



Chapter 7 Ornithology

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7 Ornithology

7.1 Executive Summary

- 7.1.1 A full suite of ornithological surveys was adopted for the purposes of assessing the avian baseline conditions for the Proposed Development. The surveys included: Vantage Point surveys, breeding bird surveys, breeding raptor surveys and breeding diver surveys; all undertaken from September 2020 to August 2021.
- 7.1.2 Three raptor species of high conservation value were registered in the site during the Vantage Point and walkover surveys, no evidence of breeding within the site or within the 2 km survey area for the three species. Five species of wildfowl and divers were recorded during the surveys, with only red-throated diver and greylag goose confirmed as breeding. Four species of gull were recorded during flight activity surveys with great black-backed gull and herring gull recorded as breeding within the Study Area. Seven species of waders were recorded during the surveys, four were recorded as breeding with only one, snipe, recorded breeding in the site. Great skuas were frequently recorded from flight activity surveys and were noted as breeding in the site and survey buffer during the breeding season while small numbers of Arctic tern were also recorded but none of the three were noted as breeding within the site.
- 7.1.3 Levels of flight activity recorded at collision risk height were considered to be low or moderate for all target species. Collision risk modelling was undertaken for the most frequently recorded at risk height. Red-throated diver, curlew, great skua, great black-backed gull and herring gull were the species considered likely to register a collision risk.
- 7.1.4 An assessment of ornithology effects arising from the construction and operation of the Proposed Development was undertaken, based on the proposed layout and turbine dimensions. Through a standardised evaluation method, Important Ornithological Features were identified and brought forward for assessment if concluded to be vulnerable to effects. Important Ornithological Features taken forward for further consideration included international designations, East Mainland Coast, Shetland Special Protection Areas which are designated for wintering great northern diver and Slavonian grebe as well as a foraging area for breeding red-throated diver.
- 7.1.5 In accordance with guidelines, the impact assessment assumed the application of standard mitigation measures. With these in place, predicted effects were considered to be barely perceptible or minor and therefore not significant for all Important Ornithological Features. There is no requirement for further specific mitigation for construction and operation phases as they are considered to have barely perceptible or minor adverse significance, i.e. not significant although additional time related mitigation and an ongoing monitoring plan is proposed to further reduce risks to breeding red-throated diver as well as to continue to understand the impacts of wind farms on this species.
- 7.1.6 Likely cumulative effects with nearby operational developments, as well as those currently permitted or at application stage of planning, were also considered. No significant cumulative effects are anticipated as a result of the Proposed Development.

7.2 Introduction

- 7.2.1 This chapter provides an assessment of the likely effects of the Proposed Development on the ornithological interests covering land at Luggies Knowe, Shetland, i.e. 'the site', and the surrounding area. The site location is presented on **Figure 7.1**
- 7.2.2 This chapter presents the baseline ornithological interests and considers the likely impacts of the Proposed Development on notable species, while focusing on Important Ornithological Features (IOFs).

- 7.2.3 Likely ornithological effects of the Proposed Development are outlined, and an assessment is provided based on the value of the receptor and the magnitude of the impact giving the significance of the effect. Where appropriate, mitigation measures to enhance, prevent, minimise or control identified ornithological effects are presented and residual ornithological effects following the adoption of those measures are assessed.
- 7.2.4 This chapter (and its associated figures) is not intended to be read as a standalone assessment. Reference should be made to **Appendix 7.1 Avian Baseline Conditions** and **Appendix 7.2 Collision Risk Modelling** as well as other chapters of this EIA Report, as referenced appropriately.
- 7.2.5 Likely ornithological effects associated with the development of a wind farm can occur throughout the three main phases of a wind farm's lifespan (i.e. construction, operation and decommissioning) and may include: direct habitat loss and indirect effects on habitat quality, mortality from collision with turbines and disturbance and displacement effects.

Description of the Site

- 7.2.6 The site is located immediately southwest of the Kebister Ness peninsula, approximately 2.5 km north of Lerwick, and is predominantly open moorland, consisting of wet heath / acid grassland habitats. The site is surrounded on three sides by industrial land, including open areas of mining to the west and large processing plants to the east and then open sea. Further moorland extends south-west. A number of small lochans and the larger Loch of Kebister are found south-west of the site boundary. The only structure within the site is the operational turbine located in the north which is accessed by a hard standing track from the minor public road running along the northern site boundary.

Statement of Competence

- 7.1.1 The assessment has been carried out in accordance with the Code of Professional Conduct of the Chartered Institute of Ecology and Environmental Management (CIEEM) by Allan Taylor (BA (Hons), MSc. ACIEEM) and Richard King (BSc (Hons), MSc., MCIEEM), ecologists and ornithologists with over 20 combined years' experience.

7.3 Legislation, Policy and Guidelines

- 7.3.1 Relevant legislative and avian census documents have been taken into account as part of this ornithological assessment. With detailed descriptions in **Appendix 7.1** those of particular relevance are:
- The Ramsar Convention on Wetlands (1975);
 - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
 - The Wildlife and Countryside Act (WCA) 1981 (as amended);
 - The Wildlife and Natural Environment (Scotland) Act 2011 (as amended); and
 - The Nature Conservation (Scotland) Act 2004 (as amended).

Planning Policy

- 7.3.2 The planning policies considered include those from the Shetland Local Development Plan (LDP) (2017), those relevant aspects of National Planning Framework 4 (NPF4), Planning Advice Notes and other relevant guidance. The Planning Advice Note (PAN) 60: Planning for Natural Heritage (amended in 2008) has also been given due consideration.

Best Practice Ornithological Guidance

- 7.3.3 As well as detailed consultation with NatureScot (NS), formerly Scottish Natural Heritage (SNH), current best practice guidance on assessing ornithological interests in relation to onshore wind farm developments was followed. A full description of relevant guidance is presented in **Appendix 7.1**; however, of particular relevance to ornithology are:
- Guidelines for Ecological Impact Assessment in the UK and Ireland (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018);
 - Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2005);
 - Survey Methods for Use in Assessing the Impacts of Onshore Wind Farms on Bird Communities (SNH, 2017);
 - Windfarms and Birds: Calculating a Theoretical Collision Risk Assuming No Avoiding Action (SNH, 2000);
 - Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model (SNH, 2018a);
 - Developing field and analytical methods to assess avian collision risk at wind farms (Band *et al.* 2007);
 - Assessing Significance of Impacts from Onshore Windfarms on Birds outwith Designated Areas (SNH, 2018b);
 - Assessing the Cumulative Impacts of Onshore Wind Farms on Birds (2018c);
 - Assessing Connectivity with Special Protection Areas (2016);
 - Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012);
 - The Scottish Biodiversity Strategy, with Scottish priority species and habitats listed on the Scottish Biodiversity List (SBL), is also pertinent and is based on the former UK Biodiversity Action Plan (UK BAP), and regional biodiversity targets defined through the Shetland Local Biodiversity Action Plan (LBAP) (Shetland Islands Council, 2015); and
 - Stanbury *et al.* (2021), Birds of Conservation Concern (BoCC): the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man.

7.4 Consultation

- 7.4.1 **Table 7.1** provides details of consultations undertaken with relevant regulatory bodies, together with action undertaken by the Applicant in response to consultation feedback.

Table 7.1 – Consultation Responses

Consultee	Consultation Response	Applicant Action
Operations Officer, Northern Isles and north Highland, NatureScot. 09/09/2021	In response to reviewing the first 12 months data “We’re satisfied that the surveys carried out to date are sufficient, in particular that you got flight line information from all three diver sites to allow a full assessment of the possible impact on the SPA.”	n/a

Consultee	Consultation Response	Applicant Action
NatureScot 03/03/2021	<p>Advice:</p> <p>The guidance for onshore wind farms is available on our website and should be referred to by the developer. Where this is not followed in the EIA process, we would expect explanations to be given as to why this is the case in the EIA Report accompanying the application.</p>	<p>All NatureScot guidance has been considered as part of the assessment.</p>
	<p>The proposed survey methodology is acceptable in principle for the more common species, provided that the 2008/2009 survey covered the full area of the current proposal and that the data collected are compatible with the increased size of turbine now proposed. However, potential impact on red-throated divers connected with East Mainland Coast, Shetland Special Protected Area will need to be addressed, and this approach may not be sufficient to assess the likely impact on divers.</p> <p>The 2008/2009 surveys found only one nest site in the vicinity, whereas the more recent surveys for the Mossy Hill wind farm recorded two sites and a significant number of flights in the area of the proposed Luggie's Knowe Turbine 3.</p>	<p>The impacts on red-throated divers including the potential impacts on the East Mainland Coast, Shetland SPA are fully considered as part of the assessment.</p> <p>The design process of the windfarm has led to the southerly turbine, which was initially proposed, being removed from the design. The location of the turbine was influenced by telecom considerations and the only resultant locations were considered provide too greater risk to the breeding red-throated divers in the vicinity. The turbine in question was therefore removed from the Proposed Development and the only remaining turbine is located at one of the two previously permitted locations.</p>
	<p>East Mainland Coast, Shetland SPA is only designated for great northern diver, red-throated diver, Slavonian grebe. All other species have been removed from this designated site.</p>	<p>Point noted and designating interests updated accordingly.</p>
	<p>Mousa is also a designated SPA, for features; Arctic tern and storm petrel.</p>	<p>Point noted and all designated sites are taken into account in the assessment.</p>

Consultee	Consultation Response	Applicant Action
Shetland Islands Council 03/03/2021	<p>While Mousa is an RSPB reserve this is not really a designation and as NatureScot have highlighted it is designated as a SPA.</p>	<p>Point noted and all designated sites including Mousa SPA are taken into account as part of the assessment.</p>
	<p>As highlighted in my screening response NatureScot recommends that ornithological surveys should be carried out for a minimum of two years, therefore the applicant will need to provide strong justification if they consider that a single years survey will be sufficient. The data previously collected to support the original application is out of date and at this time the applicant has not confirmed that it fully covers the area of the new application. Given the presence of red-throated diver and the adjacent SPA for which red-throated diver is an interest feature it is considered extremely doubtful that a single years survey information for this species will be sufficient.</p>	<p>On the completion of 12 months survey consultation with NatureScot was undertaken displaying the results of the surveys to date. NatureScot agreed that we have a robust data set that included in the region of 80 red-throated diver flight lines, and this was considered sufficient to provide a reliable collision risk value and to inform the design of the wind farm in terms of reducing potential impacts presented to breeding diver lochans and key diver flight paths.</p>
	<p>The consideration of gulls and corvids moving between the waste management facility and the Loch of Kebister will also be required as part of the ornithological assessment.</p>	<p>Points noted, collision risk modelling has been completed for herring gull and great black-backed gull. Corvid activity was much reduced on previous surveys and significant numbers were mainly recorded off site.</p>
	<p>Should golden plover be identified on site it is important to note that there is limited information on the size of the golden plover population in Shetland, however, a figure of 5195 pairs (from Wilson <i>et al.</i>, 2015) is often used in EIA Reports. This is based on estimates derived from habitat models and is significantly higher than the figure of 1450 pairs in Pennington <i>et al.</i>, 2004 which is the only other Shetland estimate available. It is important to note that the figures from Wilson <i>et al.</i> are derived from Massimino <i>et al.</i> (2011) which contained the following caveat "Estimates for these two regions are likely</p>	<p>Golden plover were not recorded breeding or flying over the site during activity survey with occasional records of calling birds the only records and the point regarding golden plover numbers is noted.</p>

Consultee	Consultation Response	Applicant Action
	<p>to be significant over-estimates of true abundance, due to the limited data from these regions which mean that the spatial smooth fitted to the GAM is fitted with considerable uncertainty (see text for more details)". Shetland is one of the two regions to which this caveat refers. In view of this it is considered that the 2015 golden plover population number is likely to be an over estimate and that any assessment of impacts should not use this as the regional population estimate</p>	
<p>Shetland Amenity Trust 03/03/2021</p>	<p>The Gremista Landfill and Recycling Plant lies just to the east of the site. Very large numbers of gulls (sometimes numbering several hundred) and large numbers of nonbreeding Ravens (numbering tens) are often present at the landfill site. The gulls often leave here with large numbers then going to bathe on Loch of Kebister. Many of these will cross the proposed turbine site on a regular basis. I assume that the collision risk for these species will also be calculated as part of the EA. As well as the risk to the birds I wonder if a large volume of large gulls on a day of poor visibility could present a threat to the turbine should a mass collision occur.</p>	<p>Points noted, collision risk modelling has been completed for herring gull and great black-backed gull.</p> <p>The site design process has resulted in the dropping of the southern turbine from the final layout, the removal of this turbine significantly reduces any potential for impacts on gulls and corvids that are attracted to the recycling centre.</p>
	<p>The consultee outlined information regarding the locations of breeding red-throated diver and potential impacts of the scoping layout.</p> <p>I can confirm that Red-throated Divers have certainly bred within, or very close to the proposed site boundary in recent years, with a third pair several hundred metres further afield. In 2015 the last year for which we have survey data, two pairs bred successfully within 200-300 m of the proposed location of turbine three.</p> <p>The impact of the proposed development on Red-throated Divers crossing the area to forage in the East Mainland Coast, Shetland SPA for which the divers are one</p>	<p>The design process of the windfarm has led to the removal of the southern turbine. The turbine was influenced by telecom considerations and the only alternative locations were considered to provide too great a risk to nearby breeding red-throated diver. The turbine was dropped, as a result, and the only remaining turbine is proposed in one of the previously permitted locations.</p> <p>The impacts on red-throated diver and the SPA population</p>

Consultee	Consultation Response	Applicant Action
	of the qualifying species, is indeed an important component of the EA. It will also be important to undertake a robust assessment of the cumulative impacts on ornithological interests of all windfarms that have been permitted or are in the planning process in Shetland, as indicated in the scoping report. Prime among these will be Red-throated Divers.	are all considered as part of the assessment, including cumulative impacts.

7.5 Assessment Methods and Significance Criteria

7.5.1 This section identifies the ‘key ornithology and nature conservation issues’ which have been considered as part of the Ornithological Impact Assessment, describes the methods used to establish baseline conditions and assess the magnitude and significance of the likely ornithological effects of the Proposed Development.

Design Iteration

7.5.2 The following assessment is based on the final site layout, which has undergone various iterations over an extended process that has taken into account a variety of potential constraints. Ultimately, the final design (**Figure 1.2**) is one that has taken into consideration all of these constraints to lessen the potential for any impacts to be experienced by any single receptor across the variety of disciplines that have all provided input into the Proposed Development’s final layout (further details on design iteration are provided in **Chapter 3**). In terms of ornithology, the potential of the site to impact on sensitive ornithological receptors, in particular breeding red-throated diver, was a significant factor in the Proposed Development being reduced from two new turbines to one.

7.5.3 As part of the planning application, a micro-siting allowance of up to 50 m in all directions is sought in respect of the turbine and associated infrastructure in order to address any potential difficulties which may arise in the event that preconstruction surveys identify ornithological (or other) constraints that could be avoided. The assessments within this chapter have taken consideration of this 50 m micro-siting and it does not alter the conclusions formed as to likely effects.

Study Area

7.5.4 Appropriate study areas (i.e. the ‘Survey Area’) for each specific survey were derived from best practice guidance (SNH, 2017) and are provided below and shown in **Figure 7.1**:

- Flight activity VP surveys: the site plus up to 2 km of VP location;
- Breeding bird walkover survey: the site plus up to 500 m (access permitting);
- Breeding raptor survey: the site plus up to 2 km (access permitting); and
- Breeding diver (lochan) survey: the site plus up to 1 km (access permitting).

Desk Study

7.5.5 A desk study was undertaken of web-based resources to identify baseline data for the Proposed Development site and wider area. In terms of nature conservation designations, the desk study aims to identify international designations such as SPAs and Ramsar wetlands within 20 km of the site and national statutory designations such as Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) or Marine Nature Reserves (MNRs) within 5 km of the site boundary. Any

Local Nature Reserves (LNRs) or non-statutory designations, such as Local Biodiversity Sites, were identified within a 2 km distance of the site boundary.

7.5.6 Existing records that are freely available for commercial use of protected or otherwise notable species (e.g. SBL/LBAP priority species) were identified with a 5km distance of the site boundary. Records from the last 10 years were considered relevant to the study. Only those relating to birds are relevant to the assessments presented in this chapter.

