Offshore Wind Power Limited

West of Orkney Windfarm Onshore EIA Report

Volume 1, Chapter 11 - Terrestrial Ornithology

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West of Orkney Windfarm

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11 TERRESTRIAL ORNITHOLOGY

Chapter summary

This chapter of the Onshore Environmental Impact Assessment (EIA) Report assesses the potential effects from the onshore Project on terrestrial ornithology receptors. This includes direct, indirect, whole project assessment, cumulative, inter-related effects, inter-relationships and transboundary effects.

Caledonian Conservation Ltd carried out a range of ornithological surveys across the onshore Project area, with appropriate survey buffers (ranging from 250 metres (m) to 6 kilometres (km)) for each receptor). Breeding bird surveys, breeding corncrake, diver and seabird surveys, breeding raptor and owl surveys, winter bird surveys, wetland bird surveys and goose and swan surveys were undertaken.

The breeding bird surveys recorded 101 species of bird. Of these, 44 were confirmed to be breeding within the onshore study area, including greylag goose, a Schedule 1 species. Barn owl (Schedule 1) were confirmed to breed during raptor and owl surveys. Whilst hen harrier and white-tailed eagle were recorded foraging or overflying the onshore study area, no nest sites or territories were recorded, and no golden eagles were observed. Merlin, peregrine, short-eared owl, golden plover and greenshank were recorded overflying or foraging within the onshore study area, but no breeding behaviour was recorded. Of the waders identified within the onshore study area, four species; curlew, lapwing, oystercatcher and snipe, were confirmed to breed and breeding wigeon and teal territories were identified. No nesting seabird colonies, corncrake or divers were confirmed within the onshore study area.

Wintering Greenland white-fronted geese, and greylag geese were recorded to forage and roost within the onshore Project area and wider landscape. The coastal area was found to be used by an assemblage of twenty species of seabirds (including ducks and gulls) for foraging during winter. In addition, sixteen species of wader were recorded to make use of the onshore Project area and wider landscape during winter.

The desk study identified nine designated sites with terrestrial ornithology features: five sites of international importance within 20 km of the onshore Project area and four sites of national importance within 5 km.

The following impacts were identified as requiring assessment:

- Construction and decommissioning:
  - Direct loss of habitat used by birds for nesting, foraging and roosting due to land-take;
  - Mortality, disturbance and damage / injury of important terrestrial ornithology receptors; and
  - Indirect effects on habitats used by birds (e.g., due to pollution or sedimentation).
- Operation and maintenance:
  - Mortality, disturbance and damage / injury to habitats of important terrestrial ornithology receptors; and
  - Indirect effects on habitats used by birds (e.g. due to pollution or sedimentation).

The assessment has taken account of embedded mitigation measures for the assessment of potential effects. Potential impacts are assessed to be low or negligible with the appropriate application of the embedded mitigation, and the impacts during decommissioning are expected to be equivalent to those encountered during construction. The key mitigation measures include steps taken to avoid or minimise the damage to key nesting and foraging habitats, to protect key ornithology receptors for the duration of the works and to adhere to best practice and regulatory guidance. These measures will be implemented through a Species and Habitat Protection Plan (SHPP) and monitored via a Habitats Management Plan (HMP) and Ecological Clerk of Works (ECoW).

No significant impacts to terrestrial ornithology receptors are predicted, either for the onshore Project or cumulatively with other plans or developments.

In addition, the Project is committed where possible to enhancing the environment, and it is proposing a biodiversity enhancement project in relation to important habitats for farmland breeding birds. The outline Biodiversity Enhancement Plan is submitted alongside the PPP application.

11.1 Introduction

This chapter of the Onshore Environmental Impact Assessment (EIA) Report presents the terrestrial ornithology receptors of relevance to the onshore Project area identified through consultation, desk-based research and field surveys. The potential impacts from the construction, operation and maintenance and decommissioning of the onshore Project on these receptors has been assessed. Where required, mitigation is proposed, and the residual impacts and their significance are assessed. Potential cumulative and transboundary impacts are also considered. The structure and assessment methods of this chapter differs from others so as to conform with the Chartered Institute of Ecology and Environmental Management (CIEEM) Ecological Impact Assessment (EcIA) guidance (CIEEM, 2018). However, wherever possible, terminology has been adapted to remain as close to other topic-specific chapters without deviating from best practice assessment methodology.

The assessment and survey work detailed in this chapter (breeding bird surveys, breeding raptor and owl surveys, breeding corncrake (*Crex crex*) surveys, breeding diver survey, breeding seabird survey, winter bird survey, Wetland Bird Survey (WeBS), and goose and swan survey) have been undertaken by Caledonian Conservation Ltd, providing independent and objective reporting based upon sound data collection and analysis in accordance with best practice guidelines and standards of CIEEM.

Table 11-1 below provides a list of all the supporting studies which relate to and should be read in conjunction with the terrestrial ornithology impact assessment. All supporting studies are appended to this Onshore EIA Report and issued on the accompanying Universal Serial Bus (USB).

Table 11-1 Supporting studies

DETAILS OF STUDY	LOCATIONS OF SUPPORTING STUDY
Climate and Carbon Assessment	Onshore EIA Report, Supporting Study (SS) 1: Climate and carbon assessment.
Terrestrial Ornithology Technical Survey Report	Onshore EIA Report, SS8: Terrestrial Ornithology Ecology Technical Survey Report.
Terrestrial Ornithology Confidential Annex	Onshore EIA Report, SS9: Terrestrial Ornithology Confidential Annex. Confidential annex containing sensitive information relating to legally protected species not suitable for general distribution.
West of Orkney Windfarm EIA, Forestry and Woodland Survey and Report	Onshore EIA Report, SS10: Forestry and Woodland Survey and Report.

The impact assessment presented herein draws upon information presented within other impact assessments within this Onshore EIA Report. Equally, the terrestrial ornithology impact assessment also informs other impact assessments. This interaction between the impacts assessed within different topic-specific chapters on a receptor is defined as an 'inter-relationship'. The topic-specific chapters and impacts related to the assessment of potential effects upon ornithological receptors are provided in Table 11-2.

Table 11-2 Terrestrial ornithology inter-relationships

CHAPTER	IMPACT	DESCRIPTION
Water and sediment quality (chapter 9, Offshore EIA Report)	Indirect mortality.	A reduction in water quality resulting in an indirect impact upon certain terrestrial ornithology receptors due to a reduction in the availability and quality of fish prey species and aquatic invertebrates etc.
Offshore intertidal and ornithology (chapter 13, Offshore EIA Report)	Indirect impacts.	Potential impacts upon birds as a result of the offshore project.
Geology and hydrology (chapter 8, Onshore EIA Report)	Changes to flow patterns and drainage.	Any changes that influence flow availability to local catchments have the potential to affect wetland habitats utilised by birds for nesting, roosting, or feeding (including availability and quality of foraging resources).
Non-avian terrestrial ecology (chapter 10, Onshore EIA Report)	Potential loss or modification of foraging, breeding or overwintering habitats within the onshore Project area.	Potential impacts upon breeding or wintering birds due to loss of suitable habitats.
Land use and other users, including forestry (chapter 12, Onshore EIA Report)	Potential loss or modification of foraging, breeding or overwintering habitats within the onshore Project area.	Potential impacts upon breeding or wintering birds due to loss of suitable habitats. Potential impacts on breeding or wintering birds due to afforestation.
Air quality (chapter 14, Onshore EIA Report)	Indirect impacts	Construction related increases in pollution and uncontrolled dust resulting in a reduction in water quality and tree health with indirect impacts upon terrestrial ornithology receptors.
Noise and vibration (chapter 15, Onshore EIA Report)	Indirect impacts	Increasing levels of noise and vibration can impact notable ornithology receptors, causing disturbance to foraging, commuting and nesting birds.
Access, traffic and transport (chapter 16, Onshore EIA Report)	Direct and indirect mortality of protected species, and direct and indirect habitat loss.	Risk of injury or mortality to protected and notable species from vehicular traffic during construction, maintenance and decommissioning activities. Direct land-take and indirect impact upon neighbouring habitats during the construction of temporary and permanent access tracks through disruption to groundwater flow through sensitive habitats or pollution events. Indirect mortality or disturbance to terrestrial ornithology receptors due to the severance of foraging habitat as a result of the construction of temporary and permanent access tracks.

The following specialists have contributed to the assessment:

- Caledonian Conservation Ltd: survey design, scoping agreement and implementation, reporting and terrestrial ornithology Onshore EIA Report chapter write up.

Effects on all designated sites are considered in this chapter in the context of EcIA (CIEEM, 2018). In addition, effects on Special Protected Areas (SPAs) and Ramsar[1] sites have been considered under the Habitats Regulation Appraisal (HRA) process which has been undertaken alongside this Onshore EIA Report.

11.2 Legislation, policy and guidance

Over and above the legislation presented in chapter 3: Planning policy and legislative context, the following legislation, policy and guidance are relevant to the assessment of impacts from the onshore Project on terrestrial ornithology:

- Legislation:
  - European Union (EU) Regulation (1141/2014) on invasive alien (non-native) species: imposes restrictions on a list of species known as 'species of Union concern', published in Commission Implementing Regulation 2016/1141. These are species whose potential adverse effects across the European Union are such that concerted action across Europe is required. The list is drawn up by the European Commission and managed with Member States using risk assessments and scientific evidence[2]; Invasive Non-native Species (INNS) (EU Exit) (Scotland) (Amendment etc.) Regulations 2020 ensures this legislation continues to function after the UK's departure from the EU;
  - European Council Directive 2009/147/EC on the Conservation of Wild Birds (the codified version of Council Directive 79/409/EEC as amended) the (Birds Directive)[1]: lists bird species that are of conservation importance at a European level. One of the main provisions of the Directive is the identification and classification of SPAs for rare or vulnerable Annex I bird species, as well as for all regularly occurring migratory species; Transposed into UK law by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland);
  - European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive)1: aims to promote the maintenance of biodiversity, and as such identifies species and habitats for which core areas must be designated as Special Areas of Conservation (SAC). Transposed into UK law by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland);

[1] Ramsar sites are classified under the Convention on Wetlands of International Importance, to which the UK Government is a signatory. Protection is implemented through co-designation of Ramsar sites as protected sites defined under domestic legislation. Most Ramsar sites are included in the Natura 2000 site network, with protection afforded as SPAs or SACs. Natura 2000 sites are European protected sites designated under the domestic legislation implementing the Habitats and Birds Directives. All Ramsar sites are also designated as SSSIs (national protected sites). See section 11.2 for more detail on relevant legislation.

[2] The EU Directives have been included as a reference, but it is noted that following the United Kingdom (UK) withdrawal from the EU these Directives are not legally binding, although the EU Withdrawal Act (2018) maintains the requirements of the EU Directives into domestic law as retained EU Law.

- Wildlife and Countryside Act (WCA) 1981 (as amended in Scotland): provides protection of birds including all wild birds, enhanced protection for species listed on Schedules 1, 1A, and A1, and protection for bird populations and communities of national importance through the designation of Sites of Special Scientific Interest (SSSIs);
- Wildlife and Natural Environment (WANE) (as amended in Scotland) Act 2011: amends other pieces of legislation including the WCA and Protection of Birds Act (PBA) and creates a mechanism for establishing a code of practice with regards to non-native, invasive species (note, in Scotland there is not a defined list of invasive non-native species – instead the meaning of non-native range is defined, and it as an offence to cause these to be present outwith their native range);
- Nature Conservation (Scotland) Act (NCSA) 2004 (as amended): places a duty on all public authorities to consider biodiversity in their work, requires Scottish Ministers to produce a biodiversity strategy and list of species and habitats of principal importance for biodiversity conservation in Scotland, and strengthens legislation protecting SSSIs; and
- Electricity Works (Environmental Impact Assessment (Scotland) Regulations 2017): in respect of the Project, implement Directive 2001/92/EU in relation to the construction and operation of onshore infrastructure associated with offshore generating stations and their impact on the environment.

- Policy:
  - The International Union for Conservation of Nature (IUCN) Red Data Book Species: provides taxonomic, conservation status and distribution information on taxa that have been globally evaluated using the IUCN Red List Categories and Criteria;
  - National Planning Framework 4 (NPF4) (Scottish Government, 2023): emphasises the importance of protecting biodiversity, reversing biodiversity loss, delivering positive effects from development, and strengthening nature networks. As part of this, development proposals are expected to contribute towards the enhancement of biodiversity, including restoration of degraded habitats, as well as restoring connections between nature networks (Scottish Government, 2023). Specific policies related to this chapter includes: Policy 2 Climate mitigation and adaption, Policy 3 Biodiversity and Policy 4 Natural places;
  - Caithness and Sutherland Local Development Plan (CaSPlan) (The Highland Council (THC), 2018): chapter 3: Planning policy and legislative context considers planning policies relevant to the safeguarding of areas of high-quality nature conservation value, and the protection and enhancement of green networks and green spaces;
  - Birds of Conservation Concern: the UK Birds of Conservation Concern (BoCC) is a periodic national review assessing the population and trends for UK breeding bird species. It uses a traffic light system to indicate an increasing level of conservation concern. Species that have a declining range and/or population, or that are vulnerable to population effects due to their small population size, are Red- or Amber-listed, depending on the extent of the decline or vulnerability, while those which are stable, increasing, or experiencing only small declines, are Green-listed. The most recent review (BoCC 5) was published in December 2021 (Stanbury et al., 2021);
  - Government Circular 06/2005: Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System (Office of the Deputy Prime Minister (ODPM));
  - Highland Nature Biodiversity Action Plan 2021 – 2026: This Local Biodiversity Action Plan (LBAP) defines nature conservation priorities, actions and targets for the Highland region;
  - Highland-Wide Local Development Plan (HwLDP) (THC, 2012): sets out a strategy to support the growth of all communities across THC region. It seeks to enable sustainable Highland communities, safeguard the environment, support a competitive, sustainable and adaptable Highland. Specific policies related to this chapter include:

  - Policy 58: Protected Species (2012): The policy states that where protected species are present the council will require surveys to be carried out to establish presence and if necessary, mitigation will need to be implemented to avoid or minimise impacts on species;
  - Policy 59: Other Important Species (2012) - The policy states that species listed under the Habitats Directive, UK and LBAPs and the Scottish Biodiversity List (SBL) (NatureScot, 2020) will need to be considered in terms of adverse effects from proposals;
- Scottish Biodiversity Strategy 2022 to 2045. Tackling the Nature Emergency in Scotland (Scottish Government, 2022): updated biodiversity strategy, notably aiming to halt and reverse biodiversity loss in Scotland. This strategy remains a draft to ensure that the final version reflects any agreement made at Conference of the Parties (COP)15. A final version will be published alongside the delivery plan, which will build on the key actions presented in the document above;
- Scottish Biodiversity Strategy Post-2020: Statement of Intent, 2020: sets the direction for a new biodiversity strategy which will respond to the increased urgency for action to tackle the twin challenges of biodiversity loss and climate change;
- Scotland's Biodiversity: It's in Your Hands: strategy for the conservation and enhancement of biodiversity in Scotland (Scottish Executive, 2004);
- 2020 Challenge for Scotland's Biodiversity: strategy for the conservation and enhancement of biodiversity in Scotland (Scottish Government, 2013);
- Scottish Government Planning Advice Note 1/2013: Environmental Impact Assessment: Scottish Government Planning Advice Note regarding Environmental Impact Assessment;
- Scottish Planning Circular 1/2017 guidance on the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017): Gives guidance on the 2017 Regulations which transpose the EIA Directive into the Scottish planning system;
- Caithness Biodiversity Action Plan (BAP), February 2003 presents an introduction to the habitats and species present in Caithness, listing the main issues and identifying opportunities for future developments that could help conserve and enhance the biodiversity of Caithness in the next five to ten years;
- The UKBAP - most recently updated in 2007: superseded by the 'UK post-2010 Biodiversity Framework' and devolved under the NCSA, the UKBAP lists of priority species and habitats are still of value to policy makers; and
- Good practice during Windfarm Construction (Scottish Renewables *et al.*, 2019).

- Guidance[3]:
  - A Handbook on Environmental Impact Assessment, Version 5 (Historic Environment Scotland (HES) and Scottish Natural Heritage (SNH), 2018): guidance to be followed when undertaking EIA published by SNH (now NatureScot) and HES;
  - An updated literature review of disturbance distances of selected bird species. NatureScot Report 1283 (Goodship & Furness, 2022); Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018);
  - Assessing Connectivity with SPAs (SNH, 2016);
  - Assessing the Cumulative Impact of Onshore Wind Energy Developments (NatureScot, 2021);

[3] Guidance specific to onshore wind farms is the standard guidance to be referred to in the absence of alternative ornithological guidance for underground cables. This approach was agreed with NatureScot – see section 11.3.

- Assessing the significance of impacts on bird populations from onshore windfarms that do not affect protected areas (SNH, 2018);
- Barn Owl Conservation Handbook (Barn Owl Trust, 2012);
- Barn Owl Survey Techniques (Barn Owl Trust, 2001);
- Bird Monitoring Methods (Gilbert et al., 1998);
- Monitoring the Impact of Onshore Windfarms on Birds (SNH, 2009);
- Raptors: A Field Guide to Survey and Monitoring (Hardey *et al.*, 2013); and
- THC Supplementary Guidance. Highland's Statutory Protected Species (2013).

11.3 Scoping and consultation

Stakeholder consultation has been ongoing throughout the EIA and has played an important part in ensuring the scope of the baseline characterisation and impact assessment are appropriate with respect to the Project and the requirements of the regulators and their advisors.

The Scoping Report was submitted to Scottish Ministers (via Marine Scotland - Licensing Operations Team (MS-LOT[4])) and THC on 1st March 2022, who then circulated the report to relevant consultees[5]. A Scoping Opinion was received from THC on 9th May 2022. Relevant comments from the Scoping Opinion specific to terrestrial ornithology are provided in Table 11-4 below, which provides a response on how these comments have been addressed within the Onshore EIA Report. The Scoping Opinion supersedes any pre-application advice provided by THC which was received on the 10th February 2021.

Further consultation has been undertaken throughout the pre-application stage. Table 11-3 below summarises the consultation activities carried out relevant to terrestrial ornithology.

[4]MS-LOT have since been renamed Marine Directorate - Licensing Operations Team (MD-LOT).

[5] The Scoping Report was also submitted to Orkney Islands Council (OIC), as the scoping exercise included consideration of power export to the Flotta Hydrogen Hub, however, this scope is not covered in this Onshore EIA Report and will be subject to a separate onshore planning application and Marine Licence.

Table 11-3 Consultation activities for terrestrial ornithology

CONSULTEE AND TYPE OF CONSULTATION	DATE	SUMMARY
NatureScot – meeting	28th April 2022	An online meeting to discuss the onshore Project Design Envelope (PDE) and to obtain agreement from consultees on survey methodologies (including targeting of breeding bird survey), key sensitivities (to date), mitigations (to date), approach to assessment and a framework for proportionate approach to cumulative effects. Survey methods agreed, including approach to targeting areas for breeding bird survey.
NatureScot – email	17th July 2022	Updated survey methodology approach reflecting change to the onshore Project area. Agreement on this approach was received 25th July.
NatureScot – meeting	2nd November 2022	An online meeting to present an update on the onshore Project and PDE and to obtain agreement from consultees on the survey methodology including approach to breeding bird surveys to accommodate refined PDE, key sensitivities (to date), mitigations (to date), approach to assessment and a framework for proportionate approach to cumulative effects. A positive response from the NatureScot representative was received. Agreement to breeding bird survey approach with regard to the refined PDE, key sensitivities, assessment methods and approach to mitigation.
Royal Society for the Protection of Birds (RSPB) – meeting	12th February 2023	An online meeting to present information on the onshore Project and PDE and to discuss the survey methodology including approach to breeding bird surveys to accommodate refined PDE, key sensitivities (to date), mitigations (to date), approach to assessment and a framework for proportionate approach to cumulative effects. A positive response from the RSPB representative was received, including reaffirming of the agreed survey methods, key sensitivities, assessment methods, and approach to mitigation. An initial discussion on biodiversity enhancement proposals was undertaken, including the management of important habitats for farmland breeding birds. Further details on this proposal is provided in the outline Biodiversity Enhancement Plan (BEP) which accompanies this Planning Permission in Principle (PPP) application (Offshore Wind Power Limited (OWPL), 2023).

Table 11-4 Comments from the Scoping Opinion relevant to terrestrial ornithology

CONSULTEE	COMMENT	RESPONSE
THC	The EIAR should provide a baseline survey of the bird and animals (mammals, reptiles, amphibians, etc) interest on site. It needs to be categorically established which species are present on the site, and where, before a future application is submitted. Further the EIAR should provide an account of the habitats present on the proposed development site. It should identify rare and threatened habitats, and those protected by European or UK legislation, or identified in national or local Biodiversity Action Plans. Habitat enhancement and mitigation measures should be detailed, particularly in respect to blanket bog, in the contexts of both biodiversity conservation. Details of any habitat enhancement programme (such as native- tree planting, stock exclusion, etc) for the proposed site should be provided. It is expected that the EIAR will address whether or not the development could assist or impede delivery of elements of relevant Biodiversity Action Plans.	A description of results from the baseline surveys conducted for birds is provided in this chapter. Full details of the baseline surveys are provided SS8: Terrestrial Ornithology Ecology Technical Survey Report and SS9: Terrestrial Ornithology Confidential Annex. Full details of the habitats present on site are provided within chapter 10: Terrestrial non-avian ecology, and SS6: Terrestrial Non-Avian Ecology Technical Survey Report, including consideration of relevant Biodiversity Action Plans, as detailed in section 11.2. Embedded mitigation measures ensure habitat protection / appropriate management, as detailed section 11.5.4. Habitat enhancement measures are detailed in the outline BEP which accompanies this PPP application (OWPL, 2023). This will be updated post-consent once detailed design is finalised.
THC	The presence of protected species such as Schedule 1 Birds or European Protected Species must be included and considered as part of the planning application process, not as an issue which can be considered at a later stage. Any consent given without due consideration to these species may breach European Directives with the possibility of consequential delays or the Project being halted by the EC. Please refer to the comments NatureScot and RSPB in this respect.	As part of this Onshore EIA Report Schedule 1 birds have been included and considered within this chapter. European Protected Species (EPS) are included and considered within chapter 10: Terrestrial non-avian ecology. A description of results from the baseline surveys conducted for birds is provided in this chapter. Full details of the baseline surveys are provided SS8: Terrestrial Ornithology Ecology Technical Survey Report and SS9: Terrestrial Ornithology Confidential Annex. Reference to standing advice on protected species is given in section 11.5, where appropriate. Response to NatureScot and RSPB comments are detailed below.

CONSULTEE	COMMENT	RESPONSE
THC	The EIAR should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the proposed development. It should provide proposals for any mitigation that is required to avoid these impacts or to reduce them to a level where they are not significant. NatureScot have provided advise in respect of the designated site boundaries for SACs and SPAs and on protected species and habitats within those sites. The potential impact of the development proposals on other designated areas such as SSSI's should be carefully and thoroughly considered and, where possible, appropriate mitigation measures outlined in the EIAR.	Effects on all designated sites are considered in this chapter in the context of EcIA (CIEEM, 2018). A HRA screening report was produced, which assisted in the identification of which sites and qualifying features will require an Appropriate Assessment (AA). As per the Habitat Regulations, a Report to Inform Appropriate Assessment (RIAA) (comprising part of the Habitat Regulations Assessment (HRA) process) has been carried out to determine whether or not the development would have an adverse effect on the integrity of any designated sites in the area. The results of the assessment are detailed in the Onshore HRA RIAA which accompanies this PPP application. The potential impact of the onshore Project on other designated areas, including SSSI sites, is discussed in section 11.6. Advice from NatureScot in respect of designated site boundaries for SACs and SPAs has been followed.
THC	Further advice may be provided by NatureScot on ecology and ornithology in relation to the surveys required and the adequacy of the work already undertaken. However, noting that NatureScot are broadly content with the scope of the assessment.	Consultation has been undertaken with NatureScot including requesting advice on survey methodology and surveys required and receiving confirmation of their agreement with the survey methodologies as detailed in

CONSULTEE	COMMENT	RESPONSE
THC	It should be noted that it is for the competent authority to consider whether an Appropriate Assessment under the Habitat Regulations is required. Your EIAR should provide sufficient information for the competent authority to come to a view on such matters. Further in relation to ornithology the Regional Golden Eagle Conservation Management Plan and the associated studies and research should form part of the baseline for the EIAR. The development will be required to contribute toward the implementation of the Regional Golden Eagle Conservation Management Plan.	A HRA screening report was produced, and identified which sites and qualifying features will require an AA. As per the Habitat Regulations, a RIAA (comprising part of the HRA process) has been carried out to determine whether or not the development would have an adverse effect on the integrity of any designated sites in the area. The results of the assessment are detailed in the Onshore HRA RIAA which accompanies this PPP application. Following discussion with THC it was confirmed that the contribution towards the Regional Golden Eagle Conservation Management Plan is no longer required as this is in place in south Inverness and is not applicable in onshore Project area.
RSPB	We largely agree with the content in the Scoping Report regarding the onshore infrastructure in Caithness and note that the development area and route has not yet been decided. We are pleased that the route will be undergrounded as this will eliminate bird collision impacts. However, there are other impacts associated with undergrounding of cables that would affect birds such as disturbance, displacement, and habitat loss. Our comments are outlined below.	Consideration has been given to the impact of the work associated with the undergrounding of cables and this assessment is detailed in section 11.6.
RSPB	When deciding on the final landfall location, underground cable route, and infrastructure locations, all designated sites should be avoided, all areas of cliff coastal habitats, peatland and wetland should be avoided and all areas with high densities of farmland waders should be avoided.	All designated sites will be avoided (with the exception of the River Thurso SAC). Horizontal Directional Drilling (HDD) will be used where possible, including beneath the River Thurso, along with other methods such as the avoidance of Groundwater Dependent Terrestrial Ecosystems (GWDTEs) and the use of clay stoppers to prevent works from affecting groundwater flows which may permanently damage sensitive habitats. Habitats likely to support high densities of breeding waders were targeted for the breeding bird survey. This information will inform the final route selection, while embedded mitigation described in section 11.5.4 will minimise impacts on breeding waders and other ground nesting bird species.

CONSULTEE	COMMENT	RESPONSE
RSPB	We agree with the scope of surveys proposed in section 3.3 Terrestrial Non-Avian Ecology. We note that habitats are proposed to be reinstated after the works as part of the mitigation measures. Not all habitats however can be easily reinstated. Therefore, the long-term or permanent loss of bird nesting, foraging, and/or roosting habitat along the onshore export cable corridor cannot be ruled out. HDD should be used if sensitive habitats cannot be avoided.	Detailed recommendations regarding appropriate mitigation measures for terrestrial non-avian ecology receptors, including habitats, is provided in chapter 10: Terrestrial non-avian ecology. Furthermore, reinstatement of foraging habitat suitable for geese and swans will be prioritised between September and mid-May so as to minimise disruption to these species, associated with Caithness Lochs SPA / Ramsar.
RSPB	We agree with the use of relevant standard survey methodologies. As set out section 3.4.3.1, the remote sensing exercise and desk study will determine the relevant targeted field survey study areas for birds. Caithness is an important stronghold for breeding farmland waders on mainland Scotland such as lapwing, curlew, redshank, oystercatcher, and snipe. Curlew and lapwing have declined massively over recent decades, and both are red-listed Birds of Conservation Concern. Curlew is also classed as 'near threatened' globally. Farmland habitats should not be overlooked or ruled out by the remote-sensing exercise and desk study as they can support high numbers of these species and field surveys for these species must be carried out.	Various methods will be used to protect habitats suitable for a range of bird species. This includes the use of HDD where possible to minimise impacts to watercourses, the avoidance of GWDTEs and the use of clay stoppers to prevent works from affecting groundwater flows. This chapter carries out a detailed assessment of the potential for the works to result in the long-term or permanent loss of bird nesting, foraging, and/or roosting habitat along the onshore Project area and has considered breeding farmland waders.
RSPB	We note that if the export cable corridor search area and substation search area is further refined then the ornithological desk top study and subsequent field surveys are to be focused around the refined areas. We consider this to be a pragmatic approach but do wish to highlight the EIA requirement to include a description of reasonable alternatives and the main reasons for selecting a chosen option. We caution the developer against potentially excluding options prior to any desk top studies as it will then be difficult to demonstrate environmental effects have been considered.	Project evolution including consideration of alternatives is detailed in chapter 4: Site selection and alternatives. Further refinement of the specific areas for onshore development will continue as the Project moves to the next stage of engineering design. This will include consideration of environmental constraints and the findings of the EIA.

CONSULTEE	COMMENT	RESPONSE
RSPB	We recommend that the Seabird Monitoring Programme Database is added to Table 3-24 Summary of Key Datasets and Reports.	Seabird Monitoring Programme Database has been considered during this assessment.
RSPB	Overall, we agree with the survey timings and methods outlined in Table 3-25. However, we note only one visit is planned for terns. Tern colony locations can vary year on year and can be transient even within the same breeding season. We therefore recommend the methods outlined in the Seabird Monitoring Handbook be used.	Four survey visits were undertaken for terns and the methodology used followed that described in the Seabird Monitoring Handbook. Breeding seabird visits were undertaken monthly between May and August 2022. All seabird species were targeted, including terns.
RSPB	Over-wintering Greenland white-fronted geese (GWFG), whooper swan and greylag geese are qualifying species of the Caithness Lochs SPA as recognised in table 3-26. The proposed development is within connectivity distance of this designated site and these species are particularly sensitive to disturbance at the roost. We would therefore recommend including wintering goose and swan roost surveys on any lochs and waterbodies within the search area and buffer and this be added to Table 3-25 Proposed Surveys and Methodologies. The search area overlaps the core feeding and roosting area for the Westfield / Broubster flock of GWFG. This is an extremely small area which averaged 130 birds in 2020/212 and the flock has been known to roost at Loch Lieurary which is within the search area. Therefore, it can confidently be concluded that any GWFG roosting in the search area are part of the SPA population.	Loch Lieurary is no longer within the onshore Project area which has been refined since the submission of the Scoping Report and removal of some of the previous landfall options and associated onshore cable corridor route options. Goose surveys were undertaken between September 2022 and mid-May 2023, within 3 km of the onshore Project area. As per the RSPB scoping comment, any GWFG recorded during the survey visits were considered likely to be associated with the Caithness Lochs SPA / Ramsar population. Potential impacts on foraging habitats and disturbance to GWFG during roosting and foraging were considered. A HRA screening report was produced, and identified which sites and qualifying features will require an AA. As per the Habitat Regulations, a RIAA (comprising part of the HRA process) has been carried out to determine whether or not the development would have an adverse effect on the integrity of any designated sites in the area. The results of the assessment are detailed in the Onshore HRA RIAA, which accompanies this PPP application.

CONSULTEE	COMMENT	RESPONSE
RSPB	We agree with the scoping out of collision of birds with cables during the operation and maintenance phase on the basis that the onshore export cable is to be underground. If plans are subject to change and overhead lines are to be considered instead of undergrounding, it will be necessary to undertake vantage point surveys for birds to help assess the risk of collision and identify any hotspots of risk.	The cables will be underground, and so there is no risk of collision.
RSPB	With regards to cumulative impacts, the onshore windfarm listed in Table 3-33 Onshore Windfarms within the Study Area should be included in the assessment. In addition, the grid connection for the Limekiln windfarm and the onshore infrastructure for the Pentland Floating Offshore Windfarm and Orkney High Voltage Direct Current (HVDC) Connection Project overlap the search area for the proposed development and should be included. Cumulative impacts on habitat loss, peat, Invasive Non-Native Species (INNS), bird disturbance and bird displacement should be considered.	An assessment of cumulative impacts related to construction, operation and maintenance and decommissioning effects has been undertaken and is detailed in section 11.7. The specific projects grid connections highlighted (Limekiln windfarm, Pentland Floating Offshore Windfarm (PFOWF) and Orkney High Voltage Direct Current (HVDC) Connection Project) no longer overlap with the onshore Project area and therefore have been removed from consideration within the assessment. Consultation has been undertaken with THC with regards to the projects considered in the cumulative assessment.
RSPB	If any felling and compensatory planting of trees is planned, early consultation should be sought as further surveys and assessment may be required. It is essential to recognise that woodland creation needs to be directed to appropriate locations. Any compensatory planting scheme should be planned for a suitable area with regards to habitats and species, for example avoiding deep peat and wader hotspots. Bird surveys should be undertaken early in the planning stages of the scheme to ensure birds of open habitats will not be affected. We recommend an off-site location elsewhere in the Highlands is considered as Caithness is an important area for breeding waders.	Potential impacts on forestry and considered in chapter 12: Land use and other users, including forestry. Bird surveys were undertaken, and the survey approach was agreed with the RSPB and NatureScot.

CONSULTEE	COMMENT	RESPONSE
RSPB	With the expected adoption of the National Planning Framework (NPF)4 in summer 2022, we encourage developers to think about how they will deliver positive effects for or biodiversity net gain. In Caithness, we would recommend the following: • Land management for breeding farmland waders. • Peatland restoration. • Greenland white-fronted goose research programme: Since Greenland white-fronted geese are in decline, and only a limited amount of information is known about the movements and habits in Caithness, we would encourage the consideration of measures such as the funding of monitoring and research to identify key habitat used by Greenland white-fronted geese in the county, which could then inform land management practice and help guide future development to try to maximise their wintering survival.	Biodiversity enhancement proposals are being explored by the Project. The Project proposes to partner with RSPB Scotland (Caithness wetlands and waders initiative) to manage important habitats for farmland breeding birds due to the availability of favourable habitats within the onshore Project area and due to a notable decline in the number of specific breeding birds (including curlew, lapwing and redshank) over recent decades. These plans are discussed in further detail in the outline BEP which accompanies this PPP application (OWPL, 2023) and will be finalised post-consent in line with further consultations.
RSPB	Finally, we consider it likely the project risks having a significant effect on European Sites either on its own or in combination with other proposals. An appropriate assessment will therefore be required.	A HRA screening report was produced, and identified which sites and qualifying features will require an Appropriate Assessment. As per the Habitat Regulations, a RIAA (comprising part of the HRA process) has been carried out to determine whether or not the development would have an adverse effect on the integrity of any designated sites in the area. The results of the assessment are detailed in the Onshore HRA RIAA, which accompanies this PPP application.

11.4 Baseline characterisation

This section provides a summary of the terrestrial ornithology survey results. An assessment of the current baseline for terrestrial ornithology within the onshore study area is provided in section 11.6 (Assessment of potential effects). The methods used to carry out the terrestrial ornithology desk study, breeding bird surveys, breeding raptor and owl surveys, breeding corncrake survey, breeding diver surveys, breeding seabird survey, winter bird surveys, WeBS, and goose and swan survey are also summarised. The key sensitive receptors have been identified (within this Onshore EIA Report, the term 'key sensitive receptor' is equivalent to the CIEEM term 'Important Ecological Feature'). Further details of the surveys and survey methodology are presented in SS8: Terrestrial Ornithology Ecology Technical Survey Report and SS9: Terrestrial Ornithology Confidential Annex.

A number of terrestrial avian receptors, which are included and considered as part of the PPP application, were identified at scoping. These included species listed under Schedules 1, 1A, and A1 of the WCA, geese and swans associated with Caithness Lochs SPA / Ramsar, farmland waders, seabirds, protected and notable species (mammals, reptiles, amphibians etc.) and designated sites.

A Desk-Based Assessment (DBA) was undertaken to prioritise habitats for detailed breeding bird survey, which was then ground-truthed.

11.4.1 Study area

The terrestrial ornithology onshore study area is defined as the onshore Project area (see Figure 11-1) and an additional 'buffer area' encompassing the Zone of Influence (ZoI) over which terrestrial avian receptors may be affected. The onshore Project area encompasses the proposed landfall option locations, the onshore export cable corridor and the location of the proposed onshore substation search area.

The guidelines for EcIA require that the surveyed site includes all areas where significant effects could occur throughout the life of the Project. The ZoI of the proposed activities upon different species varies greatly. For each terrestrial avian feature, published guidance and professional judgement were used to determine a suitable buffer around the proposed onshore Project area. Onshore study areas are defined for each survey type in Table 11-6 alongside a summary of methodologies employed.

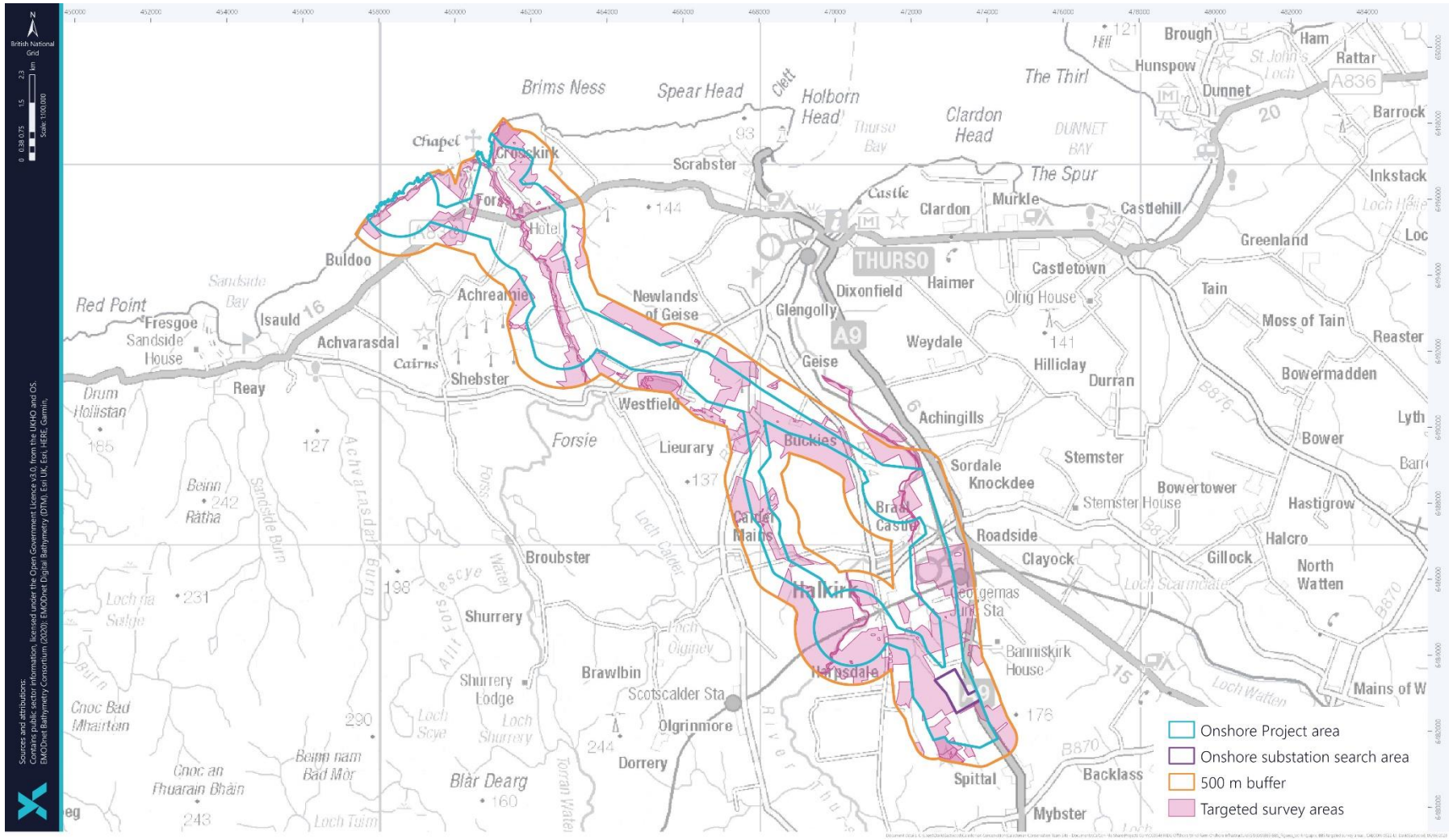

Figure 11-1 Onshore Project area with the breeding bird, winter birds and WeBS survey buffers

11.4.2 Data sources

A detailed desk study of the existing literature and data relating to terrestrial ornithology was undertaken. As part of this desk study, requests for eagle records within 6 kilometre (km) and all other avian data recorded within 2 km of the onshore Project area were made to organisations on 22nd March 2022 and 25th May 2022. Details of the data providers are listed in Table 11-5 below. In addition, relevant available digital datasets and published reports were also reviewed. The National Biodiversity Network (NBN) Atlas database was searched for avian biological records on 6th April 2022. Only records with licences allowing commercial use were included (Creative Commons License with attribution (CC-BY), Creative Commons No rights reserved licence (CCO), Open Government Licence (OGL)). The NBN Atlas also provides Creative Comms with attribution Non-Commercial (CC-BY-NC) data. CC-BY-NC data can only be used for non-commercial purposes and can therefore not be referenced by this chapter.

Whilst the use of NBN Atlas data is considered standard and appropriate in desk studies, it is (as for all desk study data) important to note that the absence of records does not indicate that a particular species is absent from the onshore study area, particularly considering the restrictions on the commercial use of certain datasets. By contacting a range of organisations that hold specific data on protected species in the area, this is not considered a notable constraint.

For all data sources, records from the past 10 years were included in the results. Older data were excluded as it is less likely to provide an accurate reflection of the current baseline.

The desk study information was used to give an overview of the existing ornithological environment within the onshore Project area and surroundings, provide information on sensitive avian species and provide information on statutory sites designated for their ornithological interest. This information was used to put avian populations and communities known from the onshore Project area into context in terms of their ornithological importance.

The existing data sets and literature with relevant coverage to the onshore Project, which have been used to inform the baseline characterisation for terrestrial ornithology are outlined in Table 11-5.

Table 11-5 Summary of key data sets and reports

TITLE	SOURCE	YEAR	AUTHOR
Mapping and aerial imagery	Ordnance Survey (OS) Maps	2022	Ordnance Survey (OS)
SiteLink: SPAs and SSSIs	https://sitelink.nature.scot/home	2022	NatureScot
Site Condition Monitoring Reports for Designated Sites	NatureScot online reports https://www.nature.scot/information-hub/publications-and-documents	Various	NatureScot

TITLE	SOURCE	YEAR	AUTHOR
Seabird Monitoring Programme Datasets and Reports	https://jncc.gov.uk/our-work/smp-report-1986-2019/	2021	Joint Nature Conservation Committee (JNCC)
Survey of the feeding areas, roosts and the flight activity of qualifying species of the Caithness Lochs Special Protection Area; 2011/12 and 2012/13. Scottish Natural Heritage Commissioned Report No. 523b.	SNH	2013	Patterson *et al.*
Greenland White-fronted Geese (GWFG). Land use and conservation at small wintering sites in Scotland. GWFG Small Sites Study – final report 2011.	Greenland White-fronted Goose Study, Wildfowl & Wetlands Trust (WWT), SNH	2011	Francis *et al.*
Highland Biological Recording Group (HBRG) Datasets	HBRG	Various	HBRG
British Trust for Ornithology (BTO) Datasets	BTO	Various	BTO
Royal Society for the Protection of Birds (RSPB) Datasets	RSPB	Various	RSPB
Wildfowl and Wetlands Trust (WWT) Datasets and Reports	WWT	Various	WWT
Datasets Available on NBN Atlas With Data Licenses Permitting Commercial Use (CC-BY or OGD)	NBN Atlas	Various	Various
Birds of Caithness including The Breeding & Wintering Atlas 2007-2012. Revised Edition.	Caithness Scottish Ornithologists' Club (SOC)	2016	Davey *et al.*
The Birds of Scotland	SOC	2007	Forrester *et al.*
Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland	BTO	2013	Balmer *et al.*
Seabird Populations of Britain and Ireland	T & A.D. Poyser	2004	Mitchell *et al.*

TITLE	SOURCE	YEAR	AUTHOR
The Migration Atlas. Movements of the Birds of Britain and Ireland	BTO	2002	Wernham *et al.*

11.4.3 Project site-specific surveys

Surveys were undertaken between 2022 and 2023 within the terrestrial ornithology onshore study area to identify potential impacts upon sensitive receptors during each stage of the onshore Project; i.e., construction, operation and maintenance and decommissioning.

A summary of terrestrial ornithology survey methodologies and onshore study areas is provided in Table 11-6 and Table 11-7. Further details of the methods are provided in the SS8: Terrestrial Ornithology Ecology Technical Survey Report.

Table 11-6 Summary of relevant field guides / survey guidance, signs searched for and survey buffer areas

SURVEY	SURVEY BUFFER	RELEVANT GUIDANCE/SURVEY METHOD FOLLOWED	SURVEY METHODOLOGY / FIELD SIGNS
Breeding bird survey	500 m	• Gilbert *et al.* (1998); • SNH (2017); and • Calladine *et al.* (2009).	Targeted areas, excluding habitats of low suitability (improved grassland and commercial forestry). The standard methodology involved four survey visits between April and July 2022 to undertake a walkover which approaches within 100 metres (m) of all open habitat (surveying each 500 x 500 m quadrat for 20 – 25 minutes), which was completed for the majority of the onshore study area in 2022. Due to refinement of the onshore Project area midway during breeding bird surveys, some small areas were not visited in April, May, or June 2022. In order to compensate for this, an additional visit was made to all targeted areas in August 2022 – waders are likely to have family groups at this time, indicative of breeding. Data from similar habitats has also been considered to ensure communities likely to be present in these areas are assessed. Furthermore, pre-construction surveys will be undertaken, and a Species and Habitat Protection Plan (SHPP) implemented for breeding birds (see embedded mitigation in section 11.5.4). In this context, this is not considered to be a significant limitation. This approach was agreed with NatureScot by e-mail (25/07/2022). All species seen or heard were recorded to map territories of breeding birds and estimate breeding bird density.

SURVEY	SURVEY BUFFER	RELEVANT GUIDANCE/SURVEY METHOD FOLLOWED	SURVEY METHODOLOGY / FIELD SIGNS
			Territories were estimated by digitising the results of the four breeding bird survey visits and analysing these in ArcGIS. Clusters of registrations of birds showing breeding behaviour on two or more visits were interpreted as a breeding territory, and a final map of estimated breeding territories produced. Cuckoos (*Culculus canorus*) are brood parasites, laying their eggs in the nests of other birds – particularly skylark. As such, although there is evidence of cuckoos displaying breeding behaviour at the site, a territory analysis has not been undertaken.
Breeding raptor and owl survey	6 km eagles 2 km all other species	• Gilbert *et al.* (1998); • SNH (2017); • Hardey *et al.* (2013); • Barn Owl Trust (2001; 2012; 2020); and • Shawyer (2012).	Walkovers searching for signs and short vantage point watches to observe birds were undertaken in all suitable breeding habitat. At least two survey visits were carried out between April and July 2022 to determine occupancy of breeding territories. Additional visits were made to habitat suitable for nesting and to where these birds had been observed.
Breeding corncrake survey	250 m	• Gilbert *et al.* (1998).	Two visits were made at night (00:00 to 03:00) between end May and June 2022 to survey for calling corncrake in all fields or other habitats with vegetation over 20 centimetres (cm).
Breeding diver survey	1 km	• Gilbert *et al.* (1998); and • SNH (2017).	Two visits were made between April and July 2022 to all small waterbodies to survey for breeding red- (*Gavia stellata*) and black- (*Gavia arctica*) throated divers.
Breeding seabird survey	2 km	• Walsh *et al.* (1995); • Gilbert *et al.* (1998); and • SNH (2017).	Shoreline was surveyed for breeding seabirds. Survey visits were completed monthly between May and August 2022. Counts of adult plumaged black guillemots (*Cepphus grille*) on land or on sea within 200 m of shore were carried out in May 2022 between 05:00 and 08:00 in order to estimate number of breeding birds. Counts of apparently occupied nest sites for all other seabird species were undertaken in order to estimate numbers of breeding birds. Survey visits included counts of incubating terns as well as all other species (Walsh *et al.* 1995; Gilbert *et al.* 1998; SNH, 2017).

