WEST SPRINGFIELD SOLAR

Shadow Habitats Regulations Appraisal

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1 INTRODUCTION

1.1.1 RPS Consulting Services Ltd. (RPS) was commissioned by TRIO POWER Limited to carry out a shadow Habitat Regulation Appraisal (sHRA) of the proposed West Springfield Solar development (the 'Proposed Development'), located within the Rankeilour Estate, near Springfield, Fife (central Ordnance Survey (OS) grid reference NO 33397 11803) (Figure 1).

1.1.2 This sHRA examines firstly whether or not the Proposed Development is likely to give rise to a likely significant effect (LSE) on any European site (the 'screening' stage of the HRA process), and secondly to assess the implications of the Proposed Development on European sites where LSEs could not be excluded at the screening stage.

1.1.3 The Planning Authority, in this case the Energy Consents Unit, shall be provided with this sHRA Report in support of the proposals and to assist the Planning Authority in its role as a Competent Authority fulfilling its duties in accordance with The Conservation of Habitats and Species Regulations 2017 (as amended), otherwise known as the Habitats Regulations.

1.1.4 This report will assist the Competent Authority in fulfilling its duties in accordance with Regulation 43 of The Habitats Regulations, which transposes certain aspects of Articles 6(3) and 6(4) of Council Directive 92/43/EEC (the 'Habitats Directive').

1.2 Habitats Regulations Appraisal

1.2.1 The Habitats Regulations require that a Habitats Regulations Appraisal (HRA) must be carried out on all plans and projects that are likely to have significant effects on European sites, which includes a network of sites of ecological importance that are often referred to as the Natura 2000 network. European sites include Special Areas of Conservation (SACs), candidate SACs (cSACs), Sites of Community Importance (SCI), Special Protection Areas (SPAs) and as a matter of policy, possible SACs (pSACs), potential SPAs (pSPAs) and Ramsar sites.

1.2.2 It is recognised that following the United Kingdom's departure from the European Union (EU), European sites in the UK are no longer considered Natura 2000 sites for the purpose of an assessment pursuant to Article 6(3) of the Habitats Directive. However, pursuant to the relevant amendments to the Conservation (Natural Habitats, andc.) Regulations 1994, following the departure of the UK from the EU, those sites still retain the same protection under UK law as they did prior to the UK's exit from the EU and the provisions of the Habitats Directive remain relevant.

1.2.2 Guidance on HRA

1.2.1 The European Commission (EC) has published a number of documents which provide a significant body of guidance on the requirements of a HRA, most notably including, 'Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (EC, 2021), which sets out the principles of how to approach decision making during the process. Additional guidance was reviewed from NatureScot, the nature conservation body within Scotland.

1.2.2 In addition to the aforementioned guidance document, the following list identifies other documents and sources of guidance for HRA, particularly in Scotland:

- Habitats Regulations Appraisal (HRA) of Local Development Plans (LDPs) - Guidance for planning authorities in Scotland (NatureScot, 2024a);
- Nature and Biodiversity Cases Ruling of the European Court of Justice (EC, 2006);
- Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC' (EC, 2019);
- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission Notice Brussels C(2021) 6913 final (EC, 2021); and

- NatureScot Guidance Note – The handling of mitigation in Habitats Regulations Appraisal – the People Over Wind CJEU judgement (NatureScot, undated-a).

1.2.3 Overview of the HRA Process

1.2.1 An HRA is a sequential process, consisting of four main stages (Plate 1):

- **Stage 1: Screening**: to determine if the plan or project is likely to have any LSEs on any European site, either alone or in combination with other plans or projects;
- **Stage 2: Appropriate Assessment (AA)**: to assess whether any LSEs identified in Stage 1: Screening are expected to result in adverse effect on the integrity of the European site, with respect to its conservation objectives. The assessment is based both on the plan or project alone and in combination with other plans or projects;
- **Stage 3: Derogation**: if it is determined under Stage 2: Appropriate Assessment that the plan or project will result in adverse effects on site integrity (AESI) of any European site, further procedures and assessment must be made, as described in Article 6(4) of the Habitats Directive. These procedures include examining alternative solutions; examining imperative reasons of overriding public interest (IROPI); and identification, assessment and compensatory measures; and
- **Conclusion**: a conclusion will be made by the Competent Authority on whether or not to grant authorisation for the plan or project.