7.5.7 Data for priority / notable species and designated sites were obtained from the following databases:

- National Biodiversity Network (NBN) Atlas;
- NatureScot SiteLink;
- Scotland's Environment Interactive Map; and
- MAGIC: Nature on the Map.

7.5.8 In addition, the Shetland Amenity Trust (SAT) were contacted to obtain breeding records for Schedule 1/Annex 1 raptors and owls and all species of conservation concern within 5 km of the site boundary.

Field Surveys

7.5.9 Ornithology field surveys for the Proposed Development were carried between September 2020 and August 2021.

7.5.10 Surveys were carried out at a variety of times and in different weather conditions to ensure data were collected that were fully representative of a range of behaviour patterns.

7.5.11 SNH (2017) guidance indicates that wind farm assessments should focus on 'target species'. NS defines ornithological target species as:

- Those protected under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended);
- Those listed on Annex 1 of the Council Directive 79/409/EEC on the Conservation of Wild Birds;
- Regularly occurring migratory species which are either rare, vulnerable or warrant species consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the proposed wind farm; and
- Species occurring at the site in nationally or regionally important numbers.

7.5.12 NS guidance goes on to note that consideration should be given to species of local conservation concern (i.e. those listed in LBAPs), but that target species should be restricted to those likely to be affected by wind farms. Pre-scoping consultation with NS, combined with the results of the data study, identified that survey work to inform the assessment should account for the potential presence of 'scarce' diurnal raptors, geese and wading bird species within and adjacent to the site.

7.5.13 A summary of the ornithological methods adopted is provided in this chapter, however, please refer to **Appendix 7.1** and **Appendix 7.2** for full details.

Vantage Point Survey

7.5.14 NS guidance advises that VP locations should be selected to achieve maximum visibility from the minimum number of survey locations. An arc of up to 180 degrees extending to 2 km from the observer can be effectively surveyed from each VP (subject to topography, vegetative screening and any other constraints to effective survey). A minimum of 36 hours of survey effort should be completed at each VP during both the breeding and non-breeding/winter periods, and the timing of VP watches should be varied to ensure that all times of day are appropriately covered.

- 7.5.15 Two VPs, one facing north and one facing south, were initially selected following review of aerial imagery and Ordnance Survey maps and then ground-truthed during an avian site scoping visit completed in September 2020. The selected VP locations were approved through consultation with NS prior to the commencement of surveys in September 2020. The location of the VPs and their respective viewsheds are presented in **Figure 7.1**.
- 7.5.16 VP surveys were completed between September 2020 and August 2021. A total of 36 hours was undertaken at each VP during the breeding season and 36 hours at each VP during the non-breeding season. VP watches were conducted for periods of no longer than 3 hours in a single watch. A minimum 30-minute break was observed between watches to allow the observer an adequate rest time between VP watches.

Breeding Bird Survey

- 7.5.17 A walkover technique based on the Brown and Shepherd method (1993) was employed and covered the site and where possible a further 500 m survey buffer. The method involved approaching within 100 m of all parts of the Survey Area to record the presence of waders. Four survey visits were conducted during the period mid-April to early July in 2021, with a minimum two-week gap between each of the survey visits. NS guidance (SNH, 2017) recommends that four survey visits should be completed over the breeding season, based on recommendations set out in Calladine *et al.* (2009). The breeding bird Survey Area with a survey buffer of 500 m is shown in **Figure 7.1**.

Breeding Raptor Survey

- 7.5.18 Surveys for breeding raptors were completed following methods as described in Hardey *et al.* (2013). A four-visit walkover survey approach was used, with survey visits being spaced between April and July 2021 and covering the site and a 2 km survey buffer (where access permissions allowed). The Survey Area was continuously scanned for target species during the walkover. This includes stops at “mini” vantage points where the view is scanned for a period (usually 15-20 minutes) across suitable habitat for target species. Surveys for breeding moorland raptors generally require four visits between April and August.
- 7.5.19 The first survey visit is primarily to detect displaying birds and/or territory occupancy by the various target species. A second visit is then used to identify active nests. The third visit is then carried out to check for the presence of young birds, and the final fourth visit is used to record fledged young (Hardey *et al.*, 2013).

Focal Diver Surveys

- 7.5.20 The potential for breeding red-throated diver on lochans in the site and wider area as well as the possibility that flight paths of both red and black-throated divers could pass over the airspace over site was mentioned during the initial consultation with NS. The presence of breeding red-throated diver within the site and a 1 km study area were noted during the breeding bird walkover and a specific diver survey for all suitable freshwater habitat between 500 m and 1 km of the site boundary was also completed.
- 7.5.21 In addition to the breeding lochan walkover survey, following the discovery of breeding activity for red-throated diver, focal diver VP surveys were undertaken to cover additional, targeted watches of breeding lochans between May and August 2021. These surveys aim to record at least 20 flightlines from each of the of diver breeding lochans identified during the breeding bird walkover surveys.
- 7.5.22 The surveys were undertaken to identify typical flight pathways used by divers to commute to and from their nesting lochan to feeding sites on the seas or other larger waterbodies that can then define a flight path used for the linear collision risk model. Survey methods followed those outlined in Gilbert *et al.* (2011). The focal lochans surveys were covered by diurnal VP surveys in two locations which covered the three known breeding lochans within the diver Study Area and recorded flightlines specifically for divers.

Survey Limitations

- 7.5.23 Full access was available onto the site and the majority of the immediate surrounding area throughout the survey period. Where access in the wider survey buffers was restricted, these areas were scanned from suitable vantage points using binoculars. As such, no significant limitation to the surveys were noted.

Evaluation Methods for Ornithological Features

- 7.5.24 The approach to the Ecological Impact Assessment (Ecia) follows the Chartered Institute of Ecology and Environmental Management guidelines (CIEEM, 2018), which prescribe an industry-standard method to define, predict and assess potential ecological effects of a development proposal. Starting with establishing the baseline through a mix of desk study and field survey, IOFs are first identified and then evaluated in terms of their vulnerability to the Development through a reasoned process considering factors such as statutory requirements, policy objectives for biodiversity, conservation status of the IOF, connectivity and spatial separation from the Development. An impact assessment is then undertaken for scoped-in IOFs that assumes construction industry-standard mitigations will be followed to ameliorate impacts as far as practicably possible. Additional mitigation strategies can then be determined to minimise any residual impacts that would otherwise be experienced by the IOF and any opportunities for enhancement identified.

- 7.5.25 In summary, the impact assessment process (CIEEM, 2018) involves:

- Identifying IOFs vulnerable to effects;
- Identifying and characterising impacts and their effects;
- Incorporating measures to avoid and mitigate negative effects;
- Assessing the significance of any residual effects after mitigation;
- Identifying the appropriate compensation methods to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

Assessing Significance

- 7.5.26 When there is the potential for the Proposed Development to have an effect on a bird species or population that may be part of, or linked to, a designated population, whether internationally such as an SPA or Ramsar population or nationally, such as an SSSI population, impacts are assessed on whether they affect the integrity of the protected site and, as such, the conservation objectives of the designation.

- 7.5.27 The species link to the protected site may be throughout the year but as detailed in the site citation documentation for the protection, it may be specific to the species' activity or the time of year. For example the protected site may be designated solely for its breeding, wintering, passage or migratory species meaning at other times of year, these species have no link to the protected site. In the situation where the bird population recorded is not considered to be protected by a designation such as an SPA, Ramsar or SSSI, the individuals are considered to be part of the 'wider area population' and in this scenario the assessment concentrates on whether there are effects on the overall population of the species in both a local (county) and wider area (Scotland) context.

- 7.5.28 The significance of the effect on an ornithological feature is determined by assessing the following three factors:

- the Nature Conservation Importance (NCI) of the species;
- the conservation status of the species; and
- the magnitude of the impact.

Nature Conservation Importance

7.5.29 Determination of the level of sensitivity of an IOF (CIEEM, 2018) to be taken forward for assessment is based on a combination of the feature’s NCI and its conservation status.

7.5.30 **Table 7.2** lists the criteria used to determine the NCI value assigned ornithological features.

Table 7.2: Evaluation Criteria for NCI

Importance	Criteria
High	<p>Populations of species receiving protection due to their inclusion as designing features of a SPA, pSPA, Ramsar or SSSI including birds outside of protected areas when there is considered to be connectivity to the site.</p> <p>Breeding population of a species listed on Schedule 1 of the Wildlife and Countryside Act (WCA).</p>
Medium	<p>More than occasional presence of target species (but not breeding) listed on Schedule 1 of the Wildlife and Countryside Act (WCA).</p> <p>A council-scale (Natural Heritage Zone - Shetland (NHZ1)) important population / area of a bird species listed on the Scottish Biodiversity List (SBL) (Scottish Government, 2013) as requiring conservation action.</p> <p>The presence of council-scale (NHZ1) breeding species noted on the latest BoCC Red-listed species (Stanbury <i>et al.</i>, 2021).</p> <p>The presence of significant number of migratory, passage or wintering species, notable due to using the site as a staging post, wintering grounds or notable migration route.</p>
Low	All other species not mentioned in categories above.

7.1.2 Where a feature qualifies under two or more criteria, the higher value is applied to the feature.

Conservation Status

7.5.31 Where possible, the conservation status for each species population was considered within the local context. The relevant population scale for assessing potential effects on breeding species in is considered to be the NHZ level. The site falls within NHZ1 – ‘Shetland’ and where possible the conservation status will be based on this area; however, for population estimates, if sufficient information on the populations does not exist, the national (Scottish) population estimate is used. For wintering or migratory species, the national (Scottish) population is considered.

7.5.32 For these purposes, conservation status was taken to mean the sum of the influences acting on a population which may affect its long term distribution and abundance. The conservation status of a species is defined by SNH (2018) as “*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest*” and they state that:

“A species’ conservation status is favourable when:

- *population dynamics indicate that the species is maintaining itself on a long-term basis and is therefore likely to persist in the habitat it occupies;*
- *the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and*

- *there is (and will probably continue to be) a sufficiently large habitat to maintain its populations on a long-term basis.*

We recommend here that the concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern.”.

7.5.33 The relevant population scale for this assessment is the NHZ1 population.

Magnitude

7.5.34 For the purposes of this assessment, magnitude was determined by consideration of the spatial and temporal nature of each impact. The levels of spatial magnitude on an ornithological feature are categorised as ‘no impact’, ‘negligible’, ‘low’, ‘medium’ or ‘high’, based on the definitions in **Table 7.3**, below, with the temporal impacts categorised in **Table 7.4**.

Table 7.3: Levels of spatial magnitude of impact

Spatial Magnitude	Description
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near loss of productivity in a bird population due to disturbance. Guide: >80 % of regional population affected.
High	Major reduction in the status or productivity of a bird population due to mortality, displacement or disturbance Guide: 21-80 % of regional population affected.
Medium	Partial reduction in the status or productivity of a bird population due to mortality, displacement or disturbance Guide: 6-20 % of regional population affected.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality, displacement or disturbance Guide: 1-5 % of regional population affected.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Reduction barely discernible, approximating to the ‘no change’ situation. Guide: <1 % of regional population affected.

Table 7.4: Levels of temporal magnitude of impact

Temporal Magnitude	Description
Immediate	Within approximately 12 months;
Short term	Within approximately 1-5 years

Temporal Magnitude	Description
Medium term:	Within approximately 6-15 years
Long term:	Between 15-25 years
Permanent	Over 25 years (impacts broadly spanning longer than the lifetime of the scheme, for the purpose of this assessment over 25 years).

Temporal Scope

7.5.35 Potential impacts on ornithological features have been assessed in the context of how the predicted baseline conditions within the Study Area might change between the surveys and the start of construction. It is anticipated that construction would take approximately 12 months to complete and would be expected to commence in c.2025 and that the baseline conditions will not materially change in the intervening time period.

Determining Ecologically Significant Effects

7.5.36 An Ecological Impact Assessment (EclA) is undertaken in relation to the baseline conditions that would be expected to occur in the absence of a development and, therefore, may include possible predictions of future changes to baseline conditions, such as environmental trends and other completed or planned development. Both adverse and beneficial impacts/effects are possible.

7.5.37 A significant effect, in ornithological terms, is defined as an effect (whether negative or positive) on the conservation status of a species within a given geographical area, including cumulative and in-combination impacts.

7.5.38 Following the classification of each species' sensitivity and consideration of the magnitude of each effect, professional judgement is used to make a reasoned assessment of the likely effect on the conservation status of each potentially affected species.

7.5.39 In accordance with the EIA Regulations, each likely effect is evaluated and classified as either significant or not significant. The significance levels of effect on bird populations are described in **Table 7.5**. Detectable changes, i.e., those of 'major' or 'moderate' significance, in the conservation status of regional populations of NCI are considered to be significant effects under the EIA Regulations. Non-significant effects are those which are likely to result in barely detectable (minor) or non-detectable (negligible) changes in the conservation status of regional (and therefore national) bird populations.

Table 7.5: Significance level of the effects

Significance of Effect	Description
Major	A detectable change to regional populations, resulting in total population loss or severe impacts to their conservation status.
Moderate	A detectable change to regional populations, resulting in population losses that are likely to impact their conservation status.
Minor	Small or barely detectable changes to regional populations, which are unlikely to impact their conservation status.
Negligible	No or barely discernible changes to regional populations, with no impact on their conservation status.

- 7.5.40 In accordance with the current CIEEM guidelines, effects of impacts are assessed in the presence of standard mitigation measures. Additional mitigation may be identified where it is required to reduce a significant effect.
- 7.5.41 Any significant effect remaining post-mitigation (the residual effect), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control in determining the application.
- 7.5.42 In addition to determining the significance of effects on IOFs, this chapter also identifies any legal requirements in relation to wildlife.

Limitations to Assessment

- 7.1.3 The surveys were undertaken at appropriate times of year, under favourable survey conditions and with full access to the majority of the Survey Area, any areas where access was restricted could be viewed clearly using binoculars. As such, no significant limitations were identified.

7.6 Baseline Conditions

- 7.6.1 This section of the report details the results of the desk study and field surveys conducted across the site and respective study areas, which provides the baseline conditions from which the impact assessment is based. This includes:
- Designated sites and desk study/external data; and
 - Protected or otherwise notable bird species.
- 7.6.2 Specific details relating to field survey methodologies and results are included within each of the relevant **Appendix 7.1 and Appendix 7.2**. The following section summarises the baseline conditions with a review of relevant results used to inform the assessment of likely ornithological impacts provided below.
- 7.6.3 Details of the numbers, timings, scientific names as well as the locations of breeding and wintering species are presented in full in **Appendix 7.1** and shown in **Appendix 7.1: Figures 3-4, 7-9** and **Appendix 7.1: Confidential Figures 5 and 6**.

Desk Study Results

- 7.6.4 **Nature Conservation Designations**
- 7.6.5 As summarised in **Appendix 7.1** and displayed on **Figure 7.2**, three international and three national statutory nature conservation designations occur within 20 km of the site, respectively. East Mainland Coast, Shetland SPA lies to the north and east of the site, 100 m from the site boundary at its closest point, Noss SPA lies 6.5 km south-east of the site and is also designated as a SSSI and a NNR, Mousa SPA lies 19 km south-south-east of the site and is also designated as a SSSI and RSPB reserve and Ward of Culswick SSSI lies 19 km west of the site.

Table 7.6: Qualifying Features of East Mainland Coast, Shetland SPA

Feature	Scientific Name	Condition * (if provided in site documentation)	Description *
Wintering / non-breeding great northern diver	<i>Gavia immer</i>	Favourable maintained (10 Feb 2010)	A mean peak annual non-breeding population of 182 individuals (7.3% of the Great Britain (GB) population) for the years 2007/08 to 2009/10.

Feature	Scientific Name	Condition * (if provided in site documentation)	Description *
Wintering / non-breeding Slavonian grebe	<i>Podiceps auritus</i>	Favourable maintained (10 Feb 2010)	A mean peak annual non-breeding population of 54 individuals (4.9% of the GB population) for the years 2006/07 to 2010/11
Foraging / breeding red-throated diver	<i>Gavia stellata</i>	Favourable maintained (10 Feb 2010)	The foraging area is available to 205 pairs of birds breeding on the nearby islands (15.8% of the GB population in 2006).

