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SCOTTISH MINISTERS' ASSESSMENT OF THE PROJECT'S
IMPLICATIONS FOR DESIGNATED SPECIAL AREAS OF
CONSERVATION ("SAC"), SPECIAL PROTECTION AREAS ("SPA")
AND PROPOSED SPECIAL PROTECTION AREAS ("pSPA") IN VIEW
OF THE SITES' CONSERVATION OBJECTIVES.

APPLICATIONS FOR CONSENT UNDER SECTION 36 OF THE ELECTRICITY
ACT 1989 (AS AMENDED) AND FOR MARINE LICENCES UNDER THE MARINE
AND COASTAL ACCESS ACT 2009 FOR THE CONSTRUCTION AND
OPERATION OF THE SEAGREEN ALPHA AND SEAGREEN BRAVO OFFSHORE
WIND FARMS

SITE DETAILS: SEAGREEN ALPHA OFFSHORE WIND FARM, 27 KILOMETRES
EAST OF THE ANGUS COASTLINE AND SEAGREEN BRAVO OFFSHORE WIND
FARM, 38 KILOMETRES EAST OF THE ANGUS COASTLINE

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SECTION 1: BACKGROUND

1 Introduction

- 1.1 This appropriate assessment (“AA”) relates to the applications (“the Applications”) submitted by Seagreen Wind Energy Limited (“SWEL” or “the Company”) for consent under section 36 (“s.36”) of the Electricity Act 1989 (as amended) (“the Electricity Act 1989”) and for marine licences under the Marine and Coastal Access Act 2009 to construct and operate the Seagreen Alpha Offshore Wind Farm, 27 kilometres (“km”) east of the Angus coastline (“the Alpha Development”) and the Seagreen Bravo Offshore Wind Farm, 38km east of the Angus coastline (“the Bravo Development”). The Alpha Development and the Bravo Development will comprise a maximum of 70 wind turbine generators (“WTGs”) each. This AA also considers the Alpha Development and the Bravo Development in-combination with each other (“the Combined Alpha and Bravo Developments”), the maximum number of WTGs for this is 120 as detailed in the Applications. In this AA when discussing the Alpha Development, the Bravo Development and the Combined Alpha and Bravo Developments more generally, these are referred to as the “Seagreen Developments”.
- 1.2 The assessment has been undertaken by the Scottish Ministers and is required under regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) (“the Habitats Regulations”). This AA is in accordance with Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (“the Habitats Directive”) and Council Directive 2009/147/EC on the conservation of wild birds (“the Birds Directive”). Before they can grant consent, the Scottish Ministers, as the competent authority under the Habitats Regulations, must be satisfied that the Seagreen Developments will not adversely affect the integrity of any European site or European offshore marine site (special areas of conservation (“SAC”) and special protection areas (“SPA”)) either in isolation or in-combination with other plans or projects.
- 1.3 A detailed AA has been undertaken and Scottish Natural Heritage (“SNH”) has been consulted.

2 AA conclusion

- 2.1 This AA concludes that there will be no adverse effects on the site integrity of the Forth Islands SPA, Fowlsheugh SPA, St Abb’s Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA, Outer Firth of Forth and St Andrews Bay Complex proposed SPA (“pSPA”), Moray Firth SAC, Firth of Tay and Eden Estuary SAC, Berwickshire and North Northumberland Coast SAC or Isle of May SAC (where

each SAC, SPA or pSPA is taken as a whole) from the Alpha Development, the Bravo Development or the Combined Alpha and Bravo Developments either in isolation or in-combination with other plans or projects, providing that the conditions set out in Section 4 are complied with.

- 2.2 The Scottish Ministers consider that the most up to date and best scientific evidence available has been used in reaching the conclusion that the Seagreen Developments will not adversely affect the integrity of these sites and are satisfied that no reasonable scientific doubt remains.

3 Background to including assessment of proposed SPAs

- 3.1 The Scottish Ministers are currently in the process of identifying a suite of new marine SPAs in Scotland. In 2014, advice was received from the statutory nature conservation bodies (“SNCBs”) on the sites most suitable for designation (“2014 SNCB Advice”) and at this stage they became draft SPAs (“dSPA”). Once the Scottish Ministers have agreed the case for a dSPA to be the subject of a public consultation, the proposal is given the status of pSPA and receives policy protection, which effectively offers the sites the same level of protection as designated sites, from that point forward until a decision on classification of the site is made. This policy protection for pSPAs is provided by Scottish Planning Policy (paragraph 210), the UK Marine Policy Statement (paragraph 3.1.3) and Scotland’s National Marine Plan (paragraph 4.45).
- 3.2 It is not a legal requirement under the Habitats Directive or the Habitats Regulations for this assessment to assess the implications of the Alpha Development and the Bravo Development on any pSPAs. Nevertheless, this AA includes an assessment of implications upon these sites in accordance with domestic policy. The Scottish Ministers are also required to consider article 4(4) of the Birds Directive in respect of pSPAs. The considerations under article 4(4) of the Birds Directive are separate and distinct to the considerations which must be assessed under this Habitats Directive assessment but they are, nevertheless, set out within this AA (see paragraph 9.13.1).
- 3.3 In accordance with the Habitats Regulations, the Scottish Ministers acting as soon as reasonably practicable following the formal designation of the pSPA, will review their decisions if the Alpha Development and the Bravo Development are authorised. If required, this will include a supplementary AA being undertaken concerning the implications of the Alpha Development and the Bravo Development on the site as designated (as the site is currently a pSPA, at present, the conservation objectives are in draft form and will be finalised at the point that the site is designated).

4 Details of proposed operation

- 4.1 The Company has submitted marine licence applications in respect of the generating station elements of the Alpha Development and the Bravo Development under part 4 of the Marine and Coastal Access Act 2009. No marine licences in respect of the offshore transmission works have been applied for as licences granted for these in 2014 are still valid. In addition, the Company has submitted two applications for s.36 consent under the Electricity Act 1989 in respect of the Alpha Development and the Bravo Development. A full description of the Seagreen Developments can be found in Chapter 5 of the [Environmental Impact Assessment Report](#) (“EIA Report”) (as submitted in September 2018). The s.36 consents and marine licences applied for are for a period of 25 years.
- 4.2 The Company proposes to construct and operate two large-scale offshore wind farms, located 27km and 38km to the east of the Angus coastline. Both the Alpha Development and the Bravo Development will consist of a maximum of 70 WTGs each, the overall total number of turbines from the Combined Alpha and Bravo Developments will not exceed 120 WTGs. Foundations and substructures under consideration include: monopiles; pin piled tubular jackets; suction caisson jackets; and gravity base structures. Subsea inter array cables will link the WTGs to the offshore substation platforms.
- 4.3 The Company previously received s.36 consents and associated marine licences to construct and operate the Seagreen Alpha and Bravo Offshore Wind Farms in [October 2014](#) (“the Original Consents”). At the time of granting the Original Consents, a combined AA (“[the 2014 AA](#)”) was completed for the Original Consents, Inch Cape Offshore Wind Farm and Neart na Gaoithe Offshore Wind Farm (collectively known as the “Forth and Tay Developments”). The Forth and Tay Developments were subject to judicial review proceedings, and although the s.36 consents have been upheld, the projects have not been built out.
- 4.4 In March 2018, Neart na Gaoithe Offshore Wind Limited (“NnGOWL”) submitted a s.36 consent application and marine licence applications in respect of the revised design for the Neart na Gaoithe Offshore Wind Farm and transmission infrastructure (“the NnGOWL Development”). NnGOWL was subsequently granted a s.36 consent and marine licences in December 2018 for the revised design.
- 4.5 In August 2018, Inch Cape Offshore Limited (“ICOL”) submitted s.36 consent and marine licence applications in respect of the revised design for the Inch Cape Offshore Wind Farm and transmission infrastructure (“the ICOL Development”). ICOL was subsequently granted a s.36 consent and marine licences in June 2019 for the revised design.

- 4.6 Unless otherwise specified, within this AA, references to the 2018 NnGOWL Development and the ICOL Development are references to the 2017 scenarios for these projects, as these projects were considered by the Company as detailed in scoping reports submitted by NnGOWL and ICOL in 2017. Where specified expressly, this AA will also refer to the s.36 consents previously granted in 2014 for the NnGOWL Development and the ICOL Development.
- 4.7 The 2014 AA concluded that the Forth and Tay Developments would not adversely affect any European sites or European offshore marine sites, either in isolation or in-combination with other plans and projects.
- 4.8 The Company submitted a [scoping report](#) and a request for a scoping opinion to the Scottish Ministers in May 2017. Following consultation with statutory and other consultees, a [scoping opinion](#) in respect of the Seagreen Developments was issued by the Scottish Ministers on 15 September 2017 (“Scoping Opinion”), advising on the scope of assessment required in respect of the Applications. The Scoping Opinion included advice on the Habitats Regulations Appraisal (“HRA”) requirements and advised that information to inform the HRA (“HRA Report”) must be submitted in conjunction with the EIA Report.
- 4.9 The Applications have been developed and proposed in order to take advantage of technological developments in the intervening time period since the Original Consents were granted. Table 1 below provides a summary comparison of the parameters of the Applications and the Original Consents design envelopes.

Table 1 Comparison of the Applications and Original Consents Design Envelope Parameters

Design Envelope Parameter	Seagreen Developments	Original Consents
Maximum number of WTGs	70 each for Alpha Development and Bravo Development 120 for Combined Alpha and Bravo Developments	75 each for Alpha Development and Bravo Development 150 for Combined Alpha and Bravo Developments
Maximum rotor tip height (above LAT)	280 metres	209.7 metres
Maximum hub height (above LAT)	170 metres	87.1-126.2 metres
Maximum rotor diameter	220 metres	122-167 metres
Minimum spacing between WTGs	1000 metres	1000 metres
Blade clearance (above LAT)	32.5 metres	29.8 - 42.7 metres
Maximum blade width	7.5 metres	5.4 metres
Foundation Options	Monopiles (70 Max across Seagreen Developments – as some locations unsuitable for monopiles) Pin piled tubular jackets(480 piles max across Seagreen Developments) Suction caisson jackets (360 max across Seagreen Developments) Gravity base (120 max across Seagreen Developments)	Steel jacket with driven piles Steel jacket with suction piles Gravity base
Inter-array cables	Up to 650km	Up to 710km

- 4.10 Selection of the preferred foundation design will be based on a detailed assessment of ground conditions and other factors influencing design viability, prior to construction. Due to limitations related to water depth, a maximum of 70 monopile foundations will be utilised across the Seagreen Developments, with the remainder of locations using one or more of the other foundation design options. For example, a maximum of 70 WTGs could use monopile foundations with the remaining 50 WTGs utilising jackets or gravity bases.
- 4.11 An indicative construction programme is included in Chapter 5 of the EIA Report and is set out below at table 2.

Table 2 Indicative Construction Timescales

Activity	Indicative Timescale
Foundation/substructures	Year 1 – Year 2
Array cable installation	Year 2 – Year 3
WTG installation	Year 2 – Year 4
Commissioning	Year 2 – Year 4

- 4.12 Figure 1 provides a chart detailing the boundaries of the Seagreen Developments.

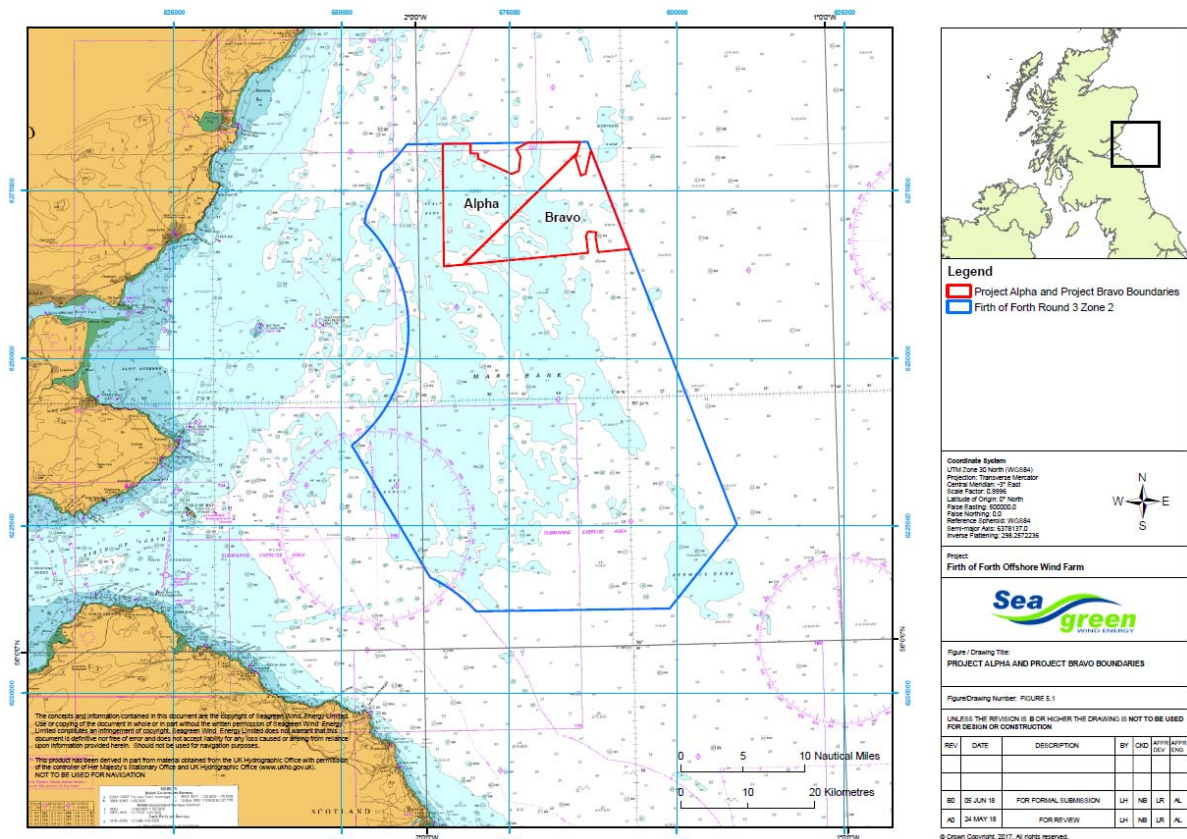


Figure 1 Chart detailing the boundaries of the Alpha Development and the Bravo Development
(Source: [EIA Report](#))

5 Consultation

- 5.1 SWEL submitted the Applications, including the EIA Report and [HRA Report](#), on 14 September 2018. The Scottish Ministers accepted the Applications and sent copies of it to SNH and other relevant consultees on 21 September 2018 for a 42 day consultation period.
- 5.2 An addendum of additional information ("[the EIA Addendum Report](#)") was subsequently provided and was circulated for consultation on 27 May 2019 for a 42 day consultation period. The EIA Addendum Report provided updated information in relation to ornithology assessments.
- 5.3 Detailed comments were received from SNH and the Royal Society for the Protection of Birds Scotland ("RSPB Scotland"). Marine Scotland Science ("MSS") provided scientific advice on the information provided.

6 Main points raised during consultation

- 6.1 The main points by each of the respondents that included HRA specific comments are summarised below. Copies of all consultation responses received by the Scottish Ministers can be accessed [here](#). Copies of all consultation responses to the EIA Addendum Report can be accessed [here](#).
- 6.2 **SNH**

Ornithology

- 6.2.1 In its response dated 2 November 2018 ("SNH Consultation Response"), SNH advised that it was unable to reach a definitive conclusion on the predicted ornithological impacts of the Seagreen Developments, in isolation or in-combination, noting that there were deviations from the Scoping Opinion in the impact assessment methods, in particular, incorporation of additional survey data, choice of Collision Risk Modelling ("CRM") options and outputs taken forward into the Population Viability Analyses ("PVA") modelling, and the presentation of PVA metrics. Consequently, SNH had low confidence in the interpretation of the outputs from the PVA, particularly the metrics outputs (counterfactual of population growth rate, counterfactual of population size and the centile results). SNH based on its preliminary conclusions objected to the Applications as they stood.
- 6.2.2 An updated ornithological impact assessment was later provided in the EIA Addendum Report. SNH provided a response to the EIA Addendum Report on 5 July 2019 ("SNH Response to EIA Addendum Report") confirming that it considered the updated assessment to have been carried out to a high standard

and in accordance with SNH and Marine Scotland guidance. Based on the updated assessment SNH advised that the Applications in isolation would not lead to any adverse impacts on site integrity for any of the SPAs under consideration. SNH also advised that cumulatively the Applications in-combination with the ICOL Development and the NnGOWL Development (as consented in 2018/2019) will not lead to any adverse impacts on site integrity for any of the SPAs under consideration. SNH further advised that the 2018 cumulative impacts have been substantially reduced from those previously assessed in 2014.

- 6.2.3 SNH advised that it had outstanding concerns in relation to the cumulative impacts of the Forth and Tay Developments (as consented in 2014) noting that in this regard, the counterfactuals of population size confirmed its concerns in respect of collision mortality of gannet at the Bass Rock (Forth Islands SPA) and kittiwake at the Forth Islands SPA and Fowlsheugh SPA.
- 6.2.4 SNH stated the model outputs indicate that the impacted population of gannet is predicted to be 88.1% of the un-impacted population and for kittiwake the impacted population is predicted to be 87.4% of the un-impacted population at Forth Island SPA and 89.5% of the un-impacted population at Fowlsheugh SPA. SNH advised that such levels of impact could give rise to adverse impact on site integrity and therefore SNH objected to the Applications in-combination with the Forth and Tay Developments (as consented in 2014).
- 6.2.5 The SNH Response to EIA Addendum Report confirmed that SNH had no outstanding concerns in respect of displacement impacts to puffin, guillemot or razorbill noting that the counterfactuals of population size and population growth rate would indicate that there is no impact on site integrity at any of the SPAs under consideration for these species.
- 6.2.6 In an email dated 15 July 2017, SNH confirmed that the Combined Alpha and Bravo Developments, when considered in-combination with the Forth and Tay Developments (as consented in 2014) would have an adverse effect on the site integrity of St Abb's Head to fast Castle SPA with respect to kittiwake. SNH advised that there would be no adverse effect on this SPA/qualifying feature if the Combined Alpha and Bravo Developments were considered in-combination with the Forth and Tay Developments (as consented in 2018/2019).

Mammals

- 6.2.7 In the SNH Consultation Response, SNH confirmed that the greatest impacts on marine mammals would arise during the construction phase of the Seagreen Developments advising that these could be mitigated through conditions on any consent and/or marine licence.

- 6.2.8 SNH noted that SWEL had incorporated the use of acoustic deterrent devices (“ADDs”) as embedded mitigation. SNH advised that these may not be necessary based on evidence from the currently under construction Beatrice Offshore Wind Farm (“Beatrice”). SNH welcomed further discussion during the development of the Piling Strategy (“PS”). In addition, SNH noted that submission of a PS to the Scottish Ministers for approval prior to the commencement of piling could mitigate any residual risk of Permanent Threshold Shift (“PTS”) and that experiences from the build out of other Scottish offshore wind farms, along with further discussion through the Forth and Tay Regional Advisory Group, would help inform the development of an appropriate PS that would mitigate cumulative impacts.
- 6.2.9 SNH advised that the PS should include further details of piling methods and timing, and the cumulative impact of any expected concurrent piling at different locations. SNH advised that the PS should also set out any measures to mitigate and manage the effects of pile installation.
- 6.2.10 In regards to noise modelling, SNH welcomed the inclusion of the additional analyses presented for underwater noise modelling using the 1% conversion factor (“CF”) as well as for 0.5%. SNH confirmed the predicted impacts for all cetacean species remain low. SNH therefore agreed with the conclusion that the magnitude of impact is low and the significance of effect from PTS is minor or negligible for all species and all scenarios.
- 6.2.11 SNH noted that the bottlenose dolphin population modelling suggested a large decrease in population size after 24 years when PTS was included. However, this work was done using interim Population Consequences of Disturbance (“iPCoD”) version 3, which is known to overestimate the impact of PTS on populations, therefore, SNH consider that the impact is likely to be far less than predicted.
- 6.2.12 SNH advised that there would be no adverse effect on site integrity for bottlenose dolphin as a qualifying interest of the Moray Firth SAC subject to the inclusion of relevant conditions on any s.36 consent/marine licence granted.
- 6.2.13 Based on the information in the EIA Report and HRA Report, SNH advised that there would be no adverse effect on site integrity for harbour seal as a qualifying interest of the Firth of Tay and Eden Estuary SAC, subject to the inclusion of standard conditions on any s.36 consent/marine licence granted. SNH confirmed that both alone and in-combination with the Forth and Tay Developments, there was no significant long term effect on the population trajectory of harbour seals.
- 6.2.14 SNH noted that the reference population for grey seal was calculated differently, as compared to the 2018 applications for the NnGOWL Development and the ICOL Development. In this instance, SWEL has combined populations from the

East Scotland Management Unit (“MU”) and the North East England MU, which means that the worst case scenario (“WCS”) cumulative predictions of disturbance go from 20% to 7.2%. However, SNH agreed with the conclusion that the predictions are precautionary and, at population level, the impacts are unlikely to be significant.

- 6.2.15 SNH advised that there would be no adverse effect on the integrity of grey seal as qualifying interests of the Isle of May SAC and Berwickshire and North Northumberland Coast SAC subject to the inclusion of standard conditions on any s.36 consent/marine licence granted. SNH confirmed that both alone and in-combination with the Forth and Tay Developments, there would be no predicted significant long term effect on the population trajectory of grey seals.

6.3 **RSPB Scotland**

- 6.3.1 In its response dated 8 November 2018, RSPB Scotland advised that although the Applications include fewer turbines compared to the Original Consents, and therefore a reduction in the predicted impacts to seabirds is expected, even with this predicted reduction, the Applications would cause significant adverse impacts on seabird populations, both in isolation and in-combination with the ICOL Development and the NnGOWL Development.
- 6.3.2 RSPB Scotland noted that a total of 1,500+ bird mortalities per year is predicted from the in-combination impacts of the Applications with the ICOL Development and the NnGOWL Development (both as consented in 2018/2019) and that 2,200+ non-breeding season bird mortalities per year are predicted from other wind projects located in UK waters.
- 6.3.3 RSPB Scotland advised that the scale of the impact would have population level effects on a number of protected species and that for some species, the scale of impact predicted would mean Scotland would fail to meet its international obligations to protect the natural environment. RSPB Scotland noted in particular, the scale of the impacts would result in a significant adverse effect on the integrity of both the Forth Islands SPA and the Fowlsheugh SPA.
- 6.3.4 RSPB Scotland disagreed with the conclusions reached in the EIA Report, considering it to be flawed and that it failed to incorporate information and data that, if included in the assessment, would result in an increase in the level of predicted impacts.
- 6.3.5 On the basis that the impacts will have a significant adverse effect on the integrity of relevant SPAs and given the shortcomings of the EIA Report, RSPB Scotland objected to the Application.

- 6.3.6 An updated ornithological impact assessment was later provided in the EIA Addendum Report. RSPB Scotland provided a response to the EIA Addendum Report on 8 July 2019 confirming that its position remained unchanged and that it continued to object to the Applications.
- 6.3.7 RSPB Scotland advised that the updated predicted population level effects on seabirds remain, in its view, unacceptable and would represent an adverse effect on the integrity of the relevant SPAs, including the Forth Islands SPA and Fowlsheugh SPA. RSPB Scotland noted that in some instances the EIA Addendum Report predicts impacts that are greater than those presented in the EIA Report. RSPB Scotland confirmed that its position is based on considering the Applications in-combination with the ICOL Development and the NnGOWL Development (as consented in 2018/2019).
- 6.3.8 RSPB Scotland advised that for both gannet and kittiwake collision risk modelling, the avoidance rates used were 98.9% ($\pm 0.2\%$) as recommended by the Scoping Opinion and SNH. RSPB Scotland recommended a lower rate be used for gannet during the breeding season but acknowledged that the approach taken is in accordance with statutory guidance. RSPB Scotland however noted that the EIA Addendum Report also refers to Bowgen and Cook's (2018)¹ recent review and the re-estimated avoidance rate to be used for these species based on evidence presented by Skov et al. (2018).² RSPB Scotland advised that it considered there to be a number of limitations with this paper and its understanding is that SNCBs have not changed their recommendations in light of this data.
- 6.3.9 RSPB Scotland noted that where scientific data does not permit a complete evaluation of risk to the Natura network, the precautionary principle must be applied, with the degree of caution applied being directly proportional to the degree of uncertainty. In this instance, it is the view of RSPB Scotland that a high level of precaution should therefore be applied to this assessment.
- 6.3.10 RSPB Scotland advised that it wholly supports the use of the counterfactual of population size ("CPS") in assessing the risks to protected species populations considering it to be the most useful metric in determining the acceptability of projects and the potential for them to impact on the conservation objectives of designated sites. RSPB Scotland noted that the EIA Addendum Report makes references to the projected growth of the populations and that although it considers there to be insufficient certainty in these predictions they are

¹ Bowgen, K. & Cook, A., (2018), Bird Collision Avoidance: Empirical evidence and impact assessments, JNCC Report No. 614, JNCC, Peterborough, ISSN 0963-8091.

² Skov, H., Heinanen, S., Norman, T., Ward, R.M., Mendez-Roldan, S. & Ellis, I. 2018. ORJIP Bird Collision and Avoidance Study. Final report – April 2018. The Carbon Trust. United Kingdom.

repeatedly referred to in the assessment summaries for each species. RSPB Scotland advised that the focus for interpreting impacts should be on the CPS, not whether a population is predicted to be at the same level or larger than its current level at the end of the project life.

- 6.3.11 RSPB Scotland agreed there are a multitude of factors driving the declining trends recorded in kittiwake populations and that decarbonisation of electricity production is required to help achieve climate change emission reduction targets. RSPB Scotland noted, however, that action to address climate change should not be taken at any cost and in this instance the potential for offshore wind to add further additional pressure on an already declining population needs to be considered carefully. RSPB Scotland considered this to be particularly relevant given the obligations on the Scottish Government to contribute toward the achievement of Good Environmental Status (“GES”) with the latest UK Marine Strategy updated assessment³ concluding that marine bird populations remain at risk and there is a failure in achieving GES for this indicator. Further consideration of points raised by RSPB Scotland is provided in Appendix 4.

SECTION 2: INFORMATION ON NATURA SITES

- 7 **Background information and qualifying interests for the relevant Natura sites**
- 7.1 This section provides links to the SNH Interactive website, at table 3, where background information on the sites being considered in this assessment is available. The qualifying interests for the sites are listed below at table 4 and the conservation objectives at table 5. Figure 2 provides a chart of the SPAs, pSPA and SACs considered within this AA.

Table 3 Name of Natura sites affected and current status

<p>SPA:</p> <p>Forth Islands SPA https://sitelink.nature.scot/site/8500</p> <p>Fowlsheugh SPA https://sitelink.nature.scot/site/8505</p> <p>St Abb’s Head to Fast Castle SPA https://sitelink.nature.scot/site/8579</p>
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³ DEFRA. 2019. Marine Strategy part one: UK updated assessment and Good Environmental Status.