SURVEY	SURVEY BUFFER	RELEVANT GUIDANCE/SURVEY METHOD FOLLOWED	SURVEY METHODOLOGY / FIELD SIGNS
Winter bird survey	500 m	• Gilbert *et al.* (1998); and • SNH (2010).	Targeted areas, excluding habitats of low suitability (improved grassland and commercial forestry) (see Figure 11-2). Three survey visits were made between September 2022 and February 2023 to undertake a walkover which approached within 200 m of all areas (surveying each 500 x 500 m quadrat for 20 – 25 minutes). All species seen or heard were recorded to assess how birds use the site in winter.
Wetland Bird Survey (WeBS)	500 m	• Gilbert *et al.* (1998).	Counts of all waders and wildfowl species using the shore were made from vantage points. Surveys were undertaken within 3.5 hours before and 3.5 hours after low tide. Surveys were completed monthly between September 2022 and March 2023.
Goose and swan survey	3 km	• Gilbert *et al.* (1998); and • SNH (2017).	Observation of fields from vantage points were carried out fortnightly between September 2022 and mid-May 2023 to establish the number of geese and swan foraging and use of the site during winter.

11.4.4 Existing baseline

This section describes the results of the onshore Project site-specific surveys and provides information on relevant designated sites of ornithological interest. Further details of the surveys and survey methodology are presented in SS8: Terrestrial Ornithology Ecology Technical Survey Report and SS9: Terrestrial Ornithology Confidential Annex.

In Section 11.6 these results, augmented by a review of literature and available data sources, have been used to describe the current baseline environment for terrestrial ornithology.

11.4.4.1 Review of available data

11.4.4.1.1 Designated sites

A search was made for statutory sites designated for ornithological interest. Only designated sites with terrestrial ornithology features are considered in this chapter. The NatureScot Sitelink register (NatureScot, 2022) was accessed to obtain information on the designated sites.

There are three sites of international importance with ornithology features located within 20 km of the onshore Project area. All three are SPAs: North Caithness Cliffs, Caithness Lochs, and Caithness and Sutherland Peatlands. The latter two are also Ramsar sites. There are four sites of national importance which were noted within 5 km of the onshore Project area (SSSI). These are summarised in Table 11-7 and are listed in order of proximity to the onshore Project area. Designated sites are shown in Figure 11-2.

Table 11-7 Summary of designated sites with terrestrial ornithological features within 20 km (international) and 5 km (national) of the onshore Project area

SITE NAME AND DESIGNATION	DISTANCE AND DIRECTION FROM ONSHORE PROJECT AREA	QUALIFYING FEATURES
North Caithness Cliffs SPA	1.4 km northeast	Internationally important breeding populations of: • Fulmar (*Fulmarus glacialis*); • Guillemot (*Uria aalge*); • Kittiwake (*Rissa tridactyla*); • Peregrine (*Falco peregrinus*); • Puffin (*Fratercula arctica*); and • Razorbill (*Alca torda*). Internationally important breeding seabird assemblage.
Caithness Lochs SPA	1.6 km west	Internationally important wintering populations of: • Greenland white-fronted goose (*Anser albifrons flavirostris*); • Greylag goose (*Anser anser*); and • Whooper swan (*Cygnus cygnus*).
Caithness Lochs Ramsar	1.6 km west	Internationally important wintering populations of: • Greenland white-fronted goose; • Greylag goose; and • Whooper swan.
Loch Calder SSSI	1.6 km west	Nationally important wintering populations of: • Greenland white-fronted goose; • Greylag goose; and • Whooper swan.
Broubster Leans SSSI	2.8 km southwest	Nationally important breeding bird assemblage including: • Wigeon (*Anas penelope*); • Snipe (*Gallinago delicata*); • Teal (*Anas crecca*); • Greenshank (*Tringa nebularia*); • Dunlin (*Calidris alpina schinzii*); • Wood sandpiper (*Tringa glareola*); and • Spotted crake (*Porzana porzana*). The site also provides important foraging habitat for species which breed elsewhere including: • Hen harrier (*Circus cyaneus*); and • Short-eared owl (*Asio flammeus*).

SITE NAME AND DESIGNATION	DISTANCE AND DIRECTION FROM ONSHORE PROJECT AREA	QUALIFYING FEATURES
Loch Scarmclate SSSI	3.1 km east	Nationally important greylag goose wintering population.
Red Point Coast SSSI	4.6 km west	Nationally important breeding population of guillemot.
Caithness and Sutherland Peatlands SPA	5.4 km southeast	Internationally important breeding populations of: • Black-throated diver (*Gavia arctica*); • Common scoter (*Melanitta nigra*); • Dunlin; • Golden Eagle (*Aquila chrysaetos*); • Golden plover (*Pluvialis apricaria*); • Greenshank; • Hen harrier; • Merlin (*Falco columbarius*); • Red-throated diver (*Gavia stellata*); • Short-eared owl; • Wigeon; and • Wood sandpiper.
Caithness and Sutherland Peatlands Ramsar	5.4 km southeast	Internationally important breeding populations of: • Black-throated diver; • Common scoter; • Dunlin; • Golden plover; • Greenshank; • Greylag goose; • Red throated diver; • Wigeon; and • Wood sandpiper.

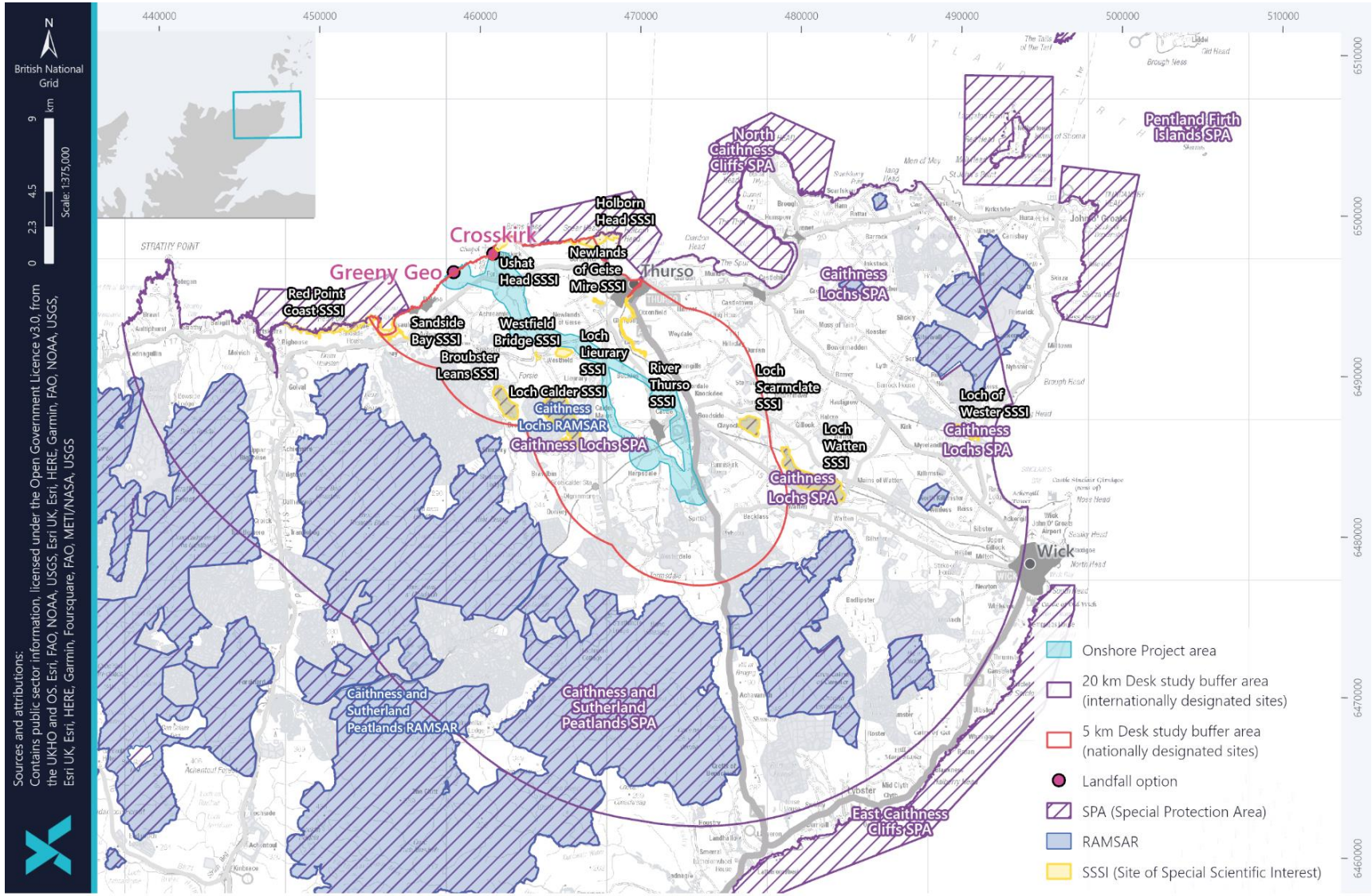

Figure 11-2 Designated sites in the vicinity of the onshore Project area

11.4.4.1.2 Protected species

Details of the data providers are listed in Table 11-5. This data search provided information on eagles within 6 km and other protected and notable terrestrial avian species within 2 km of the onshore Project area. Full details of the desk study results are provided in SS8: Terrestrial Ornithology Ecology Technical Survey Report and SS9: Terrestrial Ornithology Confidential Annex and any relevant information is referred to within the existing baseline assessment for each terrestrial avian receptor. This information has been used to put terrestrial avian protected or notable species into context in terms of their ecological importance.

11.4.4.2 Project site-specific surveys

The following sections provide a summary of results of each bird survey. Full details are provided in SS8: Terrestrial Ornithology Ecology Technical Survey Report. For those species that are carried forward to the impact assessment more detailed baseline descriptions for each species, incorporating relevant DBA results, are presented in Section 11.6.

11.4.4.2.1 Breeding bird survey

One hundred and one species of bird were recorded, of which 44 were confirmed to be breeding within the onshore study area. An additional 15 species may possibly breed within the onshore study area but were only recorded displaying behaviour indicative of breeding on a single occasion within a potential territory.

Greylag goose, a Schedule 1 species in Caithness, was confirmed to breed in the onshore study area (see Figure 11-3).

Four species of wader were confirmed to breed in the onshore study area, including curlew (*Numenius arquata*), lapwing (*Vanellus vanellus*), oystercatcher (*Haematopus ostralegus*), and snipe (Figure 11-4). In addition, three species of wader were recorded displaying breeding behaviour in suitable habitat on a single occasion in each potential territory: redshank (*Tringa totanus*), ringed plover (*Charadrius hiaticula*), and woodcock (*Scolopax rusticola*).

Common gull (*Larus canus*) was confirmed to breed within the onshore study area (Figure 11-5).

Four species of duck were confirmed to breed within the onshore study area including mallard (*Anas platyrhynchos*), teal, tufted duck (*Aythya fuligula*), and wigeon (Figure 11-6a-b).

Cuckoos were recorded exhibiting breeding behaviour. As cuckoos are brood parasites, it is not possible to provide maps of territories or nest sites in the same manner as for other species.

Thirty-two species of passerine were confirmed to breed within the onshore study area, with a further 10 recorded displaying behaviour indicative of breeding on one occasion. These are shown in Figure 11-7a-d.

Notably, golden plover and greenshank were both recorded during a single visit each, without displaying breeding behaviour (Figure 11-8). These were likely passage birds.

11.4.4.2.2 Breeding raptor and owl survey

Barn owl (*Tyto alba*) were confirmed to breed within the onshore study area (see Figure C11-1 in SS9: Terrestrial Ornithology Confidential Annex) – full details are included in SS9: Terrestrial Ornithology Confidential Annex. No other Schedule 1 raptor or owl breeding territories were found within the onshore study area.

Sparrowhawk (*Accipiter nisus*) were confirmed to breed within the onshore study area (see Figure 11-9).

No Schedule A1 nests or territories were found within the relevant onshore study areas.

Hen harrier and white-tailed eagle (*Haliiaeetus albicilla*), listed under Schedule 1A, were recorded to overfly or forage within the onshore study area, as shown in Figure 11-10 and Figure 11-11 respectively.

Osprey (*Pandion haliaetus*) were confirmed to breed outwith the onshore study area (see Figure C11-2 in SS9: Terrestrial Ornithology Confidential Annex). They were not recorded foraging or otherwise overflying in the onshore study area.

Merlin, peregrine, and short-eared owl were recorded occasionally overflying or foraging within the onshore study area, as shown in Figure 11-12, Figure 11-13 and Figure 11-14. The former two species are listed on Schedule 1, while short-eared owl are included on Annex I of the Birds Directive.

Buzzard (*Buteo buteo*), kestrel (*Falco tinnunculus*), long-eared owl (*Asio otus*), and tawny owl (*Strix aluco*) were all recorded to overfly or forage within the onshore study area, but breeding was not confirmed.

11.4.4.2.3 Breeding corncrake survey

No evidence of breeding corncrake was recorded.

11.4.4.2.4 Breeding diver survey

No evidence of breeding divers were recorded.

11.4.4.2.5 Breeding seabird survey

No breeding seabird colonies were found. A single puffin was recorded carrying food at the coast, but no nests were found within the onshore study area. Arctic tern (*Sterna paradisaea*), black-headed gull (*Chroicocephalus ridibundus*), common gull, cormorant (*Phalacrocorax carbo*), eider (*Somateria mollissima*), fulmar (*Fulmarus glacialis*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), and lesser black-backed gull (*Larus fuscus*), were all recorded during these and other surveys. However, only common gull was found to breed within the onshore study area, confirmed during the general breeding bird survey (see Section 11.4.4.2.1).

11.4.4.2.6 Winter bird survey

In total, 75 species of bird were recorded during the winter bird surveys, which are shown in Figure 11-15a-e. Of these, eight (fieldfare, green sandpiper (*Tringa ochropus*), greylag goose, goldeneye, hen harrier, merlin, redwing, and whooper swan) are protected under Schedule 1 of the Wildlife and Countryside Act, 1981, although this applies to breeding only. In addition, 23 species are Amber listed on the BoCC, 16 are Red listed on BoCC and 23 species are included in the SBL.

11.4.4.2.7 Wetland Bird Survey (WeBS)

Thirty-seven species of bird were recorded during the wetland bird surveys, which are shown in Figure 11-16a-d. Of these, 11 (black throated diver, common scoter, dunlin, golden plover, great northern diver (*Gavia immer*), greylag, peregrine, red throated diver, Slavonian grebe (*Podiceps auritus*), whimbrel and whooper swan) are included on Schedule 1 of the WCA. In addition, 24 species are Amber listed on the BoCC, eight are Red listed on the BoCC, and 13 species are included in the SBL.

Cormorant, great northern diver, guillemot and shag were recorded ubiquitously offshore within the northern extent of the onshore study area. Whilst red-throated diver was only recorded in one location to the north-east, they were also frequently observed to the north-west. Black guillemot was recorded in two locations; once offshore to the north-east and once to the north-west, and black-throated diver was recorded once (three individuals, Figure 11-16a), offshore to the north-west. Razorbill were recorded within three areas to the north of Crosskirk Bay.

Eider was the most frequently recorded duck, with numerous sightings offshore along the northern extent of the onshore study area. Red-breasted merganser and wigeon were less frequent, but also recorded fairly ubiquitously across the onshore study area. For mallard, common scoter and teal, the vast majority, if not all, of the sightings were concentrated around Crosskirk Bay.

Waders, such as common sandpiper, dunlin, ringed plover, and snipe, were also primarily recorded around Crosskirk Bay, although snipe were also frequently observed foraging within grassland areas along the clifftops to the north-west, alongside smaller numbers of curlew, golden plover and lapwing. Curlew were also observed flying offshore. Purple sandpiper, turnstone and oystercatcher were recorded in smaller numbers foraging to the north-east and north-west, and bar-tailed godwit were recorded in one location; flying offshore towards the north-western extent of the onshore study area. Whimbrel were also recorded, on one occasion, flying offshore north of Crosskirk Bay (15 individuals).

Two species of goose were recorded; pink footed goose and greylag. Pink footed goose was the most ubiquitous within the survey area with eight offshore sightings of commuting birds recorded. Greylag goose was recorded in only two locations, both flying off the coast of the western proposed landfall location.

Whooper swan were recorded in four locations within the western extent of the survey area; three flying offshore and one within the grassland area along the clifftop.

Great black-backed gull was the most frequently recorded gull, with six sightings along the shoreline; three along the coast of the western proposed landfall location and three within Crosskirk Bay. Black-headed gull was recorded in one location to the north-west of the onshore study area (a single bird, Figure 11-16a) and common gull was recorded in one location to the north-east (two birds, Figure 11-16a).

A single fulmar was recorded to the north of Crosskirk Bay and an individual Slavonian grebe was recorded offshore within the western portion of the onshore study area.

Grey heron was observed fishing along the shoreline at Crosskirk Bay regularly.

Peregrine was recorded flying offshore on a single occasion within the western portion of the onshore study area (one female).

11.4.4.2.8 Goose and swan survey

Four species of goose; Greenland white-fronted goose, greylag goose, barnacle goose and pink-footed goose, were recorded during the goose and swan surveys. Only one species of swan; whooper swan, was recorded. Greenland white-fronted goose are red listed on the BoCC and are also on the SBL. Barnacle geese, greylag geese, pink-footed geese and whooper swans are Amber listed. Although greylag goose and whooper swan are protected under Schedule 1 of the WCA, this only applies to breeding birds and not winter migrant populations.

An overview for each species is presented in Figure 11-17 to Figure 11-21. Furthermore, monthly survey results are shown in Figure 11-22a-i.

Greenland white-fronted geese were found to forage across the onshore study area, with concentrations observed in Forss, between Shebster and Broubster – this species was observed to forage within the onshore Project area on two occasions near Forss (groups of 29 and 23 birds). With regards to other observations, the largest skein recorded was 250 m north-east of onshore Project area, consisting of 1,304 birds, on grazing habitat. This flock almost certainly was moving through on migration to roost sites throughout the UK and Ireland, and it is highly unlikely all birds utilise Caithness Lochs SPA / Ramsar. The next largest foraging flock consisted of 360 birds, 720 m north of the onshore Project area, near Ardingills, followed by 21 birds, 66 m north-east of the onshore Project area. All other flocks ranged from between one and eight birds. In total 34 foraging flocks were recorded. The majority of flocks were recorded foraging in grazing fields (82%), followed by stubble (12%), with a small number of records on marsh (6%). A single roosting site was identified, to the north of Buckies (410 m north-east of onshore Project area, comprising four birds). See Figure 11-17 for an overview of white-fronted goose survey results, in the context of known important feeding and roosting areas for this species (based on NatureScot dataset (Jonathan Swale, pers. comm. 2023).

Foraging barnacle geese were recorded between 14th November 2022 and 18th March 2023, in four locations within the onshore study area, one to the east of Shebster (two birds) and three around Buckies (all individual birds); one of which was located within the onshore Project area to the north-west of Braal Castle (Figure 11-19). No barnacle goose roosts were identified. An equal number of flocks of barnacle geese were found to forage in grazing (50%) and stubble (50%) fields.

Greylag goose and pink footed goose were numerous across the site, with roosting and foraging birds recorded throughout onshore Project area and within the 3 km buffer beyond (see Figure 11-18 and Figure 11-20 respectively). However, for both species, no birds were recorded within the south-eastern portion of the onshore Project area; to the south of Braal Castle along the eastern route and to the south of Halkirk along the western route.

Greylag geese were recorded between 3rd September 2022 and 19th May 2023. Foraging flock sizes varied between one and 1,505 birds – the largest being recorded 1,300 m north-east of the onshore Project area, near Auchingills (Figure 11-19). In total 376 flocks were recorded foraging within the onshore study area, and grazing fields were the most commonly used habitat (61%), followed by stubble (37%), and vegetable (16%) fields. Greylag geese also used marsh (0.5%) and lochs (0.5%) as foraging habitat. 21 greylag goose flocks were recorded to roost, predominantly outwith the onshore Project area. The largest flock (1,800) birds roosted south of Harpsdale, 1 km south of the site. Three records of roosting greylag geese were identified within the onshore Project area, consisting of one, nine, and 10 birds respectively.

Pink-footed geese were recorded between 3rd September 2022 and 29th April 2023, with 273 foraging flocks recorded, ranging from between one and 2,500 in size. The largest foraging flock was recorded near Westfield, 400 m south of the site. The majority of pink-footed geese flocks were found to forage in grazing (53%) and stubble (44%) fields. Small numbers of flocks also made use of vegetable fields (1.4%), marsh (0.8%), lochs (0.4%), and drilled fields (0.4%). Ten roosting flocks were identified during surveys, ranging from one to 2,250 in size, with the largest being near Calder Mains, in Loch Lieurary SSSI, 2.25 km south-west of the onshore Project area.

Whooper swan sightings, while less frequent than greylag or pink-footed geese, were also relatively ubiquitous across the onshore study area, with concentrations of foraging activity recorded around Westfield (Figure 11-21). In total, 68 foraging flocks were recorded, ranging in size from one to 290 birds. The largest flock was recorded over 2.5 km east onshore Project area, foraging on stubble near Stemster House – this was the only record exceeding 100 whooper swans, with the next largest flock consisting of 92 birds. The majority of foraging flocks were recorded on marsh (43%), followed by stubble fields (35%). Whooper swans were also found to forage in grazing fields (16%), and lochs (6%). Six flocks of whooper swans were found roosting during the survey, although one of these was outwith the 3 km buffer. Of those within the survey area, four were located to the west of the onshore Project area, recorded between Westfield and Olgrinmore. Three of these were within Loch Calder, part of Caithness Lochs SPA (over 1.5 km west of the onshore Project area at its closest point – highest count 23 birds), and the fourth was 1.3 km south-east of the site (29 birds). As for greylag goose and pink footed goose, no whooper swan sightings were recorded within the south-eastern portion of the onshore Project area. A fifth roost was found 500 m north-west of the onshore Project area, between Buckies and Auchingills (five birds). See Figure 11-21 for an overview of whooper swan survey results, in the context of known important feeding and roosting areas for this species (based on NatureScot dataset (Jonathan Swale, pers. comm. 2023).