Table 7.7: Qualifying Features of Noss SPA (and including Noss SSSI and Noss NNR)

Feature	Scientific Name	Condition (if provided in site documentation)	Description *
Breeding seabird assemblage	n/a	Unfavourable Declining 1 May 2017	In excess of 20,000 seabirds.
Breeding gannet	<i>Morus bassanus</i>	Favourable Maintained 1 Jun 2014	6,860 pairs, 3% of the western European breeding population. Authors personal knowledge of monitoring this species on Noss show significantly higher figures by 2008 (approximately 9,000 pairs).
Breeding great skua	<i>Stercorarius skua</i>	Favourable Maintained 13 Aug 2013	420 pairs, 5% of EC, and 3% of western European population.
Breeding guillemot	<i>Uria aalga</i>	Unfavourable No change 23 Jun 2015	38,970 individuals 3% of EC and 1% of western European population.
Breeding fulmar	<i>Fulmarus glacialis</i>	Favourable Maintained 26 Jun 2016	6,350 pairs, 1% of the GB population.
Breeding kittiwake	<i>Rissa tridactyla</i>	Unfavourable Declining 23 Jun 2015	7,020 pairs, 1% of the GB population. Authors own knowledge of monitoring this species on Noss show significantly lower number by 2010 (less than 1000).
Breeding puffin	<i>Fratercula arctica</i>	Unfavourable Declining 10 May 2017	2,348 individuals, over 10% of the minimum qualifying assemblage of 20,000

Feature	Scientific Name	Condition (if provided in site documentation)	Description *
			Individuals.
Breeding Arctic skua (SSSI only)	<i>Stercorarius parasiticus</i>	Unfavourable Declining 2 Sept 2014	Arctic skua are also present in locally important numbers.

* All details in the descriptions as well the condition data referred to in **Table 7.7** relating to assemblage and species counts are from NatureScot, 2022a.

Table 7.8: Qualifying Features of Mousa SPA (and including Mousa SSSI)

Feature	Scientific Name	Condition* (if provided in site documentation)	Description *
Breeding storm petrel	<i>Hydrobates pelagicus</i>	Favourable Maintained 31 Jul 2015	A total of 4,750 pairs, 6% of GB & 2% of total world breeding populations.
Breeding Arctic tern	<i>Sterna paradisaea</i>	Unfavourable Declining 1 Jun 2015	Up to 1,000 pairs, 1% of GB population.
Breeding black guillemot (SSSI only)	<i>Cephus grylle</i>	Unfavourable No change 1 May 2017	No information provided in citation.

* All details in the descriptions as well the condition data referred to in **Table 7.8** relating to assemblage and species counts are from NatureScot, 2022.

Table 7.9: Qualifying Features of Ward of Culswick SSSI

Feature	Scientific Name	Condition * (if provided in site documentation)	Description *
Breeding Arctic skua (SSSI only)	<i>Stercorarius parasiticus</i>	Unfavourable Declining 2 Jun 2004	The site has supported 1% of the British population of Arctic skua.
Breeding whimbrel	<i>Numenius phaeopus</i>	Unfavourable Declining 3 Jun 2016	The site has supported up to 5% of the British population of breeding whimbrel, the site is still notable for holding over 2% of the British breeding population of whimbrel.

* All details in the descriptions as well the condition data referred to in **Table 7.9** relating to assemblage and species counts are from NatureScot, 2022a.

Non-statutory Nature Conservation Designations

7.6.6 No locally designated sites, designated for ornithological reasons, were recorded within 2 km of the site boundary, and five Important Bird Areas (IBAs) were recorded within 20 km of the site. Moorland Areas IBA is designated for a moorland breeding assemblage and lies 3.9 km north-west of the site, South Bressay IBA is designated for breeding skuas and Noss IBA are 4.8 km and 6.5 km

south-east of the site, respectively. Sandwick and Clift Hills IBA lies 14.9 km south and is also designated for breeding skuas while West Burrafirth lies 17.5 km north-west and is designated for breeding red-throated diver.

Flight Activity Summary

7.6.7

As discussed above a total of 12 months of flight activity surveys were completed at the site between September 2020 and August 2021. A summary of the results showing all target species is detailed below **Table 7.10** which shows the total number of flights recorded, the total number of flights seconds (the number of birds multiplied by the number of flight seconds) the number of flights considered at risk (with collision of the turbine rotors) and the number of flight seconds at risk. For full detail on individual flights, timings and locations see **Appendix 7.1 Annex A: Tables A3-A18** and **Appendix 7.1: Figure 3-9**.

Table 7.10: Species Recorded During Flight Activity Surveys, September 2020 to August 2021

Species	Number of Flights Recorded	Total Bird Seconds Recorded *	No. Flights Recorded 'at-risk' **	Total Flight seconds recorded 'at-risk'
Arctic tern	2	115	2	119
Common gull	10	313	5	216
Curlew	12	531	12	2,249
Glaucous gull	2	104	2	46
Great black-backed gull	116	6,077	102	14,198
Great skua	30	2,543	29	3,054
Greylag goose	18	1,870	18	1,371
Hen harrier	1	211	1	136
Herring gull	105	5,507	95	12,551
Knot	1	46	1	368
Long-tailed duck	1	94	1	188
Merlin	2	76	1	45
Oystercatcher	2	156	2	73
Red-throated diver	46	5,623	46	9,973
Snipe	2	208	2	181

*Bird seconds are calculated for each observation as the product of flight duration and number of individuals

**'At-risk' is defined as: a flight having at least part of its duration (i) at potential collision height; (ii) within the CRZ; and (iii) recorded within the 2km viewshed of the associated VP.

7.6.8 Band *et al.* (2007) devised a method by which field data on bird flight activity can be gathered and used to quantify the likelihood of bird collisions with turbines; this is known as the ‘Band’ Collision Risk Model (CRM). The Band CRM involves two methods to predict estimated collision fatalities, depending on the pattern of flight of the species involved: ‘predictable’ and ‘unpredictable’ flight methods. The model inputs the ‘at-risk’ flight seconds or number of ‘at-risk’ flights into the appropriate model along with a number of parameters such as the birds’ biometrics, the number and types of turbines and using pre-defined ‘avoidance rates’ (the likelihood of a particular species flying into a turbine) predicts a collision risk value. **Table 7.11** provides a summary of the results of the CRM process and full details are outlined **Appendix 7.2**.

Table 7.11: Collision Modelling Results

Species	Mean Annual / Breeding season Collision rate	Collisions per 25 years	Years per collision
Red-throated diver - linear (breeding season)	0.073	1.82	13.5
Red-throated diver - random (breeding season)	0.069	1.74	14.35
Curlew (annual)	0.044	1.092	22.89
Great black-backed gull (annual)	0.124	3.09	8.06
Great skua (breeding season)	0.016	0.39	63.89
Herring gull (annual)	0.144	6.94	3.59

Waterfowl and Divers

Greylag Goose

- 7.6.9 Greylag geese were confirmed as holding two territories both recorded in the 500 m survey buffer, one north of the site and one south (**Appendix 7.1: Figure 10**).
- 7.6.10 Flight activity surveys registered 18 greylag goose flights (**Appendix 7.1 Annex A: Table A9; Figure 3**); of which all 18 flights and 1,371 seconds were considered to be ‘at-risk’ (**Table 7.10**).

Red-Throated Diver

- 7.6.11 Three pairs of red-throated diver were confirmed as breeding during the breeding bird walkover surveys, one within the site and two within the 1 km survey buffer, their locations are shown in **Appendix 7.1: Confidential Figure 6**. The desk study outlined similar breeding locations within the site and 1km buffer as well as a further 47 records within the 5 km Study Area between 2011 and 2021.
- 7.6.12 Flight activity surveys registered 46 red-throated diver flights (with a total of 79 individuals recorded in flight, see **Appendix 7.1: Annex A: Table A16; Confidential Figure 5**), of which all 46 flights and 9,973 seconds were considered to take place fully or in part ‘at-risk’ height (**Table 7.10**). A collision risk value of 0.073 using the linear collision risk model and 0.069 value using the random model per breeding season (April to September) was predicted for red-throated diver (**Table 7.11**).
- 7.6.13 An additional 45 flights were registered during focal diver lochan watches (**Appendix 7.1: Annex A: Table A17; Confidential Figure 6**). A total of 50 records of red-throated diver were returned by the desk study search, five locations (some multiple records) were within 5 km of the site (**Appendix 7.1: Confidential Figure 11**).

Other Waterfowl and Divers

- 7.6.14 Flight activity surveys registered a single flight of two long-tailed duck (outside the site) and three flights totalling 16 teal. A black-throated diver was recorded on Loch of Kebister during the breeding bird surveys in August, assessed as non-breeding. No records of breeding for other waterfowl or divers were recorded during breeding bird walkover surveys.
- 7.6.15 A total of 28 records of whooper swan were identified in the desk study search area between 2011 and 2021, the nearest record over 3 km from the site, at Loch of Clickamin (**Appendix 7.1: Confidential Figure 11**).

Scarce Raptors and Owls

Merlin

- 7.6.16 Flight activity surveys registered two merlin flights (**Appendix 7.1: Annex A: Table A14; Figure 3**); however, only 45 seconds were considered to be 'at-risk' (**Table 7.10**) and therefore no significant collision risk is predicted for merlin.
- 7.6.17 The breeding bird walkover surveys found no evidence of merlin breeding activity within the Survey Area for this species. A total of nine records of merlin were returned by the desk study search, two within 5 km of the site (**Appendix 7.1: Confidential Figure 11**).

Hen harrier

- 7.6.18 Flight activity surveys registered a single hen harrier flight (**Appendix 7.1 Annex A: Table A10; Figure 3**); however, only 136 seconds were registered 'at-risk' height (**Table 7.10**). Insufficient to consider CRM and therefore no significant collision risk is predicted for hen harrier. All the flight activity was recorded during the non-breeding season (September to March) and no evidence of breeding activity was recorded for this species.

Marsh harrier

- 7.6.19 A single marsh harrier record was noted during walkover surveys and with none recorded during flight activity surveys, therefore no collision risk is predicted for marsh harrier. The flight registered was considered to be a vagrant bird on passage and no evidence of breeding activity was recorded.

Waders

Curlew

- 7.6.20 Breeding bird surveys identified a total of three (probable) breeding attempts for curlew, all outside the site boundary, in the north, west and south wider buffer of the of the Survey Area (**Appendix 7.1: Figure 10**).
- 7.6.21 Flight activity surveys registered a total of 12 curlew flights (**Appendix 7.1: Annex A: Table A5; Figure 4**); all of which (2,249 seconds) were considered to be 'at-risk' (**Table 7.10**). An annual collision risk of 0.044 is predicted for curlew, equating to one collision just under every 23 years (**Table 7.11**).

Golden Plover

- 7.6.22 Golden plover were heard but not seen during flight activity surveys, and therefore no collision risk is predicted for golden plover. No golden plover breeding territories were recorded following the breeding bird walkover. The desk study identified 41 records for golden plover within the search area recorded between 2011 and 2021.

Knot

- 7.6.23 Knot were registered on a single occasion during flight activity surveys (**Appendix 7.1: Annex A: Table A12; Figure 4**) and with a total of only 368 seconds 'at-risk' no significant collision risk is predicted for knot. Knot were not recorded as a breeding species during breeding bird walkover surveys.

Lapwing

- 7.6.24 Lapwing were heard but not seen during flight activity surveys, and therefore no collision risk is predicted for lapwing. No lapwing breeding territories were recorded following the breeding bird walkover.

Oystercatcher

- 7.6.25 Oystercatcher were registered twice during flight activity surveys (**Appendix 7.1: Annex A: Table A15; Figure 4**) and with a total of 73 seconds 'at-risk', no significant collision risk is predicted for oystercatcher. A total of three breeding territories were defined within the Survey Area, none within the site, following the breeding bird survey (**Appendix 7.1: Figure 10**).

Redshank

- 7.6.26 Redshank was not registered during flight activity surveys. A single redshank breeding territory was recorded 250 m north-east of the site (**Appendix 7.1: Figure 10**).

Snipe

- 7.6.27 A total of seven possible and probable snipe breeding territories were recorded within the Survey Area, of which two were located within the site and five in the wider 500 m survey buffer (**Appendix 7.1: Figure 10**). Snipe were registered twice during flight activity surveys (**Appendix 7.1: Annex A: Table A18; Figure 4**), and with a total of 181 seconds 'at-risk', no significant collision risk is predicted for snipe.

Other waders

- 7.6.28 Whimbrel, dunlin, turnstone, black-tailed godwit and ringed plover were not recorded during surveys but were identified by the desk study. A total of eight records of whimbrel were identified in the search area between 2011 and 2021, the nearest record was 5 km north-west of the site (**Appendix 7.1: Confidential Figure 11**). The desk study also identified six records for ringed plover, 11 for turnstone, one black-tailed godwit and 11 for dunlin.

Skuas, Terns and Gulls

Great skua

- 7.6.29 Two pairs of great skua were confirmed as breeding during the breeding bird walkover surveys, one within the site and one within the 500 m survey buffer, their locations are shown in **Appendix 7.1: Figure 10**.
- 7.6.30 Flight activity surveys registered 30 great skua flights (**Appendix 7.1: Annex A: Table A6; Figure 7**) with a total of 29 considered to be 'at risk' (see **Table 7.10**) A collision risk of 0.02 per breeding season was predicted for great skua (**Table 7.11**).

Arctic tern

- 7.6.31 No records of breeding Arctic tern were recorded during the breeding bird walkover survey. Arctic tern were registered twice during the flight activity surveys (**Appendix 7.1: Annex A: Table A3; Figure 7**). Only 45 seconds Arctic tern flight activity were considered to be 'at-risk' (**Table 7.10**) and therefore no collision risk is predicted for Arctic tern.

Common gull

- 7.6.32 Common gull were not recorded as a breeding species and were registered on ten occasions during flight activity surveys (**Appendix 7.1: Annex A: Table A4; Figure 9**). With 216 'at-risk' seconds (**Table 7.10**), no significant collision risk was predicted for common gull.

Glaucous gull

- 7.6.33 Glaucous gull are a winter visitor to the UK and as such were not recorded during the breeding season. Glaucous gull were registered twice during flight activity surveys (**Appendix 7.1: Annex A:**

Table A6; Figure 9); however, only 136 seconds were considered to be ‘at-risk’ (**Table 7.10**) and therefore no significant collision risk is predicted for glaucous gull.

Great black-backed gull

- 7.6.34 Three pairs of great black-backed gull were confirmed as breeding during the breeding bird walkover surveys, all three within the north of 500 m survey buffer, their locations are shown in **Appendix 7.1: Figure 10**. Great black-backed gull were registered on 116 occasions during flight activity surveys, with a total of 315 individuals recorded (**Appendix 7.1: Annex A: Table A7; Figure 8**). A total of 102 of the flights and 14,198 seconds was considered to be ‘at-risk’ (**Table 7.10**). An annual collision risk of 0.12 was predicted for great black-backed gull (**Table 7.11**).

Herring gull

- 7.6.35 A single pair of herring gull were confirmed as breeding during the breeding bird walkover surveys, within the eastern section of the 500 m survey buffer, the location is shown in **Appendix 7.1: Figure 10**. Herring gull were registered on 105 occasions during flight activity surveys, with a total of 271 individuals recorded (**Appendix 7.1: Annex A: Table A11; Figure 9**). A total of 95 of the flights and 12,551 seconds was considered to be ‘at-risk’ (**Table 7.10**). An annual collision risk of 0.14 was predicted for herring gull (**Table 7.11**).

Other Species

Raven

- 7.6.36 Raven (*Corvus corax*) were registered commonly during VP surveys, with occasional big groups noted associated with the recycling centre east of the site. Numbers peaked at 140 perched individuals on 18 August 2021, 43 on 14 June 2021 and 38 on 29 April 2021. The number of raven records has reduced significantly since the previous surveys at the site with species occurrence dropping from 408 registrations in 54 hours (27.5% occurrence) in 2008-2009 (Amec, 2011a) to 193 occurrences (7.6%) in 144 hours in the 2020-2021.

Other passerine species

- 7.6.37 The breeding bird survey identified a further five species breeding in small numbers within the Survey Area; BoCC Red listed species: skylark; BoCC Amber listed species: meadow pipit, red grouse and wheatear and BoCC Green listed species: hooded crow.

