



MacArthur
Green

West of Orkney Windfarm

Offshore Ornithology Additional Information

Introduction to the Additional Ornithology Information

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1 SUMMARY OF THE OFFSHORE ORNITHOLOGY EIA AND HRA

1. The West of Orkney Windfarm (‘the Project’) offshore Project area, comprising the Option Agreement Area (OAA) and Export Cable Corridor (ECC), lies to the west of Orkney and the north of mainland Scotland (Figure 1-1).

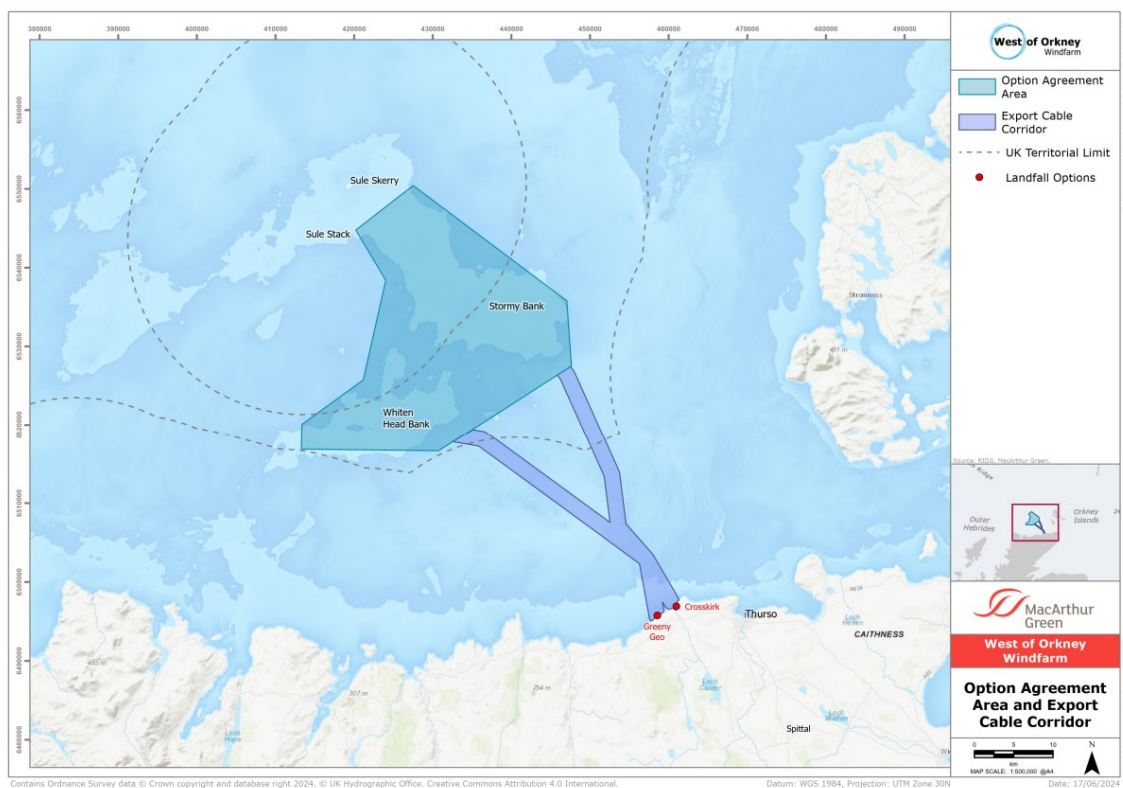


Figure 1-1. Location of the Project including the Option Agreement Area (OAA), within which the wind turbine generators will be installed, and Export Cable Corridor (ECC)

2. A Section 36 Consent application¹ was submitted to Marine Directorate - Licensing Operations Team (MD-LOT) on 18 September 2023. MD-LOT subsequently advised (8 February 2024, by email) that the offshore ornithology assessment must be revisited, revised and resubmitted as a standalone, complete ornithology assessment in line with NatureScot guidance, as set out in the NatureScot representation². This Ornithology Additional Information (OAI) is provided to fulfil this requirement.
3. The OAI comprises an [Addendum to the Offshore Ornithology Environmental Impact Assessment \(EIA\) Chapter](#), an [Addendum to the Report to Inform the Appropriate Assessment \(RIAA\)](#), and a series of technical appendices containing additional detail on approaches used and all results of the impact assessments undertaken to support the EIA and Habitats Regulations Appraisal (HRA) assessments. More information on the structure of the OAI and key findings of the assessments is provided below.

¹ [Section 36 Consent - Construction and Operation of Offshore Generating Station and Offshore Transmission Infrastructure - West of Orkney Windfarm - West of Hoy, Orkney | marine.gov.scot](#)

² [Representations - West of Orkney Windfarm - West of Hoy, Orkney | marine.gov.scot](#)

4. Approaches used to inform the EIA and HRA assessments presented in the OAI were discussed and agreed in detail with NatureScot in a series of consultation meetings during April to July 2024. NatureScot online guidance³ notes and/or Project-specific advice was followed throughout the assessments.
5. To inform the assessments, monthly digital aerial surveys were flown over the OAA (the area in which the Applicant proposes to install wind turbine generators, WTGs) during July 2020 to September 2022, inclusive. Guillemots were the most frequently recorded species, followed by puffin, and fulmar. Kittiwake and gannet were also frequently recorded. Great black-backed gull, razorbill, great skua, European storm petrel and Arctic tern were present in low numbers.
6. Collision risk models were used to estimate the number of bird collisions per annum with the Project's WTG blades during operation. Total estimated collision mortality, under a worst-case scenario, was highest for kittiwake (56 birds per annum) and gannet (45 birds per annum). Great black-backed gull estimated collision mortality was lower (12 birds per annum) and great skua and Arctic tern mortality was very low (0.4 birds per annum for both species). Other species are assumed to fly too low to be at risk of collision.
7. Some birds are known to avoid areas, i.e. are displaced, following installation of an offshore wind farm. Estimated mortality of displaced birds was highest for guillemot (318 birds per annum) and puffin (197 birds per annum). Kittiwake, gannet and fulmar displacement mortality was lower (21, 43 and 26 birds per annum, respectively). Razorbill estimated displacement mortality was low (7 birds per annum), as was Arctic tern mortality (2 birds per annum). Other species are assumed to not be displaced.
8. Estimated collision and displacement mortalities from other offshore wind farms' applications were collated to inform a cumulative (EIA) and in-combination (HRA) assessment.
9. For the EIA assessment, the impact of estimated collision and displacement mortalities on regional seabird populations was evaluated. The assessment found both Project alone and cumulative impacts to have a negligible or minor adverse effect on regional populations. These impacts were not considered significant in EIA terms.
10. For the HRA assessment, estimated collision and displacement mortalities from both the West of Orkney Windfarm and other offshore wind farms were apportioned to SPAs. The mortality was apportioned according to how far the SPA was from the Project and the size of the SPA, both of which influence the likelihood of birds from a particular SPA being impacted by the Project. The boundary of the Sule Skerry & Sule Stack SPA is 1.7 km from the OAA boundary. Consequently, predicted Project alone mortality impacts to qualifying features of this SPA, guillemot, puffin and gannet, were relatively high (128, 81 and 26 SPA birds per annum, respectively). For kittiwake, SPAs which are predicted to be impacted by both the Project and other offshore wind farms along the east coast of Scotland had the greatest in-combination mortality, e.g. East Caithness Cliffs SPA (the Project contributed 7 birds to the estimated in-combination total of 270 birds per annum) and North Caithness

³ [Guidance Note 1: Guidance to support Offshore Wind Applications: Marine Ornithology - Overview | NatureScot](#)

Cliffs SPA (the Project contributed an estimated 6 birds to the in-combination total of 53 birds per annum).

11. Population viability analysis (PVA) found the puffin, gannet and fulmar populations to be not significantly impacted by the additional collision and displacement mortality. A PVA predicted growth rate of the guillemot population at Sule Skerry & Sule Stack SPA to be slightly reduced by Project alone and in-combination mortality. Growth rate of the kittiwake populations at East Caithness Cliffs SPA and North Caithness Cliffs SPA was also predicted to be slightly reduced by the additional mortality from the Project, in-combination with other offshore wind farms. Impacts on other SPA populations, were small.
12. The HRA assessment concluded no adverse effect on site integrity for all SPAs, with the exception of Sule Skerry and Sule Stack SPA (Project alone and in-combination impacts on the guillemot feature), East Caithness Cliffs SPA (in-combination impacts on the kittiwake feature) and North Caithness Cliffs SPA (in-combination impacts on the kittiwake feature).

2 INTRODUCTION

2.1 Project Summary

13. The offshore Project will comprise up to 125 WTGs, with fixed-bottom foundations, and up to five Offshore Substation Platforms (OSPs). The OAA is the area in which the WTGs, Offshore Substation Platforms and associated infrastructure, will be installed. The export cables will be located within the ECC, with landfall options at Greeny Geo and/or Crosskirk at Caithness (**Figure 1-1**).
14. The Applicant submitted an application for consent under Section 36 of the Electricity Act 1989 and Marine Licences under Part 4 of the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 to Scottish Ministers in September 2023 for the offshore components of the Project seaward of Mean High Water Springs (MHWS), the ‘offshore Project’. The offshore Project will consist of WTGs and all infrastructure required to transmit the power generated by the WTGs to shore.
15. In accordance with relevant EIA Regulations⁴, an Offshore EIA Report was submitted to MD-LOT as part of the Applicant’s consent application (the ‘Offshore EIA Report’). A Report to Inform Appropriate Assessment (RIAA) was also submitted as part of the Offshore Application to provide the Competent Authority (MD-LOT) with the information required to assist them in undertaking an Appropriate Assessment (AA) for the offshore Project as required under the Conservation (Natural Habitats & c.) Regulations 1994 (as amended), the Conservation of Marine Habitats and Species Regulations 2017 and The Conservation of Habitats and Species Regulations 2017 (as amended) (the ‘Habitats Regulations’).
16. Following the review of the Project’s application, and upon receipt of representations from consultees, MD-LOT issued a request for Additional Information on offshore ornithology. This report is part of the OAI.

2.2 Purpose of this Report

17. This report introduces the OAI for the Project. It explains the structure of the OAI, provides the purpose of each report and summarises the key findings in each report. This Introduction to the OAI report is provided to aid navigation around the OAI.
18. The report also explains the approach taken to post-application submission consultation that has been undertaken with stakeholders (NatureScot, MD-LOT and RSPB). A comments log is provided that explains how advice received has been considered and addressed (see **Table 4-1**).

2.3 Approach taken to addressing NatureScot and MD-LOT’s advice

19. NatureScot, in their interim advice on the Project’s application (dated 13 December 2023), advised that, “The assessment is not of sufficient quality for us to have any confidence in the process or its conclusions. As such, we cannot come to a view on the significance of the

⁴ The relevant EIA Regulations include the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017, and the Marine Works (Environmental Impact Assessment) Regulations 2007.

predicted effects to ornithological interests either under EIA or HRA”, adding that, “The entire ornithological assessment therefore needs to be completely revisited and must be based on the assessment approach as provided in NatureScot Guidance Notes⁵”.

20. To ensure that the OAI fully addressed all NatureScot’s concerns and that NatureScot’s guidance and advice was followed in its entirety, the Project team initiated consultation meetings with NatureScot, as well as with MD-LOT and the RSPB. Post-application submission consultation began with a workshop with NatureScot and MD-LOT (date 26 February 2024) in which clarification on approaches recommended in NatureScot’s guidance notes was sought. This was followed by an exchange of letters seeking further clarification (dated 11 March 2024 and 27 March 2024). NatureScot then agreed to a series of weekly consultation meetings between MacArthur Green (the Project’s ornithological consultant) and NatureScot ornithologists and Marine Sustainability Managers. These weekly meetings, running from 30 April 2024 to 2 July 2024, inclusive, enabled detailed technical discussions, ensuring clarity on all aspects of NatureScot’s recommended approach to EIA and HRA assessments and to resolve Project-specific issues with following that advice and guidance.
21. **Table 4-1 in Section 4** of this report lists all consultation advice received, post-application. The table provides information on how that advice has been addressed in the OAI.

⁵ [Guidance Note 1: Guidance to support Offshore Wind Applications: Marine Ornithology - Overview | NatureScot.](#)

3 OVERVIEW OF THE ORNITHOLOGY ADDITIONAL INFORMATION

3.1 Relationship between the original application and the OAI

22. The OAI includes an [Addendum to the Offshore EIA Report](#) in the form of a revised EIA chapter for Offshore and Intertidal Ornithology. All ornithology information in this report should be read in place of information in the original EIA chapter.
23. The OAI includes an [Addendum to the RIAA](#). All ornithology information in this report should be read in place of information in the original RIAA, with the exception of pre-application consultation information. A separate Addendum to the RIAA - All topics (excluding ornithology) has been produced for non-ornithology interests.
24. The OAI includes a set of nine technical appendices. These reports entirely replace the original Supporting Study 12: Offshore Ornithology Technical Supporting Study.

3.2 Structure of the Ornithology Additional Information

25. The OAI presents a full reassessment for offshore ornithology, for both EIA and to inform HRA. The OAI comprises thirty-six documents (12 reports and 24 annexes). To aid with navigating around the various documents, the full list of all documents is presented in **Table 3-1** and the structure of the OAI is presented below, in **Figure 3-1**.
26. Rather than separating the technical documents by the regulations they are relevant to (i.e. EIA or HRA), the technical documents are ordered by steps in the impact assessment process, i.e. a description of bird abundance and density in the offshore Project area, an estimate of collision and displacement impacts, and then assessment of those impacts against relevant marine bird populations (regional populations for EIA, SPA populations for HRA). Some technical documents support both EIA and HRA while others are relevant only to EIA or HRA. **Table 3-1** and **Figure 3-1**, as well as the title of each technical appendix, indicate which documents are relevant to EIA and/or HRA.

Table 3-1. List of documents in the West of Orkney Windfarm Ornithology Additional Information and whether they support the EIA and/or the HRA assessment.

Document Title	EIA	HRA
Introduction to the Additional Ornithology Information (this document)	✓	✓
Addendum to the Offshore EIA Report	✓	
Addendum to the Report to Inform Appropriate Assessment: HRA Stage 2 - SPA information to inform Appropriate Assessment (or 'Addendum to the RIAA' for short)		✓
Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report	✓	✓
Annex 1A: Digital video aerial survey report	✓	✓
Annex 1B: Abundance estimates per survey for all birds (sitting and flying)	✓	✓
Annex 1C: Abundance estimates per survey for all flying birds	✓	✓
Annex 1D: Design-based analysis abundance estimates from each survey of sitting birds	✓	✓
Annex 1E: Design-based analysis density estimates from each survey of all birds (sitting and flying)	✓	✓

Document Title	EIA	HRA
Annex 1F: Design-based density estimates from each survey of flying birds	✓	✓
Annex 1G: Design-based density estimates from each survey of sitting birds	✓	✓
Annex 1H: Design-based mean abundance estimates from each calendar month of all birds (sitting and flying)	✓	✓
Annex 1I: Design-based mean abundance estimates from each calendar month of flying birds	✓	✓
Annex 1J: Design-based mean abundance estimates from each calendar month of sitting birds	✓	✓
Annex 1K: Design-based mean density estimates from each calendar month of all birds (sitting and flying)	✓	✓
Annex 1L: Design-based mean density estimates from each calendar month of flying birds	✓	✓
Annex 1M: Design-based mean density estimates from each calendar month of sitting birds	✓	✓
Annex 1N: Number of birds present in transect segments	✓	✓
Annex 1O: MRSea model summaries and diagnostics	✓	✓
Annex 1P: Seabirds and Highly Pathogenic Avian Influenza: a review	✓	✓
Annex 1Q: Rarely recorded species information	✓	✓
Annex 1R: Comparison of design- and model-based abundance estimates	✓	✓
Annex 1S: SPA and regional population sizes	✓	✓
Appendix 2 - HRA: HRA Screening Technical Report		✓
Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report	✓	✓
Annex 3A: Survey densities and calendar month densities	✓	✓
Annex 3B: CRM input parameters from NatureScot March 2024	✓	✓
Annex 3C: Word output files from Caneco shiny app	✓	✓
Annex 3D: Bootstrapped densities inputs to CRM	✓	✓
Appendix 4 - EIA and HRA: Displacement Technical Report	✓	✓
Annex 4A: SeabORD Analysis Final Report	✓	✓
Appendix 5 - HRA: Apportioning Technical Report		✓
Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts		✓
Appendix 7 - EIA Cumulative mortalities at regional population scales	✓	
Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts		✓
Appendix 9 - EIA: PVA at regional population scales for Project alone and cumulative impacts	✓	

27. The structure of the OAI is illustrated below in **Figure 3-1**. It shows that the **Addendum to the Offshore EIA Report** and the **Addendum to the RIAA** are supported by a series of nine technical appendices which follow the logical sequence of the impact assessment process.

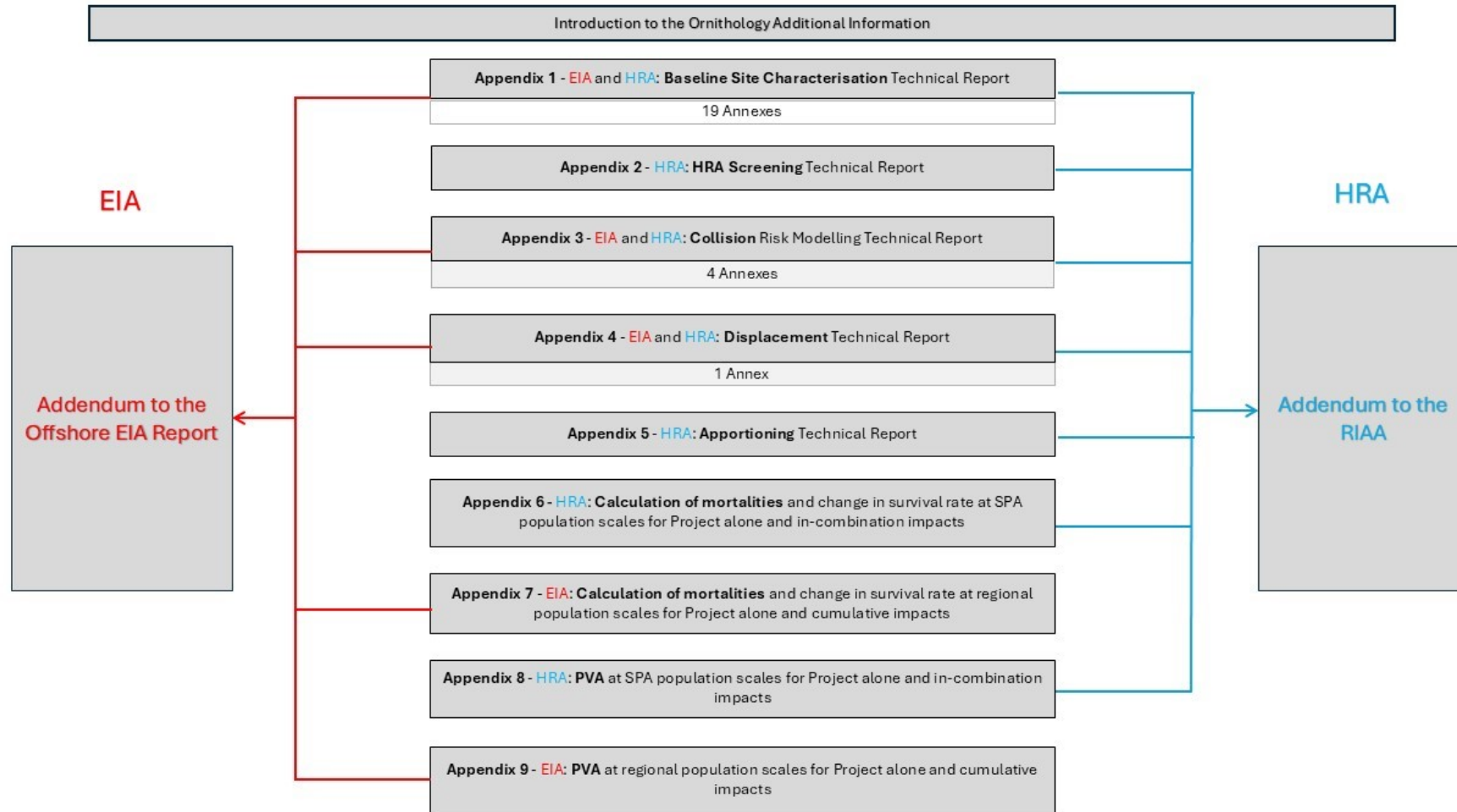


Figure 3-1. Structure of the Offshore Additional Information showing the series of technical appendices that describe the stages of impact assessment and how each of these stages contributes to EIA and/or HRA.

28. A summary of the key information presented in the [Addendum to the Offshore EIA Report](#) and [Addendum to the RIAA](#), as well as the nine technical appendices, is given in the sections below. Each section briefly summarises the structure of each report and provides a reference to key information presented in that report, to aid with navigation around the OAI. Additionally, the key findings in each report is also presented below, to give an overview of the EIA and HRA assessments.

3.3 Addendum to the Offshore EIA Report

3.3.1 Purpose and structure of report

29. The [Addendum to the Offshore EIA Report](#) updates the original West of Orkney Windfarm Offshore EIA Report, Volume 1, chapter 13: Offshore and intertidal ornithology⁶. This [Addendum to the Offshore EIA Report](#) covers:

- EIA legislation, policy and guidance (see Section 2 of the [Addendum to the Offshore EIA Report](#));
- Scoping and both pre-application and post-application consultation (see Section 3);
- Methods used for characterisation of bird presence, abundance, density and distribution in the offshore Project area, including the intertidal and nearshore area, the ECC, the OAA and associated zone of influence (i.e. 2 km buffer surrounding the OAA) (see Section 4);
- Assessment methodology used for EIA (see Section 5) which considered sensitivity of each feature to impacts and likely magnitude of impacts to determine the significance of effect;

30. The report then provides detail on the existing baseline (see **Section 6**) and identifies impacts requiring assessment that could arise during construction, operation and maintenance and decommissioning (see **Section 7.1**).

31. Impacts arising from the Project alone (see **Section 7.6**, **Section 7.7** and **Section 7.8**) and cumulatively with other OWFs (see **Section 8**), were assessed in the report. Seasonal and annual collision and displacement mortalities were assessed against regional populations and a PVA was run where required to determine potential population response to predicted mortalities.

32. Finally, the report considers ecosystem and transboundary effects (see **Section 11** and **Section 12**).

3.3.2 Key points in the report

33. The main impact pathways, that could occur during construction, operation and maintenance and decommissioning, requiring assessment as part of the EIA were:

- Disturbance and displacement by vessels and activities associated with the Project, for seabirds, breeding red-throated divers and wintering waterbirds (construction, operation and maintenance, and decommissioning of the Project);

⁶ [West of Orkney Windfarm EIA - Offshore Ornithology \(marine.gov.scot\)](#)

- Artificial lighting impacts, i.e. attraction to, disorientation, or avoidance of lighting on vessels and offshore infrastructure and associated energetic and demographic consequences, for Manx shearwater, European storm petrel and puffin (construction, operation and maintenance, and decommissioning of the Project);
 - Disturbance and displacement by vessels associated with the Project, for breeding red-throated divers and wintering waterbirds (operation and maintenance of the Project);
 - Collision risk, for kittiwake, great black-backed gull, Arctic tern, great skua and gannet (operation);
 - Displacement and barrier effects, for kittiwake, Arctic tern, guillemot, razorbill, puffin, fulmar and gannet (construction, operation and maintenance, and decommissioning of the Project); and
 - Indirect disturbance and displacement of prey species, for all marine birds (construction, operation and maintenance, and decommissioning of the Project).
34. Predicted impacts from the Project alone were found to have no significant effects on offshore ornithology features. For an assessment of potential effects during construction see **Section 7.6** of the [Addendum to the Offshore EIA Report](#), for potential effects during operation and maintenance see **Section 7.7**, and for potential effects during decommissioning see **Section 7.8**. While the assessment found some species had medium or high sensitivity to impacts, the magnitude of impact was found to be low or negligible, resulting in a significance of effect of negligible or minor adverse (see **Section 7.9** and **Table 7-38** for a summary).
35. Cumulative impacts from the Project and other OWFs were found to have negligible or minor adverse (not significant) effects on all species' regional populations that were assessed (see **Section 8.2** to **Section 8.7** for species assessments). See **Section 8.10** and **Table 8-15** for a summary of the cumulative impact assessment.
36. Since both Project alone and cumulative impacts were predicted to have a negligible or minor adverse effect on marine bird regional populations, which were not considered significant in EIA terms, further mitigation measures in addition to the existing embedded mitigation measures were not considered necessary.