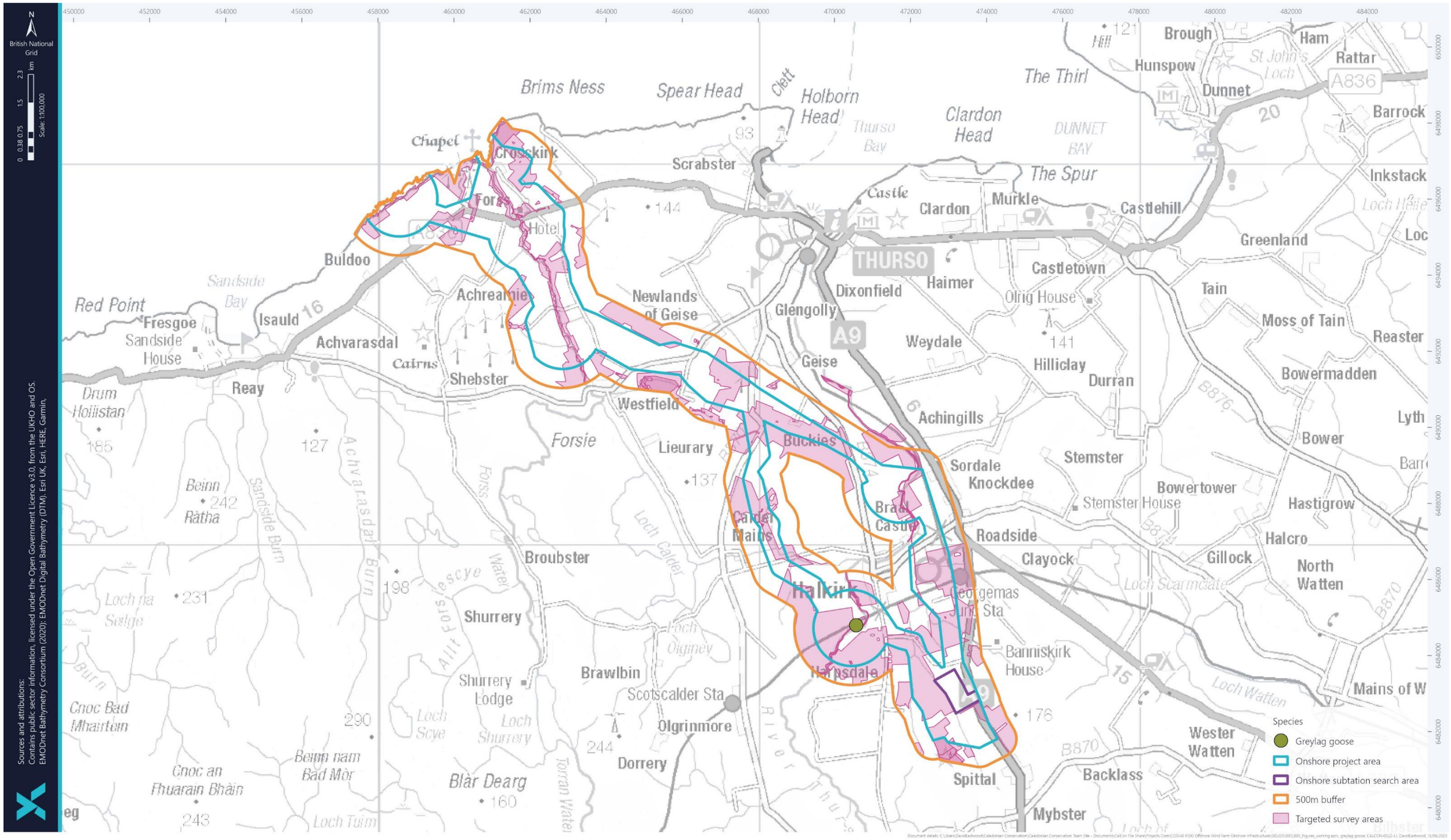

Figure 11-3 Breeding greylag goose within the onshore study area

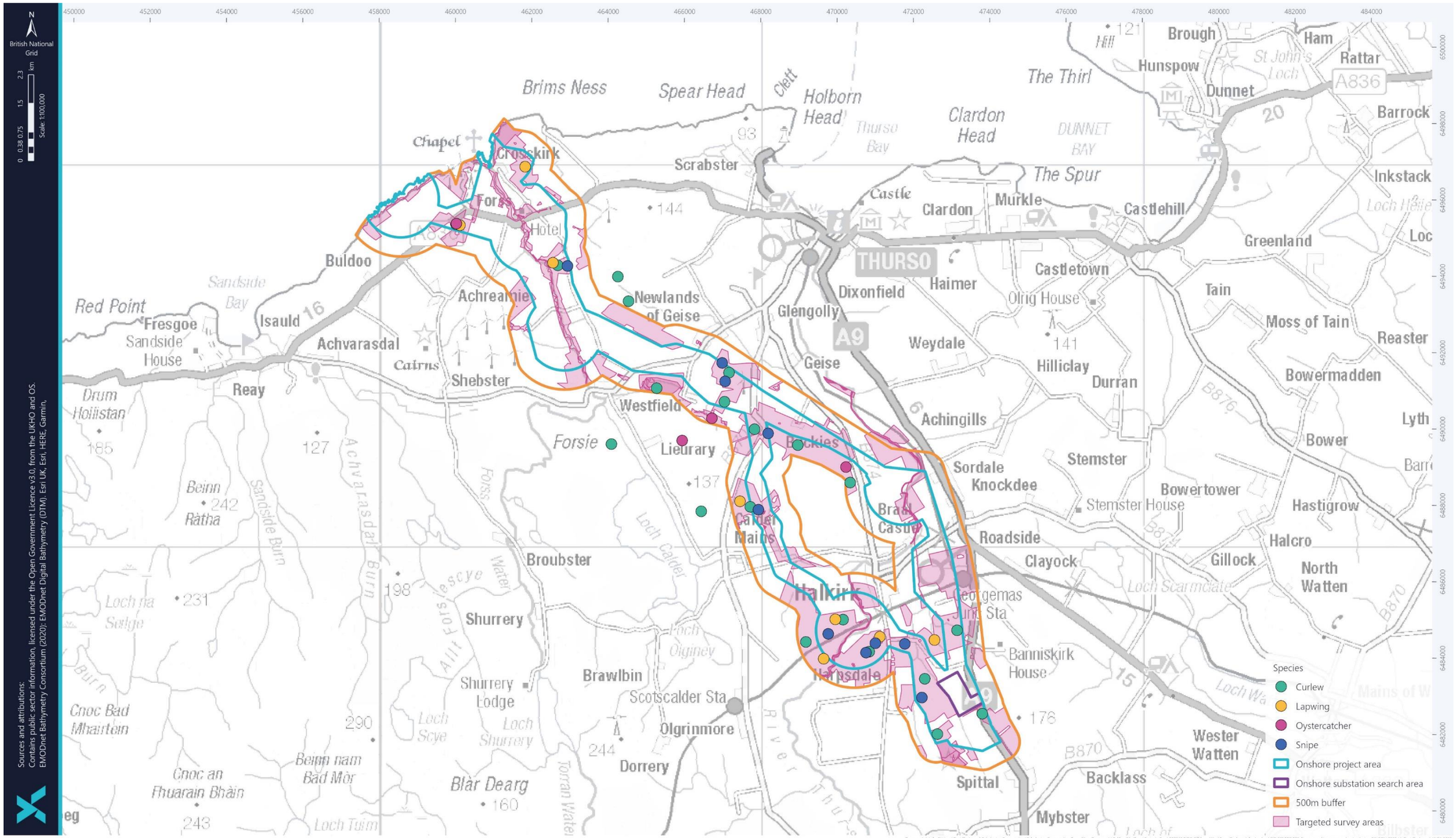

Figure 11-4 Wader territories within the onshore study area

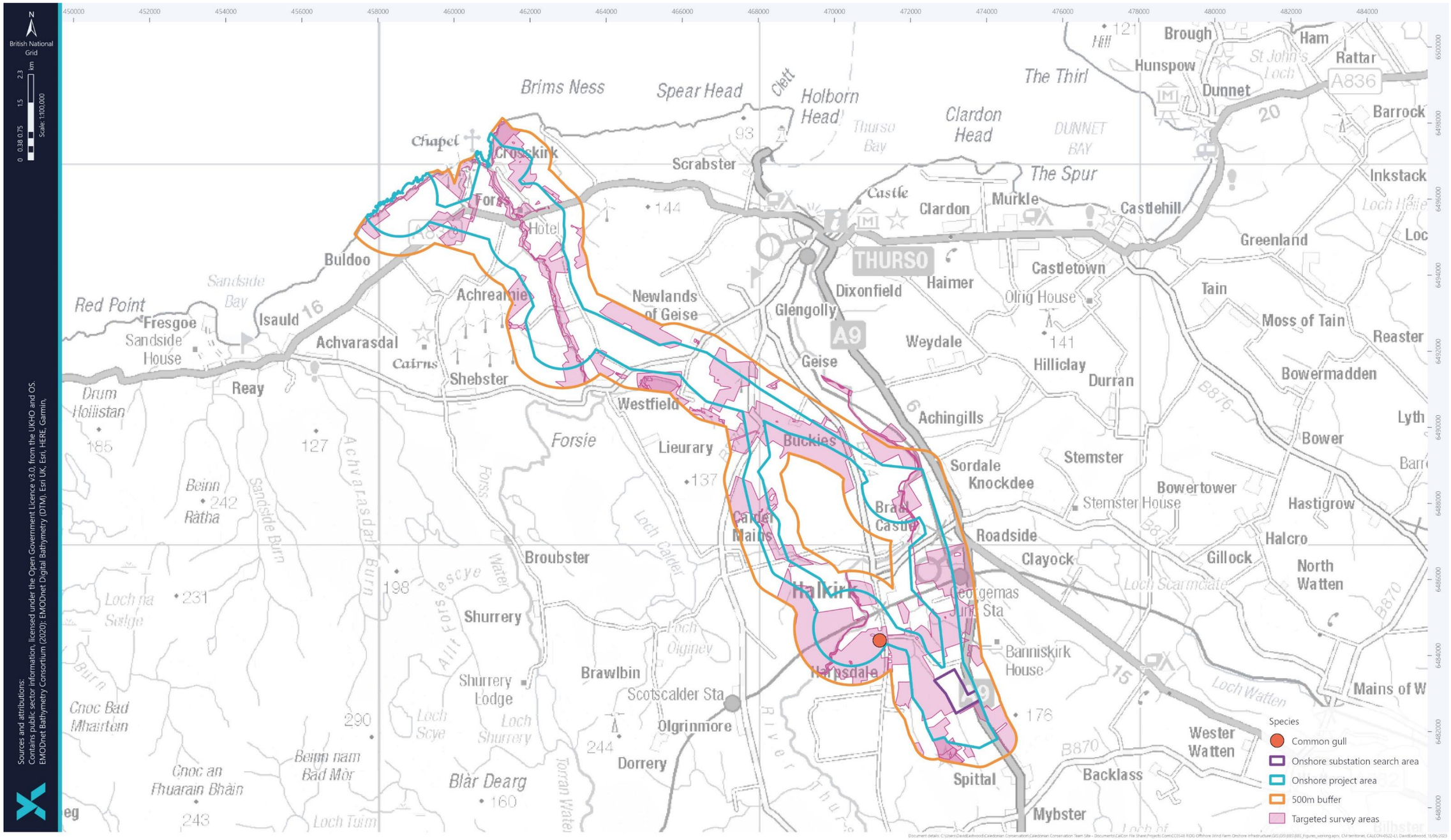

Figure 11-5 Common gull territories within the onshore study area

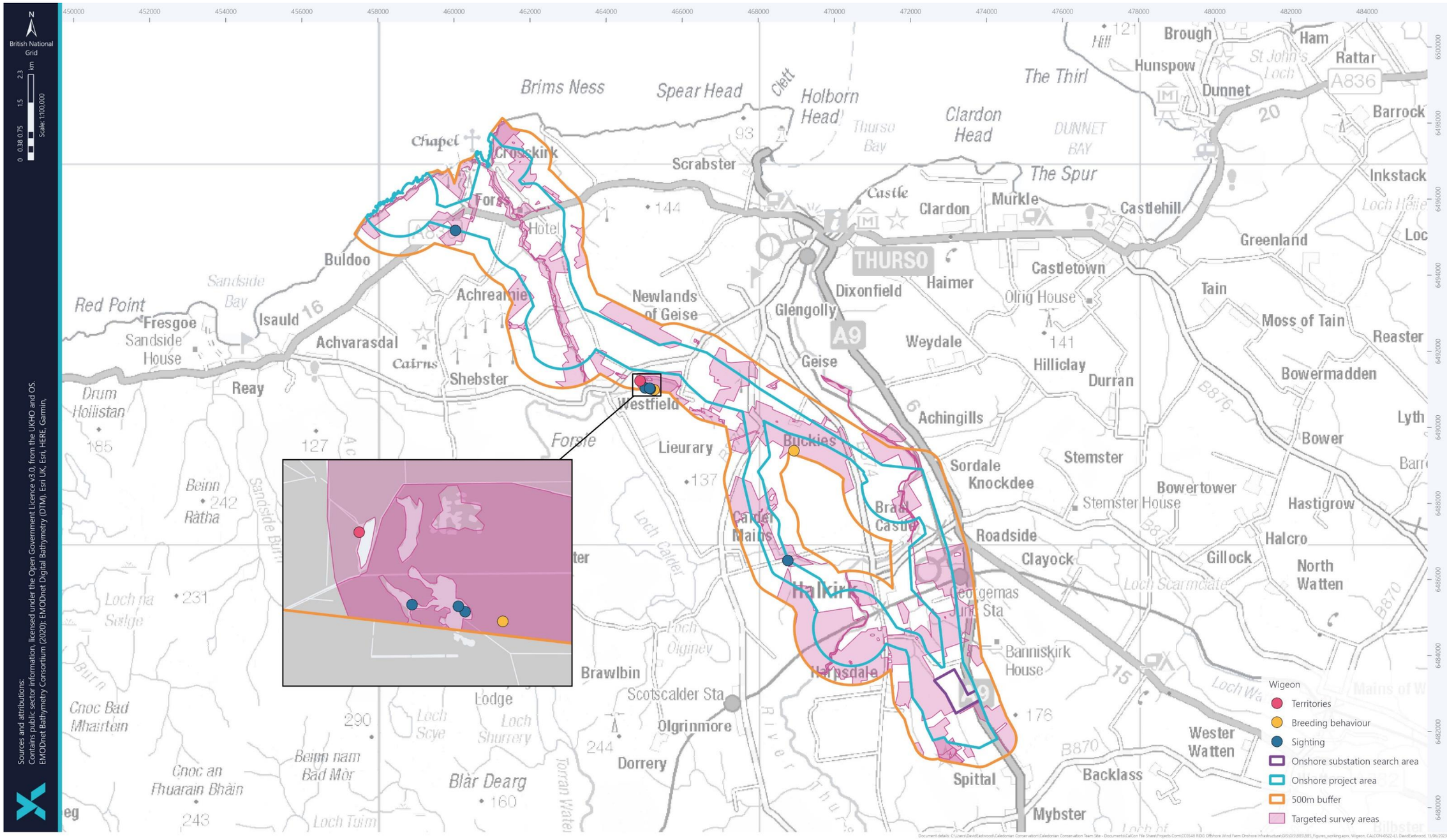

Figure 11-6a Wigeon territories within the onshore study area

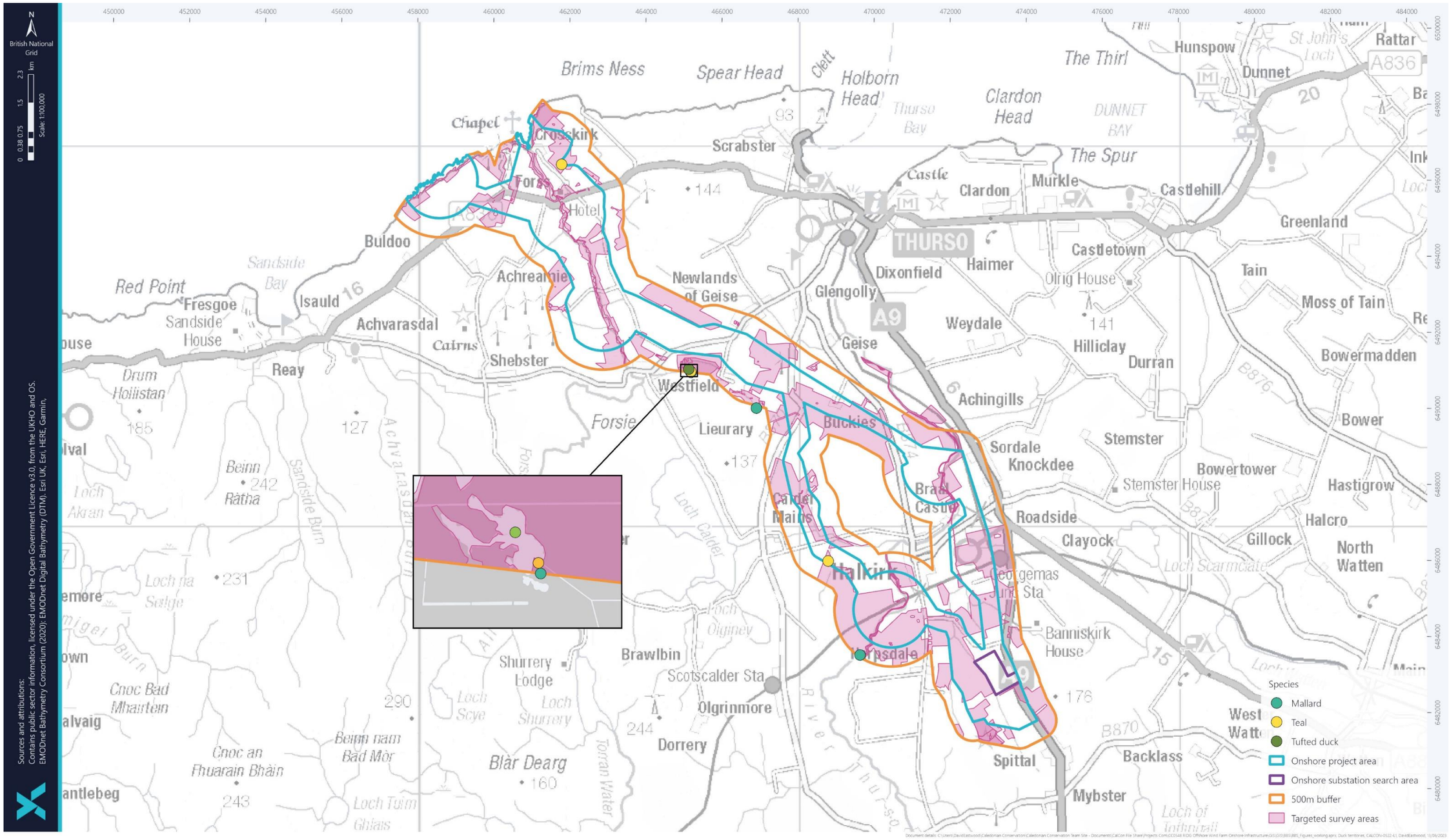

Figure 11-6b Duck species (excluding wigeon) within the onshore study area

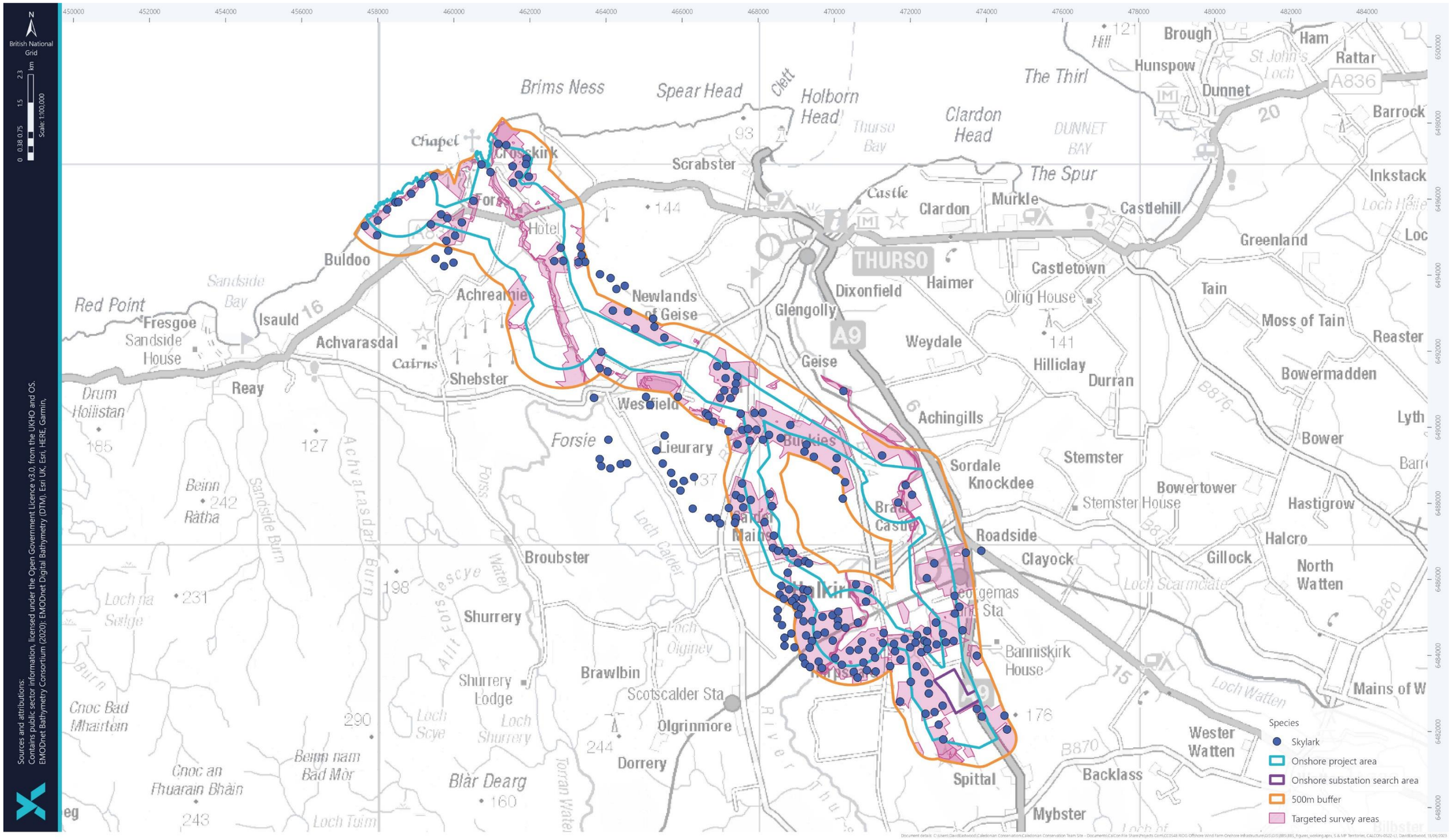

Figure 11-7a Breeding skylark within the onshore study area

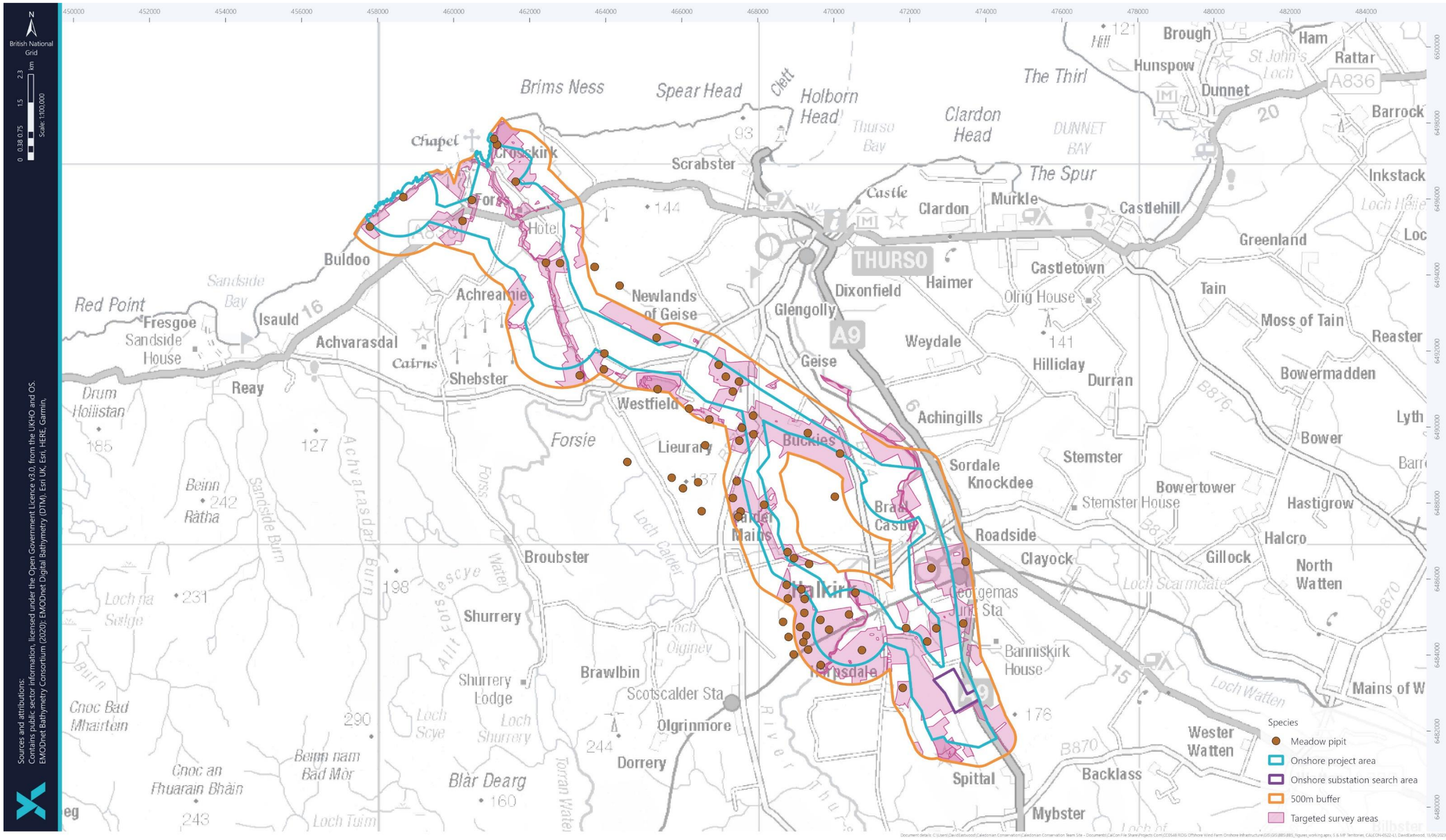

Figure 11-7b Breeding meadow pipits within the onshore study area

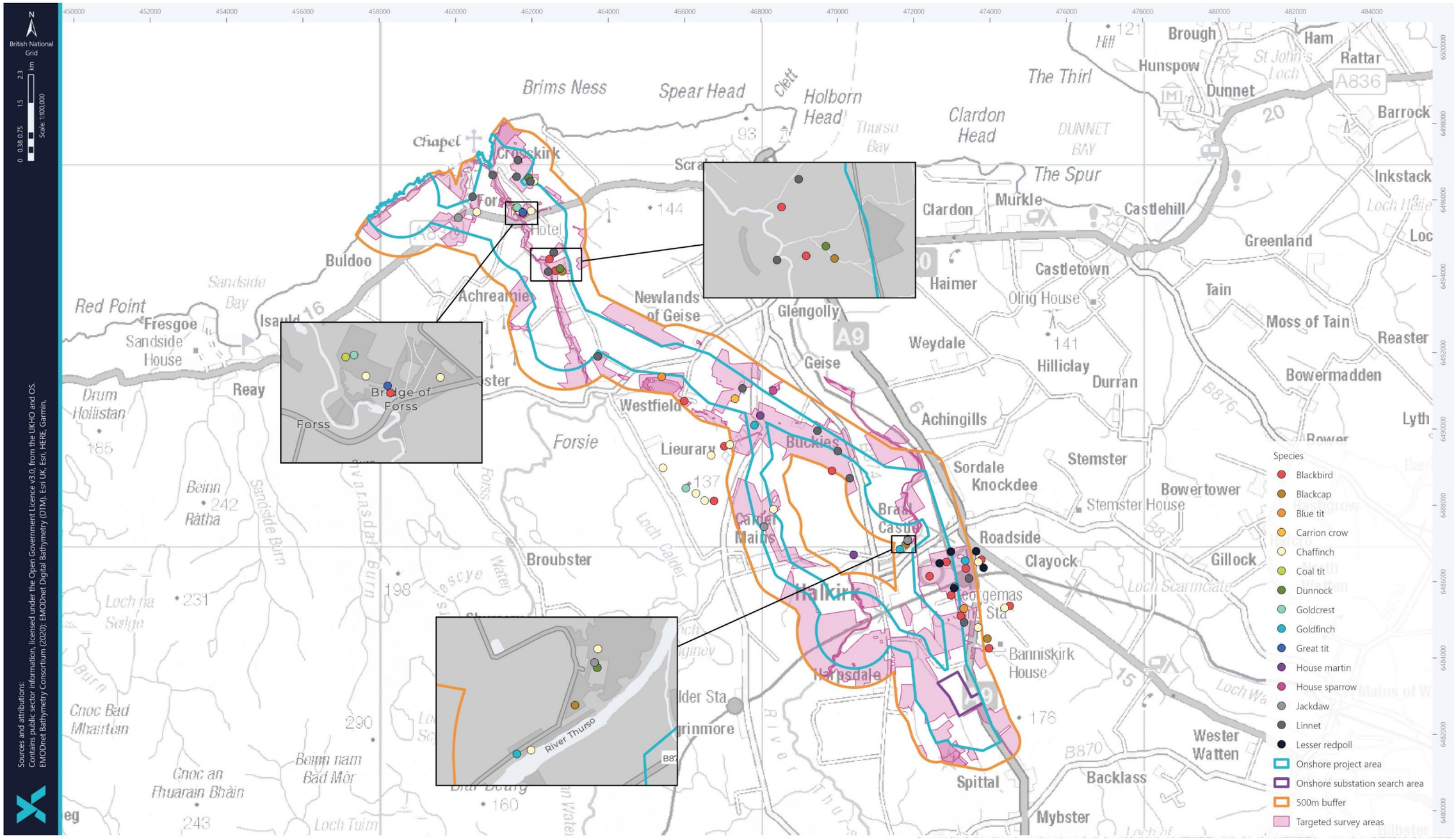

Figure 11-7c Breeding passerines within the onshore study area

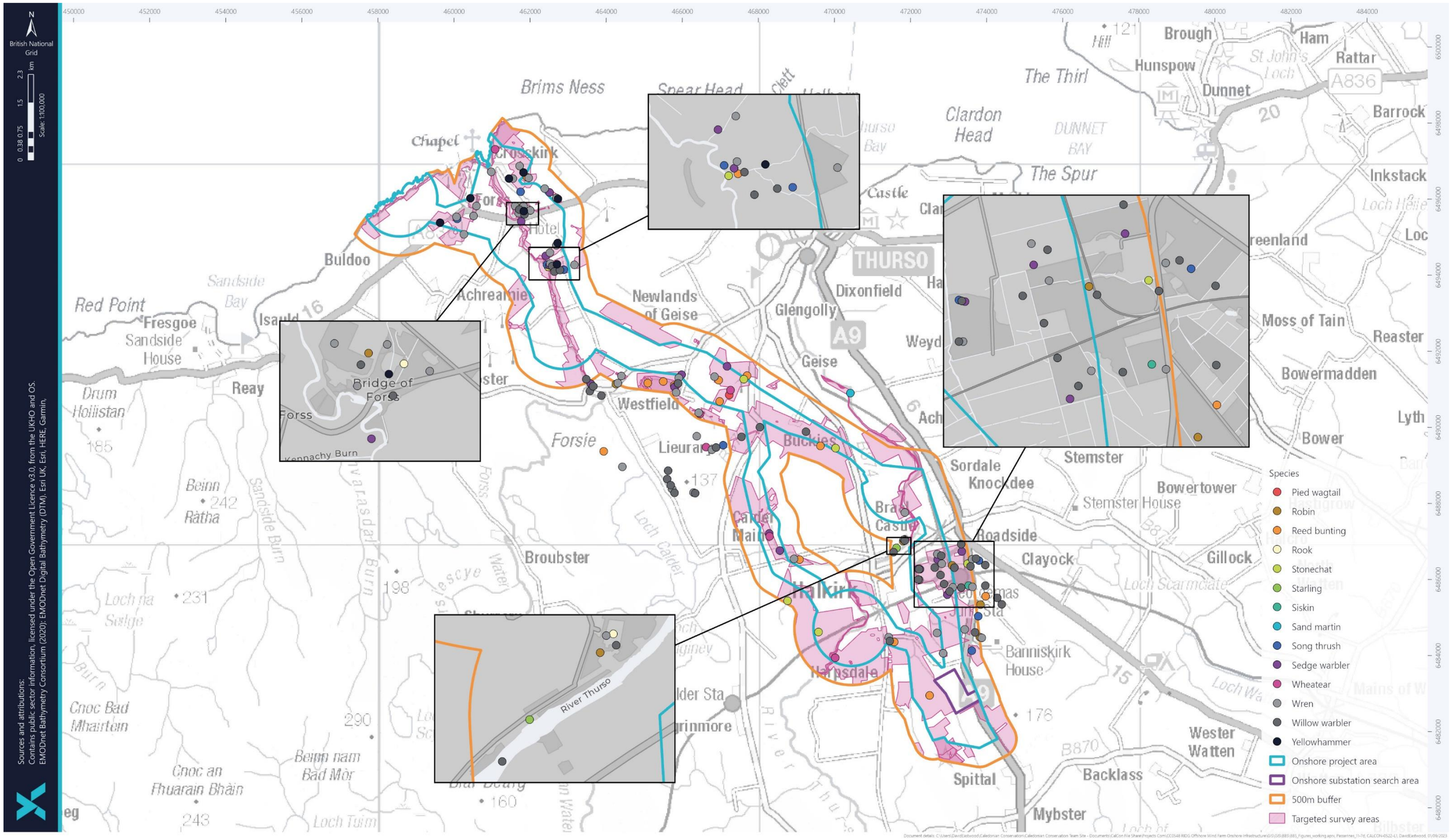

Figure 11-7d Breeding passerines continued within the onshore study area

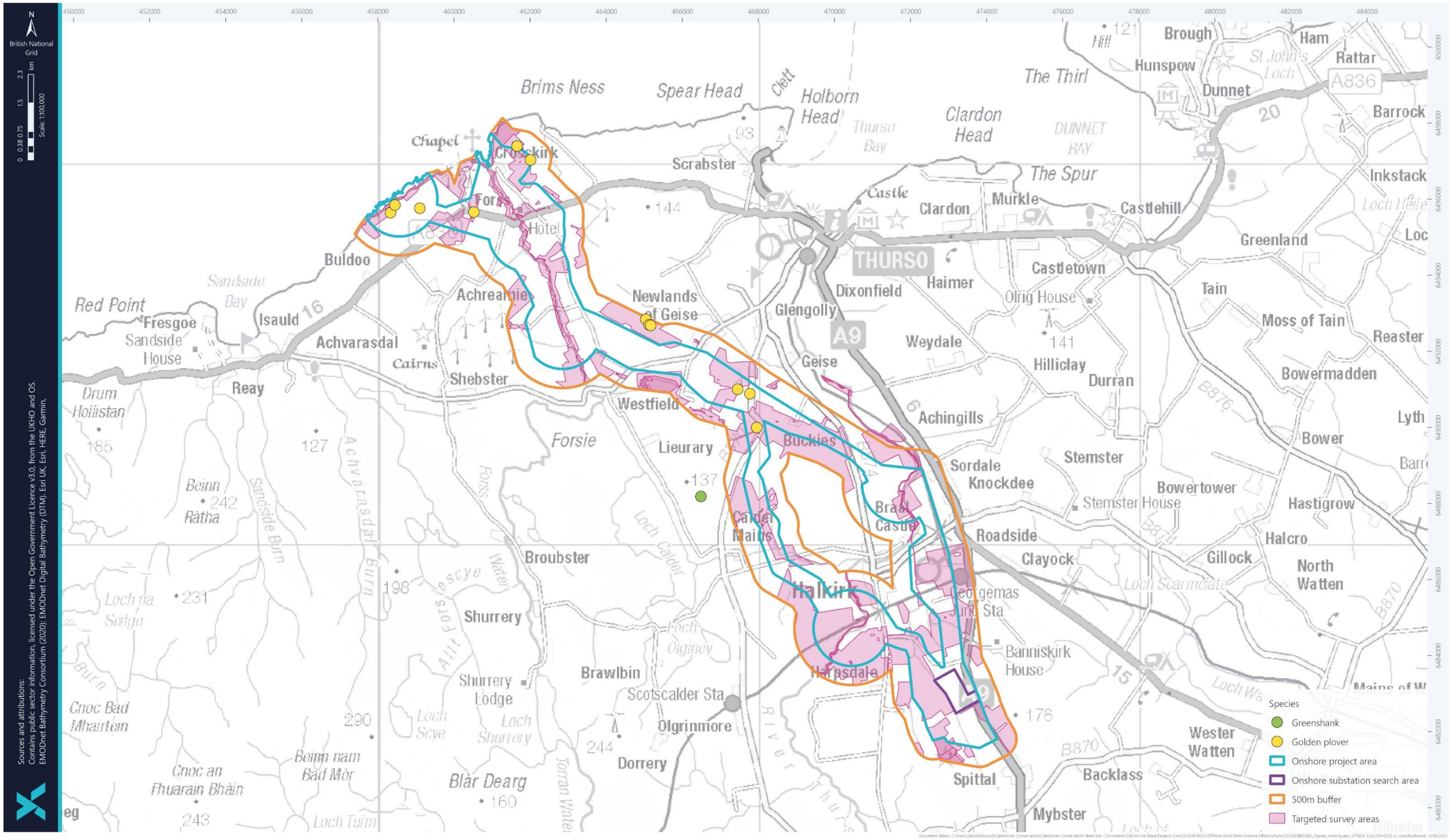

Figure 11-8 Greenshank and golden plover observed during the breeding season

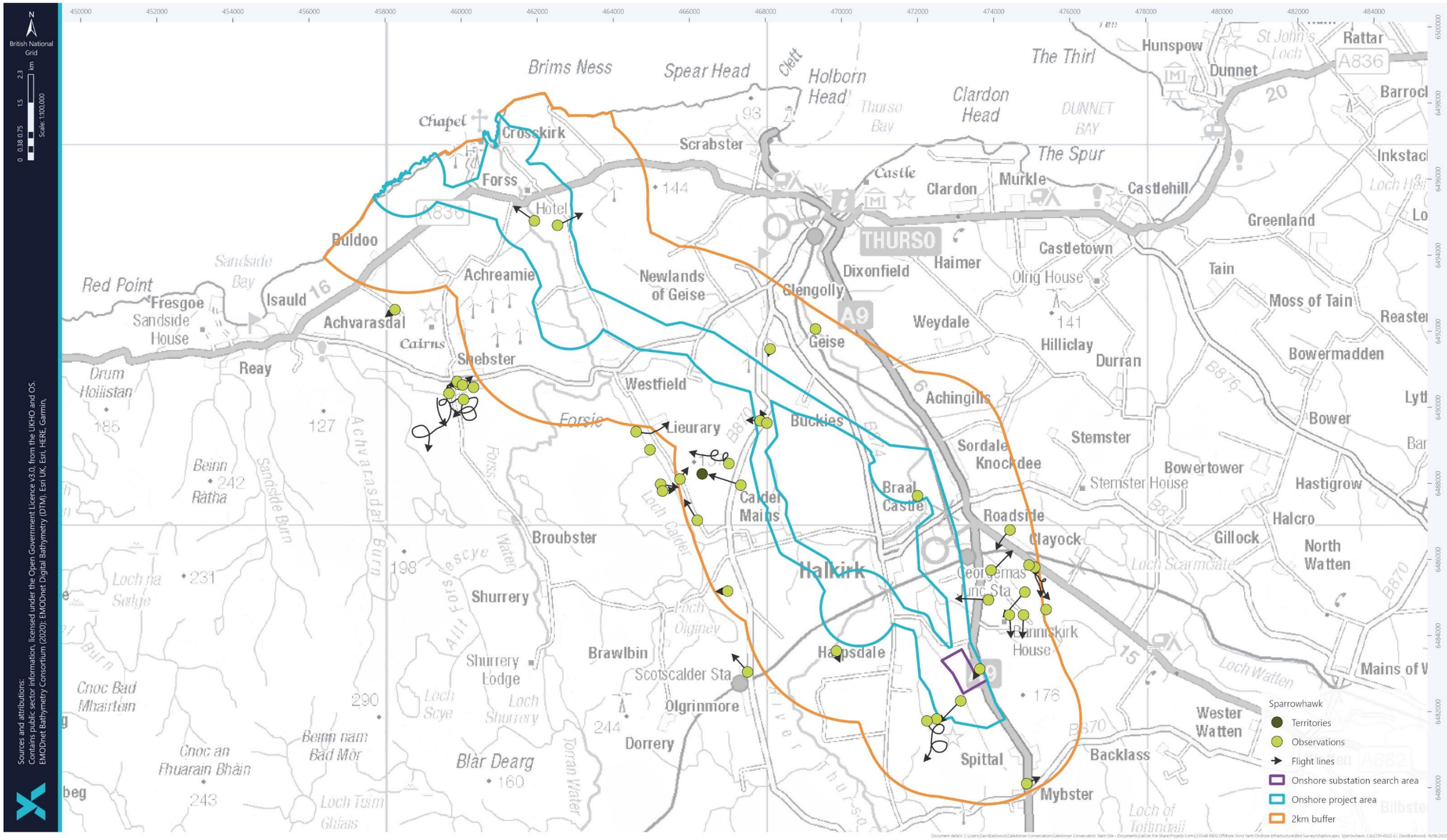

Figure 11-9 Sparrowhawk territories and observations within the onshore study area during the breeding season

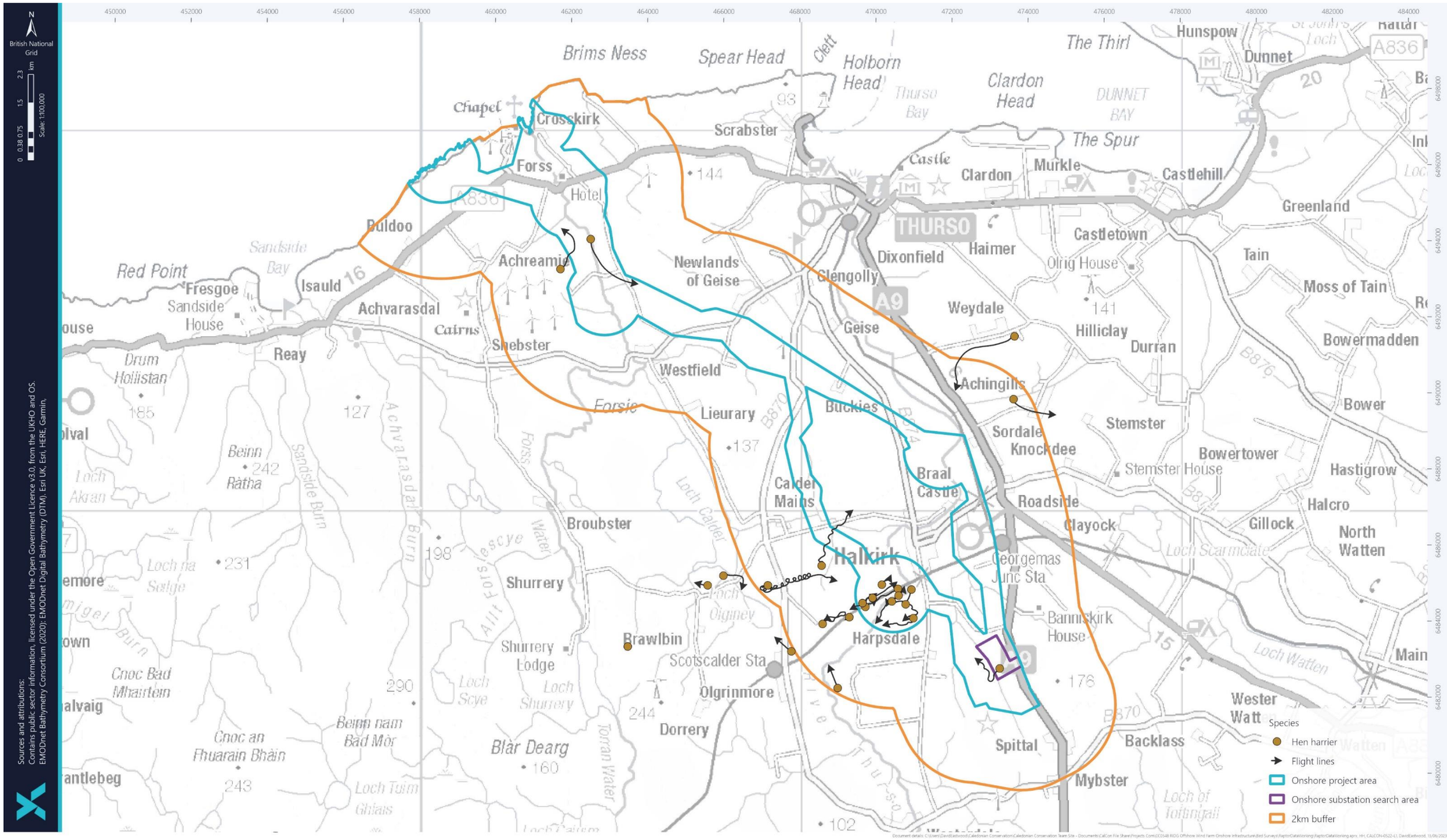

Figure 11-10 Hen harrier observations within the onshore study area during the breeding season

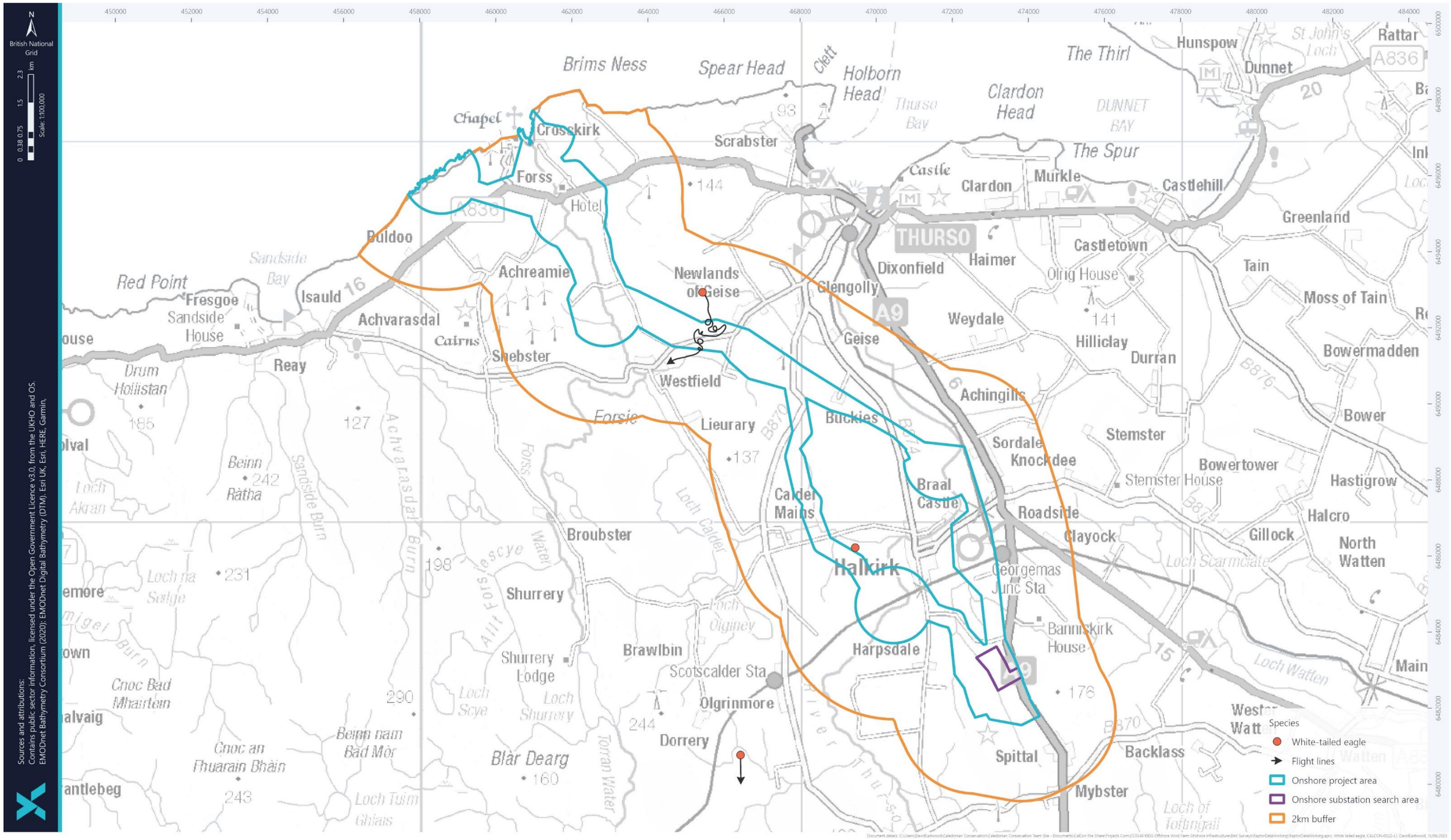

Figure 11-11 White-tailed eagle observations within the onshore study area during the breeding season

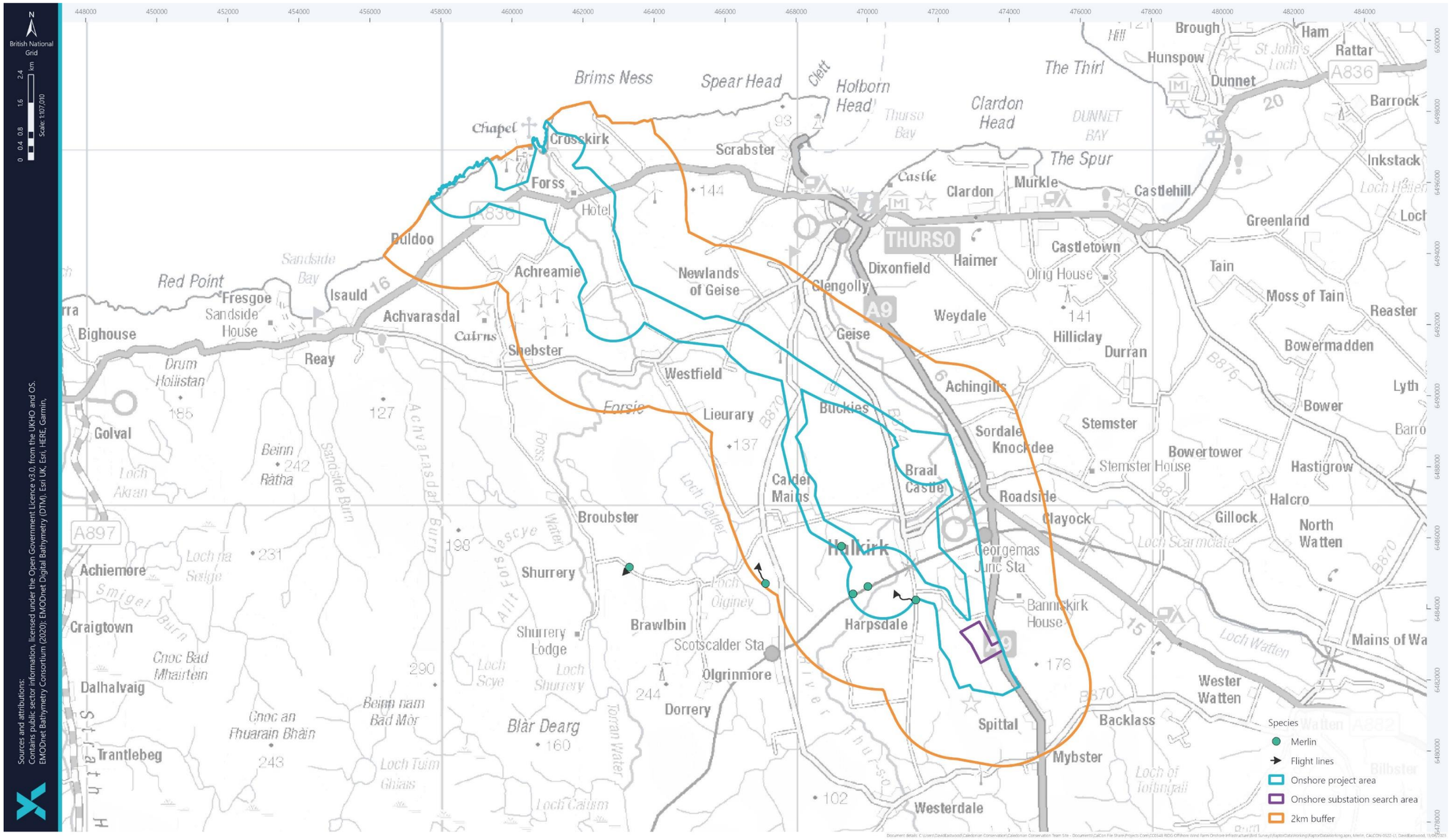

Figure 11-12 Merlin observations within the onshore study area during the breeding season

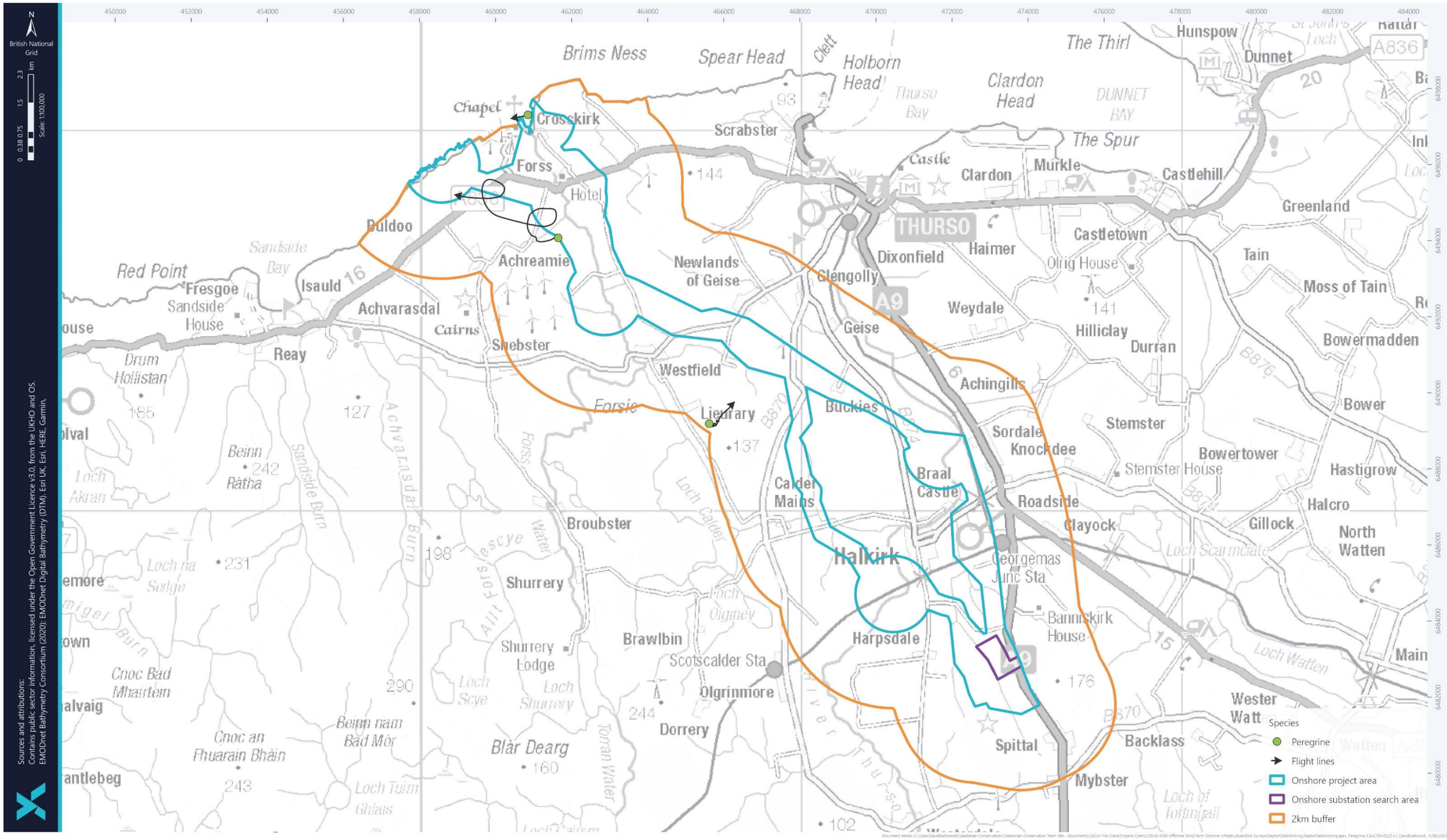

Figure 11-13 Peregrine observations within the onshore study area during the breeding season

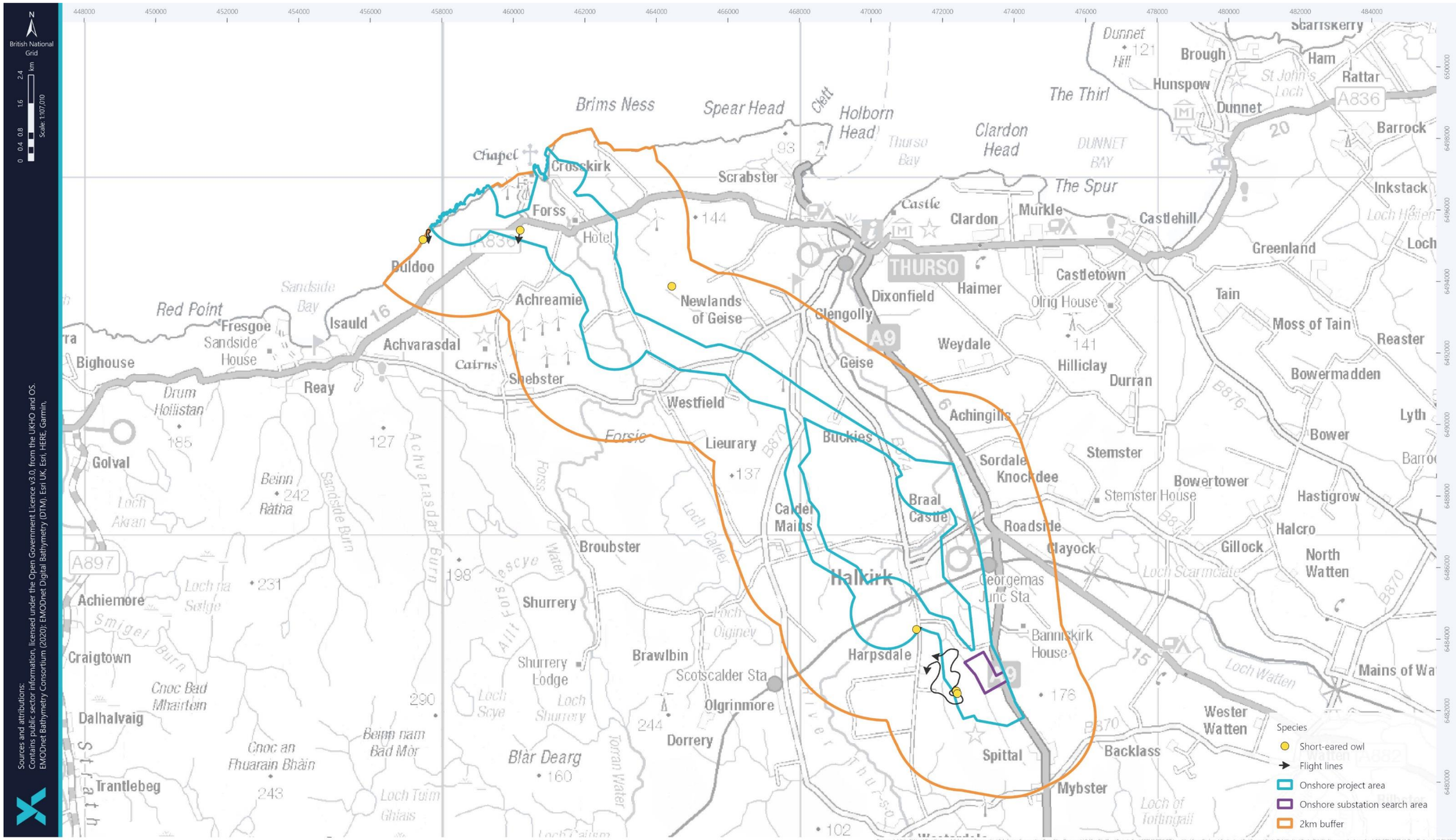

Figure 11-14 Short-eared owl observations within the onshore study area during breeding season