Likely future baseline without development

- 7.6.38 The forward baseline at the site in the case that the Proposed Development is not built is assumed to be very similar to the conditions outlined in the section above. This assumes that there will be no change in the current land use, being occasionally grazed by sheep farm and being uninhabited and undisturbed throughout much of the year. The one change in the baseline that may occur from the change in land use within the industrial areas close to the site, for example the decommissioning of the recycling centre or fish processing plant may then lead to a reduction in the presence of scavenging birds such as gulls and raven.
- 7.6.39 The majority of ornithological species on the site rely on the availability of food from within surrounding moorland, lochans, seas and beaches as well as areas of lowland grassland. It is considered unlikely that there will be any significant change in the baseline conditions in the area in the coming years should the land use remain in its current state.

Summary of Evaluation of Recorded Features

Table 7.12 - Summary of Evaluation of Ornithological Features

Feature	Summary	NCI
Designated Sites		
East Mainland Coast, Shetland SPA	The level of value follows the level of designation. Lies north-east and north-west of the site, 100m from the site boundary at its closest point. Designated for wintering great northern diver and Slavonian grebe and as a foraging location for breeding red-throated diver. The following species recorded on site are assumed to belong to the SPA population: - Red-throated diver	High
Noss SPA	The level of value follows the level of designation. Located 6.5 km south-east of the Proposed Development boundary. Designated for a seabird assemblage of international importance, breeding gannet, kittiwake, great skua, guillemot, puffin.	High
Noss SSSI	The level of value follows the level of designation. The designating features will be considered a part of the SPA which is a higher classification value with the exception of breeding Arctic skua.	High
Noss NNR	The level of value follows the level of designation. Located 6.5 km south-east of the Proposed Development boundary. Designated for seabird assemblage.	High
Ward of Culswick SSSI	The level of value follows the level of designation. Located 19 km west for breeding whimbrel and Arctic skua.	High
Mousa SPA	The level of value follows the level of designation. Located 19 km south-south-east of the Proposed Development boundary. Designated for internationally important numbers of breeding storm petrel and Arctic tern.	High
Mousa RSPB	Located 19 km south-south-east. Designated for numbers of breeding black guillemot, storm petrel and Arctic tern.	High
Mousa SSSI	Located 19 km south-south-east. Designated for numbers of breeding black guillemot, storm petrel and Arctic tern.	High
Moorland Areas IBA	Located 3.9 km north-west designated for moorland bird assemblage.	Medium

Feature	Summary	NCI
South Bressay IBA	Located 4.8 km south-east designated for breeding skuas.	Medium
Noss IBA	Located 6.5 km south-east designated for breeding seabirds.	Medium
Sandwick and Clift Hills IBA	Located 14.9 km south designated for breeding skuas.	Medium
West Burrafirih IBA	Located 17.5 km north-west designated for breeding red-throated diver.	Medium
Waterfowl and Divers		
Greylag goose	Frequently recorded in summer months, the majority of records are likely naturalised birds. BoCC Amber listed species.	Low
Long-tailed duck	Recorded once, BoCC Red listed species.	Low
Teal	Infrequently recorded, not recorded as a breeding species. BoCC Amber listed species.	Low
Black-throated diver	Recorded once, no breeding records, BoCC Amber listed species. Annex 1, Schedule 1, BoCC Amber listed and SBL species	Low
Raptors		
Hen harrier	Hen harrier is a Schedule 1, Annex 1 and an SPL species. Recorded once on passage.	Low
Marsh harrier	Marsh harrier is an Annex 1 and Schedule 1 listed species, and also listed on the SBL and the BoCC Amber list. Recorded once on passage.	Low
Merlin	Merlin is an Annex 1 and Schedule 1 listed species, and also listed on the SBL, the BoCC Red List and Shetland LBAP species. Recorded twice, no evidence of breeding within 2km. Schedule 1, Annex 1 and an SPL species.	Low
Waders		
Curlew	A BoCC Red listed, SBL species and Shetland Breeding Waders LBAP species. Frequently recorded and breeding in 500 m survey buffer.	Medium
Golden plover	Only heard calling, no breeding records, Annex 1 species and Shetland Breeding Waders LBAP species.	Low

Feature	Summary	NCI
Knot	BoCC Amber listed species. Infrequently recorded, winter visitor.	Low
Lapwing	Recorded once, no breeding records. SBL / BoCC Red listed Shetland Breeding Waders LBAP species.	Low
Oystercatcher	Not breeding in site, recorded twice in site and breeding in small numbers in 500m survey buffer. BoCC Amber listed Shetland Breeding Waders LBAP species.	Low
Redshank	Not breeding or recorded within the site, only record a pair breeding in 500 m survey buffer. BoCC Amber listed Shetland Breeding Waders LBAP species.	Low
Snipe	Infrequently recorded, breeding records in site and 500 m buffer. BoCC Amber listed species Shetland Breeding Waders LBAP species.	Medium
Other waders	Not recorded during surveys, only records from desk study for whimbrel, dunlin, turnstone, black-tailed godwit and ringed plover.	Low
Seabirds, Skuas and Gulls		
Arctic tern	Recorded twice, not breeding in Proposed Development; Annex 1, BoCC Red listed and SBL species.	Low
Great skua (the wider area population)	Frequently recorded in breeding season, probable breeding species, BoCC Amber list species.	Medium
Common gull	Commonly recorded, no breeding records in Proposed Development BoCC Amber listed species.	Low
Glaucous gull	Infrequently recorded, no breeding records in Proposed Development BoCC Amber listed species.	Low
Great black-backed gull	Frequently recorded, Breeding records in 500m survey buffer BoCC Amber and SBL listed species.	Medium
Herring gull	Frequently recorded, breeding records in 500m survey buffer BoCC Red and SBL listed species.	Medium
Other species		
Raven	Commonly recorded, occasional large groups close to site, no breeding records in Proposed Development.	Low
Other (five) passerine species	Commonly recorded species typical of the habitat, BoCC red and amber listed and SBL species recorded in low densities.	Low

Impacts Scoped Out of the Assessment

7.6.41 As noted in **Section 7.5**, under evaluation methods for IOFs, ornithological features of medium and high NCI are considered IOFs. Due to a range of factors, some of these IOFs can be scoped-out of further consideration if they are not vulnerable to effects from the Proposed Development.

IOFs Scoped In or Out of the Assessment

7.6.42 Following evaluation of the baseline data, including desk study and field survey data, and considering the embedded mitigation measures described above, some potential effects on IOFs can be scoped out of the assessment, as described in **Table 7.13** below. This is based on professional judgement and experience from other relevant projects in the region.

7.6.43 The subsequent assessment of effects will be applied to IOFs considered to be of high or medium Nature Conservation Value (**Table 7.2**) that are known to be present within the site or surrounding area (as confirmed through survey results and consultations outlined above).

Table 7.13 - IOFs Scoped In or Out of the Assessment

IOF	Rationale for Scoping In/Out	Scoped In/Out
East Mainland Coast, Shetland SPA	<p>Lies directly south-east of the site. Designated for wintering great northern diver (182 individuals (7.3% of the Great Britain (GB) population)) and Slavonian grebe (54 individuals (4.9% of the GB population)).</p> <p>Great northern diver and Slavonian grebe were not recorded during surveys at the site and are not commonly found away from the sea in the winter months. Given the lack of records and the fact that they are considered unlikely to be present within the site, great northern diver and Slavonian grebe are scoped out of the assessment.</p> <p>The SPA is designated in part as a foraging location for breeding red-throated diver with 205 pairs of birds breeding on the nearby islands which equates to 16.4% of the GB population (1250 pairs, BTO 2021) and 50.3% of the NHZ1 population (estimated 407 pairs) (Wilson <i>et al</i>, 2015). Red-throated diver numbers were assessed as being favourable in the 2010 site condition monitoring data.</p> <p>Red-throated diver were recorded as a breeding species and frequently recorded during the breeding season during flight activity and diver lochan surveys. With the regular presence of red-throated diver within the site during the breeding season and the direct proximity of the SPA, it is considered the birds recorded are part of the SPA population meaning breeding red-throated diver are scoped into the assessment.</p>	<p>In:</p> <p>breeding red-throated diver.</p> <p>Out:</p> <p>Wintering great northern diver and wintering Slavonian grebe</p>
Noss SPA	<p>The SPA is designated for breeding great skua, northern fulmar, gannet and common guillemot breeding seabird assemblage including breeding puffin and breeding kittiwake.</p>	<p>Out:</p> <p>Noss SPA including</p>

IOF	Rationale for Scoping In/Out	Scoped In/Out
	<p>Great skua were recorded as holding two breeding territories within the breeding bird Survey Area. Great skua were recorded regularly during flight activity surveys between May and September 2021. Great skua are a BoCC Amber list species.</p> <p>Noss SPA lies 6.5 km east of the site and the island of Bressay, which has a significant great skua population, lies between Noss and the site. With two breeding pairs present in the Survey Area, it is considered likely that the flight activity that was recorded during surveys belong to the birds breeding locally and as such are not of SPA provenance and therefore (Noss SPA) breeding great skua are scoped out of the assessment.</p> <p>Gannet, puffin, kittiwake, guillemot and fulmar were not recorded during flight activity surveys and were not recorded as breeding species during breeding bird surveys. With no registrations of birds recorded during surveys and no breeding records means the Noss SPA population of gannet, puffin, kittiwake, guillemot and fulmar are scoped out of the assessment.</p> <p>All designated species are scoped out, therefore Noss SPA is scoped out of this assessment.</p>	<p>Breeding seabird assemblage, breeding great skua, breeding kittiwake, northern fulmar, breeding guillemot, breeding puffin and breeding gannet.</p>
Noss SSSI	<p>Arctic skua were not recorded during flight activity surveys and were not recorded as breeding species during breeding bird surveys. With no registrations of birds recorded during surveys and no breeding records means the Noss SSSI population of Arctic skua are scoped out of the assessment.</p> <p>All other SSSI designated species are scoped out (see above), and therefore Noss SSSI is scoped out of this assessment.</p>	<p>Out: Noss SSSI including breeding Arctic skua.</p>
Noss NNR	<p>All designated species are scoped out (see above), and therefore Noss NNR is scoped out of this assessment.</p>	<p>Out: Noss NNR</p>
Mousa SPA	<p>The SPA is designated for breeding storm petrel and breeding Arctic tern.</p> <p>Storm petrel were not recorded during flight activity surveys and with no suitable breeding habitat present were not recorded as breeding species during breeding bird surveys. With no registrations of storm petrel recorded during surveys and no breeding records means</p>	<p>Out: Mousa SPA including breeding storm petrel; breeding Arctic tern.</p>

IOF	Rationale for Scoping In/Out	Scoped In/Out
	<p>the Mousa SPA population of storm petrel are scoped out of the assessment.</p> <p>Arctic tern were infrequently recorded during flight activity surveys (two records) and were not recorded as breeding species during breeding bird surveys. With very registrations of birds recorded during surveys and no breeding records and given the fact the Mousa is almost 20 km from the site, the Mousa SPA population of Arctic tern are scoped out of the assessment.</p> <p>All designated species are scoped out, therefore Mousa SPA is scoped out of this assessment.</p>	
Mousa SSSI	<p>Black guillemot were not recorded during flight activity surveys and were not recorded as breeding species during breeding bird surveys. With no registrations of birds recorded during surveys and no breeding records means the Mousa SSSI population of black guillemot are scoped out of the assessment.</p> <p>All other designated species are scoped out (see above) and therefore Mousa SSSI is scoped out of this assessment.</p>	<p>Out:</p> <p>Mousa SSSI including breeding black guillemot.</p>
Ward of Culswick SSSI	<p>Ward of Culswick is designated for a breeding population of whimbrel and Arctic Skua. Whimbrel and Arctic Skua were not recorded during flight activity surveys and were not recorded as breeding species during breeding bird surveys. With no registrations of birds recorded during surveys, no breeding records and the fact that the SSSI is 19km from the site means the Ward of Culswick SSSI population whimbrel and Arctic Skua are scoped out of the assessment.</p>	<p>Out:</p> <p>Ward of Culswick SSSI including breeding whimbrel and breeding Arctic Skua.</p>
Moorland Areas, South Bressay, Noss, Sandwick and Clift Hills and West Burrafirth IBAs.	<p>The five IBAs lie between 3.9km and 17 km from the site and are designated for upland breeding species, skuas and red-throated diver.</p> <p>At over 3.9 km from the site boundary it is considered unlikely that the Proposed Development will have any impact on these local nature sites. As such Moorland Areas, South Bressay, Noss, Sandwick and Clift Hills and West Burrafirth IBA's. are scoped out of the assessment.</p>	<p>Out</p>
Great skua (the wider area population)	<p>Great skua were recorded frequently during flight activity surveys between April and September 2021. Two breeding territories were identified. Great skua are a BoCC Amber List species.</p>	<p>In</p>

IOF	Rationale for Scoping In/Out	Scoped In/Out
	<p>Forrester <i>et al</i> (2007) outline that great skua numbers in Shetland initially increased from 2,958 Apparently Occupied Territories (AOTs) in 1969-70 to 5,363 AOT's in 1985-88 to 6,703 AOTs in 1998-2002. The NHZ1 population is stated as 10,377 pairs (Wilson <i>et al.</i>, 2015). Overall numbers of great skua in Shetland remain stable; however, in 2021 and 2022 in the northern isles a number of great skua have been casualties of bird flu and this decline in numbers due to bird flu, the Shetland population of great skua is considered to be unfavourable.</p> <p>The regular presence of great skua flying across the site during the breeding season means that breeding great skua are scoped into the assessment.</p>	
Curlew	<p>Curlew were recorded regularly in low numbers year round from flight activity surveys. Breeding bird surveys identified a total of three territories within the Survey Area. Three breeding territories represents 0.07 % of the estimated NHZ1 population (estimated total of 4,227 pairs, as per Wilson et al, 2015). Curlew is BoCC red-listed, as well as an SBL and Shetland LBAP species and considered to be a species at risk from wind farm developments.</p> <p>Numbers of curlew are declining across the UK and the presence of multiple breeding territories of a BoCC Red list species means that curlew are scoped into the assessment.</p>	In
Snipe	<p>Snipe were recorded infrequently from flight activity surveys. Breeding bird surveys identified a total of six breeding territories within the Survey Area, which represents 0.1 % of the estimated NHZ1 population (estimated total of 6,728 pairs, as per Wilson <i>et al</i>, 2015).</p> <p>Numbers of snipe are declining across the UK as a whole and the presence of multiple breeding territories of a BoCC Amber list species means that snipe are scoped into the assessment.</p>	In
Great black-backed gull	<p>Great black-backed gull were frequently recorded during flight activity surveys all year round. Breeding bird surveys identified a total of three breeding territories within the Survey Area, none within the site.</p> <p>Numbers of great black-backed gull are declining across the UK and the regular flight activity and presence of multiple breeding territories of a BoCC Amber list species</p>	In

IOF	Rationale for Scoping In/Out	Scoped In/Out
	means that great black-backed are scoped into the assessment.	
Herring gull	<p>Herring gull were frequently recorded during flight activity surveys all year round. Breeding bird surveys identified a total of one breeding territories within the Survey Area, none within the site.</p> <p>Numbers of herring gull are declining across the UK and the regular flight activity and presence of multiple breeding territories of a BoCC Red list species means that herring are scoped into the assessment.</p>	In

7.7 Identification and Evaluation of Key Impacts

Standard Mitigation

- 7.7.1 As previously noted, following CIEEM guidance (CIEEM, 2018), the assessment process assumes the application of standard mitigation measures. This section of the assessment details the mitigation measures that are recommended to ameliorate identified effects associated with the construction and operational phase of the Proposed Development. These measures are aimed to prevent, reduce or offset any likely significant effects of the Proposed Development on identified ornithological receptors. This approach is in accordance with best practice guidance and UK, Scottish and Local Government environmental, planning and sustainability policies.
- 7.7.2 The principles and objectives for mitigation associated with the Proposed Development have been developed through an iterative process with the Applicant’s design team and through discussion with NS and other stakeholders.
- 7.7.3 Mitigation includes best practice methods and principles applied to the Proposed Development as a whole (generic measures) as well as site specific mitigation measures applied to individual locations (specific measures).
- 7.7.4 All ornithological mitigation to be implemented during construction will be incorporated into a Construction Environmental Management Plan (CEMP). This CEMP, to be agreed in consultation with stakeholders, will outline all required mitigation and provide details on timelines for undertaking mitigation for each identified ornithological receptor. This CEMP will also outline a timetable of actions and form part of the contract documents to ensure delivery of mitigation specified in this chapter. In addition, the CEMP would incorporate the provision of an Ecological Clerk of Works (ECoW) to oversee the implementation of recommended mitigation during construction.