3.4 Addendum to the RIAA

3.4.1 Purpose and structure of the report

37. The [Addendum to the RIAA](#) report provides an update to the marine ornithology components of the original West of Orkney Windfarm Offshore HRA: Report to Inform Appropriate Assessment⁷, henceforth the 'original RIAA'. The original RIAA should be referred to for details of:
- The Project description including the offshore Project boundary, offshore infrastructure, Project stages and embedded mitigation;

⁷ [West of Orkney Windfarm - Offshore HRA Screening Report \(marine.gov.scot\)](#)

- The HRA process;
 - HRA Scoping and pre-application HRA consultation.
38. The [Addendum to the RIAA](#) report provides information on:
- Post-application consultation (see **Section 2** of the [Addendum to the RIAA](#));
 - The Project design envelope parameters and embedded mitigation of relevance to the ornithology HRA (see **Section 3**);
 - A summary of HRA screening (see **Section 4** in the [Addendum to the RIAA](#) for a summary and [Appendix 2 - HRA: HRA Screening Technical Report](#) for full details of HRA screening);
 - Approaches used for the HRA impact assessment (see **Section 5**);
 - Information to inform an appropriate assessment for each SPA that was screened in (see **Section 6**);
 - The Applicant’s conclusions regarding adverse effect on site integrity (see **Section 7**).
39. SPAs were screened in where a Likely Significant Effect (LSE) could not be ruled out when both theoretical connectivity and an impact pathway were established.
40. An assessment to inform HRA was undertaken for all SPAs for which LSE could not be ruled out. A qualitative HRA impact assessment was undertaken for most impact pathways, due to a lack of suitable data to allow a quantitative assessment, including:
- Collision risk for migratory qualifying features, while on migration to/from their breeding and wintering grounds (excluding seabirds which were assessed separately);
 - Negative impacts from artificial lighting, i.e. attraction to, disorientation, or avoidance of lighting on vessels and offshore infrastructure and associated energetic and demographic consequences, for Manx shearwater, European storm petrel and puffin features of SPAs;
 - Disturbance/displacement caused by vessel traffic for wintering waterfowl, breeding red-throated divers, and seabirds using marine extensions to colony SPAs;
 - Disturbance/displacement caused by construction operations in the OAA and/or ECC; and
 - Changes to prey abundance/availability in response to construction and/or operation of the Project.
41. A quantitative impact assessment to inform HRA was undertaken for collision and displacement impacts arising during Project operation, both for the Project alone and in-combination with other OWFs. Seasonal and annual collision and/or displacement mortalities, from the Project alone and in-combination, were then apportioned to SPA populations and change in baseline annual adult survival rate caused by predicted mortalities was found. Where the change in survival rate and Project alone mortality were above a pre-determined threshold, a PVA model was run to assess population response to predicted mortalities.
42. The [Addendum to the RIAA](#) presents information to inform an appropriate assessment for each SPA for which LSE could not be ruled out. The assessment for each SPA includes information on the site’s conservation objectives, qualifying features, plus details of

predicted seasonal and annual collision and/or displacement mortality at that SPA, from both the Project alone and, in-combination. Finally, a conclusion of whether the Project alone, or in-combination with other OWFs, will have an adverse effect on site integrity (AEoSI) is provided.

3.4.2 Key points in the report

43. A total of 235 SPAs were screened into the [Addendum to the RIAA](#).

3.4.2.1 SPAs with migratory species qualifying features

44. Information from Woodward *et al.* (2023), WWT & MacArthur Green (2014), GreenVolt Wind Farm's RIAA⁸ and Berwick Bank Wind Farm's RIAA⁹ were used to consider whether collision risk to migratory qualifying features could cause an adverse effect on site integrity for SPAs with migratory species features. The assessment in the RIAA concluded no AEoSI for these SPAs from this impact pathway. See **Section 6.1.1** of the [Addendum to the RIAA](#).

3.4.2.2 SPAs with seabird features at risk of negative impacts from artificial lighting

45. There is evidence that Manx shearwaters, European storm-petrels, Leach's petrels and puffin fledglings are attracted to lighting on vessels, turbines and other infrastructure associated with OWFs (Deakin *et al.* 2022). No Leach's petrels were recorded in the Offshore Project Area and so no assessment was undertaken for this species. A review of evidence for attraction to, disorientation, or displacement from lighting and associated increase in collision risk and/or distributional change resulting in energetic and demographic consequences was undertaken. Artificial lighting on offshore Project infrastructure and vessels during construction, operation and maintenance and decommissioning was assessed. No AEoSI was concluded for this impact pathway. See **Section 6.1.3** (impacts during Construction) and **Section 6.2.4** (impacts during Operation and Maintenance) of the [Addendum to the RIAA](#).

3.4.2.3 SPAs with marine bird features at risk of disturbance/displacement by Project vessels

46. A qualitative assessment was undertaken for all SPAs screened in due to potential impacts from vessels associated with construction and operation of the Project. Currently, the Project is not able to confirm which ports or harbours will be used for construction activities, nor the location of the Operations and Maintenance Base, but potential ports/harbours were identified for the assessment.

47. Information on indicative vessel routes, volume of vessel traffic using a port in recent years, predicted numbers of vessels associated with Project construction activities, and operation and maintenance activities, sensitivity of waterbird species to vessels and wintering waterbird distributions in marine SPAs is presented in the SPA accounts (see **Section 6.3** of the [Addendum to the RIAA](#)). This was used to identify which species had the potential to be impacted by the presence of Project vessels, and to assess the magnitude of any impact, i.e. the relative increase in vessel traffic and the proportion of an SPA that could be affected by disturbance/displacement from Project vessels.

⁸ [Green Volt Offshore Wind Farm Offshore Habitats Regulations Assessment \(marine.gov.scot\)](#)

⁹ [221220 - eor0766 berwick bank wind farm - riaa part 3 spa assessment - signed.pdf \(marine.gov.scot\)](#)

48. All assessments of the potential for Project vessels to cause disturbance/displacement of interest features of SPAs concluded no AEOsI. Despite this, mitigation has been proposed, which includes some limitations on vessel speeds and restrictions to movements, e.g. making use of existing vessel routes when feasible, when vessels are transiting through areas supporting higher densities of species sensitive to the presence of vessels (see **Section 6.1.1** and **6.2.2** of the [Addendum to the RIAA](#) for full details).

3.4.2.4 SPAs with breeding seabird features at risk of displacement and/or collision during Project operation

49. Collision and displacement mortality for the Project was estimated from seabird densities and abundances derived from digital aerial surveys. Mortality was estimated for all seasons (breeding and non-breeding), following NatureScot's guidance and the Biologically Defined Minimum Population Scales (BDMPS) seasonal definitions (Furness, 2015). Estimated collision and displacement mortality from other OWFs' applications was collated and used to assess in-combination impacts. As requested by NatureScot, two in-combination scenarios were presented, one including Berwick Bank Wind Farm impacts and the other excluding those impacts. Predicted Project collision and displacement mortality to immature birds and to sabbatical birds (i.e. adults birds that were taking a year off breeding) was removed, leaving only Project mortality on breeding adult birds. This mortality, along with in-combination mortality, was then apportioned to SPAs and the change in baseline annual adult survival rate caused by the additional mortality, for each SPA population, was calculated. A PVA was run when predicted impacts exceeded a predefined threshold, to assess population response to predicted impacts.
50. A detailed SPA account was provided for each SPA feature for which a PVA was run (see **Section 6.3** of the [Addendum to the RIAA](#)). A total of 25 SPAs required a PVA to be run for at least one feature. However, in most cases, impacts were small and the predicted change in population growth rate in the presence of impacts, compared with a baseline with no impacts, suggested both Project alone and in-combination impacts would not significantly impact the SPA population.
51. Following assessment, for almost all breeding seabird features of SPAs, it was possible to conclude no AEOsI. For three SPA features. however, the Applicant was unable to conclude no AEOsI:
- Sule Skerry and Sule Stack SPA, for which it was not possible to reach a conclusion of no AEOsI due to displacement impacts, both from Project alone and in-combination with other OWFs, on the guillemot qualifying feature;
 - East Caithness Cliffs SPA for which it was not possible to reach a conclusion of no AEOsI due to collision and displacement impacts, from the Project in-combination with other OWFs, on the kittiwake qualifying feature;
 - North Caithness Cliffs SPA for which it was not possible to reach a conclusion of no AEOsI due to collision and displacement impacts, from the Project in-combination with other OWFs, on the kittiwake qualifying feature.
52. A summary of conclusions for all SPAs for which LSE could not be ruled out is provided in **Section 7** of the [Addendum to the RIAA](#).

3.5 Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report

3.5.1 Purpose and structure of the report

53. The [Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report](#) provides a detailed description of how the offshore Project area is used by marine birds, prior to constructing and operating an OWF in the area. It also presents density and abundance information which is used in HRA screening, collision risk modelling and assessment of displacement mortality.
54. Use of the offshore Project area by marine birds was characterised by 27 digital aerial surveys over an area which included the offshore Project area and a 4 km buffer. These surveys were undertaken during July 2020 to September 2022, inclusive. From these, design- and model-based methods were used to estimate bird density and abundance on each survey, with design-based estimates used to inform both the EIA and HRA assessments. **Section 3** of the [Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report](#) has details of survey methods and approaches to estimating density and abundance for each survey and species. A species account for all species recorded regularly in the OAA plus 4 km buffer is provided in **Section 4** of the [Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report](#), which includes a review of the ecology, status and threats/pressures on each species, as well as raw counts, density and abundance estimates.

3.5.2 Key points in the report

55. Site characterisation was undertaken for an area which covered the OAA plus a 4 km buffer. This 4 km buffer was used as any influence of the Project on marine birds, beyond the boundary of the OAA, would be expected to extend no further than 4 km.
56. A total of 27 digital aerial surveys were carried out across the OAA plus an area of at least 4 km beyond the boundary of the OAA (except for a small area outside of the OAA which was not covered by surveys early in the campaign). Surveys started in July 2020 and ended in September 2022, inclusive. The survey area was modified slightly in late January 2021 to accommodate a modification to the OAA boundary (see **Section 3.1.1** in the **Baseline Site Characterisation Technical Report**).
57. Guillemots were the most frequently recorded species in the OAA plus 4 km buffer, followed by puffin and fulmar. Gannet and kittiwake were also regularly recorded. Great black-backed gull, razorbill, great skua, European storm petrel and Arctic tern were occasionally recorded in the OAA plus 4 km buffer. Herring gull and Manx shearwater were rarely recorded, and no Leach's petrel were recorded on any of the 27 surveys, despite the proximity of the Sule Skerry and Sule Stack SPA, where this species is a qualifying feature.
58. Both model- and design-based methods were used to derive density and abundance estimates for each of the 27 digital aerial surveys. A comparison of model- and design-based estimates is provided in [Annex 1R](#). Design-based density and abundance estimates were used to inform the EIA and HRA assessments, as agreed with NatureScot.
- Kittiwakes were present in the OAA plus 4 km buffer year-round with peaks in March, July and October (peak density = 1.55 bird/km²; peak abundance = 1,880 birds);

- Great black-backed gulls were mostly in the OAA plus 4 km buffer in the winter with peaks in February and December (peak density = 0.4 birds/km²; peak abundance = 465 birds);
- Herring gulls were mostly in the OAA plus 4 km buffer in the winter with peaks in November and February (peak density = 0.03 birds/km²; peak abundance = 31 birds);
- Arctic terns were only in the OAA plus 4 km buffer in the breeding season with peaks in June and August (peak density = 0.15 birds/km²; peak abundance = 178 birds);
- Great skuas were mostly in the OAA plus 4 km buffer in the breeding season with a few records in the spring and autumn. Peaks occurred in July and June (peak density = 0.26 birds/km²; peak abundance = 70 birds);
- Guillemots were in the OAA plus 4 km buffer year-round with peaks in April and July (peak density = 9.1 birds/km²; peak abundance = 10,477 birds);
- Razorbills were in the OAA plus 4 km buffer year-round with peaks in April and September (peak density = 0.4 birds/km²; peak abundance = 443 birds);
- Puffins were present in the OAA plus 4 km buffer mostly in the breeding season and autumn with peaks in June each year (peak density = 6.2 birds/km²; peak abundance = 7,224 birds);
- European storm petrels were in the OAA plus 4 km buffer only in the breeding season with peaks in September and August (peak density = 0.2 birds/km²; peak abundance = 279 birds);
- Fulmars were present in the OAA plus 4 km buffer year-round with peaks in December and October (peak density = 3.9 birds/km²; peak abundance = 4,533 birds);
- Manx shearwaters were in the OAA plus 4 km buffer only in the breeding season with peaks in June and July (peak density = 0.01 birds/km²; peak abundance = 24 birds); and
- Gannets were present in the OAA plus 4 km buffer year-round with peaks in September and April (peak density = 1.8 birds/km²; peak abundance = 1,737 birds).

3.6 Appendix 2 - HRA: HRA Screening Technical Report

3.6.1 Purpose and structure of the report

59. This report provides the details and results of the process by which SPAs and Ramsar sites were identified for which LSE could not be ruled out and hence a requirement to undertake an assessment to inform an appropriate assessment was required.
60. HRA Screening requires initially establishing theoretical connectivity between the Project and an SPA. **Section 2** of [Appendix 2 - HRA: HRA Screening Technical Report](#) tests for theoretical connectivity under different criteria for SPAs with breeding seabird qualifying features (**Section 2.1**), for marine SPAs (**Section 2.2**) and SPAs with migratory qualifying features (**Section 2.3**).
61. The second step of HRA screening involves screening out any SPAs for which there is no LSE, i.e. no impact pathway by which the Project could undermine the conservation objectives of an SPA. **Section 3.2** of [Appendix 2 - HRA: HRA Screening Technical Report](#) identifies all potential impact pathways for the Project, during construction, operation and decommissioning.

62. SPAs for which there is both theoretical connectivity and an impact pathway, i.e. LSE could not be ruled out, were screened into the [Addendum to the RIAA](#) for further assessment (see **Annex A** of [Appendix 2 - HRA: HRA Screening Technical Report](#) for the full list of SPAs screened in).

3.6.2 Key points in the report

63. Theoretical connectivity between the offshore Project area and SPA qualifying features was established under the following criteria:
- Seabird colony SPAs within foraging range of the OAA plus 2 km buffer, with breeding seabird features which were present in the OAA plus 2 km buffer, during the breeding season in non-trivial numbers;
 - Seabird colony SPAs within the UK North Sea BDMPS region, with breeding seabird features which were present in the OAA plus 2 km buffer, during the non-breeding season in non-trivial numbers;
 - Marine SPAs (defined as marine sites supporting wintering waterbird features, i.e. divers, seaduck and grebes, and/or breeding red-throated diver features; marine sites supporting breeding seabird features using the marine environment for foraging and other behaviours; and marine extensions to seabird colony SPAs), that were within 15 km of the offshore Project area or within 15 km of indicative vessel routes that could be used by vessels associated with the Project. Theoretical connectivity was also assumed for any terrestrial SPAs which were functionally-linked to these marine SPAs, e.g. supporting breeding red-throated divers which used a marine SPA for foraging;
 - Terrestrial SPAs with breeding red-throated diver features within 9 km of the offshore Project area (i.e. the OAA and/or the ECC) and/or indicative vessel routes;
 - SPAs with migratory species as qualifying features (excluding seabirds which are assessed separately) that use flyways that pass in the vicinity of the offshore Project area;
 - Where theoretical connectivity was established for a terrestrial SPA with breeding seabird features, which had a functionally linked marine SPA, e.g. Seas off Foula SPA, Seas of St Kilda SPA, Northumberland Marine SPA, theoretical connectivity was also assumed for the marine SPA, under the assumption that any damage to the terrestrial site could have a knock-on effect on the functionally linked marine SPA.
64. Impact pathways from Project construction, operation and maintenance, and decommissioning were assessed for their potential to have an LSE on the conservation objectives of SPAs with theoretical connectivity to the Project (see **Table 3-2** of [Appendix 2 - HRA: HRA Screening Technical Report](#) for a list of impact pathways). LSE could not be ruled out for any of the SPAs for which theoretical connectivity with the offshore Project was established. Consequently, an assessment of AEoSI was undertaken for 235 SPAs in the [Addendum to the RIAA](#).
65. A list of all sites which were taken forward into the [Addendum to the RIAA](#) is provided in **Annex A** of [Appendix 2 - HRA: HRA Screening Technical Report](#). The justification for screening each site into the [Addendum to the RIAA](#) is also provided.

3.7 Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report

3.7.1 Purpose and structure of the report

66. [Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report](#) includes details of methods used in collision risk modelling (CRM) and collision estimates for the five species for which CRM was undertaken (see **Section 3.2**).
67. Details of the collision risk models used to estimate collision mortality, along with the parameters used in the modelling, is provided in **Section 2.2** and **Section 2.3** of **Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report**, respectively. An estimate of densities of birds in flight, used to estimate collision mortality, is provided in **Section 2.1.1**.

3.7.2 Key points in the report

68. Collision estimates were calculated using densities of birds in flight (from the OAA only) from 24 months of digital aerial survey data and species-specific avoidance rates and other biometric data, as recommended by NatureScot (see **Table 2-1** of **Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report**, for biometrics used in CRM). Avoidance rates used in the stochastic CRM were 0.9928 (kittiwake and gannet), 0.9939 (great black-backed gull) and 0.9907 (Arctic tern and great skua). A deterministic (Band) CRM was also used to estimate collision mortality. Only model Option 2 with a generic flight height distribution was used for CRM, as advised by NatureScot. A Most Likely Scenario (MLS) and Worst-Case Scenario (WCS) were modelled, using different WTG parameters.
69. The species with the highest annual collision estimate was kittiwake, with an estimated mortality of 56 birds per annum. Gannet had a slightly lower annual collision estimate, with an estimated mortality of 45 birds per annum. Great black-backed gull had a much lower annual mortality estimate of 12 birds per annum. Arctic tern and great skua had very low annual collision estimates, of only 0.4 birds per annum, for each species. These annual collision mortality estimates are based on stochastic collision risk model outputs, under a WCS. See **Table 4-1** in **Section 4** of [Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report](#) for seasonal and annual collision mortality estimates for all five species.

3.8 Appendix 4 - EIA and HRA: Displacement Technical Report

3.8.1 Purpose and structure of the report

70. The [Appendix 4 - EIA and HRA: Displacement Technical Report](#) provides information on predicted displacement mortality that is used in the impact assessments presented in the [Addendum to the Offshore EIA Report](#) and the [Addendum to the RIAA](#).
71. Two methods were used to assess displacement mortality: the displacement matrix approach (SNCB, 2022) and the SeabORD model (Searle *et al.* 2018). Details of the displacement matrix approach are provided in **Section 2.3** of [Appendix 4 - EIA and HRA: Displacement Technical Report](#). A key input to the displacement matrix is an estimate of mean seasonal peak (MSP) abundance, which is provided in **Section 2.3.3** of [Appendix 4 - EIA and HRA: Displacement Technical Report](#), with MSP abundances summarised in **Table 2-16**. Information on parameterisation of SeabORD is given in **Section 2.4** of [Appendix 4 - EIA and HRA: Displacement Technical Report](#).

72. Estimates of displacement mortality derived from the matrix approach are given in **Section 3.1** of [Appendix 4 - EIA and HRA: Displacement Technical Report](#) and results from the SeabORD modelling are presented in **Section 3.2**. Finally, a summary of displacement mortalities is presented in **Table 4-1**.

3.8.2 Key points in the report

73. MSP abundance and displacement mortality were estimated for seven species (kittiwake, Arctic tern, guillemot, razorbill, puffin, fulmar and gannet) during the breeding and non-breeding seasons, defined by NatureScot, and also for autumn and spring passage and winter periods, as defined by BDMPS (Furness, 2015).
74. The displacement matrix approach was used to estimate displacement mortality for all seven species. Two displacement scenarios were used to estimate mortality: one with a larger proportion of birds predicted to die due to being displaced (high impact scenario); and one with a smaller proportion of birds predicted to die from displacement (low impact scenario). **Table 2-17** in [Appendix 4 - EIA and HRA: Displacement Technical Report](#) provides displacement and mortality rates used in the assessment. SeabORD was also used to estimate displacement mortality for guillemot and puffin at seven SPAs.
75. The species with the highest displacement mortality was guillemot, with an estimated mortality of 239 and 79 birds during the breeding and non-breeding season, respectively. Puffin had slightly lower estimated displacement mortality of 158 and 38 birds for the breeding and non-breeding season, respectively. Kittiwake, gannet and fulmar had lower predicted displacement mortality estimates, with annual displacement mortality estimates of 21, 43 and 26 birds, respectively, under the high impact scenario. Arctic tern and razorbill had low estimated annual displacement mortality, of 2 and 9 birds, respectively, under the high impact scenario. **Table 4-1** in [Appendix 4 - EIA and HRA: Displacement Technical Report](#) presents estimated displacement mortality for each species, season and scenario.
76. SeabORD modelling found the largest reductions in adult and chick survival at Sule Skerry and Sule Stack SPA for both guillemot and puffin. This is as expected, given the proximity of the SPA to the OAA. Displacement mortality estimates from the displacement matrix approach, and not SeabORD, were used in the EIA and HRA impact assessments.

3.9 Appendix 5 - HRA: Apportioning Technical Report

3.9.1 Purpose and structure of the report

77. The [Appendix 5 - HRA: Apportioning Technical Report](#) provides details of the methods and outputs of the approach taken to apportion collision and displacement impacts to SPAs with connectivity to the Project. This apportioning of impacts to SPAs only applies to HRA and not EIA.
78. The list of SPAs that were screened in due to LSE for collision and displacement impacts during operation, is provided in [Appendix 2 - HRA: HRA Screening Technical Report](#). Project alone and in-combination impacts were apportioned to all these SPAs. [Appendix 5 - HRA: Apportioning Technical Report](#) provides information on how an apportioning weighting was derived for each species and SPA for the breeding season and non-breeding seasons, for Project alone and in-combination impacts. These apportioning weightings were then used to

apportion collision and displacement mortalities to each SPA (see [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#)).

79. Different methods are used for apportioning Project alone and in-combination mortalities, and for mortality occurring in the breeding and non-breeding seasons. Methods used for apportioning the Project's predicted collision and displacement mortalities in the breeding season are described in **Section 2.2** of [Appendix 5 - HRA: Apportioning Technical Report](#). **Section 2.3** describes methods for apportioning in-combination mortality in the breeding season. The approach used for apportioning both Project-alone and in-combination non-breeding season mortality is described in **Section 2.4**. Methods for apportioning guillemot non-breeding season mortality differed to other species, due to them remaining close to their colonies year-round. Guillemot non-breeding season apportioning methods are presented in **Section 2.4.1**.
80. **Section 3** of [Appendix 5 - HRA: Apportioning Technical Report](#) presents apportioning weightings for each species, season, SPA and OWF combination.