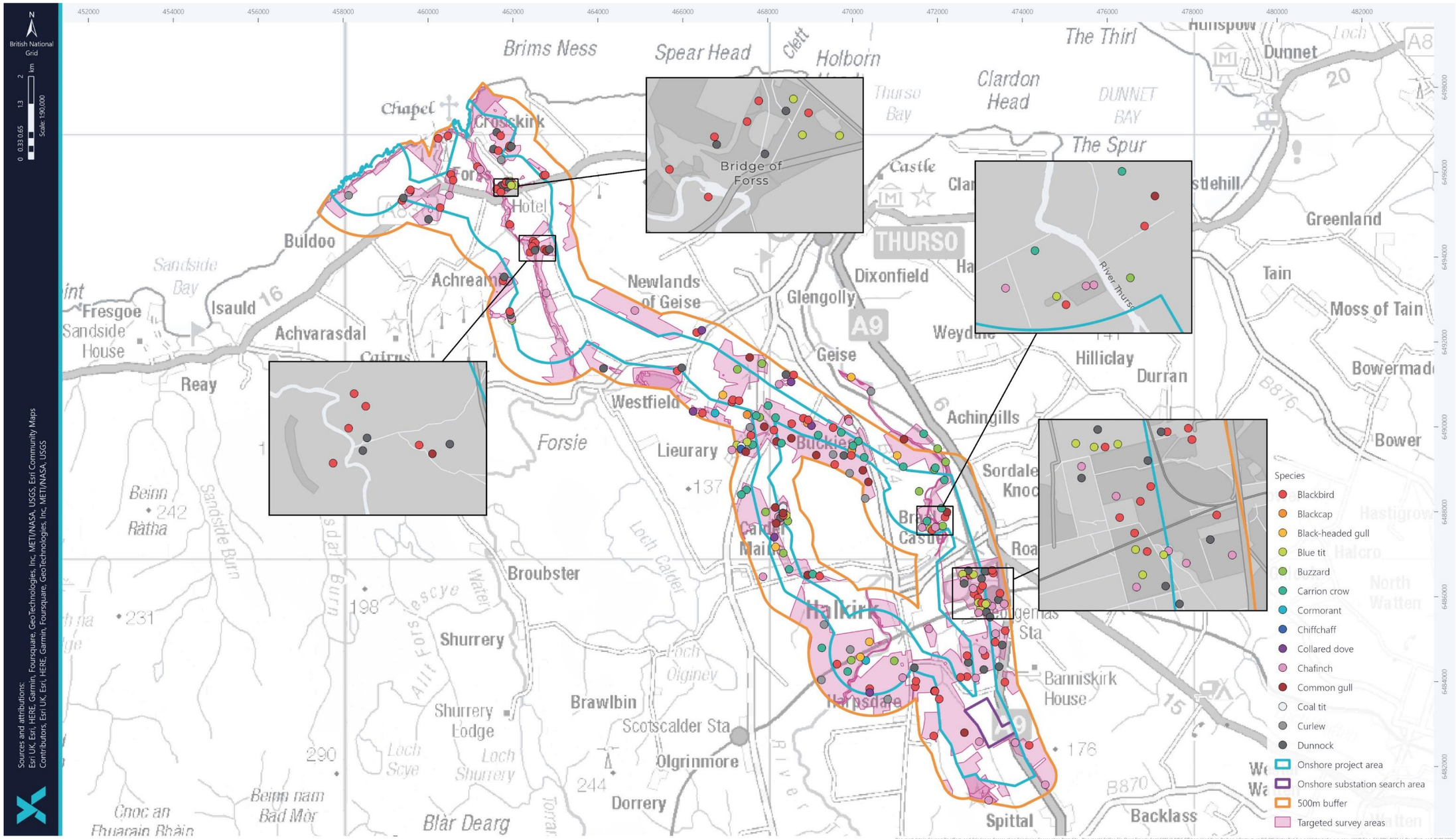

Figure 11-15a Winter bird survey observations

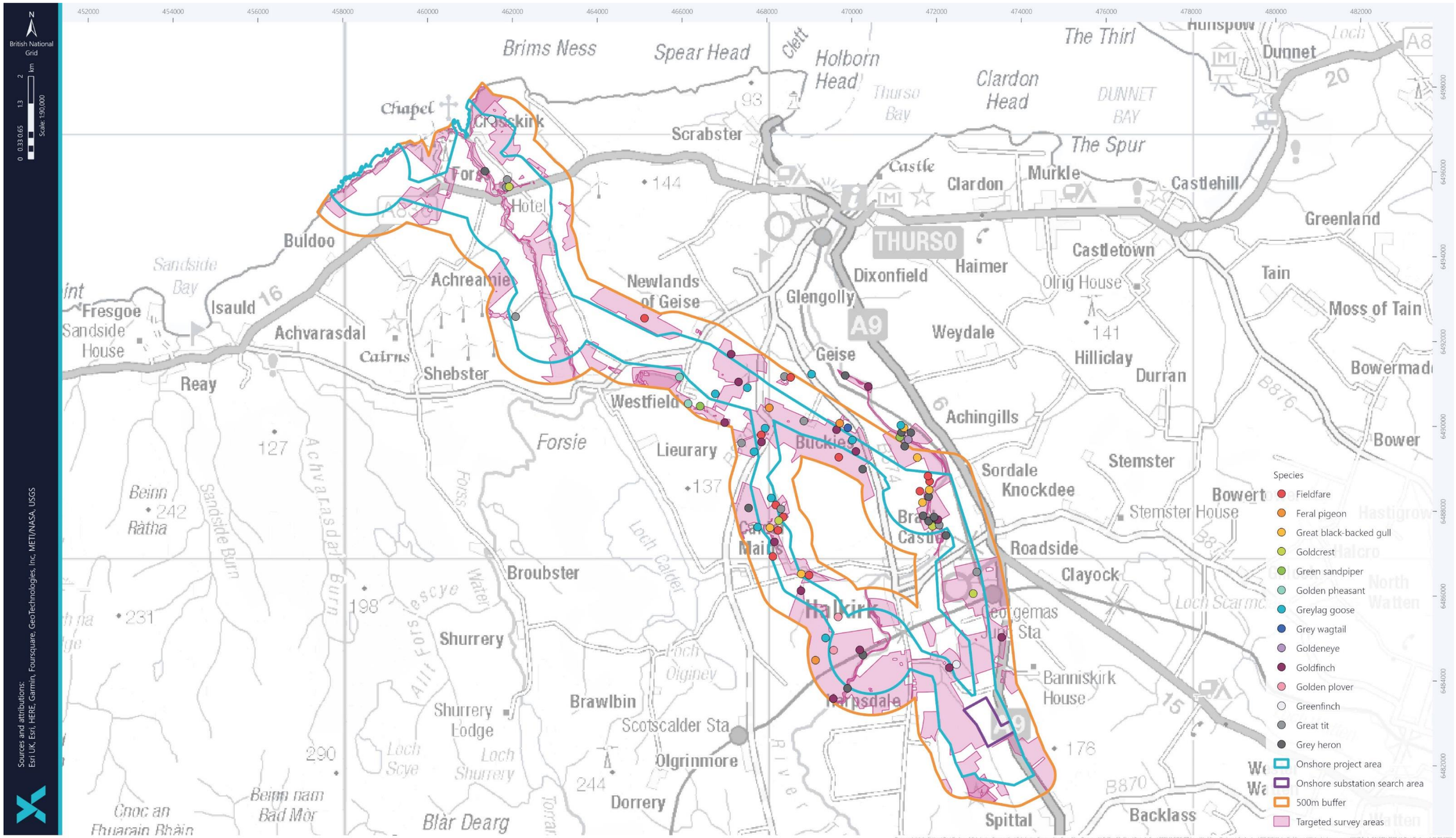

Figure 11-15b Winter bird survey observations continued

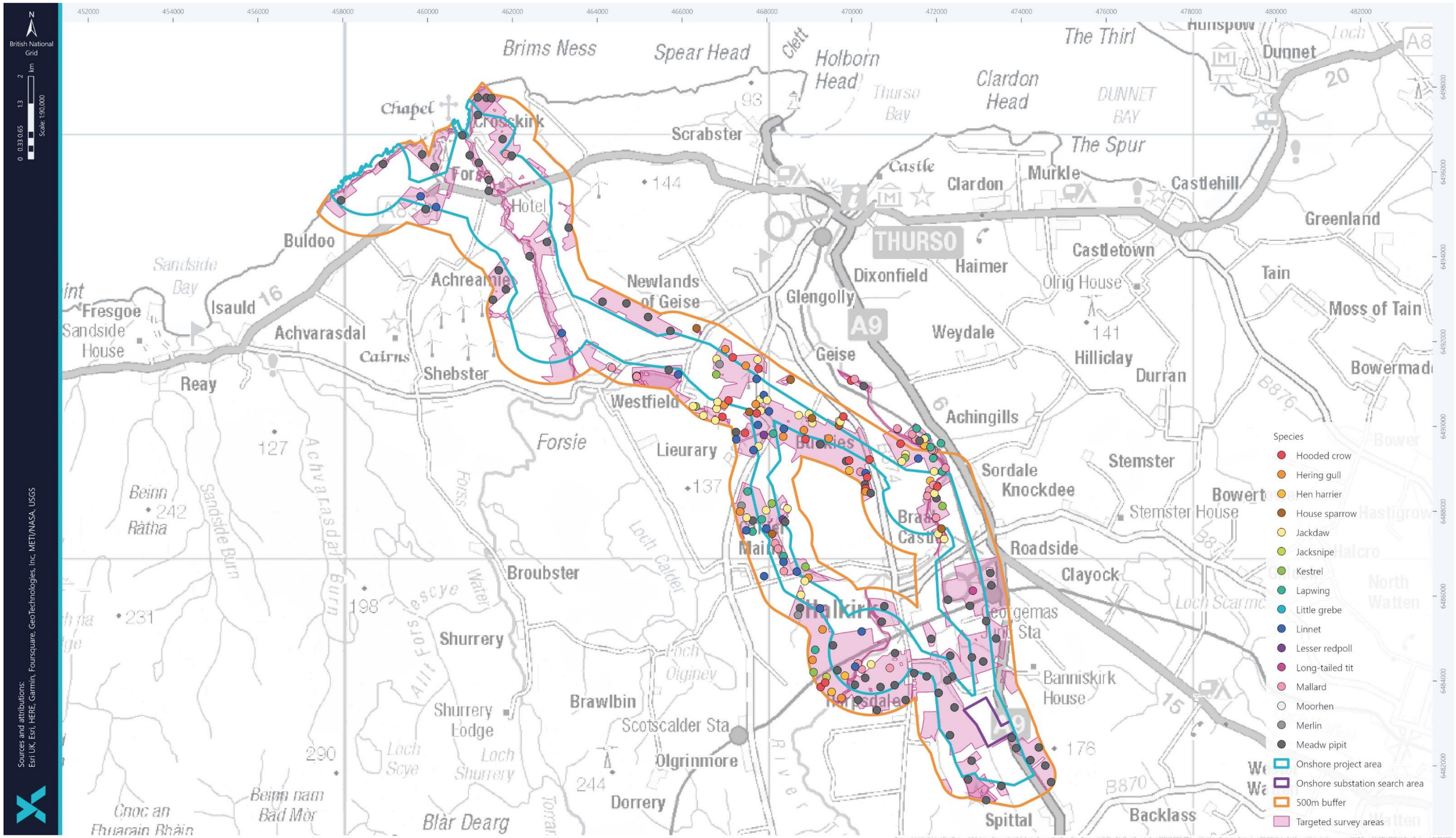

Figure 11-15c Winter bird survey observations continued

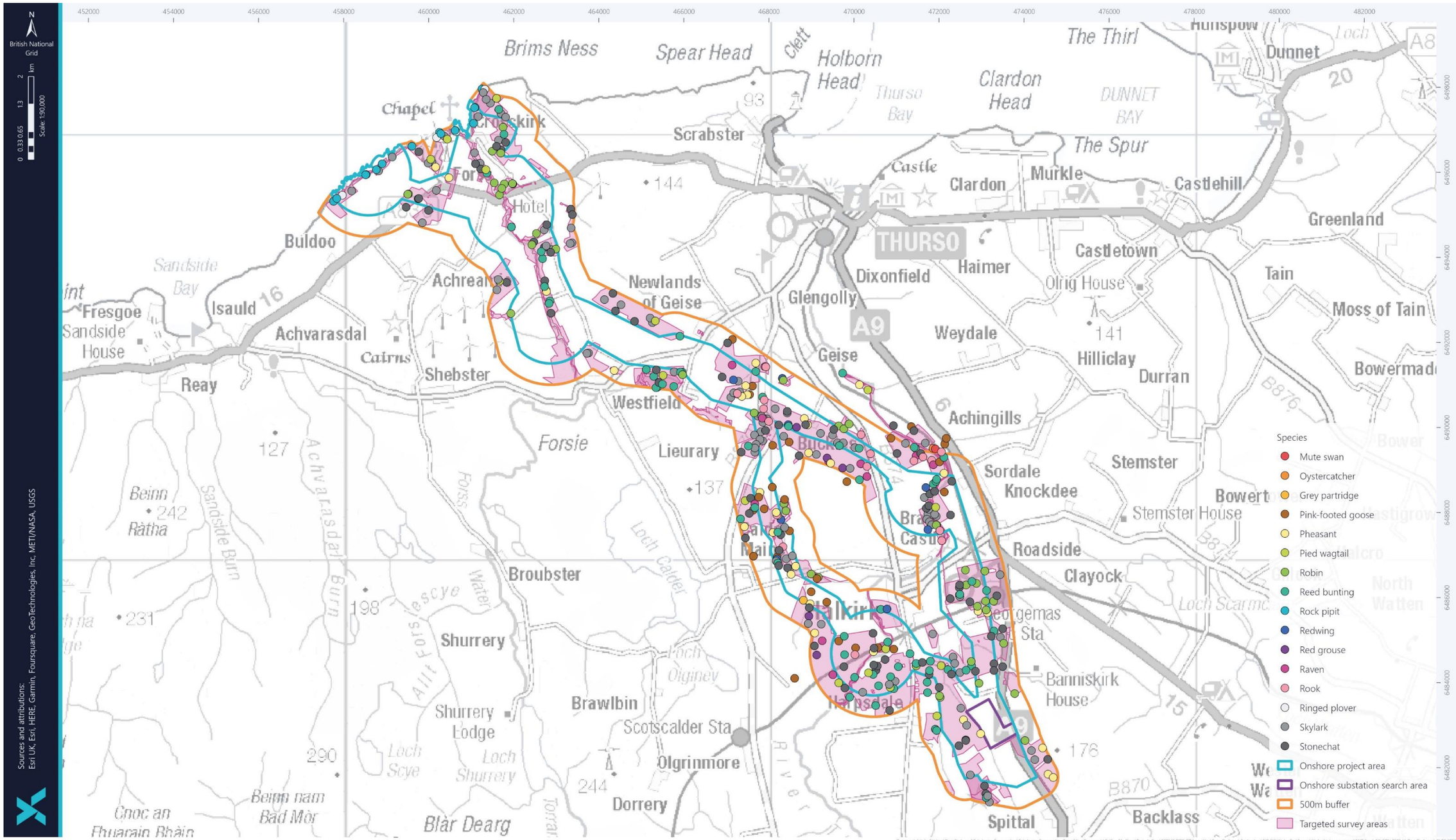

Figure 11-15d Winter bird survey observations continued

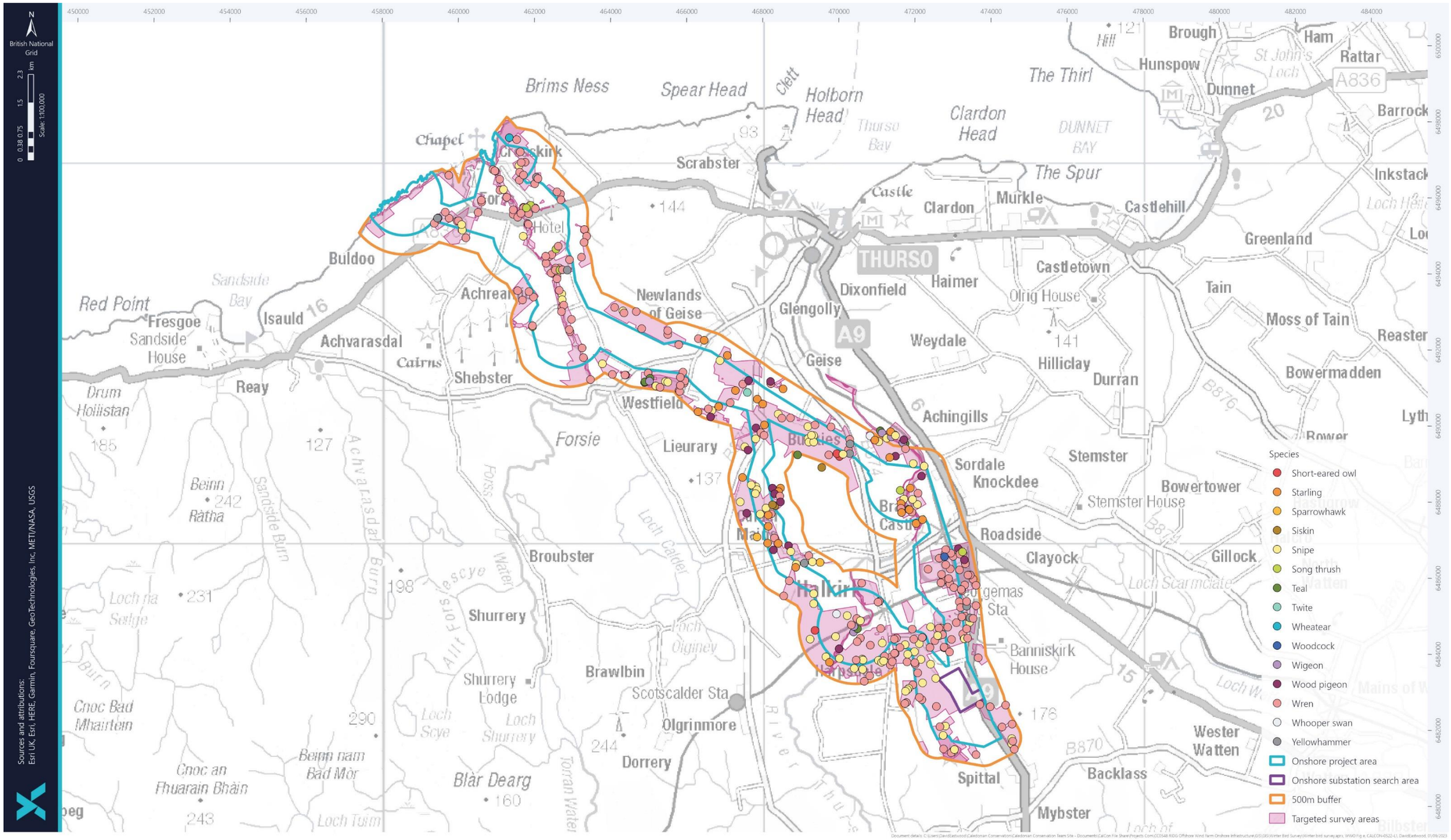

Figure 11-15e Winter bird survey observations continued

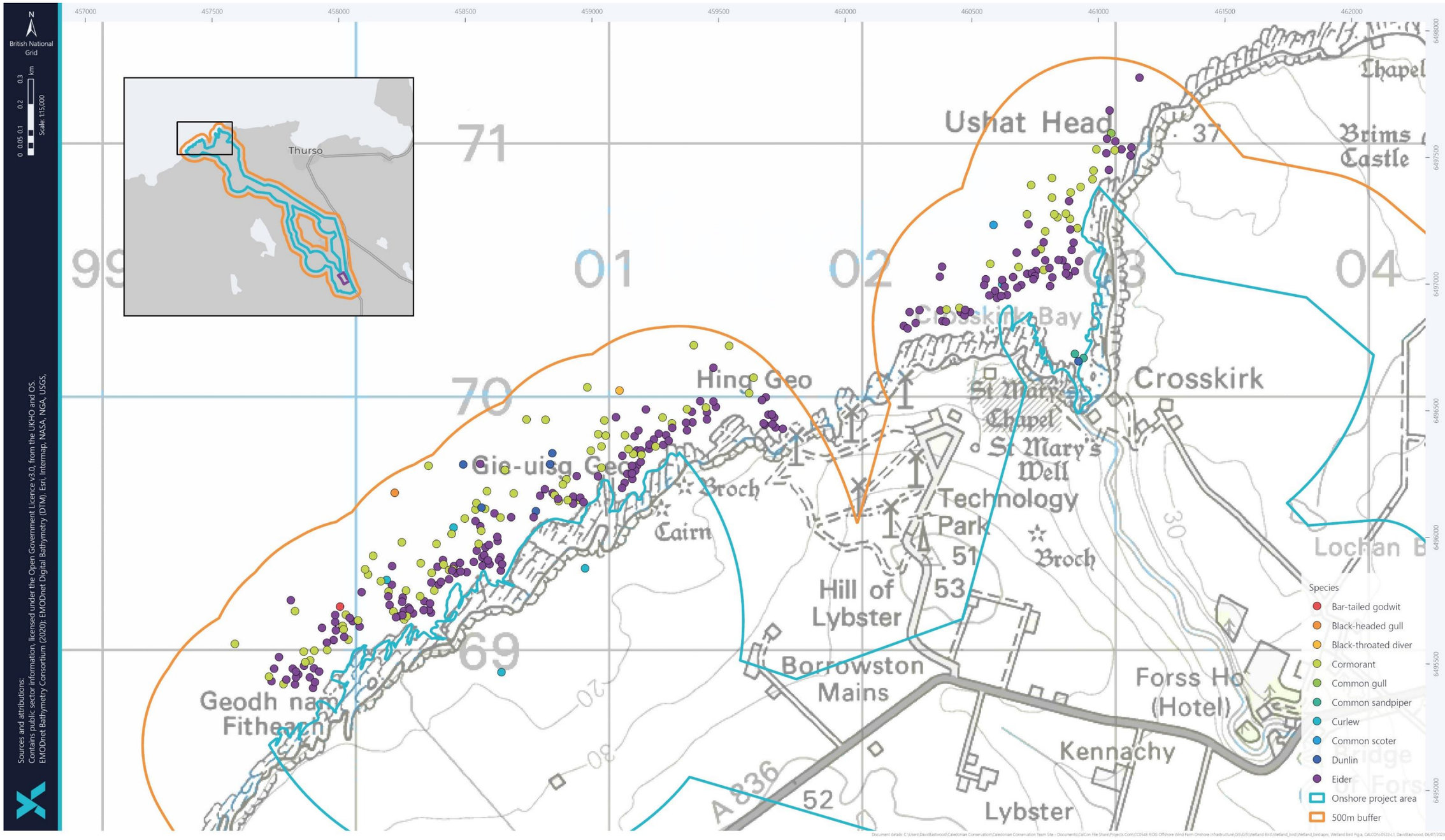

Figure 11-16a Wetland bird survey observations

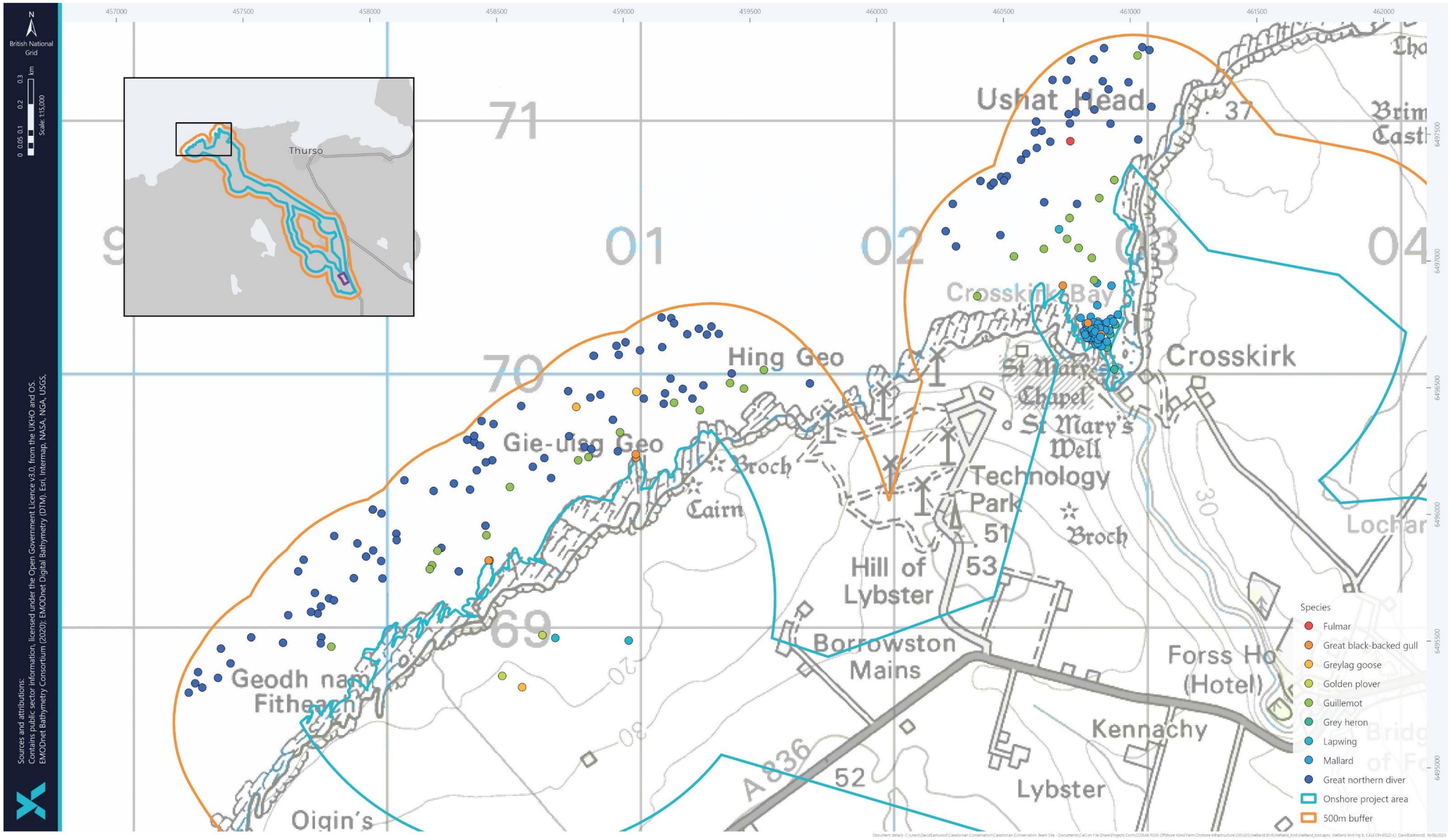

Figure 11-16b Wetland bird survey observations continued

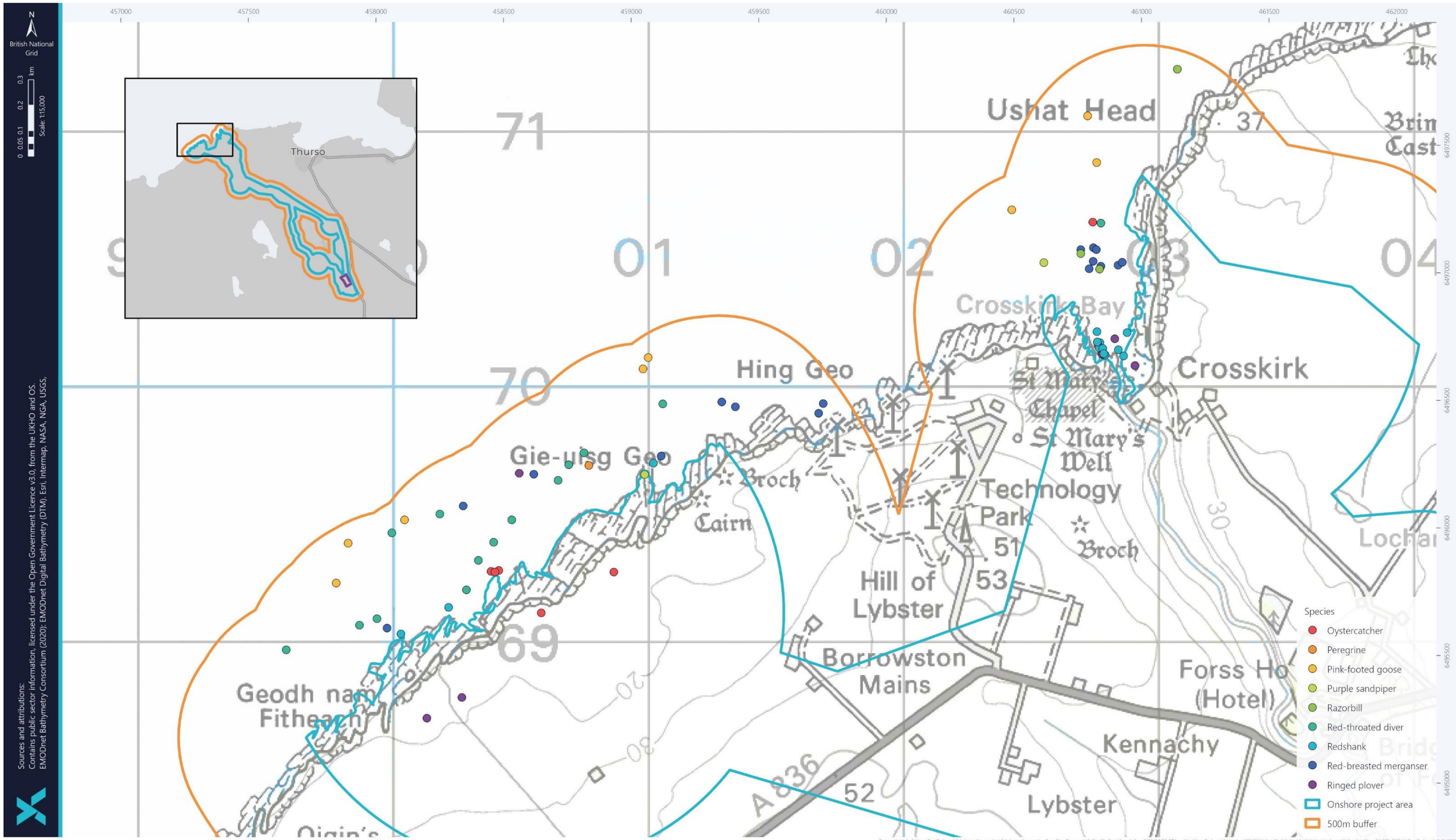

Figure 11-16c Wetland bird survey observations continued

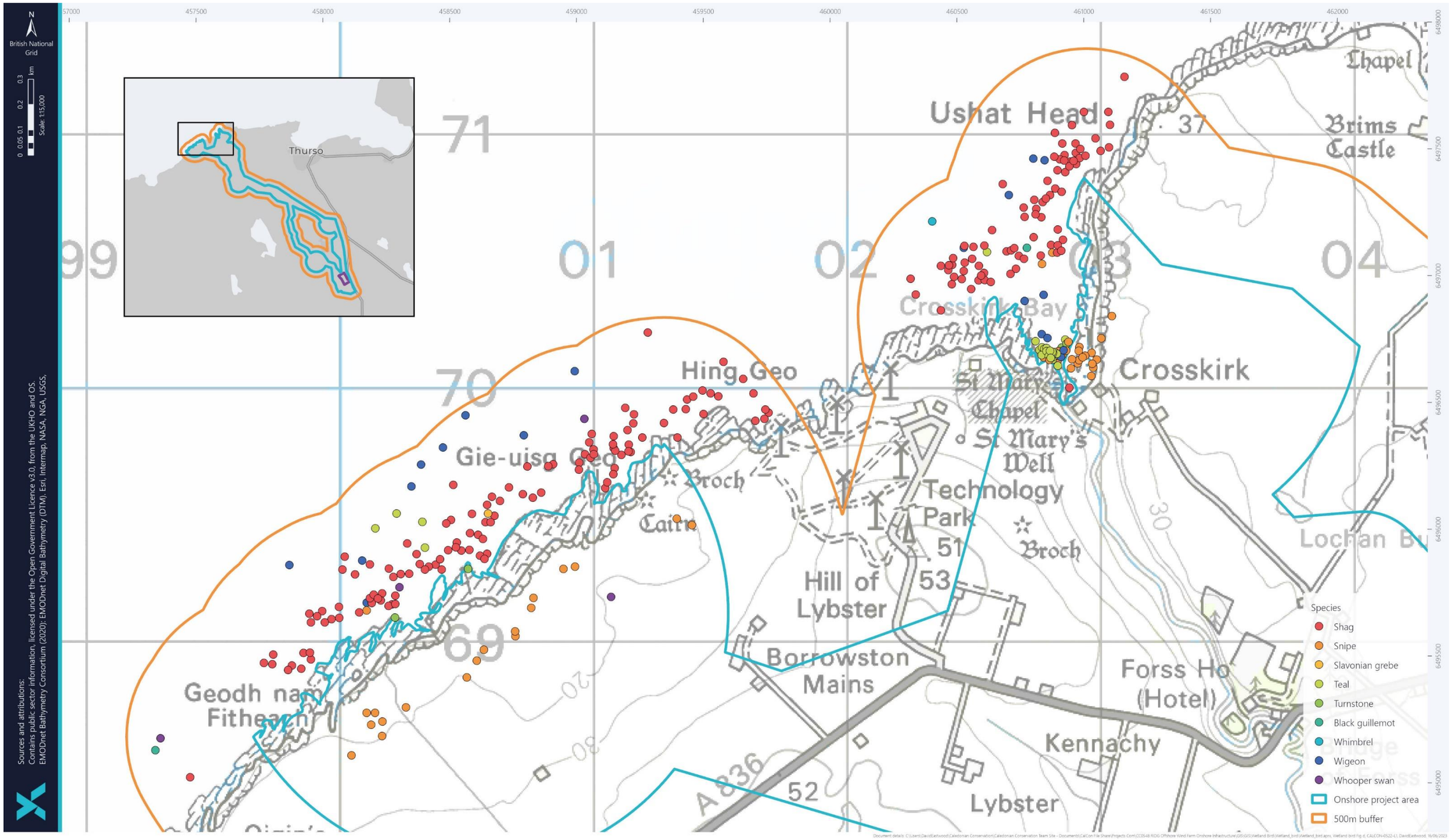

Figure 11-16d Wetland bird survey observations continued

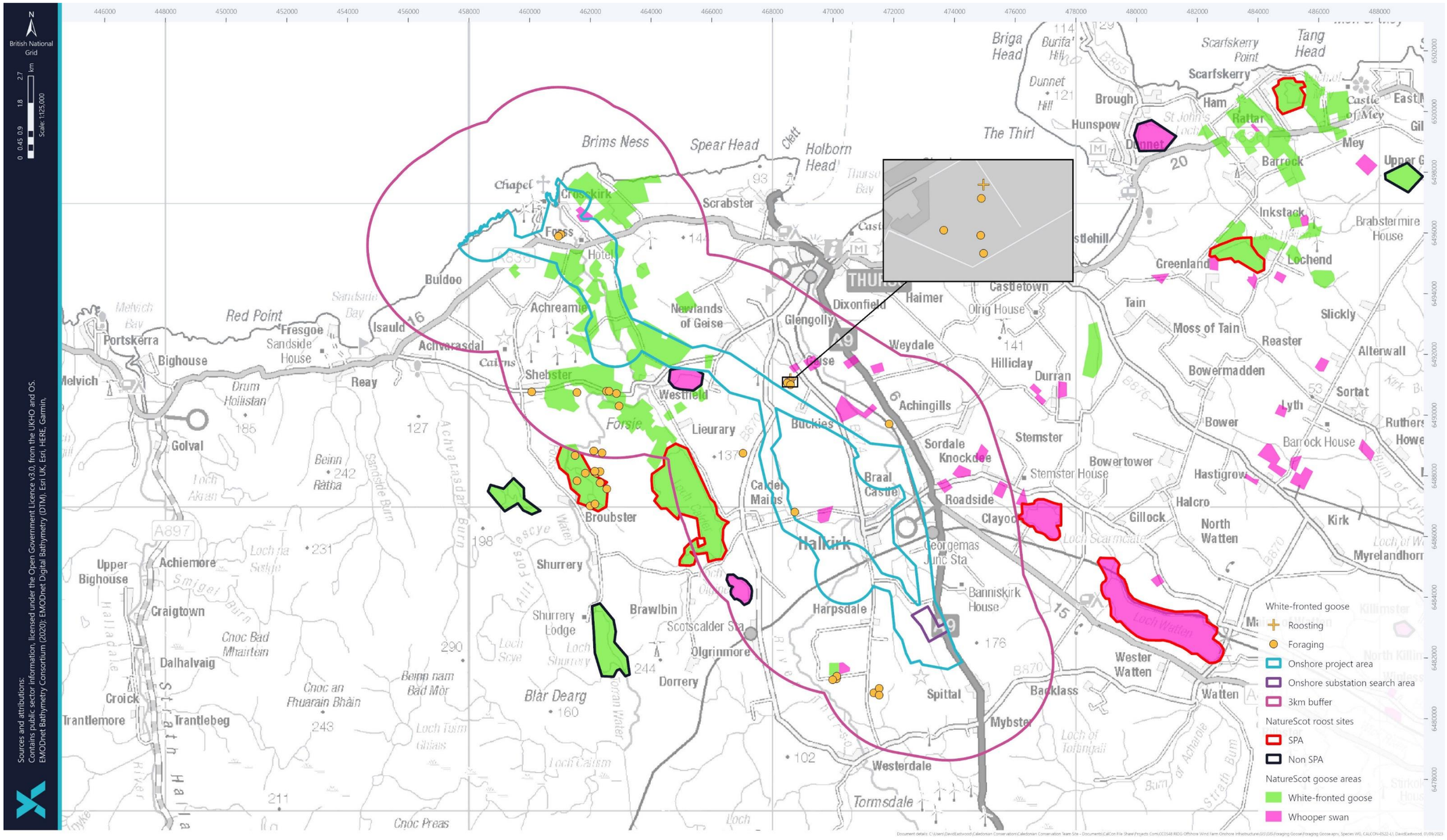

Figure 11-17 Migratory Greenland white-fronted goose overview (including important foraging and roosting areas identified by NatureScot for context)

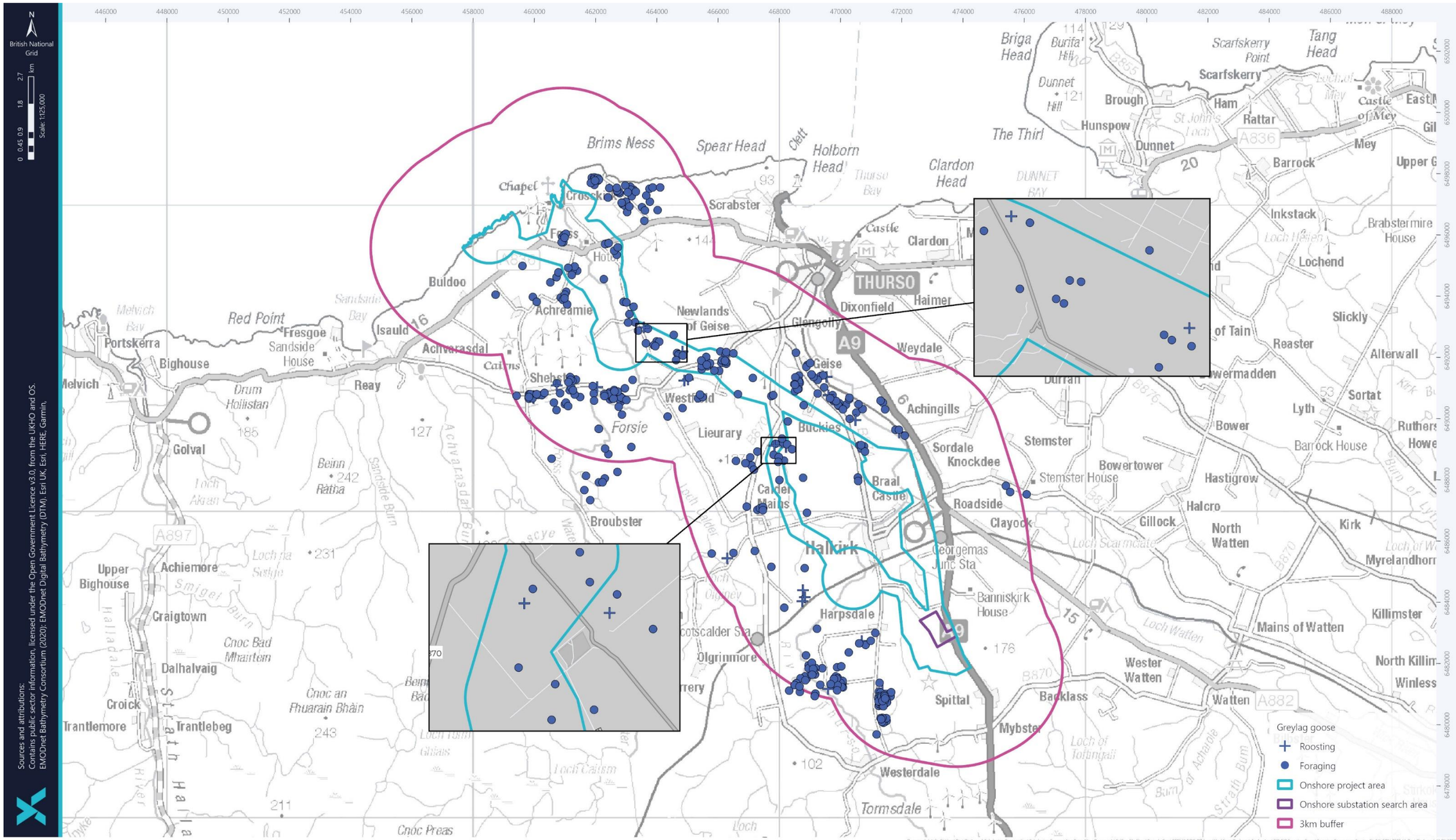

Figure 11-18 Migratory greylag goose overview

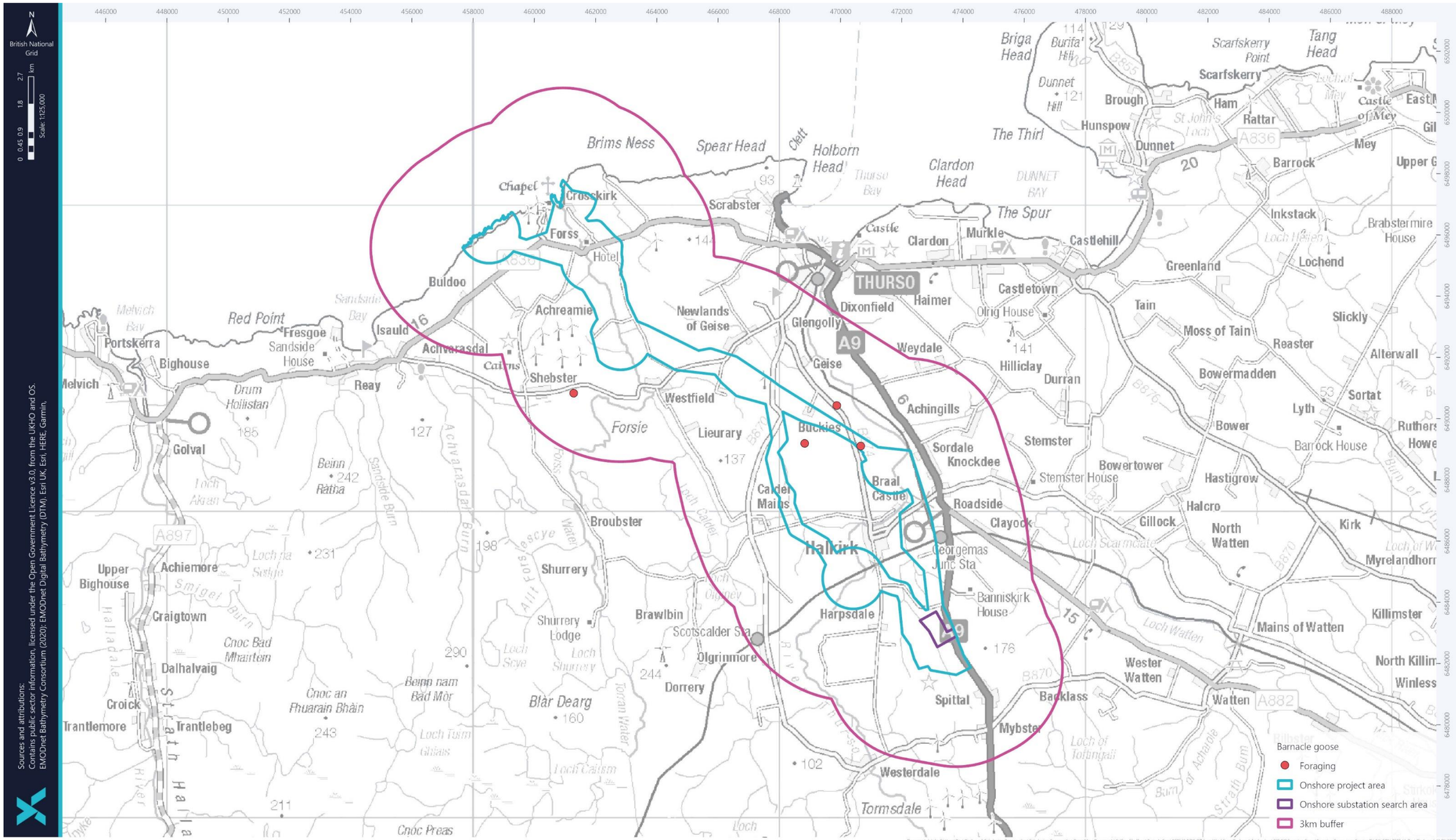

Figure 11-19 Migratory barnacle goose overview

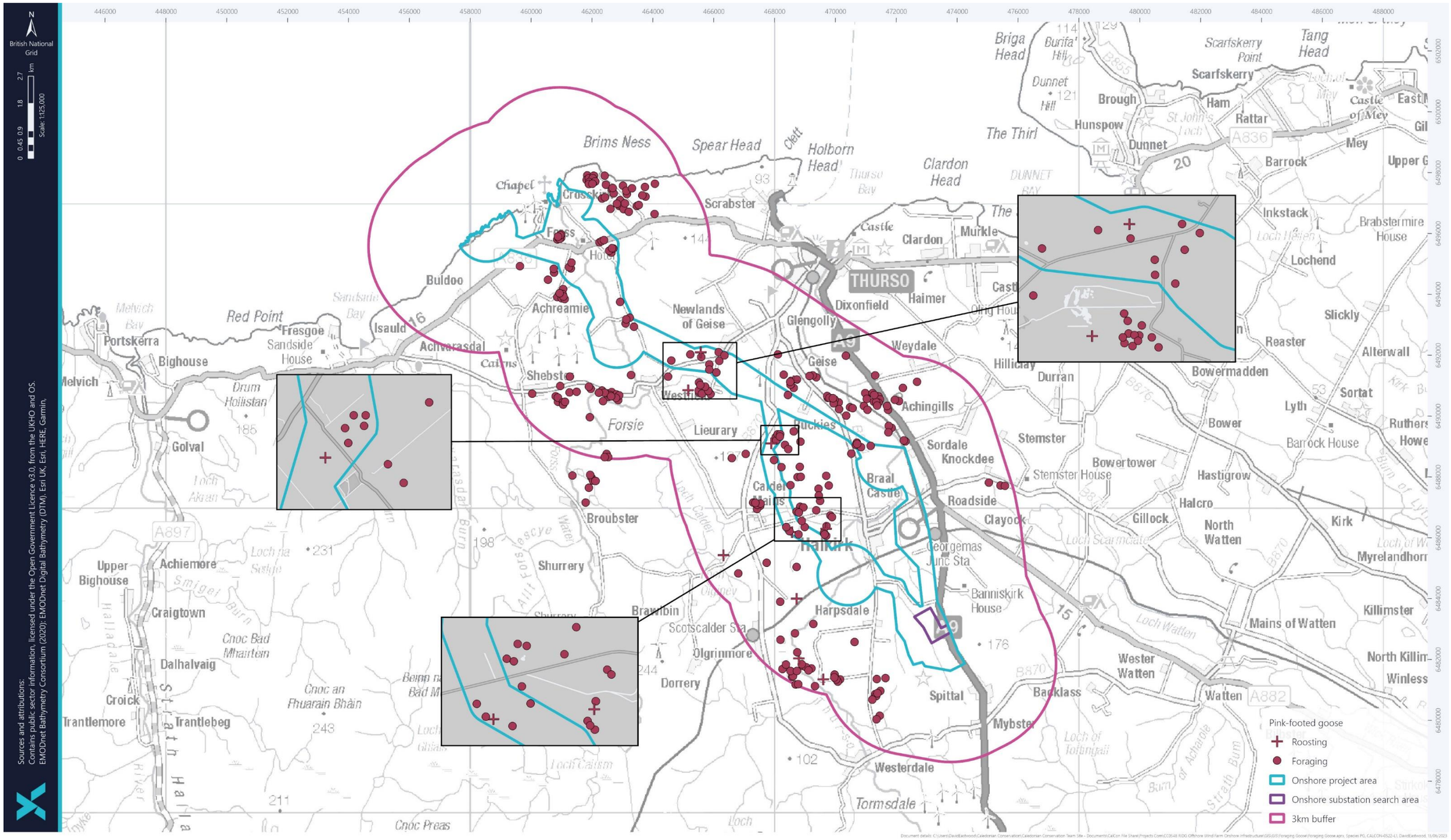

Figure 11-20 Migratory pink-footed goose overview

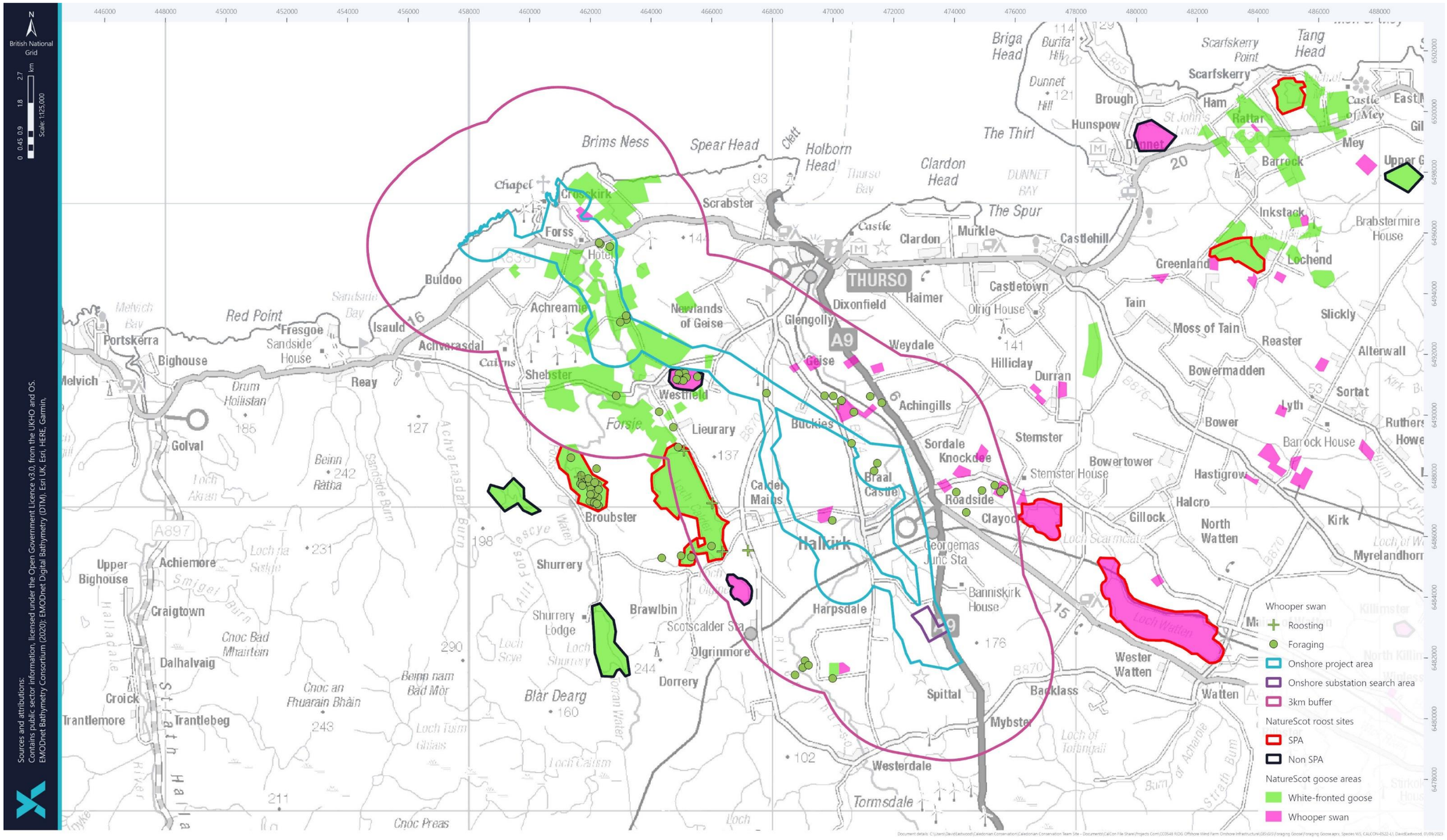

Figure 11-21 Migratory whooper swan overview (including important foraging and roosting areas identified by NatureScot for context)