Generic/Embedded Mitigation

- 7.7.5 In the event that the scheme is permitted, the generic mitigation measures that apply to all ornithological receptors across the Proposed Development, and which are considered as embedded in the site development proposals and therefore assumed to be the case for the purposes of assessing potential impacts, are outlined below:
- Not more than 12 months prior to construction of the Proposed Development, the Applicant will engage a Suitably Qualified Ecologist (SQE) to undertake a series of pre-construction ornithological surveys to update the baseline information reported in this chapter and include a full breeding bird survey and diver breeding survey. The aim of these surveys would be to

provide up to date information in order to finalise the mitigation proposals. This would be in addition to completing a final check prior to construction for key target species (also see **Chapter 6** of this EIA Report) and would be discussed and agreed with NS.

- Further to or incorporated into the update surveys above, protection of breeding bird nests from damage and/or destruction during the breeding season will need to be ensured. Wherever possible, all vegetation clearance will occur outside the breeding season (i.e. clearance to be undertaken between October and February inclusive, inclusive), to ensure that no active nests are damaged or destroyed by the proposed works. This would include any areas of shrub clearance and vegetation removal for access tracks, compounds or turbine bases due to the populations of ground nesting birds on and around the site.
- Removing vegetation from working areas outside the breeding season, wherever possible between October and February inclusive but preferably between November and January, would also reduce the attractiveness of those areas to breeding birds the following season, which means that birds are less likely to breed in those areas.
- Avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices as far as practicable.
- An ecological toolbox talk will be given to all construction personnel as part of site induction on the potential presence of ornithological species and any measures that need to be undertaken should such species be discovered during construction activities. The toolbox talk will also include the requirement to report and log any bird casualties (including due to the met mast) at the Proposed Development during construction and operation of the site.

7.7.6 As part of the Proposed Development, it will be necessary to develop and implement a Site Restoration Plan (SRP) as part of the CEMP to ensure the regeneration of those areas of habitat that have been temporarily lost through development.

7.7.7 In order to facilitate restoration, disturbed ground will be restored as soon as practicably possible using materials removed during the construction of access tracks, excavation of cable trenches and turbine foundations. To achieve this, any excavated soil will need to be stored in such a manner that is suitable to facilitate retention of the seed bank. This will aid site restoration and help conserve the pre-construction floristic interests at the site.

7.7.8 Additional, specific mitigation measures are discussed in **Section 7.9**.

7.8 Potential Effects

Description of the Proposed Development

7.8.1 As described in **Chapter 4**, the Proposed Development will consist of one wind turbine with a maximum blade tip height of up to 149.9 m and battery energy storage system, with a combined installed capacity of 19.9 MW. The specific turbine manufacturer and model has not yet been selected, as this will be subject to a pre-commencement tendering exercise and will be confirmed post-consent.

7.8.2 The proposed final location of the turbine has been defined, in order to enable the EIA Report to fully describe the Proposed Development for which permission is being sought. The British National Grid coordinates denoting where the turbine is proposed to be located are listed in **Chapter 4** and shown on **Figure 1.2**.

7.8.3 The main elements of the Proposed Development which have the potential to impact on IOFs, both during construction and operation are:

- Track construction, including bridging/culverting of streams / drainage ditches, mobile plant traffic movements and potential for dust generation;

- Temporary borrow pit operations, including potential for dust generation;
- Turbine foundation creation (including excavation, pile-driving of anchors, etc.);
- Crane pad and permanent hardstanding construction;
- Up to 12 battery energy storage units which will contain batteries, inverters, transformers and control equipment, housed in steel containers approximately 12 m in length by 3 m in width by 3 m in height.
- Cable-laying and grid connection infrastructure (including substation);
- Temporary lay-down and site compound areas;
- Temporary materials storage (soils and turves);
- Site water management; and
- Site restoration (track batters, compounds, etc.).

Construction Impacts

7.8.4 The above activities have the potential to cause the following construction impacts to the IOFs identified for the site:

- Direct loss of habitat.
- Direct loss of foraging habitat and/or breeding habitat for protected species.
- Indirect loss of foraging habitats and/or breeding habitat for species, through displacement.
- Disturbance and displacement to habitats and species (including noise, vibration, pollution), due to track and turbine base construction, as well as turbine erection, heavy machinery, noise and human activity on the site. Disturbance of ground vegetation and ground-nesting birds may affect a 5 m zone around all infrastructure.

Operational Impacts

7.8.5 The potential operational impacts have been identified as:

- Habitat change (modification) over time (N.B. operation phase drying of peaty or marshy substrates may affect up to 5m around cut track).
- Direct and indirect loss of foraging or breeding habitat due to displacement or avoidance.
- Mortality resulting from collision with turbine.
- Cumulative impacts of the Proposed Development in the context of other nearby wind farms (operational, permitted and in planning).

Assessment of Construction Effects

East Mainland Coast, Shetland SPA Qualifying Species - Red-throated Diver

7.8.6 Impact: Displacement of breeding or foraging red-throated diver from the site during construction, either by disturbance or because of direct habitat loss.

7.8.7 NCI / Conservation Status of the receptor: As per **Table 7.12** red-throated diver are High NCI. Red-throated diver are a BoCC Green list species and as of 2010 the SPA population are considered to be in a favourable condition (See **Table 7.6**).

Magnitude of Impact:

- 7.8.8 Red-throated divers are susceptible to disturbance, primarily at their nesting grounds during the breeding season, but other studies have outlined disturbance and displacement of passage birds may also occur (Cramp, 1977). A study conducted by Bundy (1978) outlined that breeding success can be impacted in areas where both human disturbance and avian predators (such as gulls and skuas) are present. However, reactions to human disturbance are likely to be influenced by the area of water and the availability of cover (Bundy, 1978). Ruddock & Whitfield (2007) suggest that divers are more likely to take flight and show signs of active disturbance on smaller breeding lochans in response to human disturbance than they are on lochs with a maximum dimension of about 400 m or greater.
- 7.8.9 However, Ruddock & Whitfield (2007) note that most red-throated divers showed signs of disturbance at about 300–500 m distance and suggest that they are insensitive to the presence of observers on the ground when making foraging flights to and from the nest as long as the observer is not within around 300 m of the nest site. Currie & Elliott (1997) outline a recommend safe working distances for forestry operations of 300 m from established nests with chicks although this figure increases significantly up to 900 m during the nest-building phase. Some birds having been observed not to leave the nest until approached to within a few metres (Ruddock & Whitfield, 2007). Therefore the upper limits of disturbance to nest-building birds suggested by Currie & Elliott (1997) are likely to refer to line of sight distances, and subject to tolerance of individual birds.
- 7.8.10 The initial design of the wind farm included infrastructure (including turbines) that was less than 500 m from a diver breeding lochan; however, through the design process of the wind farm this second proposed turbine was dropped from the scheme. The presence of breeding red-throated diver was a significant factor in the removal of the additional turbine as the risk on the local breeding population of divers was considered to be too significant.
- 7.8.11 All the breeding lochans are over 500 m from the final proposed infrastructure with two of the three breeding lochans located over 1 km from any proposed infrastructure. The proposed turbine is over 550 m from the nearest breeding attempt. The current recommended (no) disturbance buffer required for heavy construction activities is 500-750 m for breeding locations of red-throated diver (NatureScot, 2022b). As discussed in **Section 7.7** above pre-construction surveys will be completed to check for breeding red-throated diver nest locations and ensure all the recommended no-disturbance buffers will be implemented.
- 7.8.12 It is considered a possibility if the construction phase work is undertaken during the breeding season that works could result in disturbance effects on breeding red-throated diver, particularly during the early nest building period when tolerance to disturbance is lowest. Despite the temporary nature of disturbance during construction, the magnitude of the impact may still be high. Monitoring by Upton (2012a; 2014a, 2014b) at Burgar Hill wind farm, Orkney suggests that numbers of red-throated diver breeding within the wind farm site showed a marked decrease during construction and did not recover during eight subsequent breeding seasons.
- 7.8.13 Given the presence of a single breeding attempt within the top end of the recommended 750m disturbance buffer it is considered a possibility that construction works may impact on that breeding attempt. The possible impacts involve the failure of the breeding pair during the breeding season when works take place meaning that one pair of breeding red-throated divers fail to breed. The loss of one nest would equate to 0.49% of the SPA population (205 pairs) or 0.24% of the NHZ1 population 407 pairs (Wilson *et al.*, 2015).
- 7.8.14 The disturbance is likely to only last for one breeding season and therefore the impact foraging and breeding red-throated diver during the construction period is considered to be direct, short-term and of low magnitude.
- 7.8.15 Significance of Effect: As outlined above, the magnitude of the impact on the NHZ1 red-throated diver population as a result of construction is deemed to be a short-term, low, the NCI is high and the conservation status favourable. The effect is therefore considered to be **minor** and **not significant** under the EIA Regulations.

Great skua

- 7.8.16 Impact: Displacement of breeding or foraging great skua from the site during construction, either by disturbance or because of direct habitat loss.
- 7.8.17 NCI / Conservation Status of the receptor: As per **Table 7.12** great skua are Medium NCI. Great skua are a BoCC Amber list species and their numbers in Shetland are considered to be in an unfavourable condition.
- 7.8.18 Magnitude of Impact: A total of two breeding records were identified during walkover surveys with one record identified within the site and one within the 500 m survey buffer (see **Appendix 7.1: Figure 10**). The breeding record within the site was within 100 m of proposed works while the other is over 1 km from any proposed works and at this distance unlikely to be disturbed.
- 7.8.19 Great skua were recorded on 30 occasions over the site from flight activity surveys, all records between April and September, the records relating to birds commuting to and from breeding grounds. Great skua are adaptable hunters and will feed on carrion or live prey as well as parasitizing prey from other bird species such as gannets and puffins. The loss of habitat due to the Proposed Development will predominantly be in areas of open moorland and grassland habitats. These areas may be used by great skua, but the areas will be comparatively small and, therefore, the loss of habitat due to the Proposed Development is unlikely to significantly affect their foraging opportunities.
- 7.8.20 Given the impact on a maximum of two breeding territories recorded, this represents just 0.02 % of the estimated NHZ1 population (estimated total of 10,377 pairs, as per Wilson et al, 2015). The impact on great skua is considered to be direct, short-term and of negligible magnitude.
- 7.8.21 Significance of Effect: As outlined above, the magnitude of the impact on the Shetland great skua population as a result of construction is deemed to be a short-term, negligible adverse impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and **not significant** under the EIA Regulations.

Curlew

- 7.8.22 Impact: Displacement of breeding and foraging curlew from the site during construction, either by disturbance or because of direct and direct habitat loss.
- 7.8.23 NCI / Conservation Status of the receptor: As per **Table 7.12** curlew are Medium NCI. Curlew are a BoCC Red list species and as such their population are considered to be in an unfavourable condition.
- 7.8.24 Magnitude of Impact: Breeding walkover surveys identified three curlew breeding attempts within the Survey Area (see **Appendix 7.1: Figure 10**). All three records were outside the site boundary and between 500 m and 950 m from the nearest area of proposed works. Curlew were registered flying over the site on 12 occasions, with birds using the airspace infrequently over the site to commute to feeding grounds on the coast.
- 7.8.25 Curlew breed on open moorland and forage in coastal areas, most notably on mud flats exposed by the ebbing tide, and the loss of moorland habitat due to the development of the site is unlikely to negatively impact on their foraging activities. NatureScot outline a disturbance distance for breeding curlew of 200-300 m (NatureScot, 2022b).
- 7.8.26 Given the distances to the breeding attempts (being over 500 m), the relatively low levels of flight activity and the fact that construction activities are unlikely to impact on curlew foraging activities the impact on curlew during construction is considered to be direct, short-term and of negligible magnitude.
- 7.8.27 Significance of Effect: As outlined above, the magnitude of the impact on the Shetland curlew population as a result of construction is deemed to be a short-term, negligible adverse impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and **not significant** under the EIA Regulations.

Snipe

- 7.8.28 Impact: Displacement of breeding and foraging snipe from the site during construction, either by disturbance or because of direct habitat loss.
- 7.8.29 NCI / Conservation Status of the receptor: As per **Table 7.12** snipe are Medium NCI. Snipe are a BoCC Amber list species and as such their population are considered to be in an unfavourable condition.
- 7.8.30 Magnitude of Impact: Breeding walkover surveys identified six snipe breeding attempts, three within the site and three in the 500m survey buffer (see **Appendix 7.1: Figure 10**). Of the six records one is within 50 m of the proposed works and a further two are within 350 m of the proposed site works with the other three records over 1 km to the south-west. Snipe were registered flying over the site on just two occasions.
- 7.8.31 Likely impacts on snipe during construction could include potential mortality as a result of construction activities, temporary disturbance as a result of soil stripping and increased noise and vibration and temporary habitat loss. Mortality may result if construction activities are undertaken during the bird breeding season where nests and chicks may be destroyed.
- 7.8.32 Potential disturbance during construction may result in displacement from the areas of land clearance and a slightly wider area adjacent to it. During the breeding season, in order to avoid the abandonment of nests or breeding territories as a result of disturbance the standard mitigation outlined in paragraphs in 7.7.1– 7.7.7, including the pre-construction checks. The appointed ECoW will identify active nesting locations prior to any works taking place. If nest sites are identified, then appropriate mitigation measures (such as suitable exclusion zones/buffers) to protect nest sites will be implemented.
- 7.8.33 NatureScot (2022b) guidance does not define a disturbance distance for breeding snipe but for similar moorland breeding species curlew and whimbrel it is defined as up to 300 m. Given a disturbance distance of 300 m then it is considered works could impact on a single breeding territory of snipe. One breeding territory represents 0.01 % of the estimated NHZ1 population (estimated total of 6,728 pairs, as per Wilson *et al.*, 2015). Given the potential of disturbance/displacement of breeding snipe during the construction period is 0.01% of the NHZ1 population, the overall impact is considered to result in an impact of negligible and short-term magnitude.
- 7.8.34 Significance of Effect: As outlined above, the magnitude of the impact on the NHZ1 snipe population as a result of construction is deemed to be a short-term, negligible impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and **not significant** under the EIA Regulations.

Great black-backed gull

- 7.8.35 Impact: Displacement of breeding, foraging and roosting great black-backed gull from the site during construction, either by disturbance or because of direct habitat loss.
- 7.8.36 NCI / Conservation Status of the receptor: As per **Table 7.12** great black-backed gull are Medium NCI. Great black-backed gull are a BoCC Amber list species and as such their population are considered to be in an unfavourable condition.
- 7.8.37 Magnitude of Impact:
- 7.8.38 Great black-backed gull were recorded as breeding within the Survey Area with three territories all outside the site boundary. One nest was located with 200 m of a proposed track route with other two nests approximately 500 m from the nearest infrastructure.
- 7.8.39 Great black-backed gull were frequently recorded flying over the site but were rarely recorded landing within the site and regular flight routes were between the recycling centre east of the site, Loch of Kebister, Dales Voe and also towards a fish processing factory south-east of the site towards Lerwick. No significant roosts of great black-backed gull were recorded during surveys, the only noted significant roosting or landing point recorded was around the Loch of Kebister. Large groups of great black-backed gull were infrequent from VP surveys and of the 116 flights, 91 comprised

either individual or two birds and 28 were of two birds. A total of five flights were recorded consisting of more than ten birds including one of 26 and one of 42 birds.

- 7.8.40 Gulls are adaptable bird species group and nesting attempts at these distances from works are unlikely to be impacted by proposed works at the site. The loss of moorland habitat due to the development of the site is unlikely to negatively impact on their foraging activities.
- 7.8.41 Given the distances to the breeding attempts (being over 200 m), the fact that works are unlikely to significantly disturb gull species and the fact that construction activities are unlikely to impact on great black-backed gull foraging activities the impact on great black-backed gull during construction is considered to be short-term and of negligible magnitude.
- 7.8.42 Significance of Effect: As outlined above, the magnitude of the impact on the NHZ1 great black-backed gull population as a result of construction is deemed to be a short-term, negligible impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and **not significant** under the EIA Regulations.