1.2.2 Stage 1: Screening and Stage 2: Appropriate Assessment are required under Article 6(3) of the Habitats Directive and Stage 3: Derogation is outlined in Article 6(4) of the Habitats Directive.

1.2.3 Each stage determines whether a further step in the process is required. If, for example, the conclusion at the end of Stage 1 is that the plan or project will not result in any LSEs on any European site, there is no requirement to proceed further. Additionally, the HRA process for European sites may conclude at any given stage whereas others are taken forward to subsequent stages. More details on each of the three stages are provided below.

1.2.4 In all stages of HRA, the precautionary principle should be used in decision making (EC, 2019). The precautionary principle states that the absence of scientific evidence or uncertainty cannot be used as a justification for approval of the action (e.g., concluding no LSE or no AESI).

1.2.5 Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are also considered in both Stage 1: Screening and Stage 2: Appropriate Assessment. Whilst the Habitats Directive does not explicitly define which other plans and projects are within the scope of the in-combination provision of Article 6(3), it is important to note that the underlying intention of this provision is to take account of cumulative impacts on the European site. The EC advises that ***"as regards other proposed plans or projects, on grounds of legal certainty it would seem appropriate to restrict the in-combination provision to those which have been actually proposed, i.e. for which an application for approval or consent has been introduced"*** (EC, 2019).

