floating foundations. These changes have also reduced uncertainty in the impact assessments by allowing more accurate modelling of the potential final project design scenarios.

This report has been prepared to present the methods and results from collision risk and displacement modelling for the Project for available design options and WTG models with refined rotor diameters, design parameters and reduced airgap scenarios.

The ornithology assessment for the Variation 01 application focussed on collision risk and displacement impacts upon kittiwake and displacement impacts upon puffin as features of the North Caithness Cliffs (NCC) SPA, due to concerns of potential adverse effect in combination with other plans and projects raised within the Appropriate Assessment (AA) at application stage. No changes are proposed to the WTG footprint area for Variation 02 and this remains the same as that assessed for Variation 01 and the current project consents. As such, Variation 02 impacts upon puffin (a receptor for which in combination impact concerns relate only to displacement impacts – which are calculated from the footprint area) remain unchanged between Variation 01 and Variation 02. Subsequent modelling activities outlined within this report therefore focus upon comparing the impacts of Variation 02 Design Scenarios upon the kittiwake feature of NCC SPA to those estimated in relation to the consented design (Variation 01).

Variation 02 focusses upon three WTG Design Scenarios:

- Design Scenario 1: Six 18 MW WTGs, with rotor diameter 260 m
- Design Scenario 2: Five 18 MW WTGs, with rotor diameter 260 m
- Design Scenario 3: Six 15 MW WTGs, with rotor diameter 236 m

These three Variation 02 Design Scenarios are considered in collision risk models run for kittiwake for WTGs of airgap options ranging from 27 m to 35 m. Collision Risk Modelling (CRM) is undertaken using the most recent guidance around input parameters and apportioned to NCC SPA as per the process followed for the Variation 01 application.

In addition to revisions to CRM, in response to noted conservatism within the Variation 01 AA and recent empirical evidence of non-avoidance by kittiwake of areas around small Offshore Wind Farms (OWFs) (Pollock *et al*., 2024), revised distributional response (displacement and barrier effects) modelling has been undertaken using the SeabORD tool. This revision used a smaller potential displacement area around the WTG footprint area (the 'Footprint border' parameter within the SeabORD tool), compared to modelling undertaken for the Variation 01 application (HiDef, 2023).

Predicted impacts from Variation 02 Design Scenarios for selected airgap options are then used to simulate population-level consequences on growth rate and population size to kittiwake associated with NCC SPA over the lifetime of the Project using Population Viability Analysis (PVA). These outputs are compared to population-level consequences of consented levels of impact associated with Variation 01. This comparison is used to evidence that the following preferred Variation 02 Design Scenarios and associated airgap options are not appreciably different, in relation to impacts to the kittiwake feature of NCC SPA, to that previously assessed and considered acceptable for Variation 01 within the consented project:

- Design Scenario 1: 30 m airgap option
- Design Scenario 2: 28 m airgap option
- Design Scenario 3: 28 m airgap option

2. Methods

The following sections present the approaches to modelling undertaken for the Variation 02 ornithology assessment including CRM, distributional response modelling and PVA. In each case methods are presented and any deviations to Variation 01 modelling are highlighted. As detailed above, kittiwake was the focal species for this analysis.

2.1. Collision risk modelling

2.1.1. General model parameters

Stochastic collision risk models (sCRM) were run using the stochLAB package (Caneco *et al.*, 2022) in R (R core team, 2024), following the NatureScot (2025) guidance. Band Option 2 collision risk models were each run for 1000 iterations. The sCRM tool (Caneco *et al.*, 2022) allows the inclusion of a "large array correction", which accounts for a decay in bird densities at later rows within the wind farm. The large array correction was not used for the Project, as it is generally used for large wind farm sites (>100 turbines). Not using this correction also provides a more precautionary approach as it does not reduce densities of birds for later rows of turbines, and instead risk is estimated per turbine and assessed across the windfarm additively. The value used for the proportion of upwind flights was 0.5, as per NatureScot (2025) guidance. For information, the random seed (which is an arbitrary number) for all runs was set to 52.

2.1.2. Turbine parameters

Variation 02 Design Scenarios were modelled using refined turbine parameters from available machines and informed by site-specific wind speed data characteristics. Refined parameters include reductions in blade width and rotor speed, as well as an updated calculation of operational time.

Variation 02 Design Scenario parameters are presented in Table 2.1. Standard deviations are not available for the Pitch and Rotation speed windfarm parameters currently and these are therefore parameterised as deterministic values only (i.e. with no variation).

Table 2.1: Turbine parameters used for CRM for each Variation 02 Design Scenario

Parameter	Design Scenario 1	Design Scenario 2	Design Scenario 3
Scenario description	6 x 18 MW turbines	5 x 18 MW turbines	6 x 15 MW turbines
Number of turbines	6	5	6
Latitude (degrees)	58.65*		
Number of blades	3		
Rotor radius (m)	130	130	118
Air gap (m)*	27 – 35	27 – 35	27 – 35
Tidal offset	0	0	0
Blade width (m)	6.93	6.93	5.1
Pitch (degrees)	10	10	3.96
Rotation speed (rpm)	6	6	6.61

*Source: Provided by developer. *Latitude was measured in QGIS.*

The operational times of the wind farm assumed for CRMs for all Variation 02 Design Scenarios are presented in Table 2.2, based on information provided by the developer. This has been refined using high fidelity information for the Array Site including, wind speed data from deployed FLiDAR and hindcast data sets, as well as detailed information related to WTG cut-in (wind speed at which rotors will start turning) and cut-out speeds (wind speed at which rotors will stop turning to preserve integrity in high wind speeds), to define monthly operating time.

This has allowed the operational time versus downtime percentages to be refined, reflective of the time that wind speeds will be either too low or too high to allow the turbines to rotate. This has been combined with detailed information on downtime associated with servicing and repair scenarios, based on asset management and maintenance regimes of existing WTGs, to provide an accurate description of operational time versus downtime compared to the Original Application and Variation 01.

The maintenance downtime calculated is incorporated into operational time, and therefore downtime was parameterised as 0% for each month. For each of the WTG design scenarios the cut-in and cut-out speeds are the same and differences between operational and maintenance activities are not discernible. Therefore, the same operational/downtime has been applied in each design scenario.

Table 2.2: Monthly operational time values used for CRMs for all Variation 02 Design Scenarios. Values are presented to 3 decimal places for display purposes only, and were parameterised at 9 decimal place precision as provided by the developer

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean op. time (%)	89.705	86.278	82.400	88.757	87.657	86.310	85.391	87.029	89.553	93.125	91.189	88.953
Down-time*	0	0	0	0	0	0	0	0	0	0	0	0

*Source: Provided by developer. *Note that downtime estimates are included in operational times, and therefore are parameterised as zero.*

2.1.3. Species Biometric Parameters

The species-specific biometric parameters used in all models are presented in Table 2.3. Species biometric parameters were used in line with joint statutory nature conservation body guidance released in 2024 (JNCC, Natural England, Natural Resources Wales, NatureScot, 2024). Notable updates from previous runs for Variation 01 include the application of a standard deviation around flight speed, and an increase in nocturnal activity from 25% to 40%, in addition to the inclusion of a standard deviation around nocturnal activity. Avoidance rates used previously for the project were 0.993 for stochastic models, whereas here 0.9929 is used in-line with recent joint statutory nature conservation body guidance (JNCC, Natural England, Natural Resources Wales, NatureScot, 2024).

Table 2.3: Bird biometric data used for CRM (numbers in brackets are standard deviations).

Species	Body length (m)	Wingspan (m)	Flight speed (m/s)	Nocturnal activity (%)	Avoidance rate	Flight type
Kittiwake	0.39 (± 0.005)	1.08 (± 0.0625)	13.1 (± 0.4)	40% (± 12%)	0.9929 (± 0.0003)	Flapping

In order to present seasonal summaries, seasonal definitions were adopted to match those advised by NatureScot in recent applications, with the breeding season spanning mid-April – August inclusive, autumn migration September – December inclusive, and spring migration January – mid-April inclusive. This follows the breeding season definition

according to NatureScot (NatureScot, 2020), with Biologically Defined Minimum Population Scales non-breeding seasons being adapted from Furness (2015).

2.1.4. In-flight densities

Density estimates of birds in flight within the Array Area were derived from baseline Digital Aerial Survey data collected on site. Densities used in CRM for Variation 02 Design Scenarios were as per those previously used in Variation 01; i.e. these have not changed. CRMS were parameterised with a mean and standard deviation of birds in flight per km^2 in each month. Values used are presented in Table 2.4.

Table 2.4: Summary of in-flight densities within the Project Array Area used for CRM parameterisation.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly mean (n/km^2)	0.11	0.31	0.57	0.10	0.30	5.17	3.15	0.50	0.11	0.40	2.01	0.00
Standard deviation (SD)	0.20	0.40	0.29	0.20	0.07	1.93	1.13	0.29	0.14	0.60	1.11	0.00

2.1.5. Apportioning to North Caithness Cliffs SPA

Collision impacts estimated for Variation 02 Design Scenarios were apportioned to the NCC SPA, as per the approach followed for Variation 01, using the proportions presented in Table 2.5. Impacts estimated for each CRM iteration were multiplied by the season-specific apportioning rate, the proportion of the population estimated to be adults and the proportion of adults estimated to breed in any given year (termed 'non' sabbatical birds), to result in estimates of impacts attributed to breeding adults from NCC SPA, for each season. These distributions were used to calculate summary statistics of median and 95% confidence intervals of collision estimates to breeding adults at NCC SPA.

Table 2.5: Values used to apportion impacts to North Caithness Cliffs SPA

Season	Apportioning rate for all birds[1]	Proportion of the population expected to be adults[2]	Rate of non-sabbatical birds[3]	Apportioning rate to breeding adults[4]
Spring migration	0.028	0.6	0.9	0.01512
Breeding	0.717	0.95	0.9	0.613035
Autumn migration	0.023	0.6	0.9	0.01242

Source: [1]Taken from Table 17 in PFOWF application Marine Ornithology Technical Appendix 12.2 (HiDef, 2022), calculated from Furness (2015) for all birds in the BDMPS.[2]Taken from Furness (2015). [3]Adopted in-line with recent consent applications. [4]Calculated by multiplying the all-bird apportioning rate, by the adult proportion, and proportion of non-sabbatical birds.

2.2. Distributional response modelling

SeabORD (version 1.3) revisions in relation to Variation 02 Design Scenarios were run with the same parameters used by HiDef in the Variation 01 application (HiDef, 2023), with inputs reported in Technical Appendix D1 (HiDef, 2023). There are two differences to this modelling.

1) A windfarm footprint border (an additional area from which birds may be displaced) was assumed to be 0 km, as opposed to 2 km which was adopted in the previous assessment. As SeabORD does not allow an absolute of zero, 0.0001 km was used, equating to 10 cm, the lowest value SeabORD appears to allow.
2) The random seed (used to ensure reproducibility when stochasticity is present in models, so that results will be the same if the same seed is used, alongside all other inputs) likely differs from Variation 01, as the seed used by HiDef is not reported in the variation documentation, nor the original Environmental Impact

Assessment (EIA) technical appendices. Here, a seed of 52 is adopted, and the model has been re-calibrated to ensure that the range of prey values modelled are appropriate representations of a 'moderate' year for the seed used (see Section 2.2.3).

While all other parameters remain the same as used in Variation 01 for the consented project, those used in the current modelling scenario are reported for completeness; however, justifications for choices are not repeated here, nor is detailed explanation of the workings of SeabORD.

2.2.1. Colony information

Colony information used in models is provided in Table 2.6.

Table 2.6: Modelled locations of colonies and the number of pairs of kittiwake present

Colony	Latitude	Longitude	Kittiwake pairs
Duncansby Head	58.6209	-3.0212	584
Dunnet Head	58.6598	-3.4164	2,020
Holburn Head	58.6314	-3.5421	55
Melvich	58.5747	-3.8597	2,777
Stroma	58.6839	-3.1467	137

Source: HiDef (2023)

2.2.2. Species parameters

The simulation was restricted to a 'region' or 'bounding box' which matched that used in the variation application, with north limits of 61.51797 latitude, east limit of 2.41520 longitude, west limit of -9.28890 longitude, and south limit of 55.73961 latitude.

Thirty percent of populations were assumed to be susceptible to displacement, and 100% of those are susceptible to barrier effects. All birds used 'perimeter' navigation techniques, rather than A* pathway finding to determine a route around the windfarm. Birds were distributed according to a distance decay curve, parameterised with a maximum foraging range of 300.6 km, and 97.5% of individuals are assumed within this range.

2.2.3. Calibration and resultant prey values

The SeabORD model is calibrated using prey values to determine levels that meet 'moderate' conditions, defined as between 5% and 15% adult mass loss, and at least 11% chick survival in the baseline scenario which does not include distributional effects of a windfarm (Mobbs *et al*., 2018). As the random seed (used for reproducibility where models include stochasticity) was not reported for Variation 01 SeabORD models (HiDef, 2023), models for Variation 02 Design Scenarios were re-calibrated for the current seed used. In this case, calibration was undertaken with seed 52. Calibration runs used 10% of the population, and prey values were varied to find the limits of a 'moderate' year under the definition outlined above. The range of prey values used in final runs are presented in Table 2.7, alongside the resultant baseline adult mass loss percentage for the limits of a 'moderate' year, and percentage of chicks surviving the season for the lower limit.