Herring gull

- 7.8.43 Impact: Displacement of breeding, foraging and roosting herring gull from the site during construction, either by disturbance or because of direct habitat loss.
- 7.8.44 NCI / Conservation Status of the receptor: As per **Table 7.12** herring gull are Medium NCI. Herring gull are a BoCC Red list species and Wilson *et al.* (2015) outlines declining NHZ1 species trend and as such their population are considered to be in an unfavourable condition.
- 7.8.45 Magnitude of Impact:
- 7.8.46 Herring gull were recorded as breeding within the Survey Area with a single territory identified outside the site boundary. The nest was located approximately 500 m from the nearest proposed infrastructure (see **Appendix 7.1: Figure 10**).
- 7.8.47 Herring gull were frequently recorded commuting over the site but were rarely recorded landing within the site, regular flight routes were noted west to east and east to west across the site (see **Appendix 7.1: Figure 8**). No significant roosts of herring gull were recorded during surveys, Loch of Kebister being the only notable landing point which is located over 1 km from the nearest works. Although flight activity was widespread the most significant activity related to the recycling centre to the south-east of the site and further site of the proposed works at the site. Large groups of herring gull were not recorded from VP surveys and of the 105 flights, 45 were individual birds and 28 were of two birds with three consisting of more than ten birds including two of 14 birds and one of 22 birds.
- 7.8.48 Given the distance to the breeding attempts (being 500 m), the fact that works are unlikely to significantly disturb gull species and the fact that construction activities are unlikely to impact on herring gull foraging activities the impact on herring gull during construction is considered to be direct, short-term and of negligible magnitude.
- 7.8.49 Significance of Effect: As outlined above the magnitude of the impact on the NHZ1 population of herring gull as a result of construction is concluded to be a negligible and short-term impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and **not significant** under the EIA Regulations.

Assessment of Operational Effects

Predicted Operational Effects

- 7.8.50 Effects of land take on birds (i.e. decreased resource availability) are considered to be limited given the small percentage (i.e. <10 %) of the site that will be occupied by the footprint of the Development (<5 ha). Please refer to **Chapter 4** for more details. There is the potential for a component of the Proposed Development to be sited on, or close to, a specific type and area of habitat used by one or more bird species carried through in this assessment. That potential effect is assessed, where relevant, in the species text that follows.

- 7.8.51 The two main ways in which birds can be affected by operational wind farms are:
- through displacement due to ongoing disturbance caused by wind turbine structures (i.e. including barrier effect) and associated equipment (and by periodic servicing of them); and
 - potential mortality through collision with moving blades or associated infrastructure.

Displacement

- 7.8.52 A range of studies have concluded that most bird species are not significantly affected by operational wind farms (e.g. Vauk, 1990; Percival, 2005; Devereux *et al.*, 2008; Winkelmann, 1994; Langston & Pullan, 2003; Hotker *et al.*, 2006). This is reflected, in part, by NatureScot guidance (SNH, 2017) on birds and wind farms which does not, for example, normally recommend surveys for breeding passerines. The NatureScot guidance, which is the UK standard, indicates that effort should focus on species and/or species groups that are thought to be susceptible to the effects of wind farms or highly protected species on which potential effects remain unclear.
- 7.8.53 Turbines may also present a barrier effect to the movement of birds across a site, restricting them from accessing wider areas. The effect this would have on a population is difficult to predict. If birds have to regularly fly over or around an array this may result in greater energy expenditure, while birds displaced into other, suboptimal habitats may experience reduced foraging potential. Such impacts could effectively limit birds being able to build energy reserves, potentially affecting survival and/or breeding success.
- 7.8.54 Given the fact that there is limited evidence to display any negative impacts during displacement and the fact they were not recording breeding close to the proposed additional turbine curlew, herring gull and great black-backed gull are not considered likely to be displaced by the operational wind farm. With just a single territory within 300 m of the proposed infrastructure and significant alternative breeding habitat in the local and wider area, snipe are also not considered to be impacted the operational wind farm in terms of displacement. The site currently only offers limited foraging opportunities for these species and is considered sub-optimal foraging habitat. These species will forage over several square kilometres in the local area or in other areas, such as tidal mudflats. Through design iteration and due to lack of suitable breeding habitat close to turbines there is not considered to be any impacts on the breeding locations of all three of these species during the operation of the wind farm.

East Mainland Coast, Shetland SPA Qualifying Species – Red-throated diver

- 7.8.55 Impact: Displacement of red-throated diver from breeding grounds due to operational turbines.
- 7.8.56 NCI / Conservation Status of the receptor: High / favourable.
- 7.8.57 Magnitude of Impact: A monitoring study by Halley & Hopshaug (2007) at Smøla wind farm, Norway found that red-throated divers avoided the wind farm area post-construction, indicating a strong displacement effect. A more recent study undertaken Upton (2012a) indicate that red-throated diver frequently fly between the individual turbines on Burgar Hill. However, Furness (2015) suggests that this may be true only for turbines arranged in lines (as in the five-turbine Burgar Hill site) and not in array formation.
- 7.8.58 The earlier application baseline 2008-2009 breeding bird surveys at the site outlined a single pair of breeding red-throated diver in the Study Area, which was located over 500 m from the three proposed turbine locations and approximately 1 km from the location of the turbine that was constructed and is operational today. In the intervening years, a further two diver breeding locations are now present, one of which is closer to the operational turbine than the 2007 nest location. The expansion in the breeding pairs strongly indicating the presence of the operational turbine has had no displacement impacts on breeding red-throated diver in this area. Given the two turbines will be arranged in a line not an array (it can't be any other way) and the fact that the local population of breeding red-throated diver appear not to be impacted by the operational turbine in the previous 13 years, the displacement impact of the newly operational turbine is considered to be long-term and of negligible magnitude.

7.8.59 Significance of Effect: The magnitude of the impact on the East Mainland Coast, Shetland SPA population as a result of collision risk is deemed to be a long-term, negligible impact and the sensitivity is considered to be high. The effect on red-throated diver as a result of displacement from operational turbines is therefore considered to be **negligible** and therefore **not significant** under the EIA Regulations.

Great skua

7.8.60 Impact: Displacement of breeding great skua from the site during operation, either by disturbance or because of direct habitat loss.

7.8.61 NCI / Conservation Status of the receptor: As per **Table 7.12** great skua are Medium NCI. Great skua are a BoCC Amber list species and their numbers in Shetland are considered to be unfavourable.

7.8.62 Magnitude of Impact: A total of two breeding records were identified during walkover surveys with one record identified within the site and one within the 500 m survey buffer (see **Appendix 7.1: Figure 9**). The breeding record within the site was within 100 m of proposed works while the other is over 1 km from any proposed works and at this distance unlikely to be disturbed.

7.8.63 There is little evidence that operational wind farms will have any significant impacts on breeding great skua but given there was a single territory is recorded within 100 m of proposed works it is possible that the Proposed Development could displace this pair. Given the fact that pair that may be displaced were recorded breeding within 125 m of the Operational Turbine, given there is significant alternative breeding ground in the local area and with only one other breeding pair recorded, little competition for breeding grounds it is considered unlikely there will be any significant impact on the local breeding great skua population.

7.8.64 Given a precautionary impact on one breeding territory recorded, this represents just 0.01 % of the estimated NHZ1 population (estimated total of 10,377 pairs, as per Wilson et al, 2015) although given the likely impacts of bird flu the estimated breeding population is likely to lower considerably at least in the short-term. Even including the impacts of bird flu, the impact on great skua is considered to be direct, long-term and of negligible magnitude.

7.8.65 Significance of Effect: As outlined above, the magnitude of the impact on the Shetland great skua population as a result of operation as a result of displacement is deemed to be a long-term, negligible impact, the NCI is medium and the conservation status unfavourable. The effect is therefore considered to be **negligible** and not significant under the EIA Regulations.

Collision

7.8.66 For the purposes of this Section of the ornithology chapter all collision risk modelling (CRM) and analyses were completed following best practice guidelines and recommended species-specific biometrics and avoidance rates (Band et al., 2007 and SNH 2000, 2010, 2013, 2017 and 2018a). Collision risk analysis was informed by the data obtained during the flight activity surveys and corresponding flight lines (**Appendix 7.1: Figures 3-8**); full details of the calculations are provided in **Appendix 7.2**.

East Mainland Coast, Shetland SPA Qualifying Species - Red-throated diver

7.8.67 Impact: Collision of red-throated diver with the turbines leading to injury and potential mortality.

7.8.68 Sensitivity of the receptor: High.

7.8.69 Magnitude of Impact: Dürr (2021) reports one documented collision for red-throated diver in Europe, occurring at Bremen, Germany. It is possible that the species' tendency to avoid wind farms (e.g. Halley & Hopshaug, 2007; Percival, 2014; Petersen, 2007; Topping and Petersen, 2011) precludes collision risk to some degree. Okill (1992) reports the discovery of a red-throated diver assumed to have been killed by flying into overhead wires, and Furness (2015) provides two further examples of birds reportedly flying into fences on Foula in Shetland. Furness (2015) further suggests that red-throated diver may actively avoid turbines due to their vulnerability of colliding with objects that they cannot detect over distance, which, given the lack of breeding records for this species within the site and surrounding 1 km, is of relevance to the Proposed Development. Post

- construction monitoring work by Upton (2012a; 2014a, 2014b) at Burgar Hill Wind Farm, Orkney, did not find any evidence of red-throated diver collision over eight breeding seasons of monitoring.
- 7.8.70 The diver flightlines during the breeding season were closely associated with the waterbodies within the site and surrounding area and follow a general route either north-west out into Dales Voe or north-east into the open sea east of Kebister Ness. The flight route most closely associated with the area of the proposed turbine was south-west to north-east and this axis was presumed for the linear model for the collision risk modelling (see **Appendix 7.2: Confidential Figure 3**). With open water on three sides from the site the flight path for the divers was not as clearly defined as often is the case this species and for this reason the collision risk modelling was also calculated using the random model in order to proof check the linear model results. The resultant linear modelling provided an output of 0.07 collisions per annum, equating to 1.82 collisions over a notional 25-year operation period of the Proposed Development or one collision every 13.5 years (see **Table 7.11**). The random modelling provided an output of 0.06 collisions per annum, equating to 1.61 collisions over a 25-year operation period of the Proposed Development or one collision every 15.54 years (See **Table 7.11**).
- 7.8.71 The 2008 ornithology baseline surveys at the site as part of the Permitted Development completed a total of 53.75 hours across eleven watches with seven of the surveys recording 31 diver flights (Amec, 2011a). The resulting collision risk modelling (using a 98% avoidance rate) predicted a collision risk value of 0.05 (Amec, 2011b). The collision risk value reflects the presence of three turbines with a sweep of 10-100m and the presence of one confirmed breeding pair of red-throated divers. The resultant figure of 0.05 would be equivalent to 0.0125 collisions using the currently accepted avoidance rate of 99.5% (SNH, 2018a) as with the calculations used in **Appendix 7.2**. Given the increase in breeding pairs of divers in vicinity of the site from one to three, the increase in the predicted collision risk value from 0.0125 to 0.07, which remains relatively low, is to be expected.
- 7.8.72 The majority of red-throated diver flights recorded were recorded with birds flying to and from the breeding lochans and either coming from or flying onto the open sea surrounding the site. The flights would strongly indicate that the birds were from the East Mainland Coast, Shetland SPA population, which is designated as a foraging area for breeding red-throated diver.
- 7.8.73 The red-throated diver breeding population for the East Mainland Coast, Shetland SPA population is estimated to be 205 pairs (**Table 7.6**) and the NHZ1 population is estimated at 407 pairs (Wilson *et al.*, 2015) meaning the annual (linear) collision risk value of 0.07 collisions and presuming all the birds recorded are from the SPA population represents 0.02 % and 0.01 % of the SPA and NHZ1 populations respectively. When this figure is considered over a 25-year period the total collision rate represents 0.43 % of the SPA population and 0.21 % of the NHZ1 population.
- 7.8.74 There are reasons to believe the resultant figure for collision risk for red-throated diver is precautionary and the avoidance rate as used in the assessment is too low. A review of red-throated diver avoidance rates was commissioned by SNH (Furness, 2015) and including studies by Upton (2012a; 2014a, 2014b) from Burgar Hill in Orkney, as well other wind farm sites across Scotland and Europe as a whole. The study concluded that as no carcasses have been recovered in the UK which related to collision with turbines and with only one from Germany across Europe, the avoidance rate for red-throated diver is almost certainly greater than 99 % and probably greater than 99.5 %, as during the survey if a 99.5 % avoidance rate was correct the searches would of expected to recover between 1.5-3 carcasses at Burgar Hill during the search time period when in fact none were recovered. Survey completed at the site in 2020-2021 included 144 hours of VP surveys as well as 69 hours of diver specific surveys and there was no evidence of any collision (of any species) with the operational turbine in fact the surveyor noted on occasion that divers arcing away an avoiding the operational turbine with both **Appendix 7.1: Confidential Figure 5 and Confidential Figure 6** backing up the fact that divers were avoiding the area where the Operational Turbine is located.
- 7.8.75 Given this evidence from Orkney, it is considered likely that an avoidance rate of 99.5 % is precautionary from red-throated diver. An avoidance rate of 99.8 % is currently used for geese and given their similar size and flight characteristics, being large and long-necked species, which are slow to manoeuvre and with the evidence provided by the Upton studies it seems the 99.8 % would be a more realistic avoidance rate for red-throated diver and even then it still be a precautionary figure.

- 7.8.76 Given a 99.8 % avoidance rate the CRM provided an output of 0.03 collisions per annum, equating to 0.64 collisions over a notional 25-year operation period of the Proposed Development meaning the annual collision risk represents <0.01 % of both the SPA and NHZ1 populations, respectively. When this figure is considered over a 25-year period the total collision rate (using a 99.8 % avoidance rate) represents 0.16 % of the SPA population and 0.08 % of the NHZ1 (breeding) population.
- 7.8.77 Using the precautionary collision risk value of 99.5 % and presuming that all birds involved in the at-risk flights an annual collision risk of 0.07 is predicted which equates to 0.02 % of the SPA population. This small increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of low adverse magnitude.
- 7.8.78 Significance of Effect: The magnitude of the impact on the East Mainland Coast, Shetland SPA red-throated diver population as a result of collision risk is deemed to be a long-term, low impact and the sensitivity is considered to be high. The effect on red-throated diver as a result of collisions is therefore considered to be **minor adverse** and therefore **not significant** under the EIA Regulations.

Great skua

- 7.8.79 Impact: Collision of great skua with the turbines leading to injury and potentially mortality.
- 7.8.80 NCI / Conservation Status of the receptor: Medium / Unfavourable.
- 7.8.81 Magnitude of Impact: No collisions of great skua with wind turbines in Europe have been documented by Dürr (2021). A report by Upton (2014c) outlined that the initial NS recommended avoidance rate of 98 % is a precautionary rate and that an avoidance figure of 99.5 % (as used in the CRM for great skua in this assessment) is more likely to be appropriate. This approach is supported through post construction carcass searching at the operational Burgar Hill wind farm, Hammars Hill wind farm and Hoy community turbine schemes (Upton, 2012b), which has resulted in no evidence of great skua collisions being found. Furthermore, Furness (2015) provides anecdotal evidence that great skua carcasses typically remain in-situ for long-periods due to an apparent reluctance of great skua to scavenge their kin (despite frequently scavenging carcasses of other species). Carcass searches are therefore likely to be a reliable monitoring method for this species, and the conclusions drawn by Upton (2014c) are considered to be robust.
- 7.8.82 The CRM provided an output of 0.016 collisions will occur during the breeding season, equating to 0.39 collisions over the notional 25 years of operation of the Proposed Development. The great skua breeding population on Shetland is estimated at (estimated total of 10,377 pairs, as per Wilson *et al.*, 2015). The modelled collision rate over the notional 25 years represents <0.01 % of the NHZ1 population. This very small increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of negligible magnitude.
- 7.8.83 Significance of Effect: The magnitude of the impact the NHZ1 great skua population as a result of collision risk is deemed to be a negligible and long-term impact, the NCI is medium and the conservation status assessed as unfavourable. The effect on great skua as a result of collisions is therefore considered to be **negligible** and therefore **not significant** under the EIA regulations.