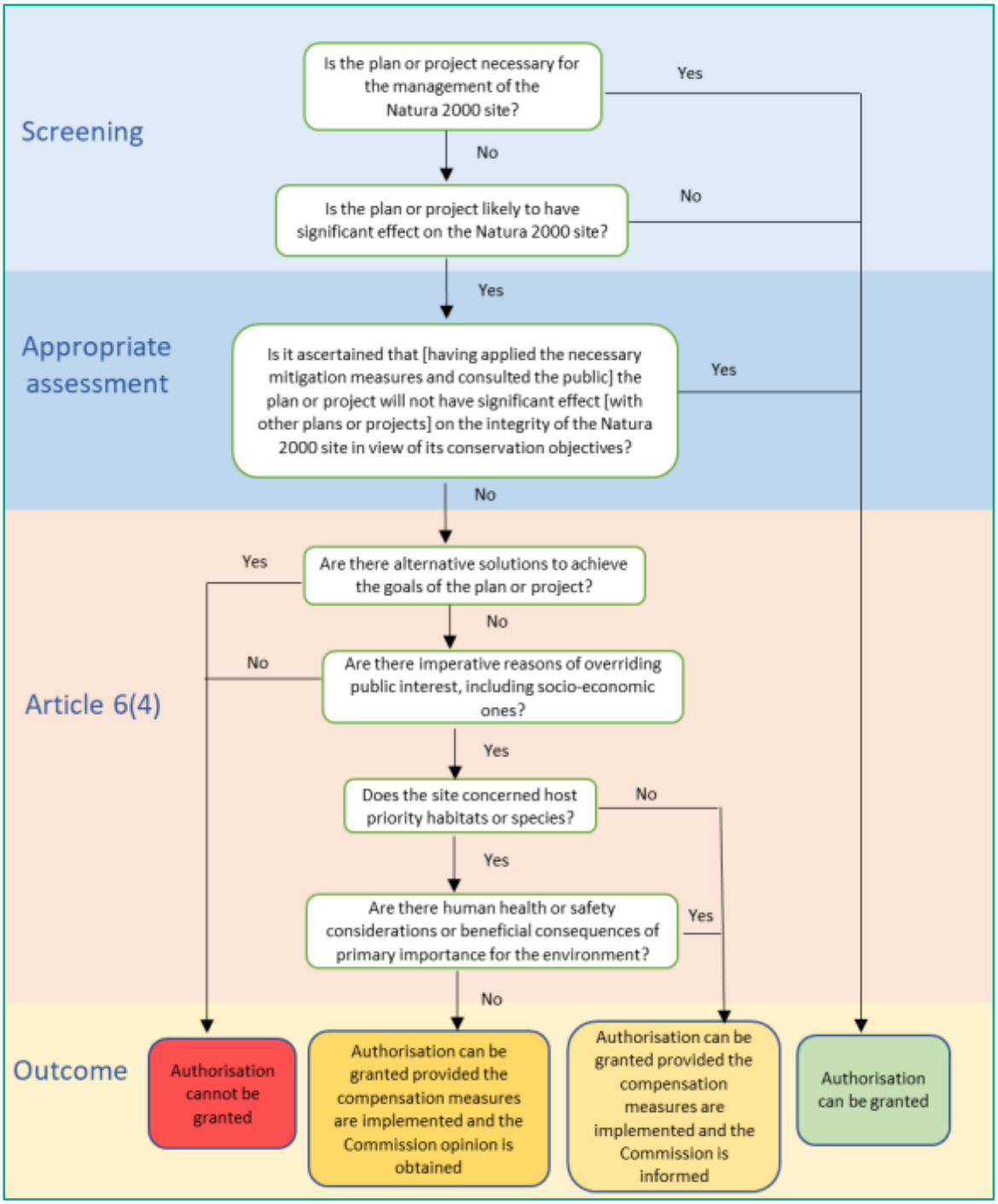

Plate 1: Stages of the HRA process (taken from EC, 2021)

Stage 1: Screening

1.2.6 Stage 1: Screening considers whether the plan or project is likely to have an LSE on any of the qualifying interests of a Natura 2000 site, either alone or in combination with other plans or projects (EC, 2021). Plans or projects that are directly connected to or necessary for the management of a Natura 2000 site are not subject to HRA, and therefore identification of LSEs is not necessary.

1.2.7 The EC advises that AA under Article 6(3) of the Habitats Directive is triggered by the likelihood, not certainty, of significant effects arising from plans or projects, regardless of their location inside or outside a European site. A likely effect is one that cannot be ruled out on the basis of objective information, both alone and in combination with other plans or projects (NatureScot, 2024a). The significance of effects should be determined in relation to the specific features and environmental conditions of the site concerned by the plan or project, taking particular account of the site's conservation objectives and ecological characteristics.

1.2.8 The threshold for a LSEs is treated in the screening exercise as being above a "de minimis" level. A "de minimis" effect is a level of risk that is too small to be concerned with when considering ecological requirements of an Annex I habitat or a population of Annex I or II species present on a European site necessary to ensure their favourable conservation condition (Natural England, 2016). If low level effects on habitats, individuals or populations of species are judged to be in this order of magnitude and that judgment has been made in the absence of reasonable scientific doubt, then those effects are not considered to be LSEs.

1.2.9 In identifying LSEs, the local circumstances of the site and the ecological characteristics of its qualifying feature(s) should be considered. It is possible that a likely effect could be significant for one qualifying feature but not another. The precautionary principle must be used in screening, and where uncertainty remains, judgement should err on the side of identifying LSEs and taking the assessment forward to Stage 2: Appropriate Assessment.

1.2.10 In line with the 2018 Court of Justice of the European Union (CJEU) ruling in case C-323/17 People Over Wind and Peter Sweetman v Coillte Teoranta ("People Over Wind"), measures intended to avoid or reduce harmful effects of the plan or project on a European site (referred to as mitigation measures) cannot be used as a reason to conclude no LSEs on the European site (EC, 2019). However, measures that are considered intrinsic or essential to the plan or project that also have the effect of reducing impacts on a European site can be considered during the screening stage (NatureScot, undated-a).

Stage 2: Appropriate Assessment

1.2.11 For all European sites where LSEs were identified in Stage 1: Screening, an AA must be made. The purpose of AA is to assess the implications of the plan or project with respect to the conservation objectives of the European site, both alone and in combination with other plans and projects (EC, 2021). Mitigation measures can be considered when undertaking Stage 2: Appropriate Assessment.

1.2.12 The test of Stage 2: Appropriate Assessment is whether or not the plan or project will result in adverse effects on the integrity of the European site. In this context, the integrity of the site is related specifically to its qualifying feature(s) and associated conservation objectives (EC, 2019). The integrity of the site is typically considered to be the "coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated" (EC, 2019).

1.2.13 The conclusions of Stage 2: Appropriate Assessment should be scientifically robust and be sufficient to allow the Competent Authority to determine with certainty whether the plan or project will result in AESI on the site. The precautionary principle should also be used in decision making. Regarding AA, the precautionary principle requires proving the negative, that is, it must be demonstrated that there will be no adverse effects on site integrity (NatureScot, 2024a). Where uncertainty remains, the Competent Authority must conclude that there will be AESI on the site.