Buchan Ness to Collieston Coast SPA

<https://sitelink.nature.scot/site/8473>

SAC:

Moray Firth SAC

<https://sitelink.nature.scot/site/8327>

Firth of Tay and Eden Estuary SAC

<https://sitelink.nature.scot/site/8257>

Berwickshire and North Northumberland Coast SAC

<https://sitelink.nature.scot/site/8207>

Isle of May SAC

<https://sitelink.nature.scot/site/8278>

pSPA:

Outer Firth of Forth and St Andrews Bay Complex pSPA

<https://sitelink.nature.scot/site/10478>

Table 4 European qualifying interests

Forth Islands SPA

- Arctic tern (*Sterna paradisaea*), breeding
- Common tern (*Sterna hirundo*), breeding
- Cormorant (*Phalacrocorax carbo*)*, breeding
- Gannet (*Morus bassanus*), breeding
- Guillemot (*Uria aalge*)*, breeding
- Herring gull (*Larus argentatus*)*, breeding
- Kittiwake (*Rissa tridactyla*)*, breeding
- Lesser black-backed gull (*Larus fuscus*), breeding
- Puffin (*Fratercula arctica*), breeding
- Razorbill (*Alca torda*)*, breeding
- Roseate tern (*Sterna dougallii*), breeding
- Sandwich tern (*Sterna sandvicensis*), breeding
- Shag (*Phalacrocorax aristotelis*), breeding

- Seabird assemblage, breeding

*indicates assemblage qualifier only

Fowlsheugh SPA

- Fulmar (*Fulmarus glacialis*)*, breeding
- Guillemot (*Uria aalge*)*, breeding
- Herring gull (*Larus argentatus*)*, breeding
- Kittiwake (*Rissa tridactyla*), breeding
- Razorbill (*Alca torda*)*, breeding
- Seabird assemblage, breeding

St Abb's Head to Fast Castle SPA

- Guillemot (*Uria aalge*)*, breeding
- Herring gull (*Larus argentatus*)*, breeding
- Kittiwake (*Rissa tridactyla*)*, breeding
- Razorbill (*Alca torda*)*, breeding
- Shag (*Phalacrocorax aristotelis*)*, breeding
- Seabird assemblage, breeding

Buchan Ness to Collieston Coast SPA

- Fulmar (*Fulmarus glacialis*)*, breeding
- Guillemot (*Uria aalge*)*, breeding
- Herring gull (*Larus argentatus*)*, breeding
- Kittiwake (*Rissa tridactyla*)*, breeding
- Shag (*Phalacrocorax aristotelis*)*, breeding
- Seabird assemblage, breeding

Moray Firth SAC

- Subtidal sandbanks
- Bottlenose dolphin (*Tursiops truncatus*)

Firth of Tay and Eden Estuary SAC

- Estuaries
- Intertidal mudflats and sandflats
- Subtidal sandbanks
- Harbour seal (*Phoca vitulina*)

Berwickshire and North Northumberland Coast SAC

- Intertidal mudflats and sandflats
- Reefs
- Sea caves
- Shallow inlets and bays
- Grey seal (*Halichoerus grypus*)

Isle of May SAC

- Reefs
- Grey seal (*Halichoerus grypus*)

Outer Firth of Forth and St Andrews Bay Complex pSPA

- Red-throated diver (*Gavia stellata*), non-breeding
- Little gull (*Hydrocoloeus minutus*), non-breeding
- Common tern (*Sterna hirundo*), breeding
- Gannet (*Morus bassanus*), breeding
- Arctic tern (*Sterna paradisaea*), breeding
- Guillemot (*Uria aalge*), breeding and non-breeding
- Slavonian grebe (*Podiceps auritus*), non-breeding
- Eider (*Somateria mollissima*), non-breeding
- Long-tailed duck (*Clangula hyemalis*), non-breeding
- Common scoter (*Melanitta nigra*), non-breeding
- Velvet scoter (*Melanitta fusca*), non-breeding
- Goldeneye (*Bucephala clangula*), non-breeding
- Red-breasted merganser (*Mergus serrator*), non-breeding
- Manx shearwater (*Puffinus puffinus*), breeding
- Razorbill (*Alca torda*), non-breeding
- Puffin (*Fratercula arctica*), breeding
- Black-headed gull (*Chroicocephalus ridibundus*), non-breeding
- Common gull (*Larus canus*), non-breeding
- Herring gull (*Larus argentatus*), breeding and non-breeding
- Kittiwake (*Rissa tridactyla*), breeding and non-breeding
- Shag (*Phalacrocorax aristotelis*), breeding and non-breeding
- Waterfowl assemblage, non-breeding
- Seabird assemblage, breeding and non-breeding

Table 5 Conservation objectives

SPA:

Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA and Buchan Ness to Collieston Coast SPA

To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

To ensure for the qualifying species that the following are maintained in the long term:

- i. Population of the species as a viable component of the site
- ii. Distribution of the species within site
- iii. Distribution and extent of habitats supporting the species
- iv. Structure, function and supporting processes of habitats supporting the species
- v. No significant disturbance of the species

SAC:

Conservation Objectives for the following Qualifying Habitats:

SAC	Qualifying Habitat(s)
Moray Firth SAC	Subtidal Sandbanks
Firth of Tay and Eden Estuary SAC	Estuaries Intertidal mudflats and sandbanks Subtidal sandbanks
Berwickshire and North Northumberland Coast SAC	Intertidal mudflats and sandflats Reefs Sea caves Shallow inlets and bays
Isle of May SAC	Reefs

To avoid deterioration of the qualifying habitats (listed above) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving the favourable conservation status for each of the qualifying features; and

To ensure for the qualifying habitat that the following are maintained in the long term:

- i. Extent of the habitat on site
- ii. Distribution of the habitat within site
- iii. Structure and function of the habitat
- iv. Processes supporting the habitat
- v. Distribution of typical species of the habitat
- vi. Viability of typical species as components of the habitat
- vii. No significant disturbance of typical species of the habitat

Conservation Objectives for the following Qualifying Interests:

SAC	Qualifying Interest(s)
Firth of Tay and Eden Estuary SAC	Harbour seal
Berwickshire and North Northumberland Coast SAC	Grey seal
Isle of May SAC	Grey seal

To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are maintained in the long term:

- i. Population of the species as a viable component of the site
- ii. Distribution of the species within site
- iii. Distribution and extent of habitats supporting the species
- iv. Structure, function and supporting processes of habitats supporting the species
- v. No significant disturbance of the species

Conservation Objectives for the following Qualifying Interests:

SAC	Qualifying Interest(s)
Moray Firth SAC	Bottlenose dolphin

To avoid deterioration of the habitats of the qualifying species (listed above) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

To ensure for the qualifying species that the following are established then maintained in the long term:

- i. Population of the species as a viable component of the site
- ii. Distribution of the species within site
- iii. Distribution and extent of habitats supporting the species
- iv. Structure, function and supporting processes of habitats supporting the species
- v. No significant disturbance of the species

pSPA:

Outer Firth of Forth and St Andrews Bay Complex pSPA (Draft Conservation Objectives)

The following conservation objectives are still in draft form and have not yet been finalised.

To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long-term and it continues to make an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species.

This contribution will be achieved through delivering the following objectives for each of the site's qualifying features:

- a. Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term;
- b. To maintain the habitats and food resources of the qualifying features in favourable condition.

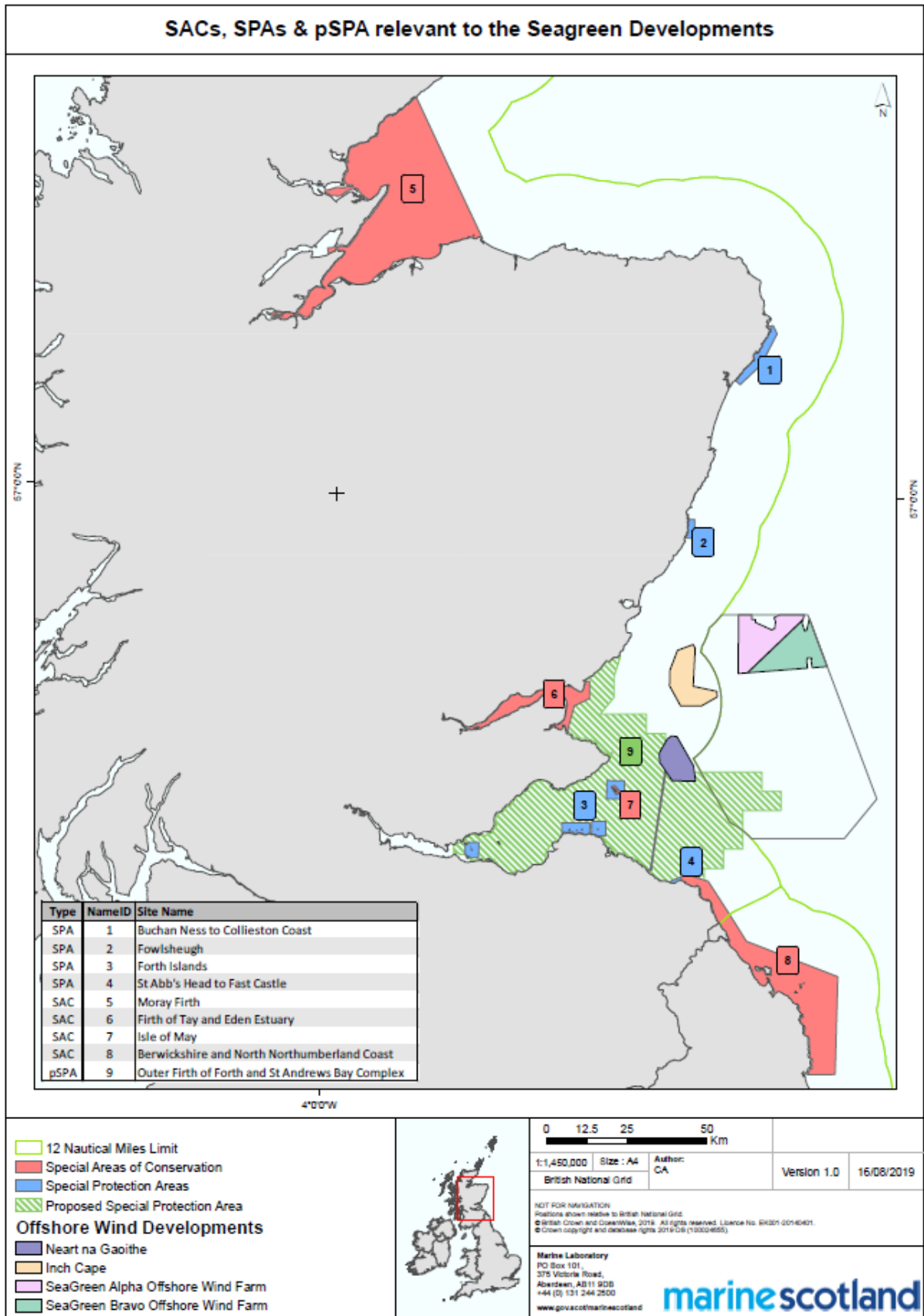


Figure 2 SPAs, pSPA and SACs considered within this AA

SECTION 3: ASSESSMENT IN RELATION TO REGULATION 48 OF THE CONSERVATION (NATURAL HABITATS, &C.) REGULATIONS 1994 (AS AMENDED) AND REGULATION 63 OF THE CONSERVATION OF HABITATS AND SPECIES REGULATIONS 2017

8 Requirement for appropriate assessment

8.1 Is the operation directly connected with or necessary to conservation management of the site?

8.1.1 The operation is not directly connected with or necessary to conservation management of the site.

8.2 Is the operation likely to have a significant effect on the qualifying interests?

8.2.1 The Scoping Opinion identified likely significant effects (“LSE”) on the following qualifying interests of the SACs, SPAs and pSPA:

MARINE MAMMALS

Moray Firth SAC

- Bottlenose dolphin

Firth of Tay and Eden Estuary SAC

- Harbour seal

Berwickshire and North Northumberland Coast SAC & Isle of May SAC

- Grey seal

8.2.2 The HRA Report identified that there could be LSE on the qualifying interests of the above SACs during the operational and maintenance phase of the Seagreen Developments arising from;

- mortality or physical injury as a result of noise;
- displacement or disturbance as a result of noise;

8.2.3 The SNH Consultation Response advised that there will be LSE on the qualifying interests listed above arising from disturbance and displacement during the construction phase of the Seagreen Developments, in particular piling activities associated with the installation of the WTGs.

ORNITHOLOGY

Forth Islands SPA

- Gannet
- Kittiwake
- Herring gull
- Puffin
- Guillemot
- Razorbill

Fowlsheugh SPA

- Kittiwake
- Herring gull
- Guillemot
- Razorbill

St Abb's Head to Fastcastle SPA

- Kittiwake
- Herring gull
- Guillemot
- Razorbill

Buchan Ness to Collieston Coast SPA

- Kittiwake
- Herring gull
- Guillemot

Outer Firth of Forth and St Andrews Bay Complex pSPA

- Gannet
- Kittiwake
- Herring gull
- Puffin
- Guillemot
- Razorbill

- 8.2.4 The HRA Report identified that there would be LSE on the qualifying interests of the pSPA and SPAs listed above during the operational and maintenance phase of the proposal. The Scoping Opinion advised that the impacts of relevance were collision risk, and displacement and barrier effects, and that for the existing breeding colony SPAs the primary focus of the assessment should be in relation to the conservation objective to maintain “the population of the species as a viable component of the site”.

- 8.2.5 The SNH Consultation Response confirmed that the Alpha Development and the Bravo Development would have LSE on a number of qualifying interests of the Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fastcastle SPA, Buchan Ness to Collieston Coast SPA, Firth of Tay and Eden Estuary SAC, Berwickshire and North Northumberland Coast SAC, Isle of May SAC and Outer Firth of Forth and St Andrews Bay Complex pSPA.
- 8.2.6 The Scottish Ministers agree with the advice provided by SNH and have undertaken an AA for the qualifying interests and sites listed above.

9 Appropriate assessment of the implications for the site in view of the site's conservation objectives.

- 9.1 The following assessment is based upon the information contained in the HRA Report, EIA Report, EIA Addendum Report and the advice received from SNH and MSS. Consideration has also been given to other consultation responses detailed above. Consideration of the effect on site integrity for each European site or European offshore marine site and qualifying interest(s) follows below.
- 9.2 For each of the qualifying interests the WCS has been considered and details of the WCS has been provided in the HRA Report, EIA Report and EIA Addendum Report. For the ornithology in-combination assessment, the WCS is considered to be the Combined Alpha and Bravo Developments in-combination with the 2014 s.36 consents granted for the NnGOWL Development and the ICOL Development. Other smaller scale projects included in the in-combination assessment are as described at Appendix 1 of this AA.
- 9.3 **Marine Mammal SACs - Moray Firth SAC, Berwickshire and North Northumberland Coast SAC, Isle of May SAC and Firth of Tay and Eden Estuary SAC**
- 9.3.1 Chapter 10 of the EIA Report provides a full explanation of the assessment methods used, and this information also informs the HRA Report. The marine mammal assessments firstly undertake noise propagation modelling based on a number of scenarios in relation to the Alpha Development and the Bravo Development. These scenarios, which are detailed in tables 6 and 7, considered different pile types (monopiles and jacket pin piles) and whether these were sequential or concurrent piling events (i.e. two piling events occurring at the same time). The Combined Alpha and Bravo Developments with a maximum of 120 WTGs were also assessed. The assessment was based on the WCS for pile driving energy (3,000 kilojoules ("KJ")) for monopiles and 1,800KJ for pin piles.

Table 6 Piling Scenarios for the Alpha Development

Description	Number of WTGs	Number of piles	Number of piling days	Number of months over which piling activity spread
Monopiles only	70	70	70	18
Pin pile jackets only	70	280	140	18
Monopiles and pin pile jackets sequential	35 monopiles 35 jackets	35 140	105	24
Monopiles and pin pile jackets concurrent	35 monopiles 35 jackets	35 140	70	24

Table 7 Piling Scenarios for the Bravo Development

Description	Number of WTGs	Number of piles	Number of piling days	Number of months over which piling activity spread
Monopiles only	35	35	35	18
Pin pile jackets only	70 jackets	280	140	18
Monopiles and pin pile jackets sequential	35 monopiles 35 jackets	35 140	105	24
Monopiles and pin pile jackets concurrent	35 monopiles 35 jackets	35 140	70	24

- 9.3.2 Following the Scoping Opinion, further discussion took place between SWEL, Marine Scotland – Licensing Operations Team (“MS-LOT”), MSS and SNH regarding the conversion factor to be used for the noise propagation modelling. Consequently, additional modelling was presented using a 1% conversion factor (to convert hammer energy to acoustic noise) in order to provide a comparison with the 0.5% conversion factor (EIA Report Appendix 10E). It was also advised by MSS that the modelling was run to reflect both with and without the use of ADDs as embedded mitigation. Based on the outputs of the models, MSS and SNH were content that the magnitude of impact would be low and the significance of effect from PTS would be low for all species and scenarios.
- 9.3.3 An estimation of the numbers of individuals likely to be displaced or experience PTS from pile driving was provided in the EIA Report (Chapter 10) and in Appendix 10E of the EIA Report, using the 0.5% and 1% conversion factor. The predicted estimate of individuals that experience PTS in their audible hearing range provides a proxy for injury, and the estimated number at risk of disturbance is also calculated. For PTS, the predicted impacts were negligible for all species considered in this AA, for both the 0.5% and 1% conversion factor.
- 9.3.4 The population level consequences of these effects were estimated using the iPCoD framework. The assessment results are provided for the Alpha Development, the Bravo Development, the Combined Alpha and Bravo Developments and in-combination with the other Forth and Tay Developments and Beatrice, the Moray East Offshore Wind Farm (“Moray East”) and the Moray West Offshore Wind Farm (“Moray West”) (collectively referred to as “the Moray Firth Developments”). The Aberdeen Harbour Expansion Project (“AHEP”), for which use of explosive blasting was assessed, is also included. Both MSS and SNH noted that this work was done using iPCoD version 3, which is known to overestimate the impact of PTS on populations, therefore, the impact (where PTS is included) is likely to be far less than predicted.
- 9.3.5 SNH provided project specific advice for the Seagreen Developments in relation to marine mammals in the SNH Consultation Response. SNH noted that the use of ADDs as embedded mitigation may not be necessary, and welcomed further discussion during the development of the PS. In addition, SNH noted that submission of a PS to MS-LOT for approval prior to the commencement of piling could mitigate any residual risk of PTS and, based on previous experiences from buildout at other Scottish offshore wind farms, can help to inform an appropriate PS that will mitigate cumulative impacts.
- 9.3.6 The assessment methods used for marine mammals differ from those that informed the 2014 AA in a number of ways. For example, there are differences in the model used for noise propagation by SWEL and the one used to inform the

2014 AA. The thresholds for onset of PTS and disturbance use the NOAA (2016)⁴ thresholds whereas the Southall *et al* (2007)⁵ thresholds, which are also presented in the EIA Report, were exclusively relied upon previously.

9.3.7 Advice provided by SNH and MSS highlights a number of issues that provide relevant context for this AA. The modelling presented by SWEL is precautionary. The results are sensitive to assumptions relating to piling scenarios (including the WCS), particularly with respect to information presented on the other Forth and Tay Developments and the Moray Firth Developments considered in combination.

9.3.8 **BOTTLENOSE DOLPHIN – Moray Firth SAC**

9.3.8.1. The HRA Report details the current population estimate of bottlenose dolphin for the East Coast Scotland MU as 195 individuals, based on photo-ID counts between 2006 and 2007. The results of further surveys suggest that the East Coast Scotland population has continued to increase in size since 2007, therefore the current population size is likely to be larger than this (Cheney *et al.*, 2018).⁶

9.3.8.2. Appendix 10E of the EIA Report estimates that for the Seagreen Developments, irrespective of whether the conversion factor is 0.5% or 1%, or whether an ADD is used as embedded mitigation or not, the magnitude is negligible, sensitivity is medium and the impact significance is negligible for this species.

9.3.8.3. In the case of the Alpha Development, for the WCS (sequential installation of monopiles), using the 1% conversion factor resulted in 6.8 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.13).

9.3.8.4. In the case of the Bravo Development, for the WCS (concurrent installation of monopiles and pin pile jackets), using the 1% conversion factor resulted in 6 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.13).

9.3.8.5. In the case of the Combined Alpha and Bravo Developments, if concurrent piling occurs at the Alpha Development and the Bravo Development, the scenario assessed was for the installation of pin pile jacket foundations. Consequently, for

⁴ NOAA (2016) Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. (U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p. National Marine Fisheries Service).

⁵ Southall, B., Bowles, A., Ellison, W., Finneran, J., Gentry, R., Greene Jr., C., Kastak, D., Ketten, D., Miller, J., Nachtigall, P., Richardson, W., Thomas, J. and Tyack, P. (2007). Marine Mammal Noise Exposure Criteria: Initial Scientific recommendations. (Aquatic Mammals. 33(4): 411-521).

⁶ Cheney, B., Graham, I. M., Barton, T., Hammond, P. S. & Thompson, P. M. 2018. Site condition monitoring of Bottlenose Dolphins within the Moray Firth Special Area of Conservation: 2014-2016. Scottish National Heritage Research Report No 1021.

this WCS, using the 1% conversion factor resulted in 5.4 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.13).

- 9.3.8.6. The WCS for disturbance was the Alpha Development (monopiles) followed by the Bravo Development (pin pile jackets). Using this scenario, the population modelling predicted that the impacted population would experience an initial slight decline in growth rate relative to the un-impacted population (baseline), after which it then returns to the same growth rate as the un-impacted population and continues to increase at the same rate as the un-impacted population for the remainder of the simulations (EIA Report, Appendix 10E, Table 1.14 and Table 1.15).
- 9.3.8.7. For the in-combination assessment modelling, the WCS the Alpha Development (sequential installation of monopiles) followed by the Bravo Development (sequential installation of pin pile jackets) (see EIA Report, Table 10.46 and paragraph 10.257)) was identified using iPCoD, where this build scenario resulted in a higher predicted increase in the risk of a 1% decline in year 1. Nonetheless, the WCS resulted in no significant long term population effect (HRA, paragraph 16.328). The HRA Report recorded that the ratio of impacted to un-impacted population size was 0.941 for the in-combination effects and concluded that there is no predicted long term effect on the East Coast Scotland bottlenose dolphin population (or Moray Firth SAC) as a result of disturbance from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments, the Moray Firth Developments and AHEP (this ratio was based on the 0.5% conversion factor - HRA Report, paragraph 16.329).
- 9.3.8.8. The SNH Consultation Response advised that the bottlenose dolphin population modelling suggested a large decrease in population size after 24 years when PTS was included. However, this work was completed using iPCoD version 3, which is known to overestimate the impact of PTS on populations. Consequently, SNH advised that the impact (when including PTS) is likely to be far less than predicted.
- 9.3.8.9. SNH advised that there will be no adverse effect on site integrity for bottlenose dolphin as a qualifying interest of the Moray Firth SAC, subject to standard conditions on any s.36 consent/ marine licence granted.
- 9.3.8.10. In reaching their conclusion, the Scottish Ministers have considered the conservation objectives, the population at the site, the predicted levels of effect and population consequences, the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that the Seagreen Developments, subject to the application of conditions, will not adversely affect the site integrity of the Moray Firth SAC with respect to bottlenose dolphin, either alone or in-combination with the other Forth and Tay Developments, the Moray Firth Developments and AHEP.

9.3.9 **GREY SEAL - Berwickshire and North Northumberland Coast SAC and Isle of May SAC**

- 9.3.9.1 Appendix 10E of the EIA Report estimates that for the Seagreen Developments, irrespective of whether the conversion factor is 0.5% or 1%, or whether ADDs are used as embedded mitigation or not, the magnitude of effect is negligible, sensitivity is low and the impact significance is negligible for this species.
- 9.3.9.2 In the case of the Alpha Development, for the WCS (sequential installation of monopiles), using the 1% conversion factor resulted in 95 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.11).
- 9.3.9.3 In the case of the Bravo Development, for the WCS (concurrent installation of monopiles and pin pile jackets), using the 1% conversion factor resulted in 71 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.11).
- 9.3.9.4 In the case of the Combined Alpha and Bravo Developments, if concurrent piling occurs at the Alpha Development and the Bravo Development, the scenario assessed was for the installation of pin pile jacket foundations. Consequently, for this WCS (concurrent installation of pin pile jackets at the Alpha Development and the Bravo Development), using the 1% conversion factor resulted in 63 animals predicted to experience disturbance during installation (EIA Report, Appendix 10E, Table 1.11).
- 9.3.9.5 The magnitude of impact of disturbance on grey seals as a result of the in-combination assessment, which incorporated the Seagreen Developments (concurrently or sequentially) and the other Forth and Tay Developments, was predicted to be negligible.
- 9.3.9.6 The SNH Consultation Response noted that the reference population for grey seals was calculated differently, as compared to the 2018 applications for the NnGOWL Development and the ICOL Development. In this instance, SWEL has combined populations from the East Scotland MU and the North East England MU, this means that the worst case cumulative predictions of disturbance go from 20% to 7.2%. However SNH agreed with the conclusion that the predictions are precautionary and, at population level, the impacts are unlikely to be significant.
- 9.3.9.7 The SNH Consultation Response advised that both alone and in-combination with other developments, there is no significant long term effect on the population trajectory of grey seals. SNH advised that there will be no adverse effect on site integrity for grey seal as qualifying interests of the Isle of May SAC and

Berwickshire and North Northumberland Coast SAC, subject to standard conditions on any s.36 consent/marine licence granted.

9.3.9.8 In reaching their conclusion the Scottish Ministers have considered the conservation objectives, the population at the sites, the predicted levels of effect and population consequences, the fact that the effects are less than in 2014, the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that the Seagreen Developments, subject to the application of conditions, will not adversely affect the site integrity of the Isle of May SAC and Berwickshire and North Northumberland Coast SAC, either alone or in-combination with the other Forth and Tay Developments and AHEP.

9.3.10 **HARBOUR SEAL - Firth of Tay and Eden Estuary SAC**

9.3.10.1 Appendix 10E of the EIA Report estimates that for the Seagreen Developments, irrespective of whether the conversion factor is 0.5% or 1%, or whether ADDs are used as embedded mitigation or not, the magnitude of the effect is negligible, sensitivity is low and the impact significance is negligible.

9.3.10.2 In the case of the Alpha Development, for the WCS (sequential installation of monopiles), using the 1% conversion factor resulted in 0.57 animals predicted to experience disturbance during installation (EIA Report, Appendix 10, Table 1.10).

9.3.10.3 In the case of the Bravo Development, for the WCS (concurrent installation of monopiles and pin pile jackets), using the 1% conversion factor resulted in 0.47 animals predicted to experience disturbance during installation (EIA Report, Appendix 10, Table 1.10).

9.3.10.4 In the case of the Combined Alpha and Bravo Developments, if concurrent piling occurs at the Alpha Development and the Bravo Development, the scenario assessed was the installation of pin pile jacket foundations. Consequently, for this WCS (concurrent installation of pin pile jackets at the Alpha Development and the Bravo Development), using the 1% conversion factor resulted in 0.56 animals predicted to experience disturbance during installation (EIA Report, Appendix 10, Table 1.10).

9.3.10.5 Harbour seals and the Firth of Tay and Eden Estuary SAC were screened out of the in-combination assessment because of the extremely low level of predicted disturbance (less than one individual seal being disturbed per day of pile driving).

9.3.10.6 SNH advised that there will be no adverse effect on site integrity for harbour seal as a qualifying interest of the Firth of Tay and Eden Estuary SAC, subject to standard conditions on any s.36 consent/marine licence granted.