Table 2.7: Prey values used for final runs following calibration, and resultant chick survival

Colony	Lower prey quantity (g per unit volume)	Resultant adult mass loss from lower prey calibration (%)	Chick survival from lower prey calibration (%)	Upper prey quantity (g per unit volume)	Resultant adult mass loss from upper prey calibration (%)
Duncansby Head	225	10.46	12.07	294	5.06
Dunnet Head	236	9.63	11.39	304	5.06
Holburn Head	232	11.14	16.67	305	5.10
Melvich	257	9.74	11.51	327	5.04
Stroma	238	11.43	14.29	304	5.00

2.2.4. Offshore renewable development

A windfarm footprint border (representing additional area of displacement beyond the Array Area) of 0.0001 km was used, alongside a 5 km buffer (where displaced birds are distributed into). The original windfarm boundary polygon was used, with an area of 5.85 km^2.

2.2.5. Simulation settings

The random seed was set to 52, and all final simulations used 100% of the population. Ten matched paired simulations were completed for each colony.

2.3. Population Viability Analysis

Populations were modelled using PVA, following guidance presented in NatureScot (2023). Models were run using the Natural England PVA tool (NEPVA, Tool v 2 (Code: v 4.18 Interface v 1.7), Searle *et al*., 2019). The tool and underlying methodology are not explained in detail here, and this document focuses on inputs required to replicate the results presented, and the derivation of them.

2.3.1. Deviations from previous simulations

Where possible, the PVA methodology used for Variation 02 Design Scenarios mirrors that used in relation to Variation 01 (HiDef, 2023). Possible divergence exists in the following areas due to absence of information regarding some parameters selected for Variation 01. For Variation 01 PVA, the random seed used was not reported. Here, the seed was set to 1234 for all runs. As the PVA tool does not currently allow for true reproducibility of results unless the seed is set and multiple scenarios within a simulation are parameterised in the same order (Butler, *per comm*.[1]), each PVA simulation was conducted independently of the others (i.e. one Design Scenario and airgap option was modelled at a time). This ensures that outputs from impact scenarios are directly comparable with one another because the only difference among runs is the impact input parameters. It was also unclear what burn-in period was

[1] During PVA QA for Variation 02 very small differences were noted among PVA outputs despite the application of a set seed value and models incorporating the same impacts. Correspondence with NE PVA tool developers (Adam Butler) highlighted that this was a consequence of how the seed is applied by the tool to fix stochastic pathways and that for outputs to be replicated exactly for any given impact, where multiple impacts are modelled concurrently, the precise order of impacts modelled within the 'impacts' section of the tool must be replicated precisely. Consequently, to simplify validation of PVA models, it was decided to use the NE PVA tool with just one impact modelled in each run.

used for Variation 01 PVA, and this was set to 10 years for Variation 02. All other simulation and population settings remained consistent with those reported for Variation 01 (HiDef, 2023).

The years in which impacts are assumed to occur were changed from previous simulations, to be appropriate for the current project timeline. The first impact year was set to 2028, and the final to 2078. Output metrics used in this report focus on mean Counterfactual Growth Rates (CGR) and mean Counterfactual Population Size (CPS), calculated as the proportional differences between impact scenarios and baseline scenarios, on a scale of 0-1, for the 25th year of operation, as that is expected to be the project lifespan. A further 25 year impact period was modelled to align with NatureScot guidance to model up to 50 years (NatureScot, 2023).

2.3.2. Impact scenarios

Population level consequences to kittiwake from NCC SPA from predicted collision and distributional responses were modelled for each Variation 02 Design Scenario for the first three airgap options below, as revised CRM results indicated mortality estimates that were slightly greater than those predicted for Variation 01. Consequently, based on the CRM results outlined in Section 3, the three airgap options taken forward to PVA for each Design Scenario were:

1) Design Scenario 1 (Six 18 MW turbines): 30 – 32 m airgap options.
2) Design Scenario 2 (Five 18 MW turbines): 28 – 30 m airgap options.
3) Design Scenario 3 (Six 15 MW turbines): 28 – 30 m airgap options.

PVAs were not undertaken for Design Scenarios and higher airgap options where Variation 02 CRM outputs were estimated to the same or less than those consented in relation to Variation 01. This was on the basis that if levels of impact were predicted to be the same or less than those consented for Variation 01, the population level consequences of those impacts will be the same or less than those consented in relation to Variation 01.

For each of the above Variation 02 Design Scenario airgap options (nine in total) PVAs were undertaken using proportional impacts to productivity, adult survival, and immature survival of the NCC SPA population.

For each of the above Variation 02 Design Scenario airgap options, impacts were considered for four different Assessment Conditions:

1) Project-only impacts: using updated CRM estimates from Section 3.1 of this report, and retaining SeabORD impacts from HiDef (2023).
2) Project-only impacts: using updated CRM and SeabORD estimates, with results from Sections 3.1 and 3.2 of this report.
3) In-combination impacts: using updated CRM estimates from Section 3.1 of this report, combined with collated impacts from other windfarms reported in HiDef (2023).
4) In-combination impacts: using updated CRM and SeabORD estimates from Section 3.1 and 3.2 of this report, combined with collated impacts from other windfarms reported in HiDef (2023),

All proportional impact rates for project-only and in-combination Design Scenario airgap options for which PVAs were undertaken, and the impact numbers that they are derived from, are reported in Sections 3.3 and 3.4 of this report.

2.3.3. Separating impacts between age classes

Collision impacts for PVA were estimated for breeding adult birds alone using assumptions about the proportion of the population expected to be adults, and the rate of sabbatical birds (see Section 2.1.5). Collisions were also estimated for the immature population based on the proportional impacts from adults and immatures in the variation application (HiDef, 2023), resulting in a correction factor of 0.06696 (i.e. 6.7% of collisions assumed to be immatures). Immature collision impacts were derived by multiplying this factor by the estimated adult collisions.

Distributional response impacts in the breeding season for PVA, estimated with SeabORD, are already separated into breeding adults and chicks, therefore, no further separation is required. For distributional responses, it is assumed that there was no impact from distributional responses on immatures, as this was not estimated by SeabORD. In the original application and the Variation 01 application, there were zero mortalities predicted with displacement matrices in the autumn migration, non-breeding season, and spring migration periods, and therefore age class assignment was not required.

2.3.4. Deriving in-combination impacts for population modelling

In-combination impacts were derived from the in-combination impact estimate for scenario 4d presented in Variation 01 (HiDef, 2023). This included PFOWF in addition to sites in the Moray Firth and selected other North Sea projects, with the exception of Berwick Bank OWF, and was used on the basis that NatureScot and the Scottish Ministers considered this scenario most appropriate for in-combination assessment. From the in-combination impact estimate for scenario 4d presented in Variation 01, the project-only impacts estimated for Variation 01 were subtracted. The resulting impacts, representing only those from other projects, were then combined with the project-only impacts estimated in relation to Variation 02 Design Scenarios and presented in Section 3.1 and 3.2 of this report.

The in-combination impact estimates from other projects, and not including those from the Project, are therefore 24.41 adult mortalities (20.41 from collision, 4.00 from distributional responses), 13.13 immature mortalities (from collision), and 12.60 juvenile/chick mortalities (from distributional responses).

Where wind farm projects with potential connectivity to the kittiwake population of NCC SPA have submitted consent applications since the submission of the Variation 01 application, those impacts have not been incorporated within the in-combination impact assessments undertaken in relation to Variation 02 Design Scenarios.

Those projects have, in accordance with appropriate HRA process, considered the Variation 01 (current consented design) or original consented designs (the latter, although superseded, is more conservative than the former) within their in-combination assessments. Consequently, on the basis that Project only impacts associated with Variation 02 Design Scenarios are not appreciably different than those consented in relation to Variation 01 [as demonstrated within Section 3], impacts resultant from design refinements for Variation 02 will not appreciably alter the conclusions of assessments submitted after Variation 01. Those projects are:

- Outer Dowsing Offshore Wind Farm
- Salamander Offshore Wind Farm (consented 21 August 2025)
- Ossian Offshore Wind Farm
- Caledonia Offshore Wind Farm
- Muir Mhòr Offshore Wind Farm
- Cenos Floating Offshore Windfarm
- West of Orkney Wind Farm (consented 27 June 2025)

Additionally, Berwick Bank OWF, for which application documents were submitted prior to Variation 01, has also recently received consent (31 July 2025). This consent is conditional upon the agreement of a derogation case which will include measures to compensate identified impacts resultant in AESI to the kittiwake feature of NCC SPA. Therefore, in accordance with recent NS recommendations, where compensated impacts are not included within in-combination assessment impact totals, it is assumed that Berwick Bank will not contribute to in-combination impacts for assessments relating to the kittiwake feature of NCC SPA. As such, consideration of Scenario 4d (i.e. without inclusion of Berwick Bank OWF) remains the most appropriate option for in-combination assessment.

It is also noted that the progression of Hornsea 4 OWF which was previously included as a component of in-combination Scenario 4d for Variation 01, has recently ceased (May 2025), and this project will not progress in its present form. Hornsea 4 OWF was estimated to contribute a total of 0.84 breeding adult kittiwake mortalities to the NCC SPA population per annum. Impacts associated with Hornsea 4 OWF remain within Scenario 4d in relation to in-combination assessment for Variation 02, introducing an additional degree of conservatism to the outcomes of those assessments.

Since the submission of Variation 01, it is also noted that the Dogger Bank South (DBS) Offshore Wind Farms, DBS East and DBS West, have, submitted a development consent order application to the Secretary of State which details the apportioning of a total of 1.8 breeding adult kittiwakes to NCC SPA. This application does not however include an in-combination assessment for impacts to kittiwake at NCC SPA (as it follows the assessment approach preferred by Natural England, given they are the primary SNCB for that project). Should these projects subsequently submit additional information in this regard, it is assumed that the Project would be considered within their in-combination assessment for impacts to kittiwake at NCC SPA.

It is also noted that Culzean Floating Offshore Wind Farm has submitted a Marine Licence variation to its consented design since the submission of Variation 01. Although this project has potential connectivity to the kittiwake population of NCC SPA, the project comprises a single turbine and, therefore, total impacts to kittiwake are extremely small (<0.1 individuals per annum), and considerations of in-combination effects have not been required for this project.

Furthermore, a number of wind farm projects with potential connectivity to the kittiwake population of NCC SPA have submitted scoping documents since the submission of Variation 01. Should those projects submit consent applications, they should, in accordance with appropriate HRA process, consider the Project within their in-combination assessments. Consequently, the insubstantial changes to Variation 01 project only impacts resultant from Variation 02 design refinements will not appreciably alter the conclusions of future assessments.

Finally, where consent applications submitted after the submission of Variation 01 attribute non-negligible impacts to the kittiwake population of NCC SPA, it is assumed that those projects would be required to compensate for those impacts. Consequently, in accordance with recent NatureScot recommendations where compensated impacts are not included within in-combination assessment impact totals, it is assumed that for consent applications submitted after the submission of Variation 01, which attribute non-negligible impacts to the kittiwake population of NCC SPA, those projects would not contribute to in-combination assessments relating to the kittiwake receptor of NCC SPA.

3. Results

3.1. Collision risk modelling

3.1.1. Overall estimate of impact

Seasonal collision estimates for each Variation 02 Design Scenario, with nine air gap options (27 m – 35 m), along with the annual estimates, are presented in Table 3.1. Monthly collision estimates are presented in Table 3.2. Collision impacts apportioned to NCC SPA are presented in Section 3.2.

Table 3.1. Stochastic, seasonal and annual collision estimates for kittiwake at the Project's Array Area. Values are rounded to 2 decimal places for display purposes only. Values are the median estimates from 1000 iterations with 95% confidence intervals (CI) in brackets.