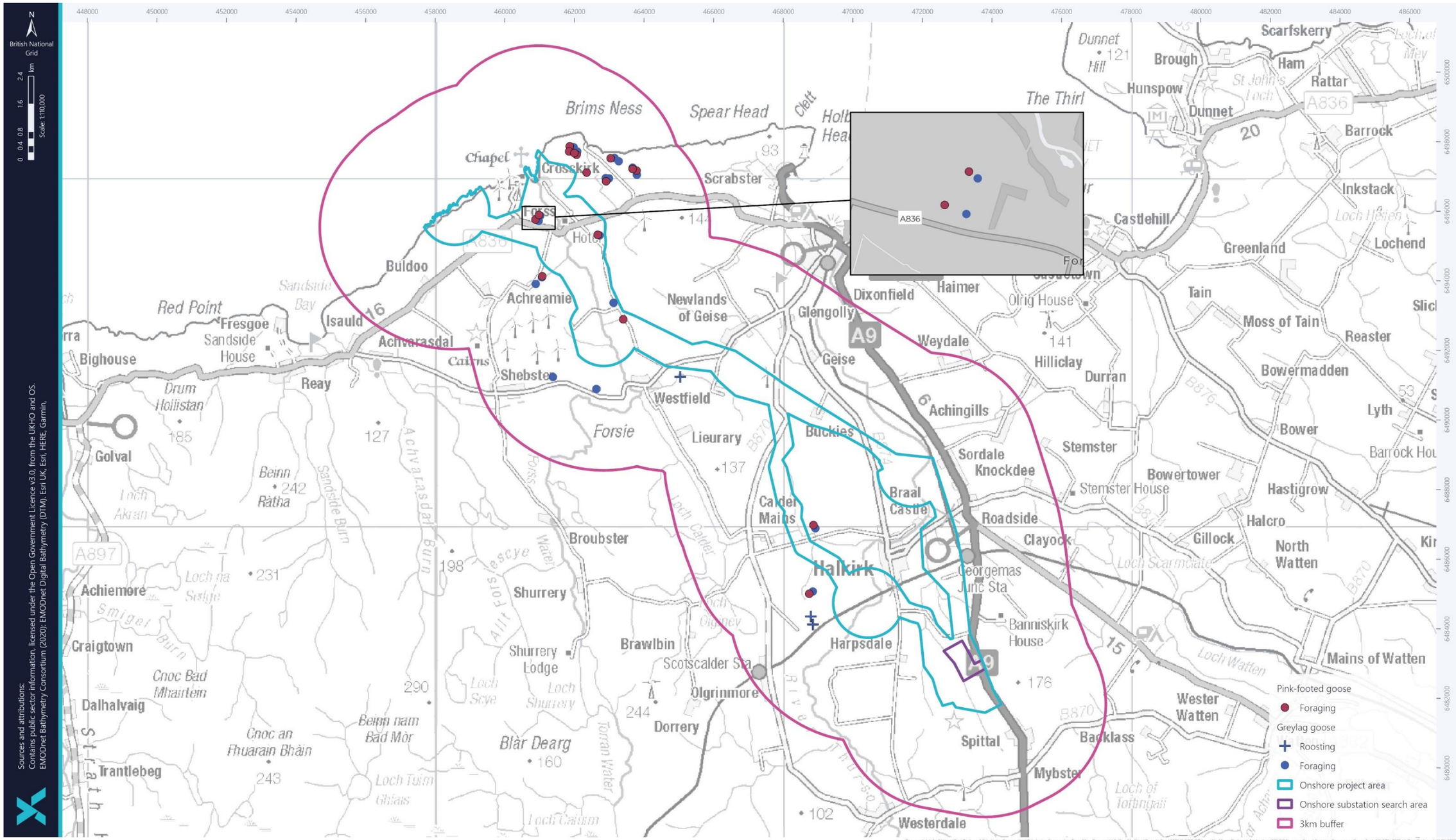

Figure 11-22a Migratory goose and swan observations: September 2022

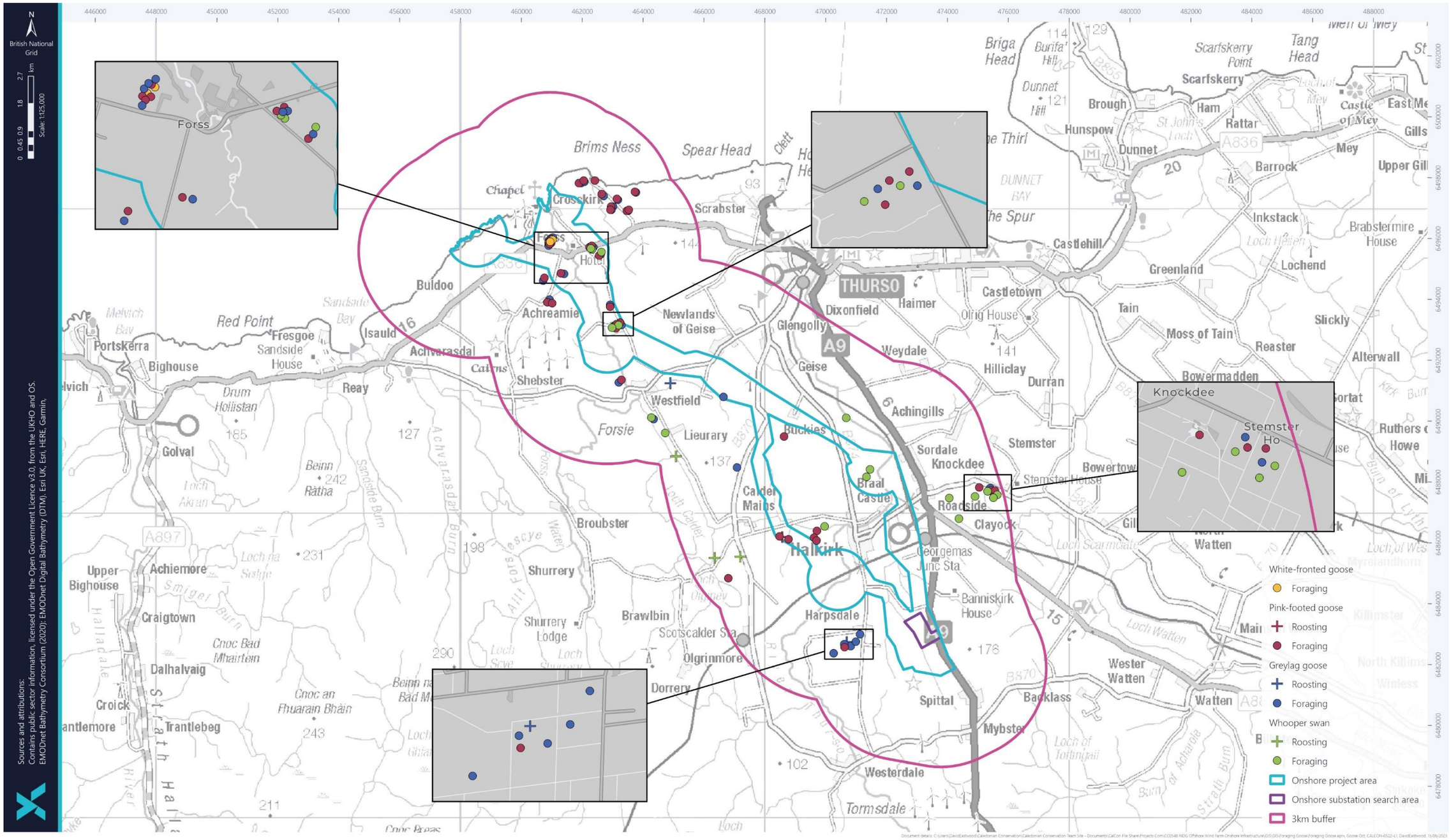

Figure 11-22b Migratory goose and swan observations: October 2022

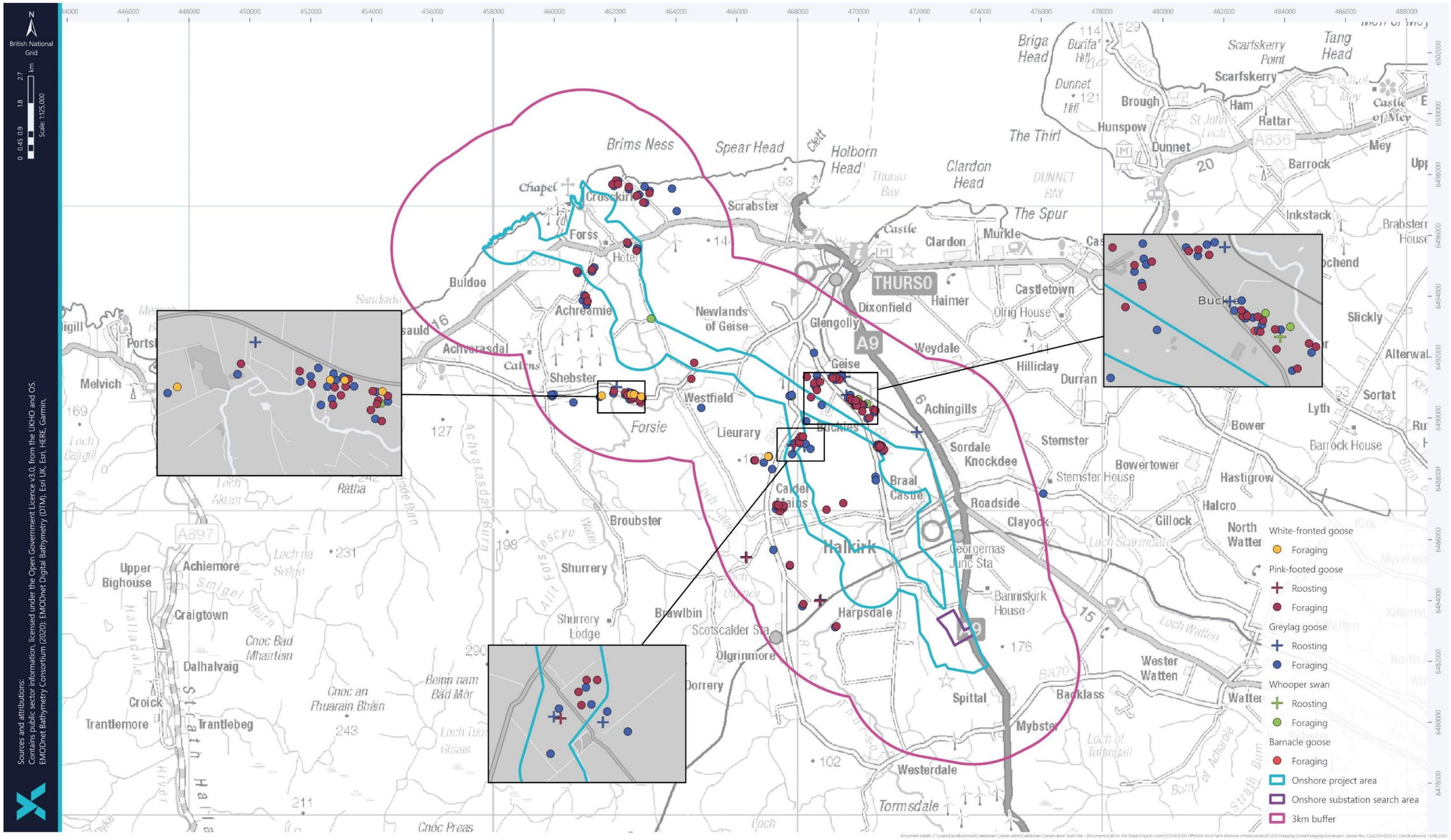

Figure 11-22c Migratory goose and swan observations: November 2022

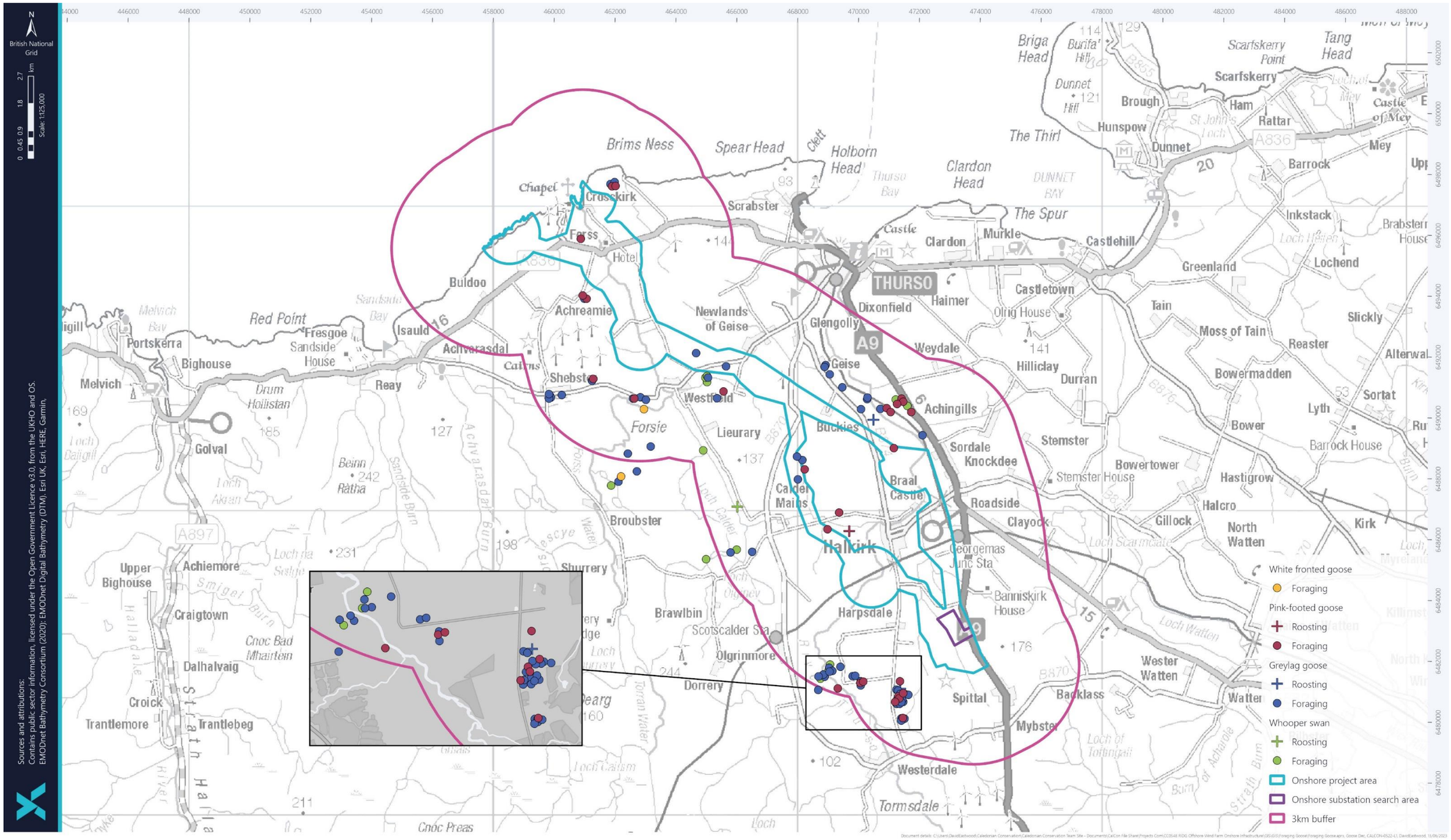

Figure 11-22d Migratory goose and swan observations: December 2022

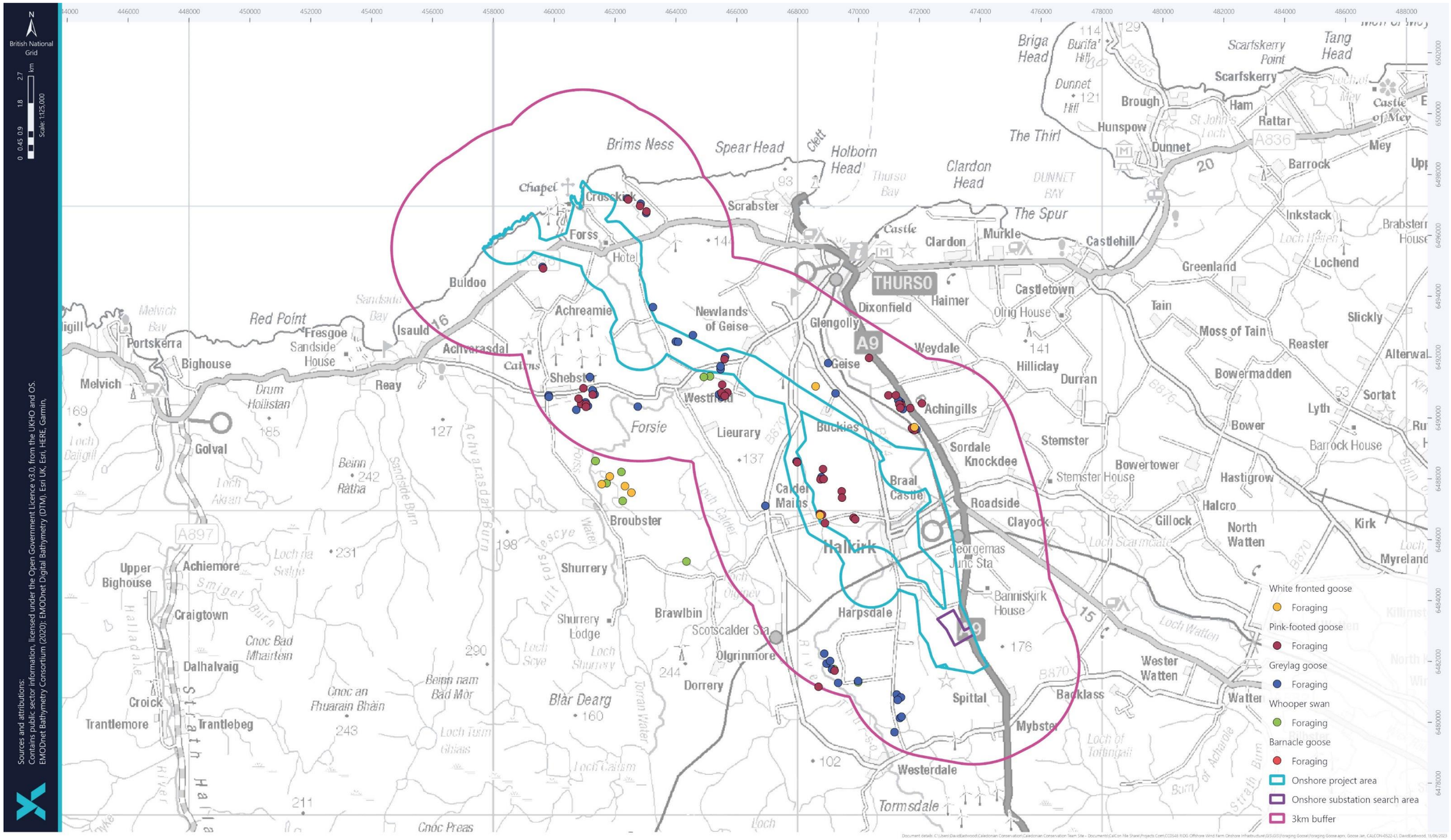

Figure 11-22e Migratory goose and swan observations: January 2023

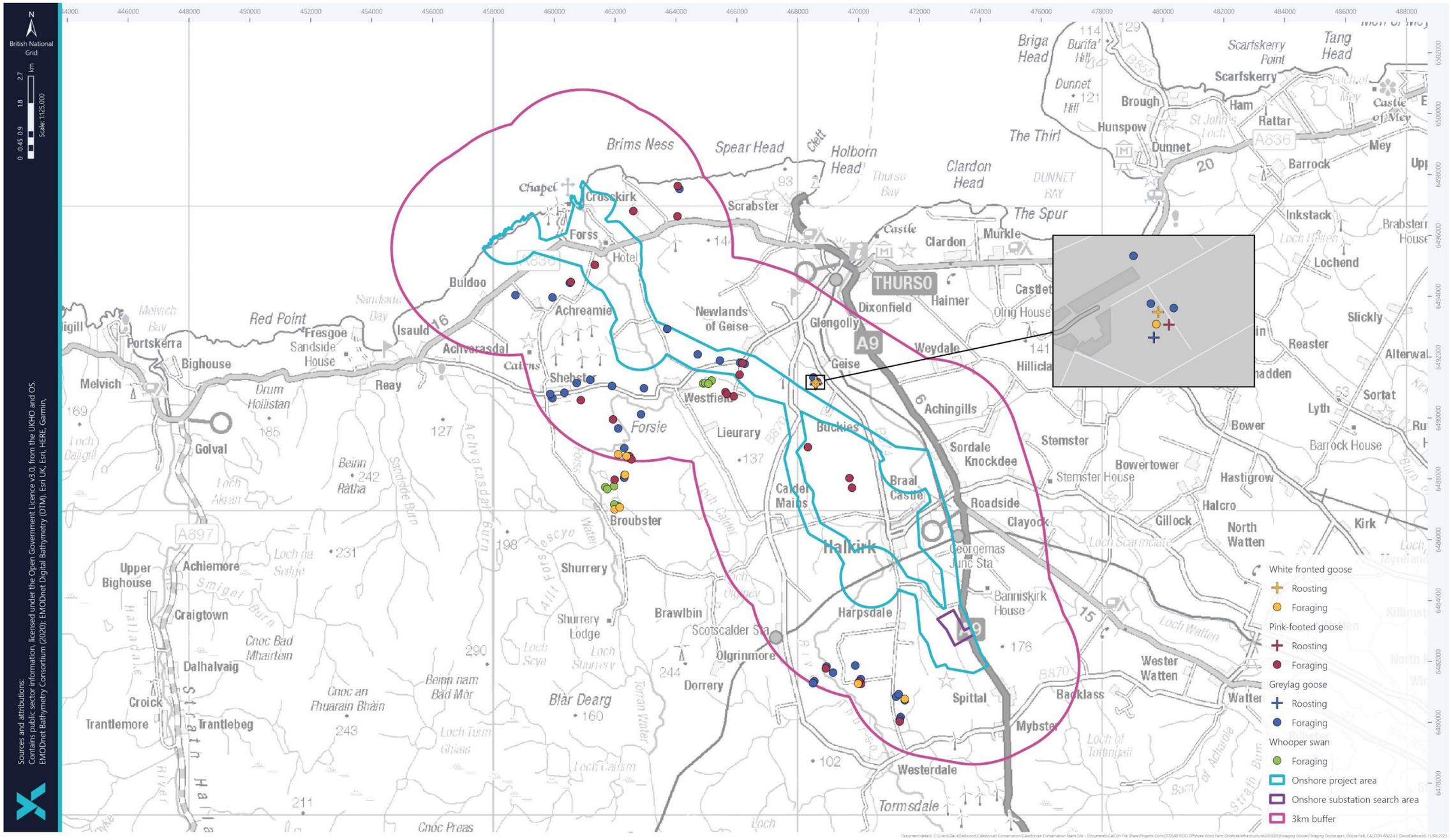

Figure 11-22f Migratory goose and swan observations: February 2023

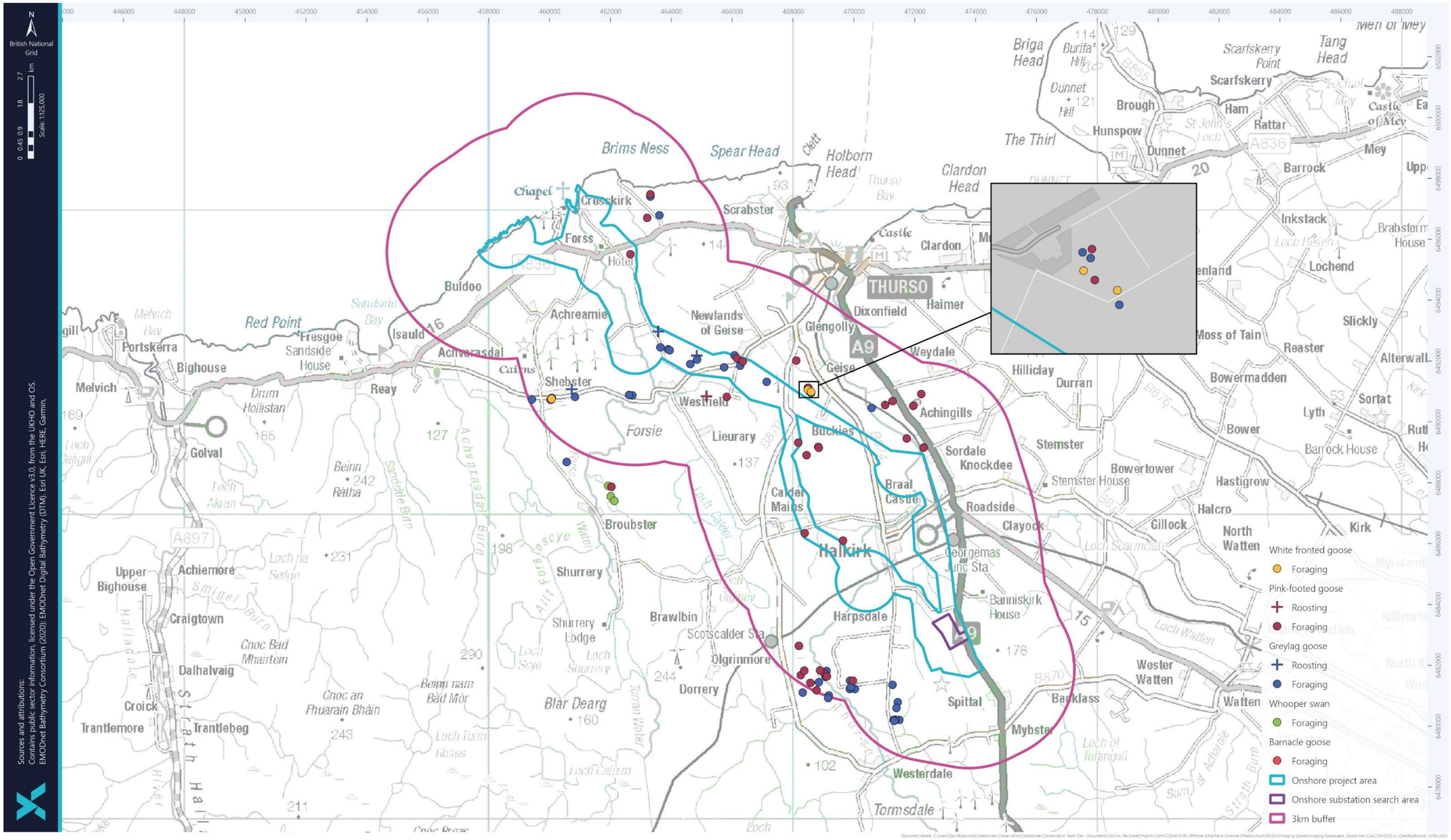

Figure 11-22g Migratory goose and swan observations: March 2023

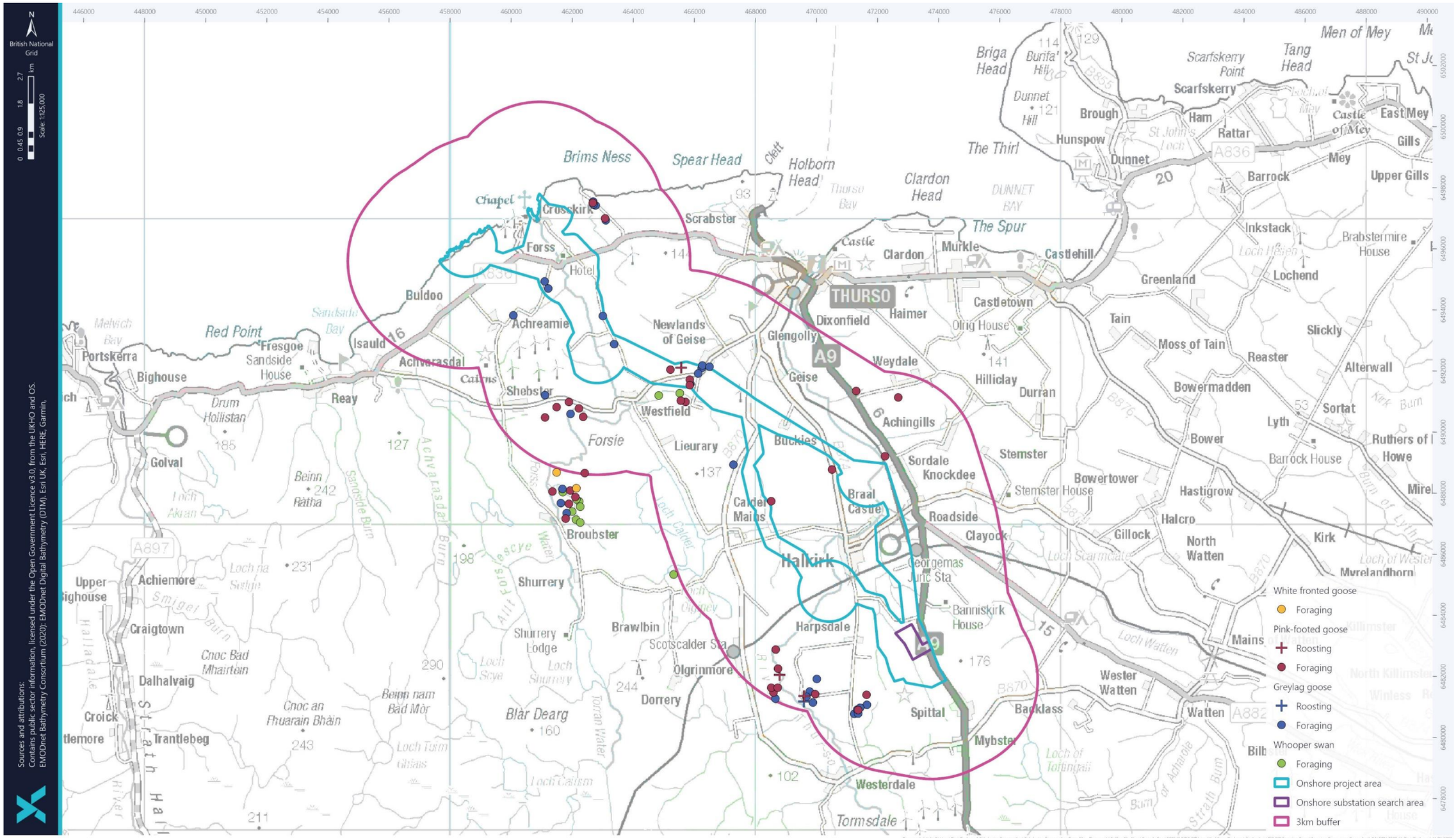

Figure 11-22h Migratory goose and swan observations: April 2023

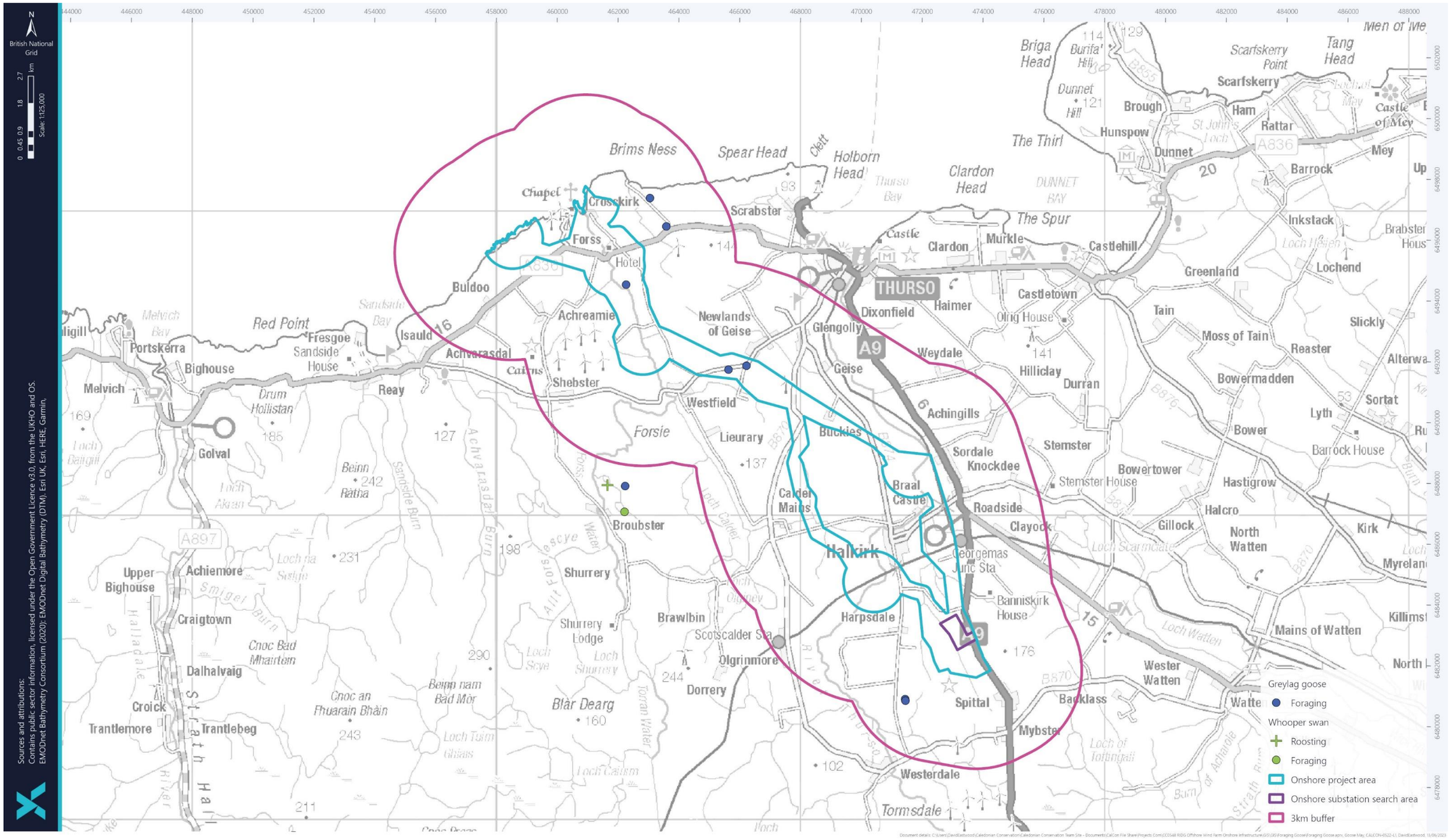

Figure 11-22i Migratory goose and swan observations: May 2023

11.4.5 Future baseline

In accordance with EcIA best practice, the baseline used for the assessment is not simply the survey results, but an interpretation of these taking in to account future changes that are likely to occur – i.e., the baseline at the time the Project is constructed, operational, and decommissioned (CIEEM, 2018). It is important to note that the future baseline is a projection, with a range of possible future conditions, and it is subject to uncertainty associated with the available projections. Across the lifetime of the Project, it is considered highly likely that the future baseline will be broadly comparable to the existing baseline described above.

Severe outbreaks of bird flu (Highly Pathogenic Avian Influenza (HPAI) A(H5N1)) in 2021 and 2022 has had a huge negative impact on wild bird populations in the UK – a particularly wide range of species and large number of individuals were affected during the 2022 breeding season and seabird colonies have been especially susceptible, suffering high mortality (Banyard *et al.*, 2022; Cunningham *et al.*, 2022; Pearce-Higgins *et al.*, 2023). This has been taken in to account in the assessment, increasing the sensitivity of the winter seabird assemblage.

There is a possibility that climate change may affect bird populations – notably breeding seabirds and upland waders. For example, climate change is disrupting marine food webs while higher temperatures and storms directly affect breeding seabirds, while drier summers affect upland breeding waders through reduced prey availability (Pearce-Higgins, 2021). However, the onshore Project area is not situated in the uplands, and no breeding seabird colonies were found. As there are no proposed land use changes, and climate change is unlikely to have a measurable effect on ornithology in this area within the Project lifetime, in most cases the future baseline will be the same as the current baseline. However, where this is not the case, this is described where relevant in the assessment.

The future baseline in relation to climate is discussed in detail in SS1: Climate and carbon assessment.

11.4.6 Summary and key issues

A summary of key sensitive receptors, as identified from the baseline characterisation study, is presented in Table 11-8 below. These form the focus of the impact assessment.

Woodland areas are comparatively rare within the proposed onshore Project area and are therefore considered to be a key element in the onshore Project area. The woodland areas have the potential to support a range of species – particularly an assemblage of breeding passerine birds. These woodland areas are currently relatively small and are generally young to semi-mature, with the most mature pockets located in Forss and along the River Thurso; to the east of Halkirk. Fountains Forestry, the company commissioned to undertake a Forestry and Woodland Survey, estimate the age range of these trees to be between three and 140 years old (Mitchell, P. & Dinwoodie, C., 2023). For further details see SS10: Forestry and Woodland Survey and Report.

The agricultural landscape also supports large numbers of wintering geese and swans associated with Caithness.

Table 11-8 Summary and key issues for terrestrial ornithology

SUMMARY AND KEY ISSUES	ONSHORE PROJECT AREA
	The key sensitive receptors and key issues are: • Breeding seabird assemblage (associated with North Caithness Cliffs SPA) – Whilst no breeding seabird assemblages were identified during the 2022 survey visits, birds are highly mobile animals. Therefore, as seabirds may breed within the Project area in subsequent years, potential impacts on nest sites, as well as disturbance to foraging birds, must be considered; • Wintering Greenland white-fronted geese, greylag geese, and whooper swans (associated with Caithness Lochs SPA / Ramsar and Loch Calder SSSI) – impacts on foraging habitat, disturbance during foraging; • Raptors and owls associated with SPAs (hen harrier, merlin, peregrine, short-eared owl) – impacts on nest sites, disturbance to foraging; • Breeding wigeon (associated with Caithness and Sutherland Peatlands SPA / Ramsar) - impacts on nest sites, disturbance to foraging; • Breeding teal (associated with Broubster Leans SSSI) – impacts on nest sites, disturbance during foraging; • Passage golden plover and greenshank (associated with Caithness and Sutherland Peatlands SPA / Ramsar) – disturbance to foraging; • Breeding greylag goose – impacts on nest sites, disturbance during foraging; • Barn owl – impacts on nest sites, disturbance to foraging; • Osprey – impacts on nest sites, disturbance to foraging; • Breeding farmland wader assemblage – impacts on nest sites, disturbance to foraging; • Cuckoo – indirect impact through reduced availability of host species (meadow pipit); • Breeding sparrowhawk and kestrel – impacts on nest sites, disturbance to foraging; • Breeding common gull – impacts on nest sites, disturbance during foraging; • Breeding mallard – impacts on nest sites, disturbance during foraging; • Skylark – impacts on nest sites, disturbance to foraging; and • Breeding passerine assemblage – impacts on nest sites, disturbance during foraging.

11.4.7 Data limitations and uncertainties

Three of the data providers identified during the data search did not provide any data (WWT, SOC and Caithness Biodiversity Group). However, records received from other data providers included many of the same taxonomic groups covered by the above organisations and so this is not considered to be a significant limitation.

Many of the data providers which did provide a response either held very few or no relevant records for the relevant onshore study area and timeframe in question – notably Highland Raptor Study Group. It is likely that the onshore study area is under-recorded and, therefore, the records received are not an accurate representation of the presence or absence of species of conservation concern within the onshore study area. Absence of data should not be

considered to indicate that particular species are absent from the search area or wider landscape. As detailed, Project specific surveys have been undertaken which provide a robust baseline, the lack of response from data providers is therefore not considered to be a significant limitation.

Surveys were carried out in safely accessible areas, where relevant permissions from landowners had been secured. Whilst access was granted to the majority of the onshore Project area, surveys were restricted in certain areas; namely small pockets of land between Forss and Westfield, towards the northern extent of the onshore Project area. There were also a number of fields and farm buildings within the onshore study area that could not be safely accessed due to the presence of cattle. Wherever possible, inaccessible areas were subject to visual assessment from adjoining fields and various vantage points using high-powered binoculars or telescopes. From these remote surveys, it was evident that the majority of the habitat types within the inaccessible areas comprised of improved grassland areas and pockets of coniferous plantation woodland, and therefore not of ornithological importance.

Due to the scale of the onshore Project area, general breeding bird and winter bird surveys were targeted, excluding habitats of low suitability (improved grassland and commercial forestry) (see Table 11-6). In addition, the standard approach to breeding bird surveys involves four visits between April and July 2022. Due to refinement of the onshore Project area midway during breeding bird surveys, some small areas were not visited in April, May, or June 2022. In order to compensate for this, an additional visit was made to all targeted areas in August 2022 – waders are likely to have family groups at this time, indicative of breeding. Data from similar habitats has also been considered to ensure communities likely to be present in these areas are assessed. In addition, pre-construction surveys will be undertaken, and a Species and Habitat Protection Plan (SHPP) implemented for birds (see embedded mitigation in section 11.5.4). In this context, these are not considered to be significant limitations. This approach was agreed with NatureScot by e-mail (25th July 2022).

11.5 Impact assessment methodology

11.5.1 Impacts requiring assessment

The impacts identified as requiring consideration for terrestrial ornithology are listed in Table 11-9. Information on the nature of impact (i.e., direct or indirect) is also described. It should be noted that impacts are not necessarily relevant to all Project stages.

The onshore Project works will involve construction of the cable landfalls (by HDD), onshore export cables, onshore substation, temporary construction compounds, permanent access track and temporary access tracks, all of which would result in direct and potentially indirect habitat loss. The effects of disturbance to habitats are variable in their extent and depend on the nature of the disturbance and the sensitivity of the receptor affected. Some disturbance types, for example the creation of temporary hardstanding areas, result in medium to long-term disturbance with extended recovery periods. In other cases, for example the installation of the onshore export cables, disturbance is short-term and habitats may be able to recover quickly. Construction works may also cause injury (which may lead to mortality) in bird species through damage caused by vehicles or plant. Further disturbance can occur due to increases in noise and light levels, and perceived predation risk associated with the presence of site personnel and vehicles.

During operation and maintenance, the scale and level of impact is likely to be reduced. Nevertheless, human activities related to the maintenance of onshore infrastructure have the potential to cause temporary and localised disturbance effects on avian features. Due to the unpredictable nature of the requirement for maintenance works, it is difficult to determine the precise effects on habitats and species. However, it is expected that maintenance activities would be infrequent and small scale, resulting in disturbance effects of a lower magnitude than those during construction. Indirect effects on habitats and protected species may also be anticipated during maintenance works. For example, the pollution of watercourses as a result of accidental release. Nevertheless, the potential for indirect effects to occur during operation is anticipated to be far lower than that during construction.

Decommissioning works are likely to be of a similar nature and duration as construction activities, and the potential effects are likely to be similar; with the exception that the habitats present will be fully restored. A Decommissioning, Restoration and Aftercare Plan will be written for the approval of the THC prior to the decommissioning stage. This Plan will include measures to protect ecology features.

Table 11-9 Impacts requiring assessment for terrestrial ornithology.

POTENTIAL IMPACT	NATURE OF IMPACT
Construction and decommissioning*	
Loss of habitat used by birds for nesting, foraging, and roosting due to land-take	Direct
Mortality, disturbance and damage / injury of important terrestrial ornithology receptors	Direct / Indirect
Effects on habitats used by birds (e.g., due to pollution or sedimentation)	Indirect
Operation and maintenance	
Mortality, disturbance and damage / injury of important terrestrial ornithology receptors	Direct / Indirect
Effects on habitats used by birds (e.g., due to pollution or sedimentation)	Indirect

**** In the absence of detailed information regarding decommissioning works, and unless otherwise stated, the impacts during the decommissioning of the onshore Project considered analogous with, or likely less than, those of the construction stage as detailed in section 11.6.***

11.5.2 Impacts scoped out of the assessment

The impacts scoped out of the assessment during EIA scoping, and the justification for this, are listed in Table 11-10.

Table 11-10 Impacts scoped out for terrestrial ornithology

IMPACT SCOPED OUT	JUSTIFICATION
Construction, operation and maintenance and decommissioning	
Collision of birds with cables	Cables will be underground, with no overhead lines – therefore there is no risk of bird collisions.
Direct effects on North Caithness Cliffs SPA	No nesting seabird colonies or raptors (including peregrine for which the North Caithness Cliffs SPA is designated) were identified within the onshore study area, and so there is no direct pathway for effect on the qualifying features of North Caithness Cliffs SPA as a result of the onshore aspects of this Project.
Direct or indirect effects on Red Point Coast SSSI	No evidence of guillemot was found within the onshore study area, and so no impacts are predicted on this species, which is the qualifying feature of the SSSI.
Direct and indirect effects on nesting seabird colonies	No nesting seabird colonies were identified within the onshore study area, and so no impacts are predicted.
Direct and indirect effects on corncrake	No evidence of corncrake was found within the onshore study area, and so no impacts are predicted.
Direct and indirect effects on divers	No evidence of divers of any species was found within the onshore study area, and so no impacts are predicted.
Direct or indirect effects on osprey	Although recorded in the wider landscape, with osprey nests observed outwith the onshore study area, no evidence of osprey was found within the onshore study area, and so no impacts are predicted.
Direct or indirect effects on breeding mallard	Although three mallard territories were identified, these were all outwith the onshore Project area, and the closest was over 450 m from the boundary. This is considerably beyond the 100 m recommended buffer to avoid disturbance for this species (Goodship & Furness, 2022).
Species of negligible importance	These are generally common and widespread ornithological features.

11.5.3 Assessment methodology

The approach adopted for the assessment of ecological impacts on terrestrial ornithology is in line with published guidance for EcIA produced by CIEEM (CIEEM, 2018). These guidelines set out the process for assessment through the following stages:

- Determination of the importance of ecological features through desk study and surveys;
- Identification and characterisation of potential effects to determine level of impact;
- Assessment of likely significant impacts;
- Identification of requirement for measures to avoid and mitigate (reduce) these impacts; and assessment of the significance of any residual impacts after mitigation;
- Identification of any monitoring requirements; and
- Assessment of the significance of any residual impacts after mitigation.

The worst case scenario estimates the level of effect in the event that the onshore construction works take place within the most sensitive areas.

11.5.3.1 Determining importance

According to the CIEEM guidance (2018), determining which ecological features are important and should be subject to detailed assessment is one of the key challenges in the EcIA process. Ecological features can be important for a variety of reasons, and may relate, for example to:

- Quality or extent of designated sites or habitats;
- Habitat / species rarity;
- The extent to which they are threatened throughout their range; or
- Their rate of decline.

The level of importance of ecological features identified for the onshore Project area has been determined using the criteria defined in Table 11-11 defined as 'sensitivity' with equivalent levels to those described in chapter 7: EIA methodology, so as to remain consistent with the broader assessment methods used in this EIA. In line with CIEEM guidance, these criteria have been determined with regard to statutory requirements and policy objectives for biodiversity. Note that in this assessment 'receptor' is used to refer to 'Important Ecological Features' as defined in CIEEM guidance (CIEEM, 2018), so as to ensure consistency with the broader EIA assessment methodology as defined in chapter 7: EIA methodology.

In addition, where relevant and where available, use is made of contextual information about distribution of habitats and species, and species abundance, including trends based on historical records.

As available quantitative data on a particular habitat or species may be limited, particularly below the international and national level, the evaluation of importance may also involve an element of professional judgement.

Evaluations are based upon a combination of information gathered via the desk study and field survey results, along with professional experience and judgement. Social and economic factors are also considered when assessing ecological features if appropriate.

In addition to the importance of a habitat or species *per se*, the assessment presented here also considers the value of the onshore Project area and surroundings for each ecological feature in terms of the extent of habitat present, the number of individuals present or the nature and level of use. For example, if one or more pairs of birds included on Schedule 1 of the WCA 1981 (as amended) was found to be breeding within the onshore Project area, the species would likely be assigned a medium or higher importance level (depending on population status and trends). However,

if a single Schedule 1 bird flew across the onshore Project area on one or two occasions only, and little or no suitable breeding habitat was present, it would likely be assessed as being of low importance.

Table 11-11 Sensitivity criteria

SENSITIVITY OF RECEPTOR	DEFINITION
High	Birds that are part of an internationally important population. For example: • A species listed as a qualifying feature of a site of international importance designated for its avian interest, i.e., SPAs and Ramsar sites; and/or • A species present in internationally important numbers. Birds that are part of a nationally important population. For example: • A species listed as a qualifying feature of a site of national importance designated for its avian interest, i.e., SSSIs and National Nature Reserves (NNRs); • A nationally important population / assemblage of Schedule 1 or Annex I species; and/or • A species present in nationally important numbers.
Medium	Birds that are part of a regionally important population. For example: • A regionally important (e.g., within a Natural Heritage Zone (NHZ) population / assemblage of Schedule 1 or Annex I species; • A regionally important population of a species included on the SBL; and/or • A regionally important population / assemblage of species included on the UK BoCC Red or Amber list.
Low	Birds that are part of a locally important population. For example: • A species listed as an important feature of a Site of Importance for Nature Conservation (SINC) or equivalent site selected on local authority criteria; • A species listed as an important feature of a Local Nature Reserve (LNR); • A locally important population of a species included on the SBL; • A locally important population / assemblage of species included on the UK BoCC Red or Amber list; • All populations / assemblages of Schedule 1 species that have not been captured in higher categories above; • Assemblages of other species that are of importance in the context of the local authority area (e.g., LBAP priority species); and/or • Other species that are, in the opinion of the assessor, of note and for which mitigation measures could be recommended as a good practice measure.
Negligible	Common and widespread habitat, or species of little or no intrinsic nature conservation value. For example: • All species that are widespread and common and which are not present in locally, regionally, nationally or internationally important numbers (e.g., common and widespread passerines).