Derogation

1.2.14 Certain exceptions to the conclusions made in Stage 2: Appropriate Assessment are allowed under Article 6(4) of the Habitats Directive. The three key components of derogation under Article 6(4) include (EC, 2021):

- alternative solutions have been considered and it can be demonstrated that the solution put forward for HRA is the least damaging for habitats and species with respect to the integrity of the European site, and that now other feasible alternative exists that would not adversely affect the integrity of the site;
- there are no imperative reasons of overriding public interest for the plan or project to not go ahead; and
- all compensatory measures to ensure that the overall coherence of the European site is protected are taken.

1.2.15 Application of Article 6(4) is not automatic, and the Competent Authority may still refuse to grant authorisation based on the conclusions of Stage 2: Appropriate Assessment.

Conclusion

1.2.16 Following the above steps, a conclusion will be made by the Competent Authority on whether to grant authorisation of the plan or project. For the Proposed Development to be consented, the Appropriate Assessment must conclude that it will not adversely affect the integrity of the European site(s), or a derogation under Article 6(4) must be granted. The precautionary principle must be employed during the decision-making process, and where uncertainty exists, authorisation must be refused.

2 THE PROPOSED DEVELOPMENT

2.1.1 The Proposed Development (also referred to as the 'site') lies between the settlements of Springfield (located approximately 0.4km east), and Ladybank (located approximately 2.1km southwest), and is 1.2km south of the hamlet of Bow of Fife. The land under consideration comprises approximately 103ha of agricultural farmland within the Rankeilour Estate (Figure 1).

2.1.2 The Proposed Development will consist of the following elements:

- solar photovoltaic (PV) panels,
- 24 battery units housed in containers;
- inverters;
- transformers;
- high voltage (HV) switch gear and control equipment;
- cabling and interconnectors;
- onsite substations and control building;
- one communications container; and two spares containers;
- site access and onsite tracks of 4m width;
- security fencing (2.4 m in height) and CCTV;
- a replacement bridge over Rankeilour Burn; and
- temporary construction compound and two welfare containers.

2.1.3 The specifications of the solar PV panels are:

- Combined capacity of 65.28MWp;
- module proposed is the TrinaSolar Vertex N;
- modules will stand approximately 1m Above Ground Level (AGL) at minimum point;
- maximum height of the modules will be up to 2.67m AGL;
- modules will be angled to 20° to the horizontal and arranged in rows;
- each module will be mounted upon a prefabricated alloy metal frame, anchored to the ground by steel piles 1.5m – 3m below ground.

2.1.4 The Proposed Development will not contain the following elements:

- site lighting; and
- any overhead powerlines.

2.1.5 Construction of the Proposed Development is anticipated to take 9 -12 months and is anticipated to commence in early 2028. A Construction Environmental Management Plan (CEMP) will be prepared and agreed with Fife Council prior to the commencement of construction activity to ensure that appropriate measures are put in place to manage noise, prevent pollution (e.g., dust, air and water pollution), and to protect sensitive habitats and species.

2.1.6 Regular ongoing maintenance will be undertaken during operation of the Proposed Development. This will consist of monthly site inspections by technicians who will access the Proposed Development. Additional unscheduled visits may be required as necessary. Ongoing maintenance activities are expected to include maintenance and cleaning purposes.

2.1.7 During operation of the Proposed Development, the land around the panels will remain as grass cover, seeded with wildflower mix, and will be managed for grazing (likely by sheep).

2.1.8 The Proposed Development will have an operational life of 40 years. After the site is decommissioned, all infrastructure will be removed, and the site will be restored to agricultural use.

A decommissioning and restoration plan will be agreed with Fife Council prior to commencement of construction.

2.1.9 The full development description can be found in Chapter 3: Proposed Development Description of the West Springfield Solar EIA Report.

3 STAGE 1: SCREENING

3.1 Identification of European Sites

3.1.1 A 2km buffer around the Proposed Development was used to identify any European sites designated for habitats or less mobile species. A 20km buffer was used to identify any European sites designated for highly mobile qualifying interests (e.g., bird species). Watercourses within the Proposed Development were also followed downstream to determine if there were any hydrological links to European sites.

3.1.2 Based on the criteria above, nine European sites were identified to be considered for LSEs in Stage 1: Screening, all of which are designated for ornithological features (Table 1). Four of these sites; Cameron Reservoir SPA, Firth of Forth SPA, Firth of Tay and Eden Estuary SPA, and Loch Leven SPA, also have Ramsar sites associated with them, designated for the same ornithological features.