9.3.10.7 In reaching their conclusion the Scottish Ministers have considered the conservation objectives, the population at the site, the predicted levels of effect and population consequences, the fact that the effects are less than in 2014, the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that the Seagreen Developments, subject to the application of conditions, will not adversely affect the site integrity of the Firth of Tay and Eden Estuary SAC with respect to harbour seal, either alone or in-combination with the other Forth and Tay Developments.

9.4 **Seabird SPAs – Forth Islands SPA, Fowlsheugh SPA, Buchan Ness to Collieston Coast SPA, St Abb’s Head to Fast Castle SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA**

9.4.1 The Scoping Opinion directed that the primary focus of the HRA Report should be the conservation objectives relating to the maintenance of the relevant qualifying species as a viable component of the sites. As also directed in the Scoping Opinion, further justification was provided in the HRA Report regarding why other conservation objectives were less relevant. The EIA Report together with the EIA Addendum Report provides a full explanation of the assessment methods (see EIA Report Chapter 8, paragraph 8.52 onwards). The ornithology assessments firstly estimated the predicted levels of effect (collision and/or displacement, depending on the species). Secondly, for each species the number of individuals estimated to be affected were assigned to age classes (e.g. breeding adults and non-breeding juveniles). These individuals were then apportioned to SPA breeding colonies. Lastly, where advised through the Scoping Opinion, the population level consequences of these effects were estimated using PVA. PVA was undertaken assuming a 25 year operational wind farm life. The assessment results are provided for the Alpha Development, the Bravo Development and the Combined Alpha and Bravo Developments. In addition results are also presented for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and other offshore wind farm projects and proposals, as identified in the EIA Addendum Report (part 2 - section 2) and in the EIA Report chapter 8 (paragraphs 8.562 onwards). Further detail on the projects considered in-combination by the Scottish Ministers is provided at Appendices 1 and 2 of this assessment.

Differences with the 2014 Assessment

9.4.2 The assessment methods used for ornithology differ from the assessment methods that informed the 2014 AA in a number of ways. For example, Option 2 of the Band 2012 collision risk model was used in the current assessment for kittiwake and gannet compared with Option 3 in 2014. Different avoidance rates have been used in the collision risk assessment, based on agreement on more appropriate avoidance rates.

- 9.4.3 With regards to displacement and barrier effects in 2014, the Centre for Ecology and Hydrology (“CEH”) Searle et al 2014 model was used. This Searle et al model simulates the movements of individual birds from breeding colonies. The model estimates changes to adult survival and productivity based on estimated changes in adult body mass and provisioning rates of chicks. Data from tagged individuals are used in the model. In this AA, the use of the matrix approach for displacement estimates the percentage of birds displaced from the Seagreen Development areas and from that the percentage of those displaced adults that do not survive. This more simplistic approach was advised in the Scoping Opinion and is informed by data on seabird densities collected at the Seagreen Development sites.
- 9.4.4 The population consequences of the effects have been assessed using a different approach to population modelling in these assessments. The 2014 AA was informed by Bayesian state-space models produced by CEH. This AA is informed by stochastic Leslie-matrix PVAs.
- 9.4.5 For the collision risk assessment, the design options considered as WCS for the Seagreen Developments are detailed in Table 8 below. The design options were the same for the Alpha Development, the Bravo Development, and the Combined Alpha and Bravo Developments, however the number of WTGs differed, with 70 for the Alpha Development and the Bravo Development, but 120 for the Combined Alpha and Bravo Developments. The design options incorporate fewer WTGs than included within the 2014 design, whilst the greater hub heights result in greater clearance above the sea surface.

Table 8 Wind farm parameters for the 2017 design options considered in the CRM

Parameter	The Seagreen Developments
Hub height (relative to MSL) (m)	140.2
Rotor diameter (m)	220
Height to lower blade tip (relative to MSL) (m)	30.18
Maximum blade width (m)	7.5
Rotor speed (rpm)	8.00-10.55 (monthly mean values used)
Pitch	10
Monthly percentage of time operational	89

- 9.4.6 A table detailing the differences between the methods used in the 2014 AA and this AA is included at Appendix 3 to this AA.

9.5 **In-combination assessment – approach**

9.5.1 The Scoping Opinion required that two different in-combination assessments with the Forth and Tay Developments were undertaken. These were as follows:

Table 2 In-combination assessment scenarios

Scenario 1
Quantitatively for the Seagreen Developments in isolation and in-combination with the WCS (for each species) from: <ul style="list-style-type: none">• The NnGOWL Development (2014, as consented) or the NnGOWL Development (2017 scoping report);• The ICOL Development (2014, as consented) or the ICOL Development (2017 scoping report); and• Qualitative assessment of the breeding season effects from other wind farms.
Scenario 2
Quantitatively for the Seagreen Developments in isolation and in-combination with: <ul style="list-style-type: none">• The NnGOWL Development (2017 scoping report);• The ICOL Development (2017 scoping report); and• Qualitative assessment of the breeding season effects from other wind farms.

9.5.2 The HRA Report and EIA Addendum Report (section 3) concluded that the outputs from the in-combination assessment for the 2014 s.36 consents for the NnGOWL Development and the ICOL Development represented the WCS. The in-combination impacts with the European Offshore Wind Deployment Centre (“EOWDC”), Hywind Scotland Pilot Park (“Hywind”), and Forthwind Offshore Wind Demonstration Project (“Forthwind”) were considered by SWEL during the breeding season. Details of the other projects considered qualitatively in this AA are included in Appendix 1. During the non-breeding season impacts of additional offshore wind farms situated in the North Sea (“North Sea Developments”) were also considered for gannet and kittiwake (these are listed in full at Appendix 2).

9.5.3 A summary of the design envelope parameters for the s.36 consents granted in 2014 and 2018/2019 for the NnGOWL Development and the ICOL Development is included at paragraphs 14.2 and 14.3 of Appendix 1.

Table 10 Summary of in-combination scenarios presented in the HRA Report

Impact	Worst Case Design Scenario	Justification
In-combination collision impacts	<p>Breeding season: the Combined Alpha and Bravo Developments, the Forth and Tay Developments (2014 s.36 consents) and Hywind, Kincardine Offshore Wind Farm, EOWDC and Forthwind.</p> <p>Non-Breeding Season: Forth and Tay Developments (2014 s.36 consents) and more distant North Sea Developments included for kittiwake and North Sea Developments and offshore wind farms in the English Channel for gannet.</p>	<p>Species from breeding SPA colonies are within the mean maximum foraging range of the Forth and Tay Developments but not more distant projects.</p> <p>This approach was recommended in the Scoping Opinion.</p>
In-combination impacts arising from displacement	<p>Breeding Season: the Combined Alpha and Bravo Developments the Forth and Tay Developments (2014 s.36 consents).</p> <p>Non-Breeding Season: For guillemot and razorbill displacement effects from the Forth and Tay Developments were included.</p>	<p>Displacement and mortality rates as per Scoping Opinion guidance.</p> <p>This approach was recommended in the Scoping Opinion.</p>

9.5.4 The Applications submitted by SWEL were for a maximum of 70 WTGs for the Alpha Development and 70 WTGs for the Bravo Development. For the Combined Alpha and Bravo Developments the maximum total will be 120 WTGs. Therefore in the collision and displacement assessments which follow below the estimates for collision for the Alpha Development plus the Bravo Development do not result in the total collision estimates for the Combined Alpha and Bravo Developments. In addition the displacement effects of the Combined Alpha and Bravo Developments differ from the Alpha Development plus the Bravo Development because when considering the Combined Alpha and Bravo Developments there is no buffer between the Alpha Development and the Bravo Development so the displacement effects for the Alpha Development plus the Bravo Development are slightly greater than for the Combined Alpha and Bravo Developments.

9.6 **GANNET – Forth Islands SPA, Outer Firth of Forth and St Andrews Bay Complex pSPA**

9.6.1 **Forth Islands SPA – Gannet – developments in isolation**

9.6.1.1 The Forth Islands SPA has the largest colony of northern gannet in the world. The SPA population is increasing in size with the last census (2014) estimating the population being 75,259 pairs (compared with a population of 21,600 pairs at the time of designation in 1990). The gannet qualifying feature of the SPA is considered to be in a favourable maintained condition (SNH, 2017).⁷ During the breeding season birds from the colony range widely across the North Sea, at times travelling as far as the Norwegian coast (Hamer et al. 2007).⁸ Regular feeding movements occur to the north-east of the colony with concentrations of feeding locations off north-east Scotland (Hamer et al. 2011).⁹ Outwith the breeding season, gannets disperse widely across the North Sea and move southward with birds wintering in the Bay of Biscay and off West Africa.

9.6.1.2 The Seagreen Development sites, including the 2km buffer zone, do not overlap with the boundary of the Forth Islands SPA, therefore, potential impacts arise from the presence of individuals from the colony within Seagreen Development sites. In the EIA Addendum Report, SWEL presented CRM using the methodologies outlined in the Scoping Opinion (and detailed in Appendix 3). The

⁷ SNH (2017). SiteLink. Scottish Natural Heritage <https://gateway.snh.gov.uk/sitelink/index.js> (Last accessed 22/07/2019).

⁸ Hamer K.C., Humphreys E.M., Garthe S., Hennicke J., Peters G., Grémillet D., Phillips R.A., Harris M.P. & Wanless S. (2007) Annual variation in diets, feeding locations and foraging behaviour of Gannets in the North Sea: flexibility, consistency and constraint. (Marine Ecology Progress Series, 338, 295-305).

⁹ Hamer, K.C., Holt, N. & Wakefield, E. (2011). The distribution and behaviour of northern gannets in the Firth of Forth and Tay area. A review on behalf of the Forth and Tay Offshore Wind Developers Group. Institute of Integrative & Comparative Biology, University of Leeds.

CRM predictions calculated for the breeding season were apportioned between the Forth Islands SPA and the Troup Head population ('Gamrie and Pennan' see Table 1-1 in Annex 4 to the EIA Addendum Report) (Troup Head is the only gannet colony other than Forth Islands SPA within mean maximum foraging range of the Seagreen Developments and 2km buffer). Collision estimates were apportioned to age classes based on at-sea observation data specific to the Alpha Development and Bravo Development, the number of adult collisions during the breeding season were amended according to a 10% assumed sabbatical rate (as advised in the Scoping Opinion).

- 9.6.1.3 The predicted impacts presented in the EIA Addendum Report stated that the majority of impacts on gannet arising from the Seagreen Developments in isolation were for the breeding adult population. Collision estimates were calculated using Option 2 of the Band model and a 98.9% avoidance rate.

Table 11 Estimated collision impacts for Forth Islands SPA gannet from the developments in isolation

	The Alpha Development	
Seasonal period	Estimated number of collisions	
	Breeding adults	Sub-adults
Breeding	168	5
Post-breeding	3	0.2
Pre-breeding	5	0.0
	The Bravo Development	
Breeding	119	3
Post-breeding	3	0.2
Pre-breeding	6	0.0
	The Combined Alpha and Bravo Developments	
Breeding	245	7
Post-breeding	5	0.3
Pre-breeding	10	0

- 9.6.1.4 PVA was undertaken by SWEL for a 25 year period using the specific calculated additional mortality values (for adults and sub-adults). The PVA concluded that there would be no decrease in the current population from the Alpha Development or the Bravo Development, with a continued increase in the population over the next 25 years. Over 25 years, it is predicted that the population will have increased from its current level to 97,982 pairs, with no wind farms present. The additional mortality from collision arising from the Alpha Development and the Bravo Development in isolation has the potential to cause a reduced level of population increase.

- 9.6.1.5 For the Alpha Development after 25 years, the median of the ratio of the impacted to un-impacted population size is 0.977 (n.b. ratio values are referred to in the HRA Report as the counterfactuals). The ratio of the population growth rate for the Alpha Development alone showed minimal reduction (with a value of 0.999).
- 9.6.1.6 For the Bravo Development after 25 years, the median of the ratio of the impacted to un-impacted population size is 0.983. The ratio of the population growth rate for the Bravo Development alone showed minimal reduction (with a value of 0.999).
- 9.6.1.7 For the Combined Alpha and Bravo Developments after 25 years, the median of the ratio of the impacted to un-impacted population size is 0.966. The ratio of the population growth rate for the Combined Alpha and Bravo Developments showed minimal reduction (with a value of 0.999).
- 9.6.1.8 The SNH Response to EIA Addendum Report advised that the Seagreen Developments taken alone would not result in an adverse effect on site integrity to the Forth Islands SPA with respect to gannet.

9.6.2 Forth Islands SPA – Gannet – developments in-combination

- 9.6.2.1 This AA is based upon the WCS, which means that the Combined Alpha and Bravo Developments are assessed in-combination with the s.36 consents granted in 2014 for the NnGOWL Development and the ICOL Development. The estimated impacts of the s.36 consents granted in 2018/2019 for the NnGOWL Development and the ICOL Development on gannet are substantially less than the values used in this AA.
- 9.6.2.2 The EIA Addendum Report estimated that 776 breeding adults would be impacted by collision mortality during the breeding season from the Combined Alpha and Bravo Developments in-combination with the s.36 consents granted in 2014 for the NnGOWL Development and the ICOL Development.
- 9.6.2.3 CRM was also presented for the WCS plus the post-breeding and pre-breeding period collision estimates from the North Sea Developments and other offshore wind farms in the English Channel. The inclusion of these effects, increased the total number of estimated collisions. However, the total collisions estimated during the autumn and spring passage periods remained substantially lower than those in the breeding season. The cumulative total of adult gannets predicted to be impacted is 897 birds.

Table 12 Estimated collisions for Forth Islands SPA gannet for the Combined Alpha and Bravo Developments in-combination with other plans and projects

Development	Seasonal period	Breeding adults (2014 s.36 consents for NnGOWL Development and ICOL Development)	Breeding adults (2018/2019 s.36 consents for NnGOWL Development and ICOL Development)
The Combined Alpha and Bravo Developments plus Forth and Tay Developments	Breeding	776	421
The Combined Alpha and Bravo Developments plus Forth and Tay Developments	Autumn passage	13	8
North Sea Developments and Channel		57	57
Total autumn passage		70	65
The Combined Alpha and Bravo Developments plus Forth and Tay Developments	Spring passage	25	18
North Sea Developments and Channel		26	26
Total spring passage		51	44
Total	All seasons	897	530

9.6.2.4 Collisions from other offshore wind farms within mean maximum foraging range of the Forth Islands SPA gannet population were considered in the EIA Addendum Report. The additional mortality predicted from these projects was deemed to be extremely small, relative to the population of the Forth Islands SPA, representing a small addition to the in-combination effects presented above. These projects are detailed in Appendix 1 to this AA.

- 9.6.2.5 The cumulative total number of individuals experiencing annual mortality for the WCS is assessed to be 897, which is less than the cumulative total of 1,169 estimated in the 2014 AA.
- 9.6.2.6 PVA undertaken by Seagreen for the WCS indicated relatively small predicted reductions in end population size for in-combination assessment with the other Forth and Tay Developments after 25 years (median of the ratio of the impacted to un-impacted population size of 0.895). When the passage period collisions for all age classes from the North Sea Developments and offshore wind farms in the English Channel were considered, the PVA outputs represented a 12% reduction in the 25 year projected population size (0.881). The ratio of the population growth rate for the 25 year period was represented by a value of 0.995. The population projections for all scenarios showed that the end population size was much greater than the population size at citation. The EIA Addendum Report therefore concluded that the effects of the Seagreen Developments in isolation and in-combination would not hinder the achievement of the conservation objectives of the Forth Islands SPA with respect to gannet.
- 9.6.2.7 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments could give rise to adverse impact on site integrity of the Forth Islands SPA with respect to gannet when considered in-combination with the 2014 s.36 consents granted for the other Forth and Tay Developments. SNH advised that the Combined Alpha and Bravo Developments would not give rise to adverse impact on site integrity of the Forth Islands SPA with respect to gannet when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.

9.6.3 Outer Firth of Forth and St Andrews Bay Complex pSPA – Gannet – developments in isolation and in-combination

- 9.6.3.1 The Scoping Opinion advised that the assessment carried out for gannet at the Forth Islands breeding colony SPA could also be applied to the pSPA, and a separate assessment for the gannet qualifying feature at the pSPA was not required.
- 9.6.3.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of gannet as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.6.4 Gannet – Precaution in the Assessment

- 9.6.4.1 There are a number of precautionary assumptions made in this AA which mean that the estimated cumulative collision total and their population consequences

are highly likely to be over-estimates. For example, the seabird collision avoidance study undertaken at Thanet offshore wind farm lends support to the view that the avoidance rates used in this assessment are likely to be highly precautionary (Bowgen & Cook 2018, Skov *et al*, 2018).^{10,11}

- 9.6.4.2 The research at Thanet has also provided valuable information on bird flight speeds. The Scoping Opinion advised that flight speed data for use in CRM be taken from published data (Pennycuick 1997;¹² Alerstam *et al*. 2007).¹³ These flight speeds are based on very small sample sizes (32 gannet). The laser rangefinder track data collected at Thanet recorded by Skov *et al*. (2018) and reviewed by Bowgen & Cook (2018) offers species-specific empirical data on flight speeds from large numbers of individuals. This study indicates lower flight speeds than were used in the assessment, these would reduce the number of gannet collisions calculated.
- 9.6.4.3 Lastly, basing this assessment on the WCS for the NnGOWL Development and the ICOL Development (i.e., the s.36 consents for these projects granted in 2014) is very precautionary because they are unlikely to be constructed. If their s.36 consents granted in 2018/2019 were used in this assessment it would substantially reduce the estimated effects from those projects, as highlighted in Table 12 above.

9.6.5 Gannet – Conclusions

- 9.6.5.1 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments could give rise to adverse impact on site integrity for gannet as a qualifying interest of the Forth Islands SPA in-combination with the s.36 consents granted in 2014 for the NnGOWL Development and the ICOL Development. SNH advised that the Combined Alpha and Bravo Developments would not give rise to adverse impact on site integrity of the Forth Islands SPA with respect to gannet when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.
- 9.6.5.2 In reaching their conclusion, the Scottish Ministers have considered the conservation objectives, populations at the sites, predicted levels of effect and population consequences, the fact that the effects are less than in 2014, the

¹⁰ Bowgen, K. & Cook, A., (2018), Bird Collision Avoidance: Empirical evidence and impact assessments, JNCC Report No. 614, JNCC, Peterborough, ISSN 0963-8091.

¹¹ Skov, H., Heinanen, S., Norman, T., Ward, R.M., Mendez-Roldan, S. & Ellis, I. 2018. ORJIP Bird Collision and Avoidance Study. Final report – April 2018. The Carbon Trust. United Kingdom.

¹² Pennycuick, C.J., 1997. Actual and 'Optimum' Flight Speeds: Field Data Research. *The Journal of Experimental Biology*, 200, pp. 2355-2361.

¹³ Alerstam, T., Rosén, M., Bäckman, J., Ericson, P.G. & Jellgren, O. (2007). Flight speeds among bird species: allometric and phylogenetic effects. *PLoS Biology*, 5(8), e197.

precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that, subject to the application of conditions, there will be no adverse effect on the site integrity of the Forth Islands SPA or Outer Firth of Forth and Tay Bay Complex pSPA in respect of the gannet qualifying interest as a result of the Seagreen Developments in isolation or in-combination with either the 2014 or 2018/2019 s.36 consents granted for the other Forth and Tay Developments or projects detailed in Appendices 1 and 2.

9.7 KITTIWAKE – Forth Islands SPA, Fowlsheugh SPA, St Abb’s Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA

9.7.1 Scottish kittiwake populations have experienced significant declines over the past 30 years and this decline was highlighted in advice received from both SNH and RSPB Scotland. The reasons for the decline are uncertain, although factors such as climate change and changes to prey distribution are very likely to be key drivers. The results of the modelling for collision and displacement impacts were presented as per the Scoping Opinion in the EIA Addendum Report (part 2, section 3) except for Buchan Ness to Collieston Coast SPA where the original HRA was not superseded by the EIA Addendum Report as the assessment was considered sufficient.

9.7.2 During the breeding season, kittiwake from other non-SPA breeding colonies, may also be present within the Seagreen Development areas and, therefore, at risk from collision and displacement impacts. The potential impacts on all non-SPA breeding colonies and across all SPA colonies, for which kittiwake is a qualifying interest, within the mean maximum foraging range have been apportioned to take account of the presence of these birds.

9.7.3 The EIA Addendum Report (part 2, section 3) presents the outputs of the collision risk modelling, completed using the methodologies outlined in the Scoping Opinion, which considered the maximum design envelope of 70 WTGs for the Alpha Development, 70 WTGs for the Bravo Development, and 120 WTGs for the Combined Alpha and Bravo Developments. Displacement effects were also assessed using the matrix approach.

9.7.4 Table 13 below provides the cumulative estimated additional mortality during the breeding season from collisions and displacement/barrier effects for kittiwake in relation to the Seagreen Developments in-combination with the Forth and Tay Developments, for both the 2014 and 2017 designs. Collisions during the non-breeding season were assessed for the Forth and Tay Developments in isolation and in-combination with all North Sea Developments (using only the WCS of the 2014 consented and 2017 designs for the Forth and Tay Developments). Displacement and barrier effects were assessed quantitatively for the breeding

season only. An unusually high abundance of kittiwake was observed during a survey carried out in July 2017, following discussion between SWEL, SNH, and MSS it was agreed that for HRA the median for this month across survey years would be used for July 2017, then the peak seasonal population derived (for displacement modelling). In the EIA Addendum Report (part 2 – section 2) collision risk and displacement effects are presented both with and without the inclusion of the July 2017 data.

9.7.5 The 2014 designs for the ICOL Development and NnGOWL Development give the highest collision estimates and the impacts for displacement and barrier effects are unaffected by the design, therefore, the estimated 2014 effects remain the WCS. Collisions account for over 75% of the estimated additional mortality for kittiwake.

Table 13 Cumulative estimated additional mortality during the breeding season from collision and displacement/barrier effects for kittiwake

Development	Impact	Design	Additional mortality (individuals)		
			Total*	Breeding Adults	Sub Adults
Alpha Development	Collision	2017	173	168	5
	Displacement/barrier effects	N/A	21	19	2
Bravo Development	Collision	2017	122	119	3
	Displacement/barrier effects	N/A	18	16	2
The Combined Alpha and Bravo Developments	Collision	2017	252	245	7
	Displacement/barrier Effects	N/A	32	29	3
NnGOWL Development	Collision	2017	8	7	1
		2014	15	14	1
	Displacement/barrier effects	N/A	12	11	1
ICOL Development	Collision	2017	36	33	3
		2014	130	120	10
	Displacement	N/A	21	19	2
Forth and Tay total		2017 – all projects	361	344	17
		2014 for ICOL Development and NnGOWL Development with 2017 for the Combined Alpha and Bravo Developments	462	438	24

*Total = sum of breeding adult and sub-adult mortality

9.7.6 Forth Islands SPA – Kittiwake – developments in isolation

- 9.7.6.1 The kittiwake population at the Forth Islands SPA is in an unfavourable and declining condition (SNH, 2019)¹⁴ having declined from 8,400 pairs at the time of designation in 1990 to 4,663 pairs in 2017 (SNH, 2017).¹⁵
- 9.7.6.2 The Seagreen Development areas (including 2km buffer) do not overlap with the Forth Islands SPA. Published information on kittiwake foraging ranges (Thaxter et al, 2012)¹⁶ and tracking from the Isle of May (CEH, 2011a)¹⁷ suggests it is very likely that breeding period kittiwakes from the Forth Islands SPA will occur in the Seagreen Development areas (including 2km buffer), as well as the other Forth and Tay Development areas.
- 9.7.6.3 During the non-breeding season, kittiwake are largely pelagic, therefore, it is likely that some SPA kittiwake will pass through North Sea Developments during the autumn and spring passage periods (September-December and January-mid April). Non-breeding season displacement impacts have been considered qualitatively, as per the Scoping Opinion.

9.7.6.4 Collision

- 9.7.6.4.1 In the EIA Addendum Report (part 2 – section 3), the WCS scenario for kittiwake collisions was based on 70 WTG for both the Alpha Development and the Bravo Development, and 120 WTGs for the Combined Alpha and Bravo Developments.
- 9.7.6.4.2 For the Alpha Development the outputs of the CRM predicted that 7 adults and 1 sub-adult would be effected per annum, with the majority of collisions predicted during the breeding period. For the Bravo Development the outputs of the CRM predicted an additional annual mortality of 5 adults and 1 sub-adult, with the majority of collisions predicted during the breeding period. For the Combined Alpha and Bravo Developments the outputs of the CRM predicted an additional annual mortality of 9 adults and 1 sub-adult, with the majority of collisions predicted during the breeding period.

¹⁴ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

¹⁵ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

¹⁶ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

¹⁷ Daunt, F., Bogdanova, M., Newell, M., Harris, M. and Wanless, S. (2011a). GPS tracking of common guillemot, razorbill and black-legged kittiwake on the Isle of May, summer 2010. Report to FTOWDG. CEH Edinburgh.

9.7.6.5 Displacement

9.7.6.5.1 Displacement effects were calculated following the SNCB matrix approach, as per the Scoping Opinion, using a displacement rate of 30% and a 2% mortality rate. The EIA Addendum Report (part 2 – section 3) estimated impacts for displacement mortality from the Seagreen Developments alone. For the Alpha Development 0.2 adult birds during the breeding period would be impacted. For the Bravo Development 0.1 adult birds during breeding would be impacted. For the Combined Alpha and Bravo Developments 0.3 adults birds would be impacted.

9.7.6.6 Collision and displacement combined for the developments in isolation

9.7.6.6.1 The combined predicted collision and displacement effects are assumed in the EIA Addendum Report(part 2 – section 3) to be additive. The combined effects from the developments in isolation is predicted to be an additional mortality of 8 adult birds and 1 sub-adult bird per annum for the Alpha Development, an additional mortality of 7 adult birds and 1 sub-adult bird per annum for the Bravo Development, and an additional mortality of 12 adult birds and 2 sub-adult birds per annum for the Combined Alpha and Bravo Developments.

9.7.6.6.2 PVA was undertaken by SWEL for a range of scenarios; for collision only and for collision and displacement combined. The PVA projected a slight population increase for the Forth Islands SPA kittiwake for the un-impacted population, with the projected population size for the un-impacted population at 25 years 9% greater than the starting population. The PVA results for 25 years for the developments in isolation are presented below.

Table 14 PVA results for Forth Islands SPA kittiwake for the developments in isolation

Impact	Ratio of impacted to un-impacted population size (25 years)		
	The Alpha Development	The Bravo Development	The Combined Alpha and Bravo Developments
Collision only	0.986	0.988	0.979
Collision and displacement combined	0.981	0.983	0.971

9.7.6.7 Conclusion

9.7.6.7.1 The SNH Response to the EIA Addendum Report advised that there would be no adverse effect on the site integrity of the Forth Islands SPA in respect of kittiwake as a result of the Seagreen Developments in isolation.

9.7.7 Forth Islands SPA – Kittiwake – developments in-combination

9.7.7.1 Collision

9.7.7.1.1 The 2014 designs for the NnGOWL Development and the ICOL Development represented the WCS for the in-combination assessment (in conjunction with the 120 WTGs design for the Combined Alpha and Bravo Developments). The outputs of the CRM predicted that the majority of effects would occur during the breeding period. Across the year, 47 adults and 3 sub-adults were predicted to be effected by collision mortality when the Combined Alpha and Bravo Developments were considered in-combination with the other Forth and Tay Developments.