Design Scenario	Airgap Option	Spring migration	Breeding	Autumn migration	Annual
Design Scenario 1 (Six 18 MW WTGs, rotor diameter 260 m)	27m	0.69 (0.29 - 1.3)	6.16 (3.29 - 10.23)	1.45 (0.43 - 3.12)	8.4 (4.92 - 13.04)
	28m	0.63 (0.26 - 1.19)	5.6 (2.98 - 9.33)	1.32 (0.39 - 2.84)	7.63 (4.48 - 11.88)
	29m	0.57 (0.24 - 1.08)	5.08 (2.7 - 8.51)	1.19 (0.36 - 2.59)	6.95 (4.03 - 10.82)
	30m	0.52 (0.22 - 0.98)	4.63 (2.45 - 7.73)	1.09 (0.33 - 2.35)	6.32 (3.65 - 9.93)
	31m	0.47 (0.2 - 0.89)	4.21 (2.23 - 7.07)	0.99 (0.29 - 2.14)	5.74 (3.29 - 9.07)
	32m	0.43 (0.18 - 0.82)	3.82 (2.03 - 6.44)	0.9 (0.26 - 1.95)	5.21 (2.98 - 8.26)
	33m	0.39 (0.16 - 0.75)	3.47 (1.84 - 5.87)	0.81 (0.24 - 1.77)	4.74 (2.69 - 7.52)
	34m	0.36 (0.14 - 0.68)	3.15 (1.68 - 5.35)	0.74 (0.21 - 1.62)	4.3 (2.43 - 6.93)
	35m	0.32 (0.13 - 0.62)	2.87 (1.52 - 4.87)	0.67 (0.19 - 1.48)	3.9 (2.2 - 6.37)
Design Scenario 2 (Five 18 MW WTGs, rotor diameter 260 m)	27m	0.58 (0.24 - 1.08)	5.13 (2.74 - 8.53)	1.21 (0.36 - 2.6)	7 (4.1 - 10.87)
	28m	0.53 (0.22 - 0.99)	4.67 (2.48 - 7.78)	1.1 (0.33 - 2.37)	6.36 (3.74 - 9.9)
	29m	0.48 (0.2 - 0.9)	4.23 (2.25 - 7.09)	1 (0.3 - 2.15)	5.79 (3.36 - 9.02)
	30m	0.43 (0.18 - 0.82)	3.86 (2.04 - 6.45)	0.9 (0.27 - 1.96)	5.27 (3.05 - 8.28)
	31m	0.4 (0.16 - 0.75)	3.51 (1.86 - 5.89)	0.82 (0.25 - 1.78)	4.79 (2.74 - 7.56)
	32m	0.36 (0.15 - 0.68)	3.18 (1.69 - 5.37)	0.75 (0.22 - 1.62)	4.34 (2.48 - 6.88)
	33m	0.33 (0.13 - 0.63)	2.9 (1.54 - 4.89)	0.68 (0.2 - 1.48)	3.95 (2.24 - 6.27)
	34m	0.3 (0.12 - 0.57)	2.63 (1.4 - 4.46)	0.61 (0.18 - 1.35)	3.58 (2.03 - 5.78)
	35m	0.27 (0.11 - 0.52)	2.39 (1.27 - 4.06)	0.56 (0.16 - 1.23)	3.25 (1.84 - 5.31)
Design Scenario 3 (Six 15 MW WTGs, rotor diameter 236 m)	27m	0.56 (0.23 - 1.05)	4.94 (2.64 - 8.21)	1.16 (0.35 - 2.51)	6.75 (3.95 - 10.48)
	28m	0.51 (0.21 - 0.95)	4.49 (2.39 - 7.49)	1.06 (0.32 - 2.28)	6.13 (3.59 - 9.55)
	29m	0.46 (0.19 - 0.86)	4.08 (2.17 - 6.83)	0.96 (0.29 - 2.08)	5.58 (3.23 - 8.7)
	30m	0.42 (0.17 - 0.78)	3.72 (1.97 - 6.22)	0.87 (0.26 - 1.89)	5.08 (2.94 - 7.98)
	31m	0.38 (0.16 - 0.72)	3.38 (1.79 - 5.67)	0.79 (0.24 - 1.72)	4.61 (2.65 - 7.28)
	32m	0.35 (0.14 - 0.66)	3.07 (1.63 - 5.17)	0.72 (0.21 - 1.56)	4.18 (2.4 - 6.63)
	33m	0.31 (0.13 - 0.6)	2.79 (1.48 - 4.72)	0.65 (0.19 - 1.43)	3.81 (2.16 - 6.04)
	34m	0.29 (0.11 - 0.55)	2.54 (1.34 - 4.31)	0.59 (0.17 - 1.3)	3.45 (1.94 - 5.57)
	35m	0.26 (0.1 - 0.5)	2.3 (1.22 - 3.92)	0.54 (0.15 - 1.19)	3.13 (1.77 - 5.12)

Table 3.2: Monthly collision risk estimates for kittiwake. Values are medians calculated from 1000 iterations, with 95% CIs in brackets.

Design Scenario	Airgap Option	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Design Scenario 1 (Six 18 MW WTGs, rotor diameter 260 m)	27m	0.09 (0 - 0.28)	0.2 (0.01 - 0.57)	0.32 (0.06 - 0.69)	0.12 (0.01 - 0.35)	0.21 (0.11 - 0.33)	3.41 (1.04 - 6.64)	2.14 (0.65 - 3.92)	0.32 (0.04 - 0.74)	0.09 (0 - 0.26)	0.34 (0.02 - 1)	0.99 (0.11 - 2.36)	0 (0-0)
	28m	0.08 (0 - 0.26)	0.18 (0.01 - 0.52)	0.29 (0.06 - 0.62)	0.11 (0.01 - 0.31)	0.19 (0.1 - 0.31)	3.09 (0.94 - 6.06)	1.94 (0.59 - 3.58)	0.29 (0.04 - 0.67)	0.08 (0 - 0.23)	0.3 (0.01 - 0.91)	0.9 (0.1 - 2.15)	0 (0-0)
	29m	0.07 (0 - 0.23)	0.17 (0.01 - 0.47)	0.26 (0.05 - 0.57)	0.1 (0 - 0.29)	0.17 (0.09 - 0.28)	2.81 (0.85 - 5.53)	1.76 (0.53 - 3.26)	0.26 (0.04 - 0.61)	0.07 (0 - 0.21)	0.28 (0.01 - 0.83)	0.82 (0.09 - 1.96)	0 (0-0)
	30m	0.06 (0 - 0.21)	0.15 (0.01 - 0.43)	0.24 (0.05 - 0.52)	0.09 (0 - 0.26)	0.15 (0.08 - 0.26)	2.56 (0.77 - 5.05)	1.6 (0.48 - 2.97)	0.24 (0.03 - 0.56)	0.07 (0 - 0.2)	0.25 (0.01 - 0.75)	0.74 (0.09 - 1.79)	0 (0-0)
	31m	0.06 (0 - 0.19)	0.14 (0.01 - 0.39)	0.22 (0.04 - 0.47)	0.08 (0 - 0.24)	0.14 (0.07 - 0.23)	2.33 (0.7 - 4.61)	1.44 (0.44 - 2.7)	0.22 (0.03 - 0.51)	0.06 (0 - 0.18)	0.23 (0.01 - 0.68)	0.67 (0.08 - 1.64)	0 (0-0)
	32m	0.05 (0 - 0.18)	0.12 (0.01 - 0.35)	0.2 (0.04 - 0.43)	0.07 (0 - 0.21)	0.13 (0.06 - 0.21)	2.12 (0.64 - 4.2)	1.31 (0.39 - 2.47)	0.2 (0.03 - 0.46)	0.05 (0 - 0.16)	0.21 (0.01 - 0.62)	0.61 (0.07 - 1.49)	0 (0-0)
	33m	0.05 (0 - 0.16)	0.11 (0.01 - 0.32)	0.18 (0.04 - 0.39)	0.06 (0 - 0.2)	0.12 (0.06 - 0.2)	1.92 (0.58 - 3.82)	1.19 (0.36 - 2.24)	0.18 (0.02 - 0.42)	0.05 (0 - 0.15)	0.19 (0.01 - 0.56)	0.55 (0.06 - 1.36)	0 (0-0)
	34m	0.04 (0 - 0.15)	0.1 (0.01 - 0.29)	0.16 (0.03 - 0.36)	0.06 (0 - 0.18)	0.11 (0.05 - 0.18)	1.75 (0.52 - 3.49)	1.08 (0.32 - 2.04)	0.16 (0.02 - 0.38)	0.05 (0 - 0.13)	0.17 (0.01 - 0.52)	0.5 (0.06 - 1.24)	0 (0-0)
	35m	0.04 (0 - 0.13)	0.09 (0.01 - 0.27)	0.15 (0.03 - 0.32)	0.05 (0 - 0.16)	0.1 (0.05 - 0.16)	1.58 (0.47 - 3.18)	0.98 (0.29 - 1.86)	0.15 (0.02 - 0.35)	0.04 (0 - 0.12)	0.15 (0.01 - 0.47)	0.45 (0.05 - 1.13)	0 (0-0)
Design Scenario 2 (Five 18 MW WTGs, rotor diameter 260 m)	27m	0.07 (0 - 0.23)	0.17 (0.01 - 0.48)	0.27 (0.05 - 0.57)	0.1 (0 - 0.29)	0.17 (0.09 - 0.28)	2.84 (0.87 - 5.54)	1.78 (0.54 - 3.26)	0.27 (0.04 - 0.61)	0.07 (0 - 0.21)	0.28 (0.01 - 0.83)	0.83 (0.1 - 1.97)	0 (0-0)
	28m	0.07 (0 - 0.21)	0.15 (0.01 - 0.43)	0.24 (0.05 - 0.52)	0.09 (0 - 0.26)	0.16 (0.08 - 0.25)	2.58 (0.78 - 5.05)	1.62 (0.49 - 2.98)	0.24 (0.03 - 0.56)	0.07 (0 - 0.2)	0.25 (0.01 - 0.76)	0.75 (0.09 - 1.79)	0 (0-0)
	29m	0.06 (0 - 0.19)	0.14 (0.01 - 0.39)	0.22 (0.04 - 0.47)	0.08 (0 - 0.24)	0.14 (0.07 - 0.23)	2.34 (0.71 - 4.61)	1.47 (0.45 - 2.72)	0.22 (0.03 - 0.51)	0.06 (0 - 0.18)	0.23 (0.01 - 0.69)	0.68 (0.08 - 1.64)	0 (0-0)
	30m	0.05 (0 - 0.18)	0.13 (0.01 - 0.36)	0.2 (0.04 - 0.43)	0.07 (0 - 0.22)	0.13 (0.07 - 0.21)	2.13 (0.64 - 4.21)	1.33 (0.4 - 2.47)	0.2 (0.03 - 0.46)	0.05 (0 - 0.16)	0.21 (0.01 - 0.63)	0.62 (0.07 - 1.49)	0 (0-0)
	31m	0.05 (0 - 0.16)	0.11 (0.01 - 0.32)	0.18 (0.04 - 0.39)	0.07 (0 - 0.2)	0.12 (0.06 - 0.2)	1.94 (0.59 - 3.84)	1.2 (0.36 - 2.25)	0.18 (0.02 - 0.42)	0.05 (0 - 0.15)	0.19 (0.01 - 0.57)	0.56 (0.06 - 1.37)	0 (0-0)
	32m	0.04 (0 - 0.15)	0.1 (0.01 - 0.29)	0.17 (0.03 - 0.36)	0.06 (0 - 0.18)	0.11 (0.05 - 0.18)	1.77 (0.53 - 3.5)	1.09 (0.33 - 2.06)	0.17 (0.02 - 0.39)	0.05 (0 - 0.13)	0.17 (0.01 - 0.51)	0.51 (0.06 - 1.25)	0 (0-0)
	33m	0.04 (0 - 0.13)	0.09 (0.01 - 0.27)	0.15 (0.03 - 0.33)	0.05 (0 - 0.16)	0.1 (0.05 - 0.16)	1.6 (0.48 - 3.18)	0.99 (0.3 - 1.87)	0.15 (0.02 - 0.35)	0.04 (0 - 0.12)	0.16 (0.01 - 0.47)	0.46 (0.05 - 1.13)	0 (0-0)
	34m	0.04 (0 - 0.12)	0.09 (0.01 - 0.24)	0.14 (0.03 - 0.3)	0.05 (0 - 0.15)	0.09 (0.04 - 0.15)	1.46 (0.43 - 2.9)	0.9 (0.27 - 1.7)	0.14 (0.02 - 0.32)	0.04 (0 - 0.11)	0.14 (0.01 - 0.43)	0.42 (0.05 - 1.03)	0 (0-0)
	35m	0.03 (0 - 0.11)	0.08 (0.01 - 0.22)	0.12 (0.02 - 0.27)	0.04 (0 - 0.14)	0.08 (0.04 - 0.14)	1.32 (0.39 - 2.65)	0.82 (0.24 - 1.55)	0.12 (0.02 - 0.29)	0.03 (0 - 0.1)	0.13 (0.01 - 0.39)	0.38 (0.04 - 0.95)	0 (0-0)
Design Scenario 3 (Six 15 MW WTGs, rotor diameter 236 m)	27m	0.07 (0 - 0.22)	0.16 (0.01 - 0.46)	0.26 (0.05 - 0.55)	0.09 (0 - 0.28)	0.17 (0.09 - 0.27)	2.73 (0.83 - 5.35)	1.71 (0.52 - 3.15)	0.26 (0.03 - 0.59)	0.07 (0 - 0.21)	0.27 (0.01 - 0.8)	0.8 (0.09 - 1.89)	0 (0-0)
	28m	0.06 (0 - 0.21)	0.15 (0.01 - 0.42)	0.23 (0.05 - 0.5)	0.08 (0 - 0.25)	0.15 (0.08 - 0.25)	2.48 (0.75 - 4.86)	1.56 (0.47 - 2.88)	0.23 (0.03 - 0.54)	0.06 (0 - 0.19)	0.24 (0.01 - 0.73)	0.72 (0.08 - 1.73)	0 (0-0)
	29m	0.06 (0 - 0.19)	0.13 (0.01 - 0.38)	0.21 (0.04 - 0.46)	0.08 (0 - 0.23)	0.14 (0.07 - 0.22)	2.25 (0.68 - 4.44)	1.41 (0.43 - 2.62)	0.21 (0.03 - 0.49)	0.06 (0 - 0.17)	0.22 (0.01 - 0.67)	0.66 (0.08 - 1.58)	0 (0-0)
	30m	0.05 (0 - 0.17)	0.12 (0.01 - 0.34)	0.19 (0.04 - 0.41)	0.07 (0 - 0.21)	0.12 (0.06 - 0.21)	2.05 (0.62 - 4.05)	1.28 (0.39 - 2.39)	0.19 (0.03 - 0.45)	0.05 (0 - 0.16)	0.2 (0.01 - 0.6)	0.6 (0.07 - 1.44)	0 (0-0)
	31m	0.05 (0 - 0.16)	0.11 (0.01 - 0.31)	0.17 (0.03 - 0.38)	0.06 (0 - 0.19)	0.11 (0.06 - 0.19)	1.87 (0.56 - 3.7)	1.16 (0.35 - 2.17)	0.18 (0.02 - 0.41)	0.05 (0 - 0.14)	0.18 (0.01 - 0.55)	0.54 (0.06 - 1.32)	0 (0-0)
	32m	0.04 (0 - 0.14)	0.1 (0.01 - 0.28)	0.16 (0.03 - 0.34)	0.06 (0 - 0.17)	0.1 (0.05 - 0.17)	1.7 (0.51 - 3.37)	1.05 (0.32 - 1.98)	0.16 (0.02 - 0.37)	0.04 (0 - 0.13)	0.17 (0.01 - 0.5)	0.49 (0.06 - 1.2)	0 (0-0)
	33m	0.04 (0 - 0.13)	0.09 (0.01 - 0.26)	0.15 (0.03 - 0.31)	0.05 (0 - 0.16)	0.09 (0.05 - 0.16)	1.55 (0.46 - 3.07)	0.96 (0.28 - 1.8)	0.14 (0.02 - 0.34)	0.04 (0 - 0.12)	0.15 (0.01 - 0.45)	0.44 (0.05 - 1.09)	0 (0-0)
	34m	0.04 (0 - 0.12)	0.08 (0.01 - 0.24)	0.13 (0.03 - 0.29)	0.05 (0 - 0.14)	0.08 (0.04 - 0.14)	1.4 (0.42 - 2.8)	0.87 (0.26 - 1.64)	0.13 (0.02 - 0.31)	0.04 (0 - 0.11)	0.14 (0.01 - 0.41)	0.4 (0.05 - 1)	0 (0-0)
	35m	0.03 (0 - 0.11)	0.07 (0.01 - 0.21)	0.12 (0.02 - 0.26)	0.04 (0 - 0.13)	0.08 (0.04 - 0.13)	1.27 (0.37 - 2.55)	0.79 (0.23 - 1.49)	0.12 (0.02 - 0.28)	0.03 (0 - 0.1)	0.12 (0.01 - 0.37)	0.36 (0.04 - 0.91)	0 (0-0)

3.1.2. Apportioned to North Caithness Cliffs SPA

Figure 3.1 shows median annual collision impacts apportioned to NCC SPA for each modelled Design Scenario and airgap option, relative to the consented estimate of 2.24 annual collisions presented in the Variation 01 application. Seasonal and annual summaries are presented in Table 3.3.