Table 1: European sites within 20km of the Proposed Development

Site Name	Site Type	Distance from Proposed Development	Qualifying features
Firth of Tay and Eden Estuary	SPA and Ramsar	10.42km	**Non-breeding:** • Bar-tailed godwit *Limosa lapponica* • Common scoter *Melanitta nigra* • Cormorant *Phalacrocorax carbo* • Dunlin *Calidris alpina alpina* • Eider *Somateria mollissima* • Goldeneye *Bucephala clangula* • Goosander *Mergus merganser* • Grey plover *Pluvialis squatarola* • Greylag goose *Anser anser* • Icelandic black-tailed godwit *Limosa limosa islandica* • Long-tailed duck *Clangula hyemalis* • Oystercatcher *Haematopus ostralegus* • Pink-footed goose *Anser brachyrhynchus* • Red-breasted merganser *Mergus serrator* • Redshank *Tringa tetanus* • Sanderling *Calidris alba* • Shelduck *Tadorna tadorna* • Velvet scoter *Melanitta fusca* • Waterfowl assemblage **Breeding:** • [redacted] • Marsh harrier *Circus aeruginosus*
Firth of Forth	SPA and Ramsar	11.26km	**Non-breeding:** • Bar-tailed godwit • Common scoter • Cormorant • Curlew *Numenius arquata* • Dunlin • Eider • Golden plover *Pluvialis apricaria* • Goldeneye

Site Name	Site Type	Distance from Proposed Development	Qualifying features
			• Great crested grebe *Podiceps cristatus* • Grey plover *Pluvialis squatarola* • Knot *Calidris canutus* • Lapwing *Vanellus vanellus* • Long-tailed duck • Mallard *Anas platyrhynchos* • Oystercatcher • Pink-footed goose • Red-breasted merganser • Red-throated diver *Gavia stellata* • Redshank • Ringed plover *Charadrius hiaticula* • Scaup *Aythya marila* • Shelduck • Slavonian grebe *Podiceps auri*tus • Turnstone *Arenaria interpres* • Velvet scoter • Wigeon *Anas penelope* • Waterfowl assemblage **Passage:** • Sandwich tern *Sterna sandvicensis*
Outer Firth of Forth and St Andrews Bay Complex	SPA	11.44km	**Non-breeding:** • Black-headed gull *Chroicocephalus ridibundus* • Common gull *Larus canus* • Common scoter • Eider • Goldeneye • Guillemot *Uria aalge* • Herring gull *Larus argentatus* • Kittiwake *Rissa tridactyla* • Little gull *Hydrocoloeus minutus* • Long-tailed duck • Razorbill *Alca torda* • Red-breasted merganser • Red-throated diver • Shag *Phalacrocorax aristotelis* • Slavonian grebe • Velvet scoter • Seabird assemblage • Waterfowl assemblage **Breeding:** • Arctic tern *Sterna paradisaea* • Common tern *Sterna hirundo* • Gannet *Morus bassanus* • Guillemot • Herring gull • Kittiwake • Manx shearwater *Puffinus puffinus*

Site Name	Site Type	Distance from Proposed Development	Qualifying features
			• Puffin *Fratercula arctica* • Shag • Seabird assemblage
Cameron Reservoir	SPA and Ramsar	12.57km	**Non-breeding:** • Pink-footed goose
Loch Leven	SPA and Ramsar	18.23km	**Non-breeding:** • Cormorant • Gadwall *Anas strepera* • Goldeneye • Pink-footed goose • Pochard *Aythya ferina* • Shoveler *Anas clypeata* • Teal *Anas crecca* • Tufted duck *Aythya fuligula* • Whooper swan *Cygnus cygnus* • Waterfowl assemblage **Habitat (Ramsar site only):** • eutrophic loch

3.1.3 The Firth of Tay and Eden Estuary SPA and Ramsar site comprise estuarine and coastal habitats in eastern Scotland from the mouth of the River Earn in the inner Firth of Tay, east to Barry Sands on the Angus coast and St Andrews on the Fife coast. The site lies approximately 10km north and north east from the Proposed Development. The habitats contain areas of intertidal flats, steeply shelving mud and shingle, reedbeds, mussel beds and saltmarsh (NatureScot, 2018a). The SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex I species: marsh harrier (1992 to 1996, an average of four females, 3% of the population of Great Britain (GB)); [redacted] and bar-tailed godwit (1990/91 to 1994/95, a winter peak mean of 2,400 individuals, 5% of the GB population) (NatureScot, 2018a). The SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species (Table 1) and over 20,000 individual waterfowl. During the period 1990/91 to 1994/95 a winter peak mean of 48,000 individual waterfowl was recorded, comprising 28,000 wildfowl and 20,000 waders, including nationally important populations of 18 species (NatureScot, 2018a).