Curlew

- 7.8.84 Impact: Collision of curlew with the turbines leading to injury and potentially mortality.
- 7.8.85 NCI / Conservation Status of the receptor: Medium / Unfavourable.
- 7.8.86 Magnitude of Impact: A total of 13 curlew fatalities due to collision with wind turbines have been reported across Europe (Dürr, 2021), of the 13 fatalities eight were recorded in the Netherlands and four in Germany. with none recorded in the UK. In the context of European breeding and wintering populations, this level of mortality is very low. Despite these figures, SNH (2018b) has outlined a default avoidance rate of 98 % for this species.
- 7.8.87 Curlew were recorded on 12 occasions during flight activity surveys, with an annual collision risk of 0.044 (or one bird every 22.89 years) predicted which equates to <0.01% of the NHZ1 population (estimated total of 4,227 pairs, as per Wilson *et al.*, 2015). This very small increase in baseline

mortality is therefore predicted to result in an impact that is considered to be of negligible and long-term magnitude.

- 7.8.88 Significance of Effect: The magnitude of the impact the NHZ1 curlew population as a result of collision risk is deemed to be a negligible and long-term impact, the NCI is medium and the conservation status unfavourable. The effect on curlew as a result of collisions is therefore considered to be **negligible** and therefore **not significant** under the EIA regulations.

Great black-backed gull

- 7.8.89 Impact: Collision of great black-backed gull with the turbines leading to injury and potentially mortality.
- 7.8.90 NCI / Conservation Status of the receptor: Medium / Unfavourable.
- 7.8.91 Magnitude of Impact: A total of 85 great black-backed gull fatalities due to collision with wind turbines have been reported across Europe (Dürr, 2021), of the 85 fatalities 55 were recorded in the UK (all recorded at off-shore windfarms, including 32 at Blyth Harbour) with 22 in Belgium and two in Germany. In the context of European breeding and wintering populations, this level of mortality is considered to be low.
- 7.8.92 In their commissioned report on avoidance rates SNH (2015) state “*on balance and based on wider UK and international data as well as studies in Orkney, it seems more appropriate to align the avoidance rate for red-throated diver and great skua with that of large Larus gulls, at 0.995.*” Given that information the avoidance rate of 99.5 % has been used for large gull species.
- 7.8.93 Previous surveys at the site undertaken in 2008 identified a total of 336 registrations of great black-backed gull from a total of 56 hours of observations (Amec, 2011a) in comparison with 116 registrations during the 2020-2021 surveys from a total of 144 hours of observation. The species occurrence during surveys dropping from 22.5% in 2008 (Amec, 2011a) to 4.89% in 2020-2021. This drop off in flight activity is likely due to the changing in land use in the wider area. During the 2008 surveys the area east of the site was used as a land-fill site whereas now it is a recycling centre and is now less attractive to foraging gulls.
- 7.8.94 The CRM provided an output of 0.12 collisions will annually, equating to 3.1 collisions over the notional 25 years of operation of the Proposed Development (**Appendix 7.2**). The great black-backed gull breeding population on Shetland is estimated at (estimated total of 2,106 pairs, as per Wilson *et al.*, 2015). The modelled annual collision rate is <0.01 % of the NHZ1 population and over the notional 25 years represents 0.07 % of the Shetland population. This small increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of negligible magnitude.
- 7.8.95 Significance of Effect: The magnitude of the impact the Shetland great black-backed gull population as a result of collision risk is deemed to be a negligible and long-term impact and the NCI is medium and the conservation status unfavourable. The effect on great black-backed gull as a result of collisions is therefore considered to be **negligible** and therefore **not significant** under the EIA regulations.

Herring gull

- 7.8.96 Impact: Collision of herring gull with the turbines leading to injury and potentially mortality.
- 7.8.97 NCI / Conservation Status of the receptor: Medium / Unfavourable.
- 7.8.98 Magnitude of Impact: A total of 1,123 herring gull fatalities due to collision with wind turbines have been reported across Europe (Dürr, 2021), of the fatalities 52 were recorded in the UK (all recorded at offshore windfarms, including 39 at Blyth Harbour) with 799 in Belgium and 122 in Germany.
- 7.8.99 As with great black-backed gull an avoidance rate of 99.5 % has been used for herring gull.
- 7.8.100 Previous surveys at the site undertaken in 2008 identified a total of 396 registrations of herring gull from a total of 56 hours of observations (Amec, 2011a) in comparison with 105 registrations during the 2020-2021 surveys from a total of 144 hours of observation. The species occurrence during

surveys dropping from 26.7% in 2008 (Amec, 2011a) to 4.46% in 2020-2021, or a sixfold drop. This drop off in flight activity is likely due to the changing in land use in the wider area. During the 2008 surveys the area east of the site was used as a land-fill site whereas at the time of survey it was a recycling centre with a reduced availability of food and so less attractive to foraging gulls.

7.8.101 The CRM provided an output of 0.14 collisions will annually, equating to 3.58 collisions over the notional 25 years of operation of the Proposed Development (**Appendix 7.2**). The herring gull breeding population in NHZ1 is estimated at (estimated total of 2,526 pairs, as per Wilson *et al.*, 2015). The modelled annual collision rate is <0.01 % of the NHZ1 population and over the notional 25 years represents 0.07 % of the Shetland population. This small increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of negligible magnitude.

7.8.102 Significance of Effect: The magnitude of the impact the Shetland herring gull population as a result of collision risk is deemed to be a negligible and long-term impact and the NCI is medium and the conservation status unfavourable. The effect on herring gull as a result of collisions is therefore considered to be **negligible** and therefore **not significant** under the EIA regulations.

Decommissioning

7.8.103 In the event of decommissioning, or replacement of turbines, it is anticipated that the levels of effect would be similar but of a lesser level than those during construction. Decommissioning would be undertaken in line with best practice processes and methods at that time and will be managed through an agreed Decommissioning Environmental Management Plan.

7.9 Additional Mitigation

7.9.1 Under the CIEEM guidance no significant impacts have been predicted for any species or designation. Therefore no additional mitigation is required as part of the scheme.

7.9.2 The proposed turbine location is over 500 m from the nearest red-throated diver nest as of the 2021 surveys. Following a best practice approach, it is proposed that pre-construction surveys will be completed in order to confirm any new breeding locations closer to the scheme and a 500 m no disturbance buffer implemented on any diver breeding attempts. Even at 500 m red-throated diver can be disturbed due to works, most notably during nest building and incubation stages (April to July). In order to minimise impacts on breeding red-throated diver any significant maintenance works will be completed outside this (April to July inclusive) time period.

7.9.3 In order to further gather information on the impacts of operational turbines on breeding red-throated diver a series of monitoring measures are proposed at the site. The site will be subject to a breeding diver check of the site and a wider 1 km buffer in order to identify all breeding attempts by red-throated diver and to monitor breeding success. The survey will comprise four visits between mid-April and August and be completed in years 1-3, year 5 and year 10 post-construction. Should any breeding attempts be recorded within 1 km of the operational turbines at total of 36 hours of focal diver lochan surveys will be completed between June and August covering each breeding lochan (while any breeding attempt is still active, completed from the least possible VP locations to cover all breeding lochans).

7.10 Residual Effects

Construction

7.10.1 Following the application of the standard and generic/embedded mitigation measures there are no significant adverse impacts on IOF's predicted at the site and so there are no residual effects of the Proposed Development, therefore no further specific mitigation is required.

Operation

- 7.10.2 Taking into account the proposed mitigation measures, it is concluded that the Development will not have a significant adverse effect at greater than the minor level for any species using the site and immediate surrounding area.
- 7.10.3 Taking into account the proposed mitigation measures, it is concluded that the Proposed Development will not have a significant adverse effect on the integrity of any of the statutory designated sites identified as having potential connectivity with the Proposed Development.
- 7.10.4 There is an inherent level of uncertainty associated with ecological assessment (as is acknowledged in CIEEM Guidance). However, post-construction monitoring (PCM) is proposed to assess the potential impacts of the windfarm on red-throated diver as outlined in **Section 7.9** above.
- 7.10.5 This assessment has fully considered the principles of, and guidance provided by Scottish Planning Policy, the Nature Conservation (Scotland) Act 2004, the Shetland Local Development Plan 2017, and the Shetland LBAP. In particular, consideration has been given to international responsibilities and the protection of designated sites.

7.11 Habitats Regulations Appraisal

- 7.11.1 Given the proximity of the Proposed Development to the East Mainland Coast, Shetland SPA there is a potential for the activities associated with the Proposed Development's construction and operation to result in adverse effects on the qualifying interests of the Natura site. Consequently, a Habitat Regulations Appraisal (HRA) is considered to be necessary to identify the nature, extent and significance of any adverse effects and, if found, whether these are likely to impact the integrity of the designated site.
- 7.11.2 The HRA must formally be undertaken by the Shetland Islands Council as competent authority for the consideration of the Proposed Development application. This section provides information to inform HRA (i.e. is a 'Shadow HRA') to enable the competent authority to undertake this process.

Legislative Background

- 7.11.3 Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ("The Habitats Directive"), provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species through the establishment and conservation of an EU-wide network of sites. This network is known as Natura 2000 and is a European ecological network of special areas of importance for nature conservation, composed of sites hosting rare and vulnerable habitats and species. This network is designed to enable the natural habitat types and the species' habitats concerned to be maintained or, where appropriate, restored at a favourable conservation status in their natural range.
- 7.11.4 The UK has designated a number of sites of nature conservation importance which form part of a network of Natura 2000 Sites. As mentioned above, Natura 2000 Sites comprise SACs designated under the EC Habitats Directive and SPAs designated under the EC Wild Birds Directive. In addition, as clarified by paragraphs 207 to 211 of the Scottish Planning Policy 2014, candidate SACs and proposed Special Protection Areas (SPAs) (i.e. sites which have been approved by Scottish Ministers for formal consultation but which have not yet been designated) are treated as if they had been fully designated, and wetlands of international importance designated under the Ramsar Convention (Ramsar site wetlands) are also treated as designated Natura 2000 Sites and/or SSSIs and are therefore also considered in HRAs..
- 7.11.5 The procedures that must be followed when considering developments affecting Natura 2000 Sites are set out in Article 6 of the Habitats Directive. In Scotland, this process is implemented through the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) ("The Habitats Regulations").

7.11.6 Habitats Directive Article 6(3) set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of European sites (Annex 1.1). Article 6(3) establishes the requirement for Appropriate Assessment (AA):

“Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

7.11.7 For reasons of clarity, it is confirmed that the Proposed Development is not related to or considered necessary for the management of the Moray Firth SAC designation.

7.11.8 Both EU and national guidance exists in relation to Member States fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in this report to inform the Article 6 assessments has had regard to the following guidance and legislation:

- Guidance:
 - SNH (2018b). Natura sites and the Habitats Regulations: How to consider proposals affecting SACs and SPAs in Scotland. The essential quick guide.
- Legislation:
 - Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (also known as the ‘Habitats Directive’).
 - Council Directive 2009/147/EC on the conservation of wild birds, codified version, (also known as the ‘Birds Directive’).
- The European Communities (Birds and Natural Habitats) Regulations 2011 to 2015.

Overview of Appropriate Assessment Stages

7.11.9 An HRA is a process to determine any Likely Significant Effect (LSE) through Stage 1 screening and (where such likely effects are identified) assess whether there are adverse impacts on the integrity of a Natura Site by means of an Appropriate Assessment (AA) (Stage 2).

7.11.10 The threshold for a LSE is treated in the screening exercise as being above a trivial or ‘*de minimis*’ level. A *de minimis* effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex I (bird) or Annex II (non-avian) species present on a European site necessary to ensure their favourable conservation status. If low level effects on habitats or individuals of species are judged to be in this order of magnitude, and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be significant.

7.11.11 Based on the outcome of the AA, the Competent Authority shall agree to a plan or project only after having ascertained that it will not adversely affect the integrity of the Natura 2000 site concerned.

7.11.12 The European Commission (2018) states that the ‘integrity of the site’ can be usefully defined as the coherent sum of the site’s ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated. They go on to state the following:

“The integrity of the site involves its constitutive characteristics and ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the habitats and species for which the site has been designated and the site’s conservation objectives.”

- 7.11.13 When considering the ‘integrity of the site’, it is therefore important to consider a range of factors, including the possibility of effects materialising in the short, medium and long-term.
- 7.11.14 The judgement (May 2018) of Case C-323/17 (“People Over Wind”) affirms that ecological mitigation measures cannot be considered during Stage 1, and the European Commission (2018) therefore now considers that mitigation measures must be directly linked to the likely impacts that have been identified in Stage 2; they can therefore only be defined once these impacts have been described and assessed by the competent authority through an Appropriate Assessment.
- 7.11.15 Mitigation measures, which aim to avoid or reduce impacts or prevent them from happening in the first place, must not be confused with compensatory measures, which are intended to compensate for any damage that may be caused by the project. Compensatory measures can only be considered under Article 6(4) if the plan or project has been accepted as necessary for Imperative Reasons of Overriding Public Interest (IROPI) and where no alternatives exist.
- 7.11.16 Where a competent authority concludes through an AA that there will be an adverse effect on the integrity of a Natura 2000 Site, the Competent Authority may only agree to a plan or project if:
- it is evidenced that there are no alternative solutions (Stage 3); and
 - there are IROPI for the advancement of the project (Stage 4).

Shadow HRA

East Mainland Coast, Shetland SPA

Description

- 7.11.17 The East Mainland Coast, Shetland SPA stretches from Fish Holm and Lunna Ness in the north southwards, encompassing Whalsay, to the north coast of Bressay. Through much of the site, water depths are generally less than 40 m but in the north depth rapidly increases. The east coast of Shetland is relatively sheltered compared to the west and much of the shore is cliff albeit well interspersed with sandy beaches and bays such that the sediments are largely gravel and sand. The diversity of fish, polychaete worms, gasteropod and bivalve molluscs dependent upon the sediments and seaweeds present form potential prey for waterbirds frequenting the area.
- 7.11.18 Annex I species that are a primary reason for selection of this site:
- Non-breeding population of:
- Great northern diver; and
 - Slavonian grebe.
- Supporting breeding population of:
- Red-throated diver.

Site condition

- 7.11.19 As described in **Table 7.6** the three qualifying features are described as being ‘favourable maintained’ as of February 2010 (NatureScot, 2022a).

Stage 1: Screening for Likely Significant Effects

East Mainland Coast, Shetland SPA

Elements of the Proposed Project with the Potential for Likely Significant Effects

- 7.11.20 As described above there were no records of great northern diver or Slavonian grebe and it is considered there would be no impacts on the wintering populations of these species.
- 7.11.21 The potential effects of the development on the qualifying interest of the East Mainland Coast, Shetland SPA are therefore limited to:
- disturbance, displacement and collision risk on breeding red-throated diver.

Analysis of the Potential for Likely Significant Effects

Red-throated diver

- 7.11.22 Red-throated diver were recorded during breeding bird walkover surveys and regularly recorded flying over the site during flight activity watches.
- 7.11.23 The design of the wind farm means there is no infrastructure within 500 m of the nearest breeding lochan for red-throated diver but it is still considered a possibility that up to one breeding attempt could be disturbed during construction of the wind farm, the impact is predicted to last a maximum of one breeding season.
- 7.11.24 The operation of the wind farm could lead to the displacement of up to one breeding pair of red-throated diver and the operation of the turbine is predicted to increase the collision risk to flying red-throated divers of 0.07 birds per year.
- 7.11.25 Consequently, there is potential for LSE on the qualifying feature of the SPA.

Stage 2: Shadow Appropriate Assessment

Breeding red-throated diver

Pathways of effects - Construction

- 7.11.26 Construction of the wind farm will create both visual and noise disturbance which could lead to displacement and disturbance to breeding red-throated diver. The recommended no-disturbance buffer for red-throated diver is 500 m (NatureScot, 2022b). Works will not take place within the no disturbance buffer of any breeding lochan during the breeding season and appointed ECoW will ensure the maintenance of the buffers reducing the potential impacts to breeding divers.
- 7.11.27 The potential impacts and effects of construction on breeding red-throated diver are outlined in **Sections 7.8.9-7.8.15** above and predicts the possible worst-case scenario of displacement of one pair for one year which would equate to 0.49% of the SPA population (205 pairs) (NatureScot, 2022a).
- 7.11.28 The effect is considered to be minor and not significant under the EIA Regulations and it is therefore concluded that the works during construction of the wind farm is not likely to reduce the integrity, or impact negatively on the conservation objectives, of the favourable breeding East Mainland Coast, Shetland SPA population of red-throated diver.