The results demonstrate that for Variation 02 Design Scenario 1, estimated collision impacts are below those associated with the Variation 01 consented design when airgaps exceed 33 m, while for Design Scenarios 2 and 3, estimated collision impacts are below those associated with the Variation 01 consented design when airgaps exceed 31 m.

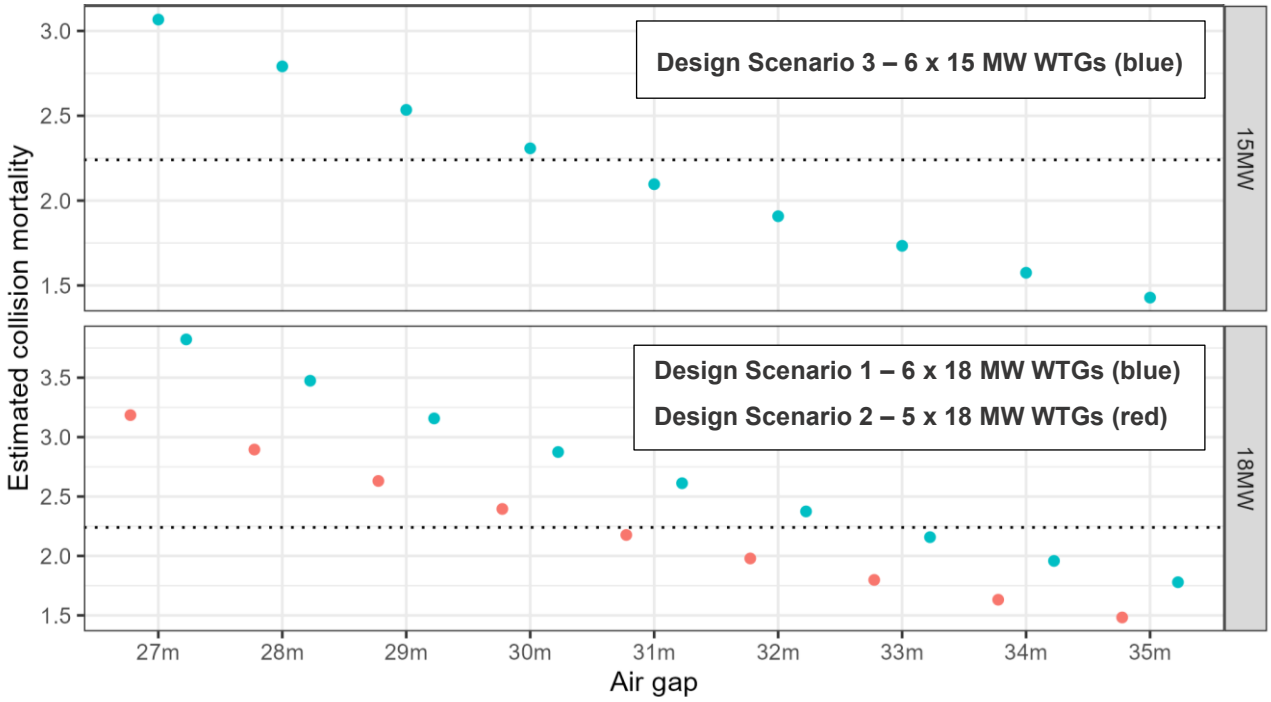


Figure 3.1: Annual collision risk estimates for kittiwake from the Project, apportioned to NCC SPA, summarised with medians for each Design Scenario.

Table 3.3: **Stochastic, seasonal and annual collision estimates for kittiwake at the Project's Array Area, apportioned to NCC SPA. Values are rounded to 2 decimal places for display purposes only. Values are the median estimates from 1000 iterations with 95% confidence intervals (CI) in brackets.**

Design Scenario	Airgap Option	Spring migration	Breeding	Autumn migration	Annual
Design Scenario 1 (Six 18 MW WTGs, rotor diameter 260 m)	27m	0.01 (0 - 0.02)	3.77 (2.02 - 6.27)	0.03 (0.01 - 0.07)	3.82 (2.05 - 6.34)
	28m	0.01 (0 - 0.02)	3.43 (1.83 - 5.72)	0.03 (0.01 - 0.07)	3.47 (1.86 - 5.78)
	29m	0.01 (0 - 0.02)	3.11 (1.65 - 5.21)	0.03 (0.01 - 0.06)	3.16 (1.69 - 5.27)
	30m	0.01 (0 - 0.01)	2.84 (1.5 - 4.74)	0.02 (0.01 - 0.05)	2.87 (1.53 - 4.8)
	31m	0.01 (0 - 0.01)	2.58 (1.37 - 4.33)	0.02 (0.01 - 0.05)	2.61 (1.39 - 4.37)
	32m	0.01 (0 - 0.01)	2.34 (1.24 - 3.95)	0.02 (0.01 - 0.04)	2.37 (1.27 - 3.98)
	33m	0.01 (0 - 0.01)	2.13 (1.13 - 3.6)	0.02 (0.01 - 0.04)	2.16 (1.15 - 3.64)
	34m	0.01 (0 - 0.01)	1.93 (1.03 - 3.28)	0.02 (0 - 0.04)	1.96 (1.05 - 3.31)
	35m	0 (0 - 0.01)	1.76 (0.93 - 2.99)	0.02 (0 - 0.03)	1.78 (0.95 - 3.02)
Design Scenario 2 (Five 18 MW WTGs, rotor diameter 260 m)	27m	0.01 (0 - 0.02)	3.15 (1.68 - 5.23)	0.03 (0.01 - 0.06)	3.19 (1.71 - 5.28)
	28m	0.01 (0 - 0.01)	2.86 (1.52 - 4.77)	0.03 (0.01 - 0.05)	2.9 (1.55 - 4.82)
	29m	0.01 (0 - 0.01)	2.59 (1.38 - 4.35)	0.02 (0.01 - 0.05)	2.63 (1.41 - 4.39)
	30m	0.01 (0 - 0.01)	2.37 (1.25 - 3.95)	0.02 (0.01 - 0.05)	2.4 (1.28 - 4)
	31m	0.01 (0 - 0.01)	2.15 (1.14 - 3.61)	0.02 (0.01 - 0.04)	2.18 (1.16 - 3.64)
	32m	0.01 (0 - 0.01)	1.95 (1.04 - 3.29)	0.02 (0.01 - 0.04)	1.98 (1.06 - 3.32)
	33m	0 (0 - 0.01)	1.78 (0.94 - 3)	0.02 (0 - 0.03)	1.8 (0.96 - 3.03)
	34m	0 (0 - 0.01)	1.61 (0.86 - 2.73)	0.01 (0 - 0.03)	1.63 (0.87 - 2.76)
	35m	0 (0 - 0.01)	1.46 (0.78 - 2.49)	0.01 (0 - 0.03)	1.48 (0.79 - 2.51)
Design Scenario 3 (Six 15 MW WTGs, rotor diameter 236 m)	27m	0.01 (0 - 0.02)	3.03 (1.62 - 5.04)	0.03 (0.01 - 0.06)	3.07 (1.64 - 5.09)
	28m	0.01 (0 - 0.01)	2.76 (1.46 - 4.59)	0.02 (0.01 - 0.05)	2.79 (1.49 - 4.64)
	29m	0.01 (0 - 0.01)	2.5 (1.33 - 4.18)	0.02 (0.01 - 0.05)	2.53 (1.36 - 4.23)
	30m	0.01 (0 - 0.01)	2.28 (1.21 - 3.81)	0.02 (0.01 - 0.04)	2.31 (1.23 - 3.85)
	31m	0.01 (0 - 0.01)	2.07 (1.1 - 3.48)	0.02 (0.01 - 0.04)	2.1 (1.12 - 3.51)
	32m	0.01 (0 - 0.01)	1.88 (1 - 3.17)	0.02 (0 - 0.04)	1.91 (1.02 - 3.2)
	33m	0 (0 - 0.01)	1.71 (0.91 - 2.9)	0.02 (0 - 0.03)	1.73 (0.93 - 2.92)
	34m	0 (0 - 0.01)	1.56 (0.82 - 2.64)	0.01 (0 - 0.03)	1.57 (0.84 - 2.66)
	35m	0 (0 - 0.01)	1.41 (0.75 - 2.4)	0.01 (0 - 0.03)	1.43 (0.76 - 2.42)

3.2. Distributional response modelling

Distributional response modelling for Variation 01 predicted kittiwake mortalities of 1 adult and 9 chicks as a result of the Project (HiDef, 2023). The current modelling predicts mortalities of 0.9 adults and 1.0 chicks from distributional effects of the Project (Table 3.4), with the largest impacts predicted at Dunnet Head.

Table 3.4: Mortality of kittiwake predicted to five sub-sites within the NCC SPA. All adult estimates are from 'moderate' years.

Colony	Baseline adult mass loss (%)	Baseline Adult Mortality		Adult Mortality with Development		Additional adult mortality	Additional Chick mortality (%)	Additional chick mortality (individuals)
		Mean	SD	Mean	SD	Mean number of adults	Mean	
Duncansby Head	7.86	308.00	5.85	308.0	5.85	0	0.0	0
Dunnet Head	7.76	1026.90	10.91	1027.70	10.57	0.8	0.03	0.6
Holburn Head	7.69	37.00	0.94	37.0	0.94	0	0.18	0.1
Melvich	7.22	1517.60	17.26	1517.70	17.19	0.1	0.01	0.3
Stroma	7.67	66.10	1.66	66.10	1.66	0	0	0
TOTAL						**0.9**		**1.0**

3.3. Project-only impacts for use in population modelling

A summary of inputs to PVAs for Project-only impacts using Variation 02 updated CRM estimates, but retaining Variation 01 SeabORD impacts (Assessment Condition 1) is provided in Table 3.5.

Table 3.5: Derivation of impacts for Assessment Condition 1 (Project-only; updated CRM; SeabORD as per Variation 01)

	Design Scenario								
	1 (6x18 MW)			2 (5x18 MW)			3 (6x15 MW)		
	Airgap options (m)								
	30	31	32	28	29	30	28	29	30
Adults									
Collision to adults only	2.87	2.61	2.37	2.90	2.63	2.40	2.79	2.53	2.31
SeabORD adult impact					1				
Total impacts to adults only	3.87	3.61	3.37	3.90	3.63	3.40	3.79	3.53	3.31
Adult population					11,146				
Proportional impacts to adults	0.00035	0.00032	0.00030	0.00035	0.00033	0.00031	0.00034	0.00032	0.00030
Immatures									
Collision to immatures	0.19	0.17	0.16	0.19	0.18	0.16	0.19	0.17	0.15
Immature population					7430.67				
Proportional impact to immatures	0.00003	0.00002	0.00002	0.00003	0.00002	0.00002	0.00003	0.00002	0.00002
Juveniles									
SeabORD chick mortality					9				
Chick population					5,573				
Proportional impacts to chicks					0.00161				

A summary of inputs to PVAs for Project-only impacts using Variation 02 updated CRM estimates and Variation 02 updated SeabORD impacts (Assessment Condition 2) is provided in Table 3.6

Table 3.6: Derivation of impacts for Assessment Condition 2 (Project-only; updated CRM; updated SeabORD)

	Design Scenario								
	1 (6x18 MW)			2 (5x18 MW)			3 (6x15 MW)		
	Airgap options (m)								
	30	31	32	28	29	30	28	29	30
Adults									
Collision to adults only	2.87	2.61	2.37	2.90	2.63	2.40	2.79	2.53	2.31
SeabORD adult impact					0.9				
Total impacts to adults only	3.77	3.51	3.27	3.80	3.53	3.30	3.69	3.43	3.21
Adult population					11,146				
Proportional impacts to adults	0.00034	0.00031	0.00029	0.00034	0.00032	0.00030	0.00033	0.00031	0.00029
Immatures									
Collision to immatures	0.19	0.17	0.16	0.19	0.18	0.16	0.19	0.17	0.15
Immature population					7430.67				
Proportional impact to immatures	0.00003	0.00002	0.00002	0.00003	0.00002	0.00002	0.00003	0.00002	0.00002
Juveniles									
SeabORD chick mortality					1				
Chick population					5,573				
Proportional impacts to chicks					0.00018				

3.4. In-combination impacts for use in population modelling

A summary of inputs to PVAs for in-combination impacts using Variation 02 updated CRM estimates, but retaining Variation 01 SeabORD impacts (Assessment Condition 3) is provided in Table 3.7.