3.1.4 The Firth of Forth SPA and Ramsar site is a complex of estuarine and coastal habitats in south east Scotland stretching from Alloa to the coasts of Fife and East Lothian. The site includes extensive invertebrate-rich intertidal flats and rocky shores, areas of saltmarsh, lagoons and sand dune. The SPA and Ramsar site are approximately 11km south of the Proposed Development at their closest point. The SPA qualifies under Article 4.1 by regularly supporting a population of European importance of the Annex 1 species: sandwich tern during the passage period (a winter peak mean during the five year period 1993/94 to 1997/98 of 1,617 individuals, 6% of the GB population) (NatureScot, 2018b). The site further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species (1993/94 to 1997/98 winter peak means): pink-footed goose; shelduck; knot; redshank turnstone (NatureScot, 2018b). The Firth of Forth SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1992/93 to 1996/97 a winter peak mean of 95,000 individual waterfowl was recorded, comprising 45,000 wildfowl and 50,000 waders including nationally important populations of 23 species (Table 1) (NatureScot, 2018b).

3.1.5 The Cameron Reservoir SPA and Ramsar site is a mesotrophic reservoir with a grassland and willow Salix carr fringe, covering 64.4ha in Fife, Scotland, located approximately 12km east of the Proposed Development (NatureScot, 1994). The site is of international importance for its wintering pink-footed geese. During the five-winter period 1986/87 to 1990/91 an average peak of 6,760

pink-footed geese was recorded, representing over 6% of the Icelandic/Greenlandic population (NatureScot, 1994).

3.1.6 The Outer Firth of Forth and St Andrews Bay Complex SPA is a large estuarine/marine site on south-east coast of Scotland consisting of the two closely adjacent Firths of Forth and Tay. The SPA encompasses the coastal areas to the north east around to the south west of the site, and is approximately 11km south from the Proposed Development, at closest point. The area supports a wide variety of both pelagic and demersal fish, including sand eels, and crustaceans, molluscs and marine worms, all of which, especially sand eels, comprise the prey of the waterfowl species (NatureScot, 2020). The SPA qualifies under Article 4.1 by regularly supporting a non-breeding population of European importance of the following Annex 1 species: red-throated diver; Slavonian grebe; little gull and feeding common tern and Arctic tern from the adjacent breeding colonies (NatureScot, 2020). The SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of migratory common eider and by regularly supporting in excess of 20,000 individual waterfowl including nationally important populations of long-tailed duck; common scoter; velvet scoter; common goldeneye; and red-breasted merganser, as well as migratory seabird, foraging European shag from the nearby colonies, and Northern gannet (NatureScot, 2020). The site also regularly supports in excess of 20,000 seabirds during both the breeding season and non-breeding season (Table 1) (NatureScot, 2020).

3.1.7 The Loch Leven SPA and Ramsar site lies approximately 18km south west of the Proposed Development. Loch Leven is the largest natural eutrophic lake in Britain but is relatively shallow, with a diverse aquatic and shoreline vegetation (NatureScot, 2000). The site covers 1,608ha and is surrounded by farmland and the town of Kinross. The SPA qualifies under Article 4.1 by supporting a population of European importance of wintering Icelandic whooper swan (1993/94-97/98 winter peak mean of 97, 2% of British population), and also qualifies under Article 4.2 by regularly supporting populations of European importance of wintering Icelandic/Greenlandic pink-footed geese (1993/94-97/98 winter peak mean of 17,163, 8% of total population, all of which winters in Britain) and shoveler (509, 1% of north west European and 5% of British population) (NatureScot, 2000). Loch Leven SPA further qualifies under Article 4.2 by regularly supporting a wintering waterfowl assemblage of European importance (1993/94-1997/98 winter peak mean of 34,280) which includes large populations of cormorant; gadwall; teal; pochard; tufted duck; and goldeneye (NatureScot, 2000).