9.7.7.1.2 Collision estimates were provided for the Combined Alpha and Bravo Developments in-combination with the WCS for the other Forth and Tay Developments, plus the passage period collision estimates for the North Sea Developments (see Appendix 2 for full list). The inclusion of these collision impacts increased the predicted number of birds to be impacted. These figures are presented in table 15 below. The total number of adult kittiwakes predicted to be impacted by collision mortality per annum was 56 birds.

Table 15 Estimated in-combination collision impacts for Forth Islands SPA kittiwake

Developments	Seasonal period	Estimated number of collisions	
		Adults	Sub-adults
Forth and Tay Developments	Breeding	46	2.4
Forth and Tay Developments	Autumn passage	0.7	0.4
North Sea Developments		3.2	1.8
Total autumn passage		3.9	2.2
Forth and Tay Developments	Spring passage	0.7	0.2
North Sea Developments		5.6	2.5

Total spring passage		6.3	2.7
Total	All seasons	56	7

9.7.7.2 Displacement

9.7.7.2.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and a total estimated mortality of 14 adult birds and 1 sub-adult bird for the breeding period.

9.7.7.2.2 Displacement is most likely to affect breeding kittiwake as they are constrained to feed in areas relatively close to their colonies (mean maximum foraging range 60 +/- 23.3 km, Thaxter et al. 2012).¹⁸ During the non-breeding season, however, kittiwake no longer act as central place foragers and disperse widely (Frederiksen et al. 2012).¹⁹ Therefore non-breeding season displacement is not considered further in this AA.

9.7.7.3 Collision and displacement combined for the developments in-combination

9.7.7.3.1 The combined predicted impacts of collision and displacement are assumed in the EIA Addendum Report (part 2 – section 3) to be additive. The impact from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments is predicted to be an additional mortality of 61 adult birds and 4 sub-adult birds per annum. For the WCS, comprising the Combined Alpha and Bravo Developments in-combination with the 2014 s.36 consents for the other Forth and Tay Developments and the North Sea Developments, this figure rises to 71 adult and 9 sub-adult birds per annum.

¹⁸ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

¹⁹ Frederiksen, M., Moe, B., Daunt, F., Phillips, R. A., Barrett, R. T., Bogdanova, M. I., ... & Christensen-Dalsgaard, S. (2012). Multicolony tracking reveals the winter distribution of a pelagic seabird on an ocean basin scale. *Diversity and distributions*, 18(6), 530-542.

- 9.7.7.3.2 Breeding season effects from other offshore wind farms (in this case ORE Catapult Levenmouth Demonstration Turbine (“ORE Catapult”), EOWDC, Hywind, Kincardine Offshore Wind Farm (“Kincardine”) and Forthwind, see further detail in Appendix 1) within mean maximum foraging range of the Forth Islands SPA were considered qualitatively. The EIA Addendum Report (part 2 – section 3) concluded that the collision, displacement and barrier effects from these developments would be minor and not affect the conclusions of the assessment presented in the EIA Addendum Report.
- 9.7.7.3.3 The cumulative annual total mortality is assessed to be 80 which is less than the cumulative total of 135 estimated in the 2014 AA. The 135 estimate from the 2014 AA was based upon the assessment of adults only. The adults only estimate for this assessment is 71.
- 9.7.7.3.4 PVA results were presented for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and the other North Sea Developments. The WCS (2014 s.36 consents for the other Forth and Tay Developments) gave reductions of up to 16% after 25 years of impact. The PVA results are presented below for all scenarios.

Table 16 PVA results for Forth Islands SPA kittiwake for the developments in-combination with other plans and projects

Impacts	Scenario	Ratio of impacted to un-impacted population size (25 years)
Collision only	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments	0.893
	The Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and the North Sea Developments	0.874
Collision and displacement combined	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments	0.863
	The Combined Alpha and Bravo Developments in-	0.848

	combination with the other Forth and Tay Developments and the North Sea Developments	
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9.7.7.4 Conclusion

9.7.7.4.1 The SNH Response to the EIA Addendum Report advised that the assessed impacts could give rise to adverse impact on site integrity of the Forth Islands SPA in respect of kittiwake as a result of the Combined Alpha and Bravo Developments when considered in-combination with the 2014 s.36 consents granted for the other Forth and Tay Developments. SNH advised that the Combined Alpha and Bravo Developments would not give rise to adverse impact on site integrity of the Forth Islands SPA with respect to kittiwake when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.

9.7.8 Fowlsheugh SPA – Kittiwake – developments in isolation

9.7.8.1 The kittiwake population at the Fowlsheugh SPA is reported as in a favourable and maintained condition (based on latest assessed condition in 1999) (SNH, 2019).²⁰ However, the kittiwake population has declined from 36,350 pairs at the time of site designation in 1992 to 9,655 pairs in 2015.²¹

9.7.8.2 The Seagreen Developments (including 2km buffer) do not overlap with the Fowlsheugh SPA, however, from published data (Thaxter et al, 2012²² and CEH, 2011b²³) it is likely that during the breeding period kittiwake from the Fowlsheugh SPA will occur in the area of the Seagreen Developments as well as the ICOL Development. The NnGOWL Development is beyond the mean maximum foraging range for the species, so is not included in the cumulative assessment for the breeding period.

9.7.8.3 During the non-breeding season, kittiwake are largely pelagic, therefore, it is likely that some SPA kittiwake will pass through North Sea Developments during

²⁰ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

²¹ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

²² Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

²³ Daunt, F., Bogdanova, M., Redman, P., Russell, S. and Wanless, S. (2011b). GPS tracking of blacklegged kittiwakes and observations of trip durations and flight directions of common guillemot at Fowlsheugh and St Abb's Head, summer 2011. Report to FTOWDG. CEH Edinburgh.

the autumn and spring passage periods (September-December and January-mid April).

9.7.8.4 **Collision**

- 9.7.8.4.1 In the EIA Addendum Report (part 2 – section 3), the WCS scenario for kittiwake collisions was based on the 70 WTG for each the Alpha Development and the Bravo Development, and 120 WTGs for the Combined Alpha and Bravo Developments.
- 9.7.8.4.2 For the Alpha Development the outputs of the CRM predicted 27 adult and 3 sub-adult collisions per annum, with the majority of collisions predicted during the breeding period.
- 9.7.8.4.3 For the Bravo Development the outputs of the CRM predicted 24 adult and 2 sub-adult collisions per annum, with the majority of collisions predicted during the breeding period.
- 9.7.8.4.4 For the Combined Alpha and Bravo Developments the outputs of the CRM predicted 40 adult and 5 sub-adult collisions per annum, with the majority of collisions predicted during the breeding period.

9.7.8.5 **Displacement**

- 9.7.8.5.1 Displacement impacts were calculated following the SNCB matrix approach, as per the Scoping Opinion, using a displacement rate of 30% and a 2% mortality rate. The EIA Addendum Report (part 2 – section 3) estimated impacts for displacement mortality. For the Alpha Development 8 adult birds during the breeding period would be impacted. For the Bravo Development 7 adult birds during breeding period would be impacted. For the Combined Alpha and Bravo Developments 12 adults birds would be impacted.

9.7.8.6 **Collision and displacement**

- 9.7.8.6.1 The combined predicted impacts of collision and displacement are assumed in the EIA Addendum Report (part 2 – section 3) to be additive. The combined impact from the Seagreen Developments in isolation is predicted to be an additional mortality of 36 adult birds and 4 sub-adult bird per annum for the Alpha Development, an additional mortality of 31 adult birds and 3 sub-adult birds per annum for the Bravo Development, and an additional mortality of 52 adult birds and 6 sub-adult birds per annum for the Combined Alpha and Bravo Developments.

9.7.8.6.2 PVA was undertaken by SWEL for a range of scenarios; for collision only and for collision and displacement combined. The PVA projected a population increase for the Fowlsheugh SPA kittiwake under all impact scenarios, with the projected population size for the un-impacted population at 25 years 74% greater than the starting population. The PVA results for 25 years for the Seagreen Developments in isolation are presented below.

Table 37 PVA results for Fowlsheugh SPA kittiwake for the developments in isolation

Impact	Ratio of impacted to un-impacted population size (25 years)		
	The Alpha Development	The Bravo Development	The Combined Alpha and Bravo Developments
Collision only	0.970	0.975	0.957
Collision and displacement combined	0.961	0.967	0.945

9.7.8.7 Conclusion

9.7.8.7.1 The SNH Response to the EIA Addendum Report advised that there would be no adverse effect on the site integrity of the Fowlsheugh SPA in respect of kittiwake as a result of the Seagreen Developments in isolation.

9.7.9 Fowlsheugh SPA – Kittiwake – developments in-combination

9.7.9.1 Collision

9.7.9.1.1 The 2014 designs for the ICOL Development represented the WCS for the in-combination assessment (in conjunction with the 120 WTG design for the Combined Alpha and Bravo Developments). The EIA Addendum Report (part 2 – section 3) considered that the NnGOWL Development site was beyond the mean maximum foraging range of kittiwake from Fowlsheugh SPA (Thaxter et al, 2012)²⁴ and was therefore not deemed to have connectivity to the SPA population during the breeding period.

²⁴ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

9.7.9.1.2 Collision estimates were provided for the Combined Alpha and Bravo Developments in-combination with the WCS for the other Forth and Tay Developments, plus the passage period collision estimates for the North Sea Developments (see Appendix 2 for full list). The inclusion of these collision impacts increased the predicted number of birds to be impacted. These figures are presented in table 18 below. The total number of adult kittiwakes predicted to be impacted by collision mortality per annum was 95 birds.

Table 18 Estimated in-combination collision impacts for Fowlsheugh SPA kittiwake

Developments	Seasonal period	Estimated number of collisions	
		Adults	Sub-adults
The Combined Alpha and Bravo Developments in-combination with the ICOL Development (2014)	Breeding	74.2	5.2
The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014)	Autumn passage	1.8	1.1
The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014) and the North Sea Developments		6.5	3.7
Total autumn passage		8.3	4.8
The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014)	Spring passage	1.7	0.4
The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014) and the North Sea Developments		11.3	5
Total spring passage		13.0	5.4
Total	All seasons	95	15

9.7.9.2 **Displacement**

9.7.9.2.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the ICOL Development with a total estimated mortality of 18 adult birds and 2 sub-adult birds for the breeding period.

9.7.9.3 **Collision and displacement**

9.7.9.3.1 The combined predicted impacts of collision and displacement are assumed in the EIA Addendum Report (part 2 – section 3) to be additive. The impact from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments is predicted to be an additional mortality of 96 adult birds and 7 sub-adult birds per annum. For the WCS, comprising Combined Alpha and Bravo Developments in-combination with the s.36 consents granted in 2014 for the other Forth and Tay Developments and the North Sea Developments, this figure rises to 114 adults and 17 sub-adult birds per annum.

9.7.9.3.2 Breeding season effects from other offshore wind farms (in this case ORE Catapult, EOWDC, Forthwind, Hywind and Kincardine, see further detail in Appendix 1) within mean maximum foraging range of Fowlsheugh SPA were considered qualitatively. The EIA Addendum Report (part 2 – section 3) concluded that the collision, displacement and barrier effects from these developments would be minor and not affect the conclusions of the assessment presented in the EIA Addendum Report

9.7.9.3.3 The cumulative total number of individuals experiencing annual mortality is assessed to be 131 which is less than the cumulative total of 212 estimated in the 2014 AA. The 212 estimate from the 2014 AA was based upon the assessment of adults only. The adults only estimate for this assessment is 114.

9.7.9.3.4 PVA results were presented for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and the other North Sea Developments. The WCS of the 2104 s.36 consents for the other Forth and Tay Developments gave reductions of up to 12% after 25 years of impact. The PVA results are presented below for all scenarios.

Table 19 PVA results for Forth Islands SPA kittiwake for the developments in-combination with other plans and projects

Impacts	Scenario	Ratio of impacted to un-impacted population size (25 years)
Collision only	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments (2014)	0.916
	The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014) and the North Sea Developments	0.895
Collision and displacement combined	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments (2014)	0.899
	The Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments (2014) and the North Sea Developments	0.877

9.7.9.4 Conclusion

9.7.9.4.1 The SNH Response to the EIA Addendum Report advised that the assessed impacts could give rise to adverse impact on site integrity of the Fowlsheugh SPA in respect of kittiwake as a result of the Combined Alpha and Bravo Developments when considered in-combination with the 2014 s.36 consents granted for the other Forth and Tay Developments. SNH advised that the Combined Alpha and Bravo Developments would not give rise to adverse impact on site integrity of the Fowlsheugh SPA with respect to kittiwake when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.

9.7.10 **St Abb's Head to Fast Castle SPA – Kittiwake – developments in isolation**

9.7.10.1 The kittiwake population at the St Abb's Head to Fast Castle SPA is reported as in an unfavourable and declining condition (SNH, 2019).²⁵ The population has declined from 21,170 pairs at the time of site designation in 1992 to 2,779 pairs in 2016.²⁶

9.7.10.2 **Collision**

9.7.10.2.1 The predicted impacts of collision from the Seagreen Developments in isolation were predicted to be small, primarily affecting the breeding adult population. For the Alpha Development a predicted 4 birds per annum were estimated to collide, for the Bravo Development a predicted 3 birds per annum were estimated to collide, and for the Combined Alpha and Bravo Developments a predicted 6 birds per annum were estimated to collide.

9.7.10.3 **Displacement**

9.7.10.3.1 The SNCB matrix approach was used to estimate additional mortality impacts attributable to the kittiwake population of the St Abb's Head to Fast Castle SPA as a result of displacement and barrier effects during the breeding period. Displacement effects were calculated using a 30% displacement rate and 2% mortality rate. The EIA Addendum Report (part 2 – section 3) estimated impacts for displacement mortality. For the Alpha Development 1 adult bird during the breeding period would be impacted. For the Bravo Development 1 adult bird during breeding would be impacted. For the Combined Alpha and Bravo Developments 1 adult bird would be impacted.

9.7.10.4 **Collision and displacement**

9.7.10.4.1 The combined predicted impacts of collision and displacement are assumed in the EIA Addendum Report (part 2 – section 3) to be additive. The combined impact from the Seagreen Developments in isolation is predicted to be an additional mortality of 4 adult birds and 1 sub-adult bird per annum for the Alpha Development, an additional mortality of 4 adult birds and 1 sub-adult bird per annum for the Bravo Development, and an additional mortality of 6 adult birds and 1 sub-adult bird per annum for the Combined Alpha and Bravo Developments.

²⁵SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

²⁶ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

9.7.10.4.2 PVA was undertaken by SWEL for a range of scenarios; for collision only and for collision and displacement combined. The PVA metrics predicted a very slight increase for the St Abb’s Head to Fast Castle SPA kittiwake population for the un-impacted population. The PVA results for 25 years for the Seagreen Developments in isolation are presented below.

Table 20 PVA results for Fowlsheugh SPA kittiwake for the developments in isolation

Impact	Ratio of impacted to un-impacted population size (25 years)		
	The Alpha Development	The Bravo Development	The Combined Alpha and Bravo Developments
Collision only	0.989	0.991	0.986
Collision and displacement combined	0.986	0.986	0.980

9.7.10.5 In isolation – conclusion

9.7.10.5.1 The SNH Response to the EIA Addendum Report advised that there would be no adverse effect on the site integrity of the St Abb’s Head to Fast Castle SPA in respect of kittiwake as a result of the Seagreen Developments in isolation.

9.7.11 St Abb’s Head to Fast Castle SPA – Kittiwake – developments in-combination

9.7.11.1 Collision

9.7.11.1.1 The 2014 designs for the NnGOWL Development and the ICOL Developments represented the WCS for the in-combination assessment in conjunction with the Combined Alpha and Bravo Developments. The outputs of the CRM predicted that the majority of impacts would occur during the breeding period, with 15 birds estimated to be impacted by collision mortality. Across the year, 14 adults and one sub-adult were predicted to be impacted by collision mortality when the Combined Alpha and Bravo Developments were considered in-combination with the s.36 consents granted in 2014 for the other Forth and Tay Developments.

9.7.11.1.2 Collision estimates were provided for the Combined Alpha and Bravo Developments in-combination with the WCS for the other Forth and Tay Developments, plus the passage period collision estimates for the North Sea Developments (see Appendix 2 for full list). The inclusion of these collision impacts substantially increased the predicted number of birds to be impacted during the passage periods. These figures are presented in table 21 below. The total number of adult kittiwakes predicted to be impacted by collision mortality per annum was 20 birds.

Table 21 Estimated in-combination collision impacts for St Abb’s Head to Fast Castle SPA kittiwake

Developments	Seasonal period	Estimated number of collisions	
		Adults	Sub-adults
Forth and Tay Developments	Breeding	12.7	0.8
Forth and Tay Developments	Autumn passage	0.6	0.4
North Sea Developments		2.3	1.4
Total autumn passage		3	2
Forth and Tay Developments	Spring passage	0.6	0.1
North Sea Developments		3.8	1.9
Total spring passage		4	2
Total	All seasons	20	5

9.7.11.2 Displacement

9.7.11.2.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and a total estimated mortality of 3 adult birds and 1 sub-adult bird for the breeding period.

9.7.11.3 Collision and displacement

- 9.7.11.3.1 The combined predicted impacts of collision and displacement are assumed in the EIA Addendum Report (part 2 – section 3) to be additive. The combined impact from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments is predicted to be an additional mortality of 17 adult birds and 2 sub-adult birds per annum. For the WCS, comprising the Combined Alpha and Bravo Developments in-combination with the s.36 consents granted in 2014 for the other Forth and Tay Developments and the North Sea Developments, this figure rises to 23 adult and 5 sub-adult birds per annum.
- 9.7.11.3.2 Breeding season effects from other offshore wind farms (in this case ORE Catapult and Forthwind, see further detail in Appendix 1) within mean maximum foraging range of the St Abb’s Head to Fast Castle SPA were considered qualitatively. The EIA Addendum Report (part 2 – section 3) concluded that the collision, displacement and barrier effects from these developments would be minor and not affect the conclusions of the assessment presented in the EIA Addendum Report.
- 9.7.11.3.3 The cumulative total number of individuals experiencing annual mortality is assessed to be 28 which is less than the cumulative total of 60 estimated in the 2014 AA. The 60 estimate from the 2014 AA was based upon the assessment of adults only. The adults only estimate for this assessment is 23.
- 9.7.11.3.4 PVA results were presented for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments and the other North Sea Developments. The WCS gave reductions of up to 8.5% after 25 years of impact. The PVA results are presented below for all scenarios.

Table 22 PVA results for St Abb’s Head to Fast Castle SPA kittiwake for the developments in-combination with other plans and projects

Impacts	Scenario	Ratio of impacted to un-impacted population size (25 years)
Collision only	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments (2014)	0.946
	The Combined Alpha and Bravo Developments in-combination with the other	0.926

	Forth and Tay Developments (2014) and North Sea Developments	
Collision and displacement combined	The Combined Alpha and Bravo Developments in-combination with other Forth and Tay Developments (2014)	0.940
	The Seagreen Developments in-combination with the other Forth and Tay Developments (2014) and the North Sea Developments	0.915

9.7.11.4 In-combination conclusion

9.7.11.4.1 SNH advised in an email dated 15 July 2019 that the assessed impacts could give rise to adverse impact on site integrity of the St Abb's Head to Fast Castle SPA in respect of kittiwake as a result of the Combined Alpha and Bravo Developments when considered in-combination with the 2014 s.36 consents granted for the other Forth and Tay Developments. SNH advised that Combined Alpha and Bravo Developments would not give rise to adverse impact on site integrity of the St Abb's Head to Fast Castle SPA with respect to kittiwake when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.

9.7.12 Buchan Ness to Collieston Coast SPA – Kittiwake – developments in isolation and in-combination

9.7.12.1 The kittiwake population at the Buchan Ness to Collieston Coast SPA is reported as in an unfavourable condition (SNH, 2019).²⁷ The population has declined from 30,452 pairs at the time of site designation in 1998 to 11,482 pairs in 2017.²⁸

9.7.12.2 The HRA Report concluded that there is no connectivity between kittiwake from the Buchan Ness to Collieston Coast SPA with the Seagreen Developments and therefore, no adverse effects were predicted from the Seagreen Developments in isolation or in-combination with other plans or projects. PVA modelling was not undertaken.

9.7.12.3 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Buchan Ness to Collieston Coast SPA in respect of

²⁷ SNH (2019). Sitelinks. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

²⁸ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

kittiwake as a result of the Combined Alpha and Bravo Developments in isolation or in-combination.

9.7.13 **Outer Firth of Forth and St Andrews Bay Complex pSPA – Kittiwake – developments in isolation and in-combination**

9.7.13.1 The Scoping Opinion advised that the assessment carried out for kittiwake at the breeding colony SPAs detailed above could also be applied to the pSPA, and a separate assessment for the kittiwake qualifying feature at the pSPA was not required.

9.7.13.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of kittiwake as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.7.14 **Kittiwake – Precaution in the Assessment**

9.7.14.1 There are a number of precautionary assumptions made in this assessment which mean that the estimated cumulative total number of individuals impacted and the population consequences are highly likely to be over-estimates.

9.7.14.2 SNH, in its scoping advice, advised that displacement for kittiwake did not require to be included in the assessment due to emerging evidence that kittiwake are not affected by displacement. The inclusion of displacement in this AA is likely to be precautionary, as is the assumption that collision and displacement effects are additive. The assumption that birds are displaced at an equal rate within the wind farm and from a 2km buffer around each project is also likely to be very precautionary.

9.7.14.3 Another example comes from the seabird collision avoidance study undertaken at Thanet offshore wind farm which lends support to the view that the avoidance rates used in this assessment are likely to be highly precautionary (Bowgen & Cook 2018, Skov et al, 2018).^{29,30}

²⁹ Bowgen, K. & Cook, A., (2018), Bird Collision Avoidance: Empirical evidence and impact assessments, JNCC Report No. 614, JNCC, Peterborough, ISSN 0963-8091.

³⁰ Skov, H., Heinanen, S., Norman, T., Ward, R.M., Mendez-Roldan, S. & Ellis, I. 2018. ORJIP Bird Collision and Avoidance Study. Final report – April 2018. The Carbon Trust. United Kingdom.

- 9.7.14.4 The Scoping Opinion advised that flight speed data for use in CRM be taken from published data (Pennycuick 1997;³¹ Alerstam et al. 2007).³² These flight speeds are based on very small sample sizes (2 kittiwake). The laser rangefinder track data collected at Thanet recorded by Skov et al. (2018) and reviewed by Bowgen & Cook (2018) offers species-specific empirical data on flight speeds from large numbers of individuals. This study together with others (reviewed in Elliott et al. 2014)³³ indicates lower flight speeds than were used in the assessment, these would reduce the number of kittiwake collisions calculated.
- 9.7.14.5 The EIA Addendum Report presented the predicted collision risk impacts using Option 1 (which uses site-specific flight height estimates), in addition to the Option 2 outputs. The predicted numbers of collisions varied between Option 1 and Option 2 outputs, though in a different direction for the Alpha Development and the Bravo Development, with this explained by differences in flight heights found in the Alpha Development and the Bravo Development areas. Following the Scoping Opinion this AA is based on Option 2 of the Band model which uses generic flight heights. Overall the predicted collisions using Option 2 were higher than using Option 1, again suggesting that this AA is precautionary.
- 9.7.14.6 Lastly, basing this assessment on the WCS for the NnGOWL Development and the ICOL Development (the s.36 consents for these projects granted in 2014) is very precautionary because they are unlikely to be constructed. If the more recent s.36 consents granted in 2018/2019 were used in this assessment it would substantially reduce the effects associated with those projects though reductions in calculated collision mortality.

9.7.15 **Kittiwake – Conclusion**

- 9.7.15.1 Based on the information provided in the HRA Report, the EIA Report, and the EIA Addendum Report, the SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments could have an adverse effect on site integrity for kittiwake as a qualifying interest of the Forth Islands SPA, and Fowlsheugh SPA when considered in-combination with the s.36 consents granted in 2014 for the NnGOWL Development and the ICOL Development. SNH confirmed in an email dated 15 July 2019 that there could also be an adverse effect on the site integrity of St. Abb's Head to Fast Castle SPA. SNH advised that the Combined Alpha and Bravo Developments would not give rise to adverse

³¹ Pennycuick, C.J., 1997. Actual and 'Optimum' Flight Speeds: Field Data Research. *The Journal of Experimental Biology*, 200, pp. 2355-2361.

³² Alerstam, T., Rosén, M., Bäckman, J., Ericson, P.G. & Jellgren, O. (2007). Flight speeds among bird species: allometric and phylogenetic effects. *PLoS Biology*, 5(8), e197.

³³ Elliott, K.H., Chivers, L.S., Bessey, L., Gaston, A.J., Hatch, S.A., Kato, A., Osborne, O., Ropert-Coudert, Y., Speakman, J.R. and Hare, J.F., 2014. Windscape shape seabird instantaneous energy costs but adult behavior buffers impact on offspring. *Movement Ecology*, 2(1), p.17.

impact on site integrity of the Forth Islands SPA, Fowlsheugh SPA or ST Abbs Head to Fast Castle SPA with respect to kittiwake when considered in-combination with the 2018/2019 s.36 consents granted for the NnGOWL Development and the ICOL Development.

9.7.15.2 In reaching their conclusion the Scottish Ministers have considered the conservation objectives, the populations at the sites, the predicted levels of effect and population consequences, the fact that the effects are less than in 2014, the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that, subject to the application of conditions, there will be no adverse effect on the site integrity of Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA or Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of the kittiwake qualifying interest as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with either the s.36 consents granted in 2014 or 2018/2019 for the other Forth and Tay Developments or the projects detailed in Appendices 1 and 2.

9.8 **HERRING GULL - Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA**

9.8.1 The closest largest breeding colonies of herring gulls to the Seagreen Development areas are at Fowlsheugh SPA, but a greater proportion of the herring gull observed in the Seagreen Development areas are apportioned to the Forth Islands SPA given its significantly greater population. Results from site-specific monitoring indicate that herring gulls are present in the Seagreen Development areas throughout the year.

9.8.2 During the breeding season, herring gulls from other non-SPA breeding colonies, may also be present within the Seagreen Development areas and, therefore, at risk from collision impacts. The potential impacts on all non-SPA breeding colonies and across all SPA colonies, for which herring gull is a qualifying interest, within the mean maximum foraging range have been apportioned to take account of the presence of these birds.

9.8.3 The Combined Alpha and Bravo Developments were assessed in-combination with the WCS of the 2014 and 2017 designs for the Forth and Tay Developments. Qualitative consideration was given to the impacts from other wind farms within mean maximum foraging range of the relevant SPA populations. Following the Scoping Opinion collision impacts were presented in the EIA Report for both Option 2 of the Band model with a 99.5% avoidance rate and for Option 3 with a 99.0% avoidance rate, with the Option 3 outputs used for this assessment.