Table 3.7: Derivation of impacts for Assessment Condition 3 (In-combination; updated CRM; SeabORD as per Variation 01)

	Design Scenario								
	1 (6x18 MW)			2 (5x18 MW)			3 (6x15 MW)		
	Airgap options (m)								
	30	31	32	28	29	30	28	29	30
Adults									
Project-only adult impacts	3.87	3.61	3.37	3.90	3.63	3.40	3.79	3.53	3.31
Impacts from other projects to adults					24.41				
Total in-combination impact to adults	28.28	28.02	27.78	28.31	28.04	27.81	28.2	27.94	27.72
Adult population					11,146				
Proportional impacts to adults	0.00254	0.00251	0.00249	0.00254	0.00252	0.00250	0.00253	0.00251	0.00249
Immatures									
Project-only immature impacts	0.19	0.17	0.16	0.19	0.18	0.16	0.19	0.17	0.15
Impacts from other projects to immatures					13.13				
Total in-combination impacts to immatures	13.32	13.30	13.29	13.32	13.31	13.29	13.32	13.30	13.28
Immature population					7430.67				
Proportional impact to immatures	0.00179	0.00179	0.00179	0.00179	0.00179	0.00179	0.00179	0.00179	0.00179
Juveniles									
Project-only juvenile impacts					9				
Impacts from other projects to juveniles					12.60				
Total in-combination impacts to juveniles					21.6				
Juvenile population					5,573				
Proportional impacts to chicks					0.00388				

A summary of inputs to PVAs for in-combination impacts using Variation 02 updated CRM estimates and Variation 02 updated SeabORD impacts (Assessment Condition 4) is provided in Table 3.8.

Table 3.8: Derivation of impacts for Assessment Condition 4 (In-combination; updated CRM; updated SeabORD)

	Design Scenario								
	1 (6x18 MW)			2 (5x18 MW)			3 (6x15 MW)		
	Airgap options (m)								
	30	31	32	28	29	30	28	29	30
Adults									
Project-only adult impacts	3.77	3.51	3.27	3.80	3.53	3.30	3.69	3.43	3.21
Impacts from other projects to adults					24.41				
Total in-combination impact to adults	28.18	27.92	27.68	28.21	27.94	27.71	28.1	27.84	27.62
Adult population					11,146				
Proportional impacts to adults	0.00253	0.00250	0.00248	0.00253	0.00251	0.00249	0.00252	0.00250	0.00248
Immatures									
Project-only immature impacts	0.19	0.17	0.16	0.19	0.18	0.16	0.19	0.17	0.15
Impacts from other projects to immatures					13.13				
Total in-combination impacts to immatures	13.32	13.30	13.29	13.32	13.31	13.29	13.32	13.30	13.28
Immature population					7430.67				
Proportional impact to immatures					0.00179				
Juveniles									
Project-only juvenile impacts					1				
Impacts from other projects to juveniles					12.60				
Total in-combination impacts to juveniles					13.60				
Juvenile population					5,573				
Proportional impacts to chicks					0.00244				

3.5. Population modelling

Results from PVAs are presented in Table 3.9 for Assessment Conditions 1 – 4 as set out in Section 2.3.2.

Table 3.9: PVA results for selected airgap options for each Design Scenario for each Assessment Condition. *Impacts are presented without variation due to the complexity of combining uncertainty from sCRM and SeabORD.

Project-only / In-combination	Impact or PVA Output	Models updated and PVA output values	Assessment Condition	Variation 01 consented values	Variation 02 Design Scenarios								
					1 (6 x 18 MW)			2 (5 x 18 MW)			3 (6 x 15 MW)		
					Airgap options (m)								
					30	31	32	28	29	30	28	29	30
Project-only	Impact*	CRM updated	1	**3.24**	**3.87**	3.61	3.37	**3.90**	3.63	3.40	**3.79**	3.53	3.31
	PVA output	CGR		**0.999 (0.997 – 1.000)**	**0.999 (0.998 - 1.001)**	0.999 (0.998 - 1.001)	0.999 (0.998 - 1.001)	**0.999 (0.998 - 1.001)**	0.999 (0.998 - 1.001)	0.999 (0.998 - 1.001)	**0.999 (0.998 - 1.001)**	0.999 (0.998 - 1.001)	0.999 (0.998 - 1.001)
		CPS (25 years)		**0.983 (0.937-1.030)**	**0.982 (0.936 - 1.033)**	0.983 (0.936 - 1.034)	0.984 (0.937 - 1.032)	**0.982 (0.936 - 1.033)**	0.983 (0.935 - 1.033)	0.983 (0.936 - 1.033)	**0.982 (0.935 - 1.033)**	0.983 (0.935 - 1.035)	0.983 (0.936 - 1.033)
	Impact*	CRM and SeabORD updated	2	**3.24**	**3.77**	3.51	3.27	**3.80**	3.53	3.30	**3.69**	3.43	3.21
	PVA output	CGR		**0.999 (0.997 – 1.000)**	**1 (0.998 - 1.001)**	1 (0.998 - 1.001)	1 (0.998 - 1.001)	**1** (0.998 - 1.001)	1 (0.998 - 1.001)	1 (0.998 - 1.001)	**1 (0.998 - 1.001)**	1 (0.998 - 1.001)	1 (0.998 - 1.001)
		CPS (25 years)		**0.983 (0.937-1.030)**	**0.992 (0.946 - 1.043)**	0.994 (0.945 - 1.045)	0.994 (0.944 - 1.043)	**0.993 (0.944 - 1.044)**	0.993 (0.945 - 1.043)	0.994 (0.946 - 1.043)	**0.993 (0.945 - 1.042)**	0.994 (0.946 - 1.045)	0.993 (0.945 - 1.044)

Project-only / In-combination	Impact or PVA Output	Models updated and PVA output values	Assessment Condition	Variation 01 consented values	Variation 02 Design Scenarios								
					1 (6 x 18 MW)			2 (5 x 18 MW)			3 (6 x 15 MW)		
					Airgap options (m)								
					30	31	32	28	29	30	28	29	30
In-combination	Impact*	CRM updated	3	**27.65**	**28.28**	28.02	27.78	**28.31**	28.04	27.81	**28.2**	27.94	27.72
	PVA output	CGR		**0.996 (0.994 - 0.998)**	**0.996 (0.995 - 0.998)**	0.996 (0.995 - 0.998)	0.996 (0.995 - 0.998)	**0.996 (0.995 - 0.998)**	0.996 (0.995 - 0.998)	0.996 (0.995 - 0.998)	**0.996 (0.995 - 0.998)**	0.996 (0.995 - 0.998)	0.996 (0.995 - 0.998)
		CPS (25 years)		**0.909 (0.863 - 0.955)**	**0.908 (0.865 - 0.955)**	0.909 (0.864 - 0.954)	0.909 (0.863 - 0.954)	**0.908 (0.865 - 0.955)**	0.909 (0.863 - 0.955)	0.909 (0.865 - 0.957)	**0.908 (0.863 - 0.956)**	0.909 (0.865 - 0.955)	0.909 (0.864 - 0.956)
	Impact*	CRM and SeabORD updated	4	**27.65**	**28.18**	27.94	27.68	**28.21**	27.94	27.71	**28.10**	27.84	27.62
	PVA output	CGR		**0.996 (0.994 - 0.998)**	**0.997 (0.995 - 0.998)**	0.997 (0.995 - 0.998)	0.997 (0.995 - 0.998)	**0.997 (0.995 - 0.998)**	0.997 (0.995 - 0.998)	0.997 (0.995 - 0.998)	**0.997 (0.995 - 0.998)**	0.997 (0.995 - 0.998)	0.997 (0.995 - 0.998)
		CPS (25 years)		**0.909 (0.863 - 0.955)**	**0.918 (0.873 - 0.963)**	0.919 (0.872 - 0.966)	0.919 (0.874 - 0.966)	**0.918 (0.872 - 0.965)**	0.918 (0.874 - 0.966)	0.919 (0.874 - 0.965)	**0.918 (0.873 - 0.966)**	0.919 (0.874 - 0.966)	0.919 (0.873 - 0.965)

4. Conclusions

On the basis of revised CRM, and without consideration of revisions to distributional response impact calculations, the Project considers that the following preferred Variation 02 Design Scenario airgap options do not result in appreciable differences to population consequences to kittiwake from NCC SPA, compared to levels of impact consented in relation to Variation 01:

- Variation 02 - Design Scenario 1 (Six 18 MW turbines with 260 m rotor diameter) – 30 m airgap
- Variation 02 - Design Scenario 2 (Five 18 MW turbines with 260 m rotor diameter) – 28 m airgap
- Variation 02 - Design Scenario 3 (Six 15 MW turbines with 236 m rotor diameter) – 28 m airgap

For each of the above Variation 02 Design Scenarios and selected airgap options, before consideration of potential revisions to distributional response impact calculations, PVA CGR [Counterfactual of Growth Rate] outputs are the same (to 3 decimal places) as those consented in relation to Variation 01 (CGR = 0.999 Project only and 0.996 in-combination), for the Section 36 Consent, the Offshore Wind Farm Marine Licence and the Offshore Transmission Infrastructure Marine Licence.

For consented levels of Project-only impact associated with Variation 01, kittiwake populations from NCC SPA after the 25 year operational lifespan of the Project were estimated to be 1.7% smaller than in the absence of the Project. The equivalent population reductions for Variation 02 would be:

- 1.8% in relation to Variation 02 - Design Scenario 1 (Six 18 MW turbines, with 260 m rotor diameter) – 30 m airgap
- 1.8% in relation to Variation 02 - Design Scenario 2 (Five 18 MW turbines, with 260 m rotor diameter) – 28 m airgap
- 1.8% in relation to Variation 02 - Design Scenario 3 (Six 15 MW turbines, with 236 m rotor diameter) – 28 m airgap

For consented levels of in-combination impact associated with Variation 01, kittiwake populations from NCC SPA after the 25 year operational lifespan of the Project were estimated to be 9.1% smaller than in the absence of the Project (and other relevant projects). The equivalent population reductions for Variation 02 would be:

- 9.2% in relation to Variation 02 - Design Scenario 1 (Six 18 MW turbines, with 260 m rotor diameter) – 30 m airgap
- 9.2% in relation to Variation 02 - Design Scenario 2 (Five 18 MW turbines, with 260 m rotor diameter) – 28 m airgap
- 9.2% in relation to Variation 02 - Design Scenario 3 (Six 15 MW turbines, with 236 m rotor diameter) – 28 m airgap

Such differences in population predictions between Variation 01 and each of the Variation 02 Design Scenarios with selected airgap options would not be measurable against background levels of variability within the kittiwake population of NCC SPA. Given that levels of impact associated with Variation 01 have been agreed by regulators as not constituting potential adverse effect on site integrity (AEOSI) to the designated kittiwake feature of NCC SPA, it follows that impacts for Variation 02 Design Scenarios with selected airgap options, which would have indistinguishable population consequences to Variation 01, would also not constitute potential AEOSI.

Furthermore, when revisions to distributional response impact calculations are considered in addition to revised CRM, it is notable that for each of the above Variation 02 Design Scenarios and selected airgap options, population consequences to kittiwake from NCC SPA are predicted to be less than those consented in relation to Variation 01.

For each of the above Variation 02 Design Scenarios and selected airgap options, after consideration of revisions to distributional response impact calculations, project-only and in-combination PVA CGR outputs are 0.001 higher

than those consented in relation to Variation 01 [Project-only impacts CGR = 0.999 for Variation 01 and CGR = 1.000 for all Variation 02 Design Scenarios with selected airgap options. In-combination impacts CGR = 0.996 for Variation 01 and CGR = 0.997 for all Variation 02 Design Scenarios with selected airgap options].

For each of the above Variation 02 Design Scenarios and selected airgap options, after consideration of revisions to distributional response impact calculations, project-only and in-combination PVA CPS outputs after 25 years of impacts are 0.009 to 0.010 higher than those consented in relation to Variation 01. [Project-only impacts CPS = 0.983 for Variation 01, while CPS = 0.992 for Variation 02 Design Scenario 1 and CPS = 0.993 for Design Scenarios 2 and 3 with selected airgap options. In-combination impacts, CPS = 0.909 for Variation 01 and CPS = 0.918 for all Variation 02 Design Scenarios with selected airgap options].

Again, it follows that impacts for Variation 02 Design Scenarios with selected airgap options, which would be predicted to have smaller population consequences (i.e. higher CGR and CPS values) than those consented in relation to Variation 01, would also not constitute potential AEOSI.

5. References

Caneco, B. Humphries, G. Cook, A. Masden, E. 2022. Estimating bird collisions at offshore windfarms with stochLAB. https://hidef-aerial-surveying.github.io/stochLAB/

Furness, R.W. 2015. Non-breeding season populations of seabirds in UK waters: Population sizes for Biologically Defined Minimum Population Scales (BDMPS). Natural England Commissioned Reports, Number 164.

HiDef. 2022. Pentland Floating Offshore Wind Farm. Offshore EIAR (Volume 3). Technical appendix 12.2: Marine ornithology – Connectivity and Apportioning. Available from: https://pentlandfloatingwind.com/wp-content/uploads/2022/08/appendix_12.2._marine_ornithology_connectivity_and_apportioning1_redacted.pdf (Accessed 13th March 2025)

HiDef. 2023. Pentland floating offshore windfarm S36C variation application. Technical appendix D1: Marine ornithology modelling results summary. Available from: 231011_-_pentland_floating_offshore_wind_farm_-_variations_-_s.36_and_offshore_windfarm_and_transmission_infrastructre_-_s36_variation_application_report_-_develope_002_redacted.pdf (Accessed 13th March 2025).