3.9.2 Key points in the report

81. For each species, breeding season SPA apportioning weights were calculated as a function of distance the SPA is from the OAA plus 2 km buffer, SPA population size and the proportion of the area within foraging range which is sea (i.e. the area over which birds from that SPA could be distributed). Breeding season mortality was not apportioned to any SPAs beyond foraging range. Distance between an SPA and the OAA was defined as the shortest straight line distance between the SPA boundary and the boundary of the OAA plus 2 km buffer.
82. The boundary of Sule Skerry & Sule Stack SPA is 1.7 km from the OAA. Consequently, the OAA plus 2 km buffer (i.e. the distance used in the calculation of SPA apportioning weighting for Project alone breeding season impacts) overlapped with the boundary of this SPA. NatureScot advised that Sule Skerry and Sule Stack SPA should therefore be given an apportioning weighting of 1. This meant that, for species that are qualifying features of the SPA (guillemot, puffin, gannet), all breeding season Project collision and displacement mortality was apportioned to this SPA and no breeding season mortality, for these three species, was apportioned to any other SPAs. Non-breeding season mortality for these species was apportioned to SPAs throughout the UK North Sea BDMPS region (with the exception of guillemot).
83. During the non-breeding season(s), the number of adults that each SPA contributes to the BDMPS population (Furness, 2015) was calculated. This was converted to an SPA apportioning weighting for non-breeding season mortality under the assumption that birds from any SPA within a BDMPS region have an equal probability of experiencing collision or displacement mortality at the Project and at other OWFs within the BDMPS region.
84. The Project sits on the boundary of two BDMPS regions for most species, a UK North Sea BDMPS region and a Western Waters BDMPS region (Furness, 2015). When apportioning impacts and assessing in-combination impacts, it was assumed that all seabirds using the OAA plus 2 km buffer travelled through the UK North Sea in the non-breeding season. This precautionary assumption means that all OWFs in the UK North Sea were assumed to be

impacting the same SPAs as the Project in the non-breeding season, when calculating in-combination impacts, i.e. in-combination impacts were higher than if it had been assumed that seabirds using the OAA travelled down the west coast of Britain in the non-breeding season. This approach was discussed and agreed with NatureScot in a consultation meeting. See **Section 2.3** of [Appendix 5 - HRA: Apportioning Technical Report](#) for more details.

85. A different approach was used to apportion guillemot non-breeding season mortality, as advised by NatureScot. This assumed that guillemots remained close to their breeding colonies in the non-breeding season, i.e. all SPAs within foraging range of the Project had non-breeding season Project alone and in-combination mortality apportioned to them.

3.10 **Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts**

3.10.1 Purpose and structure of the report

86. This report provides information on how Project alone and in-combination impacts were calculated for each SPA, as part of the assessment to inform the HRA. Breeding and non-breeding season collision and displacement mortality, from the Project and other OWFs, was apportioned to each SPA population using the apportioning weights calculated in [Appendix 5 - HRA: Apportioning Technical Report](#). The apportioned mortalities allow calculation of the change to baseline annual adult survival rate for each SPA population. This change to adult survival rate, caused by the additional predicted collision and displacement mortality, is used in the PVA modelling. SPA-specific mortalities, change to annual adult survival rate and PVA outputs inform the HRA assessment in the [Addendum to the RIAA](#).
87. The list of OWF projects to include in the in-combination assessment was updated from the original RIAA, to include all consented UK OWF projects, plus any other projects that had submitted an application, as of 31 December 2023. MD-LOT advised that Seagreen 1A and GreenVolt should be added to the list and Salamander was also included. For those OWF Projects for which a Scoping Opinion had been adopted, a qualitative assessment was undertaken, following MD-LOT advice (see **Table 2-1** of [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#) for a list of the 44 OWF projects included in the in-combination assessment).
88. Information on the collation of displacement and collision impacts from other OWF project applications is provided in Section 2.2.2 of [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#). Mortalities from the Project and other OWFs were apportioned to SPAs (see Section 2.2.5), after removing mortalities that were immature birds or non-breeding sabbatical adult birds (see Section 2.2.4). The change in annual adult survival rate at each SPA in the presence of Project alone and in-combination mortality was found (Section 2.2.6) and the need for a PVA was assessed (Section 2.2.7). This process is illustrated by a worked example, presented in Section 2.2.8.
89. Section 3 of [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#) presents the seasonal and annual mortalities for the Project and each of the other 44 OWFs included in the quantitative

in-combination assessment. The Project alone and in-combination apportioned mortalities and change in annual adult survival rate are also presented, for each SPA that was screened into the HRA assessment. In-combination mortalities and change in survival rate are presented with Berwick Bank Wind Farm impacts included and excluded, as requested by NatureScot. The tables also indicate whether Project alone mortality and change in annual adult survival rate were sufficiently high to require a further assessment of population response to predicted impacts, by running a PVA.

3.10.2 Key points in the report

90. A total of 44 consented OWFs were included in the in-combination assessment. Additionally, a qualitative assessment for a further 11 OWFs, for which a Scoping Opinion has been adopted, was undertaken.
91. Both the Project alone and in-combination assessments included a high and low impact displacement scenario and the WCS for collisions. In-combination assessments were undertaken with Berwick Bank Wind Farm impacts included and excluded, under two separate scenarios, as requested by NatureScot. Contrary to NatureScot's advice, Natural England advise that kittiwakes do not need to be assessed for displacement impacts. Therefore, kittiwake displacement mortality from Scottish OWFs only, and not from English OWFs, was included in the in-combination assessment.
92. For each SPA, Project alone and in-combination seasonal and annual collision and/or displacement mortalities are presented, along with the change in baseline annual adult survival rate caused by this additional OWF mortality. Where impacts were small, no PVA was undertaken. Where impacts exceeded a pre-defined threshold, a PVA was run for that SPA population. The threshold for a PVA, as advised by NatureScot, was:
 93. Project alone: if change in annual adult survival rate was $\geq 0.02\%$ a PVA was run;
 94. In-combination: if change in adult survival rate was $\geq 0.02\%$ and Project-alone annual mortality was ≥ 0.2 birds per annum, a PVA was run.
95. In total, a PVA was run for 49 features at 25 SPAs.
96. The tables in Section 3 of [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#) enable comparison of Project-alone and in-combination mortalities (including and excluding Berwick Bank impacts), as well as assessment of which SPAs have the greatest Project-alone and in-combination mortalities and change to adult survival rate.

3.11 Appendix 7: EIA Cumulative mortalities at regional population scales

3.11.1 Purpose and structure of the report

97. [Appendix 7 - EIA Cumulative mortalities at regional population scales](#) scales provides a summary of the Project alone and cumulative impacts from OWFs included in the EIA assessment. The cumulative impacts on each regional population are the basis for assessment of impacts discussed in detail in the [Addendum to the Offshore EIA Report](#). NatureScot advised that a regional population was the appropriate population against which to assess Project alone and cumulative impacts for EIA.

98. Methods used to calculate regional population size are presented in Section 2.1 of [Appendix 7 - EIA Cumulative mortalities at regional population scales](#). A qualitative assessment was used for OWF projects for which a Scoping Opinion had been adopted but no application submitted (see Section 2.2) whereas a quantitative approach was followed for the 44 OWF projects included in the cumulative assessment (i.e. those which had submitted an application by 31 December 2023 plus Seagreen 1A, GreenVolt, as advised by MD-LOT, plus Salamander) (see Section 2.3).

3.11.2 Key points in the report

99. Project alone and cumulative impacts were assessed against a regional population, defined as adult and immature birds from all colonies (both SPA and non-SPA) within foraging range of the Project.
100. Collision and displacement mortality from 44 other OWFs included in the cumulative assessment were collated from recent OWF Section 36 consent applications. Natural England advise that kittiwakes do not need to be assessed for displacement impacts. Therefore, kittiwake displacement mortality from Scottish OWFs only, and not from English OWFs, was included in the cumulative assessment. This approach was discussed and agreed with NatureScot.
101. Following calculation of the total collision and displacement mortality for each species, the change in baseline annual survival rate was calculated, by dividing total Project mortality, or cumulative mortality, by the regional population size. Note, unlike the assessment to inform HRA which only considers impacts to the breeding adult component of the population, for EIA the collision and displacement mortality impacting all age classes was assessed against the whole regional population. A PVA was run when pre-defined thresholds were exceeded. The thresholds were:
102. Project alone: if change in survival rate was $\geq 0.02\%$ a PVA was run;
103. In-combination: if change in survival rate was $\geq 0.02\%$ and Project-alone annual mortality was ≥ 0.2 birds, a PVA was run.
104. Cumulative kittiwake mortality, across all age classes, was estimated to be 1,271 collisions per annum and 367 displacement mortalities per annum. However, the Project only contributed an estimated 40 collision mortalities and 39 displacement mortalities to this total. Gannet had an estimated 1,700 collisions per annum, and a displacement mortality of 1,022 individuals per annum. The Project contributed an estimated 45 collision mortalities and 49 displacement mortalities to this total. Cumulative great black-backed gull collisions were estimated to be 31 collisions per annum but only up to one bird per annum was from the Project. Guillemot cumulative displacement mortality was estimated to be 2,547 birds per annum, with 318 mortalities from the Project. Razorbill cumulative mortality was 920 displacement mortalities per annum but only five of these were from the Project. Cumulative puffin displacement mortality was 1,046 birds per annum, with the Project contributing up to 197 mortalities to the cumulative total.

3.12 Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts

3.12.1 Purpose and structure of the report

105. [Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts](#) describes methods and parameters used to undertake PVA. It also provides the full results obtained from PVAs used to investigate the population response to predicted Project alone and in-combination mortality.
106. **Section 2.1** of [Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts](#) lists the features and SPAs for which Project alone and/or in-combination mortality was sufficiently high to require a PVA to be run. A description of PVA model structure and parameterisation is provided in **Section 2.2**. **Section 2.3** describes the different scenarios run for each species.
107. In **Section 3** of [Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts](#), each PVA has an input table which has information on model parameterisation, an output table which presents three PVA output metrics, with several measures of variation (e.g. SD, 95% CI) at 25, 35 and 50 years, and a plot showing population size against time under the various scenarios.

3.12.2 Key points in the report

108. PVA was run using the latest version of the NEPVA tool (Searle *et al.*, 2019). Following NatureScot advice, projections were run for 25 years, 35 years and 50 years. Starting population size was SPA population size when counted during the Seabirds Count census (Burnell *et al.*, 2023) and demographic rates were taken from Horswill & Robinson (2015). PVA models included demographic and environmental stochasticity and no density dependence. PVA model outputs included the counterfactuals of population growth rate and population size, as well as the 50th quantiles for unimpacted and impacted populations.
109. The PVA models used the estimated change in annual adult survival rate for seabird features of SPAs, arising from impacts from the Project alone and in-combination with other OWFs, as presented in [Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts](#). The PVAs produced projections of population size through time in the presence of these impacts, compared with baseline unimpacted population size. Plots illustrated the difference in population size between impacted and unimpacted populations and the PVA metric outputs (i.e. counterfactuals of population size and growth rate) quantified the relative change in populations due to impacts.
110. The output metrics table for each feature for which a PVA was run, is presented in the [Addendum to the RIAA](#), under the SPA accounts (see **Section 6.3**), where it is used to assess whether Project impacts, alone or in-combination, could cause an adverse effect on site integrity.

3.13 Appendix 9 - EIA: PVA at regional population scales for Project alone and cumulative impacts

3.13.1 Purpose and structure of the report

111. This report describes methods and parameters used in undertaking PVA, to aid with understanding regional population response to Project alone and cumulative collision and displacement mortality, as part of the EIA assessment, as presented in the [Addendum to the Offshore EIA Report](#).
112. **Section 2** of [Appendix 9 - EIA: PVA at regional population scales for Project alone and cumulative impacts](#) describes the PVA model structure and parameterisation. **Section 2.3** describes the different PVA scenarios that were run for each species, for the Project-alone and cumulatively. **Section 3** presents the inputs and outputs for each PVA run and a figure to illustrate population size through time under the different scenarios, for each species.

3.13.2 Key points in the report

113. PVAs were very similar to those run for the HRA assessment but used a different starting population size. For HRA, starting population size was the SPA colony size. For EIA, a regional population was used as the starting population size. Also, the PVAs modelled collision and displacement mortality on all individuals in the population, rather than adults only (which done for the PVAs to inform HRA).
114. Demographic rates used in the models were from Horswill & Robinson (2015) and models were density independent and included demographic and environmental stochasticity. Impacts were incorporated into the PVAs as change in survival for regional seabird populations arising from impacts from the Project alone and cumulatively with other OWFs, as presented in [Appendix 7 - EIA Cumulative mortalities at regional population scales](#).
115. For each run of the PVA, complete tables of all input values are provided, together with the outputs which are presented in both tabulated and graphical form. Output metrics were the counterfactuals of growth rate and population size, as well as the 50th centile of the unimpacted and impacted populations. These metrics were calculated at 25 years, 35 years and 50 years. The output metrics table is presented in the [Addendum to the Offshore EIA Report](#) where it is used to assess whether Project impacts, alone or cumulatively, significantly impact regional seabird populations.

4 DETAILED LOG OF POST-APPLICATION CONSULTATION AND RESPONSES

116. **Table 4-1** lists all post-application submission consultation that has taken place with NatureScot, the Maine Directorate Licensing Operations Team (MD-LOT) and The Royal Society for the Protection of Birds (RSPB). All advice received since the application was submitted is listed and how that advice has been followed and addressed is described.

Table 4-1. All post-application submission advice received and how it has been addressed in the OAI. Note, the term Supplementary Environmental Information (SEI) and Ornithology Additional Information (OAI) are used to refer to the same set of documents.

	Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed
1	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The primary ornithological impact assessment does not follow NatureScot guidance nor is it in accordance with advice provided at pre-application and therefore has resulted in an incomplete and incorrect assessment.	The OAI largely follows NatureScot online guidance, except for a few areas, where NatureScot Project-specific advice was followed. The approach used throughout the OAI has been discussed and agreed with NatureScot.
2	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The volume and propagation of errors combined with a lack of transparency throughout the ornithological assessment and therefore we have no confidence in the predicted impacts.	The OAI has been structured to be as transparent as possible, with the different steps of the assessment broken down into sequential technical reports and summarised in the Addendum to the RIAA and the Addendum to the Offshore EIA Report. Throughout the whole OAI, clear signposting to relevant information has been provided so it is clear how information is carried through the assessment. The entire assessment has been checked for errors.
3	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	We object to this proposal until further information and assessment is obtained from the applicant, comprising but not limited to: A complete re-assessment of the offshore ornithology interest.	A complete re-assessment has been undertaken, from generating density and abundance estimates from raw counts through all stages of the assessment including estimating collision and displacement mortality, apportioning those impacts to SPAs (HRA only) and running PVAs to understand population response to those impacts. Furthermore, the cumulative and in-combination assessment has been updated to include recent OWF applications and Scoping Reports.
4	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The assessment is predicated on the applicant's approach and does not follow NatureScot guidance as directed within the Scoping Opinion or thereafter through advice provided during pre-application.	The OAI largely follows NatureScot guidance. On occasion, Project-specific advice was provided to the Applicant that was slightly different to the online guidance, e.g. on approach to apportioning breeding season impacts, given the proximity of the Sule Skerry and Sule Stack SPA to the offshore Project area. The Project-specific advice was followed in these cases. In two areas, the approach used differed to NatureScot guidance at the Applicant's request:

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
					<p>1. Use of design based estimates instead of model based estimates to inform the assessments;</p> <p>2. Use of straight line distances instead of coastal distances between an SPA boundary and the OAA plus 2 km buffer, in the apportioning calculation.</p> <p>However, these two points were discussed and agreed with NatureScot during consultation meetings and evidence is provided in the Addendum to the RIAA to show the consequences of using these approaches. In both cases, using this different approach made no material difference to assessment results and conclusions.</p>	
5	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The assessment of distributional responses required by NatureScot as per our published guidance is provided as an alternative approach, located in Annex 12-13, as a series of tables with insufficient explanatory or accompanying text.	Only one approach to assessing distributional responses has been used in the OAI, which follows NatureScot Guidance Note 8. The approach is explained with clear methods and tables showing input and output data.
6	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The scale and range of errors identified throughout the entire assessment are many and fundamental.	We have carefully checked the OAI for errors, ensuring numbers used in the assessment are consistent across different components of both the EIA and HRA assessments.
7	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The lack of transparency throughout each stage of the assessment means that values cannot be replicated or tracked through the process.	The OAI has been structured and written to be as transparent as possible. Clear explanations are provided throughout on the sources of data used for each step in the assessment and then how these outputs are subsequently used in later stages of the assessment. Worked examples are provided for apportioning impacts to SPAs (HRA only) to help illustrate a complex component of the assessment.

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
8	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	This propagation of errors through each stage of the assessment means we have no confidence in the outputs both across each stage and at the end of the process.	The careful error check of the OAI plus the more transparent and clear approach means that the assessment can be followed through all stages. This should provide confidence in the assessment and conclusions drawn from the assessment.
9	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The EIA and RIAA are based on different ornithological assessment approaches resulting in inconsistency and comparability issues.	Baseline site characterisation, collision risk modelling and displacement mortality estimation inform both the EIA and HRA assessments. Report titles clearly indicate which regulatory regime they are informing and the Introduction to the OAI report includes a diagram illustrating how the same approach to estimating mortality is used to inform HRA and EIA assessments. The mortalities are then assessed against different populations: SPA populations for HRA and regional populations for EIA.
10	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The structure and format of Chapter 13, Supporting Study 12 and associated Annexes 12.1 to 12.13 is such that necessary cross referencing is extremely challenging and time consuming. The flow of information between and across these documents is incredibly difficult to navigate without hyperlinks or other aids.	The OAI has been structured differently, with the Addendum to the RIAA and Addendum to the Offshore EIA Report supported by a series of sequential technical appendices presenting each stage of the assessment in turn. An Introduction document provides an overview of the whole OAI to help the reader understand the structure of the OAI and to orientate themselves. Within each document, hyperlinks are provided to tables, figures and sections within that document. Clear signposting to other components of the OAI which have more detailed information is provided throughout each report.
11	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The full DAS methodology and resulting baseline characterisation report for birds is missing.	The full DAS report, provided by HiDef, is in Annex 1A, which is an annex to Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report.
12	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	Information on model and tool versions as well as access dates are not provided.	The model and tool version and access date is provided for the MRSea, SeabORD, sCRM and NEPVA. Access date and version is also provided for other information used in the OAI, e.g. seabird colony count data.

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
13	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	The number and length of many of the submission documents is concerning. For example, the scale of this project and likelihood of impacts to a smaller number of species and SPAs has still resulted in the RIAA having double the number of pages compared to other projects that are considerably more complex in impact and greater in scale.	The OAI is also very long as it contains additional narrative and context explaining approaches used and where information was sourced from. Where possible, information has been moved to Annexes to make technical reports easier to follow. The Addendum to the RIAA and Addendum to the Offshore EIA Report are both quite long because we wanted to include sufficient information on methods used in the assessments to allow those two reports to be read as standalone documents. Additionally, a large number of SPAs were screened into the RIAA due to the location of the Project, being in the vicinity of many SPAs around the Northern Isles and northern mainland Scotland. Furthermore, the Addendum to the RIAA includes extensive information to support assessment of vessel impacts on wintering waterfowl features, following advice from NatureScot on the information required on this impact pathway (NatureScot Consultation meeting, 25 June 2024 and 2 July 2024).
14	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Whole assessment	References are missing and / or incorrect.	References in the OAI have been checked.
15	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Baseline – digital aerial survey methods	Baseline characterisation (Annex 12.11) - We expect the production of a DAS report based on two full years of data - this has not been provided. Instead, raw count data is provided in Annex 12.11 without any accompanying narrative or context. The omission of this information, prevents verification of input values and compounds the transparency issues referred to below.	The full DAS report is provided in the OAI as Annex 1A. This covers 27 months of DAS. In addition to this, raw count data is provided in the Appendix 1 - HRA and EIA: Baseline Site Characterisation Technical Report. The raw count data is provided for the site characterisation within the OAA plus 4 km buffer whereas the DAS report covers the full survey area, which is a larger area than the OAA plus 4 km buffer.

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
16	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Baseline - Digital aerial survey methods	HRA screening - We raised concerns during the pre-application process that the generation of the initial long list was confusing and did not indicate on what basis each site / feature has been included, which made evaluation difficult. Without the complete DAS report we are unable to confirm definitively whether any sites / features have been missed.	Full details of methods used for HRA Screening and SPAs screened in or out, are presented in Appendix 2 - HRA: HRA Screening Technical Report. NatureScot Guidance Note 3 and Guidance Note 4 were followed, throughout. Theoretical connectivity was determined according to the considerations laid out in the NatureScot guidance notes, dependent on the type of SPA and impact pathway. LSE was then considered. Finally a full list of sites screened into the Addendum to the RIAA is provided in the report.
17	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Baseline - Vessel disturbance	From our review of the RIAA we note that disturbance from vessel movement has not been adequately considered. This impact pathway will cover construction and operation / maintenance activities and, while we understand that agreements have not yet been reached with individual Ports, we are concerned that North Orkney and Scapa Flow marine SPAs have been prematurely screened out – this concern was also raised during pre-application.	Marine SPAs with wintering waterfowl and breeding red-throated diver features were screened into the Addendum to the RIAA for LSE from vessel traffic impacts. This includes Scapa Flow SPA (but not North Orkney as there was no theoretical connectivity). An account of the screening process is provided in Appendix 2 - HRA: HRA Screening Technical Report. This impact pathway is given a detailed and comprehensive assessment in the RIAA, under the individual SPA accounts. Three SPAs (Scapa Flow, Moray Firth and Outer Firth of Forth and St Andrews Bay Complex) are considered in detail, with information on indicative vessel routes and numbers of vessel transits for each port and this is assessed against the diver, seaduck and grebe distribution in the SPAs along with sensitivity of the qualifying feature to the presence of vessels. In addition, mitigation is proposed to ensure any impacts from vessel movements are minimised
18	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	A clear, explicit methodology and audit trail has not been provided for the collision assessment which prevents replication to verify how input values have been derived or understand which input parameters have been selected. This has led to a fundamental lack of confidence in the modelled output values which undermines the next stage of the assessment.	Methods used for collision risk modelling followed NatureScot Guidance Note 7, with biometric parameters including avoidance rates being those provided by NatureScot in a consultation meeting on 4th June 2024. Methods are clearly documented and explained in Appendix 3 - HRA and EIA: Collision Risk Modelling Technical Report. Input densities of birds in flight (1,000 bootstraps) and information on wind farm and turbine parameters are also provided to allow replication

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					of collision estimates presented in the collision technical report.	
19	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	No information is provided on which version of the sCRM model has been used (or when) – this relates to the use of Caneco et al. 2022 which supersedes MacGregor et al. 2018 and whether or not the updates to Caneco have been used.	The version of the sCRM model used is provided in the Collision Risk Modelling technical report: Caneco (2022) shiny app v0.1.1 run online on 9 and 10 May 2024.
20	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	It is not clear how density estimates taken forward into collision risk modelling have been derived. Annexes 12.1, 12.2 and 12.4 of Volume 2 - Supporting Study 12 each presents density estimates in slightly different ways; a summary table is then provided in Annex 12.5 of those density values taken forward for use in the CRMs. However insufficient detail is provided in Annex 12 (section 3.1.1 - estimates per survey) to replicate or verify how the values have been derived, and without the full DAS / characterisation report, we have not been able to find the values used in the design based calculation as referred to in paragraph 17 (Supporting Study 12).	The density estimates used in collision risk modelling were either means or bootstrap resampled estimates generated by design based methods. They were based on 24 months of survey data (October 2020 to September 2022, inclusive), with two surveys informing the estimate for each of the 12 calendar months. Appendix 1 baseline site characterisation technical report presents density estimates of birds in flight within the OAA for each individual survey and for each of the 12 calendar months. An excel file of 1000 bootstrap estimates of density of birds in flight, for each calendar month, is also provided as an annex to Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report to enable replication of the collision estimates.
21	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	Avoidance rates from Ozsanlav-Harris <i>et al.</i> 2023 have been used, however for certain species e.g. kittiwake, there are a number of different rates that could be used (e.g. kittiwake, all gull, small gull or large gull). There is a lack of transparency as to which avoidance rate has been used for each species. We require avoidance rates to follow our guidance.	The SNCBs were in the process of finalizing a guidance note which provides an update on guidance regarding avoidance rates, at the time that collision risk modelling was being undertaken for the OAI. Consequently, NatureScot provided avoidance rates (and other biometric parameters) for use in collision risk modelling, by email on 4 June 2024. Only these avoidance rates were used in CRM. Note, there are small differences between NatureScot’s Project-specific advice of 4 June 2024 and the recently published SNCB CRM guidance

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
					note. Collision estimates were generated using NatureScot's Project-specific advice of 4 th June 2024.	
22	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	References have not been provided for all parameters, such as nocturnal activity for example or are erroneous e.g. wing span and body length for great skua do not match the reference provided.	References have been provided for all biometrics used in collision risk modelling (see Appendix 3 - HRA and EIA: Collision Risk Modelling Technical Report).
23	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	Mean density estimates are provided in Tables 4 and 5 in Annex 12.8 (Seabirds and highly pathogenic avian influenza) for gannet (in flight) with and without data from August and September 2022 - months known to overlap with HPAI-related mortality. For great skua, Figure 12 provides an overview of dead / alive birds per survey. Other than the passing reference made in paragraph 113 (Annex 12.8), it is not clear how HPAI-related effects have been addressed elsewhere in the assessment including use or not of the densities provided in Annex 12.8 – see next steps below.	Collision estimates were based on estimates of birds in flight in the OAA derived from digital aerial surveys undertaken in October 2020 to September 2022 inclusive, i.e. included August and September 2022. HPAI impacts are reviewed in detail in Annex 1P of the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report. HPAI is also discussed in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report, being used to explain patterns in density and abundance estimates for different species across the 27 digital aerial surveys. Raw counts of alive and dead gannets and great skuas, for each of the 27 surveys is also presented. In the Addendum to the RIAA, HPAI is also discussed in relation to conclusions on AEoSI, making explicit reference to Tremlett <i>et al.</i> , 2023, providing additional context to interpretation of PVA outputs, in light of recent evidence on HPAI impacts.
24	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	A significant proportion of the tables in Annexes 12.1, 12.2 or 12.4 of Supporting Study 12 comprises entirely of row after row of zeros – these could have been structured and formatted in a more useful manner.	We have given thought to the best way to present information in tables. However, in some cases, it is important to include zero values as these are valuable information. Data on species that were recorded infrequently in the OAA plus 4 km buffer are presented in the OAI but inevitably there are many zeros in tables of raw counts, density and abundance.