- 9.8.4 Prior to apportioning, for the Alpha Development the outputs of the CRM predicted 8 herring gull collisions per annum, with the majority of collisions predicted during the non-breeding period.
- 9.8.5 For the Bravo Development the outputs of the CRM predicted 5 herring gull collisions per annum, with the majority of impacts predicted during the non-breeding period.
- 9.8.6 For the Combined Alpha and Bravo Developments the outputs of the CRM predicted 12 herring gull collisions per annum, with the majority of impacts predicted during the non-breeding period.
- 9.8.7 **Forth Islands SPA – Herring gull – developments in isolation and in-combination**
- 9.8.7.1 The herring gull population decreased between the time of designation and counts undertaken in 2014, however the population has increased again since 2014 and is in a favourable maintained condition.³⁴ The herring gull breeding population in the Forth Islands SPA is 6,580 pairs³⁵ and it is likely that breeding herring gull from this SPA will occur within the Seagreen Development areas.
- 9.8.7.2 The CRM presented in the HRA Report estimated that there would be a loss of fewer than one bird from the breeding adult age class per annum for the Combined Alpha and Bravo Developments alone (0.3).
- 9.8.7.3 The estimated collision impacts for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments, EOWDC, Hywind and Kincardine was greater. Estimated collisions were higher in the non-breeding season. The predicted in-combination collision mortality to adult herring gull was 12.3 birds per annum which is significantly below 1% of baseline mortality (22 birds per annum).
- 9.8.7.4 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Forth Islands SPA in respect of herring gull as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with other plans or projects.

³⁴ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

³⁵ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

9.8.8 Fowlsheugh SPA – Herring gull – developments in isolation and in-combination

- 9.8.8.1 The herring gull population has decreased significantly since the time of designation when the population was 3,190 pairs³⁶ to the latest population estimate of 125 pairs in 2015.³⁷ The population is in an unfavourable and declining condition (SNH, 2019).³⁸
- 9.8.8.2 The CRM presented in the HRA Report estimated that there would be a loss of fewer than one bird from the breeding adult age class per annum for the Combined Alpha and Bravo Developments alone (0.1).
- 9.8.8.3 The estimated collision impacts for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments, EOWDC, Hywind and Kincardine was greater. Estimated collisions were higher in the non-breeding season. The predicted in-combination collision mortality to adult herring gull was 1.9 birds per annum which is above 1% of baseline mortality (0.4 birds per annum), though the contribution of the Combined Alpha and Bravo Developments to this total was small.
- 9.8.8.4 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Fowlsheugh SPA in respect of herring gull as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with other plans or projects.

9.8.9 St Abb’s Head to Fast Castle SPA – Herring gull – developments in isolation and in-combination

- 9.8.9.1 The herring gull population has decreased significantly since the time of designation when the population was 1,160 pairs³⁹ to the latest population estimate of 325 pairs in 2016.⁴⁰ The population is in an unfavourable and declining condition (SNH 2019).⁴¹
- 9.8.9.2 The CRM presented in the HRA Report estimated that there would be a loss of fewer than 1 bird from the breeding adult age class per annum for the Combined Alpha and Bravo Developments (0.6).

³⁶ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

³⁷ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

³⁸ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

³⁹ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁴⁰ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁴¹ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

9.8.9.3 The estimated collision impacts for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments was greater. The predicted in-combination collision mortality to adult herring gull was 1.2 birds per annum which is just above 1% of baseline mortality (1 bird per annum).

9.8.9.4 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the St Abb's Head to Fast Castle SPA in respect of herring gull as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with other plans or projects.

9.8.10 Buchan Ness to Collieston Coast SPA – Herring gull – developments in isolation and in-combination

9.8.10.1 The CRM presented in the HRA Report estimated that there would be a loss of fewer than 1 bird from the breeding adult age class from the Combined Alpha and Bravo developments (0.1)

9.8.10.2 The estimated collision impacts for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments was greater. The predicted in-combination collision mortality to adult herring gull was 10.1 birds.

9.8.10.3 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Buchan Ness to Collieston Coast SPA in respect of herring gull as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with other plans or projects.

9.8.11 Outer Firth of Forth and St Andrews Bay Complex pSPA – Herring Gull – developments in isolation and in-combination

9.8.11.1 The Scoping Opinion advised that the assessment carried out for herring gull at the breeding colony SPAs detailed above could also be applied to the pSPA, and a separate assessment for the herring gull qualifying feature at the pSPA was not required.

9.8.11.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of herring gull as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.8.12 Herring gull – Conclusion

- 9.8.12.1 SNH advised that there would be no adverse effect on the site integrity of the St Abb's Head to Fast Castle SPA, Forth Islands SPA, Fowlsheugh SPA, or Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of the herring gull qualifying interest from the Combined Alpha and Bravo Developments in isolation or in-combination with other plans or projects.
- 9.8.12.2 In reaching their conclusion, the Scottish Ministers have considered the conservation objectives, the populations at the sites, the predicted levels of effect and population consequences and the advice from SNH. The Scottish Ministers conclude subject to the application of conditions, there will be no adverse effect on the site integrity of the Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, the Buchan Ness to Collieston Coast SPA, or Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of the herring gull qualifying interest as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the Forth and Tay Developments and other projects detailed in Appendix 1.

9.9 PUFFIN – Forth Islands SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA

- 9.9.1 The Scoping Opinion advised that SWEL was only required to consider displacement effects as puffin fly lower than the height of the turbine blades so are not at risk from collision. Displacement effects during the non-breeding season were not required to be assessed as following breeding, puffins disperse widely and are not present within the Forth and Tay region in significant numbers.
- 9.9.2 As the footprints of the Seagreen Development sites and the sites for the NnGOWL Development and the ICOL Development have not changed, the displacement effects from the s.36 consents granted in 2014 will be no different to those from the 2017 designs, therefore it was not necessary to assess the different scenarios as it was for the collision risk assessment. However methods of assessment for displacement have changed since 2014 (as detailed in Appendix 3).
- 9.9.3 The closest large puffin colony to the Seagreen Development areas is located on the Isle of May, which is part of the Forth Islands SPA. The population is in a favourable declining condition with an increase in population from 14,000 pairs

at the time of site designation⁴² to 50,282 pairs in 2009 then subsequently a decrease, with 45,005 pairs for 2009-2017.⁴³

- 9.9.4 The assessment follows the advice on displacement of puffin provided in the Scoping Opinion and assesses the wind farm areas plus 2km buffers. A 60% displacement rate and 2% mortality rate are assumed during the breeding season.

9.9.5 Forth Islands SPA – Puffin – developments in isolation

- 9.9.5.1 Published data (Thaxter et al, 2012)⁴⁴ suggests it is very likely that breeding puffins from the Forth Islands SPA will occur in the Seagreen Development areas and 2km buffer, as well as within the sites of the other Forth and Tay Developments.
- 9.9.5.2 Using the 60% displacement and 2% mortality rates in the EIA Addendum Report(part 2 – section 3), this equated to a mortality of up to 18 adult birds per annum for the Alpha Development, 26 adult birds per annum for the Bravo Development, and 37 adult birds per annum for the Combined Alpha and Bravo Developments.
- 9.9.5.3 PVA undertaken by SWEL found a continuous significant increase in the breeding population over the next 25 years for all impact scenarios. Over 25 years, it is predicted that the population will have increased from its current level (45,005 pairs) to 153,416 pairs, with no wind farms present. After 25 years, the median of the ratio of the impacted to un-impacted population size from the Alpha Development in isolation is 0.994 (n.b. ratio values are referred to in the EIA Addendum Report as the counterfactuals), for the Bravo Development the median of the ratio of the impacted to un-impacted population size is 0.992, and for the Combined Alpha and Bravo Developments the median of the ratio of the impacted to un-impacted population size is. 0.988.
- 9.9.5.4 The SNH Response to the EIA Addendum Report advised that Combined Alpha and Bravo Developments in isolation would not result in an adverse effect on site integrity to the Forth Islands SPA with respect to puffin.

9.9.6 Forth Islands SPA – Puffin – developments in-combination

⁴² SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁴³ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁴⁴ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

- 9.9.6.1 The EIA Addendum Report (part 2 – section 3) estimated that the predicted in-combination mortality rate from displacement during the breeding season would be more than double the impacts of the Combined Alpha and Bravo Developments. The EIA Addendum Report (part 2 – section 3) estimated that 92 breeding adults and 108 sub-adults could suffer mortality per annum due to in-combination displacement effects.

Table 234 Estimated adult puffin mortality from displacement impacts from the Forth and Tay developments during the breeding season

Developments	Breeding adults
Alpha Development	18
Bravo Development	26
Combined Alpha and Bravo Developments	37
NnGOWL Development	33
ICOL Development	22
Total	92

- 9.9.6.2 PVA was undertaken by SWEL for the Forth Islands SPA over a 25 year period. The additional mortality from displacement effects arising from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments may cause a reduced level of population increase (when compared to the population without any wind farms), with a predicted population size of 146,814 pairs after 25 years. After 25 years, the median of the ratio of the impacted to un-impacted population size from the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments is 0.957 (n.b. ratio values are referred to in the EIA Addendum Report as the counterfactuals).
- 9.9.6.3 SNH advised that the Combined Alpha and Bravo Developments in-combination with the NnGOWL Development and the ICOL Development would not result in an adverse effect on site integrity to the Forth Islands SPA with respect to puffin.

9.9.7 Outer Firth of Forth and St Andrews Bay Complex pSPA – Puffin – developments in isolation and in-combination

- 9.9.7.1 The Scoping Opinion advised that the assessment carried out for puffin at the Forth Islands breeding colony SPA detailed above could also be applied to the pSPA, and a separate assessment for the puffin qualifying feature at the pSPA was not required.

9.9.7.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of puffin as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.9.8 Puffin – Conclusions

9.9.8.1 The 2014 AA estimated a much greater effect on puffin from the Forth and Tay Developments, the total estimated mortalities in 2014 was 1251 puffin per year from the Forth Islands SPA. This was due to the different assessment methodologies advised in 2014. The assumptions in the 2014 AA were overly precautionary for example a mortality rate of 50% was assumed for puffin. The mortality rate used in the current assessment is 2%, which was advised by SNH, and detailed in the Scoping Opinion. The 2014 AA concluded that there would be no adverse effect on site integrity, the predicted effects in the current AA are significantly less.

9.9.8.2 SNH advised that, based on the information contained within the EIA Addendum Report, there would be no adverse effect on the site integrity of the Forth Islands SPA or Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of the puffin qualifying interest as a result of the Combined Alpha and Bravo Developments in isolation and in-combination with the other Forth and Tay Developments.

9.9.8.3 In reaching their conclusion the Scottish Ministers have considered the conservation objectives, the populations at the sites, the predicted levels of effect and population consequences, the fact that the effects are less than in 2014 and the advice from SNH. The Scottish Ministers conclude that, subject to the application of conditions, the Combined Alpha and Bravo Developments will not adversely affect the site integrity of Forth Islands SPA or Outer Firth of Forth and St Andrews Bay Complex pSPA with respect to puffin in isolation or in-combination with the other Forth and Tay Developments and projects detailed in Appendix 1.

9.10 GUILLEMOT - Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA, and Outer Firth of Forth and St Andrews Bay Complex pSPA

9.10.1 The Scoping Opinion advised that SWEL was only required to consider displacement effects on this species, as guillemot fly lower than the height of the turbine blades and are therefore not at risk from collision.

9.10.2 As the footprints of the Seagreen Development areas and the sites for the NnGOWL Development and the ICOL Development have not changed, the

displacement effects from the s.36 consents granted in 2014 will be no different to those from the 2017 designs, therefore it was not necessary for SWEL to assess the different scenarios. However methods of assessment for displacement have changed since 2014 (as detailed in Appendix 3).

- 9.10.3 The closest large guillemot colonies to the Seagreen Development areas are at Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA and Buchan Ness to Collieston Coast SPA. These four SPAs were identified as being at possible risk from the effects of displacement.
- 9.10.4 This assessment follows the advice on displacement of guillemot provided in the Scoping Opinion and assesses the wind farm areas plus 2km buffers. A 60% displacement rate and 1% mortality rate are assumed during the breeding and non-breeding seasons. An unusually high abundance of guillemot was observed during a survey carried out in July 2017, following discussion between SWEL, SNH, and MSS it was agreed that for the HRA the median for this month across survey years would be used for the July 2017 data, then the peak seasonal population derived. In the EIA Addendum Report (part 2 – section 2) displacement is presented both with and without the inclusion of the July 2017 data.

9.10.5 Forth Islands SPA - Guillemot – developments in isolation

- 9.10.5.1 The guillemot population is in a favourable maintained condition with an increase in population from 8,000 birds at the time of site designation (SNH, 2019)⁴⁵ to 28,786 birds in 2017 (SNH 2017).⁴⁶ Published data on guillemot foraging ranges (Thaxter et al 2012)⁴⁷ and tracking from the Isle of May (Daunt et al. 2011a)⁴⁸ suggests that it is very likely that breeding guillemots from the Forth Islands SPA will occur within the Seagreen Developments areas and 2km buffer.
- 9.10.5.2 Using the 60% displacement and 1% mortality rates in the EIA Addendum Report (part 2 – section 3), this equated to a mortality for the Alpha Development of 8 adults birds during breeding and 4 adults during the non-breeding period, this results in an estimated annual mortality of 12 birds from displacement. For the Bravo Development estimated displacement mortality is 6 adult birds during

⁴⁵ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁴⁶ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁴⁷ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

⁴⁸ Daunt, F., Bogdanova, M., Newell, M., Harris, M. & Wanless, S. (2011a). GPS tracking of common guillemot, razorbill, black-legged kittiwake on the Isle of May Summer 2010. Report for FTOWDG. Centre for Ecology and Hydrology, Edinburgh.

breeding and 4 adults during the non-breeding period, this results in an estimated annual mortality of 10 birds from displacement. For the Combined Alpha and Bravo Developments estimated displacement mortality is 11 adults birds during breeding and 8 adults during the non-breeding period, this results in an estimated annual mortality of 19 birds from displacement.

- 9.10.5.3 PVA was undertaken by SWEL for Forth Islands SPA for a 25 year period). The predicted median end population size is greater than the current SPA population size and increased over the projection period (irrespective of whether impacts were incorporated or not). After 25 years the median of the ratio of impacted to un-impacted population size for the assessment of the Alpha Development in isolation is 0.992, for the Bravo Development in isolation the ratio of impacted to un-impacted population size is 0.994, for the Combined Alpha and Bravo Developments the ratio of impacted to un-impacted population size is 0.987.
- 9.10.5.4 SNH advised that the Combined Alpha and Bravo Developments in isolation would not result in an adverse effect on the site integrity of the Forth Islands SPA with respect to guillemot.

9.10.6 Forth Islands SPA – Guillemot – developments in-combination

- 9.10.6.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments. Displacement impacts were broadly similar for both the breeding and non-breeding seasons, however, the contribution of the Combined Alpha and Bravo Developments during the non-breeding season was predicted to be smaller than that during the breeding season. The combined annual estimated mortality was 53 adult birds and 53 sub-adults, as outlined in table 24 below.

Table 24 Estimated mortality of Forth Islands SPA guillemots as a result from displacement from the developments in-combination

Seasonal period	Project plus 2km buffer	Breeding adults	Sub adults
Breeding	Combined Alpha and Bravo Developments	11	10
	NnGOWL Development	9	9
	ICOL Development	7	10
Total		27	28
Non Breeding Season	Combined Alpha and Bravo Developments	8	6
	NnGOWL Development	14	14

	ICOL Development	4	5
Total		26	25
Annual	Total	53	53

9.10.6.2 PVA was undertaken by SWEL for guillemot breeding in the Forth Islands SPA for a 25 year period. The PVA results for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments indicated small population-level impacts. After 25 years the median of the ratio of impacted to un-impacted population size 0.962.

9.10.6.3 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments would not result in an adverse effect on the site integrity of the Forth Islands SPA with respect to guillemot.

9.10.7 Fowlsheugh SPA – Guillemot – developments in isolation

9.10.7.1 The guillemot population is in a favourable maintained condition with a small decrease in population from 56,450 birds at the time of site designation (SNH, 2019)⁴⁹ to 74,379 birds in 2015 (SNH, 2017).⁵⁰

9.10.7.2 The Seagreen Development areas (including 2km buffer zone) do not overlap with the Fowlsheugh SPA. Published data (Thaxter et al 2012)⁵¹ and tracking from the Fowlsheugh SPA (Daunt et al 2011a)⁵² demonstrate that it is likely that breeding guillemots from the Fowlsheugh SPA will occur within the Seagreen Development areas and 2km buffer.

9.10.7.3 Using the 60% displacement and 1% mortality rates in the EIA Addendum Report (part 2 – section 3), this equated to a mortality for the Alpha Development of 26 adults birds during breeding and 16 adults during the non-breeding period, this results in an estimated annual mortality of 42 birds from displacement. For the Bravo Development estimated displacement mortality is 19 adults birds during breeding and 14 adults during the non-breeding period, this results in an estimated annual mortality of 33 birds from displacement. For the Combined

⁴⁹ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁵⁰SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁵¹ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

⁵² Daunt, F., Bogdanova, M., Newell, M., Harris, M. & Wanless, S. (2011a). GPS tracking of common guillemot, razorbill, black-legged kittiwake on the Isle of May Summer 2010. Report for FTOWDG. Centre for Ecology and Hydrology, Edinburgh.

Alpha and Bravo Developments estimated displacement mortality is 37 adults birds during breeding and 26 adults during the non-breeding period, this results in an estimated annual mortality of 63 birds from displacement.

9.10.7.4 PVA was undertaken by SWEL for Fowlsheugh SPA for a 25 year time period. The PVA predicted a more than doubling of the Fowlsheugh SPA guillemot population without any wind farm impacts and a slightly reduced increase with the calculated displacement impacts for the Combined Alpha and Bravo Developments. After 25 years the median of the ratio of impacted to un-impacted population size for the Alpha Development in isolation is 0.986, for the Bravo Development in isolation the ratio of impacted to un-impacted population size is 0.988, for the Combined Alpha and Bravo Developments the ratio of impacted to un-impacted population size is 0.978.

9.10.7.5 The SNH Response to the EIA Addendum Report advised that the Seagreen Developments in isolation would not adversely affect the site integrity of the Fowlsheugh SPA with respect to guillemot.

9.10.8 Fowlsheugh SPA – Guillemot – developments in-combination

9.10.8.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments. Displacement impacts were broadly similar for both the breeding and non-breeding seasons. The combined annual estimated mortality was 78 adult birds and 73 sub-adults, as outlined in table 25 below.

Table 255 Estimated annual in-combination displacement impacts on Fowlsheugh SPA guillemot

Seasonal period	Project plus 2km buffer	Breeding adults	Sub adults
Breeding	Combined Alpha and Bravo Developments	37	33
	NnGOWL Development	1	1
	ICOL Development	8	10
Total		46	44
Non Breeding Season	Combined Alpha and Bravo Developments	26	22
	NnGOWL Development	2	2
	ICOL Development	4	5
Total		32	29
Annual	Total	78	73

- 9.10.8.2 PVA was undertaken by SWEL for guillemot breeding in the Fowlsheugh SPA for a 25 year period. The PVA results for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments indicated small population-level impacts. After 25 years the median of the ratio of impacted to un-impacted population size is 0.964.
- 9.10.8.3 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments when considered in-combination with the other Forth and Tay Developments would not adversely affect the site integrity of the Fowlsheugh SPA with respect to guillemot.

9.10.9 St Abb's Head to Fast Castle SPA – Guillemot – developments in isolation

- 9.10.9.1 The guillemot population is in a favourable maintained condition (SNH, 2019)⁵³ with an increase in the population from 31,750 birds at the time of site designation to 48,516 birds in 2016 (SNH, 2017).⁵⁴
- 9.10.9.2 Using the 60% displacement and 1% mortality rates in the EIA Addendum Report (part 2 – section 3), this equated to a mortality for the Alpha Development of 6 adults birds during breeding and 4 adults during the non-breeding period, this results in an estimated annual mortality of 10 birds from displacement. For the Bravo Development estimated displacement mortality is 4 adults birds during breeding and 3 adults during the non-breeding period, this results in an estimated annual mortality of 7 birds from displacement. For the Combined Alpha and Bravo Developments estimated displacement mortality is 9 adults birds during breeding and 6 adults during the non-breeding period, this results in an estimated annual mortality of 15 birds from displacement.
- 9.10.9.3 PVA was undertaken by SWEL for St Abb's Head to Fast Castle SPA for a 25 year time period. The PVA predicted a more than doubling of the St Abb's Head to Fast Castle SPA guillemot population without impacts and a slightly reduced increase with the calculated displacement impacts for the Combined Alpha and Bravo Developments. After 25 years the median of the ratio of impacted to un-impacted population size for the assessment of the Alpha Development in isolation is 0.995, for the Bravo Development in isolation the ratio of impacted to un-impacted population size is 0.996, for the Combined Alpha and Bravo Developments the ratio of impacted to un-impacted population size is 0.992.

⁵³ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁵⁴ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

9.10.9.4 The SNH Response to the EIA Addendum report advised that the Combined Alpha and Bravo Developments in isolation would not result in an adverse effect on site integrity to the St Abb's Head to Fast Castle SPA with respect to guillemot.

9.10.10 St Abb's Head to Fast Castle SPA – Guillemot – developments in-combination

9.10.10.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments. Displacement impacts were similar for both the breeding and non-breeding seasons. The combined annual estimated mortality was 28 adult birds and 27 sub-adults, as outlined in table 26 below.

Table 26 Estimated in-combination annual displacement effects on guillemot of St Abb's Head to Fast Castle SPA

Seasonal period	Project plus 2km buffer	Breeding adults	Sub adults
Breeding	Combined Alpha and Bravo Developments	9	8
	NnGOWL Development	3	3
	ICOL Development	3	4
Total		15	15
Non Breeding Season	Combined Alpha and Bravo Developments	6	5
	NnGOWL Development	5	5
	ICOL Development	2	2
Total		13	12
Annual	Total	28	27

9.10.10.2 PVA was undertaken by SWEL for guillemot breeding in the St Abb's Head to Fast Castle SPA for a 25 year period. The PVA results for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments indicated small population-level impacts. After 25 years the median of the ratio of impacted to un-impacted population size is 0.985.

9.10.10.3 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments would not result in adverse effect on the site integrity of the St Abb's Head to Fast Castle SPA with respect to guillemot.

9.10.11 Buchan Ness to Collieston Coast SPA - Guillemot – developments in isolation and in-combination

- 9.10.11.1 The guillemot population is in a favourable maintained condition (SNH, 2019)⁵⁵ with an increase in the population from 17,280 birds at the time of site designation to 45,067 birds in 2017 (SNH, 2017).⁵⁶
- 9.10.11.2 Published data (Thaxter et al 2012)⁵⁷ suggests that it is possible that breeding guillemots from the Buchan Ness to Collieston Coast SPA will be present within the Seagreen Development areas (including the 2km buffer).
- 9.10.11.3 For the Combined Alpha and Bravo Developments in isolation, using the 60% displacement and 1% mortality rates in the HRA Report, displacement numbers were presented with and without inclusion of the July 2017 survey data, where unusually high abundances of guillemot (and other species) were observed, both values are presented here as a range. For the Alpha Development estimated displacement annual mortality was of 2-3 adult birds. For the Bravo Development estimated displacement annual mortality was of 2-3 adult birds. For the Combined Alpha and Bravo Developments estimated displacement annual mortality was of 3-4 adult birds.
- 9.10.11.4 For the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments, EOWDC, Hywind and Kincardine the HRA Report estimated that the total annual mortality is 9 adult birds, with 7 during breeding and 3 during the non-breeding period.
- 9.10.11.5 PVA analysis was not undertaken for guillemot for the Buchan Ness to Collieston Coast SPA.
- 9.10.11.6 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments neither in isolation nor in-combination would result in adverse effects on the site integrity of the Buchan Ness to Collieston Coast SPA in respect to guillemot.

9.10.12 Outer Firth of Forth and St Andrews Bay Complex pSPA – Guillemot – developments in isolation and in-combination

⁵⁵ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁵⁶SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁵⁷ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

9.10.12.1 The Scoping Opinion advised that the assessment carried out for guillemot at the breeding colony SPAs detailed above could also be applied to the pSPA, and a separate assessment for the guillemot qualifying feature at the pSPA was not required.

9.10.12.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of guillemot as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.10.13 Guillemot – Precaution in the Assessment

9.10.13.1 The Scottish Ministers consider that the assessment completed with respect to guillemot is precautionary. In particular, the inclusion of a 2km buffer to all the sites of the Forth and Tay Developments, and no habituation to the wind farms. The inclusion of the 2km buffer in the displacement assessment has led to predicted displacement effects which are much greater than if the wind farm areas had been considered without the buffer.

9.10.14 Guillemot – Conclusions

9.10.14.1 The SNH Consultation Response and the SNH Response to the EIA Addendum stated that for guillemot as a qualifying interest of the Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA, the Combined Alpha and Bravo Developments would not have an adverse effect on the site integrity in-combination with the Forth and Tay Developments.

9.10.14.2 In reaching their conclusion, the Scottish Ministers have considered the conservation objectives, the populations at the sites, the predicted levels of effect and population consequences, the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that the Combined Alpha and Bravo Developments, subject to the application of conditions, will not adversely affect the site integrity of the Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA and the Outer Firth of Forth and St Andrews Bay Complex pSPA with respect to guillemot, either alone or in-combination with the other Forth and Tay Developments and projects detailed in Appendix 1.

9.11 **RAZORBILL - Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA and Outer Firth of Forth and St Andrews Bay Complex pSPA**

- 9.11.1 The Scoping Opinion advised that SWEL was only required to consider displacement effects as razorbill fly lower than the height of the turbine blades and, therefore, are not at risk from collision impacts.
- 9.11.2 As the footprints of the Seagreen Development sites and the sites for the NnGOWL Development and the ICOL Development have not changed, the displacement effects from the s.36 consents as granted in 2014 will be no different to those from the 2017 designs, therefore it was not necessary for SWEL to assess the revised scenarios as it was for the collision risk assessment. However methods of assessment for displacement have changed since 2014 as detailed in Appendix 3.
- 9.11.3 The closest large razorbill colonies to the Seagreen Development areas are at the Isle of May (part of the Forth Islands SPA) and Fowlsheugh SPA. These two SPAs were identified as being at possible risk from the impacts of displacement. The population sizes at Forth Islands SPA and Fowlsheugh SPA have increased significantly since the time of designation.
- 9.11.4 This assessment follows the advice on displacement of guillemot provided in the Scoping Opinion and assesses the wind farm areas plus 2km buffers. A 60% displacement rate and 1% mortality rate are assumed during the breeding and non-breeding seasons. An unusually high abundance of razorbill was observed during a survey carried out in July 2017, following discussion between SWEL, SNH, and MSS it was agreed that for the HRA the median for this month across survey years would be used for July 2017, then the peak seasonal population derived. In the EIA Addendum (part 2 – section 2) displacement effects are presented both with and without the inclusion of the July 2017 data.

9.11.5 Forth Islands SPA – Razorbill – developments in isolation

- 9.11.5.1 The razorbill population at Forth Islands SPA is in a favourable maintained condition (SNH, 2019)⁵⁸ with an increase in population from 2,800 birds at the time of site designation in 1990 to 7,792 birds in 2017 (SNH, 2017).⁵⁹ Published information on razorbill foraging ranges (Thaxter et al, 2012)⁶⁰ and the outputs of

⁵⁸ SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁵⁹ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

⁶⁰ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

tracking studies on the Isle of May (Daunt et al. 2011a)⁶¹ demonstrate that it is likely that breeding razorbills from the Forth Islands SPA will occur within the Seagreen Development areas and 2km buffer.