JNCC, Natural England, Natural Resources Wales, NatureScot. 2024. Joint advice note from the Statutory Nature Conservation Bodies (SNCBs) regarding bird collision risk modelling for offshore wind developments. JNCC, Peterborough.

Mobbs, D.C., Searle, K., Butler A., Daunt, F. 2018. User Guide for SeabORD version 1.3. Report to Marine Science Scotland. DOI: 10.7489/12118-1.

NatureScot. 2025. Guidance Note 7: Guidance to support Offshore Wind Applications: Marine Ornithology – Advice for assessing collision risk of marine birds.

NatureScot. 2020. Guidance Note 9: Guidance to support Offshore Wind Applications - Seasonal periods for birds in the Scottish Marine Environment.

NatureScot. 2023. Guidance Note 11: Guidance to support Offshore Wind Applications: Marine Ornithology - Recommendations for Seabird Population Viability Analysis (PVA).

Pollock C.J., Johnston D.T., Boersch-Supan P.H., Thaxter C.B., Humphreys E.M., O'Hanlon N.J., Clewley G.D., Weston E., Shamoun-Baranes J. and Cook A.S.C.P. 2024. Avoidance and attraction responses of kittiwakes to three offshore wind farms in the North Sea. Marine Biology, 171: 217.

R Core Team. 2024. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org

Searle, K., Mobbs, D., Daunt, F., and Butler, A. 2019. A Population Viability Analysis Modelling Tool for Seabird Species. (Centre for Ecology and Hydrology report for Natural No. Natural England Commissioned Report NECR274).

natural power

Creating a better environment

naturalpower.com
sayhello@naturalpower.com

25 years

For full details on our ISO and other certifications, please visit our website.

NATURAL POWER CONSULTANTS LIMITED, THE NATURAL POWER CONSULTANTS LIMITED, NATURAL POWER SARL, NATURAL POWER CONSULTANTS (IRELAND) LIMITED, NATURAL POWER LLC, NATURAL POWER S.A, NATURAL POWER SERVICES LIMITED AND NATURAL POWER OPERATIONS LIMITED (collectively referred to as "NATURAL POWER") accept no responsibility or liability for any use which is made of this document other than by the Client for the purpose for which it was originally commissioned and prepared. The Client shall treat all information in the document as confidential. No representation is made regarding the completeness, methodology or current status of any material referred to in this document. All facts and figures are correct at time of print. All rights reserved. VENTOS® is a registered trademark of NATURAL POWER. Melogale™, WindCentre™, ControlCentre™, ForeSite™, vuWind™, WindManager™ and OceanPod™ are trademarks of NATURAL POWER.

No part of this document or translations of it may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording or any other information storage and retrieval system, without prior permission in writing from Natural Power. All facts and figures correct at time of print. All rights reserved. © Copyright 2020.

Appendix 2 – SLVIA Comparison

Pentland Floating Offshore Wind Farm

Section 36 Consent – Variation 02

Copenhagen Offshore Partners

10 George Street, Edinburgh, EH2 2PF,

Prepared by:

SLR Consulting Limited

The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 405.V14065.00007

Client Reference No: OP.HIL002

2 October 2025

Revision 7

1.0 Background

1.1 Highland Wind Limited (HWL) was awarded Section 36 Consent ('the Original S36 Consent') under the Electricity Act 1989 by the Scottish Ministers on 28 June 2023 for the offshore generation components of the Pentland Floating Offshore Wind Farm (PFOWF) (the 'Project'). On 11 October 2023, HWL requested a variation to the Original S36 Consent to reduce the number of Wind Turbine Generators (WTGs) and floating substructures from seven to six, reduce the maximum height, rotor diameter and hub height of the WTGs, reduce the WTG footprint area from 10km^2 to 5.85km^2 and to extend the operational life of the Project consent from 10 years to 25 years. The varied design (Variation 01) remained within the design envelope assessed in the Environmental Impact Assessment Report (EIAR), submitted in August 2022 (the 'Original EIAR'). The Variation 01 project design was consented in April 2024 (the 'Consented Project').

1.2 The Original S36 Consent comprised seven WTGs of dimensions up to a 260m rotor diameter, 170m hub height and 300m blade tip height. The 2023 variation to the Section 36 Consent (Variation 01) comprised five WTGs of dimensions up to a 250m rotor diameter, 160m hub height and 285m blade tip height, and one WTG of dimensions up to a 220m rotor diameter, 145m hub height and 255m blade tip height.

1.3 The proposed 2025 variation to the Section 36 Consent (Variation 02) comprises six WTGs located in the same positions as the WTGs assessed in the Variation 01 application, but with an increase in the WTG dimensions up to a maximum of a 260m rotor diameter, 190m hub height and 300m blade tip height. This represents a return to the maximum dimensions consented under the Original S36 Consent, although the number of WTGs remains reduced from seven to six, as is the case with the Consented Project.

2.0 Introduction

2.1 This report has been prepared by SLR Consulting Limited in relation to Variation 02 for the Project. It sets out a comparison between the Original S36 consent, the Consented Project (assessed in Variation 01), and Variation 02, the current proposal. This report should be read in conjunction with the comparative wirelines presented in Figure S32C-1 to Figure S32C-10 and the updated cumulative wirelines and plan presented in Figure S32C-11 to Figure S32C-21, which accompany this report.

2.2 The number and dimensions of the WTGs for the Original S36 Consent, the Consented Project (assessed in Variation 01) and the proposed Variation 02 are set out in Table A below.

Table A: Comparison between the Original S36 Consent, the Consented Project and Proposed Variation 02 WTG dimensions

Layout	Number of WTGs	Rotor Diameter	Hub Height
Original S36 Consent	7 in total	7 WTG @ 260m	7 WTG @ 170m
Consented Project (Variation 01)	6 in total	5 WTG @ 250m 1 WTG @ 220m	5 WTG @ 160m 1 WTG @ 145m
Proposed Variation 02	**6 in total**	**6 WTG @ 260m**	**6 WTG @ 170m**

2.3 The table illustrates an increase in maximum dimensions for the six WTGs assessed in the Consented Project (Variation 01) and proposed in Variation 02, with rotor diameter and hub

height increased by 10m and the blade tip height increased by 15m for the five WTGs. For the one smaller WTG in the Consented Project, the increases will be 40m for rotor diameter, 25m for hub height and 45m for blade tip height. The layout of the WTGs remains unaltered, although it should be noted that the layout is indicative and has been used to illustrate a worst-case scenario by locating the WTGs at the furthest extents of the WTG footprint area, whilst also keeping the WTGs closest to shore.

2.4 While the maximum hub height is 190m, the overall worst-case scenario for Seascape, Landscape and Visual Impact Assessment (SLVIA) will comprise the maximum dimensions for blade tip height (300m) and rotor dimensions (260m) which leads to the slightly lower hub height of 170m. This was the worst-case scenario applied in the Original EIAR to also ensure that the maximum blade tip height and maximum rotor diameter were applied.

2.5 This report considers how the changes to the maximum WTG dimensions proposed for Variation 02 will alter the appearance of the Project and how they may affect the potential seascape, landscape and visual effects that were re-assessed in the SLVIA for Variation 01 which is the currently Consented Project.

2.6 It should also be highlighted that consent for the original project design, the Original S36 Consent, comprising seven turbines at 300m, was granted in 2023. Seascape, landscape and visual effects for this larger scheme were considered acceptable and, therefore, reference is also made to the Original S36 Consent, where appropriate.

3.0 Methodology

3.1 The aim of this assessment is to compare the effects of Variation 02 with the effects of the Consented Project, assessed in Variation 01. The methodology used for this review is consistent with the SLVIA Methodology presented in the Original EIAR. The effects of Variation 02 are assessed against the baseline comprising the Consented Project (Variation 01) which, owing to its consented status, can be regarded as part of the 'predicted baseline'.

3.2 The assessment takes account of the acceptability of the offshore wind farm development in this location and of this scale, as denoted through the previous consent of both the original project design (consented in 2023) and the Variation 01 project design (consented in 2024), and therefore assesses the magnitude of change arising from changes to the WTG dimensions relative to the Consented Project.

4.0 Cumulative Context

4.1 When submitting a variation to a consented wind farm development it is usual practice to prepare a revised cumulative assessment, taking into account any changes to the cumulative context that may have occurred since the Project was consented.

4.2 The Variation 01 application did not include a revised cumulative assessment as, following a review of the cumulative context, it was not deemed necessary as there had been no material change to this since the Original EIAR was submitted.

4.3 A review of the cumulative context was carried out in September 2025, and this is illustrated on Figure S36C-11. The main changes in the cumulative context since the Original EIAR and Variation 01 application, are the construction of Limekiln Wind Farm and Extension, which are now operational. This development comprises 24 WTGs with a blade tip height of 149.9m, located in the Limekiln coniferous plantation approximately 3km to the south of Reay. The construction of Strathy Wood and Strathy South has also started. This changes the status of the Limekiln Wind Farm from consented to operational, Limekiln Extension from application to operational and Strathy Wood and Strathy South from consented to under construction, making these wind farms part of the baseline assessment rather than just the cumulative assessment.

4.4 Other updates to the cumulative context since the Variation 01 application, which are relevant to the comparative assessment, include: the consenting of Bettyhill Phase 2 to the south of the operational Bettyhill; and the applications for Melvich and Kirkton Energy Park (at appeal) proposed to the west of the A897, south of Melvich Bay. The scoping stage Cairnmore Hill Resubmission also came forward as an application and is now at appeal.

4.5 Some projects that were considered in the Original EIAR are no longer in the planning system. This includes the removal of Ackron Wind Farm from the planning system and the dismissal of Drum Hollistan at appeal. However, a further resubmission for Ackron has now been scoped.

4.6 Within the cumulative assessment West of Orkney Wind Farm has changed in status from scoping to consented stage, which has enabled the proposed layout to be included in the cumulative wirelines and the assessment.

4.7 In the Original EIAR the West of Orkney Wind Farm was included in the Scenario 3 cumulative assessment but is now included in Scenarios 1, 2 and 3.

4.8 Whilst there are other changes to the cumulative context for Variation 02, these are unlikely to materially alter its cumulative effect.

5.0 Comparative Assessment of Visual Effects

5.1 Comparative wirelines have been prepared which illustrate the changes in appearance between the Consented Project (Variation 01) and Variation 02. These are presented in Figure S32C-1 to Figure S32C-10 that accompany this report. The ‘a’ figures present the wirelines included in the Variation 01 application, while the ‘b’ figures present the wirelines for Variation 02. As for the Variation 01 application, ten of the key viewpoints from the Original EIAR, which show the fullest visibility of the Project, have been selected to represent the proposed changes.

5.2 As the Consented Project and Variation 02 comprise the same number of WTGs located in the same positions, the focus of the reassessment is the difference between the dimensions of the WTGs. The increase of the rotor diameter and hub height by 10m and the blade tip height by 15m for five of the WTGs, indicates the incremental nature of the change and explains why there is very little perceptible difference between the Consented Project design presented in Variation 01 and the proposed project design presented in Variation 02, as illustrated in the wirelines.

5.3 The smaller dimensions of the one smaller WTG in the Variation 01 wirelines, make it appear further away. While the increases in dimensions for Variation 02 for this WTG are more notable, these simply make the WTG appear the same size as the other WTGs and more part of the group than appearing more distant. This change, therefore, has a positive rather than a negative effect on the appearance of the WTGs, by increasing consistency between the WTGs. To avoid repetition, this point applies to the updated comparative assessments for all of the viewpoints presented in Table B below.

5.4 A comparative assessment of the Consented Project assessed in Variation 01, and Variation 02 is presented. This highlights that although there is a small increase in the dimensions of the WTGs for Variation 02, these differences would not be sufficient to alter the rating of magnitude of change or change a not significant effect into a significant effect. This conclusion is consistent with the Variation 01 SLVIA Report which stated that, conversely, the incremental reduction in height would not alter the rating of magnitude of change or change a significant effect into a not significant effect.

5.5 The Variation 01 application presented a layout in which the WTGs were notably more compact than the Original Application. As the Variation 02 WTGs are in the same locations

as the Variation 01 WTGs, this means that the improvements of the reduced footprint, when compared to the Original Application, are carried over into Variation 02.

5.6 The other factor considered in the reassessment is the additional baseline influence from the operational Limekiln Wind Farm and Extension. This affects the assessment from viewpoints in which Limekiln Wind Farm and Extension have a notable close-range effect, establishing a context in which the influence of the more distant Project would be moderated.