11.5.3.2 Identification and characterisation of potential effects

In line with CIEEM guidance (2018), reference is made to the following characteristics when describing potential ornithological effects:

- Nature of impact: *whether an impact is positive / beneficial to habitats (e.g. by improving habitat structure) or to species (e.g. by increasing species diversity or extending habitat) or negative / detrimental to habitats (e.g. by direct habitat destruction) or to species (e.g. by loss of or displacement from suitable habitat);*
- Extent: *the spatial or geographical area over which the effect may occur;*
- Magnitude: *the size, amount, intensity and volume. This should be quantified if possible and expressed in absolute or relative terms (e.g. the amount of protected habitat lost or percentage decline in a species population);*
- Duration: *the length of time the activity occurs over. This should be defined in relation to ornithological characteristics (e.g. a species lifecycle) as well as human timeframes. It should also be noted that the duration of an activity may differ from the duration of the resulting effect (e.g. if short-term construction activities cause disturbance to red-throated divers during their breeding period, there will be long-term implications from failure to reproduce that season);*
- Reversibility: *an irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation;*
- Frequency: *the number of times an activity occurs. This may influence the resulting effect; and*
- Timing: *the time of year during which the activity occurs. This may result in an effect on an ornithological feature if it coincides with critical life-stages or seasons (e.g. bird breeding season).*

The timescales of potential effects on ornithological features are considered. Incorporated into this evaluation is the reversibility of the effect, which is based on the duration of the impact, or the time required for the feature to return to baseline pre-construction conditions (Regini, 2000). Knowledge of how rapidly the population or performance of a species is likely to recover following loss or disturbance (e.g. by individuals being recruited from other populations elsewhere) is used to assess reversibility, where such information is available.

The following definitions have been applied with regard to timescales:

- Immediate: within approximately 12 months;
- Short-term: within approximately one to five years;
- Medium-term: within approximately six to 15 years; and
- Long-term: more than 15 years.

11.5.3.3 Geographic context

Impacts on terrestrial ornithology are assessed in local and, if necessary, regional context as appropriate. For the purposes of the assessment, a local population refers to the population within Caithness. If a potentially significant impact on a local population or habitat extent is identified, the assessment is extended to consider potential impacts on the wider regional population or habitat extent. However, if no significant effect on the local population or habitat extent is identified, consideration of the wider geographical area is not considered necessary since this will result in potential effects that are of the same or lower level for those wider populations or habitat extents.

SNH (now NatureScot) has defined NHZs within Scotland (SNH, 2002), which they consider to be appropriate biogeographical spatial units against which regional effects of proposed developments can be assessed. NHZ classifications represent areas with a high level of biogeographic coherence and are unrelated to administrative boundaries. The onshore Project area lies within NHZ 2: Orkney and North Caithness. Where an assessment of a

regional ornithological feature is necessary, effects are assessed within this NHZ as far as possible. At this stage, however, there are limited data on habitats and populations of species available at the NHZ level.

11.5.3.4 Determining magnitude of effects

For the purposes of this assessment, the potential effects are assigned to different magnitude levels to assist the assessment process, so as to remain consistent with the broader EIA assessment methodology described in chapter 7: EIA methodology. The magnitude level of an effect is defined using the criteria in Table 11-12. Note that these effects relate to negative effects; where positive effects are predicted, these are not assigned different levels.

Table 11-12 Magnitude criteria

MAGNITUDE CRITERIA	DEFINITION
High	Total or almost complete loss of an ornithological feature (habitat or population), likely to result in a permanent effect on its long-term ornithological integrity and affect its conservation status. Large-scale, permanent changes to an ornithological feature, and likely to change its ornithological integrity and affect its conservation status.
Medium	Moderate-scale, long-term changes to an ornithological feature, or larger-scale temporary changes, but its long-term ornithological integrity is unlikely to be affected and any changes in conservation status are reversible.
Low	Small-scale, temporary effects on an ornithological feature that do not affect ornithological integrity or conservation status.
Negligible	Little or no detectable effect on an ornithological feature.

11.5.3.5 Significance of impact

For terrestrial ornithology, potential effects are identified, and significance of impact is assessed for each stage of the Project lifecycle. Significance is attributed relative to the background conditions.

The CIEEM guidance on EcIA (CIEEM, 2018) avoids and discourages use of the matrix approach to determining significance and describes only two categories: "significant" or "not-significant".

According to the CIEEM guidance, for the purpose of EcIA, a "significant effect" is an effect that either supports or undermines biodiversity conservation objectives for important ecological features and biodiversity in general. Effects can be considered significant at a wide range of scales from international to local.

The guidance further states that "in broad terms, significant effects encompass impacts on structure and function of defined sites, habitats, or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)".

In line with this guidance, rather than using a matrix to determine significance, the approach used in this chapter is to consider the sensitivity of the habitats and populations and the characteristics and severity of the effect. Professional judgement is applied as to whether the ecological integrity of a habitat or population will be affected.

The term "ecological integrity" refers to the maintenance of the conservation status of a habitat or population of a species at a specific location or geographical scale. This is used here in accordance with the definition adopted by the ODPM Circular 06/2005 on Biodiversity and Geological Conservation (Ministry of Housing, Communities and Local Government, 2005), whereby designated site integrity refers to "the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".

Effects are more likely to be significant where they affect a habitat or species of higher levels of importance, threaten the integrity of a habitat or population, or where the severity of the effect is high. Effects not considered to be significant would be those that do not threaten the integrity of an ecological feature or where the habitat or population affected is considered to be of low importance.

In this assessment, an effect that threatens the integrity of a habitat or species population is considered to be significant. Effects that do not threaten the integrity of a habitat or population are considered to be not significant.

Where appropriate, mitigation measures are identified to avoid and reduce potentially significant effects. It is also good practice to propose mitigation measures to reduce negative effects that are not significant, and the embedded mitigations adopted for the onshore Project (Table 11-14) reflect such good practice.

The significance of residual effects on populations following implementation of mitigation is then determined along with any monitoring requirements.

11.5.4 Embedded mitigation

As described in chapter 7: EIA methodology, certain measures have been adopted as part of the Project development process in order to reduce the potential for impacts to the environment, as presented in Table 11-14. These embedded mitigations have been accounted for in the assessment presented below. The requirement for additional mitigation measures (secondary mitigation) is dependent on the significance of the effects on terrestrial ornithology receptors.

In line with CIEEM guidance (2018), the principal mitigation measure adopted to minimise the impact of the onshore Project on terrestrial ornithology features has been the use of an iterative design process, which has involved consideration of key ecological issues and constraints throughout the design process. As a result, most of the mitigation measures are embedded within the overall design, allowing the opportunity to site onshore infrastructure away from sensitive ecological features such as Ushat Head SSSI and breeding sites for sensitive species (e.g., seabird colonies) possible.

Table 11-13 Species specific mitigation buffers to avoid disturbance – see T05 in Table 11-14

RECEPTOR	BUFFER DISTANCE	REFERENCE	NOTES
Wintering barnacle geese	50 m	Goodship & Furness (2022)	Use of the minimum disturbance distances is considered appropriate as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.
Breeding common gull	60 m	Goodship & Furness (2019)	Recommended to avoid distance.
Breeding mallard	100 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.
Breeding barn owl	100 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.
Breeding wigeon	200 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.
Breeding teal	200 m	No published disturbance distance available.	See section 11.6.4.6.1 for justification.
Breeding golden plover	500 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.
Breeding white-tailed eagle	1,000 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.
Breeding Greenshank	500 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.

RECEPTOR	BUFFER DISTANCE	REFERENCE	NOTES
Wintering Greenland white-fronted goose	500 m	Goodship & Furness (2022)	Use of the minimum disturbance distances is considered appropriate as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.
Wintering greylag	500 m	Goodship & Furness (2022)	Same buffer used for Greenland white-fronted geese for efficient approach to mitigation, exceeding minimum disturbance distance, but is less than maximum disturbance distance. It is considered appropriate to use a disturbance distance less than the maximum, as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.
Wintering whooper swan	500 m	Goodship & Furness (2022)	Same buffer used for Greenland white-fronted geese for efficient approach to mitigation, exceeding minimum disturbance distance, but is less than maximum disturbance distance. It is considered appropriate to use a disturbance distance less than the maximum, as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.
Breeding greylag goose	600 m	Goodship & Furness (2022)	Maximum disturbance distance is considered appropriate due to sensitivity of birds while breeding, and the potential consequences of breeding failure.

In accordance with the onshore PPP application, the embedded mitigations listed below have been attributed to particular Development Zones within the onshore Project area, these are detailed in Table 11-14 and presented in Figure 11-23.

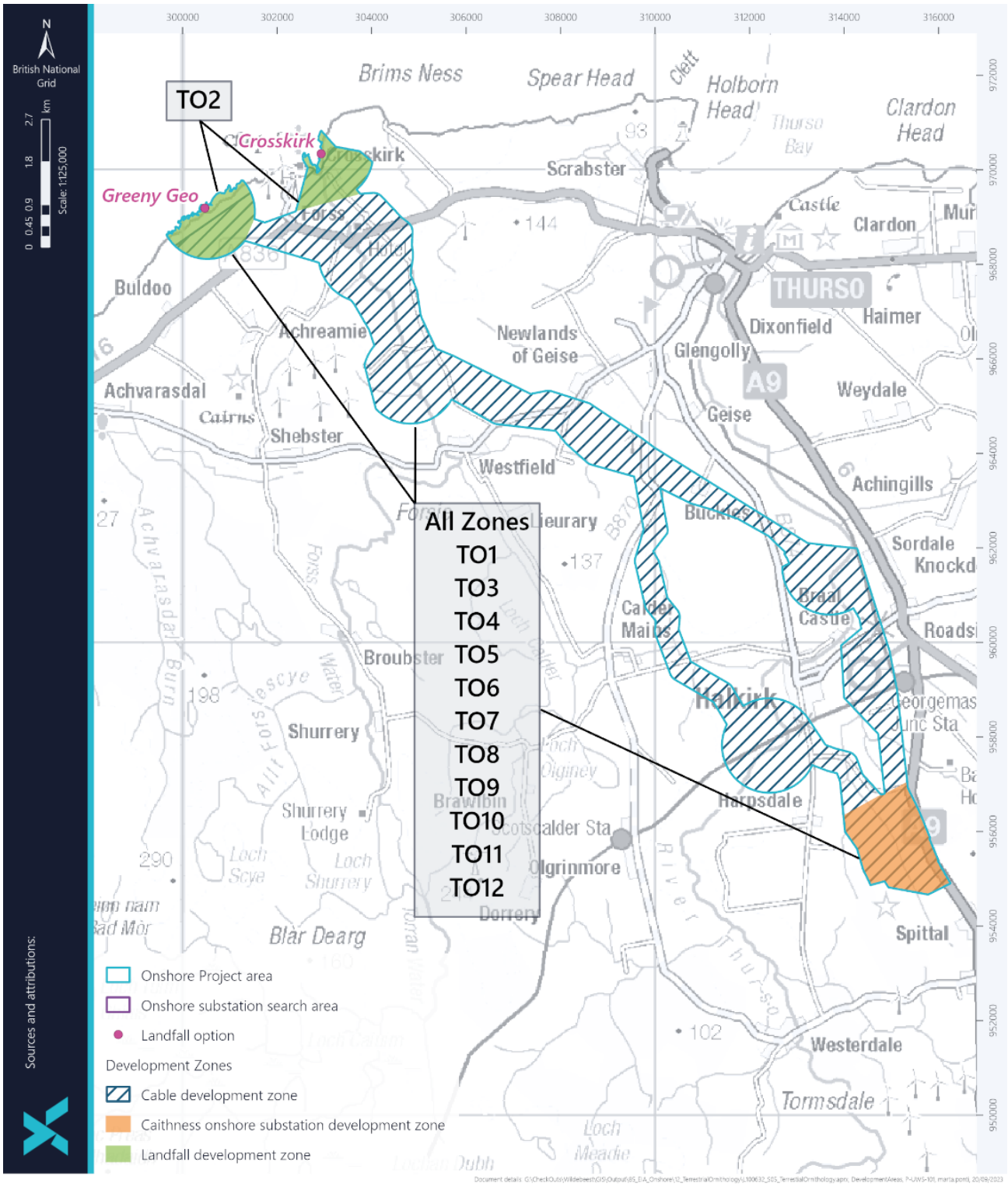

Figure 11-23 Development Zones and mitigations for the onshore PPP application

Table 11-14 Embedded mitigation measures relevant to terrestrial ornithology

ID	MITIGATION MEASURE	TYPE*	DESCRIPTION	HOW MITIGATION WILL BE SECURED	DEVELOPMENT ZONE APPLICABLE
TO1	Onshore Project area and avoidance of sensitive areas	Primary	The boundary of the onshore Project has been developed to avoid sensitive areas (peatland, woodland, designated areas) wherever possible. Where impacts cannot be avoided, these will be minimised. Further details on habitats can be found in chapter 10: Terrestrial non-avian ecology.	Established within the design principles.	All zones
TO2	Minimising impact on sea cliffs and cliff coastal habitats	Primary	Minimising impact on sea cliffs and coastal habitats associated with designated sites or communities of conservation importance by the use of HDD. No de-vegetation or ground-breaking works are to occur within 50 m of the cliff edge. This will ensure that sensitive coastal habitats which may be used by wintering seabirds are not adversely affected by the construction, operation or decommissioning works for the onshore Project. Further details on habitats can be found in chapter 10: Terrestrial non-avian ecology.	Established within the design principles (secured through CMSs). These measures will also be established within the SHPP. The SHPP will be secured through a condition attached to the PPP.	Landfall zone
TO3	Return location to pre-construction state (all locations)	Primary	Once an area is no longer required for construction, it will be re-instated to ensure it can return to its original use for the remainder of the construction period and operational period. Where habitat is to be reinstated, turfs will be removed to a suitable storage point where they will be maintained during works. Topsoil and subsoil, where applicable, will also be stored separately, and excavations backfilled with these materials to maintain the original stratification as well as is practical. Turfs will then be replaced as close to their original location as possible. Due to the temporary and short-term nature of most construction activities, this method will allow the reinstatement of habitat immediately after works are completed in a given area. Further details on habitats can be found in chapter 10: Terrestrial non-avian ecology.	Established through design principles (secured through CMSs). These measures will also be established within the Habitat Management Plan (HMP) and within the SHPP. These plans will be secured through conditions attached to the PPP. Landowner agreements.	All zones

ID	MITIGATION MEASURE	TYPE*	DESCRIPTION	HOW MITIGATION WILL BE SECURED	DEVELOPMENT ZONE APPLICABLE
TO4	Return location to pre-construction state (high sensitivity habitats).	Primary	For high sensitivity habitats (e.g., Annex I habitats and SBL habitats), particular care should be taken when removing, storing and reinstating the turfs. In addition to ensuring that the turfs are replaced as close to their original location as possible, and as quickly as possible following works in a given area, the turf should be reinstated in their original orientations. Additionally, targeted specific National Vegetation Classification (NVC) surveys as agreed with NatureScot post-consent will be carried out within a 250 m buffer ahead of construction works to allow for the micrositing of the route to avoid particularly sensitive habitats in the Project area. Further details on habitats can be found in chapter 10: Terrestrial non-avian ecology.	Established through design principles and as outlined within Outline Management Plan (OMP) 1: Outline Construction Environmental Management Plan (CEMP), these measures will also be established within the SRMP appended to the CEMP. The CEMP will be secured through a condition attached to the PPP. Additionally, these measures will also be established within the SHPP and the Decommissioning, Restoration and Aftercare Plan. These plans will also be secured through conditions attached to the PPP.	All zones
TO5	Geese and swan protection measures	Primary	To avoid impacts on foraging geese and swans, wherever possible, construction and maintenance activities will not take place within 500 m of feeding locations identified by Project specific surveys and potentially important feeding areas based on NatureScot dataset (Jonathan Swale, pers. comm. (2023)) between September and mid-May. This meets the minimum disturbance distance for Greenland white-fronted geese, and more than the minimum of 200 m for greylag geese and whooper swans (Goodship & Furness, 2022). Where this is not possible, monitoring will be undertaken by a suitably experienced and qualified Ecological Clerk of Works (ECoW) searching for Greenland white-fronted geese, greylag geese, or whooper swans within 500 m of active construction activities. If these species are found, they will be observed for signs of disturbance. If birds are observed to be disturbed (i.e. multiple short flights within a small area, or small groups of birds leaving the main skein), all works will stop within 500 m, and will	Established within the design principles. These measures will also be established within the SHPP. The SHPP will be secured through a condition attached to the PPP.	All zones

ID	MITIGATION MEASURE	TYPE*	DESCRIPTION	HOW MITIGATION WILL BE SECURED	DEVELOPMENT ZONE APPLICABLE
			not recommence until the ECoW has confirmed it is safe to do so after these species are no longer within the buffer area. In addition, foraging habitat within important feeding areas will be prioritised for reinstatement so as to ensure any disruption to Greenland white-fronted geese, greylag geese, and whooper swans is as temporary as possible. No construction activities will take place within 500 m of a Greenland white-fronted goose, greylag goose, or whooper swan roost within one hour before and after sunrise, and one hour before and after sunset. This is to avoid impacts on roosting birds. Any foraging Barnacle geese identified will be afforded a 50 m buffer to avoid disturbance.		
TO6	Minimisation of watercourse crossings	Primary	Minimisation of watercourse crossing where possible (i.e., reduce the number of crossings and the impact of each crossing through the implementation of appropriate techniques such as HDD).	Established within the design principles. These measures will also be established within the SHPP. The SHPP will be secured through a condition attached to the PPP.	All zones
TO7	ECoW(s)	Primary	Ensure appropriately qualified ECoW presence at sensitive locations and/or sensitive periods. The SHPP will include details of a watching brief which will ensure that the correct procedure is followed if a nesting bird is found during devegetation or groundbreaking works. When the ECoW is not present on site, works must stop and advice should be sought from the ECoW to determine an appropriate approach. This will include implementing a buffer appropriate to the species and ensuring that works do not recommence until the ECoW has confirmed that the young have fledged and left the nest and/or the nest has been abandoned naturally. Where appropriate, this approach should be discussed and agreed with NatureScot prior to works recommencing.	The requirement for an ECoWs will be secured through a condition attached to the PPP. The SHPP will also include the requirements for ECoW(s). The SHPP will be secured through a condition attached to the PPP.	All zones

ID	MITIGATION MEASURE	TYPE*	DESCRIPTION	HOW MITIGATION WILL BE SECURED	DEVELOPMENT ZONE APPLICABLE
TO8	CEMP	Tertiary	The CEMP will outline how the onshore Project will ensure suitable implementation and control of the mitigation measures. An outline CEMP (OMP1: Outline CEMP) is provided alongside the application for PPP. The CEMP will be finalised prior to construction once the final design of the onshore Project is established.	As per OMP1: Outline CEMP, the final CEMP will be provided at post-consent. The CEMP will be secured through a condition attached to the PPP.	All zones
TO9	Control of diffuse pollution and point source pollution	Tertiary	Pollution prevention and control measures will be implemented in accordance with the latest legislation and guidance from the Scottish Environment Protection Agency (SEPA). This includes utilisation of best practice sediment management techniques and employment of best practice pollution prevention techniques. The final CEMP will include a Pollution Prevention and Control Plan in accordance with SEPA's Pollution Prevention Guidelines (SEPA, 2018). A Dust and Air Quality Management Plan (DAQMP) will also be produced within the final CEMP. Pollution prevention and control measures for HDD activities will be included in HDD CMSs with an associated 'Break-out' Contingency Plan' to mitigate impacts.	As per OMP1: Outline CEMP, these measures will be established within the Pollution Prevention and Control Plan, DAQMP and HDD CMSs which will be appended to the final CEMP. The CEMP will be secured through a condition attached to the PPP.	All zones
TO10	Creation and implementation of a SHPP	Tertiary	Create and implement a SHPP. The SHPP will include the following measures. Pre-construction surveys for bird species will be undertaken to identify any species making use of the onshore Project area ahead of works. Surveys will include breeding birds and breeding raptors and owls. Pre-construction checks for nesting birds will be undertaken within 24 hours prior to devegetation or ground-breaking works – if nesting birds are found an exclusion zone will be implemented with a buffer appropriate to the species and works will not be able to recommence within the exclusion zone until the ECoW has confirmed that breeding has ended. In addition, monitoring will be undertaken by suitably experienced and qualified ECoW(s) searching for Greenland white-fronted geese or whooper swans within 500 m of active construction activities – this is described in greater detail under TO5.	The SHPP will establish these mitigations. The SHPP will be secured through a condition attached to the PPP.	All zones

ID	MITIGATION MEASURE	TYPE*	DESCRIPTION	HOW MITIGATION WILL BE SECURED	DEVELOPMENT ZONE APPLICABLE
			Recommended buffers to avoid disturbance to breeding birds which have been identified in this assessment are provided in Table 11-13. If species not included in Table 11-13 are identified as breeding, best practice guidance should be followed in establishing an appropriate buffer to avoid disturbance.		
TO11	Engagement with neighbouring developments	Tertiary	Engagement with neighbouring developments to allow the monitoring / understanding of the likely cumulative environmental impacts of the works and to take steps to mitigate the impact of these. This includes collaboration on any Biodiversity Net Gain projects.	External communication with the community, landowners and asset owners will be undertaken by the Community Liaison Officer (CLO). The requirement for a CLO will be secured through a condition attached to the PPP. An outline BEP has been provided alongside the application for PPP. The final BEP will be secured through a condition attached to the PPP.	All zones
TO12	Decommissioning, Restoration and Aftercare Plan	Primary	A Decommissioning, Restoration and Aftercare Plan will be prepared for the onshore Project and agreed with THC prior to decommissioning works being undertaken. The plan will include any measures required to protect ecological features during decommissioning which are likely to be similar to those proposed within the CEMP.	Established within the design principles and the Decommissioning, Restoration and Aftercare Plan which will be secured through a condition attached to the PPP.	All zones

** After IEMA (2015).*

11.5.5 Worst case scenario

As detailed in chapter 7: EIA methodology, this assessment considers the worst case scenario for the onshore Project parameters which are predicted to result in the greatest environmental impact, known as the 'worst case scenario'. The worst case scenario represents, for any given receptor and potential impact, the design option (or combination of options) that would result in the greatest potential for change.

Two potential cable corridor routes have been considered and the onshore substation search area is larger than the proposed final footprint. As the cable routes and infrastructure could be sited anywhere within the illustrated Project area, and temporary storage areas during construction are still to be confirmed, it is not possible to undertake a quantitative assessment of the likely impact of the onshore Project upon individual terrestrial ornithology receptors.

Given that the worst case scenario is based on the design option (or combination of options) that represents the greatest potential for change, the development of any alternative options within the design parameters will give rise to no worse effects than those assessed in this impact assessment. Table 11-15 presents the worst case scenario for potential impacts on terrestrial ornithology during construction, operation and maintenance and decommissioning.

Table 11-15 Worst case scenario specific to terrestrial ornithology receptor impact assessment

POTENTIAL IMPACT	WORST CASE SCENARIO	JUSTIFICATION
Construction and decommissioning		
Loss of habitat used by birds for nesting, foraging and roosting due to land-take **Mortality, disturbance and damage / injury of important terrestrial ornithology receptors**	Construction activity will last up to a total of four years. Landfall • Preparation of the working area at the landfall site to accommodate a maximum of six boreholes (five plus one contingency), HDD drilling equipment, utilities and welfare facilities with an estimated area of 7,500 m^2; • Storage of excavated materials from the boreholes estimated to be 1,630 m^3 per HDD bore prior to disposal off-site; and • HDD construction works for the Landfall will take up to six months. Onshore export cable corridor • Construction and reinstatement of temporary laydown areas (estimated to be every 2 km along the route) and access roads for trench / HDD works; • Ditches and small watercourses that are crossed by the onshore Project haul roads will have appropriately sized pipework installed to maintain water conveyance capacity. Such pipework will be removed when the haul roads are removed; • Excavation of trenches and storage of excavated materials estimated to be 162,525 m^3 per trench (five trenches) for the working corridor estimated to be 33 km long and 100 m wide; and • Although not fully defined, it is conservatively assumed that the installation of the onshore export cables will progress in sections across multiple work fronts. The process will follow trenching, installation of ducts and reinstatement and will be conducted in sections (i.e. from one Cable Joint Bay (CJB) to the next) and repeated. HDD construction works for the onshore export cable will take up to six months.	Direct habitat loss during the preparation of working areas, excavation activities and the storage of materials are considered to result in the greatest impact upon ornithological interests within the onshore Project area. The impact upon these ornithological receptors as a result of these works are detailed in section 11.5. Construction activities could result in disturbance or mortality to birds. Construction noise and lighting may disturb foraging or nesting birds, resulting in displacement.

POTENTIAL IMPACT	WORST CASE SCENARIO	JUSTIFICATION
	Onshore substation • Maximum substation footprint of 23.9 hectares (ha) with maximum excavated material 1,207,000 m^3; and • Preparation of temporary work compound for substation – 62,500 m^2 (including compound and welfare facilities). Access tracks • Approximately 5 km in length of permanent access tracks. 24% (1.2 km) are existing tracks, 44% (2.21 km) are existing tracks that require improvements and 33% (1.67 km) will be newly installed tracks; • Temporary access tracks (not including haul roads) up to 3,300 m in length at the landfall, the entry and exit points of the HDD points and the onshore substation. Lengths are indicative only; and • Where possible, local infrastructure including road networks, farmer tracks and utility access roads will be utilised to minimise the construction of new infrastructure. Temporary bridges/spanning structure will be considered for appropriate locations for haul roads. Construction Traffic • The most intensive traffic is expected to occur between Year 2 Q2 and Year 3 Q2, with the maximum predicted in Q3 of the Year 2 of construction with an average of 632 construction Heavy Good Vehicles (HGV) vehicle trips per day, or an average maximum of 53 two-way HGV vehicle movements each hour, based on a 12-hour working day.	
Effects on habitats used by birds (e.g. due to pollution or sedimentation)	Landfall • Preparation of the working area at the landfall site to accommodate a maximum of six (five plus one contingency) boreholes, HDD drilling equipment, utilities and welfare facilities with an estimated area of 7,500 m^2; • Storage of excavated materials from the boreholes estimated to be 1,630 m^3 per HDD bore prior to disposal off-site; • Materials used during drilling of bores, e.g. drilling muds and grout; and	These activities are considered to represent the worst case scenario with regard to potential indirect impact upon ornithological interests as a result of pollution events including the contamination of groundwater due to surface water runoff, sediment pollution, the effects of construction dust, noise and light pollution.

POTENTIAL IMPACT	WORST CASE SCENARIO	JUSTIFICATION
	• Fuel used in plant machinery. Onshore export cable corridor • Construction and reinstatement of temporary laydown areas (estimated to be every 2 km along the route) and access roads for trench / HDD works; • Excavation of trenches / HDD and storage of excavated materials estimated to be 162,525 m^3 per trench (five trenches) for the working corridor estimated to be 33 km long; and • Fuel used in plant machinery. Onshore substation • Potential for on-site batching of concrete; • Sustainable Drainage Systems (SuDS) will be required for surface water drainage. Transformer and shunt reactor areas are at higher risk of oil contamination. Runoff from the transformer bunds and shunt reactor bunds will discharge to the surface water drainage system through a bund water control unit; • Appropriate measures will also be employed to intercept run-off from the work site, for example using silt fences, check dams and settlement ponds to reduce the suspended sediment load of the water prior to any potential discharge into watercourses; • Installation of septic tank system and subsequent discharges; and • Fuel used in plant machinery. Further details of the drainage strategy mechanisms are provided in the Outline Drainage Strategy presented within SS3: Flood risk and drainage assessment.	

POTENTIAL IMPACT	WORST CASE SCENARIO	JUSTIFICATION
Operation and maintenance		
Mortality, disturbance and damage / injury of important terrestrial ornithology receptors	Onshore substation • Post construction, the temporary works will be removed and the ground re-instated. The only permanent structures will be the onshore substation (maximum of 12 buildings anticipated), associated hardstanding and permanent access tracks; and • Maximum footprint of onshore substation: approximately 23.9 ha with associated hard standing.	Maximum footprint of substation which is the only 'above ground' element of the onshore Project that will result in long term loss of habitats.
	The onshore substation will be unmanned. Therefore, there will be a limited amount of traffic (predominantly light-vehicle traffic) to and from the substation for general operation and maintenance purposes. • Bi-weekly visual inspection and replace fault items under warranty; and • Additional plant maintenance quarterly. Onshore cables; routine maintenance: • Bi-annual visual inspection of CJB / Transition Joint Bay (TJB) / earth link boxes. Non-routine maintenance activities: • As required following events causing deterioration or damage to areas surrounding cables; and • Reactive maintenance to faults / failure rates of key plant items. Traffic • Estimated traffic volume is around one vehicle per week.	Possible injury or mortality to terrestrial ornithology receptors through the movement of maintenance vehicles through the site and some temporary disturbance to foraging and nesting birds during routine maintenance works as a result of the operation of the substation. During more significant maintenance works (if required) there is some potential for habitat loss, disruption of groundwater flows and more significant pollution events. There is also the potential for a greater level of disturbance and injury or mortality to birds during ground-breaking works (if required) and deep excavations. Operational noise and lighting may disturb foraging or nesting birds, resulting in displacement.

POTENTIAL IMPACT	WORST CASE SCENARIO	JUSTIFICATION
Indirect effects on habitats used by birds (e.g., due to pollution or sedimentation)	• SuDS system will be required for surface water drainage. Transformer and shunt reactor areas are at higher risk of oil contamination. Runoff from the transformer bunds and shunt reactor bunds will discharge to the surface water drainage system through a bund water control unit. • Appropriate measures will also be employed to intercept run-off from the work site, for example using silt fences, check dams and settlement ponds to reduce the suspended sediment load of the water prior to any potential discharge into watercourses. • Installation of septic tank system and subsequent discharges. Further details of the drainage strategy mechanisms are provided in the Outline Drainage Strategy presented within SS 3: Flood Risk and Drainage Assessment. Operational noise • High Voltage Alternating Current (HVAC) – 100 decibel (dB); and • Main transformer – 85 dB from library (increased to 100 dB to include contingency), 97 dB emitted from STATCOM cooling system (increase to 100 dB for contingency). Lighting • External lighting from 2.2 lux – 150 lux will be used to illuminate the building and external area. 2.5 lux will be required around the perimeter fencing. There may also be a need for up to 150 lux at areas requiring higher level of illumination.	Possible indirect effects due to pollution during routine operation and maintenance. During more significant maintenance works (if required) there is some potential for disruption of groundwater flows and more significant pollution events.

11.6 Assessment of potential effects

11.6.1 Evaluation of sensitivity

A summary of the evaluation of the sensitivity of birds recorded within the relevant onshore study areas during the 2022 to 2023 baseline surveys is provided in Table 11-16. Locations of designated sites relevant to specific species are illustrated as relevant in Figure 11-2.

Table 11-16 Evaluation of the sensitivity of terrestrial bird species recorded within the relevant onshore study areas during the 2022-23 baseline surveys

SENSITIVITY	RECEPTOR	JUSTIFICATION
High	Designated sites of international importance: • North Caithness Cliffs SPA; • Caithness Lochs SPA / Ramsar; and • Caithness and Sutherland Peatlands SPA / Ramsar.	These SPAs are internationally designated sites, supporting populations and/or assemblages of birds which are considered to be internationally important.
	Designated sites of 'national importance: • Loch Calder SSSI; • Broubster Leans SSSI; and • Loch Scarmclate SSSI.	These SSSIs are nationally designated sites, supporting populations and/or assemblages of birds which are considered to be nationally important.
	Breeding seabird assemblage	Species included as qualifying features for North Caithness Cliffs SPA (fulmar, kittiwake, and puffin), and other seabirds associated with the breeding assemblage (Arctic tern, cormorant, black-headed gull, common gull, herring gull, lesser black-backed gull, and eider).
	Wintering Greenland white-fronted geese, greylag geese, and whooper swans	Wintering Greenland white-fronted geese, greylag geese, and whooper swans are included as qualifying features of Caithness Lochs SPA / Ramsar, as well as Loch Calder SSSI. Wintering greylag geese are also a qualifying feature of Loch Scarmclate SSSI. Although greylag goose and whooper swan are included on Schedule 1, this applies to native breeding populations only.
	Peregrine, hen harrier, merlin, and short-eared owl	Peregrine is a qualifying feature of North Caithness Cliffs SPA. Hen harrier, merlin, and short-eared owl are qualifying features of Caithness and Sutherland SPA. Hen harrier and short-eared owl are also included on the citation of Broubster Leans SSSI.

SENSITIVITY	RECEPTOR	JUSTIFICATION
	Breeding wigeon and teal	Breeding wigeon are a qualifying feature of Caithness and Sutherland Peatlands SPA / Ramsar. Wigeon and teal are both a qualifying features of Broubster Leans SSSI.
	Passage golden plover and greenshank	Breeding golden plover and greenshank are both qualifying features of Caithness and Sutherland Peatlands SPA / Ramsar. Although not recorded to breed within the onshore study area, both species were recorded on passage.
	Breeding greylag goose	Although considered non-native throughout most of Scotland, breeding greylag geese are indigenous to the onshore study area, and listed under Schedule 1 for Caithness and Sutherland, as well as for the Outer Hebrides and Wester Ross. Although populations appear to be increasing, there are relatively limited numbers and distribution, increasing their importance. Breeding greylag geese are also a notified feature of Caithness and Sutherland Peatlands Ramsar site.
	White-tailed eagle	White-tailed eagles are included on Schedules 1, 1A, and A1.
	Breeding barn owl	Barn owl are listed on Schedule 1. Although barn owl are widespread and appear to have stable populations throughout Scotland, this species is less common in Caithness and Sutherland, likely due to climate and limited nesting opportunities, which increases their importance.
	Winter seabird assemblage	Twenty species of seabirds (including ducks and gulls) were found to use the coast and sea at the north of the onshore study area. Notably, this included seven species listed on the SBL, three on the LBAP priority species list, four on the BoCC Red List, and 15 included on the Amber List. Although four species (black-throated diver, great northern diver, red-throated diver, and Slavonian grebe) are included on Schedule 1, this only applies to breeding populations. Nineteen of the 20 species are of conservation concern, listed on the SBL, or included on the BoCC Red or Amber Lists. In addition, severe outbreaks of bird flu (HPAI) A(H5N1)) in 2021 and 2022 has had a huge negative impact on wild bird populations in the UK – a particularly wide range of species and large number of individuals were affected during the 2022 breeding season and seabird colonies have been especially susceptible, suffering high mortality (Banyard *et al.*, 2022; Cunningham *et al.*, 2022; Pearce-Higgins *et al.*, 2023). This increases the sensitivity of the winter seabird assemblage.

SENSITIVITY	RECEPTOR	JUSTIFICATION
Medium	Breeding farmland wader assemblage	Farmland waders have suffered severe declines throughout the UK between 1988 and 2011. These declines have continued since. Curlew, lapwing, oystercatcher, redshank, ringed plover, snipe, and woodcock are included in this assemblage. Curlew, lapwing, oystercatcher, snipe, and woodcock are all included on the SBL. Curlew, lapwing, oystercatcher, redshank, and snipe are LBAP priority species. In addition, curlew, lapwing, ringed plover, and woodcock are included on the BoCC Red List, while oystercatcher, redshank and snipe are on the BoCC Amber List.
	Cuckoo	Although cuckoo have suffered severe declines in the UK, this has been lesser in Scotland, and populations appear to have increased in Caithness (Davey *et al.*, 2016). Cuckoo are included on the BoCC Red List. Cuckoos are brood parasites, and the host species with the greatest abundance within the onshore study area was meadow pipit.
	Winter wader assemblage	Sixteen species of wader were recorded using the onshore study area in the non-breeding season. Notably, this included eight species listed on the SBL, seven LBAP priority species, eight on the BoCC Red List, and seven included on the Amber List. Although three species (green sandpiper (*Tringa ochropus*), purple sandpiper (*Calidris maritima*), and whimbrel) are included on Schedule 1, this only applies to breeding populations. 15 of the 16 species are of conservation concern, listed on the SBL, or included on the BoCC Red or Amber Lists.
Low	Sparrowhawk and kestrel	Sparrowhawk and kestrel are both included on the BoCC Amber List, reflecting declines in the UK. However, they both remain widespread in Caithness (Davey *et al.*, 2016).
	Breeding common gull	Although common gull may be considered to be part of the breeding seabird assemblage of North Caithness Cliffs SPA, the territory confirmed was considerably inland and unlikely to be directly associated with the qualifying population. Common gull is included on the BoCC Amber List. This species is increasing in abundance at coastal areas in Caithness but is suffering a decline at inland sites (Davey *et al.*, 2016).
	Skylark	Although skylark are included on the BoCC Red List, this relates to large declines in area of intensified grassland management and of arable farming, where there has been a switch from spring to autumn-sown cereal crops. Skylark remains abundant in the farmland environment in Caithness.

SENSITIVITY	RECEPTOR	JUSTIFICATION
	Breeding passerine assemblage	Thirty species of passerine were confirmed to breed within the onshore study area, with a further ten recorded displaying behaviour indicative of breeding on one occasion. Notably this included ten species listed on the SBL, one LBAP priority species, eight on the BoCC Red List, and 12 included on the Amber List. Note that this receptor excludes breeding skylarks which, although passerines, have been considered separately.
	Winter passerine assemblage	Forty-one species of passerine were found to use the onshore study area during the non-breeding season. Notably, this included 12 species listed on the SBL, nine on the BoCC Red List, and eight included on the Amber List. Although two species (fieldfare (*Turdis pilaris*) and redwing (*Turdis iliacus*)) are included on Schedule 1, this only applies to breeding populations.
	Wintering barnacle geese	Listed on the SBL and included on the BoCC Amber List. Only recorded very occasionally, and in small numbers.
	Wintering pink-footed geese	Included on the BoCC Amber List. The population of pink-footed geese has increased dramatically since the 1960s (Mitchell *et al.*, 2010).
Negligible	All other common and widespread bird species (including buzzard, common breeding passerines, and species recorded on single occasions with no indication of breeding or in significant numbers).	

11.6.2 Designated sites and species not taken forward to the assessment phase

The Red Point Coast SSSI has been scoped out for further assessment. This is due to the fact that no evidence that guillemot were identified within the onshore study area, therefore there are no direct pathways for effect on the qualifying features of this SSSI as a result of the onshore aspects of the Project.

Species of negligible importance are not considered further in this assessment as these are generally common and widespread ornithological features. As discussed in section 11.5.2, as no nesting seabird colonies, guillemot, corncrake or divers were found within the onshore study area, they are not taken forward to the assessment phase. Whilst three mallard territories and osprey nests were found, these were all outwith the onshore study area and are also not considered further.

11.6.3 Designated sites and species taken forward to the assessment stage

In this section, results from the desk study and all relevant field surveys have been reviewed to describe the current baseline[6] environment for terrestrial ornithology, providing an overview of the existing ornithological environment within the onshore Project area and wider landscape. Following assessment of current baseline, the likely impact of each stage of the onshore Project upon the terrestrial ornithology features is assessed.

Although no significant impacts on ornithological features of low value are likely, these features are nevertheless considered because they are of local conservation importance, and additional mitigation measures could be recommended for such features as a good practice measure. Furthermore, due to various limitations (see sections 11.4.7 and 11.5.5), precautionary measures are considered prudent.

To avoid repetition, where potential effects on ornithological features of the same level of importance are likely to be similar due to similarities in ecology and/or distribution, they are assessed as a group rather than separately for each feature.

11.6.4 Potential effects on receptors of high sensitivity

11.6.4.1 Designated sites of international importance

As detailed in section 11.4.4.1.1, there are three SPAs with ornithology features located within 20 km of the onshore Project area: North Caithness Cliffs, Caithness Lochs, and Caithness and Sutherland Peatlands. The latter two are also Ramsar sites. See Table 11-7 for a description of their qualifying terrestrial ornithology features. These three sites are internationally designated and are therefore considered to be high sensitivity receptors (see Table 11-7).

Under the Habitats Regulations, any development likely to have a significant effect on an SPA, either alone or in combination with other developments, requires an AA (part of the HRA process) to be carried out by the relevant competent authority, to determine whether or not the development, would have an adverse effect on the integrity of the site.

Effects on all designated sites of international importance are considered in this chapter in the context of EcIA (CIEEM, 2018). In addition, effects on Special Protected Areas (SPAs) and Ramsar sites have been considered under the Habitats Regulation Appraisal (HRA) process which has been undertaken alongside this Onshore EIA Report.

11.6.4.1.1 Potential construction effects

No seabirds that could be considered to be associated with North Caithness Cliffs SPA were found to breed within the onshore study area. Birds may occasionally overfly the onshore Project area and may adjust their flightpath to avoid disturbance from construction, but this would not result in a measurable effect. As such, no effect is predicted

[6] *As described in section 11.4.5, in most cases, the future baseline will be unchanged from the current baseline. CIEEM guidance indicates impact assessments should be based on the predicted baseline at the time impacts will occur.*

on the breeding seabird assemblage associated with North Caithness Cliffs SPA during construction. Further details are provided in section 11.6.4.3.

As detailed in section 11.6.4.6, no effect is predicted on breeding wigeon associated with Caithness and Sutherland Peatlands SPA / Ramsar site during construction.

Although no evidence of breeding golden plover or greenshank was found, these birds do move through on passage. In the worst case, it is possible that birds may be temporarily excluded from this area due to disturbance if construction activities take place here during the passage season for these species. However, this would be very short-term and temporary, with other suitable foraging habitat available within the onshore study area and wider landscape. As such, no effect is predicted on the breeding populations of golden plover and greenshank associated with Caithness and Sutherland Peatlands SPA / Ramsar site during construction. Full details are provided in section 11.6.4.7.

As detailed in section 11.6.4.8 no effect is predicted on breeding greylag geese associated with Caithness and Sutherland Peatlands Ramsar site during construction.

There was no evidence of breeding within the onshore study area for any raptor or owl species that could be considered to be associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA / Ramsar site. Birds were only found to overfly the onshore study area occasionally. As such, no effects are predicted for nest sites. In the worst case, it is possible that birds may be temporarily excluded from a small area of foraging habitat due to disturbance if construction activities take place here during the breeding season for these species. However, this would be very short-term and temporary, with other suitable foraging habitat available within the onshore study area and wider landscape, including at Broubster Leans SSSI, the habitat at which will not be affected by this Project. No measurable effect is predicted, particularly given the low level of activity recorded within the onshore study area for these species. Therefore, no effect is predicted on breeding raptors and owls associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA site during construction. Further details are provided in section 11.6.4.5.

Wintering Greenland white-fronted geese, greylag geese, and whooper swan are all qualifying features of Caithness Lochs SPA / Ramsar, and were recorded to use the onshore study area, primarily for foraging, although small numbers of greylag geese and whooper swans were also found to roost. It is possible that construction activities in surrounding habitats may displace Greenland white-fronted geese, greylag geese, and whooper swans from foraging and roosting. Works will be temporary, and reversible in the short-term for any section of the onshore export cable route, and there is abundant similar habitat in the local area. In addition, the level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, due to the high sensitivity of these species, specific mitigation has been embedded in the approach to the Project. To avoid impacts on foraging geese and swans, wherever possible, construction activities will not take place within 500 m of feeding locations identified by Project specific surveys and important feeding areas based on NatureScot dataset (Jonathan Swale, pers. comm. (2023)) between September and mid-May. This meets the minimum disturbance distance for Greenland white-fronted geese, and more than the minimum of 200 m for greylag geese and whooper swans (Goodship & Furness, 2022).

Where this is not possible, monitoring will be undertaken by a suitably experienced and qualified ECoW searching for Greenland white-fronted geese or whooper swans within 500 m of active construction activities. If these species are found, they will be observed for signs of disturbance. If birds are observed to be disturbed (i.e. multiple short

flights within a small area, or small groups of birds leaving the main skein), all works will stop within 500 m, and will not recommence until the ECoW has confirmed it is safe to do so after these species are no longer within the buffer area. In addition, foraging habitat within important feeding areas will be prioritised for reinstatement so as to ensure any disruption to Greenland white-fronted geese and whooper swans is as temporary as possible.

In addition, no construction activities will take place within 500 m of a Greenland white-fronted goose, greylag goose, or whooper swan roost within one hour before and after sunrise, and one hour before and after sunset. This is to avoid impacts on roosting birds.

There is not predicted to be any measurable effect on the populations of these species. Therefore, after implementing the embedded mitigation measures, no significant effect is predicted on populations of Greenland white-fronted geese, greylag geese, or whooper swans associated with Caithness Lochs SPA / Ramsar during construction. See section 11.6.4.4 for further details.

No significant effects are predicted on any other qualifying features of SPAs / Ramsar sites.

11.6.4.1.2 Potential operation and maintenance effects

No significant effects are predicted on features associated with SPAs / Ramsar sites during the operation and maintenance of the Project, as detailed in sections 11.6.4.3, 11.6.4.4, 11.6.4.5, 11.6.4.6, 11.6.4.7, and 11.6.4.8.

No effects are predicted on any other qualifying features of SPAs / Ramsar sites.

11.6.4.1.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from decommissioning are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no significant negative effect is predicted on SPAs or Ramsar sites.

11.6.4.2 Designated Sites of national importance

As detailed in Section 11.4.4.1.1, there are three SSSIs located within 5 km of the onshore Project area relevant to ornithology for which potential pathways for effect could not be ruled out; Loch Calder, Broubster Leans, and Loch Scarmclate. See Table 11-7 for a description of their qualifying terrestrial ornithology features. These three sites are nationally designated and are therefore considered to be high sensitivity receptors (see Table 11-7).

11.6.4.2.1 Potential construction effects

No significant effect is predicted on wintering Greenland white-fronted geese, greylag geese, or whooper swans associated with Loch Calder SSSI, or greylag geese associated with Loch Scarmclate SSSI, after embedded mitigation has been applied. For more detail see sections 11.6.4.4 and 11.6.4.8.

No effect is predicted on breeding wigeon which may be considered to be associated with Broubster Leans SSSI. However, in the worst case scenario, two teal territories (outwith the SSSI) may be lost due to indirect disturbance during construction for a single year. This would be a short-term temporary reversible effect, which would not require mitigation to enable restoration of the breeding population to the pre-works baseline level, and will not affect the conservation objectives of Broubster Leans SSSI. This would result in a temporary negative effect of negligible magnitude. Therefore, no significant effect is predicted on breeding teal. Full details for wigeon and teal are provided in section 11.6.4.6. Although hen harrier and short-eared owl are included as features of Broubster Leans SSSI, this is for foraging only and there is no pathway for effect on habitats – further details are provided in section 11.6.4.5.

11.6.4.2.2 Potential operation and maintenance effects

No significant effect is predicted on features associated with Loch Calder and Loch Scarmclate SSSIs during operation and maintenance of the Project, as detailed in section 11.6.4.4 and 11.6.4.8.

No effects are predicted on features associated with Broubster Leans SSSI during the operation and maintenance of the Project, as detailed in sections 11.6.4.6 and 11.6.4.5.

11.6.4.2.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from decommissioning are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no significant negative effect is predicted on SSSIs.

11.6.4.3 Breeding seabird assemblage

Fulmar, kittiwake, and puffin are known to breed in the wider area based on BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report), and were recorded occasionally during surveys, particularly at the coast. No breeding sites were found, and only puffin was recorded showing potential breeding behaviour – overflying the onshore Project area at the coast carrying food. North Caithness Cliffs SPA supports internationally important breeding populations of these species. Kittiwake and puffin are both included on the BoCC Red List while fulmar is on the BoCC Amber List.