Pathways of effects - Operation

- 7.11.29 The operation of the wind farm could lead to impacts on the East Mainland Coast, Shetland SPA population of breeding red-throated diver in two ways; firstly due to displacement of divers from their nesting grounds and secondly due to collision of red-throated divers with turbines leading to injury or mortality.
- 7.11.30 **Section 7.8.56-7.8.60** outlines the potential for displacement of breeding red-throated diver of the operational wind farm is predicted to be negligible and it is considered unlikely that the operational will impact on the breeding population in terms of displacement.
- 7.11.31 The effect is predicted to be negligible and not significant under the EIA Regulations.
- 7.11.32 **Section 7.8.68-7.8.79** outlines the potential impacts on breeding East Mainland Coast, Shetland SPA population of red-throated diver in terms of collision of breeding birds with the operational turbine. The annual collision risk was predicted to be 0.07 collisions (and presumes all the birds recorded during the survey are from the SPA population) represents 0.02 % of the SPA population. When this figure is considered over a 25-year period the total collision rate represents 0.43 % of the SPA population.
- 7.11.33 The effect is considered to be minor and not significant under the EIA Regulations. It is therefore concluded that the operation of the wind farm is not likely to reduce the integrity of the breeding population of red-throated diver and, therefore, does not impact negatively on the conservation objectives of the SPA.

Comparison of Effects

- 7.11.34 The species recorded during surveys remain similar in both the permitted development and proposed development. The most significant difference lies in the increase in breeding red-throated diver and a decrease in the numbers of large gulls and crows. This reduction relates to the number of birds recorded due to changing land use in the industrial areas east of the site. There was no change in significance for any species recorded.

7.12 Assessment of Cumulative Effects

- 7.12.1 The cumulative assessment of effects on receptors takes into consideration other operational, under construction and in planning developments. The assessment does not include for developments at the scoping stage, in accordance with national planning policy and given the lack of detailed information on such proposed developments. The assessment takes into account all types of developments considered to be relevant in the context of the assessed impacts, not just wind farm developments.
- 7.12.2 The assessment of ornithological effects associated with the Proposed Development alone, predicted no significant effects for every IOF due to a low level of both breeding records for high sensitivity species within the site and the relatively low activity levels at collision height of IOFs recorded during baseline surveys.
- 7.12.3 The Proposed Development lies within NHZ1 and so a qualitative cumulative assessment of the likely effects of local wind farm projects as shown in **Table-7.14**, on local NHZ1 populations, is considered.

Table 7.14 Cumulative Windfarm Developments

Site Name	Status	Number of Turbines	Height to Blade Tip	Distance / Direction from the Site
Operational turbine	Operational	1	121 m	adjacent
Mossy Hill	Planning permission granted	12	145 m	1.4 km south-west
Hoo Field	Part-built, planning permission granted	2	77 m	1.7 km south
Burradale	Operational	5	70 m	3.8 km south-west
Viking	Planning permission granted	103	155 m	10 km north-west
Culter Field	Planning permission granted	3	67 m	15 km south
Beaw Field	Planning permission granted	17	145 m	36 km north
Garth	Built	5	70 m	54 km north
Energy Isles	In Planning	18	200 / 180 m	54 km north

- 7.12.4 For the purpose of this cumulative assessment, it is considered that all other developments included in cumulative calculations remain as they were at installation and remain so for the assessment (25 year) period. As such, where appropriate the annual collision rates calculated for the Proposed Development are expanded to a 25-year equivalent in order to allow for comparisons between developments.
- 7.12.5 Construction impacts of disturbance and displacement were predicted to be negligible for all species bar East Mainland Coast, Shetland SPA red-throated diver, which was considered to be a minor adverse impact, with possible short-term effect on one breeding pair.
- 7.12.6 In terms of operation the collision risk modelling at the site identified negligible impacts from the results for all species, with the exception of red-throated diver where a total of 0.073 annual collisions were predicted. This collision risk figure still predicts that impacts due to collision risk are minor and are considered to be not significant.
- 7.12.7 The cumulative assessment therefore has been limited to disturbance-displacement for red-throated diver. In terms of collision risk, for completeness, the cumulative impacts of collision risk for curlew, great skua and red-throated diver will be considered (details for herring gull and great black-backed gull are not available for other sites and not considered).
- 7.12.8 The Operational Turbine would not have any additional impacts in terms of red-throated diver displacement as the same (and less pairs were present at time of surveys). Collision risk was predicted for three turbines and predicted 0.05 for red-throated diver, 6.4 for three turbines at 98% avoidance rate (0.53 one turbine at 99.5%) for great black-backed gull and 3.32 for three turbines at 98% avoidance rate (0.28 one turbine at 99.5%) for herring gull. No collision risk value was presented for curlew and great skua.
- 7.12.9 The Mossy Hill Wind Farm lies 1.4 km south-west of the site and predicts there will be no displacement of red-throated diver and predicts collision risk values per annum for red-throated diver of 0.08, great skua of 0.19, curlew of 1.4, great black-backed gull of 18.3 and herring gull of 2.43 (Peel energy, 2018).
- 7.12.10 Hoo Field wind farm, located 1.7 km south-west of the site, consists of one operational one permitted turbine. Initial surveys identified little flight activity and update work in 2018 was limited as SIC and NS agreed the lack of activity did not require further ornithology survey work. With no significant data Hoo Field is scoped out of the cumulative assessment (Greencat Renewables, 2019).
- 7.12.11 Burradale wind farm, 3.8 km south-west, was commissioned in 2003 and no data is available for public viewing. It is presumed no significant figure impacts on cumulative effects and with no information available Burradale wind farm is scoped out of the cumulative assessment.
- 7.12.12 The Viking Wind Farm ES (Natural Research Projects, 2009) predicted moderate significant adverse residual effects on merlin and whimbrel. Collision risk was considered as either low or negligible for all species bar whimbrel. No further significant effects were predicted. Given the lack of predicted effects Viking wind farm is scoped out of the cumulative assessment.
- 7.12.13 Culter Field Wind farm is located 15 km south and is permitted for three turbines. The surveys completed in 2011 did not identify any breeding red-throated diver and collision risk modelling was not required any species or these reasons Culter Field wind farm is scoped out of the cumulative assessment.
- 7.12.14 Beaw Field Wind Farm, located 36 km north of the site predicted a negligible impact on all assessed species (Peel Energy, 2016), including impacts on red-throated diver. Given the negligible impacts predicted it is unlikely that an in-combination effect will occur given the distance that Beaw Field Wind Farm is from the site. With no impacts greater than negligible and a separation of 36 km Beaw Field is scoped out of the cumulative assessment.

- 7.12.15 The five-turbine Garth Wind Farm, on Yell and 54 km from the site, did not predict any significant effects on birds using the site. There is a predicted collision mortality rate for red-throated diver was one bird every 10-11 years or 0.09 per annum (North Yell Development Council, 2009). Although this was calculated using a 95% confidence rate meaning with a 99.5% rate. Using current avoidance rates, this collision rate would equate to less than 0.01 birds per annum. A collision risk of 0.8 was predicted for great skua although again with 95% avoidance rate, using today's 99.5% rate this would equate to approximately 0.01 collisions per annum.
- 7.12.16 The Energy Isles Wind Farm, comprising 18 turbines, also on Yell and 54 km away, predicted a potential displacement of no pairs of red-throated divers and collision risk value of 0.25 for red-throated diver, 0.023 for curlew and 0.95 for great skua (ITPE, 2021).
- 7.12.17 At 54 km cumulative effects are considered unlikely between both Garth and Energy Isles wind farms and the site but are included on a precautionary basis.

Table 7.15: Cumulative effects

Effect	Cumulative schemes (where figures were produced and are available)	Predicted cumulative effect	Cumulative effects with Proposed Development
Displacement of red-throated diver	Permitted turbine (same predicted) - 0. Mossy Hill - 0 Garth - 0 Energy Isles - 0	A precautionary of one is predicted from the site – the total remains one.	<p>The loss of one nest would equate to 0.49 % of the SPA population (205 pairs) or 0.24 % of the NHZ1 population 407 pairs (Wilson <i>et al.</i>, 2015).</p> <p>The effect on red-throated diver as a result of cumulative displacement from operational turbines is therefore considered to be negligible and therefore not significant under the EIA Regulations.</p>
Collision red-throated diver	Permitted turbine – 0.05 for three turbines (used as precautionary value) Mossy Hill – 0.08 (mean annual) Garth - 0.01 Energy Isles – 0.25	Site = 0.07. Cumulative on Mainland Shetland = 0.2. Cumulative All = 0.44.	<p>The red-throated diver breeding population for the East Mainland Coast, Shetland SPA population is estimated to be 205 pairs (Table-7.6) meaning the cumulative collision risk value of mainland sites which may impact on the SPA of 0.2 collisions and presuming all the birds recorded are from the SPA population represents 0.05 % of the SPA respectively.</p> <p>With the total cumulative collision risk of 0.44 and the NHZ1 population estimated at 407 pairs (Wilson <i>et al.</i>, 2015) this represents 0.05 % of the NHZ1 population.</p> <p>When this figure is considered over a 25year period the total collision rate represents 1.21 % of the SPA population and 1.35 % of the NHZ1 population.</p> <p>The effect on red-throated diver as a result of cumulative collision with operational turbines is therefore considered to be minor and therefore not significant under the EIA Regulations.</p>

Effect	Cumulative schemes (where figures were produced and are available)	Predicted cumulative effect	Cumulative effects with Proposed Development
Collision curlew	Permitted turbine (same predicted) – none predicted. Mossy Hill –2.346 - 0.4477 (mean 1.4) Energy Isles – 0.023	Site = 0.04. Cumulative = 1.46.	The cumulative annual collision risk of 1.463 predicted which equates to 0.02 % of the NHZ1 population (estimated total of 4,227 pairs, as per Wilson <i>et al.</i> (2015)). With such a minimal predicted increase in curlew mortality, the effect on curlew as a result of cumulative collision risk with operational turbines is therefore considered to be negligible and therefore not significant under the EIA Regulations.
Collision great skua	Permitted turbine – none predicted. Mossy Hill – 0.322 and 0.06 (mean 0.19) Garth – 0.01 Energy Isles – 0.95	Site = 0.02. Cumulative = 1.17.	The cumulative annual collision risk of 1.17 predicted which equates to less than 0.01 % of the NHZ1 population (an estimated total of 10,377 pairs, as per Wilson <i>et al.</i> , (2015)). With such a minimal predicted increase in great skua mortality, the effect on great skua as a result of cumulative collision risk with operational turbines is therefore considered to be negligible and therefore not significant under the EIA Regulations.
Collision great black-backed gull	Permitted turbine -6.4 at 98% avoidance - therefore for one turbine at 99.5% - 0.53. Mossy Hill – 31.65 – 4.96 (mean 18.3)	Site = 0.14. Cumulative = 18.98	The cumulative CRM provided an output of 18.98 collisions annually. The great black-backed gull breeding population on Shetland is estimated at a total of 2,106 pairs, as per Wilson <i>et al.</i> (2015). The modelled annual collision rate is 0.45 % of the NHZ1 population. This increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of low magnitude. The effect on the great black-backed gull as a result of cumulative collision risk with operational turbines is therefore considered to be minor and therefore not significant under the EIA Regulations.

Effect	Cumulative schemes (where figures were produced and are available)	Predicted cumulative effect	Cumulative effects with Proposed Development
Collision herring gull	Permitted turbine – 3.32 at 98% for three turbines. Therefore 0.28 for one turbine at 99.5%. Mossy Hill –4.172 – 0.68 (mean 2.43)	Site = 0.12. Cumulative = 1.12.	<p>The cumulative CRM provided an output of 1.12 collisions annually. The herring gull breeding population on Shetland is estimated at a total of 2,526 pairs, as per Wilson <i>et al.</i> (2015). The modelled annual collision rate is 0.02% of the NHZ1 population. This small increase in baseline mortality is therefore predicted to result in an impact that is considered to be long-term and of negligible magnitude.</p> <p>The effect on the herring gull as a result of cumulative collision risk with operational turbines is therefore considered to be negligible and therefore not significant under the EIA Regulations.</p>

Comparison of Cumulative Effects

- 7.12.18 The 2011 Permitted Development cumulative assessment considered only projects within a 20 km radius of the Site which was limited to two developments, namely Burradale and Viking. The figures calculated for the Viking windfarm were for an earlier iteration with 127 turbines and the collision risk and likely displacement figures for this species have subsequently reduced significantly with updated designs. While the Proposed Development includes more projects the overall collision risk values and displacement of key species is reduced through redesign of Viking and updates in the collision risk modelling methodology meaning collision risk values for species such as red-throated diver and great skua have modified significantly (avoidance rates for red-throated diver have changed from 95% to 99.5%).
- 7.12.19 The overall cumulative assessment concluded there would be no significant impacts on any features or species in addition to the Viking wind farm cumulative predictions. The results of the cumulative effects from the Proposed Development are minor or negligible not significant for all species, although not stated in the 2011 Permitted Development chapter likely remains the same.

7.13 Conclusion

- 7.13.1 **Table 7.16** below summarises the predicted effects of the construction and operational impacts on ornithology, and it is concluded that the Development will not have a significant adverse effect at greater than the minor sensitivity level for any species using the site and immediate surrounding area.

Table 7.16 – Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect		Comparison in Residual Effect Significance from 2011 Permitted Development
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse	
Construction						
East Mainland Coast, Shetland SPA Qualifying Species – Red-throated diver: disturbance and displacement	Negligible and not significant	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Negligible and not significant	Adverse	No change in significance
Great skua: disturbance and displacement.	Negligible and not significant	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Negligible and not significant	Adverse	No specific mention of this species but breeding bird population used: No change in significance
Curlew: disturbance and displacement.	Negligible and not significant	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion zones during breeding season.	Negligible and not significant	Adverse	No specific mention of this species but breeding bird population used: No change in significance
Snipe: disturbance and displacement.	Negligible and not significant	Adverse	Timing of works or pre-construction check for nesting birds. Exclusion	Negligible and not significant	Adverse	No specific mention of this species but breeding bird population used: No change in significance

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect		Comparison in Residual Effect Significance from 2011 Permitted Development
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse	
			zones during breeding season.			
Operation						
East Mainland Coast, Shetland SPA Qualifying Species – Red-throated diver: displacement	Negligible and not significant	Adverse	None	Negligible and not significant	Adverse	No change in significance
East Mainland Coast, Shetland SPA Qualifying Species – Red-throated diver: collision risk	Minor and not significant	Adverse	None	Minor and not significant	Adverse	No change in significance
Great skua: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	Adverse	No specific mention of this species but breeding bird population used: No change in significance
Curlew: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	Adverse	No specific mention of this species but breeding bird population used: No change in significance

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect		Comparison in Residual Effect Significance from 2011 Permitted Development
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse	
Great black-backed gull: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	Adverse	No change in significance
Herring gull: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	Adverse	No change in significance
Decommissioning						
Scoped out of the assessment						

Table 7.17 – Summary of Cumulative Effects

Receptor	Effect	Cumulative Developments	Significance of Cumulative Effect		Comparison in Residual Effect Significance from 2011 Permitted Development
			Significance	Beneficial/ Adverse	
East Mainland Coast, Shetland SPA Qualifying Species – Red-throated diver: displacement	Negligible and not significant	Adverse	None	Negligible and not significant	n/a – no cumulative assessment provided
East Mainland Coast, Shetland SPA Qualifying Species –	Minor and not significant	Adverse	None	Minor and not significant	n/a – no cumulative assessment provided

Receptor	Effect	Cumulative Developments	Significance of Cumulative Effect		Comparison in Residual Effect Significance from 2011 Permitted Development
			Significance	Beneficial/ Adverse	
Red-throated diver: collision risk					
Curlew: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	n/a – no cumulative assessment provided
Great skua: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	n/a – no cumulative assessment provided
Great black-backed gull: collision risk	Minor and not significant	Adverse	None	Minor and not significant	n/a – no cumulative assessment provided
Herring gull: collision risk	Negligible and not significant	Adverse	None	Negligible and not significant	n/a – no cumulative assessment provided

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