Table B: Comparison between assessment of Variation 01 (the Consented Project design) and Variation 02

Viewpoint	Original EIAR	Variation 01 in comparison to the Original Scheme	Variation 02 in comparison to Consented Project (Variation 01)
1 Beinn Ratha	Figure S32C-1a Sensitivity - medium-high Magnitude of change – medium-high Significant at a major / moderate level	Figure S32C-1b Reduction in horizontal extent readily apparent. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and overall effect of introducing WTGs into undeveloped seascape. WTG1 appears slightly larger than the five larger WTGs owing to the location of WTG1 closest to shore and the limited difference in blade tip height of 30 m. The effect will remain significant at a major / moderate level.	Figure S32C-1c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension alters the baseline by establishing a close-range influence from wind farm development, with 24 WTGs readily visible at a minimum of 1.6km to the east. This will reduce the magnitude of change from medium-high to medium. The larger number and perceived larger scale of the Limekiln WTGs, will moderate the influence of the proposed offshore WTGs owing to the closer proximity and greater influence of the Limekiln WTGs. The presence of the under construction Strathy South and Strathy Wood to the west and close to Strathy North have a limited further influence on the wider context. The effect will remain significant although reducing to a moderate level.
2 Strathy Point Car Park	Figure S32C-2a Sensitivity - medium-high Magnitude of change – medium-high Significant at a major / moderate level	Figure S32C-2b Reduction in horizontal extent readily apparent, especially with reference to Hoy in background. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and overall effect of introducing WTGs into undeveloped seascape. WTG1 appears similar in size to the five larger WTGs owing to the location of WTG1 in the row of the array	Figure S32C-2c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension has a limited effect on the baseline owing to the minimum separation distance of 16km and the extent of screening by landform as experienced from this viewpoint. This means that despite its addition to the baseline, the magnitude of change will

Viewpoint	Original EIAR	Variation 01 in comparison to the Original Scheme	Variation 02 in comparison to Consented Project (Variation 01)
		closest to shore and the limited difference in blade tip height of 30 m. The effect will remain significant at a major / moderate level.	not be altered and will remain medium-high. The effect will remain significant at a major / moderate level.
3 Portskerra /Melvich	Figure S32C-3a Sensitivity - medium-high Magnitude of change – medium-high Significant at a major / moderate level	Figure S32C-3b Reduction in horizontal extent readily apparent and WTGs appear very evenly spaced. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and overall effect of introducing WTGs into undeveloped seascape. WTG1 appears similar in size to the five larger WTGs owing to the limited difference in height of 30 m and the location of WTG1 in the row of the array closest to shore. The effect will remain significant at a major / moderate level.	Figure S32C-3c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension has no effect on the baseline owing to the absence of visibility from this viewpoint. The effect will remain significant at a major / moderate level.
4 Drum Holliston Car Park	Figure S32C-4a Sensitivity - medium-high Magnitude of change – medium-high Significant at a major / moderate level	Figure S32C-4b Reduction in horizontal extent readily apparent although grouping of WTGs with gap between arises. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and overall effect of introducing WTGs into undeveloped seascape. WTG1 appears slightly larger than the five larger WTGs owing to the location of WTG1 closest to shore and the limited difference in blade tip height of 30 m. The effect will remain significant at a major / moderate level.	Figure S32C-4c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension alters the baseline by establishing a close-range influence from wind farm development, with 24 WTGs readily visible at a minimum of 4.9km to the south-east. While the presence of the Limekiln WTGs, visible in the opposite sector to Variation 02 will increase the extent and influence of wind farm development in the baseline context, this will not be sufficient to alter the magnitude of change which will remain medium-high. The effect will remain significant at a major / moderate level.
5 Sandside Headland	Figure S32C-5a Sensitivity - medium Magnitude of change – medium-high	Figure S32C-5b Reduction in horizontal extent readily apparent although overlap between central WTGs arises.	Figure S32C-5c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will

Viewpoint	Original EIAR	Variation 01 in comparison to the Original Scheme	Variation 02 in comparison to Consented Project (Variation 01)
	Significant at a moderate level	Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and overall effect of introducing WTGs into undeveloped seascape. WTG1 appears slightly larger than the five larger WTGs owing to the limited difference in blade tip height of 30 m and the location of WTG1 closest to shore. The effect will remain significant at a moderate level.	not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension alters the baseline by establishing a close-range influence from wind farm development, with 24 WTGs readily visible at a minimum of 5.1km to the south. While the presence of the Limekiln WTGs, visible in the opposite sector to Variation 02 will increase the extent and influence of wind farm development in the baseline context, this will not be sufficient to alter the magnitude of change which will remain medium-high. The effect will remain significant at a moderate level.
6 St Mary's Chapel, Forss	Figure S32C-6a Sensitivity - medium-high Magnitude of change – medium-low Not significant at a moderate level	Figure S32C-6b Reduction in horizontal extent readily apparent and WTGs appear very evenly spaced. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and moderating effect of close range operational Forss WTGs. WTG1 appears similar in size to the five larger WTGs owing to the limited difference in blade tip height of 30 m and the location of WTG1 in the row of the array closest to shore. The effect will remain not significant at a moderate level.	Figure S32C-6c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension has no effect on the baseline owing to the absence of visibility from this viewpoint. The effect will remain not significant at a moderate level.
7 Dunnet Head	Figure S32C-7a Sensitivity - medium-high Magnitude of change – medium-low Significant at a moderate level	Figure S32C-7b Reduction in horizontal extent apparent, albeit less so from more distant range and with grouping of WTGs remaining. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and moderating effect of separation distance and other distant wind farm influences. Any differences in blade tip height between the WTGs will not be	Figure S32C-7c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension will have a limited effect on the baseline owing to its location a minimum of 26.2km to the east of the viewpoint and the baseline influence from other closer range wind farms in the same and other sectors. There will be no change to the magnitude of change, and the effect

Viewpoint	Original EIAR	Variation 01 in comparison to the Original Scheme	Variation 02 in comparison to Consented Project (Variation 01)
		discernible from this viewpoint owing to the separation distance of 28km. The effect will remain significant at a moderate level.	will remain significant at a moderate level.
10 A836 East of Forss	Figure S32C-8a Sensitivity - medium-high or medium Magnitude of change – medium-low Not significant at a moderate level	Figure S32C-8b Reduction in horizontal extent readily apparent and WTGs appear very evenly spaced. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and moderating effect of operational wind farms and other developments. WTG1 appears similar in size to the five larger WTGs owing to the limited difference in height of 30 m and the location of WTG1 in the row of the array closest to shore. The effect will remain not significant at a moderate level.	Figure S32C-8c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension has a limited effect on the baseline owing to the closer range influence of Baillie Hill Wind Farm at 4.0km and Forss Wind Farm at 3.4km. The location of Limekiln Wind Farm and Extensions is 10.3km from the viewpoint and set behind Baillie Hill Wind Farm. This means that despite its addition to the baseline, the magnitude of change will not be altered and will remain medium-low. The effect will remain not significant at a moderate level.
13 A' Mhoine	Figure S32C-9a Sensitivity - high Magnitude of change – low Not significant at a moderate / minor level	Figure S32C-9b Reduction in horizontal extent apparent, albeit less so from more distant range and with WTGs visible to only very limited extents. Although there will be a slight reduction in the magnitude of change, the overall assessment will remain unaltered owing to the incremental nature of reductions and moderating effect of separation distance and limited extents of visibility. Any differences in height between the WTGs will not be discernible from this viewpoint owing to the separation distance of 34km and the screening effect of the intervening landform. The effect will remain not significant at a moderate / minor level.	Figure S32C-9c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint. The presence of Limekiln Wind Farm and Extension has no effect on the baseline owing to the absence of visibility from this viewpoint. The effect will remain not significant at a moderate / minor level.
14 Ben Dorrery	Figure S32C-10a Sensitivity - medium Magnitude of change – medium-low	Figure S32C-10b Reduction in horizontal extent readily apparent and spacing of WTGs improved. Although there will be a slight reduction in the magnitude of change,	Figure S32C-8c Variation 02 will give rise to a 15m increase in blade tip height compared to Variation 01; a difference which will not be readily discernible from this viewpoint.

Viewpoint	Original EIAR	Variation 01 in comparison to the Original Scheme	Variation 02 in comparison to Consented Project (Variation 01)
	Not significant at a moderate / minor level	the overall assessment will remain unaltered owing to the incremental nature of reductions and moderating effect of separation distance and other distant wind farm influences. WTG1 appears similar in size to the five larger WTGs owing to the limited difference in blade tip height of 30 m and the location of WTG1 in the row of the array closest to shore. The effect will remain not significant at a moderate / minor level.	The presence of Limekiln Wind Farm and Extension has a limited effect on the baseline owing to the influence of Baillie Hill Wind Farm at 10.1km in the same sector of the view and the wider influence of wind farm development with a dense cluster at 9.0km to the south-east including Achlachan, Camster, Causeymire and Halsary. The presence of Strathy South and Strathy Wood have a limited effect on the baseline context due to distance and intervening landform. The magnitude of change will not be altered and will remain medium-low. The effect will remain not significant at a moderate / minor level.

6.0 Comparative Assessment of Cumulative Effects

6.1 This comparative cumulative assessment presents a comparison with the assessment presented in the Original EIAR. Information has been collected to present the current cumulative context in the Study Area (the associated 50 km around the Array Area), as defined for the Original Application and the Consented Project (Variation 01). A reassessment of the cumulative effects was not undertaken as part of the Variation 01 application as there were no notable changes to the cumulative baseline at the time of application which would have notably altered the cumulative assessment.

6.2 The methodology for this comparative cumulative assessment follows the methodology set out in the SLVIA of the Original EIAR.

6.3 All operational and under construction wind farms have been included as part of the baseline situation in the main assessment. The cumulative effect of the Project in conjunction with the operational and under construction wind farms and other large-scale energy developments is also considered as part of the baseline in relation to the following cumulative scenarios.

- Cumulative Scenario 1 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction and **consented** wind farms and other large-scale energy developments.
- Cumulative Scenario 2 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction, consented and **application or appeal stage** wind farms and other large-scale energy developments.
- Cumulative Scenario 3 assesses the effects of adding the Project to a cumulative situation comprising all operational, under construction, consented, application wind farms and other large-scale energy developments as well as relevant **scoping stage** wind farms.

6.4 Projects that are at the pre-planning or scoping stage are generally not considered in the assessment of cumulative effects because firm information on which to base the assessment is not available. Ackron Resubmission, which is an onshore wind farm at the scoping stage, has been included owing to its close proximity to a number of the representative viewpoints.

6.5 The most notable changes to the baseline and cumulative context at Scenario 1 is the change in status of Limekiln Wind Farm from consented to operational and Limekiln Extension from application to operational. Strathy Wood and Strathy South have also changed from consented to being under construction, however, their influence on the cumulative context is less marked due to their location further inland and to the south of the operational Strathy North. The change in status from scoping to consented of the Betty Hill Extension/Phase 2 will have an influence further west. However, the change in status of the West of Orkney Wind Farm from scoping to consented makes it the most notable cumulative influence in Scenario 1.

6.6 The removal of Drum Hollistan will reduce the cumulative interactions associated with onshore wind farms at Scenario 2. However, the application and appeal status of the Melvich and Kirkton Energy Park respectively and the appeal status of the Cairnmore Hill Resubmission add to the cumulative interactions with onshore wind farms inland from the coast.

6.7 Scenario 3 considers all of the projects considered in Scenarios 1 and 2 and also includes the revised Ackron Resubmission which is currently at scoping stage, due to its proximity to the Consented Project and the coastline.

6.8 Table C sets out the reassessment of the cumulative effects. Whilst the potential changes to the cumulative context generally result in some minor alterations to the cumulative magnitude of change, grey boxes denote where the assessment of effects has changed from being not significant in the Original EIAR assessment, to significant in this Variation 02 assessment or vice versa. The predominance of white boxes highlights the few incidences of a changed assessment. Essentially the Project will be added into a cumulative context in which onshore wind farm development already has an influence and in which offshore wind farm development will also have an influence in Scenarios 1, 2 and 3. This baseline influence generally moderates the additional influence of the Project, particularly as it comprises a very small number of turbines, for example, compared to the much larger, consented, West of Orkney Wind Farm.

6.9 Changes to the Scenario 1 cumulative assessment occur in respect of Viewpoint 2: Strathy Point Car Park and Viewpoint 3: Portkskerra/Melvich where the cumulative magnitude of change has increased to medium and moderate significant effects are assessed. The West of Orkney Wind Farm establishes a cumulative context whereby it would appear as a large scale but distant incidence of offshore wind farm development with the Project appearing distinct from it and closer to these viewpoints but with a smaller horizontal field of view.

6.10 Changes to the Scenario 2 cumulative assessment occur in respect of Viewpoint 1: Beinn Ratha, and Viewpoint 2: Strathy Point Car Park where the cumulative magnitude of change has increased to medium and moderate significant effects are assessed, largely as a result of the influence of West of Orkney Wind Farm, which is part of the Scenario 2 context with some additional onshore wind farms also visible.

6.11 These are not new or additional effects of the Project as such effects were assessed within the Original EIAR when it was assessed in the cumulative context of West of Orkney Wind Farm in Scenario 3. Such effects were considered acceptable in the consenting of the original Project design, which had a larger footprint (and horizontal field of view) than the proposed Variation 02.

6.12 Changes to the Scenario 3 cumulative assessment have not given rise to any changes to the significance when compared with the Original EIAR assessment.