Arctic tern are likely to breed in the wider area based on BTO data and records. Black-headed gull are known to be present in the onshore study area based on RSPB and BTO records. Common gull, herring gull, lesser black-backed gull and eider are known to breed in the wider area based on RSPB and BTO records (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Arctic tern, cormorant, black-headed gull, common gull, herring gull, lesser black-backed gull, and eider were also occasionally recorded in the onshore study area and may be considered to be associated with the breeding seabird assemblage for which North Caithness Cliffs SPA is also designated. Of these, only common gull was found to breed, but this was inland and so not considered associated with the SPA. There was no other indication of breeding for any species. Herring gull is included on the BoCC Red List, while all other species

are on the BoCC Amber List, with the exception of cormorant. Arctic tern, black-headed gull, and herring gull are also included on the SBL. Arctic tern is also an LBAP priority species.

The citation for North Caithness Cliffs SPA (last updated in 2018) indicates the site supports 13,700 pairs of fulmar, 13,100 pairs of kittiwake, and 2,080 pairs of puffin.

Breeding Arctic terns have declined by 37% throughout Scotland since 1987. However, Caithness has suffered a more severe decline of 60-80% due to human disturbance at colony sites, and increasing gull populations (Davey *et al.*, 2016).

Cormorant suffered a severe decline of 70% between 1969 and 2002, however the Caithness population seems to have stabilised at around 250 pairs (Davey *et al.*, 2016); Mitchell *et al.*, 2004). Declines are thought to be due to a number of factors, including persecution and food availability.

Gulls have suffered declines, at least in part due to predation by fox (*Vulpes vulpes*) and otter (*Lutra lutra*). Herring gull and lesser black-backed gull may have been further affected by changes to fishing practises, while toxins and bacteria picked up at landfill sites may be an additional factor for the former (Davey *et al.*, 2016).

The breeding eider population has remained relatively stable in Caithness, although breeding success may have been negatively affected by predation from fox and otter, competition with an increasing breeding population of greylag geese, and disturbance from human activities (Davey *et al.*, 2016).

The coastal habitat within the onshore Project area is suboptimal for cliff nesting colonies of seabirds, and there is limited suitable habitat within the onshore study area. It is more likely that these birds will commute along the coastal areas between nesting and foraging areas.

In addition, severe outbreaks of bird flu HPAI A(H5N1)) in 2021 and 2022 has had a huge negative impact on wild bird populations in the UK – a particularly wide range of species and large number of individuals were affected during the 2022 breeding season. Seabirds which nest in colonies have been particularly susceptible, likely due to close proximity to one another and transmission through faecal matter. It is possible that gulls which travel inland following waterways in winter may act as a vector for the disease, contracting it from infected poultry, and introducing it to breeding seabird colonies. Although the impact on many individual species and colonies has not yet been quantified, early studies suggest the effect has been catastrophic, with increased mortality, decreased productivity, and abonnement of colonies by adults after early breeding failure (Banyard *et al.*, 2022; Cunningham *et al.*, 2022; Pearce-Higgins *et al.*, 2023).

Due to the potential association with North Caithness Cliffs SPA, the breeding seabird assemblage is considered to be of high sensitivity.

Note that this assessment considers impacts on seabirds which may result from onshore Project activities. For impacts on seabirds from the offshore Project see Offshore EIA Report, chapter 13: Offshore and intertidal ornithology.

11.6.4.3.1 Potential construction effects

As set out in Table 11-9 each species included within the breeding seabird assemblage has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

There was no evidence of breeding or foraging within the onshore Project area (including the sea at the landfall option sites) for any population that could be considered to be associated with North Caithness Cliffs SPA. Birds were only found to overfly the onshore study area occasionally. As such, no effects are predicted for breeding colonies or nest sites or impacts on foraging habitat.

It is possible that seabirds may choose alternate flight paths due to disturbance during construction near the coastline, however this would be very short-term and temporary. Furthermore, no important commuting routes were identified, and only small numbers of birds recorded occasionally. Given the baseline level of disturbance due to agriculture and the energy industry, it is considered highly unlikely that birds would be affected by disturbance from these works, and if they are only minor adjustments to flight paths would be likely to result, without impediment to accessing foraging areas. Therefore, no measurable effect is predicted as a result of construction disturbance.

Therefore, no effect is predicted on breeding seabirds associated with North Caithness Cliffs SPA during onshore construction.

11.6.4.3.2 Potential operation and maintenance effects

As set out in Table 11-9 each species included within the breeding seabird assemblage has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

No habitat used by the breeding seabird assemblage will be affected during the operation or maintenance of the Project.

The level of disturbance caused will be similar to the existing baseline level from agriculture and the energy industry.

Therefore, no effect is predicted on breeding seabirds associated with North Caithness Cliffs SPA during operation.

11.6.4.3.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no effect is predicted on the breeding seabird assemblage associated with North Caithness Cliffs SPA.

11.6.4.4 Wintering Greenland white-fronted geese, greylag geese, and whooper swans

Wintering Greenland white-fronted geese, greylag geese, and whooper swan are all qualifying features of Caithness Lochs SPA / Ramsar, as well as Loch Calder SSSI. Wintering greylag geese are also a qualifying feature of Loch Scarmclate SSSI. Greenland white-fronted geese and whooper swan are both included on the SBL. All three species are included on the SBL, with Greenland white-fronted geese being an LBAP priority species, and Red Listed. The other two species are Amber Listed. Although greylag geese and whooper swans are included on Schedule 1, this only applies to breeding populations.

Greenland white-fronted geese were found to forage across the onshore study area, with concentrations observed in Forss, between Shebster and Broubster – this species was observed to forage within the onshore Project area on two occasions near Forss (groups of 29 and 23 birds). With regards to other observations. the largest skein recorded was 250 m north-east of onshore Project area, consisting of 1,304 birds, on grazing habitat This flock almost certainly was moving through on migration to roost sites throughout the UK and Ireland, and it is highly unlikely all birds utilise Caithness Lochs SPA / Ramsar. The next largest foraging flock consisted of 360 birds, 720 m north of the onshore Project area, near Ardingills, followed by 21 birds 66 m north-east of the site. All other flocks ranged from between one and eight birds. In total 34 foraging flocks were recorded. The majority of flocks were recorded foraging in grazing fields (82%), followed by stubble (12%), with a small number of records on marsh (6%). A single roosting site was identified, to the north of Buckies (410 m north-east of onshore Project area, comprising four birds).

Only two small groups of Greenland white-fronted geese were recorded to use the onshore Project area itself (near Forss), outwith NatureScot important feeding areas, (likely due to crop rotation or other changes to field use). There are important feeding areas located within and adjacent to the onshore Project area between Crosskirk and Westfield. See Figure 11-17 for an overview of white-fronted goose survey results, in the context of known important feeding and roosting areas for this species (based on NatureScot dataset (Jonathan Swale, pers. comm. 2023)).

The estimated population of Greenland white-fronted geese using Caithness Lochs SPA is 338 (based on NatureScot data) (Alexander Macdonald, pers. comm. 2023), and there are thought to be 492 within the NHZ (Wilson *et al.*, 2015). Greenland white-fronted geese are suffering a long-term decline, with the UK and Ireland population estimated at 20,797 in 2014 (Mitchell *et al.*, 2010; Fox *et al.*, 2014).

The onshore Project area and onshore study area are known to be important for foraging greylag geese associated with Caithness Lochs SPA (Mitchell, 2012). Greylag geese were recorded during novel surveys, with foraging flock sizes varying between one and 1,505 birds – the largest being recorded 1,300 m north-east of the onshore Project area, near Auchingills (see Figure 11-19). In total 376 flocks were recorded foraging within the onshore study area, and grazing fields were the most commonly used habitat (61%), followed by stubble (37%), and vegetable (16%) fields. Greylag geese also used marsh (0.5%) and lochs (0.5%) as foraging habitat. Twenty-one greylag goose flocks were recorded to roost, predominantly outwith the onshore Project area. The largest flock (1,800) birds roosted south of Harpsdale, 1 km south of the site. Three records of roosting greylag geese were identified within the onshore Project area, consisting of one, nine, and ten birds respectively.

The estimated population of using Caithness Lochs SPA is 10,488 (based on NatureScot data) (Alexander Macdonald, pers. comm. 2023). Although there are no figures for the NHZ population, Davey *et al.* (2016) estimates this as

exceeding 10,000 birds, which is in line with the Caithness Lochs SPA estimate. The greylag goose population appears to exhibit a long-term positive trend, with numbers increasing (Mitchell *et al.*, 2010).

Whooper swan sightings, while less frequent than greylag geese, were also relatively ubiquitous across the onshore study area, with concentrations of foraging activity recorded around Westfield (Figure 11-21). In total, 68 foraging flocks were recorded, ranging in size from one to 290 birds – Davey *et al.* (2016) consider flocks of over 100 birds to be exceptional in Caithness (although counts of 300 have occurred). The largest flock was recorded over 2.5 km east of the site, foraging on stubble near Stemster House – this was the only record exceeding 100 whooper swans, with the next largest flock consisting of 92 birds. The majority of foraging flocks were recorded on marsh (43%), followed by stubble fields (35%). Whooper swans were also found to forage in grazing fields (16%), and lochs (6%). However, the largest flocks were found foraging on stubble. Six flocks of whooper swans were found roosting during the survey, although one of these was outwith the 3 km buffer. Of those within the survey area, four were located the west of the onshore Project area, recorded between Westfield and Olgrinmore. Three of these were within Loch Calder, part of Caithness Lochs SPA / Ramsar (over 1.5 km west of the onshore Project area at its closest point – highest count 23 birds), and the fourth was 1.3 km south-east of the site (29 birds). A fifth roost was found 500 m north-west of the onshore Project area, between Buckies and Auchingills (five birds). Although there are no known important roost sites within the onshore Project area, there is an important roost site immediately adjacent at Westfield. There is also a small extent of important feeding area as identified by NatureScot within the onshore Project area near Crosskirk Bay. See Figure 11-21 for an overview of whooper swan survey results, in the context of known important feeding and roosting areas for this species (based on NatureScot dataset (Jonathan Swale, pers. comm. 2023).

The estimated population of whooper swans using Caithness Lochs SPA is 208 (based on NatureScot data) (Alexander Macdonald, pers. comm. 2023), and there are thought to be 706 within the NHZ (Wilson *et al.*, 2015). The whooper swan population appears to exhibit a long-term positive trend, with numbers increasing (Soriano-Redondo *et al.*, 2023).

Due to the potential association with Caithness Lochs SPA / Ramsar, Greenland white-fronted geese, greylag geese, and whooper swans are considered to be of high sensitivity.

11.6.4.4.1 Potential construction effects

As set out in Table 11-8, wintering Greenland white-fronted geese, greylag geese, and whooper swans have been assessed against the following relevant impacts: direct loss of foraging or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

No geese or swans were found to use the substation search area, nor is this within an important foraging or roosting area as identified by NatureScot, and habitat is suboptimal for foraging or roosting. Therefore, no permanent direct loss of foraging or roosting habitat is predicted. It is possible that construction activities in surrounding habitats may displace Greenland white-fronted geese, greylag geese, and whooper swans from foraging and roosting. Works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. In addition, the level of disturbance caused during the construction stage of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, due to the high sensitivity of these species, specific mitigation has been embedded in the approach to the Project.

To avoid impacts on foraging geese and swans, wherever possible, construction activities will not take place within 500 m of feeding locations identified by Project specific surveys and important feeding areas based on NatureScot dataset (Jonathan Swale, pers. comm. (2023)) between September and mid-May. This meets the minimum disturbance distance for Greenland white-fronted geese, and more than the minimum of 200 m for greylag geese and whooper swans (Goodship & Furness, 2022). Use of the minimum disturbance distances is considered appropriate as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.

Where this is not possible, monitoring will be undertaken by a suitably experienced and qualified ECoW searching for Greenland white-fronted geese or whooper swans within 500 m of active construction activities. If these species are found, they will be observed for signs of disturbance. If birds are observed to be disturbed (i.e., multiple short flights within a small area, or small groups of birds leaving the main skein), all works will stop within 500 m, and will not recommence until the ECoW has confirmed it is safe to do so after these species are no longer within the buffer area.

In addition, foraging habitat within important feeding areas will be prioritised for reinstatement so as to ensure any disruption to Greenland white-fronted geese and whooper swans is as temporary as possible.

No construction activities will take place within 500 m of a Greenland white-fronted goose, greylag goose, or whooper swan roost within one hour before and after sunrise, and one hour before and after sunset. This is to avoid impacts on roosting birds.

Therefore, after implementing the embedded mitigation measures, any effects on wintering Greenland white-fronted geese, greylag geese, and whooper swans are considered to be of negligible magnitude and not significant.

11.6.4.4.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities may displace Greenland white-fronted geese, greylag geese, or whooper swans from foraging or roosting habitat. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. In addition, the same mitigation (described above) will be employed during maintenance as for construction. After implementing the embedded mitigation measures, any effects on wintering Greenland white-fronted geese, greylag geese, and whooper swans are considered to be of negligible magnitude and not significant.

11.6.4.4.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. In addition, the same mitigation (described above) will be employed during maintenance as

for construction. After implementing the embedded mitigation measures, any effects on wintering Greenland white-fronted geese, greylag geese, and whooper swans are considered to be of negligible magnitude and not significant.

11.6.4.5 Peregrine, hen harrier, merlin, and short-eared owl

Breeding peregrine are a qualifying feature of North Caithness Cliffs SPA, with the citation for the SPA (last updated in 2018) indicating a breeding population of six pairs. RSPB records and BTO data confirm that peregrine breed and overwinter within the onshore study area (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Peregrines were recorded overflying the onshore study area on three occasions – twice at the coast, and once inland (see Figure 11-13). No evidence of breeding was found within the onshore study area. Peregrine are included on Schedule 1, the SBL, and are an LBAP priority species.

Breeding hen harrier, merlin, and short-eared owl are qualifying features of Caithness and Sutherland Peatlands SPA. The citation (last amended in 2017) indicates breeding populations of 14 pairs of hen harrier, 54 pairs of merlin, and 30 pairs of short-eared owl.

RSPB and BTO records confirm that hen harrier breed within the onshore study area, and BTO data indicates that they overwinter within the study area (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Hen harriers were occasionally recorded within the onshore study area, with activity concentrated around Bloody Moss (approximately 3 km south of Halkirk) and Yellow Moss (approximately 1 km south-west of Halkirk), where the highest concentrations of prey species such as meadow pipit, skylark, and waders were also found (see Figures 11-4, 11-7a, and 11-7b). Although hen harrier suffered a historic decline, the population in Scotland has increased overall since 1989, including in North Highland (Sim *et al.*, 2007). The breeding population in Caithness appears to be relatively stable (Davey *et al.*, 2016). Hen harrier predominantly nest in rank vegetation, such as heather and young conifer plantations, and occasionally in trees none of which is particularly available within the onshore study area (Watson, 1977; Watson, 1991).

Merlin have been recorded in the onshore study area historically based on RSPB and BTO records, with BTO data confirming breeding (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Merlin were recorded on six occasions during the breeding season, with four of these at Bloody Moss and Yellow Moss where the highest concentrations of prey species – meadow pipit and skylark – are present (sees Figures 11-7a and 11-7b). Merlin populations in the UK were stable between 1994 and 2008 (Ewing *et al.*, 2011). However, locally in Caithness, the population appears to have declined in abundance (Davey *et al.*, 2016). The decline is thought to be at least partly caused by a reduction in prey species abundance – notably meadow pipit and skylark – due to over-grazing and muirburn. However, both key prey species were found to be abundant throughout the onshore study area, with 68 meadow pipit and 227 skylark territories identified during surveys. Lack of suitable nesting habitat is more likely to be the limiting factor for merlin within the onshore study area, as this species predominantly nests on crags and in rank vegetation such as heather, or on occasion in trees (occupying nests constructed by other birds), none of which is particularly available in Caithness (Hardey *et al.*, 2013).

Short-eared owl have been recorded in the onshore study area historically based on RSPB and BTO records, with BTO data confirming breeding and overwintering within the onshore study area (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Short-eared owl were recorded on six occasions during the breeding season, throughout the onshore study area (Figure 11-14). Short-eared owls have declined by 47% since 1972 in the UK and Ireland (Balmer *et al.*, 2013). However, the decline locally in Caithness has been more severe, at up to 70% (Davey *et*

al., 2016). Declines in breeding short-eared owl are thought to be related to maturing commercial forestry offering unsuitable breeding habitat and mammalian predators such as foxes. The habitat available within the onshore study area is largely unsuitable for breeding short-eared owl.

These species were also found to occasionally forage within the onshore study area during the non-breeding season.

Hen harrier is listed under Schedules 1 and 1A, while merlin is listed under Schedule 1, and short-eared owl is included on Annex I of the Birds Directive. Hen harrier and merlin are both included on the BoCC Red List, while short-eared owl is on the Amber List. All three species are included on the SBL, while hen harrier and merlin are also LBAP priority species.

Hen harrier and short-eared owl are also included on the citation of Broubster Leans SSSI, which offers particularly important foraging habitat for these species.

Due to the potential association with North Caithness Cliffs SPA and Caithness and Sutherland SPA, hen harrier, merlin, peregrine, and short-eared owl are considered to be of high sensitivity.

11.6.4.5.1 Potential construction effects

As set out in Table 11-9, each species has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

There was no evidence of breeding within the onshore study area for any raptor or owl species that could be considered to be associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA. Birds were only found to overfly the onshore study area occasionally. As such, no effects are predicted for nest sites. However, as a precaution pre-construction surveys will be undertaken. If nesting is found for any species, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended.

The site offers potential foraging habitat, with particular concentrations of prey species at Bloody Moss and Yellow Moss. Birds using the area will likely be used to disturbance relating to agriculture and the energy industry, which is of a similar level to the cable installation works. In the worst case, it is possible that birds may be temporarily excluded from this area due to disturbance. However, this would be very short-term and temporary, with other suitable foraging habitat available within the onshore study area and wider landscape, including at Broubster Leans SSSI, the habitat at which will not be affected by this Project. No measurable effect is predicted, particularly given the low level of activity recorded within the onshore study area for these species.

Therefore, no effect is predicted on raptors and owls associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA during construction.

11.6.4.5.2 Potential operation and maintenance effects

As set out in Table 11-9, each species has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

No habitat used by nesting peregrine, hen harrier, merlin, or short-eared owl will be affected during the operation or maintenance of the Project. However, as a precaution pre-works checks will be undertaken if maintenance will take place in Bloody Moss or Yellow Moss. If nesting is found for any species, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended.

The level of disturbance caused to foraging habitat will be similar to the existing baseline level from agriculture and the energy industry.

Therefore, no effect is predicted on raptors and owls associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA during operation.

11.6.4.5.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no effect is predicted on the raptors or owls associated with North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA.

11.6.4.6 Breeding wigeon and teal

Breeding wigeon is a qualifying feature of Caithness and Sutherland Peatlands SPA, while both this wigeon and teal are included on the citation for Broubster Leans SSSI.

Wigeon have been recorded in the onshore study area historically based on RSPB and BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). A single wigeon territory was confirmed during field surveys at Loch Lieurary (Figure 11a). Breeding behaviour was recorded elsewhere within the onshore study area, but no other territories were found. The citation for Caithness and Sutherland Peatlands SPA (last amended in 2017) indicates a breeding population of 43 pairs. The UK population of wigeon has increased by 63% between 1984 and 2009 (Balmer *et al.*, 2013). However, populations locally have declined, which is thought to be attributable to predation by mammals, a reduction in water quality and loss of moorland breeding lochs due to commercial forestry (Davey *et al.*, 2016).

Teal have been recorded in the onshore study area historically based on RSPB and BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Three teal breeding territories were found within the onshore study area during field surveys (Figure 11b). One of these is within the onshore Project area at Hill of Caulder, while a second is adjacent at Lochan Buidhe, and the third is outside the boundary at Loch Lieurary. Although confirmed breeding data suggests a decrease in breeding teal in Caithness, this bird is likely under-recorded and populations are likely to be stable in the region (Davey *et al.*, 2016). Historically some of the moorland dhulochs used for breeding were made unsuitable due to commercial afforestation, but with felling taking place these are becoming available to breeding teal once again.

Wigeon and teal are both included on the BoCC Amber List.

Due to the potential association with Caithness and Sutherland SPA and Broubster Leans SSSI, breeding wigeon and teal are considered to be of high sensitivity.

11.6.4.6.1 Potential construction effects

As set out in Table 11-9, each species has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

The wigeon territory at Loch Lieurary is located 280 m outside the onshore Project area. This is further than the 200 m disturbance distance recommended for this species, (Goodship & Furness, 2022) and beyond the 250 m buffer used for Groundwater Dependent Terrestrial Ecosystems (GWDTEs) (see chapter 10: Terrestrial non-avian ecology for further details). No direct or indirect effect is predicted on breeding wigeon during construction, particularly given the precautionary embedded mitigation. As such, no effect is predicted on breeding wigeon associated with Caithness and Sutherland Peatlands SPA.

Although there is no published recommended disturbance distance for teal, it is reasonable to expect it will be similar to wigeon, to which it is closely related and both occupy similar breeding habitat. Therefore, no effect is predicted on the teal territory at Loch Lieurary as this is 480 m from the onshore Project area. Depending on the final cable route selected there is a risk of disturbance to the other two teal territories. Pre-construction surveys will be undertaken, and if nesting teal are located a 200 m exclusion zone will be implemented until breeding attempts have been confirmed to have ended, in line with embedded mitigation – with this in place any direct or indirect effect on breeding teal is considered highly unlikely. However, in the worst case scenario, two teal territories may be lost due to indirect disturbance during construction for a single year. This would be a short-term temporary reversible effect, which would not require mitigation to enable restoration of the breeding population to the pre-works baseline level and will not affect the conservation objectives of Broubster Leans SSSI. This would result in a temporary negative effect of negligible magnitude. Therefore, no significant effect is predicted on breeding teal.

11.6.4.6.2 Potential operation and maintenance effects

As set out in Table 11-9, each species has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

No habitat used by nesting wigeon, or teal will be affected during the operation or maintenance of the Project. However, as a precaution pre-works checks will be undertaken if maintenance will take place within 200 m of a waterbody. If nesting is found for either species, a 200 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended.

The level of disturbance caused will be similar to the existing baseline level from agriculture and the energy industry.

Therefore, no effect is predicted on breeding wigeon associated with Caithness and Sutherland Peatlands SPA or Broubster Leans SSSI during operation. Furthermore, no effect is predicted on breeding teal associated with Broubster Leans SSSI during operation.

11.6.4.6.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no effect is predicted on breeding wigeon associated with Caithness and Sutherland Peatlands SPA or Broubster Leans SSSI during decommissioning. Furthermore, no effect is predicted on breeding teal associated with Broubster Leans SSSI during decommissioning.

11.6.4.7 Passage golden plover and greenshank

Breeding golden plover and greenshank are qualifying features of Caithness and Sutherland SPA. Golden plover and greenshank have been recorded in the area historically based on RSPB and BTO records. BTO data indicates that greenshank breed and over-winter in the onshore study area (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Neither golden plover nor greenshank were found to breed within the onshore study area during field surveys, and no breeding behaviour was observed for either species.

Golden plover were recorded at the landfall locations, at Lythmore Moss, and between Moss of Guise and Hill of Howe (Figure 11-8).

Greenshank was recorded on one occasion at Hill of Lieurary, over 1 km from the onshore Project area (Figure 11-8). As these do not appear to relate to breeding territories, it is considered likely these were non-breeding birds on passage.

The citation for Caithness and Sutherland Peatlands SPA (last amended in 2017) indicates breeding populations of 1,064 pairs of golden plover and 653 pairs of greenshank.

Both of these species suffer from loss of breeding habitat due to commercial forestry. However, while the breeding greenshank population remain widespread and stable in Caithness, golden plover are declining as they are displaced westwards in to Sutherland (Davey *et al.*, 2016).

Greenshank are included on Schedule 1 and the BoCC Amber List. Golden plover are included on the SBL. Both birds are included as LBAP priority species.

Due to the potential association with Caithness and Sutherland SPA, passage golden plover and greenshank are considered to be of high sensitivity.

11.6.4.7.1 Potential construction effects

As set out in Table 11-9, each species has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

No breeding territories were identified for golden plover or greenshank, and habitat on site is largely sub-optimal. Therefore, no direct or indirect effects are expected on breeding territories for these species. However, pre-construction surveys will be undertaken as part of the embedded mitigation, as a precaution. If a breeding territory is found for either species, a 500 m exclusion zone will be implemented until breeding attempts have been confirmed to have ended, in line with recommended disturbance distances for these birds (Goodship & Furness, 2022).

The site offers potential foraging habitat, for birds on passage. Birds using the area will likely be used to disturbance relating to agriculture and the energy industry, which is of a similar level to the cable installation works. In the worst case, it is possible that birds may be temporarily excluded from this area due to disturbance if construction activities take place here during the passage season for these species. However, this would be very short-term and temporary, with other suitable foraging habitat available within the onshore study area and wider landscape. No measurable effect is predicted, particularly given the low level of activity recorded within the onshore study area for these species. As such, no effect is predicted on breeding populations associated with Caithness and Sutherland Peatlands SPA as a result of impacts on passage birds.

No effect is predicted on breeding populations of golden plover or greenshank associated with Caithness and Sutherland Peatlands.

11.6.4.7.2 Potential operation and maintenance effects

As set out in Table 11-9, each species has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

No habitat used by nesting golden plover or greenshank will be affected during the operation or maintenance of the Project. However, as a precaution pre-works checks will be undertaken if maintenance will take place in Bloody Moss or Yellow Moss. If nesting is found for either species, a 500 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended.

The level of disturbance caused to foraging habitat used on passage will be similar to the existing baseline level from agriculture and the energy industry.

Therefore, no effect is predicted on breeding populations of golden plover and greenshank associated with Caithness and Sutherland Peatlands SPA during operation.

11.6.4.7.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no effect is predicted on the breeding populations of golden plover and greenshank associated with Caithness and Sutherland Peatlands SPA.

11.6.4.8 Breeding greylag goose

Greylag geese are known to breed and winter in the onshore study area based on RSPB, BTO records, and BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). A single breeding territory of greylag goose was confirmed (family group observed) at Yellow Moss during field surveys (Figure 11-3).

Although common as winter visitors throughout Scotland, greylag geese are relatively uncommon as breeding birds, and only those in Caithness and Sutherland, the Outer Hebrides, and Wester Ross are considered native. Although widely distributed within Caithness, breeding greylag geese appear to have declined since 1970s from 60 pairs to 23 in 1991 (Davey *et al.*, 2016). However, the population is increasing on the Orkney Islands, and there is connectivity with populations on mainland, Scotland, which may result in recruitment and increased numbers on the Scottish mainland over time.

Reflecting their rarity as a native breeding species in Scotland, greylag geese within the onshore study area are included on Schedule 1 and are included on the BoCC Amber List. They may also be associated with Caithness and Sutherland Peatlands Ramsar (located 5.4 km south-east of the onshore Project area), which includes breeding greylag geese as a notified feature. Breeding greylag geese are therefore considered to be of high sensitivity.

11.6.4.8.1 Potential construction effects

As set out in Table 11-9, breeding greylag goose has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Greylag geese tend to breed in wetland areas with good ground cover. There is relatively little suitable habitat in the onshore Project area – Yellow Moss and Bloody Moss offer the best breeding habitat for greylag geese within the onshore study area, and so there is the potential for direct and indirect effects on this species during construction. Wherever possible, construction will be timed to take place outwith the breeding season (April to August inclusive) at Yellow Moss and Bloody Moss. Where this is not possible, pre-construction surveys will be undertaken, and if breeding greylag geese are found an exclusion zone of 600 m will be applied, in accordance with recommended disturbance distance buffers (Goodship & Furness, 2022). The nest will be monitored, and exclusion zone lifted when the breeding attempt has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding greylag geese during construction. No effects are predicted on the breeding population associated with Caithness and Sutherland Peatlands Ramsar site.

It is possible that construction activities in surrounding agricultural habitats may displace greylag geese from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging greylag geese during the breeding season are considered to be of negligible magnitude and not significant.

11.6.4.8.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding greylag goose has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat during the operation of the Project and due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry, and most of the onshore Project area is not suitable for breeding greylag geese. However, if maintenance is to take place within 600 m of Yellow Moss or Bloody Moss, pre-works checks will be undertaken within 600 m of planned activities. If nesting is found, a 600 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding greylag geese during operation. No effects are predicted on the breeding population associated with Caithness and Sutherland Peatlands Ramsar site.

It is possible that maintenance activities in surrounding agricultural habitats may displace greylag geese from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging greylag geese during the breeding season are considered to be of negligible magnitude and not significant.

11.6.4.8.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding greylag geese during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas. No effects are predicted on the breeding population associated with Caithness and Sutherland Peatlands Ramsar site.

11.6.4.9 White-tailed eagle

White-tailed eagles are recorded historically based on RSPB records, with BTO data indicating breeding and overwintering within the onshore study area (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). White-tailed eagles were recorded overflying the onshore study area on three occasions during field surveys (see Figure 11-11). No evidence of nesting was found.

White-tailed eagles are included on Schedules 1, 1A (protected from intentional or reckless harassment at any time of year), and A1 (nests protected from intentional and reckless damage when not in use). They are also included on the SBL, are an LBAP priority species, and on the BoCC Amber List. White-tailed eagles are considered to be of high sensitivity.

11.6.4.9.1 Potential construction effects

As set out in Table 11-9, each species has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

There was no evidence of breeding white-tailed eagles within the onshore study area, and there are limited nesting opportunities with most of the habitat being sub-optimal or unsuitable. Birds were only found to overfly the onshore study area occasionally. As such, no effects are predicted for nest sites. However, as a precaution pre-construction surveys will be undertaken. If nesting is found, a 1,000 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended (Goodship & Furness, 2022).

The site offers potential foraging habitat. Birds using the area will likely be used to disturbance relating to agriculture and the energy industry, which is of a similar level to the cable installation works. In the worst case, it is possible that birds may be temporarily excluded from this area due to disturbance if construction activities take place here during the breeding season for these species. However, this would be very short-term and temporary, with similar foraging habitat available within the onshore study area and wider landscape. No measurable effect is predicted, particularly given the low level of activity recorded within the onshore study area for this species.

Therefore, no effect is predicted on white-tailed eagles during construction.

11.6.4.9.2 Potential operation and maintenance effects

As set out in Table 11-9, white-tailed eagle has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

No habitat used by nesting white-tailed eagle will be affected during the operation and maintenance of the Project. However, as a precaution pre-works checks will be undertaken in suitable breeding habitat. If nesting is found, a 1,000 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended.

The level of disturbance caused to foraging habitat will be similar to the existing baseline level from agriculture and the energy industry.

Therefore, no effect is predicted on white-tailed eagles during operation.

11.6.4.9.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no effect is predicted on white-tailed eagles.

11.6.4.10 Breeding barn owl

Barn owl have been recorded in the onshore study area historically based on RSPB and BTO records. They are also known to breed in the onshore study area based on BTO data (see SS8: Terrestrial Ornithology Ecology Technical

Survey Report). Seven barn owl nest sites and one non-breeding roost site were confirmed during field surveys (see Figure C11-1 in SS9: Terrestrial Ornithology Confidential Annex). Two nest sites were within the onshore Project area, while all others and the roost location were beyond the upper disturbance distance of 100 m from the boundary (Goodship & Furness, 2022).

Although relatively widespread in Caithness now, barn owls had not been recorded in the area prior to 1991. They have since colonised Caithness (Davey *et al.*, 2016). However, barn owls remain less common in Caithness than elsewhere in Scotland, likely due to climate and limited nesting opportunities caused by a high occupancy of suitable structures by jackdaws while many abandoned buildings are roofless so exposed (Barn Owl Trust, 2012).

The current population in Caithness is unknown, with just a single breeding territory listed for the area between 1991 and 2000 in Forrester *et al.* (2007), which places the Scottish population at between 500 and 1,000 pairs. The population of barn owls in Caithness has clearly expanded rapidly in recent years.

Barn owls listed under Schedule 1 and are included on the SBL. They are therefore considered to be of high sensitivity.

11.6.4.10.1 Potential construction effects

As set out in Table 11-9, breeding barn owl has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Wherever possible, construction activities will avoid identified barn owl nest sites, buildings, and mature trees by at least 100 m. Where construction is necessary within 100 m of these potential suitable nesting features, construction will be timed to avoid the breeding season (February to October inclusive). Where neither of these options is possible, pre-construction checks will be undertaken of suitable nesting habitat features within 100 m of planned activities. If barn owls are found to breed a 100 m exclusion zone will be implemented and will not be lifted until the breeding attempt has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding barn owl during construction.

Barn owl are crepuscular, tending to be most active at dusk and dawn. However, they are sometimes active in daylight. It is possible, therefore, that construction activities in surrounding habitats may displace barn owls from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging barn owl during the breeding season are considered to be of negligible magnitude and not significant.

11.6.4.10.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding barn owl has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, if maintenance is to take place within 100 m of potentially suitable nesting habitat during the breeding season (February to October inclusive), such as buildings and

mature trees, pre-works checks will take place within this buffer of planned activities. If nesting is found, a 100 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding barn owl during operation.

It is possible that maintenance activities in surrounding agricultural habitats may displace barn owls from foraging – although this is relatively unlikely as barn owls are predominantly active at dusk and dawn. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging barn owl during the breeding season are considered to be of negligible magnitude and not significant.

11.6.4.10.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding barn owl during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.4.11 Winter seabird assemblage

Twenty species of seabirds (including ducks and gulls) were found to use the coast and sea at the north of the onshore study area. Notably, this included seven species listed on the SBL, three LBAP priority species, four on the BoCC Red List, and 15 included on the Amber List. Although four species (black-throated diver, great northern diver, red-throated diver, and Slavonian grebe) are included on Schedule 1, this only applies to breeding populations.

Those listed on the SBL included black-headed gull, black-throated diver, common scoter, herring gull, great northern diver, red-throated diver, and Slavonian grebe.

Thos included as LBAP priority species included black-throated diver, common scoter, and red-throated diver.

Species on the BoCC Red List included common scoter, herring gull, shag, and Slavonian grebe.

Those included on the BoCC Amber list were black-headed gull, black-throated diver, common gull, eider, fulmar, great black-backed gull, mallard, great northern diver, guillemot, razorbill, red-breasted merganser, teal, black guillemot, and widgeon.

All activity recorded was either in flight or foraging at sea.

The vast majority of duck activity was recorded at Crosskirk Bay, with the exception of eider which was frequently recorded at sea throughout the onshore study area.

Other seabirds were encountered throughout the onshore study area with varying degrees of frequency.

Nineteen of the 20 species are of conservation concern, listed on the SBL, or included on the BoCC Red or Amber Lists. In addition, severe outbreaks of bird flu HPAI A(H5N1) in 2021 and 2022 has had a huge negative impact on wild bird populations in the UK – a particularly wide range of species and large number of individuals were affected during the 2022 breeding season and seabird colonies have been especially susceptible, suffering high mortality (Banyard *et al.*, 2022; Cunningham *et al.*, 2022; Pearce-Higgins *et al.*, 2023). This increases the sensitivity of the winter seabird assemblage. For these reasons winter seabird assemblage is considered to be of high sensitivity.

Note that this assessment considers impacts on seabirds which may result from onshore Project activities. For impacts on seabirds caused by the offshore Project see Offshore EIA Report, chapter 13: Offshore and intertidal ornithology.

11.6.4.11.1 Potential construction effects

As set out in Table 11-9, the winter seabird assemblage has been assessed against the following relevant impacts: direct loss of foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Embedded mitigation includes the use of HDD at the landfall site, which will minimise impact on sea cliffs and coastal habitats associated with designated sites or communities of conservation importance. Furthermore, no de-vegetation or ground-breaking works are to occur within 50 m of the cliff edge. This will ensure that sensitive coastal habitats which may be used by wintering seabirds are not adversely affected by the construction of the onshore Project.

It is possible that construction activities in surrounding habitats may displace wintering seabirds from foraging at sea close to the landfall site. However, works will be temporary, and there is abundant similar habitat in the local area. Therefore, any effects on foraging seabirds in winter are considered to be of negligible magnitude and not significant.

11.6.4.11.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities near the landfall site may displace seabirds from foraging close by. However, works will be temporary, will only affect seabirds if undertaken in close proximity to the coast, and there is abundant similar habitat in the local area. Therefore, any effects on wintering seabirds are considered to be of negligible magnitude and not significant.

11.6.4.11.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on the winter seabird assemblage during

decommissioning, and a temporary effect of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.5 Potential effects on receptors of medium sensitivity

11.6.5.1 Breeding farmland wader assemblage

Four waders are known to breed in the onshore study area based on RSPB and BTO records and from field surveys (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). The four species of wader included curlew (20 territories within onshore study area, 11 within onshore Project area), lapwing (eight territories within onshore study area, five within onshore Project area), oystercatcher (four territories within the onshore study area, one within onshore Project area), and snipe (ten territories within the onshore study area, all within onshore Project area) (Figure 11-4). There is a higher density of breeding territories in the vicinity of Yellow Moss and Bloody Moss, reflecting the higher quality of nesting habitat here. In addition, three species of wader were recorded displaying breeding behaviour in suitable habitat on a single occasion in each potential territory: redshank, ringed plover, and woodcock.

Breeding waders in the farmland landscape have suffered severe declines between 1988 and 2011 (Balmer *et al.*, 2013). Curlew have received particular attention and have been subject to studies, which have found that farmland landscapes appear to be becoming less important, potentially due to agricultural intensification (Franks *et al.*, 2017). This trend in declining numbers of curlew seems to be reflected locally in Caithness, while lapwing and redshank are suffering even more extreme reductions (Davey *et al.*, 2016). Conversely, oystercatcher, snipe, and ringed plover appear relatively stable in Caithness (Davey *et al.*, 2016). Woodcock is uncommon in the area, although there has been a range expansion in to Caithness since 1972 (Balmer *et al.*, 2013). Changes from grazing cattle to sheep, mammalian predators, and afforestation are also thought to have contributed to wader declines in Caithness (Davey *et al.*, 2016).

These species benefit from a diverse interconnected range of habitats offered in a less intensive agricultural setting including semi-improved grassland, rough grassland, wetlands, and woodland habitats.

Curlew, lapwing, oystercatcher, redshank, and snipe are LBAP priority species. In addition, curlew, lapwing, ringed plover, and woodcock are included on the BoCC Red List, while oystercatcher, red shank and snipe are on the Amber List. Curlew, lapwing, and woodcock are also included on the SBL. This assemblage is considered to be of medium sensitivity.

11.6.5.1.1 Potential construction effects

As set out in Table 11-9, breeding farmland waders have been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

It is possible, in the absence of mitigation, that wader territories could be lost directly due to land-take and indirectly due to disturbance during construction. However, when construction takes place during the breeding season (March to August inclusive) pre-construction checks will be undertaken within 300 m of planned works, which is equivalent to the recommended disturbance distance for breeding curlew, and exceeds that for other species (where these are

available) (Goodship & Furness, 2022). If territories are found, an appropriate exclusion zone will be implemented. Any territories will be monitored, and exclusion zone lifted when the breeding attempt has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding farmland waders during construction.

It is possible that construction activities in surrounding agricultural habitats may displace waders from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging waders during the breeding season are considered to be of negligible magnitude and not significant.

11.6.5.1.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding farmland waders has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, if maintenance is to take place during the breeding season (March to August inclusive) pre-works checks will be undertaken within 300 m of planned activities. If nesting is found, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding farmland waders during operation.

It is possible that maintenance activities may displace waders from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging waders during the breeding season are considered to be of negligible magnitude and not significant.

11.6.5.1.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding farmland waders during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.5.2 Cuckoo

Cuckoos have been recorded in the onshore study area historically based on RSPB and BTO records and were observed within the onshore study area during field surveys (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Cuckoos are brood parasites of meadow pipits (*Anthus pratensis*) in moorland areas, and so are considered in the context of their host species breeding population in this assessment. Breeding meadow pipits were found to

be widespread with 68 territories identified within the onshore study area (24 within the onshore Project area). The greatest densities at Yellow Moss and Bloody Moss where habitat is most suitable. Although cuckoos have suffered severe declines in the UK, their distribution has expanded in Caithness, most likely reflecting good availability of their meadow pipit hosts (Davey *et al.*, 2016).

Cuckoos are included on the SBL and the BoCC Red List. They are therefore considered to be of medium sensitivity.

11.6.5.2.1 Potential construction effects

As set out in Table 11-9, breeding cuckoo has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Studies have shown that skylark and meadow pipit densities remain stable and may in fact increase during windfarm construction (Pearce-Higgins *et al.* 2012; Langston & Pullan, 2003). This may be due to the ground disturbance providing enhanced foraging opportunities for invertebrate prey – similar effects may occur during the construction of the onshore cable route as similar activities will be undertaken. Therefore, construction activities may actually have a positive effect on cuckoo by increasing populations of host species. Pre-works checks for ground nesting birds, including meadow pipit, will be undertaken, and appropriate exclusion zones implemented until it has been confirmed that the breeding attempt has ended. In the worst case, as the onshore study area does not support important populations of cuckoo, and there is ample suitable habitat in the wider area (with the highest meadow pipit densities likely to occur offsite in moorland, peatland, and upland habitats rather than the agricultural environment dominating the onshore Project area), there may be a short-term effect of negligible magnitude. Therefore, no significant direct effects are predicted.

It is possible that construction activities in surrounding agricultural habitats may displace cuckoo from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging cuckoos during the breeding season are considered to be of negligible magnitude and not significant.

11.6.5.2.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding cuckoo has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, pre-works checks for ground nesting birds, including meadow pipits, will take place before any ground-breaking or devegetation works. If nesting is found, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. Furthermore, meadow pipits are abundant throughout the onshore Project area and Caithness (Davey *et al.*, 2016). With the described mitigation in place, no direct effects are predicted on breeding cuckoo during operation.

It is possible that maintenance activities may displace cuckoo from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on cuckoo during the breeding season are considered to be of negligible magnitude and not significant.

11.6.5.2.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding cuckoo during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.5.3 Winter wader assemblage

Sixteen species of wader were recorded using the onshore study area in the non-breeding season. Notably, this included eight species listed on the SBL, seven are LBAP priority species, eight on the BoCC Red List, and seven included on the Amber List. Although three species (green sandpiper, purple sandpiper, and whimbrel) are included on Schedule 1, this only applies to breeding populations.

Those listed on the SBL included bar-tailed godwit, curlew, dunlin, golden plover, green sandpiper, lapwing, purple sandpiper, and woodcock.

Those included as LBAP priority species were curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, and snipe.

Species on the BoCC Red List included curlew, dunlin, lapwing, purple sandpiper, ringed plover, whimbrel, and woodcock.

Those included on the BoCC Amber list were bar-tailed godwit, common sandpiper, green sandpiper, oystercatcher, redshank, snipe, and turnstone.

The vast majority of wader activity was recorded at Crosskirk Bay, and the cliffs and fields behind them to the east of the coast within the onshore study area.

Snipe are relatively ubiquitous, scattered across the onshore Project area in winter.

Small numbers of other species were also recorded throughout the onshore study area, including curlew, green sandpiper, golden plover, jacksnipe, and lapwing, making use of the agricultural landscape for foraging.

A single woodcock was recorded at Sibster Forest. It should be noted that trees and woodland are limited within the onshore Project area, and in Caithness overall.

15 of the 16 species are of conservation concern, listed on the SBL, or included on the BoCC Red or Amber Lists. For this reason, the winter wader assemblage is considered to be of medium sensitivity.

11.6.5.3.1 Potential construction effects

As set out in Table 11-9, the winter wader assemblage has been assessed against the following relevant impacts: direct loss of foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Embedded mitigation includes the use of HDD at the landfall site, which will minimise impact on sea cliffs and coastal habitats associated with designated sites or communities of conservation importance. Furthermore, no de-vegetation or ground-breaking works are to occur within 50 m of the cliff edge. This will ensure that sensitive coastal habitats and species, including the winter wader assemblage, are not adversely affected by the construction of the onshore Project.

Trees and woodland are particularly limited within the onshore study area, and the wider landscape in Caithness. These can be particularly important resources for passerines in winter. Although there is relatively little woodland within the onshore Project area (see chapter 10: Terrestrial non-avian ecology for more details on impacts on habitats), any removal would constitute a negative effect of low magnitude irreversible in the long-term for the wader assemblage as a result of loss of foraging and roosting habitat – particularly for woodcock. Impacts on trees and woodland will be avoided wherever possible, as detailed in chapter 12: Land use and other users, including forestry.

Other habitats will be reinstated after works, and so any loss of foraging habitat will be temporary and reversible in the short-term, resulting in a negative effect of negligible magnitude and so not significant.

It is possible that construction activities in surrounding habitats may displace wintering waders from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging waders in winter are considered to be of negligible magnitude and not significant.

11.6.5.3.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities may displace waders from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on wintering waders are considered to be of negligible magnitude and not significant.

11.6.5.3.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on the winter wader assemblage during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6 Potential effects on receptors of low sensitivity

11.6.6.1 Sparrowhawk and kestrel

Sparrowhawk have been recorded in the onshore study area historically based on RSPB and BTO records. They are also known to breed and overwinter within the onshore study area based on BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). A single sparrowhawk territory was identified within the onshore study area, over 1.3 km outside the onshore Project area (Figure 11-19) and kestrel were observed within the onshore study area, but breeding was not confirmed. Both species nest in trees, and kestrel will also make use of rocky crags. Both species were observed occasionally foraging within the onshore study area in the non-breeding season.

Between six and nine pairs of sparrowhawk are considered likely to breed in Caithness each year, although records tend to be biased towards human population centres, and so the species is likely to be under-recorded (Davey *et al.* 2016).

Kestrel have suffered severe declines throughout much of Scotland, but populations appear to remain stable in Caithness (Davey *et al.*, 2016).

Sparrowhawk and kestrel are both included on the BoCC Amber List, and kestrel is also included on the SBL. Sparrowhawk and kestrel are therefore considered to be of low sensitivity.

11.6.6.1.1 Potential construction effects

As set out in Table 11-9, breeding sparrowhawk and kestrel have been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

The only sparrowhawk territory identified was over 1.3 km outside of the onshore Project area – although there is no published disturbance distance for this species, this is outwith the distances recommended for other raptor species (Goodship & Furness, 2022). No kestrel nests were identified. Therefore, no direct effects are predicted on breeding sparrowhawk and kestrel.

Felling of trees will be avoided wherever possible, as detailed in chapter 12: Land use and other users, including forestry. If this is not possible, pre-works checks will be undertaken for nesting birds during appropriate breeding seasons, including sparrowhawk and kestrel (March to August inclusive), and appropriate exclusion zones implemented. This precaution further reduces the likelihood of direct effects.

It is possible that construction activities may displace sparrowhawk and kestrel from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area, and ample populations of prey species. Therefore, any effects on foraging sparrowhawk and kestrel are considered to be of negligible magnitude and not significant.