- 9.11.5.2 Using the 60% displacement and 1% mortality rates in the EIA Addendum Report (part 2 – section 3), this equated to a mortality for the Alpha Development of 3 adults birds during breeding and 1 adult during the non-breeding period, this results in an estimated annual mortality of 4 birds from displacement. For the Bravo Development estimated displacement mortality is 1 adult birds during breeding and 2 adults during the non-breeding period, this results in an estimated annual mortality of three birds from displacement. For the Combined Alpha and Bravo Developments estimated displacement mortality is 4 adult birds during breeding and 3 adults during the non-breeding period, this results in an estimated annual mortality of 7 birds from displacement.
- 9.11.5.3 PVA was undertaken by SWEL for Forth Islands SPA for a 25 year period. The predicted median end population size is greater than the current SPA population size and increased over the projection period (irrespective of whether impacts were incorporated or not). After 25 years the median of the ratio of impacted to un-impacted population size for the assessment of the Alpha Development in isolation is 0.985, for the Bravo Development in isolation the ratio of impacted to un-impacted population size is 0.989, for the Combined Alpha and Bravo Developments the ratio of impacted to un-impacted population size is 0.975.
- 9.11.5.4 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments taken alone would not result in an adverse effect on site integrity to the Forth Islands SPA with respect to razorbill.

9.11.6 Forth Islands SPA – Razorbill – developments in-combination

- 9.11.6.1 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments. Displacement impacts were broadly similar for both the breeding and non-breeding seasons. The combined annual estimated mortality was 26 adult birds and 13 sub-adults, as outlined in table 27 below.

⁶¹ Daunt, F., Bogdanova, M., Newell, M., Harris, M. & Wanless, S. (2011a). GPS tracking of common guillemot, razorbill, black-legged kittiwake on the Isle of May Summer 2010. Report for FTOWDG. Centre for Ecology and Hydrology, Edinburgh.

Table 276 Estimated mortality of Forth Islands SPA razorbills as a result from displacement from the Seagreen Developments in-combination

Seasonal period	Project plus 2km buffer	Breeding adults	Sub adults
Breeding	Combined Alpha and Bravo Developments	4	3
	NnGOWL Development	3	3
	ICOL Development	4	5
Total		11	10
Non Breeding Season	Combined Alpha and Bravo Developments	3	2
	NnGOWL Development	8	6
	ICOL Development	5	5
Total		15	13
Annual	Total	26	23

9.11.6.2 PVA was undertaken by SWEL for razorbill breeding in the Forth Islands SPA for a 25 year period. The PVA results for the Combined Alpha and Bravo Developments in-combination with the Forth and Tay Developments indicated a 10% smaller population-for the impacted population compared to the un-impacted population. After 25 years the median of the ratio of impacted to un-impacted population size for the in-combination assessment is 0.900.

9.11.6.3 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments would not result in an adverse effect on the site integrity of the Forth Islands SPA with respect to razorbill.

9.11.7 Fowlsheugh SPA – Razorbill – developments in isolation

9.11.7.1 The razorbill population is in a favourable maintained condition (SNH, 2019)⁶² with an increase in population from 5,800 birds at the time of site designation to 9,950 birds in 2017 (SNH, 2017).⁶³

⁶² SNH (2019). SiteLink. Scottish Natural Heritage. <https://gateway.snh.gov.uk/sitelink/index.jsp>.

⁶³ SNH. 2017. Forth & Tay Seabird Population Counts - Updated Appendix A(ii) - Forth and Tay Scoping Opinions – November 2017.

- 9.11.7.2 The Seagreen Development areas (including 2km buffer) do not overlap with the Fowlsheugh SPA. Published data (Thaxter et al 2012)⁶⁴ suggests it is likely that breeding razorbill from the Fowlsheugh SPA will occur within the Seagreen Development areas and 2km buffer, as well as the ICOL Development area but not the NnGOWL Development area which likely lies beyond the foraging range of razorbill from Fowlsheugh.
- 9.11.7.3 Using the 60% displacement and 1% mortality rates in the EIA Addendum Report (part 2 – section 3), this equated to a mortality for the Alpha Development of 7 adults birds during breeding and 3 adults during the non-breeding period, this results in an estimated annual mortality of 10 birds from displacement. For the Bravo Development estimated displacement mortality is 3 adult birds during breeding and 4 adults during the non-breeding period, this results in an estimated annual mortality of 7 birds from displacement. For the Combined Alpha and Bravo Developments estimated displacement mortality is 8 adults birds during breeding and 5 adults during the non-breeding period, this results in an estimated annual mortality of 13 birds from displacement.
- 9.11.7.4 PVA was undertaken by SWEL for Fowlsheugh SPA for a 25 year period. The predicted median end population size is slightly lower than the current SPA population size for the un-impacted population. After 25 years the median of the ratio of impacted to un-impacted population size for the assessment of the Alpha Development in isolation is 0.971, for the Bravo Development in isolation the ratio of impacted to un-impacted population size is 0.979, for the Combined Alpha and Bravo Developments the ratio of impacted to un-impacted population size is 0.961.
- 9.11.7.5 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments taken alone would not result in an adverse effect on site integrity to the Fowlsheugh SPA with respect to razorbill.

9.11.8 Fowlsheugh SPA – Razorbill – developments in-combination

- 9.11.8.1 The NnGOWL Development is beyond the mean maximum foraging range of razorbill from the Fowlsheugh SPA, therefore, was deemed not to have connectivity, therefore the displacement matrix predictions in the EIA Addendum Report (part 2 – section 3) were only presented for the Seagreen Developments in-combination with the ICOL Development.

⁶⁴ Thaxter, C.B., Lascelles, B., Sugar, K., Cook, A.S.C.P., Roos, S., Bolton, M., Langston, R.H.W., Burton, N.H.K. (2012) Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas. *Biological Conservation* 156: 53–61.

9.11.8.2 Displacement impacts were calculated for the Combined Alpha and Bravo Developments in-combination with the ICOL Development. Displacement impacts were broadly similar for both the breeding and non-breeding seasons. The combined annual estimated mortality was 22 adult birds and 19 sub-adults, as outlined in table 28 below.

Table 28 Estimated mortality of Fowlsheugh SPA razorbills as a result from displacement from the developments in-combination

Seasonal period	Project plus 2km buffer	Breeding adults	Sub adults
Breeding	Combined Alpha and Bravo Developments	8	6
	ICOL Development	4	4
Total		12	10
Non Breeding Season	Combined Alpha and Bravo Developments	5	4
	ICOL Development	5	5
Total		10	9
Annual	Total	22	19

9.11.8.3 PVA was undertaken by SWEL for razorbill breeding in the Fowlsheugh SPA for a 25 year period. The PVA results for the Combined Alpha and Bravo Developments in-combination with the ICOL Development indicated a 7% smaller population-for the impacted population compared to the un-impacted population. After 25 years the median of the ratio of impacted to un-impacted population size for the in-combination assessment is 0.931.

9.11.8.4 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments would not result in an adverse effect on site integrity to the Fowlsheugh SPA with respect to razorbill.

9.11.9 St Abb’s Head to Fast Castle SPA - Razorbill – developments in isolation and in-combination

9.11.9.1 Displacement impacts were calculated for the Alpha Development, the Bravo Development, and the Combined Alpha and Bravo Developments in isolation and in-combination with the Forth and Tay Developments. For the in-combination assessment adult mortality was estimated at 4 individuals in the HRA Report. Due to the small effects on this SPA, further consideration was not required in the EIA Addendum Report.

9.11.9.2 The SNH Response to the EIA Addendum Report advised that the Combined Alpha and Bravo Developments in-combination with the other Forth and Tay Developments would not result in an adverse effect on site integrity to the St Abb's Head to fast Castle SPA with respect to razorbill.

9.11.10 Outer Firth of Forth and St Andrews Bay Complex pSPA – Razorbill – developments in Isolation and In-combination

9.11.10.1 The Scoping Opinion advised that the assessment carried out for razorbill at the breeding colony SPAs detailed above could also be applied to the pSPA, and a separate assessment for the razorbill qualifying feature at the pSPA was not required.

9.11.10.2 The SNH Consultation Response advised that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA in respect of razorbill as a result of the Combined Alpha and Bravo Developments in isolation or in-combination with the other Forth and Tay Developments.

9.11.11 Razorbill – Precaution in the Assessment

9.11.11.1 The Scottish Ministers consider that the assessment completed with respect to razorbill is precautionary. In particular, the inclusion of a 2km buffer to all the sites of the Forth and Tay Developments, and no habituation to the wind farms. The inclusion of the 2km buffer in the displacement assessment has led to predicted displacement effects which are much greater than if the wind farm areas had been considered without the buffer.

9.11.11.2 The apportioning of impacts during the non-breeding season was undertaken using the same apportioning method as for breeding season, on the basis that a proportion of breeding razorbill population may remain in the vicinity. This approach to apportioning impacts during the non-breeding season is precautionary, due to the influx of birds from more northern breeding colonies to Forth and Tay Region (as per Furness, 2015)⁶⁵ during the non-breeding season.

9.11.12 Razorbill – Conclusions

9.11.12.1 SNH advised that there would not be an adverse effect on the site integrity of the Forth Islands SPA and Fowlsheugh SPA in respect of razorbill as a result of the

⁶⁵ Furness, R.W. (2015) Non-Breeding season populations of seabirds in UK waters: population sizes for Biologically Defined Minimum Population Scales BDMPS. Report Number 164. Natural England Commissioned Reports.

Seagreen Developments in-combination with the other Forth and Tay Developments due to displacement impacts.

9.11.12.2 In reaching their conclusion, the Scottish Ministers have considered the conservation objectives, the populations at the sites, the predicted levels of effect and population consequences. The Scottish Ministers have also considered the precaution in the assessment methods and the advice from SNH. The Scottish Ministers conclude that, subject to the application of conditions, the Seagreen Developments will not adversely affect the site integrity of the Forth Islands SPA, Fowlsheugh SPA, St Abb's Head to Fast Castle SPA or the Outer Firth of Forth and St Andrews Bay Complex pSPA with respect to razorbill, either alone or in-combination with the other Forth and Tay Developments and projects detailed in Appendix 1.

9.12 Outer Firth Of Forth And St Andrews Bay Complex pSPA

9.12.1 The Applications do not include the transmission infrastructure and there is no overlap of any part of the Seagreen Development areas with the pSPA. Therefore it is not necessary to consider the conservation objectives relating to habitat loss and prey availability.

9.12.2 Potential impacts from collision, displacement and barrier effects on the populations as a result of the presence of the Seagreen Developments for gannet, kittiwake, herring gull, guillemot, razorbill and puffin are considered earlier in this AA.

9.13 Consideration of the Outer Firth of Forth and St Andrews Bay Complex pSPA under Article 4(4) of the Birds Directive

9.13.1 As detailed in paragraph 3.2 as the Outer Firth of Forth and St Andrews Bay Complex pSPA has not yet been designated, it also falls within the regime governed by the first sentence of Article 4(4) of the Birds Directive as follows:

“In respect of the protection areas referred to in paragraphs 1 and 2, Member States shall take appropriate steps to avoid pollution or deterioration of habitats or any disturbances affecting the birds, in so far as these would be significant having regard to the objectives of this Article. Outside these protection areas, Member States shall also strive to avoid pollution or deterioration of habitats.”

9.13.2 The Scottish Ministers have considered the information contained within the HRA Report and the advice provided by SNH and conclude that the works will not cause pollution or deterioration of habitats or any disturbance as the Seagreen Development areas are some distance from the pSPA boundary.

9.14 Overall conclusion

- 9.14.1 In the ornithology assessments above, the Scottish Ministers have considered the conservation objective of “maintaining the population of the species as a viable component of the site” on the individual qualifying features of the SPAs.
- 9.14.2 For the qualifying interests of the sites concerned the Scottish Ministers have determined that the Seagreen Developments in isolation and in-combination will not affect the populations as viable components of the SPAs. The Scottish Ministers also conclude that the Seagreen Developments will not, taken alone or in-combination with the projects detailed in Appendices 1 and 2, adversely affect the integrity of the Forth Islands SPA, Fowlsheugh SPA, Buchan Ness to Collieston Coast SPA, St Abb’s Head to Fast Castle SPA, or the Outer Firth of Forth and St Andrews Bay Complex pSPA, where each SPA is taken as a whole.
- 9.14.3 In reaching their conclusion, the Scottish Ministers consider that the most up to date and best scientific evidence available has been used and are satisfied that no reasonable scientific doubt remains. The Scottish Ministers conclude that, subject to the application of conditions, the Alpha Development, the Bravo Development or the Combined Alpha and Bravo Developments with a 25 year operational life will not have an adverse effect on the site integrity of the Isle of May SAC, Berwickshire and North Northumberland Coast SAC, Firth of Tay and Eden Estuary SAC, Moray Firth SAC, Forth Islands SPA, Fowlsheugh SPA, Buchan Ness and Collieston Coast SPA, St Abb’s Head to Fast Castle SPA, and the Outer Firth of Forth and St Andrews Bay Complex pSPA in isolation or in-combination with the 2014 s.36 consents or the 2018/2019 s.36 consents for NnGOWL Development and the ICOL Development and other projects detailed in Appendices 1 and 2.

10 Reasons for diverging from SNH advice

- 10.1 In reaching their conclusions the Scottish Ministers have given considerable weight to SNH’s advice. The methods advised by SNH through scoping and subsequent clarifications have been fully incorporated into this assessment. As such, divergence from its advice is limited to differing conclusions in relation to site integrity for gannet at Forth Islands SPA, and kittiwake at Forth Islands SPA, Fowlsheugh SPA, and St Abb’s Head to Fast Castle SPA when considering the Combined Alpha and Bravo Developments in-combination with the 2014 consents granted for the NnGOWL Development and the ICOL Development. In reaching a different conclusion, the Scottish Ministers consider that the level of impact being adverse to site integrity is a subjective opinion. In reaching their own conclusions, the Scottish Ministers have taken account of the entire context of this assessment, in particular its highly precautionary assumptions, which make it very unlikely the number of impacted individuals will be as large as the values presented in the assessment. For these reasons the Scottish Ministers

consider the levels of assessed impact to be reasonable and are satisfied there will be no adverse impacts on site integrity of any of the SACs, SPAs or the pSPA considered in this AA.

SECTION 4: CONDITIONS

11 Requirement for conditions

- 11.1 The requirement for the below conditions is as a result of SWEL's commitments in the EIA and HRA Reports, along with SNH's advice regarding mitigation measures to ensure that there will be no adverse effect on the site integrity of the Natura sites listed above.
- 11.2 The conditions below relate to Natura concerns as well as covering other interests. The conditions here are written in their complete form and so may also refer to non-Natura interests. Where reference is made to other conditions these are numbered as per the condition numbers which will be used in the s.36 consent if granted.

1. Duration of the Consent

The consent is for a period of 25 years from the date of Final Commissioning of the Alpha Development.

Written confirmation of the dates of First Commissioning of the Alpha Development and Final Commissioning of the Alpha Development must be provided by the Company to the Scottish Ministers and to Aberdeenshire Council, Angus Council, Dundee City Council, East Lothian Council, Fife Council and Scottish Borders Council no later than one calendar month after these respective dates.

Reason: To define the duration of the consent.

2. Commencement of the Alpha Development

The Commencement of the Alpha Development must be no later than five years from the date of this consent, or in substitution such other later period as the Scottish Ministers may hereafter direct in writing. The Company must provide written confirmation of the intended date of Commencement of the Alpha Development to the Scottish Ministers and to Aberdeenshire Council, Angus Council, Dundee City Council, East Lothian Council, Fife Council and Scottish Borders Council no later than one calendar month before that date.

Reason: *To ensure that the Commencement of the Alpha Development is undertaken within a reasonable timescale after consent is granted.*

3. Decommissioning

There must be no Commencement of the Alpha Development unless a Decommissioning Programme (“DP”) has been submitted to and approved in writing by the Scottish Ministers.

The Alpha Development must be decommissioned in accordance with the approved DP, unless otherwise agreed in writing in advance with the Scottish Ministers.

Reason: *To ensure the decommissioning and removal of the Alpha Development in an appropriate and environmentally acceptable manner, and in the interests of safety and environmental protection.*

4. Assignment

This consent must not be assigned without the prior written authorisation of the Scottish Ministers. The Scottish Ministers may authorise the assignment of the consent (with or without conditions) or refuse assignment as they may see fit. The consent is not capable of being assigned, alienated or transferred otherwise than in accordance with the assignment procedure as directed by Scottish Ministers.

Reason: *To safeguard the obligations of the consent if transferred to another company.*

5. Redundant wind turbine generators

If one or more Wind Turbine Generator (“WTG”) fails to generate electricity for a continuous period of 12 months, then unless otherwise agreed in writing by the Scottish Ministers, the Company must: (i) by no later than the date of expiration of the 12 month period, submit a scheme to the Scottish Ministers setting out the manner in which the relevant WTG(s) and associated infrastructure will be removed from the site and the sea bed restored; and (ii) implement the approved scheme within six months of the date of its approval, or such other date as agreed in writing by the Scottish Ministers, all to the satisfaction of the Scottish Ministers.

Reason: *To ensure that any redundant WTG(s) is/are removed from the site, in the interests of safety, amenity and environmental protection.*

6. Incident Reporting

In the event of any breach of health and safety or environmental obligations relating to the Alpha Development during the period of this consent and decommissioning, the Company must provide written notification of the nature and timing of the incident to the Scottish Ministers within 24 hours of the incident occurring. Confirmation of remedial measures taken and/or to be taken to rectify the breach must be provided, in writing, to the Scottish Ministers within a period of time to be agreed by the Scottish Ministers.

Reason: *To keep the Scottish Ministers informed of any such incidents which may be in the public interest.*

7. Implementation in accordance with approved plans and requirements of this consent

Except as otherwise required by the terms of this consent, the Alpha Development must be constructed and operated in accordance with the Application, the Environmental Impact Assessment Report (“the EIA Report”) submitted by the Company on 14 September 2018 and the addendum to the EIA Report, submitted by the Company on 27 May 2019 and any other supplementary and supporting information lodged in support of the Application.

Reason: *To ensure that the Alpha Development is carried out in accordance with the approved details.*

8. Transportation for site inspections

As far as reasonably practicable, the Company must, on being given reasonable notice by the Scottish Ministers (of at least 72 hours), provide transportation to and from the site for any persons authorised by the Scottish Ministers to inspect the site.

Reason: *To ensure access to the site for the purpose of inspecting compliance with this consent.*

9. Construction Programme

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Construction Programme (“CoP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Scottish Natural Heritage (“SNH”), the Maritime and Coastguard Agency (“MCA”), and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers.

Commencement of the Alpha Development cannot take place until such approval is granted.

The CoP must set out:

- a) The proposed date for Commencement of the Alpha Development;
- b) The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas;
- c) The proposed timings and sequencing of construction work for all elements of the Alpha Development infrastructure;
- d) Contingency planning for poor weather or other unforeseen delays; and
- e) The scheduled date for Final Commissioning of the Alpha Development.

The final CoP must be sent to the Northern Lighthouse Board (“NLB”), Scottish Fishermen’s Federation (“SFF”), Aberdeenshire Council, Angus Council, Dundee City Council, East Lothian Council, Fife Council and Scottish Borders Council for information only.

Reason: To confirm the timing and programming of construction.

10. Construction Method Statement

The Company must, no later than six months prior to the Commencement of the Alpha Development submit a Construction Method Statement (“CMS”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the MCA, and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The CMS must include, but not be limited to:

- a) Methods of construction as they relate to all aspects of the Alpha Development.
- b) Details of the commencement dates, duration and phasing for the key elements of construction, the working areas, the construction procedures and good working practices for installing the Alpha Development.
- c) Details of the roles and responsibilities, chain of command and contact details of company personnel, any contractors or sub-contractors involved during the construction of the Alpha Development.
- d) Details of the manner in which the construction related mitigation steps proposed in the Application are to be delivered.

The CMS must adhere to the construction methods assessed in the Application. The CMS also must, so far as is reasonably practicable, be consistent with the Design Statement (“DS”), the Environmental Management Plan (“EMP”), the Vessel

Management Plan (“VMP”), the Navigational Safety Plan (“NSP”), the Piling Strategy (“PS”), the Cable Plan (“CaP”) and the Lighting and Marking Plan (“LMP”).

The final CMS must be sent to the NLB for information only.

Reason: *To ensure the appropriate construction management of the Alpha Development, taking into account mitigation measures to protect the environment and other users of the marine area.*

11. Piling Strategy

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Piling Strategy (“PS”) informed through engagement with the Forth and Tay Regional Advisory Group (“FTRAG”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, and any such other advisors as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The PS must include, but not be limited to:

- a) Details of expected noise levels from pile-drilling/driving in order to inform point d below;
- b) Full details of the proposed method and anticipated duration of piling to be carried out at all locations;
- c) Details of soft-start piling procedures and anticipated maximum piling energy required at each pile location;
- d) Details of any mitigation such as Passive Acoustic Monitoring (“PAM”), Marine Mammal Observers (“MMO”), use of Acoustic Deterrent Devices (“ADD”) and monitoring to be employed during pile-driving, as agreed by the Scottish Ministers; and
- e) A Marine Mammal Mitigation Plan (“MMMP”).

The PS must be in accordance with the Application and must also reflect any relevant monitoring or data collection carried out after submission of the Application. The PS must demonstrate the means by which the exposure to and/or the effects of underwater noise have been mitigated in respect to harbour porpoise, minke whale, bottlenose dolphin, harbour seal, grey seal and Atlantic salmon.

The PS must, so far as is reasonably practicable, be consistent with the EMP, the Project Environmental Monitoring Programme (“PEMP”) and the CMS.

Reason: *To mitigate the underwater noise impacts arising from piling activity.*

12. Development Specification and Layout Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Development Specification and Layout Plan (“DSLPL”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Aberdeenshire Council, Angus Council, East Lothian Council, Fife Council, Dundee City Council, Scottish Borders Council, SNH, the MCA, the NLB, the SFF, the Ministry of Defence (“MOD”), and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The DSLPL must include, but not be limited to the following:

- a) A plan showing the location of each individual WTG (subject to any required micro-siting), including information on WTG spacing, WTG identification/numbering, seabed conditions, bathymetry, confirmed foundation type for each WTG and any key constraints recorded on the site;
- b) A list of latitude and longitude co-ordinates accurate to three decimal places of minutes of arc for each WTG. This should also be provided as a Geographic Information System shape file using WGS84 format;
- c) A table or diagram of each WTG dimensions including - height to blade tip (measured above Lowest Astronomical Tide (“LAT”)) to the highest point, height to hub (measured above LAT to the centreline of the generator shaft), rotor diameter and maximum rotation speed;
- d) The generating output of each WTG used on the site (Figure 1) and a confirmed generating output for the site overall;
- e) The finishes for each WTG (see condition [24](#) on WTG lighting and marking); and
- f) The length and proposed arrangements on the seabed of all inter-array cables.

Reason: *To confirm the final Development specification and layout.*

13. Design Statement

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Design Statement (“DS”), in writing, to the Scottish Ministers. The DS, which must be signed off by at least one qualified landscape architect, as instructed by the Company prior to submission to the Scottish Ministers, must include representative wind farm visualisations from key viewpoints as agreed with the Scottish Ministers, based upon the final DSLPL as approved by the Scottish Ministers as updated or amended. The Company must provide the DS, for information only, to Aberdeenshire Council, Angus Council, East Lothian Council, Fife Council, Dundee City Council, Scottish Borders Council.

Reason: To ensure that the Alpha Development is carried out in accordance with the approved details, and to inform interested parties of the final wind farm scheme proposed to be built.

14. Evidence supporting ornithology collision risk assessment.

In the event that the Company builds both the Alpha Development and the Seagreen Bravo Offshore Wind Farm (“the Bravo Development”), and the ratio of the WTGs is not 50:50, the Company must, no later than six months prior to the Commencement of the Alpha Development provide evidence using a methodology approved by the Scottish Ministers that the collision risk effects on kittiwake and gannet are no greater than what was assessed for the worst case scenario of 120 WTGs in the Application, if this evidence is requested by the Scottish Ministers. Such approval may only be granted following consultation by the Scottish Ministers with any advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

Reason: To ensure that the effects upon kittiwake and gannet are no greater than those assessed within the Appropriate Assessment.

15. Environmental Management Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit an Environmental Management Plan (“EMP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, SFF, East Lothian Council, and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The EMP must provide the over-arching framework for on-site environmental management during the phases of development as follows:

- a) All construction as required to be undertaken before the Final Commissioning of the Alpha Development; and
- b) The operational lifespan of the Alpha Development from the Final Commissioning of the Alpha Development until the cessation of electricity generation (environmental management during decommissioning is addressed by the Decommissioning Programme provided for by condition 3).

The EMP must be in accordance with the Application insofar as it relates to environmental management measures. The EMP must set out the roles, responsibilities and chain of command for the Company personnel, any contractors or sub-contractors in respect of environmental management for the protection of environmental interests during the construction and operation of the Alpha

Development. It must address, but not be limited to, the following over-arching requirements for environmental management during construction:

- a) Mitigation measures to prevent significant adverse impacts to environmental interests, as identified in the Application and pre-consent and pre-construction monitoring or data collection, and include reference to relevant parts of the CMS (refer to condition **10**);
- b) Marine Pollution and Contingency Plan (“MPCP”);
- c) Management measures to prevent the introduction of invasive non-native marine species;
- d) A site waste management plan (dealing with all aspects of waste produced during the construction period), including details of contingency planning in the event of accidental release of materials which could cause harm to the environment. Wherever possible, the waste hierarchy of reduce, reuse and recycle should be encouraged; and
- e) The reporting mechanisms that will be used to provide the Scottish Ministers and relevant stakeholders with regular updates on construction activity, including any environmental issues that have been encountered and the way in which these have been addressed.

The EMP must be regularly reviewed by the Company and the Scottish Ministers or FTRAG, at intervals agreed by the Scottish Ministers. Reviews must include, but not be limited to, the reviews of updated information on construction methods and operations of the Alpha Development and updated working practices.

The EMP must be informed, so far as is reasonably practicable, by the baseline monitoring or data collection undertaken as part of the Application and the PEMP.

The final EMP must be sent to Aberdeenshire Council, Angus Council, Dundee City Council, Fife Council and Scottish Borders Council for information only.

Reason: To ensure that all construction and operation activities are carried out in a manner that minimises their impact on the environment, and that mitigation measures contained in the Application, or as otherwise agreed are fully implemented.

16. Vessel Management Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Vessel Management Plan (“VMP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the MCA, the NLB, the SFF, Forth Ports (“FP”), and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The VMP must include, but not be limited to, the following details:

- a) The number, types and specification of vessels required;
- b) How vessel management will be coordinated, particularly during construction, but also during operation of the Alpha Development; and
- c) Location of working port(s), the routes of passage, the frequency with which vessels will be required to transit between port(s) and the site and indicative vessel transit corridors proposed to be used during construction and operation of the Alpha Development.

The confirmed individual vessel details must be notified to the Scottish Ministers in writing no later than 14 days prior to the Commencement of the Alpha Development, and thereafter, any changes to the details supplied must be notified to the Scottish Ministers, as soon as practicable, prior to any such change being implemented in the construction or operation of the Alpha Development.

The VMP must, so far as is reasonably practicable, be consistent with the CMS, the EMP, the PEMP, the NSP, the FMMS and the LMP.

Reason: To mitigate the impact of vessels.

17. Operation and Maintenance Programme

The Company must, no later than three months prior to the Commissioning of the first WTG, submit an Operation and Maintenance Programme (“OMP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the MCA and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers.

The OMP must set out the procedures and good working practices for operations and the maintenance of the WTG’s, substructures, and inter-array cable network of the Alpha Development. Environmental sensitivities which may affect the timing of the operation and maintenance activities must be considered in the OMP.