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25	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	There are errors and inconsistencies throughout Chapter 13. This includes but is not limited to: Despite pre-application advice, as referred to in Table 13-4, CRM outputs are only provided for the worst case scenario - the most likely scenario has been omitted.	Following NatureScot Guidance Note 7 and Project-specific advice (letter dated 27 March 2024), we have provided collision estimates for a Worst Case Scenario and a Most Likely Scenario in Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report.
26	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Collision Risk Modelling	There are errors and inconsistencies throughout Chapter 13. This includes but is not limited to: Table 13-10 in section 13.4.6 provides a summary of species at risk of collision during operation. This list of species is incorrect - puffin, guillemot, razorbill and fulmar were not taken forward for CRM.	Puffin, guillemot, razorbill and fulmar were assessed for displacement only in the OAI. Table 3-3 in Appendix 2 – HRA Screening Technical Report show which species were assessed for collision and/or displacement impact pathways. Additionally, Table 4-3 in the Addendum to the RIAA lists all impact pathways for which LSE could not be ruled out for each species.
27	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Displacement	The assessment of distributional responses (displacement and barrier effects) expected by NatureScot, has been provided in Annex 12.13 of the Supporting Study as a series of Tables with insufficient accompanying narrative and has been labelled as an ‘alternative approach’. This is contrary to advice directed by the Scoping Opinion and provided during the pre-application process.	Full details of the assessment of distributional responses are provided in Appendix 4 - HRA and EIA: Displacement Technical Report. All NatureScot advice and guidance was followed, including NatureScot Guidance Note 8, the SNCB Interim Displacement Note and pre-application Project-specific advice regarding which species and SPAs to assess using SeabORD. Displacement and mortality rates used in the displacement matrix are those advised in NatureScot Guidance Note 8, with additional project-specific advice followed on rates to use for fulmar. Mean Seasonal Peaks used in displacement matrix tables were generated following NatureScot advice provided in a letter (3 June 2024) which stated that peak abundances should be selected from complete seasons, using the 27 months of survey data to enable peak abundance to be drawn from complete seasons.

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
28	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Displacement	As this is our expected approach we have reviewed Annex 12.13 but the volume of errors / transparency issues is such that we have no confidence in any of the outputs provided. Examples include, but are not limited to:	The Appendix 4 - HRA and EIA: Displacement Technical Report has been written to be as clear and transparent as possible, enabling a full understanding of methods used to assess displacement mortality. It has also been checked for errors.
29	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Displacement	The peak month description in section 1 are incorrect in Tables 1-10 and 1-12.	The following is the approach used to calculate mean seasonal peaks: "MSPs were calculated as the peak abundance for each complete season, with seasonal peaks from each of the two years of survey then averaged". Tables are provided in Appendix 4 - HRA and EIA: Displacement Technical Report which show the abundance estimate of all birds (i.e. in flight and sat on the water) in the OAA plus 2 km buffer, for all 27 surveys. The months which contribute to a season are highlighted and the peak abundance in that season is highlighted in bold. The mean of the peaks is presented in a final row in the table.
30	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Displacement	Section 1.3 provides the displacement matrix values for each individual species in Tables 1-15 to 1-27. These do not match the corresponding values provided in summary Table 1-28 in section 1.4. The next stage of the assessment, which uses these values, is undermined if these are incorrect.	The whole OAI has been carefully checked for errors, with values in tables cross checked to ensure they agree.
31	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	change to adult survival rate	Section 2 deals with predicted impacts on adult survival, however there is insufficient transparency such that we cannot replicate the values provided in Table 2-1. This concerns predicted impacts for project alone effects for kittiwake, guillemot, razorbill, puffin and gannet; as well as in-combination values for kittiwake and puffin. As the change in adult survival values from Table 2-1 are used in the next	In the OAI, change to baseline annual adult survival rates due to Project alone and in-combination/cumulative impacts is presented in <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> and <i>Appendix 7: EIA Cumulative mortalities at regional population scales</i> . Following impacts through from the displacement technical report to change in adult survival rate is complicated as impacts need to have immature and sabbatical birds removed and the remaining impacts are then apportioned to SPAs in the breeding and non-

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed
				stage of the assessment as PVA input parameters, as per Table 3-3, the propagation of errors continues to build and results in a lack of confidence in the predicted population level effects for this impact pathway.	breeding seasons. A worked example is presented in <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> to assist with following the steps undertaken.
32	13-Dec-2023	Interim Advice on West of Orkney Windfarm application NatureScot	Displacement	Direct comparison with the applicant's assessment approach, as provided in Chapter 13, is challenging in light of these errors as well as the difficulties in being able to cross compare easily between the two approaches.	A single approach has been used for estimating displacement mortality in the OAI, which follows NatureScot's online guidance note 8 and Project-specific advice. Therefore, no comparison is required between different approaches.
33	13-Dec-2023	Interim Advice on West of Orkney Windfarm application NatureScot	Displacement	The applicant has undertaken a different approach to estimating the mean seasonal peak (described in section 13.4.4.5.3) than the approach advised by NatureScot. This is despite advice provided at pre-application (emailed dated 07/07/2023) indicating: "Data should be provided in a format that allows the calculation of mean seasonal peak population estimates based on the minimum two years of baseline data. For example, for a species with a breeding season from April to July, this requires the average of the peak population estimates between April and July in year one and two. This may require the counts to originate from different months in the two years (e.g. May in the first year and June in the second year). In practice, this requires comparable monthly abundance estimates for each year of survey. This allows for year-to-year variation in the precise time	The OAI follows the approach described in pre-application advice (email dated 7 July 2023). Tables are provided in Section 2.3.3 of Appendix 4 - HRA and EIA: Displacement Technical Report which show the abundance estimate of all birds (i.e. in flight and sat on the water) in the OAA plus 2 km buffer, for all 27 surveys. The months which contribute to a season are highlighted and the peak abundance in that season is highlighted in bold. The mean of the peaks is presented in a final row in the table.

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				(and magnitude) of peak abundance estimates to be taken into account in arriving at a mean peak population estimate. To allow recalculation of values, good practice requires presentation of monthly values in summary and full data from all surveys in an appendix to any report.”		
34	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Displacement	The use of a peak value from a partially surveyed season, as undertaken by the applicant, risks that the true seasonal peak may occur within the period that has not been surveyed.	Partially surveyed seasons have not been used to inform the mean seasonal peaks (MSP) used in the OAI. Only peaks from complete seasons inform the MSP.
35	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Apportioning - RIAA	The apportioning of breeding season impact to each SPA / qualifying feature is outlined in the RIAA via three steps reflected in Table 6-13 and Table 6-14 (section 6.7.6) and thereafter in Tables A1-1 to A1-8 and Tables A2-1 to A2-19 in Appendix A. This process is fundamental to understanding the level of impact to each site and species. We have identified significant errors and transparency issues within these Tables, and most notably in Table 6-14, a key stage of the apportioning process, where a sequence of calculations are needed to determine values for predicted impacts to all SPAs.	In the OAI, Appendix 5 - HRA: Apportioning Technical Report gives full details of how apportioning weightings were calculated for each SPA in the breeding and non-breeding season for the Project and for other OWFs (for in-combination mortality apportioning). These apportioning weightings were then applied to collision and displacement impacts for the Project alone and other OWFs (in-combination) to estimate mortality for each SPA. The calculation of impacts for each SPA is presented in <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> The whole OAI has been carefully checked for errors, with values in tables cross checked to ensure they agree.
36	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Apportioning - RIAA	The values for ‘total predicted impacts on adults’ in Table 6-14 are incorrect for most species as sabbaticals have not been removed at the required step. Interestingly, we note for the next stage in	The process of apportioning impacts from the Project to SPAs used in the OAI was as follows: 1. calculate collision and/or displacement mortality from the Project, by season; 2. remove impacts to immature birds, as defined by the

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				this table, in which the ‘predicted impacts to all SPAs’ are calculated, the correct values have been used. Such inconsistencies within the table make it difficult to follow, interpret and agree with the data provided.	proportion of the population assumed to be immature birds (taken from the BDMPS stable age structures used in Furness, 2015); 3. for breeding season impacts only, remove impacts that are assumed to be on sabbatical birds; 4. apportion remaining impacts (i.e. only adults and only non-sabbaticals for the breeding season) to SPAs, using apportioning weights provided in the Apportioning Technical Report. These steps are laid out in a worked example in Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts. All apportioned mortalities are also presented in tables in this report.	
37	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Appportioning - RIAA	For guillemot, we cannot track the values through the apportioning process set out in Table 6-14, in particular how the ‘total predicted impact on adults’ values have been derived and as such believe these are incorrect.	Guillemot apportioning is slightly more complicated for the non-breeding season, due to each OWF (i.e. the Project and other OWFs used in the in-combination assessment) having its own set of SPAs which are impacted due to being within guillemot foraging range of each OWF. This approach follows NatureScot's advice. Breeding season apportioning followed NatureScot's Project-specific advice on apportioning, given that the Sule Skerry and Sule Stack SPA boundary overlapped with the OAA plus 2 km buffer. A full explanation of how guillemot impacts were apportioned to SPAs is given in Appendix 5 - HRA: Apportioning Technical Report.
38	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Appportioning - RIAA	There are also inconsistencies across Table 6-14 in the use of decimal place and rounding up.	Decimal points and rounding up are consistent within the OAI tables. Note that in some cases, rounding means that numbers within tables appear to not quite add up. However, the non-rounded numbers were used in the calculation of mortalities, apportioning and PVAs, so this is a presentational issue only. Where this happens, a footnote to the table explains the rounding issue.

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39	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Apportioning - RIAA	No reference for sabbatical rate used for great skua has been provided.	For the OAI, a precautionary approach was taken to assessing great skua impacts and no sabbatical rate was applied, i.e. it was assumed that all adults in the OAA were breeding birds. Given HPAI impacts on great skua, we felt it was important to take a more precautionary approach to the assessment for this species, given HPAI impacts and recent population declines.
40	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	The 50 year metric has been omitted from the application submission documents despite advice provided during the pre-application stage of the need to include this time period.	PVA metrics are provided for 25, 35 and 50 years in the Addendum to the RIAA.
41	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	For guillemot at Sule Skerry & Sule Stack SPA (section 6.20.3.1 / Appendix C) – the change in adult survival rates for in-combination effects does not appear to correlate with the additional impact from other projects.	This was an error in the original RIAA. As a full re-assessment has been undertaken, this error is no longer present. The OAI has been carefully checked for errors.
42	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	For puffin at Sule Skerry & Sule Stack SPA (section 6.20.3.2 / Appendix C) – there are inconsistencies in the values for predicted impacts on breeding adults presented in the Tables in Appendices A and C.	This was an error in the original RIAA. As a full re-assessment has been undertaken, this error is no longer present. The OAI has been carefully checked for errors.
43	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	For great black-backed gull at East Caithness Cliffs SPA (section 6.11.3.2 / Appendix C) – we note that the metric CPS in-combination value is extremely low. We have been unable to track impacts predicted for in-combination or replicate the predicted change in adult survival.	This was an error in the original RIAA. As a full re-assessment has been undertaken, this error is no longer present. The OAI has been carefully checked for errors.
44	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	For kittiwake at Calf of Eday SPA (section 6.3.8.1 / Appendix C) – there are inconsistencies in the predicted impacts for project alone effects between the	This was an error in the original RIAA. As a full re-assessment has been undertaken, this error is no longer present. The OAI has been carefully checked for errors.

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				narrative in this section and the tables in Appendices A and C.		
45	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	With respect to Annex 12-13 these include, but are not limited to: There are inconsistencies across Tables 3-4, 3-5, 3-7 and 3.8 - the Counter Factual for Population Size (CPS) for a 'Low' scenario is lower than for the 'High' scenario, even though the number of birds impacted in the 'High' scenario is greater.	These were not errors but were caused by stochasticity in the PVA. Where impacts are very small, or differences between scenarios are very small, the stochasticity in the model can be greater than the effect of the impact.
46	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	PVA	With respect to Annex 12-13 these include, but are not limited to: Those errors / transparency issues noted in the sections above continue to undermine our confidence in the PVA outputs.	The OAI has been carefully structured and written in order to provide as much clarity as possible on approaches used and the results of the assessments. The OAI has also been carefully checked for errors. This should help build confidence in the PVA outputs in the OAI.
47	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	RIAA conclusions	We do not agree how the applicant has chosen to consider impacts as de minimis and how this approach has been applied throughout sections 6.8 – 6.22 of the RIAA.	In the original RIAA, some PVA's were not run for in-combination impacts due to those impacts being deemed de minimis. A different approach has been taken in the OAI which follows NatureScot advice, i.e. in-combination PVAs were run when change to adult survival was at equal to or greater than 0.02% AND Project-alone mortality was equal to or greater than 0.2 birds per annum. The term 'de minimis' is not used in the OAI.
48	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	RIAA conclusions	The conclusions presented within Table 6-74 (section 6.22) of the RIAA are not consistent with the results of the assessment for individual SPAs.	The OAI has been carefully checked to ensure consistency throughout the assessment, including conclusions drawn from results of the assessment.
49	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant	Section 6.22.1 of the RIAA presents further evidence not used in the assessment that the applicant considers to be relevant. Not all of the evidence presented in section 6.22.1 has been reviewed and / or accepted	There is no section on 'Further evidence not used in the assessment' in the OAI. The conclusions of the assessment are based on the outputs of the PVA models, with additional context provided to assist with interpreting the PVA outputs, i.e. feature condition, feature status and population trends and

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				by NatureScot for inclusion within the ornithological assessment process for wind farm development in Scotland. Our comments are outlined below:	extent to which HPAI might have impacted an SPA population and what that means with respect to the population's resilience to additional OWF impacts.	
50	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Baseline	Use of tracking data to inform decisions around connectivity must be agreed during the HRA screening. The evidence presented in section 6.22.1.1 was not agreed during the pre-application stage.	In the OAI connectivity was determined following NatureScot advice (Guidance Note 3), i.e. connectivity was assumed for any SPA within foraging range of the OAA plus 2 km buffer. GPS tracking data was not used to inform connectivity.
51	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Baseline	With reference to Vallejo et al. 2017, we advised during pre-application that this study was in relation to the Robin Rigg wind farm in the Solway Firth, which is very different in both scale and location to the proposed West of Orkney Windfarm development. In addition, as acknowledged by the authors, there were some limitations to the study. Approaches to marine ornithology survey and analyses have evolved substantially in the interim; as such we would not consider this study in isolation as applying more generally to potential displacement of common guillemots by offshore wind farms.	In the OAI, displacement rates and mortality rates used in the displacement matrix followed NatureScot guidance and advice. Conclusions in the RIAA Addendum are based on outputs of the PVAs. However, conclusions on AEOSI do refer to the recent study by Trinder <i>et al.</i> (2024) which suggests guillemot displacement rates could be lower than 60%. This is used to inform the Applicant's conclusions and not in the assessment itself, which was based on the 60% displacement rate.
52	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Emerging evidence	Section 6.22.1.2 advocates for the use of the Ozsanlav-Harris et al (2023) avoidance rates and queries why our guidance has not been updated to reflect these. Our guidance will be updated shortly. The difference between the two versions is down to the fourth decimal place. Please note we have not been able to verify the CRM outputs presented in Tables 6-79.	The OAI collision estimates are based on the avoidance rates provided by NatureScot in an email on 4th June 2024. No other avoidance rates are used in the OAI.

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53	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Emerging evidence	<p>The update to our guidance will also include our position on macro-avoidance for gannet, which the applicant advocates for (based on Pavat et al. 2023), noting that we are concerned, due to the small sample size as well as the location of the study wind farms (i.e. at some distance from colony SPAs), that the underlying studies are unlikely to be sufficiently representative. Particularly with respect to variation in seasonality, notably breeding season behaviour. We also note Lane et al. (2020) indicated gannet trip duration and distance varies seasonally, with marked differences during chick rearing, which could impact the number of birds in contact with offshore wind farm developments.</p> <p>No macro-avoidance adjustment to gannet collision estimates was applied in the OAI.</p>
54	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Assessment tools	<p>SeabORD considers consequences to both adult mortality and productivity, and allows for some quantification of uncertainty. The number of colonies which SeabORD can run simultaneously will depend on the version used. Updates to SeabORD through the Cumulative Effects Framework will address this constraint. As advised during pre-application, we understand that Vallejo et al. 2022 is being peer reviewed – until this is complete we reserve comment on the issues raised in this paper.</p> <p>In the OAI, SeabORD was used to model guillemot and puffin impacts for up to four SPA colonies, as advised by NatureScot. No consideration of the strengths and weaknesses of the SeabORD approach is provided in the OAI. However, the impact assessment uses displacement mortality derived from the displacement matrix approach.</p>

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55	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Further evidence provided by the applicant - Assessment tools	NatureScot supports the need for an update to BDMPS.	Noted. The Furness (2015) BDMPS report was used in the OAI.
56	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	The primary ornithological assessment must be based on the approaches described within our published suite of guidance notes.	The ornithological assessment presented in the OAI is based on NatureScot's published suite of guidance notes, supplemented with Project-specific advice. Throughout the OAI, details of the advice and guidance that was followed for that component of the assessment is clearly stated, either in the text or in text boxes.
57	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	In addition to this guidance, we provided further specific advice post scoping during the pre-application phase. We expect this to be followed.	The OAI follows advice provided by NatureScot, both pre- and post-submission of the original EIAR and RIAA. Where relevant, the Applicant checked with NatureScot that the pre-application advice remained the most up to date advice to be used. The assessments followed all of the most recent NatureScot guidance and advice, where any of that advice had changed.
58	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	Any changes to assessment approaches or tools since the previously agreed project cut-off must be discussed and agreed with NatureScot in advance of resubmission.	Some changes to assessment approaches have occurred since the submission, following NatureScot advice. For example: - the use of 27 months of digital aerial survey data, to provide complete seasons, when producing a mean seasonal peak; - approaches to apportioning given complexities with the NatureScot apportioning tool when a Project boundary overlaps an SPA boundary; - thresholds for in-combination impacts that require assessment using a PVA. All of these were discussed in detail with NatureScot in consultation meetings and the approach fully agreed.
59	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	The presentation of the assessment should be transparent with a clear audit trail and narrative that enables any output values from specific tools / steps to be tracked through each stage of the assessment.	We have tried to make the OAI as clear and transparent as possible. We have provided substantially more narrative than was in the original RIAA, EIA Chapter and Supporting Study, to explain approaches and methods used, the origin of input information and how outputs were taken forward in the assessment process. To assist with this, we have also provided

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					an introductory report that provides an overview of the structure of the OAI and a summary of the key points from each report.	
60	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	The entire ornithological assessment should be checked for errors to ensure that all output values are correct for each stage of the assessment.	We have carefully checked the OAI for errors.
61	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	The DAS surveys and report should be provided and used to inform the HRA screening process.	The DAS report from HiDef is provided as an annex (Annex 1A) to the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report.
62	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	We require agreement in advance as to how HPAI-related impacts are to be addressed within the revisited assessment.	It was agreed with NatureScot (Consultation Meeting of 28 May 2024) that HPAI impacts would be assessed in a qualitative manner. Specifically, HPAI would be considered in the baseline site characterisation report, interpreting changes in raw counts, densities and abundances across the 27 months of the DAS campaign in light of HPAI impacts. Additionally, it was agreed on 28 May 2024 that HPAI would be considered in the Addendum to the RIAA, when drawing conclusions on adverse effect on site integrity for a qualifying feature of an SPA, i.e. providing additional context to interpretation of outputs of the PVA.
63	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	All references should be checked and information on model versions must be included.	All references in the OAI have been checked. Model versions and dates on which they were downloaded/used are provided in the OAI.

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64	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	The structure, layout and flow of information between documents needs to be revised and must include the provision of suitable navigational aids to speed up cross-referencing.	A different structure has been used for the OAI. This revised structure was presented to NatureScot and MD-LOT in a consultation meeting (26 February 2024). NatureScot subsequently confirmed they were content with this structure. An overview of the structure of the OAI is provided in the Introduction to the OAI report. There is substantial cross-referencing between reports, explaining how the assessment progresses through the various technical reports. Hyperlinks within reports assist with cross-referencing.
65	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	Should the applicant wish to include any alternatives from our assessment approach, this must be discussed and agreed in advance with us including how this information is to be presented to enable clear comparisons between approaches (where this is appropriate).	NatureScot guidance was followed throughout the EIA and HRA assessments. Where this guidance was not followed (either at the request of NatureScot and/or the Applicant) the different approach was discussed and agreed with NatureScot during consultation meetings. There is no part of the EIA and HRA assessments that take an approach that was not fully discussed and agreed with NatureScot during consultation meetings. Where NatureScot have requested a comparison of approaches this has been provided in the relevant technical appendix, e.g. model- vs design-based approaches, straight-line vs coastal distances for breeding season apportioning.
66	13-Dec-2023	Interim Advice on West of Orkney Windfarm application	NatureScot	Elements to be addressed within any revised assessment	With respect to the assessment of cumulative effects for fulmar (Chapter 13, section 13.7.1) –please note, we are still considering how fulmar should be assessed cumulatively as part of the ScotWind / INTOG sites.	NatureScot advised (consultation meeting of 11 June 2024) that no in-combination or cumulative assessment for fulmar was required, and that only a Project alone assessment for displacement/barrier effects was required in the OAI. This has been undertaken in the OAI.
67	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland	Whole assessment	The EIA chapter does not follow the Scoping Advice (or subsequent NatureScot guidance).	The Addendum to the Offshore EIA report in the OAI follows the Scoping Advice and NatureScot's guidance and Project-specific advice.