11.6.6.1.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding sparrowhawk and kestrel has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry, and it is highly unlikely trees will be affected. If trees are to be affected during the breeding season (sparrowhawk February to September inclusive; kestrel March to August inclusive), pre-works checks will be undertaken and exclusion zones employed as appropriate (Hardey *et al.*, 2013; Forrester *et al.*, 2007).

It is possible that maintenance activities in surrounding agricultural habitats may displace sparrowhawk and kestrel from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging sparrowhawk and kestrel are considered to be of negligible magnitude and not significant.

11.6.6.1.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on sparrowhawk and kestrel during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6.2 Breeding common gull

Common gull have been recorded in the onshore study area historically based on RSPB and BTO records (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). A single common gull breeding territory was confirmed at Yellow Moss (Figure 11-15). As this territory is located considerably inland (over 15 km from the coast), it has not been considered to be associated with the breeding seabird assemblage of the North Caithness Cliffs SPA.

Historically, common gulls nested inland in Caithness. However, this distribution has changed recently, with populations increasing at the coast and decreasing inland. The reason for this decline is thought to be related to a number of factors, such as land use change in marginal hill ground, afforestation, and predation by mammals (Davey *et al.*, 2016).

Common gull is included on the BoCC Amber List. Given the decline in inland breeding sites, breeding common gull has been considered to be of low sensitivity.

11.6.6.2.1 Potential construction effects

As set out in Table 11-9, breeding common gull has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Inland common gulls tend to breed in wetland areas with good ground cover, or on islands of waterbodies. There is relatively little suitable habitat in the onshore Project area – Yellow Moss and Bloody Moss offer the best inland breeding habitat for common gull within the onshore study area, and so there is the potential for direct and indirect effects on this species during construction. Wherever possible, construction will be timed to take place outwith the breeding season (April to August inclusive) at Yellow Moss and Bloody Moss. Where this is not possible, pre-construction surveys will be undertaken. A disturbance distance of about 60 m is given for breeding common gull in Goodship & Furness (2019). The nest will be monitored, and exclusion zone lifted when the breeding attempt has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding common gull during construction.

It is possible that construction activities may displace common gulls from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging common gulls during the breeding season are considered to be of negligible magnitude and not significant.

11.6.6.2.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding common gull has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry, and most of the onshore Project area is not suitable for breeding common gull. However, if maintenance is to take place within 100 m of Yellow Moss or Bloody Moss, pre-works checks will be undertaken within 100 m of planned activities. If nesting is found, a 100 m exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With this mitigation in place, no direct effects are predicted on breeding common gull during operation.

It is possible that maintenance activities may displace common gulls from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local

area. Therefore, any effects on foraging common gulls during the breeding season are considered to be of negligible magnitude and not significant.

11.6.6.2.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding common gulls during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6.3 Skylark

Skylark have been recorded in the onshore study area historically based on RSPB and BTO records (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Skylark were found to be widespread and abundant throughout the onshore study area, with 227 territories identified, 94 of which were within the onshore Project area (Figure 11-7a).

Although skylark have suffered severe declines in the UK, this relates to large declines in area of intensified grassland management and of arable farming, where there has been a switch from spring to autumn-sown cereal crops. Skylark remains abundant in the farmland environment in Caithness (Balmer *et al.*, 2013; Davey *et al.*, 2016). Furthermore, where commercial afforestation has historically reduced available breeding habitat for skylark in Caithness, much of this is now being felled, restoring areas for these birds (Davey *et al.*, 2016).

Skylark are included on the BoCC Red List due to large declines, largely due to changes in farming practices. However, as skylark remain abundant in the farmland environment in Caithness, they are considered to be of low sensitivity.

11.6.6.3.1 Potential construction effects

As set out in Table 11-9, breeding skylark has been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Studies have shown that skylark densities remain stable and may in fact increase during windfarm construction (Pearce-Higgins *et al.* 2012; Langston & Pullan, 2003). This may be due to the ground disturbance providing enhanced foraging opportunities for invertebrate prey – similar effects may occur during the construction of the onshore cable route as similar activities will be undertaken. Therefore, construction activities may actually have a positive effect on local skylark populations. Pre-works checks for ground nesting birds, including skylark, will be undertaken, and appropriate exclusion zones implemented until it has been confirmed that the breeding attempt has ended. In the worst case there may be a temporary effect reversible in the short-term, and of negligible magnitude, due to displacement from breeding habitat. Therefore, no significant effects are predicted.

It is possible that construction activities may also displace skylark from foraging. However, works will be temporary, and reversible in the short-term, and there is abundant similar habitat in the local area. Therefore, any effects on skylark during the breeding season are considered to be of negligible magnitude and not significant.

11.6.6.3.2 Potential operation and maintenance effects

As set out in Table 11-9, breeding skylark has been assessed against the following impacts where relevant: disturbance and damage to nesting, foraging, or roosting habitat due to maintenance works, injury to birds, and indirect effects such as pollution.

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, pre-works checks for ground nesting birds, including skylarks, will take place before any ground-breaking or devegetation works. If nesting is found, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With the described mitigation in place, no direct effects are predicted on breeding skylark during operation.

It is possible that maintenance activities may displace skylark from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on skylark during the breeding season are considered to be of negligible magnitude and not significant.

11.6.6.3.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding skylark during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6.4 Breeding passerine assemblage

Excluding skylark which have been considered separately, 46 species of passerine have been recorded in the onshore study area historically based on RSPB, BTO records, and BTO data (see SS8: Terrestrial Ornithology Ecology Technical Survey Report). Field surveys confirmed that 30 species of passerine were confirmed to breed within the onshore study area - these are shown in Figures 11-7c to 11-7d. A further ten recorded displaying behaviour indicative of breeding on one occasion. Notably, this included ten species included on the SBL, eight on the BoCC Red List, and 12 on the Amber List.

Of those confirmed to breed, dunnock (*Prunella modularis*), house sparrow (*Passer domsticus*), lesser redpoll (*Acanthis cabaret*), linnet (*Linaria cannabina*), reed bunting (*Emberiza schoeniclus*), siskin (*Carduelis spinus*), song

thrush (*Turdus philomelos*), starling (*Sturnus vulgaris*), and yellowhammer (*Emberiza citronella*) are included on the SBL. Grasshopper warbler (*Locustella naevia*), also included on the SBL, was observed displaying breeding behaviour, but breeding was not confirmed.

Of those confirmed to breed, house sparrow, lesser redpoll, linnet, starling, and yellowhammer are included on the BoCC Red List. Grasshopper warbler, greenfinch (*Chloris chloris*), and mistle thrush (*Turdus viscivorus*) are also included on the BoCC Red List and were observed displaying breeding behaviour, but breeding was not confirmed.

Of those confirmed to breed, dunnock, meadow pipit, reed bunting, rook (*Corvus frugilegus*), sedge warbler (*Acrocephalus schoenobaenus*), song thrush, wheatear (*Oenanthe oenanthe*), willow warbler (*Phylloscopus trochilus*), and wren (*Troglodytes troglodytes*) are included on the BoCC Amber List. Grey wagtail (*Motacilla cinerea*), whitethroat (*Curruca communis*), and wood pigeon (*Columba palumbus*) are also included on the BoCC Amber List and were observed displaying breeding behaviour, but breeding was not confirmed.

This assemblage includes a mix of ground, scrub, and tree nesting species, as well as some associated with buildings, reflecting the diversity within the agricultural landscape in Caithness. It should be noted that trees and woodland are limited in the onshore study area, as detailed in chapter 12: Land use and other users, including forestry.

Breeding passerines are considered to be of low sensitivity. Whilst a number are included within the SBL and BoCC Red and Amber Lists, there are no locally significant populations of these nationally important species within the Project area.

11.6.6.4.1 Potential construction effects

As set out in Table 11-9, breeding passerines have been assessed against the following relevant impacts: direct loss of nesting, foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Trees and woodland are particularly limited within the onshore study area, and the wider landscape in Caithness. These are particularly important resources for breeding passerines. Although there is relatively little woodland within the onshore Project area (see chapter 10: Terrestrial Non-avian Ecology for more details on impacts on habitats), any removal would constitute a negative effect of low magnitude irreversible in the long-term for the passerine assemblage as a result of loss of breeding habitat. Impacts on trees and woodland will be avoided wherever possible. Where this is not possible, compensatory planting will be undertaken to offset this effect, as detailed in chapter 10: Terrestrial non-avian ecology and chapter 12: Land use and other users, including forestry, as well as the outline BEP, which is submitted alongside this PPP Application.

Other habitats will be reinstated after works, and so any loss of nesting sites will be temporary and reversible in the short-term, resulting in a negative effect of negligible magnitude and so not significant.

Where construction takes place in the bird breeding season (March to September inclusive), pre-works nesting bird checks will be undertaken in any habitat type. If breeding is confirmed, an exclusion zone appropriate to the species will be implemented to avoid disturbance. The nest will be monitored and works will only recommence once the breeding attempt has been confirmed to have ended. With this mitigation in place, no direct impacts are predicted on the breeding passerine assemblage.

It is possible that construction activities in surrounding habitats may displace passerines from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging passerines are considered to be of negligible magnitude and not significant.

11.6.6.4.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. However, pre-works checks for nesting birds will take place before any ground-breaking, tree felling, or other devegetation works are undertaken, as may be required in the event that more significant maintenance works needed; such as non-routine maintenance of the onshore export cable corridor. If nesting is found, an appropriate exclusion zone will be employed and works will not take place until breeding has been confirmed to have ended. With the described mitigation in place, no direct effects are predicted on breeding passerines during operation.

It is possible that maintenance activities may displace passerines from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on passerines during the breeding season are considered to be of negligible magnitude and not significant.

11.6.6.4.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on breeding passerines during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6.5 Winter passerine assemblage

Forty-one species of passerine were found to use the onshore study area during the non-breeding season, as shown in Figures 11-15a to 11-15e. Notably, this included 12 species listed on the SBL, nine on the BoCC Red List, and eight included on the Amber List. Although two species (fieldfare and redwing) are included on Schedule 1, this only applies to breeding populations.

Those listed on the SBL included hooded crow (*Corvus cornix*), house sparrow, lesser redpoll, linnet, redwing, reed bunting, siskin, skylark, song thrush, starling, twite (*Linaria flavirostris*), and yellowhammer.

Species on the BoCC Red List included fieldfare, greenfinch, house sparrow, lesser redpoll, linnet, skylark, starling, twite, and yellowhammer. Those included on the BoCC Amber list were dunnock, meadow pipit, redwing, reed bunting, rook, song thrush, wood pigeon, and wren.

This assemblage includes a mix of ground, scrub, and tree foraging species, as well as some associated with buildings, reflecting the diversity within the agricultural landscape in Caithness. It should be noted that trees and woodland are limited in this area. Many of the species recorded gather in large single or mixed species flocks in winter, and are likely taking advantage of the agricultural landscape for food.

The winter passerine assemblage is considered to be of low sensitivity. Whilst a number are included within the SBL and BoCC Red and Amber Lists, there are no locally significant populations of these nationally important species within the Project area.

11.6.6.5.1 Potential construction effects

As set out in Table 11-9, the winter passerine assemblage has been assessed against the following relevant impacts: direct loss of foraging, or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Trees and woodland are particularly limited within the onshore study area, and the wider landscape in Caithness. These can be particularly important resources for passerines in winter. Although there is relatively little woodland within the onshore Project area (see chapter 10: Terrestrial Non-avian Ecology for more details on impacts on habitats), any removal would constitute a negative effect of low magnitude irreversible in the long-term for the passerine assemblage as a result of loss of foraging and roosting habitat. Impacts on trees and woodland will be avoided wherever possible. Where this is not possible, compensatory planting will be undertaken to offset this effect, as detailed in chapter 10: Terrestrial non-avian ecology and chapter 12: Land use and other users, including forestry, as well as the outline BEP, which is submitted alongside this PPP Application.

Other habitats will be reinstated after works, and so any loss of foraging habitat will be temporary and reversible in the short-term, resulting in a negative effect of negligible magnitude and so not significant.

It is possible that construction activities in surrounding habitats may displace passerines from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on foraging passerines in winter are considered to be of negligible magnitude and not significant.

11.6.6.5.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities may displace passerines from foraging. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. Therefore, any effects on wintering passerines are considered to be of negligible magnitude and not significant.

11.6.6.5.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored. Therefore, no direct effect is predicted on the winter passerine assemblage during decommissioning, and a temporary effect reversible in the short-term of negligible magnitude considered to be not significant as a result of disturbance displacing birds from foraging areas.

11.6.6.6 Wintering barnacle geese

Foraging barnacle geese were recorded at four locations within the onshore study area, one to the east of Shebster (two birds) and three around Buckies (all individual birds); one of which was located within the onshore Project area to the north-west of Braal Castle (Figure 11-19). No barnacle goose roosts were identified. An equal number of flocks of barnacle geese were found to forage in grazing (50%) and stubble (50%) fields.

Only a small number of barnacle geese are found in Caithness each year (Davey *et al.*, 2016). Those that are observed are likely on passage, migrating further south to known roosting sites elsewhere in the UK, or are associated with the population on Orkney, which holds the bulk of the NHZ population of this species, estimated at 6,514 birds (Wilson *et al.*, 2015). The barnacle goose population appears to exhibit a long-term positive trend, with numbers increasing (Mitchell *et al.*, 2010).

As they are relatively uncommon in Caithness, and included on the SBL and BoCC Amber List, barnacle geese are considered to be of low sensitivity.

11.6.6.6.1 Potential construction effects

As set out in Table 11-9, wintering barnacle geese have been assessed against the following relevant impacts: direct loss of foraging or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Barnacle geese were not found to use the substation search area, and habitat is suboptimal for foraging or roosting. Therefore, no permanent direct loss of foraging or roosting habitat is predicted.

It is possible that construction activities in surrounding habitats may displace barnacle geese from foraging and roosting. Works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. In addition, the level of disturbance caused during the construction stage of the Project will be similar to the existing baseline level from agriculture and the energy industry, and barnacle geese have a relatively low disturbance distance (minimum 50 m) (Goodship & Furness, 2022). Use of the minimum disturbance distances is considered appropriate as birds will be habituated to a similar level of disturbance as a result of the existing baseline level from agriculture and the energy industry, and there is abundant similar habitat in the local area which may be utilised during any short-term disturbance caused by construction.

Considering the nature of works, behaviour of barnacle geese, and it being unlikely they will be encountered at a given location during construction due to their infrequent occurrence, after embedded mitigation is implemented, any effects on wintering barnacle geese are considered to be of negligible magnitude and not significant.

11.6.6.6.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities may displace barnacle geese from foraging or roosting habitat. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area.

Therefore, any effects on wintering barnacle geese are considered to be of negligible magnitude and not significant.

11.6.6.6.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored.

Therefore, any effects on wintering barnacle geese are considered to be of negligible magnitude and not significant.

11.6.6.7 Wintering pink-footed geese

Pink-footed geese were found to forage within the onshore study area, with flocks ranging from between one and 2,500 in size. The largest foraging flock was recorded near Westfield, 400 m south of the site. The majority of pink-footed geese flocks were found to forage in grazing (53%) and stubble (44%) fields. Small numbers of flocks also made use of vegetable fields (1.4%), marsh (0.8%), lochs (0.4%), and drilled fields (0.4%). Ten roosting flocks were identified during surveys, ranging from one to 2,250 in size, with the largest being near Calder Mains, in Loch Lieurary SSSI, 2.25 km south-west of the onshore Project area.

Pink-footed geese, previously rare in Caithness, have become increasingly common during passage over the last century, with flocks of up to 2,000 not uncommon in the agricultural areas, and a peak roost count of 20,000 at Scrabster Loch in 2011 (Davey *et al.*, 2016). The NHZ population is estimated at 20,746, which is consistent with the peak roost count in Davey *et al.* (2016) (Wilson *et al.*, 2015). The pink-footed goose population appears to exhibit a long-term positive trend, with numbers increasing (Mitchell *et al.*, 2010). This is a relatively small proportion (4%) of the UK population, which was estimated at 485,509 in 2020 (Brides *et al.*, 2021).

As they are relatively abundant, and included on the BoCC Amber List, pink-footed geese are considered to be of low sensitivity.

11.6.6.7.1 Potential construction effects

As set out in Table 11-9, wintering pink-footed geese have been assessed against the following relevant impacts: direct loss of foraging or roosting habitat, direct injury of birds, direct and indirect disturbance to habitats or birds, and indirect effects such as pollution.

Pink-footed geese were not found to use the substation search area, and habitat is suboptimal for foraging or roosting. Therefore, no permanent direct loss of foraging or roosting habitat is predicted.

It is possible that construction activities in surrounding habitats may displace pink-footed geese from foraging and roosting. Works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area. In addition, the level of disturbance caused during the construction stage of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is unlikely that this would have a measurable impact on the pink-footed goose population at an NHZ or UK level.

Therefore, after embedded mitigation is implemented, any effects on wintering pink-footed geese are considered to be of negligible magnitude and not significant.

11.6.6.7.2 Potential operation and maintenance effects

The level of disturbance caused during the operation and maintenance of the Project will be similar to the existing baseline level from agriculture and the energy industry. It is possible that maintenance activities may displace pink-footed geese from foraging or roosting habitat. However, works will be temporary, and reversible in the short-term for any section of the cable route, and there is abundant similar habitat in the local area.

Therefore, any effects on wintering pink-footed geese are considered to be of negligible magnitude and not significant.

11.6.6.7.3 Potential decommissioning effects

Works associated with decommissioning may cause disturbance to ornithological receptors. The level of effect will depend on the ornithological receptors present at the time of decommissioning; although this cannot be reliably predicted at this stage, it is likely that the habitats will be similar and will support a similar suite of species.

As decommissioning works are likely to be of a similar nature and duration as construction activities, the potential effects resulting from this stage are likely to be similar to those resulting from construction, with the exception that habitat will be restored.

Therefore, any effects on wintering pink-footed geese are considered to be of negligible magnitude and not significant.

11.6.7 Summary of potential effects

A summary of the outcomes of the assessment of potential effects from the construction, operation and maintenance and decommissioning of the onshore Project is provided in Table 11-17.

Table 11-17 Summary of potential effects

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Construction and decommissioning*						
No raptor, owl or seabird species that could be considered to be associated with the North Caithness Cliffs SPA site were found to breed within the onshore study area. Therefore, no direct effects upon the qualifying features of this internationally designated site are anticipated. **No evidence of breeding golden plover, greenshank, raptor species or owl species was found within the onshore study area, and no impact upon breeding wigeon is anticipated. Therefore, no impacts upon the qualifying features of Caithness and Sutherland Peatlands SPA / Ramsar site is anticipated.** **Wintering Greenland white-fronted geese, greylag geese, and whooper swans were found to use the onshore Project area. There is potential for short-term temporary displacement from foraging habitat through disturbance. Geese and swans were not found to use the substation search area, and so no direct land-take is anticipated.** **This is not predicted to have a measurable effect on the populations associated with Caithness Lochs SPA / Ramsar.**	Designated sites of international importance: • North Caithness Cliffs SPA; • Caithness Lochs SPA / Ramsar; and • Caithness and Sutherland Peatlands SPA / Ramsar.	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
No pathway for effect upon the foraging habitats for hen harrier and short-eared owl at Broubster Leans, and no effects upon breeding wigeon are anticipated. However, there may be some indirect disturbance to teal territories during construction. **Wintering Greenland white-fronted geese, greylag geese, and whooper swans were found to use the onshore Project area. There is potential for short-term temporary displacement from foraging habitat through disturbance. Geese and swans were not found to use the substation search area, and so no direct land-take is anticipated. This is not predicted to have a measurable effect on the populations associated with Loch Calder or Loch Scarmclate SSSIs.**	Designated sites of 'national importance: • Loch Calder SSSI; • Broubster Leans SSSI; and • Loch Scarmclate SSSI.	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
No effects predicted upon breeding seabird assemblages predicted as there was no evidence of breeding or foraging within the onshore Project area, although birds were recorded overflying the onshore study area occasionally.	Breeding seabird assemblage	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Wintering Greenland white-fronted geese, greylag geese, and whooper swans were found to use the onshore Project area. There is potential for short-term temporary displacement from foraging habitat through disturbance. Geese and swans were not found to use the substation search area, and so no direct land-take is anticipated.	Wintering Greenland white-fronted geese, greylag geese, and whooper swans	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
No evidence of breeding of any raptor or owl species within the onshore study area. As such, no impacts these important terrestrial ornithology receptors are anticipated.	Peregrine, hen harrier, merlin, and short-eared owl	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of breeding wigeon and teal and possible indirect effects due to pollution and sedimentation.	Breeding wigeon and teal	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution, sedimentation and disruption of groundwater flows etc.	Passage golden plover and greenshank	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution, sedimentation and disruption of groundwater flows etc.	Breeding greylag goose	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution, sedimentation and disruption of groundwater flows etc.	White-tailed eagle	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution, sedimentation and disruption of groundwater flows etc.	Breeding barn owl	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Temporary short-term displacement from offshore foraging habitat through disturbance associated with onshore Project activities at the landfall site.	Winter seabird assemblage	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution, sedimentation and disruption of groundwater flows etc.	Breeding farmland wader assemblage	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Cuckoo	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Winter wader assemblage	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
No evidence of breeding sparrowhawk or kestrel within the onshore study area. As such, no impacts these important terrestrial ornithology receptors are anticipated.	Sparrowhawk and kestrel	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Breeding common gull	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Skylark	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Mortality, injury and disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Breeding passerine assemblage	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Direct habitat loss or damage due to land-take and the tracking of vehicles and trampling by site personnel. Disturbance of important terrestrial ornithology receptors and possible indirect effects due to pollution.	Winter passerine assemblage	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
There is potential for short-term temporary displacement from foraging habitat through disturbance. Geese were not found to use the substation search area, and so no direct land-take is anticipated.	Barnacle goose	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
There is potential for short-term temporary displacement from foraging habitat through disturbance. Geese were not found to use the substation search area, and so no direct land-take is anticipated.	Greylag goose	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Operation and maintenance						
No pathway for effect upon the qualifying features of North Caithness Cliffs SPA or Caithness and Sutherland Peatlands SPA / Ramsar have been identified. **Possible displacement of Greenland white-fronted geese, greylag geese, and whooper swans associated with Caithness Lochs SPA / Ramsar, from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.**	Designated sites of international importance: • North Caithness Cliffs SPA; • Caithness Lochs SPA / Ramsar; and • Caithness and Sutherland Peatlands SPA / Ramsar.	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
No pathway for effect upon the qualifying features of Broubster Leans SSSI have been identified. **Possible displacement of Greenland white-fronted geese, greylag geese, and whooper swans associated with Loch Calder and Loch Scarmclate SSSIs, from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.**	Designated sites of 'national importance: • Loch Calder SSSI; • Broubster Leans SSSI; and • Loch Scarmclate SSSI.	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
No effects predicted upon breeding seabird assemblages predicted as there was no evidence of breeding or foraging within the onshore Project area, although birds were recorded overflying the onshore study area occasionally.	Breeding seabird assemblage	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible displacement from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.	Wintering Greenland white-fronted geese, greylag geese, and whooper swans	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
No evidence of breeding of any raptor or owl species within the onshore study area. As such, no impacts these important terrestrial ornithology receptors are anticipated.	Peregrine, hen harrier, merlin, and short-eared owl	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding wigeon and teal	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Passage golden plover and greenshank	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding greylag goose	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	White-tailed eagle	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding barn owl	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible displacement from offshore foraging habitat due to disturbance from maintenance works at landfall site.	Wintering seabird assemblage	High	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding farmland wader assemblage	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Cuckoo	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possibly displacement from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.	Winter wader assemblage	Medium	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
No evidence of breeding sparrowhawk or kestrel within the onshore study area. As such, no impacts these important terrestrial ornithology receptors are anticipated.	Sparrowhawk and kestrel	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding common gull	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Skylark	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible disturbance, injury or mortality to ornithology receptors as a result of the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events. During more significant maintenance works (if required) there is some potential for habitat loss, more significant pollution events and the disturbance, injury and mortality of important ornithological receptors.	Breeding passerine assemblage	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

POTENTIAL EFFECT	RECEPTOR	SENSITIVITY OF RECEPTOR	MAGNITUDE OF IMPACT	CONSEQUENCE (SIGNIFICANCE OF EFFECT)	SECONDARY MITIGATION REQUIREMENTS	RESIDUAL CONSEQUENCE (SIGNIFICANCE OF EFFECT)
Possible displacement from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.	Winter passerine assemblage	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible displacement from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.	Barnacle goose	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant
Possible displacement from foraging habitat as a result of disturbance due to the movement of maintenance vehicles during the routine operation and maintenance of the site, and as a result of pollution events.	Greylag goose	Low	Negligible	Not significant	None required above embedded mitigation measures.	Not significant

** In the absence of detailed information regarding decommissioning works, and unless otherwise stated, the impacts during decommissioning of the onshore Project are considered analogous with, or likely less than, those of the construction stage.*

11.7 Assessment of cumulative effects

Cumulative effects can result from individually insignificant actions that, collectively, result in a significant effect on ornithological features; even when effects may not be detected when considering the onshore Project in isolation. It is important to take such actions into account as cumulative effects can make populations of species more vulnerable or sensitive to change, in particular for features that may already be exposed to background levels of disturbance or pressure that take them close to their critical threshold (CIEEM, 2018). Therefore, the need to consider cumulative effects is a requirement under CIEEM guidelines (CIEEM, 2018). Developments to be incorporated in such an assessment must include existing and consented developments, as well as those at the application stage.

Impacts of negligible magnitude are not considered in the cumulative impact assessment as they cannot measurably affect the outcome of an impact in combination with other developments. As all identified impacts on terrestrial ornithology receptors are negligible, a cumulative impact assessment is not considered necessary nor possible.

11.8 Inter-related effects

Inter-related effects are the potential effects of multiple impacts, effecting one receptor or a group of receptors. Inter-related effects include interactions between the impacts of the different stages of the onshore Project (i.e., interaction of impacts across construction, operation and maintenance and decommissioning), as well as the interaction between impacts on a receptor within an onshore Project stage. The potential inter-related effects for terrestrial ornithology are described below.

11.8.1 Inter-related effects between onshore Project stages

In line with the Scoping Opinion, this chapter assesses all impacts that are relevant to terrestrial ornithology receptors during the construction, operation and maintenance, and decommissioning stages of the onshore Project. Therefore, it is considered that the assessment and conclusions presented in section 11.6 provide a complete and robust assessment of all potential impacts.

The greatest impact upon terrestrial ornithology receptors is predicted to result from ground clearance during the construction stage of the onshore Project, with similar impacts anticipated during decommissioning if the onshore export cables are to be removed. However, with the embedded mitigation for terrestrial ornithology receptors in place (as detailed in section 11.5.4), the individual impacts of each component of construction and decommissioning have been assessed as not significant. Therefore, as negligible impacts are anticipated during the operation and maintenance of the onshore Project, and considering the long delay between construction and decommissioning, no additional inter-related effects beyond those presented in section 11.6 are predicted.

11.8.2 Inter-related effects within an onshore Project stage

The greatest impact upon terrestrial ornithology receptors is predicted to result from ground clearance during the construction stage of the onshore Project, with similar impacts anticipated during decommissioning if the onshore export cables are to be removed. However, whilst the potential exists for spatial and temporary interactions between different operations for both Project stages, resulting in a more significant impact upon terrestrial ornithology receptors than when a single operation is considered in isolation, no significant inter-related effects are predicted.

This is due to the fact that the embedded mitigation measures, as detailed in section 11.5.4, have reduced the levels of effect of each component of the construction or decommissioning works to 'negligible'. Therefore, the likelihood of significant inter-related effects is considered to be negligible.

For the operation of the onshore Project, it is difficult to determine the precise effects on terrestrial ornithology receptors due to the unpredictable nature of the requirement for maintenance works. However, it is expected that routine maintenance activities would be infrequent and small scale, resulting in disturbance effects of a significantly lower magnitude than those during construction or decommissioning, with the greatest impact likely to occur during any non-routine maintenance to the onshore export cables (if required). Due to the low level of impact anticipated during the operation of the onshore Project, no significant inter-related effects are predicted.

11.9 Whole Project assessment

The offshore Project is summarised in chapter 5: Project description and a summary of the effects of the offshore Project is provided in chapter 18: Offshore EIA summary. These offshore aspects of the Project have been considered in relation to the impacts assessed in section 11.6.

There is no pathway for effect on terrestrial ornithology due to the offshore aspects of this Project, as species impacted by the offshore element are not connected to populations within the onshore Project area's ZoI.

As such, whole Project impacts were assessed, and no terrestrial birds identified within the onshore study area will be impacted by the offshore Project. In addition, HDD activities during construction would be short term, temporary and reversible and so marine ornithology receptors would not be significantly affected in the long term, as such no significant whole project effects are anticipated.

11.10 Transboundary effects

Transboundary effects arise when impacts from a development within one administrative area (CIEEM, 2018) or EEA state's territory affects the environment of another EEA state(s). Impacts upon terrestrial ornithology receptors will be localised to the extent of the administrative boundary with no potential for transboundary impacts upon terrestrial ornithology receptors due to the construction, operation and maintenance and decommissioning of the onshore Project.

The potential impacts are of negligible magnitude and not significant, localised, and will not affect other EEA states; therefore, transboundary effects do not need to be considered further.

11.11 Summary of mitigation and monitoring

No secondary mitigation, over and above the embedded mitigation measures proposed in section 11.5.4, is either required or proposed in relation to the potential effects of the onshore Project on terrestrial ornithology as no adverse significant impacts are predicted.

A SHPP will be created and implemented to prevent harm to protected and notable bird species and habitats. The implementation of the SHPP will include pre-construction surveys for protected bird species as well as potentially notable habitats. These surveys will be undertaken to identify Greenland white-fronted geese, greylag geese and whooper swans making use of the onshore Project area ahead of works, allowing specific mitigation and compensation measures to be developed in consultation with NatureScot.

Targeted monitoring will be put in place to provide a check on the identified sensitive habitats identified within pre-construction surveys, and to ensure that mitigation and protection measures are in place and effective. This will be implemented via the HMP.

The Project is committed to protecting the environment by ensuring best practice and embedded mitigation measures are followed at all times during construction, operation and maintenance and decommissioning. Additionally, the Project is committed to enhancing the environment, where possible. The approach includes, but is not limited to, partnering with key stakeholders, neighbouring developers and the local community to ensure that any proposed enhancements are suited to the environment that they are situated in benefit not only the primary species but the wider ecosystem. The Project is proposing to manage important habitats for farmland breeding birds due the availability of favourable habitats within the onshore Project area and due to a notable decline in the numbers of certain breeding birds (including curlew, lapwing and redshank) over recent decades (Davey *et al.* 2016; Balmer *et al.* 2013). The outline BEP is submitted alongside the PPP Application and will be finalised after planning consent has been granted, in line with further consultations.

11.12 References

Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013). *Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland*. BTO Books, Thetford.

Banyard, A.C., Lean, F.Z.X., Robinson, C., Howie, F., Tyler, G., Nisbet, C., Seekings, J., Meyer, S., Whittard, E., Ashpitel, H.F., Bas, M., Byrne, A.M.P., Lewis, T., James, J., Stephan, L., Lewis, N.S., Brown, I.H., Hensen, R.D.E. & Reid, S.M. (2022) Detection of Highly Pathogenic Avian Influenza Virus H5N1 Clade 2.3.4.4b in Great Skuas: A Species of Conservation Concern in Great Britain. *Viruses*, **2022**, 14, 212.

Barn Owl Trust. (2001). *Survey Techniques. Leaflet No. 8*. The Barn Owl Trust, Ashburton.

Barn Owl Trust. (2012). *Barn Owl Conservation Handbook*. Pelagic Publishing, Exeter.

Barn Owl Trust (2020). *State of the UK Barn Owl population – 2020*. The Barn Owl Trust, Ashburton.

Brides, K., Wood, K.A., Auhage, S.N.V., Sigfússon, A. & Mitchell, C. (2021) *Status and distribution of Icelandic-breeding geese: results of the 2020 international census. Wildfowl & Wetlands Trust Report*. Wildfowl & Wetlands Trust, Slimbridge.

Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds, *Bird Study*, **56**:3, 381-388.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2 – Updated April 2022. Chartered Institute of Ecology and Environmental Management, Winchester. Available online at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf [Accessed 4/10/22].

Cunningham, E.J.A., Gamble, A., Hart, T., Humphreys, E.M., Philip, E., Tyler, G. & Wood, M.J. (2022) The incursion of Highly Pathogenic Avian Influenza (HPA1) into North Atlantic seabird popoulations: an interim report from the 15th International Seabird Group conference. *Seabirds*, **34**, 67-73.

Davey, P, Manson, S., Maughan, E., Omand, D., & Smith, J. (2016). *Birds of Caithness including The Breeding & Wintering Atlas 2007-2012. Revised Edition*. Caithness SOC.

Ewing, S.R., Rebecca, G.W., Heavisides, A., Court, I.R., Lindley, P., Ruddock, M., Cohen, S. & Eaton, M.A. (2011) Breeding status of Merlins Falco columbarius in the UK in 2008, *Bird Study*, **58**:4, 379-389.

Forrester, R. W., Andrews, I., J., McInerny. C., J., Murray, R., D., McGowan, R., Y., Zonfrillo, B., Betts, M., W., Jardine, D., C. & Grundy, D., S. (eds). (2007). *The Birds of Scotland*. The Scottish Ornithologists' Club, Aberlady.

Fox, T., Francis, I., Norriss, D. & Walsh, A. (2014) *Report of the 2013/14 International Census of Greenland White-fronted Geese*. Greenland White-fronted Goose Study Group & National Parks & Wildlife Service (Ireland).

Francis, I., Carl Mitchell, C., Griffin, L. & Fox, T. (2011). *Greenland White-fronted Geese Land use and conservation at small wintering sites in Scotland. GWFG Small Sites Study – final report 2011*. Wildfowl & Wetlands Trust, Slimbridge.

Franks, S.E., Douglas, D.J.T., Gillings, S. & Pearce-Higgins, J.W. (2017). Environmental correlates of breeding abundance and population change of Eurasian Curlew (*Numenius arquata*) in Britain. *Bird Study* **64**, 393-409.

Gilbert, G., Gibbons, D.W. and Evans, J. (1998). *Bird Monitoring Methods*. RSPB, Sandy.

Goodship, N. & Furness, R.W. (2019). *Seaweed hand-harvesting: literature review of disturbance distances and vulnerabilities of marine and coastal birds. Scottish Natural Heritage Research Report No. 1096.* SNH, Inverness.

Goodship, N.M. & Furness, R.W. (MacArthur Green). (2022). *An updated literature review of disturbance distances of selected bird species. NatureScot Report 1283*. NatureScot.

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring, 3rd edition*. SNH, Inverness.

Historic Environment Scotland (HES) & Scottish Natural Heritage (SNH) (2018). A Handbook on Environmental Impact Assessment, Version 5.

Institute of Environmental Management and Assessment (IEMA) (2015). *IEMA Environmental Impact Assessment Guide to Shaping Quality Development*. Institute of Environmental Management & Assessment (IEMA), Lincoln.

Joint Nature Conservation Committee (JNCC) (2021). Seabird Monitoring Programme. Available online at: https://jncc.gov.uk/our-work/smp-report-1986-2019/ [Accessed 13/09/2023].

Langston, R.H.W. & Pullan, J.D. (2003) *Windfarms and birds: an analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues*. Report T-PVS/Inf (2003) 12, BirdLife International.

Macdonald, A. (2023). *E-mail correspondence, 10 January*.

Ministry of Housing, Communities and Local Government (2005). Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf [Accessed 13/09/2023].

Mitchell, C. (2012). *Mapping the distribution of feeding Pink-footed and Inceland Greylag Geese in Scotland. A report by the Wildfowl and Wetlands Trust, as part of work jointly funded by WWT and Scottish Natural Heritage.* WWT / SNH, Slimbridge.

Mitchell, P.I., Newton, S.F., Ratcliffe, N. & Dunn, T.E. (2004). *Seabird Populations of Britain and Ireland*, JNCC, Peterborough, ISBN 0 7136 6901 2.

Mitchell, C., Colhoun, K., Fox, A.D., Griffin, L., Hall, C., Hearn, R., Holt, C. & Walsh, A. 2010. Trends in goose numbers wintering in Britain & Ireland, 1995 to 2008. *Ornis Svecica* 20, 128-143.

Mitchell, P. & Dinwoodie, C. (2023). WOW Forestry and Woodland Survey and Report. Fountains Forestry, Springfield House, Laurelhill Business Park, Stirling.

NatureScot (2020). Scottish Biodiversity List. Available online at: https://www.nature.scot/doc/scottish-biodiversity-list [Accessed 26/09/22].

NatureScot (2021). *NatureScot. Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments*. NatureScot.

NatureScot (2022). SiteLink. Available online at: https://sitelink.nature.scot/home [Accessed 15/02/2023].

Ordnance Survey (OS) (2022). OS Maps. Available online at: https://shop.ordnancesurvey.co.uk/ [Accessed 13/09/2023].

Offshore Wind Power Limited (OWPL) (2023). West of Orkney Windfarm, Outline Biodiversity Enhancement Plan. WO1-WOW-CON-EV-RP-0011. Available online at: https://www.westoforkney.com/document-library#gsc.tab=0 [Accessed 31/08/2023].

Patterson, I.J., Lambie, D., Smith, J. & Smith, R. (2013). *Survey of the feeding areas, roosts and flight activity of qualifying species of the Caithness Lochs Special Protection Area, 2011/12 and 2012/13*. Scottish Natural Heritage Commissioned Report No. 523b.

Pearce-Higgins, J.W., Stephen, L., Douse, A. & Langston, R.H.W. (2012). Greater impacts of windfarms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49, 386-394.

Pearce-Higgins, J.W. (2021). *Climate Change and the UK's Birds*. British Trust for Ornithology, Thetford.

Pearce-Higgins, J.W., Humphreys, E.M., Burton, N.H.K., Atkinson, P.W., Pollock, C., Clewley, G.D., Johnston, D.T., O'Hanlon, N.J., Balmer, D.E., Frost, T.M., Harris, S.J. & Baker, H. (2023). *BTO Research Report 752. Highly pathogenic avian influenza in wild birds in the United Kingdom in 2022: impacts, planning for future outbreaks, and conservation and research priorities. Report on virtual workshops held in November 2022.* British Trust for Ornithology, Thetford.

Regini, K. (2000). Guidelines for Ecological Evaluation and Impact Assessment. Ecology & Environmental Management In Practice, Bulletin of the Institute of Ecology and Environmental Management. Available online at: https://cieem.net/wp-content/uploads/2019/01/InPractice29sept2000.pdf [Accessed 13/09/2023].

Scottish Executive (2004). *Scotland's Biodiversity: It's In Your Hands. A strategy for the conservation and enhancement of biodiversity in Scotland*. Scottish Executive, St Andrew's House, Edinburgh.

Scottish Government (2013). 2020 Challenge for Scotland's Biodiversity. A Strategy for the conservation and enhancement of biodiversity in Scotland. Scottish Government, Edinburgh.

Scottish Government (2022). *Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland*. Scottish Government, Edinburgh.

Scottish Government (2023). *National Planning Policy 4*. Scottish Government, Edinburgh.

Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency & Forestry Commission Scotland. (2019). *Good Practice during Windfarm Construction, 4th edition*. Scottish Renewables.

Scottish Environment Protection Agency (SEPA) (2018). *Pollution Prevention Guidelines: Dealing with spills*. Guidance document PPG 22 produced by SEPA, NIEA and the EA.

Shawyer C (2012). *Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment*. Wildlife Conservation Partnership.

Sim, I.M.W., Dillon, I.A., Eaton, M.A., Etheridge, B., Lindley, P., Riley, H., Saunders, R., Sharpe, C. & Tickner, M. (2007). Status of the Hen Harrier *Circus cyaneus* in the UK and Isle of Man in 2004, and a comparison with the 1988/89 and 1998 surveys, *Bird Study*, **54**:2, 256-267.

Scottish Natural Heritage (SNH) (2002). *Natural Heritage Zones: A National Assessment of Scotland's Landscapes*. SNH.

SNH (2009). *Monitoring the impact of onshore windfarms on birds*. SNH.

SNH (2010). *Survey Methods for Use in assessing the Impacts of Onshore Windfarms on Bird Communities*. November 2005 (revised December 2010). SNH, Battleby.

SNH (2016). *Assessing Connectivity with Special Protection Areas (SPAs)*. Version 3 – June 2016. SNH.

SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore windfarms*. March 2017. Version 2. SNH, Inverness.

SNH (2018). *Guidance – Assessing the significance of impacts on bird populations from onshore windfarms that do not affect protected areas*. SNH.

Soriano-Redondo, A., Inger, R., Sherley, R.B., Rees, E.C., Abadi, F., McElwaine, G., Colhoun, K., Einarsson, O., Thorstensen, S., Newth, J., Hodgson, D.J. & Bearhop, S. (2023). Demographic rates reveal the benefits of protected areas in a long-lived migratory bird. *Proceedings of the National Academy of Sciences* **120**(12), e2212035120.

Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* **114**, 723-747.

Swale, J. (2023). *E-mail correspondence, 02nd March 2023*. The Highland Council (THC) (2012). Highland-Wide Local Development Plan (HwLDP). Available online at:

https://www.highland.gov.uk/info/178/development_plans/199/highland-wide_local_development_plan [Accessed 13/09/2023].

THC (2013). Supplementary Guidance: Highland's Statutorily Protected Species. The Highland Council.

THC (2018). Caithness and Sutherland Local Development Plan (CaSPlan). Available online at: https://www.highland.gov.uk/downloads/file/19712/casplan_adopted [Accessed 13/09/2023].

Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W. & Tasker, M.L. (1995). *Seabird monitoring handbook for Britain and Ireland*. JNCC / RSPB / ITE / Seabird Group, Peterborough.

Watson, D. (1977). *The Hen Harrier*. T and A D Poyser Ltd.

Watson, D. (1991). Hen harriers breeding in a tree nest: further comments. *Irish Birds* **4**, 418–420.

Wernham, C., Toms, M., Marchant, J., Clark, J., Siriwardena, G. & Baillie, S. (2002). *The Migration Atlas: Movements of the Birds of Britain and Ireland*. British Trust for Ornithology, Thetford.

Wilson, M.W., Austin, G.E., Gillings S. & Wernham, C.V. (2015). *Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504.* Scottish Windfarm Bird Steering Group.

11.13 Abbreviations

ACRONYM	DEFINITION
AA	Appropriate Assessment
ArcGIS	Aeronautical Reconnaissance Coverage Geographical Information System
BAP	Biodiversity Action Plan
BEP	Biodiversity Enhancement Plan
BoCC	Birds of Conservation Concern (Stanbury et al., 2021)
BTO	British Trust of Ornithology
CaSPlan	Caithness and Sutherland Local Development Plan
CC-BY	Creative Commons License with attribution
CC-BY-NC	Creative Commons Attribution Non-Commercial license
CCO	Creative Commons Attribution License
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CJB	Cable Joint Bay
CLO	Community Liaison Officer
cm	Centimetre
CMS	Construction Method Statements
COP	Conference of the Parties
DAQMP	Dust and Air Quality Management Plan
dB	Decibels
DBA	Desk-Based Assessment
EcIA	Ecological Impact Assessment
ECoW	Environmental Clerks of Work

ACRONYM	DEFINITION
EEA	European Economic Area
EIA	Environmental Impact Assessment
EPS	European Protected Species
EU	European Union
GWDTE	Ground Water Dependent Terrestrial Ecosystems
GWFG	Greenland White-Fronted Geese
ha	Hectares
HBRG	Highland Biological Recording Group
HDD	Horizontal Directional Drilling
HES	Historic Environment Scotland
HGV	Heavy Good Vehicle
HPAI	Highly Pathogenic Avian Influenza
HRA	Habitat Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
HwLDP	Highland-wide Local Development Plan
IEMA	Institute of Environmental Management & Assessment
INNS	Invasive Non-native Species
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
km	Kilometres
LBAP	Local biodiversity action plans
LNR	Local Nature Reserve

ACRONYM	DEFINITION
m / m^2 / m^3	Metres / Metres squared / Cubic metre
MD-LOT	Marine Directorate - Licensing Operations Team
MS-LOT	Marine Scotland - Licensing Operations Team
NCSA	Nature Conservation Scotland Act
NBN	National Biodiversity Network
NHZ	Natural Heritage Zones
NNR	National Nature Reserve
NPF4	National Planning Framework 4
NVC	National Vegetation Classification
ODPM	Office of the Deputy Prime Minister
OGL	Open Government Licence
OIC	Orkney Islands Council
OMP	Outline Management Plan
OS	Ordnance Survey
OWPL	Offshore Wind Power Limited
PBA	Protection of Birds Act
PDE	Project Design Envelope
PFOWF	Pentland Floating Offshore Windfarm
PPP	Planning Permission in Principle
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List

ACRONYM	DEFINITION
SEPA	Scottish Environment Protection Agency
SHPP	Species and Habitat Protection Plan
SINC	Site of Interest for Nature Conservation
SNH	Scottish Natural Heritage (now known as NatureScot)
SOC	Scottish Ornithologists Club
SPA	Special Protection Area
SRMP	Soil Resource Management Plan
SS	Supporting Study
SSSI	Sites of Special Scientific Interest
SuDS	Sustainable Drainage System
THC	The Highland Council
TJB	Transition Joint Bay
UK	United Kingdom
UKBAP	United Kingdom Biodiversity Action Plan
USB	Universal Serial Bus
WANE	Wildlife and Natural Environment (as amended in Scotland) Act 2011
WCA	Wildlife and Countryside Act
WeBS	Wetland Bird Survey
WWT	Wildfowl & Wetlands Trust
ZoI	Zone of Influence

11.14 Glossary

TERM	DEFINITION
Accidental release	A non-intentional introduction of pollutants into the environment.
Corvid	A bird of the crow family.
Crepuscular	An animal most active or appearing at the time of day just before the sun goes down, or just after the sun rises, when the light is not bright.
Dhuloch	A small waterbody in peatland habitat.
Dystrophic loch	A waterbody with acidic water and low oxygen levels due to high levels of dissolved humus, supporting little life.
Lochan	A small loch.
Mesotrophic loch	A waterbody with a moderately rich plant nutrient environment, or those having a range of submerged plant communities.
Muirburn	The intentional and controlled burning of moorland vegetation to encourage new growth (either heather or grassland) for the management of moorland game and wildlife or for improving the grazing potential of the moorland for livestock or deer. Muirburn is also used to maintain moorland landscapes and habitats, and to reduce the risk of damage to habitats from wildfires.
Oligotrophic loch	A waterbody relatively poor in plant nutrients and containing abundant oxygen in deeper areas.
Ramsar site	Wetland of international importance designated under the Ramsar Convention.
Rank vegetation	Grassland or marsh vegetation that has grown abundantly without being cut or grazed for some time.
Riparian habitat	Land adjacent to waterbodies, including submerged land such as streambeds.
Skein	Group of geese and/or swans in flight.