The OMP must, so far as is reasonably practicable, be consistent with the EMP, the PEMP, the VMP, the NSP, the CaP and the LMP.

The final OMP must be sent to the NLB for information only.

Reason: To safeguard environmental interests during operation and maintenance of the Alpha Development.

18. Navigational Safety Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Navigational Safety Plan (“NSP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MCA, FP, the NLB and any other navigational advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The NSP must include, but not be limited to, the following issues:

- a) Navigational safety measures;
- b) Construction exclusion zones;
- c) Notice(s) to mariners and radio navigation warnings;
- d) Anchoring areas;
- e) Temporary construction lighting and marking; and
- f) Buoyage.

The Company must confirm within the NSP that they have taken into account and adequately addressed all of the recommendations of the MCA in the current Marine Guidance Note (“MGN”) 543, and its annexes that may be appropriate to the Alpha Development, or any other relevant document which may supersede this guidance prior to approval of the NSP.

Reason: *To mitigate the navigational risk to other legitimate users of the sea.*

19. Emergency Response Co-operation Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit an Emergency Response Co-operation Plan (“ERCoP”) for the construction, operation, maintenance and decommissioning phases of the Alpha Development, in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MCA. Commencement of the Alpha Development cannot take place until such approval is granted. The ERCoP should follow the MCA [template and guidance](#). The ERCoP must be developed in discussion with the MCA.

The final ERCoP must be sent to the NLB for information only.

Reason: *For emergency response planning relating to the Alpha Development and requirements for Search And Rescue (“SAR”) helicopter operations.*

20. Inter Array Cable Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Cable Plan (“CaP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the MCA, the NLB, the SFF and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted. The CaP must be in accordance with the Application.

The CaP must include, but not be limited to, the following:

- a) The vessel types, location, duration and cable laying techniques for the inter array cables;
- b) The results of monitoring or data collection work (including geophysical, geotechnical and benthic surveys) which will help inform inter array cable routing;
- c) Technical specification of inter array cables, including a desk based assessment of attenuation of electro-magnetic field strengths and shielding;
- d) A Cable Burial Risk Assessment (“CBRA”) to ascertain burial depths and where necessary alternative protection measures;
- e) Methodologies and timetable for post-construction and operational surveys (including over trawl) of the inter array cables with measures to address and report to the Scottish Ministers any exposure of inter array cables.

Any consented cable protection works must ensure existing and future safe navigation is not compromised. The Scottish Ministers will accept a maximum of 5% reduction in surrounding depth referenced to Chart Datum. Any greater reduction in depth must be agreed in writing by the Scottish Ministers.

Reason: To ensure all environmental and navigational issues are considered for the location and construction of the inter array cables.

21. Lighting and Marking Plan

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Lighting and Marking Plan (“LMP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Aberdeenshire Council, Angus Council, East Lothian Council, Fife Council, Dundee City Council, the Scottish Borders Council, the MCA, the NLB, the MOD and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The LMP must provide that the Alpha Development be lit and marked in accordance with the current Civil Aviation Authority (“CAA”) and MOD aviation lighting policy and

guidance that is in place as at the date of the Scottish Ministers approval of the LMP, or any such other documents that may supersede this guidance prior to the approval of the LMP.

The LMP must also detail the navigational lighting requirements detailed in the International Association of Marine Aids to Navigation and Lighthouse Authorities (“IALA”) Recommendation O-139 or any other documents that may supersede this guidance prior to approval of the LMP.

Reason: *To ensure navigational safety and the safe marking and lighting of the Alpha Development.*

22. Aviation Radar

The Company must, prior to the Commencement of the Alpha Development, submit an Air Traffic Control Radar Mitigation Scheme (“ATC Scheme”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with the MOD. Commencement of the Alpha Development cannot take place until such approval is granted.

The ATC Scheme is a scheme designed to mitigate the impact of the Alpha Development upon the operation of the Primary Surveillance ATC Radar at RAF Leuchars (“the Radar”) and the air traffic control operations of the MOD which is reliant upon the Radar.

The ATC Scheme must set out the appropriate measures to be implemented to mitigate the impact of the Alpha Development on the Radar and must be in place for the operational life of the Alpha Development provided the Radar remains in operation.

No WTGs forming part of the Alpha Development may become operational, unless and until all those measures required by the approved ATC Scheme to be implemented prior to the operation of the turbines have been implemented and the Scottish Ministers have confirmed this in writing. The Alpha Development must thereafter be operated fully in accordance with the approved ATC Scheme.

Reason: *To mitigate the adverse impacts of the Alpha Development on the air traffic control radar.*

23. Air Defence Radar Mitigation Scheme

The Company must, prior to the Commencement of the Alpha Development, submit an Air Defence Radar Mitigation Scheme (“ADRM Scheme”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following

consultation of the ADRM Scheme with the MOD. Commencement of the Alpha Development cannot take place until such approval is granted.

The ADRM Scheme must address the impacts on the Air Defence Radar at Remote Radar Head (“RRH”) Buchan and RRH Brizlee Wood.

The Company must comply with all obligations within the approved ADRM Scheme for the duration of the operational life of the Alpha Development.

Reason: *To mitigate the adverse impact of the Alpha Development on air defence radar at RRH Buchan and RRH Brizlee Wood.*

24. Primary Radar Mitigation Scheme

No part of any WTG shall be erected until a Primary Radar Mitigation Scheme (“PRMS”) has been submitted to and approved in writing by the Scottish Ministers following consultation with Aberdeen Airport Limited, NATS (En Route) Public Limited Company (“NERL”) and the MOD. Commencement of the Alpha Development cannot take place until such approval is granted.

No WTG shall be erected until the technical mitigation measures set out in the approved PRMS have been implemented in accordance with its terms and the Alpha Development must thereafter be operated fully in accordance with such approved PRMS.

Reason: *To mitigate adverse impact to the radar and associated air traffic operations at Aberdeen Airport.*

25. Charting requirements

The Company must, prior to the Commencement of the Alpha Development, and following confirmation of the approved DSLP by the Scottish Ministers (refer to condition **12**), provide the positions and maximum heights of the WTGs, and construction equipment to the United Kingdom Hydrographic Office (“UKHO”), and Defence Geographic Centre (“DGC”) for aviation and nautical charting purposes. The Company must, within one month of the Final Commissioning of the Alpha Development, provide the coordinates accurate to three decimal places of minutes of arc for each WTG, position and maximum height of the WTGs to UKHO, MOD and DGC for aviation and nautical charting purposes.

Reason: *For aviation and navigational safety.*

26. Project Environmental Monitoring Programme

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Project Environmental Monitoring Programme (“PEMP”), in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with SNH, the SFF, the Royal Society for the Protection of Birds Scotland (“RSPB Scotland”), and any other environmental advisors or organisations as required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted. The PEMP must be in accordance with the Application as it relates to environmental monitoring.

The PEMP must set out measures by which the Company must monitor the environmental impacts of the Alpha Development. Monitoring is required throughout the lifespan of the Alpha Development where this is deemed necessary by the Scottish Ministers. Lifespan in this context includes pre-construction, construction, operational and decommissioning phases.

The Scottish Ministers must approve all initial methodologies for the above monitoring, in writing and, where appropriate, in consultation with FTRAG referred to in condition 7 of this consent in respect to all receptors listed below in point a).

Monitoring must be done in such a way as to ensure that the data which is collected allows useful and valid comparisons between different phases of the Alpha Development. Monitoring may also serve the purpose of verifying key predictions in the Application. In the event that further potential adverse environmental effects are identified, for which no predictions were made in the Application, the Scottish Ministers may require the Company to undertake additional monitoring.

The PEMP must cover, but not be limited to, the following matters:

- a) Pre-construction, construction and post-construction (if considered appropriate by the Scottish Ministers) monitoring or data collection as relevant in terms of the Application, and any subsequent monitoring or data collection for impacts on the following receptors:
 1. Birds;
 2. Marine Mammals;
 3. Commercial Fisheries;
 4. Diadromous fish;
 5. Benthic communities; and
 6. Seabed scour and local seabed sediment deposition

- b) The participation by the Company to contribute to data collection or monitoring of wider strategic relevance, identified and agreed by the Scottish Ministers.

The Company have committed to developing an Ornithology Monitoring Strategy (“OMS”) which will validate the findings of the EIA Report. The OMS must be submitted to the Scottish Ministers for their written approval, the approved OMS will be used to inform the PEMP.

Due consideration must be given to the Scottish Marine Energy Research (“ScotMER”) programme, or any successor programme formed to facilitate these research interests.

Any pre-consent monitoring or data collection carried out by the Company to address any of the above issues may be used in part to discharge this condition subject to the written approval of the Scottish Ministers.

The PEMP is a live document which will be regularly reviewed by the Scottish Ministers, at timescales to be determined by them to identify the appropriateness of on-going monitoring. Following such reviews, the Scottish Ministers may, in consultation with the FTRAG require the Company to amend the PEMP and submit such an amended PEMP, in writing, to the Scottish Ministers, for their written approval. Such approval may only be granted following consultation with the FTRAG and any other environmental, or such other advisors as may be required at the discretion of the Scottish Ministers.

The Company must submit written reports and associated raw and processed data of such monitoring or data collection to the Scottish Ministers at timescales to be determined by them. Consideration should be given to data storage, analysis and reporting and be to Marine Environmental Data and Information Network (“MEDIN”) standards.

Subject to any legal restrictions regarding the treatment of the information, the results are to be made publicly available by the Scottish Ministers, or by such other party appointed at their discretion.

The Scottish Ministers may agree, in writing, that monitoring may be reduced or ceased before the end of the lifespan of the Alpha Development.

Reason: To ensure that appropriate and effective monitoring of the impacts of the Alpha Development is undertaken.

27. Forth and Tay Regional Advisory Group

The Company must participate in the Forth and Tay Regional Advisory Group (“FTRAG”) or any successor group, established by the Scottish Ministers for the purpose of advising the Scottish Ministers on research, monitoring and mitigation programmes for, but not limited to, ornithology, marine mammals, diadromous fish, benthic and marine fish. The extent and nature of the Company’s participation in the Regional Advisory Group is to be agreed by the Scottish Ministers.

Reason: *To ensure effective environmental monitoring and mitigation is undertaken at a regional scale.*

28. Fisheries Management and Mitigation Strategy

The Company must no later than six months prior to the Commencement of the Alpha Development, submit a Fisheries Management and Mitigation Strategy (“FMMS”), in writing, to the Scottish Ministers for their written approval, in consultation with SFF and other fisheries representatives. Commencement of the Alpha Development cannot take place until such approval is granted. The FMMS must be defined and finalised in consultation with the Forth and Tay Commercial Fisheries Working Group (“FTCFWG”).

In order to inform the production of the FMMS, the Company must monitor or collect data as relevant and agreed with Scottish Ministers.

The FMMS must include a transit plan, which must lay out guidelines to address potential interactions with fishing activity, for vessels operating in and around the Alpha Development and transiting to the Alpha Development.

As part of any finalised FMMS, the Company must produce and implement a mitigation strategy for each commercial fishery that can prove to the Scottish Ministers that they would be adversely affected by the Alpha Development. The Company, any contractors, or sub-contractors working for the Company must implement the mitigation measures committed to be carried out by the Company within the FMMS. The Company must participate in and remain a member of the FTCFWG or any successor group formed to facilitate commercial fisheries dialogue.

Reason: *To mitigate the impact on commercial fishermen.*

29. Environmental Clerk of Works

Prior to the Commencement of the Alpha Development, the Company must at its own expense, and with the approval of the Scottish Ministers in consultation with SNH, appoint an independent Environmental Clerk of Works (“ECoW”). The ECoW must be

appointed in time to review and approve the draft version of the first plan or programme submitted under this consent to Scottish Ministers, in sufficient time for any pre-construction monitoring requirements, and remain in post until agreed by the Scottish Ministers. The terms of appointment must also be approved by the Scottish Ministers in consultation with SNH.

The terms of the appointment must include, but not be limited to:

- a) Quality assurance of final draft versions of all plans and programmes required under this consent;
- b) Responsible for the monitoring and reporting of compliance with the consent conditions and the environmental mitigation measures for all wind farm infrastructure;
- c) Provision of on-going advice and guidance to the Company in relation to achieving compliance with consent conditions, including but not limited to the conditions relating to and the implementation of the CMS, the EMP, the PEMP, the PS, the CaP and the VMP;
- d) Provision of reports on point b & c above to the Scottish Ministers at timescales to be determined by the Scottish Ministers;
- e) Induction and toolbox talks to onsite construction teams on environmental policy and procedures, including temporary stops and keeping a record of these;
- f) Monitoring that the Alpha Development is being constructed in accordance with the plans and this consent, the Application and in compliance with all relevant regulations and legislation;
- g) Reviewing and reporting incidents/near misses and reporting any changes in procedures as a result to the Scottish Ministers; and
- h) Agreement of a communication strategy with the Scottish Ministers.

Reason: *To ensure effective monitoring of and compliance with the environmental mitigation and management measures associated with the Alpha Development.*

30. Fisheries Liaison Officer

Prior to the Commencement of the Alpha Development, a Fisheries Liaison Officer (“FLO”), must be appointed by the Company and approved, in writing, by the Scottish Ministers (following consultation with SFF and the FTCFWG). The FLO must be appointed by the Company for the period from Commencement of the Alpha Development until the Final Commissioning of the Alpha Development. The identity and credentials of the FLO must be included in the EMP (referred to in condition **15**). The FLO must establish and maintain effective communications between the Company, any contractors or sub-contractors, fishermen and other users of the sea during the construction of the Alpha Development, and ensure compliance with best practice guidelines whilst doing so.

The responsibilities of the FLO must include, but not be limited to:

- a) Establishing and maintaining effective communications between the Company, any contractors or sub-contractors, Fishing Industry Representatives (“FIR”) fishermen and other users of the sea concerning the overall Alpha Development and any amendments to the CMS and site environmental procedures;
- b) The provision of information relating to the safe operation of fishing activity on the site of the Alpha Development; and
- c) Ensuring that information is made available and circulated in a timely manner to minimise interference with fishing operations and other users of the sea.

Reason: *To facilitate engagement with the commercial fishing industry.*

31. Protocol for Archaeological Discoveries

The Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Protocol for Archaeological Discoveries (“PAD”) and a Written Scheme of Investigation (“WSI”) which sets out what the Company must do on discovering any marine archaeology during the construction, operation, maintenance and monitoring of the Alpha Development, in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Historic Environment Scotland (“HES”) and any such advisors as may be required at the discretion of the Scottish Ministers.

Commencement of the Alpha Development cannot take place until such approval is granted. The Reporting Protocol must be implemented in full, at all times, by the Company.

Reason: *To ensure any discovery of archaeological interest is properly and correctly reported.*

32. Construction Traffic Management Plan

In the event that major offshore components require onshore abnormal load transport, the Company must, no later than six months prior to the Commencement of the Alpha Development, submit a Construction Traffic Management Plan (“CTMP”) in writing, to the Scottish Ministers for their written approval. Such approval may only be granted following consultation by the Scottish Ministers with Transport Scotland and any such other advisors as may be required at the discretion of the Scottish Ministers. Commencement of the Alpha Development cannot take place until such approval is granted.

The CTMP must include:

- a) A mitigation strategy for the proposed route for any abnormal loads on the trunk road network including any accommodation measures required, incorporating the removal of street furniture, junction widening, or traffic management of road based traffic and transportation associated with the construction of the Alpha Development. All construction traffic associated with the Alpha Development must conform to the approved CTMP; and
- b) Any additional signing or temporary traffic control measures deemed necessary due to the size or length of loads being delivered or removed as a result of the Alpha Development, must be undertaken by a recognised QA traffic management consultant.

Reason: To maintain the free flow and safety of the trunk road network.

APPENDIX 1: IN-COMBINATION ASSESSMENT – OTHER PLANS AND PROJECTS

12 In-Combination Assessment (Other Plans & Projects) - Introduction

- 12.1 The AA above provides a detailed in-combination assessment with the other Forth and Tay Developments (and where relevant other UK wind farms) for ornithology and also with the other Forth and Tay Developments, Moray East, Moray West and Beatrice offshore wind farms and AHEP for bottlenose dolphin.
- 12.2 The Scottish Ministers are aware of a number of activities which currently have a marine licence and/or s.36 consent and where LSE was identified on the qualifying interests of the Forth Islands SPA, Fowlsheugh SPA, St Abb’s Head to Fast Castle SPA, Buchan Ness to Collieston Coast SPA, Outer Firth of Forth and St Andrews Bay Complex pSPA, Moray Firth SAC, Firth of Tay and Eden Estuary SAC, Berwickshire and North Northumberland Coast SAC and Isle of May SAC. The Scottish Ministers have considered these other projects in reaching their conclusions above.
- 12.3 Table 29 below provides a summary of the projects which have been considered in this assessment. An overall conclusion regarding in-combination effects is included within the main body of the AA.

Table 29 Projects for which there is currently an active marine licence or s.36 consent and where LSE was identified on the qualifying interests of the sites

Project Name	Licence/Consent Type(s)	Relevant site(s)
The NnGOWL Development	Construction of offshore wind farm	<ul style="list-style-type: none"> • Forth Islands SPA • Fowlsheugh SPA • St. Abb’s Head to Fast Castle SPA • Buchan Ness to Collieston Coast SPA • Outer Firth of Forth and St. Andrew’s Bay Complex pSPA • Moray Firth SAC • Firth of Tay and Eden Estuary SAC • Berwickshire and North Northumberland Coast SAC

Appendix 1 – In-combination assessment – other plans and projects

		<ul style="list-style-type: none"> • Isle of May SAC
The ICOL Development	Construction of offshore wind farm	<ul style="list-style-type: none"> • Forth Islands SPA • Fowlsheugh SPA • St. Abb's Head to Fast Castle SPA • Buchan Ness to Collieston Coast SPA • Outer Firth of Forth and St. Andrew's Bay Complex pSPA • Moray Firth SAC • Firth of Tay and Eden Estuary SAC
Beatrice	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC
Moray East and Associated Modified Offshore Transmission Infrastructure	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC
Moray West	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC
AHEP	Construction, deposit/use of explosives, dredging and sea disposal	<ul style="list-style-type: none"> • Moray Firth SAC • Isle of May SAC • Forth Islands SPA • Fowlsheugh SPA • Buchan Ness to Collieston Coast SPA
Dounreay Tri Floating Wind Demonstration Project	Construction of offshore wind farm	<ul style="list-style-type: none"> • Forth Islands SPA • Fowlsheugh SPA • Buchan Ness to Collieston Coast SPA • Outer Firth of Forth and St Andrews Bay Complex pSPA
EOWDC	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC • Fowlsheugh SPA • Buchan Ness to Collieston Coast SPA
Forth Ports – Leith and Rosyth	Maintenance dredging and sea disposal	<ul style="list-style-type: none"> • Outer Firth of Forth and St Andrews Bay Complex pSPA

Appendix 1 – In-combination assessment – other plans and projects

Forth Road Bridge	Construction maintenance works	<ul style="list-style-type: none"> • Forth Islands SPA
Forthwind	Construction of offshore wind farm	<ul style="list-style-type: none"> • Outer Firth of Forth and St Andrews Bay Complex pSPA
Hywind	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC • Forth Islands SPA • Fowlsheugh SPA • Buchan Ness to Collieston Coast SPA
Kincardine	Construction of offshore wind farm	<ul style="list-style-type: none"> • Moray Firth SAC • Forth Islands SPA • Fowlsheugh SPA • Buchan Ness to Collieston Coast SPA • Outer Firth of Forth and St Andrews Bay Complex pSPA
ORE Catapult	Construction of offshore wind farm	<ul style="list-style-type: none"> • Outer Firth of Forth and St Andrews Bay Complex pSPA
Port of Cromarty Firth – Phase 4 Development (Invergordon)	Construction, dredging and sea disposal	<ul style="list-style-type: none"> • Moray Firth SAC
Port of Cromarty Firth – West Harbour	Capital dredging and sea disposal	<ul style="list-style-type: none"> • Moray Firth SAC
Granton Harbour Marina Development	Construction, dredging and sea disposal	<ul style="list-style-type: none"> • Forth Islands SPA • Outer Firth of Forth and St Andrews Bay Complex pSPA • Isle of May SAC • Berwickshire and North Northumberland Coast SAC
Ardersier Port Development	Construction and dredging	<ul style="list-style-type: none"> • Moray Firth SAC
Seawall Repairs, Guardbridge, Fife	Construction	<ul style="list-style-type: none"> • Firth of Tay and Eden Estuary SAC
Motray Seawall Repairs, Guardbridge, Fife	Construction	<ul style="list-style-type: none"> • Firth of Tay and Eden Estuary SAC

13 Project Descriptions

13.1 Descriptions of the projects considered in the in-combination assessment are detailed below.

Offshore Renewables Projects

13.2 The NnGOWL Development

13.2.1 Construction and operation of the NnGOWL Development, located 15.5km east of Fife Ness in the Firth of Forth, for which s.36 consent was granted in October 2014. The operational lifespan of the project is expected to be 25 years. The s.36 consent for the NnGOWL Development was subsequently varied in 2015 to increase the maximum rated turbine capacity and increase the maximum turbine hub heights and platform heights. The project covers an area of approximately 150km².

13.2.2 In March 2018, NnGOWL submitted applications for marine licences and s.36 consent in respect of the revised design for the wind farm and offshore transmission infrastructure to take advantage of technological advancements in the time period since s.36 consent was granted. In December 2018, s.36 consent and marine licences were granted and the NnGOWL Development is expected to have an operational lifespan of 50 years. Construction activities are anticipated to be undertaken between the third quarter of 2019 and the fourth quarter of 2022.

Table 30 Summary of design parameters for the NnGOWL Development s.36 consent (as varied in 2015) and the s.36 consent granted in 2018

Design Envelope Parameter	As varied s.36 consent (2018)	As-varied s.36 consent (2015)
Maximum number of WTGs	54	75
Maximum rotor tip height (above LAT)	208 metres	197 metres
Maximum hub height	126 metres	115 metres
Maximum rotor diameter	167 metres	126-152 metres
Minimum spacing between WTGs	800 metres	450 metres
Blade clearance above LAT	36 metres	30.5 metres
Maximum number of piles per foundation (Offshore Substation Platforms)	8	8
Number of piles per foundation (turbines)	6	4

Appendix 1 – In-combination assessment – other plans and projects

Foundation Options	Jackets	1. Gravity Base Structures 2. Jackets
Inter-array cables	Up to 10 WTGs per collector unit Up to 14 circuits 14km cable length	Up to 6 WTGs per collector unit Up to 15 circuits 75- 120km cable length
Offshore Substation Platforms – maximum level of topside above LAT	21 metres	18 metres
Offshore Export Cable Length (per cable)	43km	33km

13.2.3 A full project description can be found [here](#).

13.3 The ICOL Development

13.3.1 Construction and operation of the ICOL Development, located 15km east of the Angus coastline, for which consent was granted in October 2014. The operational lifespan of the project is expected to be 25 years. The project covers a total area of approximately 150km²

13.3.2 In August 2018, ICOL submitted applications for marine licences and s.36 consent in respect of the revised design for the wind farm and offshore transmission infrastructure (with landfall at Cockenzie, East Lothian) to take advantage of technological advancements in the time period since consent was granted. The operational lifespan of the revised design is expected to be 50 years. Construction activities are anticipated to take approximately 24 months over a 3 year period.

Table 317 Summary of design parameters for the as-consented Inch Cape Offshore Wind Farm (2014) and the s.36 consent granted in 2019

Design Parameter	As-consented (2014)	As-consented (2019)
Maximum number of WTGs	110	72
Blade tip height (above LAT)	215m	291m
Rotor diameter	Up to 172m	Up to 250m
Offshore substation platforms	5	2
Offshore Export Cables	6	2
Foundation options	Jackets and driven piles, jacket and	As per 2014, but with the inclusion of

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	suction piles, jacket and drilled piles, jacket and gravity based and gravity base	monopiles for jackets and driven piles
Inter-array cable length	353km	190km
Export cable length	83km	8km

13.3.3 A full project description of the existing consents can be found [here](#) and the s.36 consent granted in 2019 can be found [here](#).

13.4 **Beatrice**

13.4.1 Installation and operation of an offshore wind farm which is located in the outer Moray Firth 13.5km from the Caithness coast. The total area of the development is 131.5km². The operational lifespan of the wind farm is expected to be 25 years.

13.4.2 The original application was for a design envelope of up to 277 WTGs and a maximum generating capacity of up to 1,000MW. Since consent was granted in 2014, the design has been revised and the development comprises 84 turbines. Beatrice is now operational.

13.4.3 Also included in the infrastructure is:

- Up to a maximum of three Offshore Substation Platforms (“OSPs”);
- Up to a maximum of three meteorological masts; and
- Up to 350km of inter-array cabling linking the turbines, OSPs and meteorological masts.

13.4.4 Construction started in April 2017 and will continue until approximately the end of 2019. A full project description can be found [here](#).

13.4.5 The AA for this project concluded that there would be no adverse effect on the site integrity of the Moray Firth SAC provided that the conditions set out in the AA are complied with.

13.5 **Moray East**

13.5.1 The development consists of three proposed wind farm sites: the Telford, Stevenson and MacColl wind farms all situated within the development area. The original design envelope was for up to 339 WTGs with a maximum generating capacity of up to 1,500MW. This has since been reduced to a design with a maximum generating capacity of up to 1,116MW and for a maximum of 186

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WTGs. The proposals are located on the Smith Bank in the outer Moray Firth, approximately 2km from the Caithness coastline. The operational lifespan of the wind farm is expected to be 25 years.

13.5.2 Substructure and foundation design for the WTGs will consist of either a mixture of, or one design option of:

- Concrete gravity base foundation with ballast and gravel/grout bed; or
- Steel lattice jackets with pin piles.

13.5.3 The associated offshore transmission infrastructure will consist of:

- Up to two OSPs with associated substructures and foundations;
- Inter-platform cabling within the three consented Telford, Stevenson and MacColl wind farms; and
- Up to four triplecore submarine export cables between the OSPs and the shore.

13.5.4 A full project description can be found [here](#). Construction commenced in May 2019. As of July 2019, 24 WTGs (each with three pin pile foundations) had been installed.

13.6 **Moray West**

13.6.1 The development involves the construction and operation of an offshore wind farm, located 22.5km to the east of the Caithness coastline in the outer Moray Firth, and associated offshore transmission infrastructure. The development consists of:

- A maximum of 85 WTGs with a combined generating capacity of around 850MW;
- Up to two OSPs (and associated inter-connector cabling);
- One meteorological mast; and
- Two 65km offshore export cables.

13.6.2 A full project description can be found [here](#). Pre-construction surveys are currently underway.

13.7 **Dounreay Tri Floating Wind Demonstration Project (“Dounreay Tri”)**

13.7.1 The project involves the construction of a demonstration floating offshore wind farm located at least 6km off Dounreay, Caithness and consists of the following main offshore components:

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- Two offshore wind turbines with an installed capacity of between 8 and 12MW;
- A floating foundation;
- Mooring clump weight;
- Mooring chain and/or steel lines;
- Drag embedment anchors;
- One export cable to bring the electricity ashore; and
- Scour protection for the anchors and the export cable (as necessary).

13.7.2 A full project description can be found [here](#).

13.8 EOWDC

13.8.1 Installation and operation of 11 turbines, inter-array and export cables located 2 to 4.5km east of Blackdog, Aberdeenshire.