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68	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland		Some steps within the model assessments appear to be missed entirely.	All steps of the assessment are clearly presented in the OAI, detailed in a series of technical reports and summarized in the Addendum to the Offshore EIA Report and the Addendum to the RIAA.
69	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland		There are in addition several basic copy and paste errors.	The OAI has been fully checked for errors, including transcription errors.
70	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland		The 'alternative approach' which most closely resembles the parameters discussed at preapplication is obscured in an appendix and again there appear to be missing steps in the presented information.	A single approach has been presented in the OAI, which follows NatureScot's guidance and advice. All steps in the assessment process are clearly presented in the OAI.
71	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland		There is a lack of logical flow within the information presented and links between documents are confusing.	The OAI follows a revised structure, with additional narrative and signposting within and between reports to assist with following the flow of information through the assessment. The overall structure of the OAI is summarised in the Introduction to the Additional Ornithology Information.
72	13-Dec-2023	Advice on West of Orkney Windfarm application	RSPB Scotland		RSPB do not support the de minimis argument.	The de minimis argument is not followed in the OAI. Instead NatureScot's advice was followed, meaning that an in-combination PVA was undertaken when in-combination impacts caused an equal to or greater than a 0.02% change in annual adult survival rate AND Project-alone mortality was equal to or greater than 0.2 birds per annum. The term 'de minimis' was not used in the OAI.
73	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - 'Scoping approach'	The SEI will present only a NatureScot guidance 'Scoping Approach' and text where appropriate to say where this approach is less precautionary.	The OAI (formally known as the Supplementary Environmental Information 'SEI') has only a single approach which follows NatureScot online guidance and Project-specific advice. This approach is not termed, a 'Scoping Approach' in the OAI. As there is only one approach used, that follows all NatureScot guidance and advice, there was no need to give the approach a name. There is no mention in the OAI of where the NatureScot

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					approach is less precautionary - simply the NatureScot approach is followed.	
74	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - 'Scoping approach'	No 'Developer Approach' will be presented.	This is correct - no 'Developer Approach' is presented in the OAI.
75	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - 'Scoping approach'	Where there is uncertainty around an approach presented in the SEI, commentary will be provided discussing the elements of uncertainty.	The approach used in the OAI follows NatureScot guidance and advice. We have simply followed that advice rather than discussing where that advice has uncertainty associated with it. (Note uncertainty around NatureScot advice was presented in the original RIAA, under 'Evidence not used in the assessment'.)
76	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - structure	The structure of the SEI will follow that used for Berwick Bank OWF's application, particularly in relation to the technical reports and annexes. There will be six technical appendices in the SEI with associated annexes (1. Site characterization, 2. CRM, 3. Displacement, 4. Apportioning, 5. In-combination effects, 6. PVA).	This is the structure that has been used in the OAI, with the exception that details of the approaches used to HRA screening and which sites were screened in or out, are provided in a technical appendix too. The specific number of appendices differs to that indicated in February due to some minor restructuring and separation of EIA from HRA related assessments. The final number of appendices is nine and overall structure summarized in Figure 3.1 of the Introduction to the Additional Ornithology Information.
77	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - structure	All technical details used in the EIA and RIAA will be in the Technical Appendices but with sufficient detail in the EIA and RIAA so that it will be possible to read them as stand-alone documents.	The OAI follows this approach
78	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - structure	Cross referencing and hyperlinks will be used throughout the SEI.	Cross referencing and hyperlinks are used within and between reports to assist with navigation through the EIA and HRA assessments.

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79	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - structure	The EIA will be similar in terms of its layout in the application, but the RIAA will be made shorter, by re-locating Technical Appendices. The RIAA will be composed of two parts: 1) HRA screening and 2) the assessment.	The Addendum to the Offshore EIA Report, which is part of the OAI, does follow a similar structure to the original EIA Chapter. The Addendum to the RIAA, which is part of the OAI, does not include full details of HRA screening but instead summarises the main points of screening and lists all sites screened in and the impact pathway under which LSE was assumed. Full details of the HRA screening are provided in Appendix 2 - HRA: HRA Screening Technical Report.
80	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - Use of tracking data	Tracking data will be presented in the baseline Technical Appendix in the SEI, but it will not be used to screen sites in and out of the HRA screening assessment.	A summary of GPS tracking data is provided in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report, with a note on whether or not tracks entered the OAA. However, this information was not used to establish connectivity and no tracking data are considered in the HRA Screening report.
81	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Whole SEI - Use of sandeel fishery data	The SEI will not include information on the closure of the sandeel fishery.	The OAI includes no information on the closure of the sandeel fishery, other than mention of this as additional contextual information in the Addendum to the Offshore EIA Report as one of the many potential drivers of change in seabird populations. It is not considered with respect to impact assessment.
82	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Baseline - Data input	DAS data will be presented as an annex to the Baseline Site Characterisation Technical Appendix in the SEI.	The DAS report, supplied by HiDef, is in Annex 1A of the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report.
83	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Baseline - Data input	The SEI will clearly explain the differences between the DAS survey area and assessment study area and exactly which data were used in the impact assessment.	This is fully documented in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report. Briefly, marine birds in and around the offshore Project were characterised by estimating bird density and abundance within the OAA plus a 4 km buffer. The OAA (Option Agreement Area) is equivalent to the development area, i.e. the area in which WTGs and other offshore Project infrastructure, may be built. Digital aerial surveys were carried out over a larger area than the OAA plus 4 km buffer. The digital aerial survey report presents density and abundance estimates from the entire survey area, whereas the

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					baseline site characterisation report presents density and abundance within the site characterisation area, i.e. OAA plus 4 km buffer.	
84	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Baseline - Data input	A map will be included in the SEI showing the difference between different development and survey areas.	A map is included in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report, showing the OAA (i.e. development area) and extent of digital aerial survey coverage – see Figure 3-1 in that report.
85	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Baseline - Use of design-based estimates	Model and design-based estimates will be compared in the SEI.	Model- and design-based estimates have been provided in the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report, and are compared. The comparison is presented in Annex 1R and full details of MRSea model summarises and diagnostics in Annex 1O, both of which are annexes to the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report.
86	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Baseline - Use of design-based estimates	All outputs (CVs etc.) from the model-based approach, as requested in the NatureScot online guidance, will be provided in the SEI.	The OAI includes all MRSea outputs and diagnostics requested by NatureScot in Guidance Note 2 in Annex 1O and Annex 1R.
87	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	HRA Screening - Construction vessel activity	It is not yet known which ports will be used, but the SEI will consider worst and best-case scenario for port optionality.	A comprehensive assessment of potential vessel impacts on wintering waterfowl and breeding red-throated diver qualifying features has been undertaken in the Addendum to the RIAA. Information on potential ports to be used for construction, indicative vessel routes, number of vessel transits associated with the Project construction and operation, the increase in vessel activity at potential ports and the proportion of the SPA possibly impacted by increased vessel traffic is all presented in the Addendum to the RIAA, along with an assessment of vessel activity against bird distribution within the marine SPAs.

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88	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	HRA Screening - Construction vessel activity	The SEI will supply contextual information for each potential port to be used.	The OAI provides detailed information on indicative vessel routes and current vessel activity for each potential port, plus a forecast of vessel traffic associated with the Project for each potential port.
89	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Collision Risk Modelling - updated guidance	The SEI will include updated CRM guidance in the SEI, any updates to guidance after the CRM guidance will not be included.	The OAI used the most recent NatureScot advice for estimating collision risk. For the most part, NatureScot Guidance Note 7 was followed, However, biometrics and avoidance rates used were those provided in Project-specific advice by NatureScot. This was received from NatureScot in an email dated 4th June 2024. Note, avoidance rates in the recently published SNCB CRM guidance note were not used in the assessment – NatureScot Project specific advice was used instead (i.e. information provided on 4 June 2024). Additionally, only a most likely scenario and worst case scenario using Option 2, with generic flight heights is presented in the OAI, as advised by NatureScot (letter dated 27 March 2024).
90	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Collision Risk Modelling - model to be used	For the SEI, CRM will be re-run with the Caneco et al (2022) using the Shiny App once there is clarity from NatureScot about usage of model-based/design-based estimates.	Design-based estimates were used to estimate density of birds in flight within the OAA to inform CRM, as discussed and agreed with NatureScot. CRM was run using the online shiny version of the sCRM tool (Caneco, 2022).
91	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	Displacement - Buffer	The SEI will present displacement impacts in the OAA and the OAA plus a buffer.	Displacement impacts are calculated and presented in Appendix 4 - EIA and HRA: Displacement Technical Report. In this report, displacement impacts are presented using mean seasonal peaks derived from abundances in the OAA alone and OAA plus 2 km buffer. However, only the OAA plus 2 km buffer displacement impacts are taken forward into the impact assessment.
92	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	HPAI	A qualitative approach to HPAI will be presented in the SEI including additional information from 2023 colony survey counts for particular SPAs.	This has been undertaken for the OAI, with a review of changes to estimated colony size between Seabirds Count and the 2023 RSPB surveys (Tremlett <i>et al.</i> 2024) provided in each of the species accounts in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report. Additionally, AEOSI is

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					concluded for each feature and SPA taking into account recent counts provided in Tremlett <i>et al.</i> , 2024.	
93	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	In-combination assessment - 'de-minimis' term	The SEI assessment will not use the term 'de-minimis'.	This is correct. There is no mentioned of the term 'de minimis' in the OAI.
94	26-Feb-2024	Note of a virtual consultation workshop with the Project, MD-LOT and NatureScot	MD-LOT and NatureScot	In-combination assessment - Fulmar	Fulmar will be considered for the Project Alone in the SEI and the PVAs will include a 50-year projection.	NatureScot advised (consultation meeting of 11 June 2024) that no in-combination or cumulative assessment for fulmar was required, and that only a Project alone assessment for displacement/barrier effects was required in the OAI. This has been undertaken in the OAI. PVAs for all species and SPAs were projected over a 50 year period (as well as 25 years, as advised by NatureScot, and 35 years, which is the intended operational period for the Project).
95	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved	NatureScot	Approach to assessment	Question 1: The Offshore Ornithology SEI will present only a 'Scoping Approach' and no 'Developer Approach'. However, in the SEI, the text will indicate where the Scoping Approach is highly precautionary. NS (26.02.24): Please could the text also indicate where the Scoping Approach is less precautionary so there is balance. WOW: Noted.	The OAI presents a single approach to the EIA and HRA assessments, which follows NatureScot guidance and advice throughout. Consequently, the single approach provided is not labelled the 'Scoping Approach'. Additionally, there is no judgement made in the text of where the approach taken is highly precautionary, not where it is less precautionary. The exception to this is in the Addendum to the RIAA where conclusions on AEoSI consider: 1. The Restricted Build Areas which mean the WTGs closest to Sule Skerry and Sule Stack SPA will now be more distant from the SPA than was assumed when estimating collision and displacement mortality; 2. Recent evidence published in Trinder <i>et al.</i> , 2024, which suggests guillemot displacement rates could be substantially lower than the 60% assumed in the calculations of displacement mortality.

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					Note, these two considerations were not used to inform the assessment itself but were only used to inform the Applicant’s conclusions on AEoSI.	
96	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved	NatureScot	Structure of SEI	Question 2: Are NS content with the WoW approach to structuring the SEI? NS (26.02.24): Yes	The OAI is structured following the approach presented to NatureScot and MD-LOT in the consultation workshop (26 February 2024), with the exception of the addition of an Appendix 2 - HRA: HRA Screening Technical Report to the series of technical appendices. A summary of HRA screening is also presented in the Addendum to the RIAA. Also, two additional technical appendices are provided, as a consequence of splitting out information on mortality, change to survival and PVAs into reports to inform the Addendum to the RIAA and to inform the Addendum to the Offshore EIA Report, separately. Consequently, there are now nine technical appendices.
97	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved	NatureScot	Digital aerial survey report	Question 3: The digital aerial survey report will be included as an annex to the baseline site characterisation technical appendix. WoW: The digital aerial survey report includes an explanation at the start of the report about the change in development area and survey area during the course of pre-application surveys (Pages 20 – 22 Section 2.2, Figures 1 and 2). The baseline technical report will clearly explain the difference between population estimates from the full survey area, presented in the DAS report, and from within the development area (and buffers) which were taken forward to impact assessment, i.e. the Option Agreement Area (OAA). Are	The DAS report is provided in Annex 1A to Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report. The change in survey area during the 27 months of digital aerial survey is explained both in the DAS report and in the baseline site characterisation report. Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report also explains the difference between the survey area over which digital aerial surveys were flown, and the baseline site characterisation area, i.e. the OAA plus 4 km buffer (see Figure 3-1 in that report). Briefly, marine birds in and around the offshore Project were characterised by estimating bird density and abundance with the OAA plus a 4 km buffer. The OAA (Option Agreement Area) is equivalent to the development area, i.e. the area in which WTGs and other offshore Project infrastructure, may be built. Digital aerial surveys were carried out over a larger area than

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				NS content with this approach? NS (26.02.24): yes.	the OAA plus 4 km buffer. The digital aerial survey report presents density and abundance estimates from the entire survey area, whereas the baseline site characterisation report presents density and abundance within the site characterisation area, i.e. OAA plus 4 km buffer.
98	11 March 2024	NatureScot	HRA Screening for vessel activity impacts	<p>Question 4: Does NatureScot require that North Orkney and Scapa Flow marine SPAs are screened in for construction vessel activity? NS: From our review of the RIAA we note that disturbance from vessel movement has not been adequately considered. This impact pathway will cover construction and operation / maintenance activities and, while we understand that agreements have not yet been reached with individual ports, we are concerned that North Orkney and Scapa Flow marine SPAs have been prematurely screened out –this concern was also raised during pre-application [NatureScot advice on WOW application, Dec 2023] WoW: The Operations & Maintenance facility for WOW will be at Scrabster so there will be no project vessel activity in the North Orkney or Scapa Flow marine SPAs during operation. For construction, WoW will use Scapa Deep water facility if it comes online in time. If this port is not available and / or the project requires additional port facilities, the Project might use ports in Cromarty Firth or ports further afield. While some construction vessels may use Orkney ports these large vessels will use deep water shipping lanes and will</p>	In the OAI, Scapa Flow SPA is now screened in, along with functionally connected Hoy SPA and Orkney Mainland Moors SPA. North Orkney SPA is not screened in as there was no theoretical connectivity for this SPA, as vessels associated with the Project will not be transiting through or within 15 km of this marine SPA. Another two marine SPAs were also screened in due to vessels potentially transiting through them: Outer Firth of Forth and St Andrews Bay Complex SPA and Moray Firth SPA. A further four marine SPAs were also screened in due to vessels potentially transiting within 15 km of the boundary of the SPA. An account of the screening process is provided in Appendix 2 - HRA: HRA Screening Technical Report, clearly explaining the process by which sites were screened in or out for this impact pathway. Detailed and comprehensive assessments are provided in the Addendum to the RIAA, under the individual SPA accounts (for Scapa Flow, Moray Firth and Outer Firth of Forth and St Andrews Bay Complex) with information on indictive vessel routes and numbers for each port and this is assessed against the diver, seaduck and grebe distribution in the SPAs along with sensitivity of the qualifying feature to the presence of vessels. A comprehensive assessment of potential vessel impacts on wintering waterfowl and breeding red-throated diver qualifying features has been undertaken in the Addendum to the RIAA. Information on possible ports to be used for construction, indicative vessel routes, number of vessel transits associated with the Project construction, the increase in vessel activity at potential ports and the proportion of the SPA possibly impacted by increased vessel traffic is all presented in the Addendum to the RIAA, along with an assessment of vessel activity against bird

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				<p>avoid shallow areas used by features of the marine SPAs, such as red-throated diver.</p> <p>NS (26.02.24): NS do not agree that LSE can be ruled out - increase in construction traffic could be significant. More contextual information is required in the assessment. Look at most likely scenarios, e.g. numbers of boats per day passing in and out of the port.</p> <p>NS agreed to investigate whether there is any other advice that can be followed around construction vessel activity impacts on marine SPA features.</p> <p>MD-LOT (26.02.24): NS need to understand the context and change in activity in and around the port. Therefore, the assessment needs to provide contextual information. Recommendation to investigate what information is available about activity in and around the port and how activity has changed in the last few years. What additional vessel traffic will the WoW project add to current/recent activity levels?</p> <p>WoW: we will identify potential ports and scope in relevant marine SPAs (North Orkney, Scapa Flow, Moray Firth) for construction vessel activity, in the RIAA component of the SEI.</p>	<p>distribution within the marine SPAs. Additionally, Hoy SPA and Orkney Mainland Moors SPA were assessed for impacts on the breeding red-throated diver feature as these sites are functionally linked to Scapa Flow SPA. Also, vessel impacts on seabird features using the marine extension of the North Caithness Cliffs SPA was assessed in detail. For these three terrestrial sites, the full assessment information is provided in the SPA account, in Section 6.3 of the Addendum to the RIAA.</p>
99	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore	NatureScot	displacement	<p>Question 5: Does NatureScot require displacement matrix tables without a buffer to be presented in the SEI, as well as matrix tables for displacement assessments that include a buffer?</p> <p>Displacement impacts are calculated and presented in Appendix 4 - EIA and HRA: Displacement Technical Report. In this report, displacement impacts are presented using mean seasonal peaks derived from abundances in the OAA alone and OAA plus 2 km buffer. However, as discussed and agreed with</p>

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				NS (26.02.24): yes, please include a displacement matrix table with no buffer, as well as matrix tables with a buffer.	NatureScot, only the OAA plus 2 km buffer displacement impacts are taken forward into the impact assessment.
100	11 March 2024	NatureScot	HPAI	<p>Question 6: Can NatureScot provide any updated advice on how HPAI should be included in the assessment?</p> <p>WoW: The SEI will include additional contextual information and provide a qualitative interpretation of predicted WOW impacts in light of HPAI, e.g. lower confidence in population response to predicted impacts. Does NatureScot have any advice on any quantitative approaches to assessment they wish to see with respect to HPAI?</p> <p>NS (26.02.24): A qualitative context is important, commentary on timing of surveys in terms of HPAI and what this means in terms of the assessment. NS agree that a quantitative approach is not possible at the moment.</p>	No quantitative approach to assessing HPAI impacts on the ornithology assessment are presented in the OAI. In Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report, the timing of HPAI impacting different species and colonies is considered in relation to when surveys were undertaken.
101	11 March 2024	NatureScot	Fulmar impact assessment	<p>Question 7: Do NatureScot have any further advice on how fulmar should be assessed cumulatively for the SEI?</p> <p>With respect to the assessment of cumulative effects for fulmar (Chapter 13, section 13.7.1) – please note, we are still considering how fulmar should be</p>	The OAI presents an assessment (EIA and HRA) of Project alone impacts on fulmar (displacement/barrier impact pathway) but does not include an assessment of any in-combination or cumulative impacts for this species.

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		NatureScot)		assessed cumulatively as part of the ScotWind / INTOG sites [NatureScot Advice on WOW application, Dec 2023] NS (26.02.24): We are content that fulmar is considered for the Project Alone and not cumulatively/in-combination.	
102	11 March 2024	NatureScot	PVA	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved Question 8: NatureScot requested PVAs be run for 50 years, as well as 25 and 35 years. As confirmed with NatureScot in the meeting on 26th February 2024, the SEI will include PVA outputs for 25 years, 35 years and 50 years. Note that in the 50 years projection, project impacts cease after 35 years, i.e. a recovery period is included. While this is contrary to the advice in Guidance Note 11, this approach of project impacts ceasing after 35 years was previously agreed with NatureScot.	The OAI presents PVA metrics for 25 years, 35 years and 50 years for all PVAs.
103	11 March 2024	NatureScot	GPS tracking data	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb Question 9: Would NatureScot like tracking data excluded from the SEI or included for additional context around on bird distributions and origins of birds in the development area? NS (26.02.24): Having contextual information is helpful, so please include this, but don't use it for HRA screening	GPS tracking data is briefly reviewed in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report. It is not used in HRA screening.

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	2024, which have now been agreed/resolved					
104	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved	NatureScot	Entire assessment	Question 10: Please could NatureScot confirm that WOW will not be required to undertake reanalyses of data for the SEI, if NatureScot's guidance is updated prior to submission of the SEI to MD-LOT? [this excludes the updated CRM guidance as discussed under question 4.] NS (26.02.24): The only NS guidance coming out imminently is CRM; any other guidance updates will be outwith the WOW timeframe.	The OAI follows all NatureScot online guidance and additional Project-specific advice provided by NatureScot, mostly through consultation meetings during April-July 2024. However, the OAI did not use the avoidance rates provided in the SNCB CRM note as this was issued after the Applicant had completed all collision risk modelling work. Instead, CRM relied on Project-specific advice provided by NatureScot in an email of 4 June 2024. Note, NatureScot's advice of 4 th June 2024 differs slightly to the advice in the SNCB CRM guidance note.
105	11 March 2024	Letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) summarising issues discussed with NatureScot in a meeting on 26 Feb 2024, which have now been agreed/resolved	NatureScot	Sandeel fishery closure	Question 11: WOW wish to include a technical appendix on the benefits of sandeel fishery closure to seabirds and the relevance of this to predicted Project impacts on SPA qualifying features. Do NatureScot have a view on this? WoW: The aim of this review of the potential benefits of the sandeel fishery closure in the SEI would not be to consider this as a compensation measure. Rather, it would be to put the benefits of the closure in a wider context of the WoW impacts on SPAs that may benefit from the closure. MD-LOT: We advise that you do not follow this approach and just focus on the application. There is a lot of debate currently about the quantifiable nature of	The OAI does not include any mention of the sandeel fishery closure other than in the EIA Chapter, where the closure of the fishery is mentioned as one of many drivers of change in seabird populations. It is not considered in the impact assessment at any stage and there is no technical appendix on the fishery closure in the OAI.

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				the benefits from sandeel closure. Our advice is to stay clear of this debate.		
106	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	HRA Screening - Site inclusion	Confirmed that in relation to screening in North Orkney and Scapa Flow marine SPAs for construction vessel activity, they are content with the approach outlined by MD-LOT – provision of information around the likely increase in vessel traffic through the SPA, including potential use as lie-up / sheltered area if relevant, and the impacts of this additional vessel traffic on the SPA.	The OAI fully addresses this impact pathway in the Addendum to the RIAA. Information on the potential additional vessel traffic through Scapa Flow SPA and other SPAs are presented and assessed against the distribution of qualifying features in the marine SPA. Additionally, Moray Firth SPA and Outer Firth of Forth and St Andrews Bay Complex SPA were also screened in for this impact pathway and were fully assessed in the same way. Potential use of lie-up and sheltering areas was considered. However, Project vessels will not lie-up in the marine SPAs but will remain in port when not in use. Sheltering areas will only be used when bad weather presents a navigational safety issue and the area to be used will be determined at the time, at the Master’s discretion. As this is not a planned activity but a response to a Health and Safety issue, this was not assessed.
107	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Baseline - Design/model-based estimates	Confirmed that preference is for model-based estimates to be used, where they can be calculated.	The OAI uses design-based density and abundance estimates in the impact assessment, but model-based estimates are also provided and compared with design-based estimates (Annex 10). This was discussed with NatureScot (consultation meeting, 30th April 2024) during which the challenges of producing model-based estimates were explained. In many cases it was not possible to produce a model-based estimate due to a small number of bird observations within the OAA or OAA plus 2 km buffer. This meant that displacement and collision inputs would be a mix of model and design based estimates but the process for combining estimates derived under different approaches and model assumptions was not straightforward. Additionally, where both model- and design-based estimates were produced, density and abundance estimates were very similar under the two approaches. This means that the impact assessment produces similar results and

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					<p>conclusions using design-based estimates instead of model-based estimates.</p> <p>NatureScot were content with the assessment being based on design-based estimates but requested that a comparison of model- and design-based estimates was provided and an explanation as to why model-based estimates were not used, provided in the OAI. This is fully explained in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report</p>
108	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Baseline - Design/model-based estimates	<p>Confirmed that the approach laid out in the letter from the Project to NatureScot (WO1-WOW-CON-EV-LT-0005 Offshore Ornithology Questions for NatureScot) relation to combining model-based and design-based estimates appears appropriate and are content that this is followed.</p> <p>The approach presented in the letter from the Project to NatureScot used model-based estimates for kittiwake abundance that were presented in the original application. The model-based methods used for the original application did not fully follow all of NatureScot guidance in Guidance Note 2, e.g. models were not attempted in all cases where 10 or more observations were recorded, models did not have multiple covariates fitted and all the required model diagnostics were not presented. Consequently, model-based methods were rerun to generate new density and abundance estimates for the OAI. These are presented in Annex 10 in the OAI. All model diagnostics and model outputs are presented in Annex 1R, including information on the fitting of covariates. In many cases, sample sizes were too small for models to successfully produce a density surface and abundance estimate for each survey and subset of information (birds in flight/sat on the water and OAA / OAA plus 2 km / OAA plus 4 km). The approach presented in the letter to NatureScot is for one of the most frequently recorded species in the OAA, kittiwake. For many other species which were less abundant, model-based approaches largely failed to produce estimates. Given that the model and design based estimates were similar, where models produced an estimate, but in many cases model-based approaches failed to produce an estimate, the Applicant proposed that design-based estimates alone were used in the</p>

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					assessments. NatureScot agreed to this. Thus, the request outlined in the letter was superseded.	
109	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Baseline - Design/model-based estimates	Confirmed that bootstrapping can be undertaken within MRSea and the user guide describes the function for this, refer to Guidance Note 7.	Noted, but as the impact assessment was based on design-based estimates (see point immediately above), this point is no longer relevant. Bootstrapping was undertaken for the design-based estimates.
110	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	HRA Screening	Advise concluding yes LSE for Scapa Flow SPA, North Orkney SPA and West Mainland Moors SPA in relation to vessel disturbance.	LSE could not be ruled out for Scapa Flow SPA and for Orkney Mainland Moors SPA for vessel disturbance. However, no theoretical connectivity was found for North Orkney SPA due to vessels not going within 15 km of the SPA. Note, LSE could not be ruled out for Hoy SPA due to functional connectivity with Scapa Flow SPA.