Table C: Comparative Assessment of Cumulative Effects

Viewpoint / Sensitivity	Original EIAR Scenario 1	Original EIAR Scenario 2	Original EIAR Scenario 3	Variation 02 Scenario 1	Variation 02 Scenario 2	Variation 02 Scenario 3
1 Beinn Ratha Medium-high	Medium **Significant (moderate)**	Medium-low **Not significant (moderate)**	Medium **Significant (moderate)**	At Scenario 1, Limekiln and Limekiln Extension will be seen at close range and will moderate the cumulative influence of the Project, which will be seen to the fore of the more distant and larger scale West of Orkney wind farm (WF). The presence of the Project at closer range occurs in the same part of the view. Medium **Significant (moderate)**	At Scenario 2, there is further influence of onshore wind farm development from Melvich and Kirkton to the west and Cairnmore Resubmission to the north east, beyond the operational Baillie Hill. Medium **Significant (moderate)**	At Scenario 3, Ackron Resubmission will further expand onshore wind farm development, and in this context the addition of the Project will also lead to a significant effect. Medium **Significant (moderate)**
2 Strathy Point Car Park Medium-high	Low **Not significant (moderate/minor)**	Medium-low **Not significant (moderate)**	Medium **Significant (moderate)**	At Scenario 1, the Project will be seen in a different part of the sea view to the more distant and larger scale West of Orkney WF and to the fore of the Orkney Islands. Medium **Significant (moderate)**	At Scenario 2, the Project will be seen in a similar context to Scenario 1 with only distant additions to the onshore wind farm context. Medium **Significant (moderate)**	At Scenario 3, Ackron Resubmission will further expand onshore wind farm development, and in this context the addition of the Project will also lead to a significant effect. Medium **Significant (moderate)**
3 Portskerra /Melvich Medium-high	Limited potential for significant cumulative effects	Medium **Significant (moderate)**	Medium **Significant (moderate)**	At Scenario 1, the Project will be seen to the right of the more distant and larger scale West of Orkney WF, to the left of the Orkney Islands. there are no other large scale energy developments readily visible. Medium **Significant (moderate)**	At Scenario 2, Melvich is theoretically visible to the south with a small number of hubs and blades visible above the skyline. However, in reality is screened by the intervening property from this viewpoint. Medium **Significant (moderate)**	At Scenario 3, Ackron Resubmission will further expand onshore wind farm development, and it is in this context that the addition of the Project will also lead to a significant effect. Medium **Significant (moderate)**
4 Drum Holliston Car Park Medium-high	Medium **Significant (moderate)**	Medium **Significant (moderate)**	Medium **Significant (moderate)**	At Scenario 1, the Project will be seen to introduce offshore wind farm development in a cumulative context in which onshore wind farms already have an influence and will be seen to the fore of the eastern extent of the more distant West of Orkney WF Medium **Significant (moderate)**	At Scenario 2, the Cairnmore Hill resubmission would be added to the onshore wind farm influence. Medium **Significant (moderate)**	There will be no additional cumulative effect compared to the Scenario 2 assessment as the visibility of Ackron Resubmission is limited to a small tip. Medium **Significant (moderate)**
5 Sandside Headland Medium	Medium **Significant (moderate)**	Medium **Significant (moderate)**	Medium **Significant (moderate)**	At Scenario 1, the Project will be seen to introduce offshore wind farm development in a cumulative context in which onshore wind farms already have an influence, and the Project will be seen to the fore of the eastern extent of the more distant West of Orkney WF. Medium **Significant (moderate)**	At Scenario 2, the Cairnmore Hill resubmission would be added to the onshore wind farm influence.. Medium **Significant (moderate)**	There will be no additional cumulative effect compared to the Scenario 2 assessment. Medium **Significant (moderate)**
6 St Mary's Chapel, Forss Medium-high	Limited potential for significant cumulative effects	Medium-low **Not significant (moderate)**	Medium-low **Not significant (moderate)**	At Scenario 1, the close-range influence from operational Forss Wind Farm and consented Forss III Extension will moderate the cumulative influence of the Project, which will be seen to the fore of the western extent of the more distant West of Orkney WF. Medium **Not significant (moderate)**	At Scenario 2, the Cairnmore Hill Resubmission would be seen to the east close to the skyline, adding to the onshore wind farm context. Medium **Not significant (moderate)**	There will be no material additional cumulative effect compared to the Scenario 2 assessment. Medium **Not significant (moderate)**
7 Dunnet Head Medium-high	Low **Not significant (moderate/minor)**	Low **Not significant (moderate/minor)**	Medium-low **Not significant (moderate)**	At Scenario 1, the distant range of the Project at 28km will limit its influence on the cumulative effect, however it will be seen in a different part of the view from the more distant West of Orkney OWF, extending the wind farm influence across the seascape. It will be seen in the context of the wider onshore wind farm development which would also	At Scenario 2, there will be an increase in the onshore wind farm context with the addition of Lochend Extension, Cairnmore Hill Resubmission and other more distant onshore wind farms as part of existing clusters. Medium-low **Not significant (moderate)**	There will be no material additional cumulative effect compared to the Scenario 2 assessment. Medium-low **Not significant (moderate)**

Viewpoint / Sensitivity	Original EIAR Scenario 1	Original EIAR Scenario 2	Original EIAR Scenario 3	Variation 02 Scenario 1	Variation 02 Scenario 2	Variation 02 Scenario 3
				include Hollandmey and Slickly as well as other more distant consented onshore wind farms. Medium-low **Not significant (moderate)**		
10 A836 East of Forss Medium-high / Medium	Medium-low **Not significant (moderate)**	Medium-low **Not significant (moderate)**	Medium-low **Not significant (moderate)**	At Scenario 1, the cumulative effect of the Project will be moderated by the closer range influence of operational wind farms along with Forss III and Hill of Lybster and The West of Orkney WF, which extends across the seascape. Medium-low **Not significant (moderate)**	At Scenario 2, Cairnmore Hill Resubmission will be visible at close range and Melvich at a moderate range adding to the onshore wind farm context. Medium-low **Not significant (moderate)**	At Scenario 3, Ackron Resubmission will further expand onshore wind farm development at a moderate distance and partially screened. Its addition to the onshore cumulative context is not material. There will be no additional cumulative effect compared to the Scenario 2 assessment. Medium-low **Not significant (moderate)**
13 A' Mhoine High	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low **Not significant (moderate/minor)**	At Scenario 1, the cumulative effect of the Project will be moderated by the very limited addition it will make in the context of The West of Orkney WF, which extends across the seascape. Low **Not significant (moderate / minor)**	At Scenario 2, there will be no additional cumulative effect compared to the Scenario 1 assessment due to the very limited visibility of other wind farms. Low **Not significant (moderate / minor)**	There will be no additional cumulative effect compared to the Scenario 2 assessment. Low **Not significant (moderate / minor)**
14 Ben Dorrery Medium	Medium-low **Not significant (moderate/minor)**	Medium-low **Not significant (moderate/minor)**	Medium-low **Not significant (moderate/minor)**	At Scenario 1, the cumulative effect of the Project will be moderated by the separation distance and the closer range influence of the onshore wind farms along with the very limited addition it will make in the context of The West of Orkney WF, which extends across the seascape a long distance away. Medium-low **Not significant (moderate/minor)**	At Scenario 2, the influence of onshore wind farms will be added to by a number of application/appeal stage wind farms including Tormsdale, Achlachan 2 Redesign, Cairnmore Hill Resubmission at a moderate distance. Medium-low **Not significant (moderate/minor)**	At Scenario 3, Ackron Resubmission will further expand onshore wind farm development at a moderate distance and partially screened. Its addition to the onshore cumulative context is not material. There will be no additional cumulative effect compared to the Scenario 2 assessment. Medium-low **Not significant (moderate/minor)**

7.0 Summary

7.1 A comparative study of seascape, landscape and visual effects has been conducted between the proposed Variation 02 and the Consented Project assessed in Variation 01, where the WTG parameter changes proposed comprise a small increase in the maximum size of the hub height, rotor diameter and blade tip height, with the WTGs remaining in the same locations as in Variation 01 assessment. The change in the maximum dimensions of the WTGs essentially presents a return to the maximum dimensions presented in the Original EIAR for the Project, albeit with just six turbines included in Variation 02, compared to seven included in the Original EIAR. The presence of operational Limekiln Wind Farm and Extension as part of the baseline has also been considered in the reassessment.

7.2 Comparative wirelines have been used to illustrate the differences in appearance between the Consented Project (Variation 01) and Variation 02 in respect of ten of the 14 viewpoints used in the SLVIA. These show the very limited difference that the potential incremental height increase of the WTGs would have. The proposal to have WTGs of a consistent height is considered to be a positive change compared with the Consented Project. The findings of the reassessment are that there will be no change to the occurrence and levels of significance assessed in comparison with the iterations shown in both the Variation 01 application and the Original EIAR, the latter of which included WTGs of the same scale, over a larger footprint and which were considered acceptable.

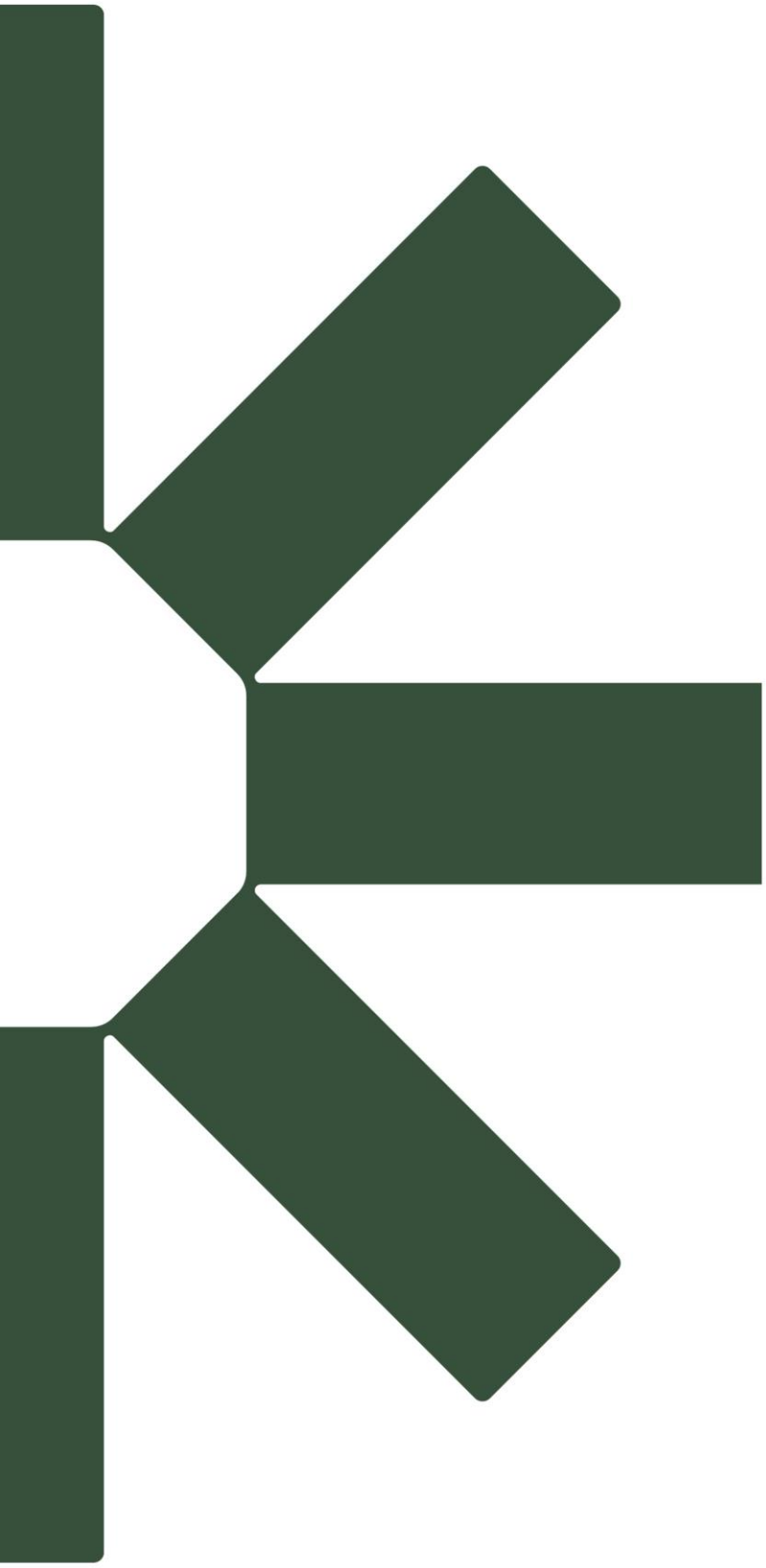
7.3 The only notable difference to the main assessment occurs in respect of Viewpoint 1 Beinn Ratha, where the baseline influence of Limekiln Wind Farm and Limekiln Extension will have a moderating effect, reducing the magnitude of change from medium-high to medium, and while not changing the assessment of a significant effect, reducing the level from major / moderate to moderate.

7.4 Although the status of some of the cumulative projects has changed and some onshore wind farm projects have been removed from or added to the planning system, the findings of the cumulative assessment remain generally consistent with the SLVIA for the Original EIAR with only changes in the assessment of magnitude of change and no changes to the significance of effect. This is owing to a similar context in which the offshore cumulative context is defined by the West of Orkney Wind Farm, albeit changed in status from scoping to consented stage at the time of this assessment; and the onshore context is defined by a combination of Limekiln and Limekiln Extension, Baillie Hill and Forss, all of which have a presence and influence along the north coast of Caithness and Sutherland.

7.5 This is with the exception of the assessments for Viewpoint 1 Beinn Ratha, Viewpoint 2 Strathy Point Car Park and Viewpoint 3: Portskerra /Melvich where primarily the change in status of the Limekiln and Limekiln Extension onshore wind farms and the West of Orkney Wind Farm do result in some instances of change to the cumulative assessment. In the Scenario 1 assessment for Viewpoints 2 and 3 the magnitude of change is increased to medium resulting in a significant (moderate) effect. The cumulative magnitude of change in Scenario 2 is now assessed as medium for Viewpoints 1 and 2 resulting in moderate significant cumulative effects, which also largely occur as a result in the change in status of the West of Orkney Wind Farm.

7.6 It is highlighted that these are not new or additional effects of the Project as such effects were assessed for the Original EIAR when it was assessed in the cumulative context of West of Orkney Wind Farm in Scenario 3. Such effects were considered acceptable in the consenting of the Project, which had a larger footprint (and horizontal field of view) than Variation 02.

7.7 It is also worth noting that any subsequent proposals for onshore or offshore wind farms within the Study Area will have to consider the cumulative effect with the Project. This was the case for the West of Orkney Wind Farm, which included the original project design i.e. seven turbines of up to 300m to tip, over a larger geographical extent than proposed by this Variation 02.



Making Sustainability Happen