13.8.2 Construction commenced in November 2017, beginning with foundations and cabling. Construction works are concluded and the project is now in the operational phase.

13.8.3 A full project description can be found [here](#).

13.8.4 The AA for this project concluded that there would be no adverse effect on any SPAs or SACs subject to conditions attached to the consent.

13.9 Forthwind

13.9.1 The current licence and s.36 consent in respect of this project is for the construction and operation of the Forthwind Offshore Wind Demonstration Project, which is located approximately 1km from the coast of Methil, Fife.

13.9.2 The project consists of two, two-bladed lattice structure WTGs, associated infrastructure, two electricity offshore export cables with an overall project footprint of 37,400m².

13.9.3 The WTG parameters are as follows:

- Maximum hub height 121 metres;
- Generating capacity of up to 9MW per turbine;
- Maximum rotor diameter of 155m; and
- Three pin piled foundations per turbine.

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13.9.4 Construction has not yet commenced but is anticipated to take place over a 3 to 6 month period, followed by testing and commissioning before becoming operational.

13.9.5 A full project description can be found [here](#).

13.9.6 The AA for this project concluded that there would be no adverse effect on the site integrity of any SPA.

13.10 **Hywind**

13.10.1 Five 6MW turbines have been installed approximately 25km off the coast at Peterhead, north east Scotland, just outside the 12 nautical mile territorial water limit. It is anticipated that the project will produce up to 135GWh per year of electricity. The turbines are positioned between 800 to 1,600m apart and attached to the seabed by a three-point mooring spread and anchoring system. Three anchors are required per turbine and the radius of the mooring system extends 600 to 1,200m out from each turbine.

13.10.2 The turbines are connected by inter-array cables. The export cable, which transports electricity from the Pilot Park to shore at Peterhead, is buried where seabed conditions allow. Where this is not possible cable protection in the form of concrete mattresses and rock is required. Both the inter-array and export cables have 33 kV transfer voltage. The export cable comes ashore at Peterhead and connects to the local distribution network at SSE Peterhead Grange substation. The onshore project infrastructure comprises an underground cable approximately 1.5km in length and a small switchgear yard facility close to Peterhead Grange substation.

13.10.3 This project has now finished construction and moved into the operational phase. A full project description can be found [here](#).

13.11 **Kincardine**

13.11.1 The works consist of the construction and operation of a demonstrator floating offshore wind farm development, located to the south east of Aberdeen, approximately eight miles from the Scottish coastline. The development is considered a commercial demonstrator site, which will utilise floating semi-submersible technology to install six or eight WTGs, with a combined maximum generating capacity of 50MW, in approximately 60 to 80m of water. The proposal also includes inter-array cabling to the connection point at the onshore Redmoor substation, Altens, Aberdeen.

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13.11.2 A full project description can be found [here](#). The construction works are scheduled to take place in three phases between March 2018 and June 2020.

13.12 **ORE Catapult**

13.12.1 The project involves the construction, operation and decommissioning of a site for the testing of new designs of offshore wind turbines with a capacity of up to 7MW at the Fife Energy Park, Methil. The development will be operational for 15 years, until 2029. During this timescale there is potential for more than one turbine model to be tested at the site. Once one turbine has been tested it will be removed from the site and replaced with a new turbine which falls within the same design parameters. Only one turbine will ever be installed at any one time. The base will remain in place throughout the development.

13.12.2 The development comprises:

- A single, three bladed demonstration wind turbine with an installed capacity of up to 7MW, maximum hub height of 110m, rotor diameter of 172m, and maximum height to turbine tip of 196m;
- A personnel bridge connection between the Fife Energy Park and turbine tower;
- Construction of an onshore crane pad; and
- Construction of an onshore control compound.

13.12.3 A full project description can be found [here](#).

13.12.4 The AA for this project concluded that, based on the outputs of surveys during the first three years of operation, the population level impacts arising from the displacement of the wintering sea duck qualifying interests would not result in an adverse effect on the site integrity of the SPA.

Large-scale construction projects

13.13 **AHEP**

13.13.1 Development of a new harbour facility at Nigg Bay, Aberdeen, approximately 0.8km south of the existing harbour in Aberdeen City centre. The works include the construction of two breakwaters, quaysides and associated infrastructure, as well as a large-scale capital dredge and dredge spoil deposit operation with associated blasting activities. Works commenced in late 2016 and are scheduled to take place over a 3 year period.

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13.13.2 Full details of the project can be found [here](#). Construction works began in May 2017 with the construction of the northern breakwater. Dredging operations are expected to last until September 2019, with all marine elements of the works currently scheduled to be complete by February 2020.

13.13.3 The AA for this project concluded that there would be no adverse effect on the site integrity of any SPAs or SACs provided that the conditions set out in the AA were complied with.

13.14 Port of Cromarty Firth Phase 4 Development

13.14.1 These works involve land reclamation to provide an additional 4.5Ha of laydown space to the west of the previously completed phase 3 development, including the construction of 215m of quay wall to create a new berth adjacent to the existing berth 5, providing a 369m long combined quay face. Fendering will then be installed along berth 5 and the new berth 6.

13.14.2 A rock armour revetment will be constructed along the north and west sides of the new laydown area with a tubular and sheet piled wall forming the new quay. The existing rock armour will be removed from the western edge of the phase 3 development and re-used on phase 4. The area will then be lined with a geotextile membrane and infilled, before appropriate drainage, bollards and services are installed prior to surfacing.

13.14.3 Dredging will be required along the toe of the new revetment structure and a second campaign will be required to create a finished depth of 12 metres along the new berth. The total dredge volume is estimated to be 110,000m³, which will be deposited at the Sutors dredge spoil deposit area.

13.14.4 The works are scheduled to take place between 1 November 2018 and 31 March 2020. Full details of the project can be found [here](#).

13.14.5 The AA for this project concluded that there would be no adverse effect on the site integrity of the Moray Firth SAC provided that the resulting conditions are complied with.

13.15 Granton Harbour Marina Development

13.15.1 The Works form part of the Granton Harbour Regeneration Development. On the west side of the existing West harbour, 225m of sloping masonry revetment will be reconstructed and this will be extended to the south by the construction of a new quay wall, 110m in length. This will be a sheet piled wall which will be backfilled with around 19,322m³ of hardcore material to reclaim 6050m² of land.

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- 13.15.2 The existing western breakwater (north mole) will be extended with a 50m concrete wall. This will have an inclined slope of rock armour on the seaward side and an additional 25m of rock revetment on the end for additional protection. A new 340 berth marina, extending to approximately 22,879m², will be formed by the deposit of pontoons, held in place by piles.
- 13.15.3 A capital dredge will be required in the area of the new marina to remove 241,365m³ of material. The top 1.2m, relative to current seabed level, of material from the site excluding the area around pre-dredge sample stations 8 and 9 (where elevated levels of contaminants were indicated) will be disposed of at the Oxcars or Narrow Deep disposal grounds. The sample station 8 and 9 material, along with all material from below 1.2m will be taken for disposal on land. It is estimated that around 86,980m³ of material will be disposed of at sea and 154,385m³ will be taken for land based disposal.
- 13.15.4 Full details of the project can be found [here](#).

13.16 **Ardersier Port Development**

- 13.16.1 The Ardersier Port Development is located at the former McDermott Fabrication Yard which lies approximately 7.5km to the west of Nairn, 3km northeast of the village of Ardersier and is bounded by the Moray Firth to the north.
- 13.16.2 The works, which involve port entrance/inner channel dredging, (sheet pile) quay wall construction/realignment and quayside (berthing) dredging, are scheduled to start in 2019 and take up to 5 years to complete.
- 13.16.3 The AA for this project concluded that the impacts could be sufficiently mitigated and there would be no adverse effect on the site integrity of the Moray Firth SAC.

Dredging operations, maintenance works and small-scale construction projects

13.17 **Seawall Repairs, Guardbridge, Fife**

- 13.17.1 Repair to the East Seawall in Guardbridge, Fife, which forms the boundary between the old Guardbridge Paper Mill and the Eden Estuary. The repairs will be over 385m of seawall and include the removal and replacement of wall cope, removal of rubble behind the seawall, concrete repairs to the seawall and replacement of revetment using concrete and rock armour. Works will be carried out over four phases during 2018-2021. Works cannot be carried out between 1 October and 31 April in any calendar year, thus ensuring works are carried out outside the period that the qualifying interests of the Firth of Tay and Eden Estuary SAC are present.

13.18 Motray Seawall Repairs, Guardbridge, Fife

- 13.18.1 University of St Andrews propose to carry out repairs to the existing north Motray seawall including fixing the reinforced mesh and dry-spray concrete. The works will be undertaken in three phases, between May 2019 and September 2021. The application is for three years, however the work window is from 01 May to 30 September in any year to avoid the bird migration period.

13.19 Forth Bridge - Maintenance Works

- 13.19.1 Bridge maintenance works, incorporating various schemes as outlined in the supporting information submitted to Marine Scotland as part of the marine licence application. The programme of works is scheduled for an initial period of 5 years, with the option for 5 additional 1 year extensions and is currently anticipated to conclude by October 2020.
- 13.19.2 The AA for this project concluded that there would be no adverse effect on the site integrity of any SPA due to the extensive alternative areas of habitat available for wintering birds. SNH advised that population, displacement and disturbance effects would be minor, temporary and very limited in area.

13.20 Port of Cromarty Firth West Harbour dredging

- 13.20.1 The works consist of dredging up to 10,000 wet tonnes of material between depths of 1.2 to 3.4m and comprises a composite of approximately 69% clay/silt and 25% sand. The material is to be removed by a boat using a grab then disposed of at the Sutor's dredge spoil deposit site.
- 13.20.2 The AA for this project concluded that there would be no adverse effect on the site integrity of the Moray Forth SAC.

13.21 Rosyth and Leith Docks - Maintenance dredging and sea disposal operations

- 13.21.1 Maintenance dredge and sea disposal at the Leith and Rosyth docks and approaches. The Leith works comprise maintenance dredging of the docks and approach channel consisting of 100,000m³ of spoil per year and disposal at Narrow Deep B spoil ground for a period of 3 years. The Rosyth works comprise maintenance dredging of the docks and approach channel consisting of 400,000m³ of spoil per year and disposal at the Oxcars spoil ground for a period of 3 years.

- 13.21.2 A combined AA was undertaken for these activities due to the close proximity, complete overlap of active licence period and potentially affected Natura sites. The AA concluded that there would be no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA.

14 Assessment of in-combination effects

14.1 Assessment of in-combination effects on the Fowlsheugh SPA

- 14.1.1 The following projects have the potential to have a likely significant effect on the relevant qualifying interests of the Fowlsheugh SPA in addition to the Forth and Tay Developments considered in detail above:

- AHEP
- Dounreay Tri
- EOWDC
- Hywind
- Kincardine

- 14.1.2 The AAs for these projects concluded that there would no adverse effect on the site integrity of the Fowlsheugh SPA, either in isolation or in-combination with other plans or projects, provided that the conditions set out in the AAs and marine licences and s.36 consents were implemented and complied with. The proposed timeframes for the Seagreen Developments will overlap with the construction/operational phases of the projects listed above. The AAs for these projects identified likely significant effects on the relevant qualifying interests of the SPA during the construction/operational phases of the works as a result of collision risk and displacement and barrier effects.

- 14.1.3 The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.2 Assessment of in-combination effects on the St Abb's Head to Fast Castle SPA

- 14.2.1 The Scottish Ministers identified no additional projects to the Forth and Tay Developments which would have an in-combination effect with the Seagreen Developments on the site integrity of the St Abb's Head to Fast Castle SPA.

14.3 Assessment of in-combination effects on the Buchan Ness to Collieston Coast SPA

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14.3.1 The following projects have the potential to have a likely significant effect on the relevant qualifying interests of the Buchan Ness to Collieston Coast SPA:

- AHEP
- Dounreay Tri
- EOWDC
- Hywind
- Kincardine

14.3.2 The AAs for these projects concluded that there would no adverse effect on the site integrity of the Buchan Ness to Collieston Coast SPA, either in isolation or in-combination with other plans or projects, provided that the conditions set out in the AAs and marine licences and s.36 consents were implemented and complied with. The proposed timeframes for the Seagreen Developments will overlap with the construction/operational phases of the projects listed above. The AAs for these projects identified likely significant effects on the relevant qualifying interests of the SPA during the construction/operational phases of the works as a result of collision risks and displacement and barrier effects.

14.3.3 The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.4 **Assessment of in-combination effects on the Forth Islands SPA**

14.4.1 The following projects have the potential to have a LSE on the relevant qualifying interests of the Forth Islands SPA:

- AHEP
- Dounreay Tri
- Forth Road Bridge Maintenance Works
- Hywind
- Kincardine

14.4.2 The AAs for these projects concluded that there would no adverse effect on the site integrity of the Forth Islands SPA, either in isolation or in-combination with other plans or projects, provided that the conditions set out in the AAs and marine licences and s.36 consents were implemented and complied with. The AAs for these projects identified LSEs on the relevant qualifying interests of the SPA. Conditions were attached to the respective AAs, marine licences and s.36 consents to mitigate the impacts on the relevant qualifying interests of the SPA.

14.4.3 The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.5 Assessment of in-combination effects on the Outer Firth of Forth and St. Andrews Bay Complex pSPA

14.5.1 The following projects have the potential to have a LSE on the relevant qualifying interests of the Outer Firth of Forth and St Andrews Bay Complex pSPA:

- Dounreay Tri
- Forthwind
- Kincardine
- ORE Catapult
- Rosyth and Leith Docks Maintenance Dredge and Sea Disposal

14.5.2 The Rosyth and Leith Docks Maintenance Dredge and Sea Disposal operations are anticipated to conclude by February 2021, therefore, there may be minimal temporal overlap with the indicative construction schedule for the Seagreen Developments. The AA for these works concluded that there would be no adverse effect on site integrity due to the availability of extensive alternative areas of habitat, the ability of marine birds to move away from the disposal operations and the long history of dredge spoil disposal at the location to be utilised.

14.5.3 The AAs for the offshore wind farm projects listed above (Dounreay Tri, Forthwind, Kincardine and ORE Catapult) concluded that there would no adverse effect on the site integrity of the Outer Firth of Forth and St Andrews Bay Complex pSPA, either in isolation or in-combination with other plans or projects, provided that the conditions set out in the AAs and marine licences and s.36 consents were implemented and complied with. Conditions were attached to the respective AAs, marine licences and s.36 consents to mitigate the impacts on the relevant qualifying interests of the SPA.

14.5.4 The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.6 Assessment of in-combination effects on the Moray Firth SAC

14.6.1 In addition to the Forth and Tay Developments, the following projects have the potential to have a LSE on the relevant qualifying interests of the Moray Firth SAC:

- AHEP
- Beatrice
- EOWDC
- Hywind

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- Moray East
- Moray West
- Kincardine
- Port of Cromarty Firth Phase 4 Development
- Ardersier Port Development
- Port of Cromarty West Harbour dredging

14.6.2 The AAs for these projects concluded that there would no adverse effect on the site integrity of the Moray Firth SAC, either in isolation or in-combination with other plans or projects, provided that the conditions set out in the AAs and marine licences and s.36 consents were implemented and complied with.

14.6.3 The construction works for the AHEP works and Port of Cromarty Firth Phase 4 Development are scheduled to conclude by the end of February 2020 and March 2020 respectively and, therefore, prior to the commencement of offshore activities for the Seagreen Developments.

14.6.4 The AA for the Hywind, Beatrice and Moray East offshore wind farm works concluded that there would be LSE on the bottlenose dolphin qualifying interest of the SAC as a result of construction activities. The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.7 **Assessment of in-combination effects on the Firth of Tay and Eden Estuary SAC**

14.7.1 In addition to the Forth and Tay Developments, repair works to the seawall, Guardbridge, Fife and to the Motray Seawall, Guardbridge, Fife were the only projects identified by the Scottish Ministers as having a potential in-combination effect on the site integrity of the Firth of Tay and Eden Estuary SAC. The works will conclude by September 2021, therefore there may be temporal overlap with the timeframes for the Seagreen Developments. The works are of relatively small-scale and are scheduled to be carried out outside the period that the qualifying interests are present (1 October – 31 April each year).

14.7.2 The Scottish Ministers have considered these projects in the in-combination assessment completed.

14.8 **Assessment of in-combination effects on the Berwickshire and North Northumberland Coast SAC**

14.8.1 The Scottish Ministers identified no plans or projects apart from the Forth and Tay Developments which would have an in-combination effect with the Seagreen

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Developments on the site integrity of the Berwickshire and North Northumberland Coast SAC.

14.9 **Assessment of in-combination effects on the Isle of May SAC**

- 14.9.1 AHEP was the only plan or project in addition to the Forth and Tay Developments identified by the Scottish Ministers as having potential in-combination effects on the Isle of May SAC with the Seagreen Developments. The AHEP AA concluded that there would be no adverse effect on the site integrity of the Isle of May SAC during the construction or operational phase of the works, provided that the conditions set out in the AA, to mitigate the impacts of underwater noise, vessel movements, reduced water quality and prey availability on the grey seal qualifying interest of the SAC.
- 14.9.2 The Scottish Ministers have considered this project in the in-combination assessment completed.

APPENDIX 2: IN-COMBINATION ASSESSMENT – NORTH SEA WIND FARMS

List of the North Sea wind farms assessed for non-breeding season effects:

- East Anglia 3
- East Anglia 1
- Hornsea 3
- Blyth Demonstrator
- Dogger Creke Beck A&B
- Dogger Teeside A and Sophia
- Dudgeon
- Hornsea 1
- Hornsea 2
- Hornsea 3
- Humber Gateway
- Hywind
- Kincardine
- Lincs
- Race Bank
- Sheringham Shoal
- Teeside
- Triton Knoll
- Westermost Rough
- EOWDC
- Beatrice
- Galloper
- Greater Gabbard
- Kentish Flats Extension
- London Array
- Moray East
- Thanet
- Rampion

APPENDIX 3: DIFFERENCES BETWEEN 2014 AND 2019 SEABIRD ASSESSMENT METHODS

The table below identifies the main differences between the 2014 and 2018/2019 assessment methodologies. These differences mean that a direct comparison of the results of the 2014 and 2018/2019 assessments is not appropriate. Consequently, where results from 2014 and 2018/2019 are presented in this document, the methodological differences identified here provide context.

Table 32 Differences in methodologies between the 2014 and 2018/2019 assessments

Difference	2018/2019 Method(s)	2014 Method(s)
1. Displacement (required for puffin, guillemot, razorbill and kittiwake).		
1. a) Overall method	<p>Matrix approach used for all species, which applies an assumed displacement rate to the number of birds estimated to be present in the wind farm and surrounding buffer, and then a mortality rate is applied to those displaced birds.</p> <p>The Scoping Opinion noted the development of the SeabORD model which is an updated version of the Searle <i>et al</i> (2014)⁶⁶ model used in the 2014 assessment. The model has not been used to inform this assessment as there is not yet agreement on how it should be used (i.e., what assumptions should be made when running the model).</p>	<p>Assessment of kittiwake, razorbill and guillemot used effect estimated in Searle <i>et al</i> (2014) individual based simulation model of impacts of changes to time and energy budgets resulting from displacement from the wind farm and buffer on survival. Puffin assessment used the matrix approach.</p>

⁶⁶ Searle, K., Mobbs, D., Butler, A., Bogdanova, M., Freeman, S., Wanless, S. & Daunt, F. (2014) Population consequences of displacement from proposed offshore wind energy developments for seabirds breeding at Scottish SPAs (CR/2012/03). (Final Report to Marine Scotland Science).

Appendix 3 – Differences between 2014 and 2018/2019 seabird assessment methods

1. b) seabird data informing method	At sea density estimates	Tracking data from adult birds tagged at breeding colonies
1. c) output	Change to adult survival rate	Changes to adult survival and productivity rates
1. d) buffer area	All birds displaced from 2km buffer around offshore wind farm	All birds avoid a 1km buffer around offshore wind farm
1. e) non-breeding season	Assessed for Forth and Tay Developments	Not assessed
2. Collision Risk Modelling (CRM) differences		
2 a) (CRM) – Band model option	<p>Assessment is based on Band model Option 2 for all species except herring gull. The Option 2 model uses generic (not site specific) species specific flight height distributions from Johnston et al. (2014 corrigendum).⁶⁷</p> <p>Option 1 outputs have been provided using site-specific data to provide further context.</p> <p>For Herring gull both Option 2 and Option 3 outputs were presented, with Option 3 outputs used for assessment.</p>	Assessment was based on Band model Option 3. The Option 3 model assumes the observed distribution of birds across the rotor swept heights and calculates the appropriate collision risk at each height.
2 b) CRM - avoidance rates	<p>Kittiwake & gannet 98.9%</p> <p>Herring gull 99.5% (Option 2) and 99.0% (Option 3).</p>	All species 95% and 98%

⁶⁷ Johnston, A. , Cook, A. S., Wright, L. J., Humphreys, E. M. and Burton, N. H. (2014), Modelling flight heights of marine birds to more accurately assess collision risk with offshore wind turbines. J Appl Ecol, 51: 31-41. doi:[10.1111/1365-2664.12191](https://doi.org/10.1111/1365-2664.12191) (with corrigendum)

Appendix 3 – Differences between 2014 and 2018/2019 seabird assessment methods

2 d) CRM- nocturnal activity	Nocturnal activity scores of 2 (25%) should be used for herring gull and kittiwake and 1 (0%) for gannet).	Nocturnal activity scores of 2 (25%) should be used for herring gull and kittiwake and 2 (25%) for gannet).
2 f) CRM – non breeding season	Scope of quantitative assessment includes all the North Sea Developments for gannet and kittiwake, and Forth and Tay Developments for herring gull.	Scope of quantitative assessment limited to Forth and Tay Developments, with qualitative consideration given to the North Sea Developments other UK offshore wind farms.
3. Apportioning		
3. a) non-breeding season	BDMPS (Furness, 2015) ⁶⁸ used for gannet and kittiwake following SNH scoping advice.	None
3. b) non-breeding season months	Gannet – Autumn, October to November; Spring, December to mid-March Kittiwake – Autumn, September to December; Spring, January to mid-April Herring gull – September to March Guillemot and razorbill all non-breeding season (mid-August to end of March) impacts should be assigned to SPA as per the breeding season.	N/A
3. c) Age classes	Using proportions derived from at sea survey data or, if not available, PVA stable age structure	

⁶⁸ Furness, R.W. (2015) Non-Breeding season populations of seabirds in UK waters: population sizes for Biologically Defined Minimum Population Scales BDMPS. Report Number 164. Natural England Commissioned Reports.

Appendix 3 – Differences between 2014 and 2018/2019 seabird assessment methods

3. d) breeding season	Apportioned to SPA and non-SPA colonies using seabird 2000 data and then between SPA colonies using most recent count data. Used SNH apportioning approach for all species except for herring gull where .	Species and colonies included in Searle <i>et al</i> displacement model did not require apportioning of displacement effects. For other species and collision effects, the SNH approach and seabird 2000 data were used.
4. Population Viability Analysis (“PVA”)		
4. a) population modelling approach	Stochastic Leslie matrix PVA	Bayesian state-space models for most populations.
4. b) effect period	25 years	25 years
4. c) effect scenarios	Reductions in survival of all age classes estimated for the wind farm in isolation, with the other existing 2014 consented Forth and Tay Developments, and with the other consented or operational offshore wind farms in the eastern UK.	A range of reductions in adult survival and productivity values that were selected and run prior to the wind farm/s effects being known.

APPENDIX 4: ADDRESSING CONCERNS RAISED BY RSPB SCOTLAND

15 Addressing concerns raised by RSPB Scotland

15.1 RSPB Scotland has responded to several consultations in relation to the Applications (summarised in section 6.3). This appendix details further the way in which the Scottish Ministers have considered the concerns raised. RSPB Scotland responded to consultations as follows:

- i. During the scoping phase to inform the Scoping Opinion – September 2017
- ii. Following the Applications (including EIA Report and HRA) – November 2018
- iii. Following the EIA Addendum Report– July 2019

15.2 Scope of assessment

15.2.1 RSPB Scotland provided consultation responses during the scoping phase. On the scoping report, RSPB Scotland was in general agreement with the suggested scope and assessment methodologies for ornithological interests. Some specific further suggestions were made by RSPB Scotland, these are addressed under the appropriate headings below.

15.3 Cable installation works

15.3.1 SNH advised that impacts from the export cable installation works on the Outer Firth of Forth and St Andrew's Bay Complex pSPA could be scoped out of assessment, as this had been adequately assessed in the previous assessments for each of the Forth and Tay wind farms. RSPB queried SNH's advice (31 August 2017) stating that further information should be provided to inform the requirements of the Birds and Habitats Directives. In a subsequent response from SNH to MS-LOT (07 September 2017) SNH advised that SWEL should provide information on the export cable corridor route amongst other information regarding the cable installation works. This advice informed the Scoping Opinion, with a requirement for provision of the information advised by SNH in its 7 September 2017 note. The Applications however did not include the export cable, therefore this has not been considered in this AA.

15.4 Baseline survey data

15.4.1 SWEL used existing baseline survey data previously used for the assessments for the Original Consents. Additional survey data were collected for the breeding period during 2017, which was welcomed by RSPB Scotland in its consultation response on the Applications. High densities of some bird species were observed during the July 2017 survey. In the Applications, SWEL suggested that these high

densities were unusual, thus likely not representative of typical densities at the site, so should be excluded for assessment. RSPB Scotland stated that the full dataset (i.e. including the July 2017) should be included in the environmental assessment. Following discussion between SWEL, SNH, and MSS it was agreed that for HRA the median for this month across survey years would be used for July 2017, then the peak seasonal population derived (for displacement modelling), thus the data were included in the EIA Addendum report. In the EIA Addendum Report (part 2 – section 2) CRMs and displacement are presented both with and without the inclusion of the July 2017 data.

15.5 **Parameters used in assessment**

15.5.1 In the Applications and the subsequent EIA Addendum Report the appropriate values for a number of parameters used in assessment (e.g. avoidance rates and flight speeds incorporated into collision risk modelling) are discussed. RSPB Scotland in its consultation response to the Applications state that individual project assessments should use the parameter values set out at the scoping stage unless new scientific literature or statutory agency advice exists. The assessment has used the parameter values set out in the Scoping Opinion, with discussion around parameter values considered in the AA only with respect to understanding the level of uncertainty in assessment.

15.6 **Population viability analysis**

15.6.1 In its consultation response to the Applications, RSPB Scotland advised that HRA conclusions for SPA sites should not be based on the end projected population sizes but on ratio metrics. The Scoping Opinion advised that ratio metrics be presented for PVA outputs, specifically: i. median of the ratio of impacted to un-impacted annual growth rate; ii. median of the ratio of impacted to un-impacted population size; and iii. centile for un-impacted population that matches the 50th centile for impacted population. The HRA conclusions of this AA are based on the second metric, also known as counter-factual of population size. Use of this measure is supported by RSPB Scotland who stated in its consultation response to the EIA Addendum Report that it supports the use of this metric for assessing risks to protected species populations.

15.7 **Collision risk models**

15.7.1 The RSPB Scotland consultation response on the scoping report was in agreement with SNH on the avoidance rates to be used in collision risk modelling. RSPB Scotland advised that for gannet during the breeding period calculated collisions for an avoidance rate of 98.0% should also be presented. In this AA the avoidance rates advised by SNH and detailed in the Scoping Opinion have been used.