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111	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	HRA Screening	Advise for each step of the assessment that the sites and qualifying features, including assemblage species, should be provided in tabulated format, with justification provided as to why each site (and qualifying feature) are being screened out from further assessment.	Appendix 2 - HRA: HRA Screening Technical Report provides a detailed step by step account of the screening that has been undertaken, in relation to the different impact pathways, types of SPAs and seasons laid out in NatureScot's online guidance notes 3 and 4. Justification was provided for any sites screened out. The HRA screening is fully tabulated. A clear summary of the HRA screening process and a list of sites for which LSE could not be ruled out is also provided in the Addendum to the RIAA.
112	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	HRA Screening	Advise that the wording around whether there is LSE is confusing – at present the wording used is ‘can conclude no potential LSE’, simply ‘is there LSE’ would be much clearer and avoid any potential confusion.	Wording in the OAI is clear, simply stating that there is LSE or is no LSE. Also, the term, ‘LSE could not be ruled out’ is used in some cases, meaning there was an LSE for that feature/site.
113	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West	NatureScot	HRA Screening	Manx shearwater, European storm petrel and Leach’s storm petrel have been screened out from negative impacts from artificial lighting based on Furness (2018) in the RIAA. This should be re-considered in	SPAs with Manx shearwater and European storm petrel SPAs were screened in where theoretical connectivity exists, i.e. SPAs with these species as qualifying features that were also within foraging of the OAA plus 2 km were screened in. No Manx shearwater or European storm petrels were recorded in the OAA plus 4 km (i.e. in the baseline site characterisation

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	of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)			light of recent published work and a new project relating to petrels and shearwaters.	area) in the non-breeding season. Consequently, there was no theoretical connectivity with the Project and SPAs in the non-breeding season. Leach's storm petrels were not recorded on any of the 27 digital aerial surveys of the OAA plus 4 km (nor at any point across the entire survey area and survey campaign). Consequently, SPAs with this species as a qualifying feature were screened out. Additionally, puffins were screened in for Sule Skerry and Sule Stack SPA due to evidence for fledgling puffins being attracted to lighting. Screening for this impact pathway is described in detail in Appendix 2 - HRA: HRA Screening Technical Report. SPAs for which Manx shearwater, European storm petrel and puffin (Sule Skerry and Sule Stack SPA only) were assessed for negative impacts from lighting during Project construction and operation, in the Addendum to the RIAA.
114	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Collision Risk Modelling	The sCRM tool provides three approaches for estimating the variability for monthly density data. We advise that 1,000 samples from a distribution of mean densities (e.g. from a bootstrapped sample) is used. Where stochastic models have been used we require a clear statement as to which variability approach has been chosen and should the first or second approach be used, this will require justification. The bootstrapped data should be provided to enable the modelling to be re-run and the outputs checked.	This bootstrapped approach was used for stochastic CRM, as advised by NatureScot. This is clearly stated in Appendix 3 - EIA and HRA: Collision Technical Report, with bootstrap estimates provided as excel files in Annex 2D, to enable CRM to be rerun.
115	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West	NatureScot	Collision Risk Modelling	We advise estimates of the number of collisions for each season are compiled from monthly estimates. Collision estimates for seasons that encompass half-months should then be allocated proportionally within the relevant season.	This approach was used in the OAI. Seasonal collision estimates were calculated in Appendix 3 - EIA and HRA: Collision Technical Report. For months that were split between seasons, e.g. April for kittiwake, 50% of collisions were allocated to the breeding season total and 50% to the non-breeding season total.

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	of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)				
116	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Collision Risk Modelling	Advised that new guidance on collision risk modelling will be published shortly. We have taken account of Ozsanlav-Harris et al. (2023), the updated parameters for the Basic Band model and CRM are provided below in appendix 1. [Appendix 1 to the letter includes biometrics and avoidance rates for deterministic and stochastic CRM.].	Subsequent to providing these updated biometrics and avoidance rates in a letter dated 27 March 2024, NatureScot provided further Project-specific advice on CRM parameters. An updated table of biometrics and avoidance rates to use for CRM was provided in an email, dated 4th June 2024, which provided parameter values for all five species for which CRM was undertaken in the assessment (gannet, kittiwake, great black backed gull, great skua and Arctic tern).
117	27-Mar-2024 Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental	NatureScot	Collision Risk Modelling	When running CRM we only require: - Most likely scenario (MLS) – option 2 (using the generic flight height dataset) - Worst case scenario (WCS) – option 2 (using the generic flight height dataset).	The OAI presents only MLS and WCS using Option 2 with generic flight heights. Appendix 3 - EIA and HRA: Collision Technical Report presents both MLS and WCS collision estimates by month, season and an annual total. However, only the WCS collision estimates were used in the HRA assessment presented in the Addendum to the RIAA. This was because MLS and WCS produced very similar results and not using an MLS reduced the number of PVAs and metrics to consider by half. This was discussed with NatureScot, who advised this was a decision for the Applicant but that they would use the WCS to inform their advice, with MLS used for context.

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	Information Queries)					
118	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Collision Risk Modelling	With regards to the work undertaken by Natural England around macro-avoidance for gannet, we are not currently in a position to adopt the full recommendations of this work, we do however accept the outputs for gannet during the non-breeding season.	No adjustment was made to gannet CRM to account for macro-avoidance. Whilst NatureScot advised they would accept an adjustment for non-breeding season estimates, no adjustment was made. Most gannet collisions occurred during the breeding season (35.3 collisions per annum), with only 9.8 collisions per annum predicted for the non-breeding season. Once these non-breeding season collisions have impacts to immature birds removed and are apportioned to SPAs, any adjustment for macro-avoidance would make an insignificant change to SPA impacts and would not change conclusions.
119	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Collision Risk Modelling	Migratory species – an updated review of migratory routes and vulnerabilities across the UK has been published by Marine Directorate and The Crown Estate. This work also includes development of a stochastic migration CRM tool (known as mCRM) to enable quantitative assessment of risks to migratory SPA species including swans, geese, divers, seaduck and raptors. This updated review should be used.	This updated review was used to inform a qualitative assessment of collision risk for migratory species, in the OAI (presented in the Addendum to the RIAA). The mCRM and strategic assessment of collision mortality for migratory species, undertaken by the Marine Directorate, has not yet been published. Only the report by Woodward <i>et al.</i> (2023) on input parameters to mCRM has been published. This was discussed with NatureScot and it was agreed that only a qualitative assessment was possible at this stage.

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120	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Collision Risk Modelling	Agreed with the approach to only use the 24 months of data collected from the start of the 2020 non-breeding season.	This approach was used in the OAI, with collision density inputs for CRM being derived from digital aerial surveys conducted during October 2020 to September 2022 inclusive.
121	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)	NatureScot	Displacement	Advised that no medium scenario is required – just a high and a low scenario.	No medium displacement impact scenario is presented in the OAI, only a high and low impact scenario, informed by NatureScot Guidance Note 8.
122	27-Mar-2024	Letter from NatureScot to the Project (CNS REN OSWF-ScotWindN1 - West of Orkney - Application: West	NatureScot	Apportioning	Confirmed that apportioning to age classes to be based on stable age structure from PVAs.	A stable age structure approach to determining the proportion of individuals in a population that were immature/juvenile was used. Stable age structure was taken from the BDMPs report (Furness, 2015) to ensure consistency across the breeding and non-breeding seasons in adult: immature proportions. Whilst Horswill and Robinson (2015) was not published at the time the

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	of Orkney Windfarm Offshore Ornithology Supplementary Environmental Information Queries)				BDMPS (Furness, 2015) report was being written, very similar demographic rates are used to generate population models and stable age structures.
123	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Whole assessment	<p>The SEI will comprise the impact assessment undertaken for the West of Orkney application, but presented in a clear, transparent format that will include narrative and context that allows values to be easily tracked through all stages of the assessment. The structure of the SEI will be as it was described to NatureScot in the meeting of 26th February 2024 and as shown in the slides presented in that meeting (see slide 11). The SEI will follow all NatureScot guidance and/or project-specific advice received from NatureScot, with the exception of a few points. As recommended in the meeting, these points will be clearly presented in the SEI, with an explanation as to why a deviation from NatureScot guidance/advice was considered necessary. The SEI will also include evidence to demonstrate that, where the approach used deviates from guidance/advice, this does not substantially alter predicted impacts and conclusions of the assessment, thereby giving NatureScot reassurance that the assessment can be relied upon.</p> <p>Since writing this letter to NatureScot, the Applicant has adopted a different approach. The OAI (which was called the SEI in April 2024) does not comprise the impact assessment which was presented in the original RIAA, original EIAR and Supporting Study. Instead a full reassessment has been undertaken.</p> <p>The structure of the OAI (= SEI) is as described to NatureScot on 26th February 2024, but with an additional technical report, the HRA Screening Technical Report. Additionally, two other technical reports have been split to inform EIA and HRA. In total, 9 technical reports (i.e. technical appendices) now support the Addendum to the RIAA and Addendum to the Offshore EIA Report. Together, these comprise the OAI.</p> <p>The OAI follows all NatureScot guidance and/or Project-specific advice, i.e. there was no deviation from NatureScot guidance/advice taken. No account is given of the consequences of deviating from NatureScot guidance/advice as the OAI fully follows all NatureScot guidance and advice provided.</p>

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124	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	design vs model based methods	<p>Design-based estimates will be used to calculate predicted mortalities: the SEI will present updated model-based estimates of density and abundance for each species, along with density surface maps. These model-based estimates will be compared with design-based estimates to illustrate that the two approaches generate similar values. However, the design-based estimates will be used in the impact assessment, i.e. to parameterise displacement matrix tables and as inputs to collision risk modelling.</p> <p>The OAI followed this approach. This was discussed and agreed with NatureScot in a consultation meeting (30th April 2024). NatureScot accepted the use of design-based estimates in the assessment so long as a comparison of model vs design based estimates was presented in the OAI (see Annex 10 for comparison of estimates generated by two approaches) and an account was given for why model-based estimates were not used in the assessment (see Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report for full account).</p>
125	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	collision risk modelling	<p>Collision mortality estimates produced by the McGregor et al (2018) tool and not the Caneco et al (2022) tool will be used in the impact assessment: the SEI will present and compare collision mortalities generated by both tools, to provide evidence that estimated mean collision mortality is similar. However, outputs from the McGregor et al. (2018) tool will be taken forward to impact assessment in the SEI. For information, the collision mortalities used in the assessment will be derived from McGregor et al (2018) sCRM, run using the mean and SD approach to variability, rather than the bootstrap approach and using the avoidance rates presented in NatureScot Guidance Note 7, rather than the updated avoidance rates. Additionally, input bird densities to the CRM will be generated using the full 27 months of survey, i.e. some calendar</p> <p>Since writing this letter to NatureScot, the Applicant has adopted a different approach. The OAI (which was called the SEI in April 2024) uses an approach to collision risk modelling that entirely follows NatureScot online Guidance Note 7 plus Project-specific advice on biometric values and avoidance rates to use (received by email on 4th June 2024). As advised by NatureScot:</p> <ul style="list-style-type: none"> - Caneco et al (2022) sCRM was used for estimating collision mortality - the McGregor et al (2018) tool was not used to estimate collisions in the OAI; - the bootstrap approach to variability in the sCRM was used in the OAI instead of the mean and truncated SD approach; - updated avoidance rates were used in the OAI CRM, i.e. those provided by NatureScot by email on 4th June 2024; - monthly input bird densities for CRM were generated using 24 months of survey (Oct 2020 - Nov 2022) and not 27 months of survey data. <p>The Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report describes in detail the methods used for estimating collision mortality, clearly laying out how</p>

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				months will be based on three years of data, rather than just two years;	NatureScot guidance and advice was followed throughout. No aspect of collision risk modelling deviated from NatureScot guidance or advice.	
126	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	apportioning	Apportionment weightings will be derived from nearest boundary distances and not geometric centre distances between the development area and SPAs: the SEI will follow NatureScot project-specific advice to use the shortest distance between the boundary of the WoW development area plus buffer and SPA boundaries, rather than the longer distance of geometric centres of the development area and SPAs, for calculating apportionment weightings. For clarity, on this point the SEI is following NatureScot Project specific advice, rather than generic online guidance.	The OAI uses the approach described here, i.e. from SPA boundary to the boundary of the OAA plus 2 km buffer, rather than distance between geometric centres. NatureScot advised using this approach for apportioning due to the very close proximity of Sule Skerry and Sule Stack SPA to the offshore Project. This approach was discussed and agreed with NatureScot in a consultation meeting on 21 May 2024.
127	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI will use the sCRM (McGregor et al 2018) outputs that were used in the original application. This approach differs to NatureScot guidance which is to use Caneco (2022), with updated avoidance rates and bootstrap approach to variability.	Since writing this letter to NatureScot, the Applicant has adopted a different approach. The OAI (which was the SEI), follows NatureScot Guidance for CRM. The online sCRM tool (Caneco, 2022) was used, as advised in NatureScot's online guidance note 7. Avoidance rates were those provided by NatureScot (by email, 4th June 2024). The bootstrap approach was used, as advised in NatureScot's online guidance note 7.
128	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI will need to capture and explain for the audit trail how the assessment differs from the Scoping Opinion / pre-app advice. While there is no longer going to be a 'Developer' approach and 'Scoping' approach, the Scoping approach will now include agreed deviations for which comparisons and justification should also	The OAI follows the Scoping Opinion and pre-application advice, as well as NatureScot's online guidance notes and post-application advice. This is documented throughout the OAI. There are now no deviations to NatureScot guidance and advice. The whole assessment follows NatureScot guidance and advice and so no account of how the assessment deviates from advice is required.

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				provided. A key for us will be that you present this in a clear and logical manner with easy to follow links if information is in different places.		
129	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI will present the differences between sCRM and stochLAB outputs for all the species at risk of collision that occurred in non-negligible numbers and a commentary explaining why the differences occur and what this means to predicted impacts and conclusions.	Note, stochLAB = McGregor et al. (2018) and sCRM = Caneco (2022). The OAI does not present collision estimates generated by the McGregor et al. (2018) stochLAB tool. Only the online shiny version of the Caneco (2022) sCRM was used for estimating collision mortality, following NatureScot online guidance. Therefore, there are no differences in approaches that require comparison.
130	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	Requested that commentary was provided that addresses issues encountered with regard to risk calculated across the blade in McGregor et al 2018.	This request is no longer relevant since the McGregor et al. (2018) CRM tool is not used for CRM in the OAI. However, Carl Donovan (pers. comm.) advised that there are multiple minor differences between the StochLAB McGregor et al. (2018) tool and the sCRM Caneco (2022) version of the tool, e.g. the way the model assesses deterministic collision risk. However, as the assessments presented in the OAI did not use StochLAB, this issue is not relevant to the OAI results and conclusions.
131	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI PVA Technical Appendix will also present a log of where the predicted impacts in the assessment may have been over- or underestimated and commentary around this. The purpose of this is to help NatureScot understand whether the PVA outputs are likely to be over or underestimating the SPA population response to predicted Project impacts and to assist with concluding on whether AEOSI is likely or not.	As the OAI follows all NatureScot advice and guidance no log of over- or underestimates in impacts is provided. The exception to this is in the Addendum to the RIAA where conclusions on AEoSI consider: <ol style="list-style-type: none"> 1. The Restricted Build Areas which mean the WTGs closest to Sule Skerry and Sule Stack SPA will now be more distant from the SPA than was assumed when estimating collision and displacement mortality; 2. Recent evidence published in Trinder <i>et al.</i>, 2024, which suggests guillemot displacement rates could be substantially lower than the 60% assumed in the calculations of displacement mortality.

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					Note, these two considerations were not used to inform the assessment itself but were only used to inform the Applicant's conclusions on AEoSI.	
132	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The collision risk assessment will use means calculated from 27 months of data, these means were used in the original application. This approach differs to NatureScot guidance which is to use 24 months.	Since writing this letter to NatureScot, the Applicant has adopted a different approach. The OAI uses 24 months of digital aerial survey data to calculate collision mortalities, following NatureScot Guidance Note 7 and as advised by NatureScot in consultation meetings.
133	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI will provide tables and commentary showing how the input mean densities differ between 24 and 27 months and the implications of this in the assessment.	As 27 months of DAS were not used, no comparison is made between collision estimates derived using 24 months and 27 months of survey data.
134	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Collision Risk Modelling	The SEI will consider when the survey data were collected, in relation to HPAI outbreaks and provide commentary on whether densities used in CRM are likely to be different to what might be expected in the absence of any HPAI outbreaks.	This approach was used in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report to assist with interpreting raw counts, densities and abundances derived from the OAA (plus 2 km and 4 km buffers). This was not explicitly used for interpreting collision mortalities. It was agreed with NatureScot (consultation meeting 26 February 2024) that HPAI impacts would be considered in the Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report and in the Addendum to the RIAA but not elsewhere in the assessment.
135	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Displacement	In the SEI, the displacement assessment will use means calculated from 24 months of data using whole seasons, these means were used in the original RIAA assessment (described as the 'alternative' approach in the application). This approach follows NatureScot guidance.	Subsequent to this discussion with NatureScot, further Project-specific advice was received which advised that mean seasonal peaks should be derived from peak abundance estimates from complete seasons. And that complete seasons should be selected from across the 27 months of the digital aerial survey campaign (letter from NatureScot to the Project, dated 3 June 2024). This subsequent advice was followed rather than the advice provided on 30th April 2024.

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136	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Displacement	Advised that the use of the term 'alternative' approach really wasn't a helpful term. Use of 'developer' or 'scoping' is much less ambiguous. There is also potential for confusion as this 'alternative' approach will now be the main approach.	The term 'alternative' approach is not used in the OAI. Also, the terms 'Scoping Approach' and 'Developer Approach' are also not used.
137	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	The SEI will use design-based estimates for the assessment, this is the same approach used in the original application. This approach differs to NatureScot guidance which is to use model-based estimates where available.	The OAI impact assessment is based on design-based estimates but a comparison of model- and design-based estimates is provided in the OAI (Annex 1R) as requested by NatureScot. This shows that model- and design-based estimates are very similar and the predicted impacts, PVA metrics and conclusions would not have been different had model-based estimates been used instead. Use of design-based estimates to inform the assessments presented in the OAI was agreed with NatureScot.
138	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	The design-based estimates will be presented for each survey in the Baseline report.	The OAI presents design-based estimates for each of the 27 surveys, including a breakdown of birds in flight, sat on the water and combined, within the OAA, OAA plus 2 km and OAA plus 4 km. This information is in Appendix 1: Baseline Site Characterisation Technical Report and associated annexes.
139	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	The SEI will also include all of the available model-based estimates in plots and tables and these numbers will be compared with the design-based estimates with a commentary explaining the similarities and differences around these numbers and what this means for predicted impacts and conclusions. It will be logged where design-based estimates differ to model-based estimates, noting whether they are higher or lower.	The OAI provides all model-based estimates in Annex 1R, along with a comparison of abundance and density estimates with design-based estimates. Annex 1O provides all the MRSea model diagnostics and other outputs from using a model-based approach to estimating density and abundance.

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140	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	NatureScot also expect commentary outlining why model-based was not used.	The OAI provides commentary on why model-based estimates were not used in the impact assessment in Appendix 1: Baseline Site Characterisation Technical Report – see Section 3.3.4.
141	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	The SEI Baseline report will include raw count dot-maps showing the distribution of birds recorded in the survey area each month. A hyperlink will be included to show where the model-based density surface maps are located in a separate annex (if the decision is to place the MRSea outputs, including density surface maps, in a separate annex).	The OAI Appendix 1: Baseline Site Characterisation Technical Report presents dot maps showing raw counts of birds recorded in the survey area each month. Density surface maps are presented in Annex 1O. No hyperlinks are provided between documents but clear signposting is provided across documents in the OAI, referring to report titles and sections where relevant.
142	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	NatureScot requested that the MRSea outputs (i.e. all model diagnostics, density surface maps, etc) associated with the model-based estimates should be provided in the SEI, as an annex.	All model diagnostics, density surface maps and other information associated with the MRSea model-based approaches are presented in Annex 1O.
143	12-Apr-2024	Letter from MacArthur Green to NatureScot (WO1-WOW-CON-EV-LT-0013)	NatureScot	Baseline - Design/model-based estimates	NatureScot requested that density surface maps should be included in a separate annex.	Density surface maps are presented in Annex 1O of the OAI.
144	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	The SEI will present input information for both Caneco 2022 and McGregor et al 2018 using 27 months of data to enable NatureScot to replicate both the application collision mortalities (which are used in the SEI impact assessment) and the Caneco collision mortalities.	After 20 May 2024, the approach to the impact assessments presented in the OAI changed. NatureScot online guidance note 7 and Project-specific advice in a letter from NatureScot (27 March 2024) has been followed. Only collision estimates generated by the Caneco (2022) model, using 24 months of digital aerial survey data, are presented in the impact assessments provided in the OAI. Therefore, no comparison is made with any other collision estimates.

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145	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Caneco will be run following all NatureScot guidance and advice, with the exception of using input data from 27 months instead of 24 months.	The OAI presents collision mortalities generated using Caneco (2022) sCRM but using 24 months of survey data and not 27 months, as advised by NatureScot (letter dated 27 March 2024).
146	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Caneco will be run using 27 months of data but with a qualitative interpretation of the input data, particularly in relation to when surveys were carried out and HPAI. In other words, CRM will be carried out and presented in the SEI as discussed and agreed at the meeting on 30th April but with additional CRM input information provided in the SEI.	The Caneco sCRM tool was run using 24 months of data, therefore no qualitative interpretation of the input data was required. Consideration of how HPAI may have influenced survey data is made in Appendix 1: Baseline Site Characterisation Technical Report and in the Addendum to the RIAA, but is not considered in relation to estimating collision impacts.
147	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	The SEI will include in annexes all density and abundance estimates in data tables for each survey in the OAA, OAA + 2 km buffer and OAA + 4 km buffer. For each area, the table data will be split into sitting birds, flying birds and sitting + flying birds. It is the data in the tables that is most important in the SEI for NatureScot to refer to.	All of these density and abundance estimates are presented in tables in Appendix 1: Baseline Site Characterisation Technical Report, and/or in associated annexes.
148	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	For the purpose of data illustration, there is no strong preference whether density or abundance is presented, but presentation is best to be relevant to the impact assessment. Where values aren't used in the assessment, NatureScot don't necessarily need data to be visualised.	A plot of abundance estimates for the OAA plus 2 km buffer for each of the 27 digital aerial surveys is provided in the Species Accounts section of Appendix 1 EIA and HRA: Baseline Site Characterisation Technical Report. The plot presents abundance by calendar month, illustrating the change in abundance across years.

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149	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	NatureScot suggested that, where appropriate the SEI could illustrate density or abundance of birds in charts as follows: - For displacement species, a chart showing abundance of all birds (flying + sitting) in the OAA + 2 km buffer in each survey will be presented. - For collision risk species, a chart showing density of flying birds in the OAA in each survey will be presented.	The OAI includes charts showing abundance in the OAA plus 2 km buffer of birds in flight and sat on the water. It does not also include a chart of birds in flight in the OAA, as this will tend to be correlated with the abundance plot for most species. Estimates of density of birds in flight in the OAA are provided for each of the 27 surveys for each species in the Species Accounts in Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report.
150	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	In the main text of the baseline report, bird abundance (flying+sitting in the OAA + 2 km buffer) and density (flying only in OAA) will be presented for all displacement and collision risk species. Charts will present this abundance information. The annexes will include all the combinations of density and abundance in OAA/OAA+ 2 km/OAA+4 km as well as flying/sitting/combined for all species.	The OAI presents the information described and it is presented in the main baseline report (i.e. Appendix 1: Baseline Site Characterisation Technical Report) and/or annexes to this report.
151	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	The SEI will compare model-based against design-based estimates for the key species AND species with the largest difference between model and design.	the OAI compares model- and design-based estimates in Annex 1R.
152	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	For the key species, the comparison between model-based and design-based estimates will be presented for i) all birds (sitting + flying), ii) sitting birds and iii) flying birds that are within the OAA + 4 km buffer (as this has the largest number of observations and hence the	Annex 10 presents model- and design based estimates for each of the 27 surveys of: - abundance of birds in flight and on the sea in the OAA plus 4 km buffer (in a table and as a plot); - abundance of birds in flight in the OAA plus 4 km buffer (in a table and as a plot); - abundance of birds in on the sea in the OAA plus 4 km buffer (in a table and as a plot). These were provided for kittiwake, guillemot, razorbill, puffin,

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				greatest likelihood of model-based estimates successfully being produced).	fulmar and gannet, as the most commonly occurring species in the OAA plus 4 km buffer.	
153	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Baseline	NatureScot confirmed that the comparison between model and design-based estimates in the OAA + 4 km buffer (and not the OAA or the OAA +2 km buffer) is enough information to present in the SEI.	Annex 10 presents a comparison of abundance estimates within the OAA plus 4 km buffer, generated by model- and design-based methods.
154	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening	Approach to updated HRA screening was presented, NatureScot happy with the approach taken in which theoretical connectivity is established in a series of steps that align with the steps in the NatureScot online guidance, i.e. for breeding seabirds in the breeding season, followed by non-breeding season; marine SPAs for wintering waterfowl, for wintering gulls, for breeding red throated divers, for terrestrial migratory species.	The approach described is what is presented in the OAI, in Appendix 2: HRA Screening Technical Report. HRA screening is also summarised in the Addendum to the RIAA.
155	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening	The SEI RIAA will screen out Arctic tern due to lack of connectivity between the Project and any SPAs in the breeding season due to all SPAs being beyond the short foraging range for this species. No Arctic tern were recording the OAA+4 km buffer in the non-breeding season, hence no non-breeding season connectivity.	Collision and displacement estimates were calculated for Arctic tern and these were used in the Addendum to the Offshore EIA Report for an EIA assessment for Arctic tern. Arctic tern were screened out of HRA and no apportioning of impacts to SPAs was undertaken.
156	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening	The SEI EIA will need to consider non-SPA colony connectivity for Arctic tern.	A full EIA assessment was undertaken for Arctic tern, which is described in detail in the Addendum to the Offshore EIA Report. Displacement and collision mortality for this species was also estimated in Appendix 3: Collision Technical Report and Appendix 4: Displacement Technical Report.

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157	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening	There is no direct connectivity between North Orkney SPA and the construction vessel routes as these will be more than 15 km apart. However, the SEI will screen in both North Orkney and Scapa Flow SPAs as per NatureScot advice, as well as Orkney Mainland Moors and Hoy SPAs. The reason to include these is that red-throated divers from the breeding sites use both marine SPAs and therefore impacts on one could impact the other.	On reflection, the decision was made to not screen in North Orkney SPA as there was no theoretical connectivity with the Project. No vessels associated with construction, operation or decommissioning of the Project are planning to use any ports that would require transit through or near to the North Orkney SPA. Scapa Flow SPA, Orkney Mainland Moors SPA and Hoy SPA were screened in.
158	7-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening	NatureScot confirmed that kittiwake do not need to be considered with respect to wintering gull roosts, and instead connectivity should be considered via the 15 km buffer approach.	This advice was noted and consequently, no SPAs with wintering gull roost features were screened into the Addendum to the RIAA for this impact pathway (but SPAs with these features, such as Outer Firth of Forth and St Andrews Bay Complex SPA, were screened in for other impact pathways).
159	13-May-2024	Email from the Project to RSPB	RSPB	Whole assessment	The Project confirmed with RSPB that the SEI will follow all NatureScot guidance and/or project-specific advice received from NatureScot, with the exception of a few points. These points will be clearly presented in the SEI, with an explanation as to why a deviation from NatureScot guidance was considered necessary. The SEI will also include evidence to demonstrate that, where the approach used deviates from guidance, this does not substantially alter predicted impacts and conclusions of the assessment, thereby giving RSPB reassurance that the assessment can be relied upon.	This approach was followed in the OAI.

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160	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Regarding using 27 months of survey data in CRM calculations (rather than using 24 months of data), NatureScot confirmed that so long as including these three months of data didn't result in a reduction in mean densities of birds in flight per calendar month, compared with excluding them, and that consequences of including these 3 months were clearly laid out, then including the additional 3 months of data would be ok. NatureScot noted that this should be added to the log of points in the assessment where estimates might be higher or lower than expected.	This advice is no longer relevant as 27 months was not used in the OAI impact assessment for estimating collision mortality. Only 24 months of survey was used to inform CRM in the OAI. No log of points where assessments methods were over or under precautionary is provided as NatureScot guidance and advice was followed throughout.
161	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	NatureScot requested that monthly collision estimates with larger SDs (as determined by Caneco Shiny) are flagged and a narrative is provided to indicate where uncertainty around mean collision estimates is higher. NatureScot confirmed that only mean collision estimates are taken forward to impact assessment but that understanding where uncertainty is higher is still important. To also be added to uncertainty log.	This advice is no longer relevant as density estimates with small SDs (as were presented in the original application) were not used in the OAI assessments. Mean and SD for calendar month estimates of bird density were calculated from the bootstrap estimates produced from the two digital aerial surveys that informed each calendar month estimate, from the 24 months of digital aerial survey used for CRM. These SDs, derived from bootstrap estimates from the two surveys, fully capture the range in variability across the two surveys. Note, these SDs were not directly used in CRM as the bootstrap approach to stochastic CRM was used, but mean and SD of inputs to CRM are presented to illustrate the change in density for each species, across the 12 calendar months. This approach follows NatureScot online Guidance Note 7.
162	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Regarding macro-avoidance for gannet, NatureScot confirmed that whilst they have not published advice on this yet, NatureScot would accept an adjustment to input densities to CRM in the non-breeding season to accommodate gannet	There is no log of under- or over-estimates provided in the OAI as the single approach taken followed NatureScot advice and guidance. No macro avoidance adjustment was used for gannet collision risk modelling. As explained above, only low numbers of gannet collisions were predicted for the non-

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				macroavoidance behaviour. This means the SEI would not be applying any macro-avoidance adjustment for gannet during the breeding or non-breeding season as this would require a new CRM assessment - NatureScot requested that this was also added to the log of over/underestimates of impacts.	breeding season and NatureScot advised against applying a macro-avoidance correction for the breeding season.	
163	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Regarding assessment of migratory species, NatureScot confirmed that the mCRM tool is not yet published and so only a qualitative assessment of collision risk for migratory terrestrial species can be undertaken. However, NatureScot flagged the importance of using the most recent Marine Directorate report (Woodward et al. 2023: Work Package 1: Strategic review of birds on migration in Scottish waters) on migratory species to ensure the most up to date understanding of migratory routes is used in the assessment.	The Woodward et al (2023) report was used to inform a qualitative assessment of migratory species collision mortality. This assessment is presented in the Addendum to the RIAA.
164	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	NatureScot noted that the Scoping Opinion requirement regarding the need to also consider vessel disturbance from O & M activities. NatureScot note that Scrabster is the intended O & M base, so the LSE screening report will need to address whether or not there is connectivity to any SPAs in Caithness & Sutherland for which breeding red throated diver is a qualifying feature.	Appendix 2: HRA Screening Technical Report provides details of how vessel activity could impact SPAs with wintering waterfowl and breeding red-throated diver features. This impact pathway was considered for construction, operation and maintenance and decommissioning of the Project. No marine SPAs with wintering waterfowl or breeding red-throated diver qualifying features are within 15 km of the Offshore Project Area, including the OAA and the export cable corridor. The nearest SPA to the offshore Project area with a breeding red-throated diver qualifying feature is Caithness and

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					<p>Sutherland Peatlands SPA. This SPA is more than the recommended foraging range for breeding red-throated divers of 9 km (NatureScot Guidance Note 3) from the OAA plus 2 km buffer (being 20.9 km from the OAA plus 2 km buffer). However, this feature and SPA was <9 km from the ECC boundary and so was screened in and assessed for impacts on this feature from cable laying operations.</p> <p>The transit route of vessels from Scrabster to the OAA is also more than 9 km from the boundary of the SPA. However, Vessels transiting to/from Scrabster would need to pass through the marine extension to the North Caithness Cliffs SPA. Consequently, this SPA was screened in and vessel disturbance during operation and construction to seabirds using the marine extension was assessed.</p>
165	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	<p>NatureScot acknowledged the uncertainty around which ports/harbours and vessel routes might be used for construction. Recommended including use of indicative vessel transit routes, lie up and sheltering areas so that the additional contribution from the construction and operation of the wind farm could be understood and implications for SPAs considered. While NatureScot acknowledge that much of the detail will come through the VMP, commentary is needed at application so the potential level of significance can be understood.</p> <p>The Addendum to the RIAA in the OAI addresses this advice comprehensively and in detail, with AIS information used to identify indicative vessel routes and current vessel activity, information from the Project on the construction programme to estimate increase in vessel activity (including type, size and speed of vessels) and this is assessed against distribution maps of the interest features of the marine SPAs potentially impacted, dependent on which ports are used.</p>
166	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	<p>Any marine SPA with wintering waterfowl features within 15 km of these has been screened in. Any marine SPA with breeding season red-throated diver features has also been screened in if within 10km of the</p> <p>Appendix 2: HRA Screening Technical Report describes in detail the process for screening in or out marine SPAs with wintering waterfowl and breeding red-throated diver features which could be impacted by vessel activity during construction or operation, plus any functionally connected terrestrial SPAs.</p>

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				construction activities including indicative vessel transit routes. Additionally, any terrestrial SPAs for breeding red-throated divers with functional connectivity to the marine SPAs have also been screened in.		
167	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - SPA long list	Regarding the long list of SPAs with theoretical connectivity, NatureScot suggested use of annexes and hyperlinks within tables but accepted that the initial long list would be long.	Annexes are used in the Appendix 2: HRA Screening Technical Report to reduce the volume of information within the body of the main report. Both the initial long list and list of sites screened in with regards to the provision of information to inform an Appropriate Assessment is long.
168	14-May-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - Thresholds	NatureScot accepted that PVAs will be required for all sites and species where the combined breeding and non-breeding season threshold of 0.02% point change was met or exceeded for project alone or in-combination impacts. A PVA of the in-combination effect is not required where the project alone impact is less than 0.2 birds/annum. In this instance a table should be provided that details by site and species what these proportions are and number of birds impacted per annum.	The Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts and Appendix 7: EIA Cumulative mortalities at regional population scales Technical Reports provide details of Project-alone and in-combination/cumulative mortalities for SPA/regional populations. These reports also provide information on the change in baseline annual adult survival rate. Where these metrics exceed the threshold for a PVA, this is indicated in the tables. The tables in these appendices provide mortalities and change in annual adult survival rate for all SPA and regional populations for all species assessed, irrespective of whether or not a PVA was run. These tables are also presented in the Addendum to the RIAA (section 6-3) to provide clarity on which features and SPAs required a PVA to be run or not.
169	21-May-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - Thresholds	NatureScot advised that mortalities and change to adult annual survival rate should be tabulated in the SEI.	Mortalities and change to annual adult survival rate are tabulated in the OAI in Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts and Appendix 7: EIA Cumulative mortalities at regional population scales Technical Reports and in the Addendum to the RIAA.

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170	21-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Appportioning - breeding season	Due to the very close proximity to Sule Skerry & Sule Stack SPA NatureScot advise that apportioning within the breeding season should be based on shortest distance from SPA boundary to OAA + 2 km buffer.	Apportioning followed this approach in the OAI. All details of apportioning methods and apportioning weights for each SPA for the breeding and non-breeding seasons are presented in Appendix 5: Apportioning Technical Report. The distance from the SPA boundary to the OAA plus 2 km was used in apportioning calculations.
171	21-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Calculating change in adult survival	Regarding the percentage point change calculation: The approach outlined is correct. It is described here as an absolute difference, which is the same thing as a percentage point change. A percent point is the unit for the arithmetic difference between two percentages.	The OAI uses the method described for calculating percentage point change in annual adult survival rate, i.e. $[\text{mortality estimate}] / [\text{population size}] * 100$.
172	21-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Calculating seasonal collision and displacement impacts	NatureScot confirmed that breeding and non-breeding seasons are identified as follows: <ul style="list-style-type: none"> • Breeding season: birds are strongly associated with nest site – nesting, egg laying, provisioning young • Non-breeding season: birds are more widely dispersed and not strongly associated with nest site. This period subsumes the ‘breeding site attendance’ periods defined in NatureScot’s seasonal definitions guidance Non-breeding season apportioning is dependent on information within BDMPS (Furness 2015). Where Furness seasons overlap with NS breeding seasons Furness seasons should be foreshortened. For some species Furness identifies a single non-breeding (winter) period, for others there are also	This approach was used when calculating seasonal collision and displacement mortality impacts, i.e. where seasons overlapped, NatureScot breeding season took priority over any BDMPS non-breeding seasons. Mortality in those months was allocated to the breeding season. See Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report and Appendix 4 - EIA and HRA: Displacement Technical Report.

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					autumn and spring migration BDMPS which should be used.	
173	28-May-2024	Email to MD-LOT from the Project	MD-LOT	In-combination - List of projects to include in the assessment	MacArthur Green requested confirmation from MD-LOT that no additional projects should be added to the following project list for the in-combination assessment.	No response as this was an email to MD-LOT from the Project rather than any advice to the Project.

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174	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Displacement - Mean seasonal peaks	NatureScot recommend complete (in-year) seasons are used to ensure the peak is fully representative. We acknowledge due to the start of the DAS campaign that this may require exclusion of slightly different months, depending on species to account for species-specific breeding seasons. This approach need to be fully documented in the assessment.	The OAI draws on surveys from the 27 months of DAS to ensure complete seasons are used for identifying peak abundance. For all species, two complete seasons were available for each season (i.e. breeding, non-breeding and BDMPS seasons) across the 27 months of DAS. Calculation of mean seasonal peaks to inform displacement mortality estimation is provided in Appendix 4 - EIA and HRA: Displacement Technical Report.
175	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	NatureScot approved the use of 24 months of data, starting in October 2020, to calculate mean seasonal density inputs used in the CRM assessment. This follows NatureScot guidance about basing mean density values on 24 months of data collection.	This approach was used in the OAI, as presented in Appendix 3: Collision Technical Report.
176	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling	Confirmed that CRM will be redone using the Caneco (2022) shiny app in line with Guidance Note 7. This means the previous comparison and issues around SD no longer apply.	CRM was run using the Caneco (2022) shiny app. No comparison was made with any other approaches - only a single approach was used that follows NatureScot guidance and advice.
177	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HPAI	Regarding how to address HPAI-related impacts in the SEI NatureScot advised the following: - Look at what has changed in the area. Which species were identified where and when; - Check RSPB updated colonies counts and compare differences with Seabird count to see if any differences related to HPAI and to look at what was happening at colonies nearby. - Are there any populations that have suddenly declined? If this decline is seen in	This approach to considering HPAI impacts was incorporated into the Addendum to the RIAA, under the SPA accounts and conclusions on AEOSI.

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				most other colonies but don't have data for a specific colony, then can use this context when interpreting PVA outputs. NatureScot are content this is done qualitatively –with narrative provided in terms of, what does this means for the assessment.		
178	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	Appportioning - Sule Skerry and Sule Stack SPA	NatureScot advised to use 0.1 as distance for Sule Skerry & Sule Stack in breeding season apportioning. It is acknowledged that for any species that is a feature of the SPA, effectively all impacts are apportioned to this SPA and zero to any other.	A distance of 0.1 km was used in the NatureScot apportioning tool to calculate the apportioning weighting for Sule Stack and Sule Skerry SPA. This gave an apportioning weighting of 1.000 or very close to 1 for species that are features of this SPA (guillemot, puffin, gannet). This meant that for the breeding season, impacts to other SPAs for these three species were zero or close to zero. This is presented in Appendix 5 - HRA: Apportioning Technical Report.
179	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA screening and Apportioning - Buffers	Different distances were used for HRA screening (SPA to OAA) and apportioning (SPA to OAA+2 km), although SPAs were still screened in if 2 km beyond the foraging range limit. This difference is described in detail in the HRA screening report. NatureScot confirmed this was fine but to make a note about the difference between the distances provided in the HRA screening and apportioning tables.	In the OAI, the same distances were used for HRA screening and for apportioning breeding season mortality. In all cases, the straight-line distance from SPA boundary to the OAA plus 2 km buffer was used.
180	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA approach to non-breeding apportioning	NatureScot confirmed to run assessment for only the UK North Sea BDMPS, i.e. assume that all birds from WOW are heading through the North Sea, as a worst-case scenario. However, a narrative should also be provided to explain why this is a worst-case scenario and that some birds may travel down the west coast of the UK.	The OAI assesses non-breeding season impacts under the assumption that all birds recorded in the OAA plus 2 km buffer migrate through the North Sea and not down the west coast of Britain, as discussed and agreed with NatureScot, i.e. the UK North Sea BDMPS region and population was used to apportion non-breeding season impacts from the Project and other OWFs A justification for this more precautionary

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					approach is provided in Appendix 5 - HRA: Apportioning Technical Report	
181	28-May-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA - In-combination	NatureScot confirmed that MD-LOT are required to agree the list of projects included for the in-combination totals.	MD-LOT were emailed a list of OWFs that were proposed for inclusion in the quantitative in-combination and cumulative assessments, with a request for advice on whether any other OWFs should be included. NatureScot advised that it was MD-LOT's responsibility to confirm whether the proposed list of OWF projects to include in the in-combination and cumulative assessment was complete, and not NatureScot's responsibility.
182	3-Jun-2024	letter from NatureScot to the Project	NatureScot	EIA requirements	NatureScot consider a revised EIA ornithology chapter should be submitted, which take account of the approaches being undertaken now that have been agreed during our weekly meetings.	A revised Addendum to the Offshore EIA Report has been produced, which includes the reassessment of impacts. This is part of the OAI.
183	3-Jun-2024	letter from NatureScot to the Project	NatureScot	Displacement – seasonal mean peak	The DAS campaign for West of Orkney Windfarm started in July 2020, part way through the breeding season and was completed in September 2022, covering a period of 27 months. In line with guidance note 8, we advise complete (in-year) seasons are used to calculate the mean seasonal peak to ensure the peak is fully representative. We acknowledge, due to the start date of the DAS campaign, that this may require exclusion of slightly different months, depending on the species to account for species-specific breeding seasons e.g. guillemot will differ from gannet. This approach needs to be fully documented in the SEI assessment and we suggest that monthly values are provided during the next meeting for agreement.	This approach was used for identifying peak abundances for use in calculation of mean seasonal peaks. This approach is fully documented in Appendix 4 - EIA and HRA: Displacement Technical Report. Abundance estimates are provided for each of the 27 months, the months that comprise each season are indicated, the peak abundance within that season is highlighted in bold and the mean of the peaks is provided at the bottom of each table.

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184	3-Jun-2024	letter from NatureScot to the Project	NatureScot	CRM	In line with guidance note 7, and as discussed in the meeting held on 28 May 2024, NatureScot welcome that the CRM will be redone using the Caneco (2022) shiny app such that outputs will be provided for the Most Likely and Worst-Case Scenarios, under Option 2, for both deterministic (Band) CRM and sCRM.	This is the approach that is used in the OAI, as presented in Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report.
185	3-Jun-2024	letter from NatureScot to the Project	NatureScot	CRM	The CRM will be based on data from 24 months from October 2020 to September 2022 inclusive, in line with NatureScot guidance, and as such will not include the months of July to September 2020. NatureScot acknowledge this will mean a different approach to the displacement assessment.	This approach was used in the OAI. As acknowledged by NatureScot in the note of the consultation meeting, data to inform CRM was taken from 24 months of survey whereas data to inform displacement impacts was taken from 27 months of survey.
186	3-Jun-2024	letter from NatureScot to the Project	NatureScot	Apportioning - Non-breeding season	NatureScot advise the SEI assessment should be based on a realistic Worst-Case Scenario and as such should use the UK North Sea region. NatureScot acknowledge that this is likely to result in a more precautionary assessment. Narrative should be provided in the SEI that discusses the potential that some birds / impact maybe linked to the Western Waters region, which currently has less development pressures.	The assessment is based on a non-breeding season assessment that assumes that all birds from the OAA plus 2 km buffer migrated through the UK North Sea BDMPS region and none travelled down the west coast of Britain. Full details of this are provided in <i>Appendix 2 - HRA: HRA Screening Technical Report</i> , Section 2.1.3. .
187	3-Jun-2024	letter from NatureScot to the Project	NatureScot	In-combination assessment	NatureScot suggest further narrative is provided in the SEI to address which projects were screened into the in-combination assessment and that the approach is confirmed with MD LOT to ensure the list of projects screened in is acceptable.	The list of projects to include in the in-combination and cumulative assessments has been agreed with MD-LOT. Narrative is provided in the OAI to explain the basis on which projects were included or excluded. See Section 2 in <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> for more details

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188	3-Jun-2024	letter from NatureScot to the Project	NatureScot	In-combination assessment	NatureScot confirm that in-combination impacts should be provided with and without Berwick Bank.	The cumulative and in-combination assessments present annual mortality estimates, change in annual adult survival rate and PVA outputs (where a PVA was required), both with and without Berwick Bank impacts.
189	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	EIA	MacArthur Green confirmed that an updated EIAR will be included in the Ornithology SEI package - along with the Technical Appendices and the RIAA. There won't be any need to look back at the original application for any information – the SEI will be standalone.	This is the case with the OAI, with the exception of the Addendum to the RIAA - this only covers offshore ornithology and a separate Addendum to the RIAA (excluding ornithology) has been produced and should be referred to for other receptors.
190	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Displacement - Mean seasonal peaks	Regarding calculating mean seasonal peaks (MSP) for displacement, a 'complete season' comprised a period of consecutive months, including all months falling within that season. Complete seasons were obtained from subsets of the 27 months of digital aerial survey. NatureScot confirmed that this is the correct approach. Correct to use complete seasons, even if it means that more than 24 months of data are included to calculate MSPs, in light of the spread of DAS data given the start / end dates of the campaign.	This was the approach used in the OAI - see Appendix 4 - EIA and HRA: Displacement Technical Report.
191	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Collision Risk Modelling - Bird input parameters	NatureScot advised on biometrics and avoidance rates to use for collision risk modelling [by email dated 3 rd June 2024].	These values were used in the OAI - see Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report.

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192	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	In-combination - Projects to include	NatureScot advised that there needs to be some narrative on what wind farms are included/excluded and why. NatureScot is comfortable with the SEI in-combination assessment not including OWF that have submitted applications after Berwick Bank. However, NatureScot advised that it is ultimately a decision for MD-LOT and not NatureScot on which projects to include for in-combination assessments.	On this issue of which OWF to include/exclude in the in-combination and cumulative assessments, the OAI followed advice received from MD-LOT (10 June 2024 by email). See Section 2 of <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i>
193	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	In-combination - Breeding season	NatureScot agreed that the application approach to only including Moray and Pentland for the breeding season should be disregarded. The new approach is to include in-combination impacts from other OWFs that are potentially impacting SPAs within foraging range of West of Orkney, as well as the Moray projects and PFOWF. NatureScot confirmed that they are content with this new approach which is in line with NatureScot guidance.	The approach taken in the OAI follows NatureScot Guidance and advice when determining which OWFs are impacting the same SPAs or regional populations as the Project. Details of which OWFs were included in the cumulative and in-combination assessments is provided in <i>Appendix 5 - HRA: Apportioning Technical Report</i>
194	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Availability bias for auks	Availability bias was only calculated using design-based estimates (i.e. not model-based estimates). For each survey for auks (guillemot, razorbill and puffin), the steps are: 1) For each survey, work out the proportion of unidentified birds to add to each species, e.g. apportion 'Large Auk species' to guillemots and razorbills, or 'auk species' to guillemots, razorbills and puffins, in order to work out the best estimate of the numbers of each species observed. Density and abundance	This was the approach that was used in the OAI. See <i>Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report</i>

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				estimates were calculated for each species including apportioned birds. 2) Multiply the species density/abundance value by the availability bias correction figure. Underwater percentages used are: Guillemot = 23.7%, Razorbill = 17.4%, Puffin = 14.2%. NatureScot confirmed this is the standard approach to be used.		
195	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - Projection periods	NatureScot confirmed that 60 years is not required. Projection periods of 25, 35, 50 years will be presented.	In the OAI, PVAs metrics are presented for simulations run for 25 years, 35 years and 50 years.
196	4-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - Recovery period	The impact is stopped at 35 years to allow a 15-year recovery period in a 50-year projection to account for the operational period spanning 35 years in line with the proposed consent period. NatureScot confirmed that this is the correct approach and that the published guidance recommendation of no recovery period applied, only to projections over time periods that were shorter than the consent/operational period.	This is the approach that is used in the OAI. See <i>Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts</i> AND <i>Appendix 9 - EIA: PVA at regional population scales for Project alone and cumulative impacts</i> for details
197	10-Jun-2024	Email from MD-LOT to the Project	MD-LOT	In-combination - List of projects to include in the assessment	MD-LOT identified that consented projects Green Volt and Seagreen Phase 1A, have not been included on the list (presented in the email 28 May). Projects which have been consented must be assessed quantitatively. This includes projects which have been consented elsewhere in the UK which may impact on the same protected sites/species as West of Orkney.	GreenVolt and Seagreen Phase 1A were added to the in-combination and cumulative assessments, along with Salamander which had also recently submitted an application. See Section 2 of <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i>

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198	10-Jun-2024	Email from MD-LOT to the Project	MD-LOT	In-combination - List of projects to include in the assessment	The established MD-LOT position is that projects which are reasonably foreseeable should be included in the in-combination assessment. This includes projects which have received a scoping opinion. MD-LOT therefore advises that other offshore wind projects in Scotland where a scoping opinion has been adopted to date must be included in the in-combination assessment – this may be a qualitative assessment.	All projects in Scotland for which a Scoping Opinion had been adopted, as of 19 th June 2024, were included in a qualitative assessment. The approach to the qualitative assessment is described in Section 2.1 of <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> . Additionally, information on Projects with a Scoping Opinion which could impact SPAs that are potentially impacted by West of Orkney Windfarm, are considered in the Addendum to the RIAA under the SPA accounts, see Section 6.3.
199	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	In-combination - With and without Berwick Bank	NatureScot requested that the WOW SEI includes an in-combination assessment with and without Berwick Bank impacts.	This was undertaken in the OAI. See <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> and <i>Appendix 7: EIA Cumulative mortalities at regional population scales</i>
200	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	In-combination - With and without Berwick Bank	NatureScot agreed with the following approach for the in-combination assessment: 1) Present in-combination mortality at SPAs with and without Berwick Bank (BB), plus SPA-specific change in adult survival with and without BB, in the RIAA. Also, in the RIAA we will present PVA outputs together with accompanying narrative / interpretation for with BB impacts in-combination. 2) Additionally, we will provide an annex to the PVA Technical Appendix with the ‘without BB’ PVA outputs, i.e. CPS, etc values. However, in the RIAA we will provide only some explanatory text on methods used for producing the ‘without BB’ PVA outputs and some signposting to the annex. There will be no interpretation	The approach described under (1) was followed. However, the ‘without Berwick Bank impacts scenario’ is also presented and discussed in the Addendum to the RIAA and Addendum to the Offshore EIA Report, alongside scenarios that included Berwick Bank impacts, rather than being presented in an annex, as described in (2). This is presented in the OAI (in the In-combination/cumulative reports, in the EIA and HRA PVA reports, in the EIA Chapter and in the Addendum to the RIAA).i.e. the consequences of including and excluding Berwick Bank impacts are fully considered in both HRA and EIA assessments. In other words, all the information that NatureScot requested is presented in the OAI, but in the main reports rather than an annex. Consequences of including or excluding Berwick Bank Wind Farm impacts on in-combination mortality and change in population growth rate is discussed in the SPA accounts in the Addendum to the RIAA.

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				of the ‘without BB’ PVA outputs in the RIAA, i.e. the PVA tables and plots will just be in an annex without any narrative or context. NatureScot suggested that the tables are annotated to that it’s clear that this approach was agreed during these weekly meetings.	
201	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - Other information	NatureScot requested that MacArthur Green state which growth rate is used for the Counterfactuals of the Growth Rate (CGR). This is provided in the OAI: "The counterfactuals of population growth rate (C-PGR, the average annual rate of change over the projected period)..."
202	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA Scenarios	Regarding the requirement for High/Low displacement and worst-case/most-likely scenario collision, NatureScot recommend that both high/low displacement mortality rates are presented as we consider that the real rate will lie somewhere in between. For the SEI, if outputs for the low displacement scenario are presented in an Annex to the Technical Report with no accompanying narrative/interpretation. While this will allow comparison, it means there will be no PVAs presented in the RIAA on the lower rate. As such, NatureScot advice will be based on the most precautionary approach. With respect to the Most Likely CRM scenario, NatureScot recommend both are presented as the MLS is helpful to consider against the WCS CRM outputs particularly when PDE is large. Implications for the SEI are the same as above and therefore the choice/risk lies with the Project. The high and low displacement impact scenarios are presented in Appendix 4 - EIA and HRA: Displacement Technical Report. The MLS and WCS collision impact scenarios are presented in Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report. For assessing impacts on SPA and regional populations, only the WCS collision impacts were considered but both high and low displacement impacts were considered. MLS and WCS collision mortalities were very similar, due to both scenarios having 125 WTGs but larger rotors for the WCS. Therefore, only only collision mortality under the WCS assessed and not under the MLS.

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203	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Displacement - Fulmar	Regarding displacement assessment required for fulmar, NatureScot explained that fulmar is a relatively new species to be included in displacement assessments, WOW is the first project to consider this species. Fulmar should be assessed because of barrier effects and the location of the Project. Fulmar should be assessed only for the project alone for breeding and non-breeding, there is no requirement for an in-combination assessment for this species (because other projects in the past have not been required to assess fulmar, and therefore displacement mortality values are not available for other wind farms).	The OAI assesses Project alone impacts on fulmar (displacement/barrier impact pathway) but does not consider any in-combination or cumulative impacts for this species, as advised by NatureScot.
204	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Displacement - Manx shearwater and European storm-petrel	NatureScot screening advice recommended that LSE was concluded for SPAs with Manx shearwater and the two storm petrel species as features, due to concerns over attraction to lighting, particularly on wind turbines.	SPAs with Manx shearwater and European storm petrel features were screened in to the Addendum to the RIAA for this impact pathway, i.e. LSE was concluded. However, SPAs with Leach's petrels were not screened in due to no Leach's petrels being recorded in the OAA plus 4 km buffer on any surveys. As puffin fledglings can be attracted to lighting, the puffin feature at Sule Skerry and Sule Stack SPA was also screened in. This impact pathway was also assessed for these three species in the Addendum to the Offshore EIA Report.
205	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	CRM - Manx shearwater and European storm-petrel	NatureScot advise to use the Marine Directorate report (https://www.gov.scot/publications/review-information-assessment-risk-collision-displacement-petrels-shearwaters-offshore-winddevelopments-scotland/) – this report provides a good basis for a qualitative assessment. NatureScot confirmed they are not looking to see a	This report (Deakin et al. 2022), along with other literature, was used in a qualitative assessment of impacts of lighting during both construction and operation and maintenance on these two species, as well as for puffin fledglings.

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				quantitative assessment for Manx shearwater and European storm-petrel - a qualitative assessment is sufficient.		
206	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Displacement & CRM - Arctic tern and great skua	<p>NatureScot reviewed the estimated collision and displacement mortality (OAA+2 km for displacement) for Arctic tern and great skua and advised the following:</p> <p>Arctic tern - NatureScot agree apportionment of impacts is not required for this species.</p> <p>Great skua - Given the vulnerability of the great skua population in light of HPAI impacts, NatureScot would wish to see apportionment for this species.</p>	<p>The OAI followed this advice.</p> <p>Arctic tern collision and displacement mortalities are presented in Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report and Appendix 4 - EIA and HRA: Displacement Technical Report. However, impacts are not then apportioned to SPAs due to both no LSE (due to no theoretical connectivity) and very small impacts. Arctic tern are assessed in the Addendum to the Offshore EIA Report.</p> <p>Great skua impacts were apportioned to SPAs and considered in both the Addendum to the RIAA and the Addendum to the Offshore EIA Report, although impacts were sufficiently small to not require a PVA to be run for this species.</p>
207	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Apportioning - Guillemot in the non-breeding season	<p>NatureScot guidance was to use guillemot foraging ranges (including different foraging ranges for Northern Isles colonies) to define this species' non-breeding season BDMPS. MacArthur Green pointed out that, for in-combination assessment, each individual OWF will have its own guillemot non-breeding season BDMPS, comprising SPAs within foraging range of each OWF. This has been taken account of in guillemot non-breeding season apportioning in the WOW SEI. NatureScot agreed and requested that the method used is clearly laid out.</p>	<p>The method used for guillemot apportioning is clearly laid out in the OAI (Section 2.4.1 of Appendix 5 - HRA: Apportioning Technical Report).</p>

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208	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Apportioning - Sabbatical rates	NatureScot confirmed that the sabbatical rates provided in the note of meeting dated 11 June 2024 are correct	These sabbatical rates were used to remove non-breeding adults from breeding season Project mortality totals, before impacts were apportioned to SPAs. See <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i> , for more details. NatureScot confirmed that the sabbatical rates provided in the note of meeting dated 11 June 2024 are correct
209	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Apportioning - not apportioning immature birds	NatureScot confirmed that only adults are apportioned. Immatures and sabbaticals are removed.	This approach was followed in the OAI. See Section 2 of <i>Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts</i>
210	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	EIA - PVA threshold	NatureScot confirmed that the same threshold applies to EIA, as for HRA. Therefore a PVA is required when decrease in adult survival rate is equal to or more than 0.02 percentage point change	A PVA was run for assessing impacts on regional populations, for EIA, using this threshold (<i>Appendix 7: EIA Cumulative mortalities at regional population scales</i>). Additionally a PVA was run for cumulative impacts when change in baseline annual adult survival rate was equal to or more than 0.02% AND Project alone mortality was equal to or more than 0.2 birds per annum. This is the same threshold as was used for PVAs to inform HRA.
211	11-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	EIA - Reference population	NatureScot advised they have accepted the approach outlined by Salamander and provide below how they see this being done: 1) Breeding season regional populations are based on foraging ranges (Woodward et al., 2019). 2) Non-breeding season regional populations are based on BDMPS (Furness, 2015). 3) Breeding season population contributes only some of the birds subject to impact in the non-breeding season. (BDMPS	This approach was followed in the OAI. See <i>Appendix 7: EIA Cumulative mortalities at regional population scales</i>

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				<p>population is bigger).</p> <p>4) So, the number of mortalities during the non-breeding season will include impacts to birds that aren't part of the breeding season regional population.</p> <p>5) To account for this, the mortality in the non-breeding season needs to be multiplied by the ratio of birds from the regional breeding population compared to the BDMPS non-breeding population.</p> <p>6) Then add the proportion of non-breeding season mortality applied to the regional breeding population should then be added to the breeding season mortality estimate to calculate an annual mortality. This annual impact on adult survival rate should be used in a regional PVA (based on the regional breeding population).</p> <p>As an example using fictitious numbers:</p> <ul style="list-style-type: none"> - Breeding season population = 200,000 - Non-breeding season population = 600,000 - Breeding season mortality = 12 - Non-breeding season mortality = 20 - $200,000/600,00 = 0.33$ (i.e. breeding seabird population makes up 33% of BDMPS population) - $20 \times 0.33 = 6.6$ (mortalities from regional breeding population in non-breeding season) - Annual mortality for PVA purposes = 18.6 	

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212	18-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Project design - WCS & MLS	NatureScot confirmed that for the collision assessment, the presentation of the Worst-Case Scenario (WCS) and the Most-Likely Scenario (MLS) is a Project decision. If the Project is willing to take the risk, NatureScot confirmed that basing the assessment on WCS is fine.	The assessment is based on only WCS, although MLS collision mortalities are presented in Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report.
213	18-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	EIA - Reference population	NatureScot noted that the ratio approach as discussed in the meeting 11 June 2024, can be used where there is more than one BDMPS season.	This approach was followed in the OAI. See Appendix 7: EIA Cumulative mortalities at regional population scales
214	18-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	RIAA - Migratory species	NatureScot confirmed the need to use the WWT & MacArthur Green (2014) report and consider this alongside the new updated Woodward et al (2023) report. NatureScot accept that only a qualitative assessment can be undertaken in the absence of the mCRM tool.	This approach was followed in the OAI. See Addendum to the RIAA where SPAs with migratory features are assessed for collision risk, following a qualitative approach.
215	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	RIAA - No MLS presented	MacArthur Green confirmed that the Collision Technical Appendix in the SEI includes collision mortalities estimated under the Worst Case Scenario (WCS) project design and a Most Likely Scenario (MLS), only the WCS collision impacts are apportioned to SPAs and presented in the RIAA, MLS collision impacts are not presented in the RIAA. NatureScot confirmed that if the MLS were presented, they would use this for context, but NatureScot advice would be based on the WCS. Given that the MLS and WCS impacts are similar, including the MLS	The OAI impact assessment is based on the WCS only. See Appendix 3 - EIA and HRA: Collision Risk Modelling Technical Report

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				scenario is unlikely to substantially change NatureScot advice.		
216	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	In-combination - approach to great skua assessment	MacArthur Green reviewed applications from other recent projects (GreenVolt, Salamander, Moray projects, Berwick Bank) to collate information on great skua collision impacts. Great skua were rarely or never seen in project development areas. Berwick Bank application was the only one to calculate collision impacts and apportion impacts. These were added to West of Orkney project alone impacts to assess whether a PVA was required – impacts were sufficiently small that no PVA was required. NatureScot agreed with this approach.	This approach was followed in the OAI. See Appendix 6 - HRA: Calculation of mortalities and change in survival rate at SPA population scales for Project alone and in-combination impacts
217	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	PVA - demographic rates to use	MacArthur Green confirmed they are using the NEPVA tool for running PVAs using the default values for each species under the Country/National/Scotland criteria for all species except fulmar, great skua and Arctic tern. Horswill & Robinson (2015) demographic rates will be used for fulmar, Arctic tern and great skua. Fulmar and great skua are composite rates for immatures and these will be adjusted to give annual rates. NatureScot agreed with this approach and asked that an explanation is included as to what was done and why.	An explanation of demographic rates used is presented in the OAI (Appendix 8 - HRA: PVA at SPA population scales for Project alone and in-combination impacts and Appendix 9 - EIA: PVA at regional population scales for Project alone and cumulative impacts).

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218	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	24 months and 27 months of digital aerial survey data	MacArthur Green confirmed that mean seasonal peak estimates to inform displacement mortality estimation were derived from 27 months of survey data, mean densities to inform collision risk modelling used 24 months, HRA screening and the baseline site characterisation used 27 months of survey data. NatureScot agreed with this approach.	This approach was followed in the OAI. See Appendix 4 - EIA and HRA: Displacement Technical Report
219	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	Use of further evidence in the SEI	MacArthur Green confirmed that GPS tracking data will be used to help explain numbers of birds recorded in the Offshore Project Area, in relation to HPAI impacts but will not be used to determine connectivity between SPAs and the Offshore Project Area. NatureScot agreed with this approach.	This approach was followed in the OAI. See Appendix 1 - EIA and HRA: Baseline Site Characterisation Technical Report
220	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	NatureScot confirmed that it would be helpful to include information on bird distributions within Scapa Flow, identifying areas of high densities of species susceptible to disturbance by vessels (i.e. divers and seaduck). Also, information on indicative vessel routes, indicative lie up/sheltering areas and a Vessel Management Plan, as part of embedded mitigation, would be very helpful.	Bird distribution information was obtained for Scapa Flow, Moray Firth and Outer Firth of Forth and St Andrews Bay Complex SPAs. This is presented in the Addendum to the RIAA, along with indicative vessel routes and other information on current port activity and potential Project vessel numbers.
221	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	The Project may also wish to consider additional mitigation to reduce disturbance of divers and seaduck by vessels during construction, e.g. vessel routes which avoiding areas of high densities of birds. Other potential mitigation measures could be to use slower boat speeds and avoid	This advice on mitigation was considered by the Project and used to inform the proposed mitigation reported in Addendum to the Offshore EIA Report and Addendum to the RIAA.

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				revving engines, where there are concentrations of birds.		
222	25-Jun-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	NatureScot confirmed that for Scapa Flow and North Orkney SPAs inshore wintering waterfowl surveys were undertaken during 2021/22 and 2023, seeking confirmation as to whether these are available yet.	NatureScot subsequently advised that these survey data were not yet in the public domain.
223	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	No log of uncertainty in the assessment	MacArthur Green explained that NatureScot had previously requested that we provide a log of where impacts in the Ornithological Additional Information were higher or lower than they would have been, had NatureScot's advice been followed throughout. However, the OAI now only follows NatureScot advice, with the exception of one or two very minor points which are demonstrated to make no difference to the conclusions of the impact assessment. Therefore, there will be no log included in the Additional Information. NatureScot agreed, given that different approaches are no longer being followed.	This approach was followed in the OAI. Note that NatureScot guidance and advice was followed throughout the OAI. The one or two minor points were discussed with NatureScot, e.g. consequences of using design-based rather than model-based approaches to generating density and abundance estimates used in the assessments; consequences of using straight line distances rather than coastal at-sea distances for apportioning. In all cases, NatureScot were content with the approach used in the OAI, on condition that the consequence of using these slightly different approaches was presented in the OAI. This has been done.
224	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	Summary and use of advice in consultation meeting notes	NatureScot asked for a summary of how the information in the weekly consultation meetings have been used in the assessment. It may be helpful to present a summary of approaches that were explored and discussed, and whether these were ultimately used in the assessment or not. If not, then explain why not.	This table of responses to advice provides clarity on how advice received post-application has been used in the EIA and HRA assessments and throughout the OAI.

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225	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	Impacts not apportioned to non-SPA colonies	NatureScot acknowledge that breeding season apportioning is complicated for West of Orkney due to the close proximity of the Sule Skerry & Sule Stack SPA, and that by apportioning only to SPA colonies, the impact assessment is more precautionary or makes very little difference to conclusions of the assessment. In this instance, for these reasons, we are content to deviate from our normal advice.	This is noted in the Appendix 5 - HRA: Apportioning Technical Report.
226	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	Apportioning - Using straight-line distances rather than coastal distances	NatureScot clarified that using straight-line distances will have slightly reduced impacts at SPAs closer to WOW and slightly increased impacts at further way SPAs, but while NatureScot advice is to use coastal distances for apportioning, NatureScot are content that, in this instance, as the consequences of using straight-line distances in this case are not significant and do not change conclusions of the impact assessment – can you provide the justification in the document submission.	this approach to apportioning is documented in the Appendix 5 - HRA: Apportioning Technical Report – see Section 2.2.2.2.
227	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	NatureScot has advised that Scapa Flow should be screened in due to potential impacts from vessel traffic passing through Scapa Flow SPA and using shelter/lie up locations within the Scapa Flow SPA, if the Project uses Scapa Deep Water Quay for construction. The Project may use Leith/Dundee which would require vessels to transit through the Outer Firth of Forth and St Andrews Bay Complex (OFFSAB) SPA or Ardersier/Cromarty/Nigg which	All three marine SPAs have been screened in and a detailed comprehensive assessment of vessel activity impacts on diver, seaduck and grebe features has been undertaken and reported in Addendum to the RIAA.

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				would require vessels to transit through the Moray Firth marine SPA. NatureScot confirmed that all marine SPAs should be treated in the same way as Scapa Flow SPA in the Ornithology Additional Information Addendum to the RIAA.		
228	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	NatureScot confirmed that information on current numbers of vessels arriving in port, vessel density within the SPA, bird density and distribution within the SPA, predicted Project vessel activity during construction should be presented. In addition, the anticipated increase in vessel traffic arriving/leaving the port as a result of WOW compared with the baseline, should be presented, e.g. the current port arrivals and expected number of port arrivals including WOW vessels.	AIS information on port arrivals and departures is presented in the Addendum to the RIAA along with the other information listed by NatureScot.
229	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	Regarding presenting detailed mitigation at this stage, versus agreeing details post-consent, NatureScot highlighted that there is no embedded mitigation within the outline Navigational Safety and Vessel Management Plan (that was submitted with the WOW original application) for minimising impacts to wildlife. Depending on the assessment, NatureScot advised that the Project may need to consider additional mitigation specifically for SPA features, both in terms of avoiding areas of high bird density if feasible, or actions to be taken if concentrations of birds observed, e.g. slower boat speeds.	This advice on mitigation was considered by the Project and used to inform the proposed mitigation reported in Addendum to the Offshore EIA Report and Addendum to the RIAA.

Date of Advice	Format of advice	Consultee	Stage/Topic	Comment	Response/where addressed	
230	2-Jul-2024	note of consultation meeting	MacArthur Green and NatureScot	HRA Screening - Construction vessel activity	<p>NatureScot would be looking to understand likely impact to the marine SPA via the following type of information / assessment:</p> <ul style="list-style-type: none"> -estimate of the % of SPA populations likely to be impacted and extent of SPA impacted. -assess impact in terms of conservation objectives including potential for cumulative impacts with any other proposed developments within project timeframe. 	<p>The Addendum to the RIAA includes a calculation of the percentage of the marine SPA that could be affected by the presence of a vessel along indicative transit routes. It was not possible to estimate the proportion of the bird population that could be affected as density surfaces were not available. However, a qualitative assessment is provided which considers the extent to which indicative vessel routes overlap with areas of higher bird density. In combination impacts are also considered using a qualitative approach.</p>
231	09-Jul-24	email from NatureScot to Project	NatureScot	PVA	<p>We are content for the PVA models to be density independent.</p> <p>Density independent models were used for PVA in the OAI.</p>	

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