3.2 Establishing Likely Significant Effects

3.2.1 The possibility of LSE is considered in this HRA using the source-pathway-receptor model. The three key elements of this model are:

- **source**: The individual elements of the Proposed Development that have the potential to affect an identified ecological feature (or receptor).
- **pathway**: The means or route by which a source can affect the ecological feature.
- **receptor**: the ecological feature that could be affected by the source. An ‘ecological feature’ is defined as a qualifying feature of the European site for which conservation objectives have been set.

3.2.2 Each element of the source-pathway-receptor model can exist for a Proposed Development however an effect is created when there is a linkage between the source, pathway and receptor. The nine European sites identified in Table 1 were all assessed for LSEs using this model.

3.2.3 There is a potential for LSEs on the qualifying species of the nine European sites through:

- habitat loss and/or fragmentation;
- disturbance (noise and/or visual); and
- injury and/or mortality.

3.2.4 Given the distance between the European sites and the Proposed Development, no direct impacts from pollutants are anticipated. The Proposed Development site is hydrologically connected to the Firth of Tay and Eden Estuary SPA (but not the other European sites) through the River Eden (SPA located approximately 10km downstream of the Proposed Development site), and therefore

there is a potential for indirect impacts from inputs of pollutants on habitats within the SPA. However, standard pollution prevention measures will be in place during construction which will minimise the risk and impact of pollution impacts. Considering this, the potential impact of indirect effects of pollution inputs is considered to be **negligible**, and therefore this impact is not considered in this HRA.

3.2.5 No overhead powerlines are required for the Proposed Development, and therefore there is no risk of collision.

3.2.2 Firth of Tay and Eden Estuary SPA and Ramsar

Non-Breeding Species

3.2.1 Pink-footed geese and greylag geese are present within the SPA and Ramsar site from approximately September to April each year, where they roost within the site, on the foreshore and on Mugdrum Island, and forage both within the SPA and Ramsar site and on adjacent agricultural land (Scottish Nature Heritage [SNH], 2010a). Pink-footed geese and greylag geese predominantly forage on winter stubble, grass and winter cereals (Bell, 1988). The habitat within the site provides suitable foraging habitat for geese and is within the 20km foraging range for the species (SNH, 2016), and therefore there is a **potential for LSE** on pink-footed geese and greylag geese from the SPA.

3.2.2 Common scoter, velvet scoter, eider, goldeneye, shelduck, and long-tailed duck are primarily present within the SPA and Ramsar site during the winter months, typically from late autumn through early spring, with peak numbers observed between November and March as they migrate to the estuary for feeding and shelter. These species inhabit coastal waters, particularly in sheltered and shallow bays and nearshore areas where they can access abundant food resources such as molluscs, crustaceans, and other marine invertebrates. As these species utilise coastal and marine habitats, there is no potential for the Proposed Development to impact habitat availability for this species. No powerlines are necessary for the Proposed Development, and therefore there is no risk of collision during migration. Given this, there is considered to be no impact pathway between the Proposed Development and common scoter, velvet scoter or eider at the SPA or Ramsar site, and therefore it is concluded that there will be **no LSE** on these qualifying features.

3.2.3 Cormorants are typically present year-round in the SPA, though it is the non-breeding population which is a qualifying feature of the SPA and Ramsar site as their numbers peak during the winter months when they gather in larger groups. Cormorants inhabit a variety of coastal and freshwater environments within the estuary, including intertidal zones, mudflats, and rocky shorelines, where they can easily access both marine and freshwater habitats. They are skilled divers, primarily foraging for fish and other aquatic prey. The Firth of Tay and Eden Estuary provides essential feeding grounds and roosting sites for cormorants, supporting their dietary needs and overall survival. As the Proposed Development is located inland and does not provide suitable inland habitat for cormorant (e.g., lakes or rivers with healthy fish population), it is therefore concluded that there will be **no LSE** on this qualifying feature.

3.2.4 Goosander and red-breasted merganser are primarily present in the SPA during the winter months, typically from late autumn through early spring, with peak numbers observed from November to March as they migrate to the estuary for feeding and shelter. Goosander are often seen in small groups or pairs. Both species inhabit a variety of aquatic environments, including coastal waters, estuaries, and rivers, where they can access abundant fish prey. As the Proposed Development is not located in any coastal or marine habitats, and the rivers nearby are small and far away from the SPA (therefore unlikely to be utilised by the SPA populations), it is concluded that there will be **no LSE** on this qualifying feature.

3.2.5 Grey plover, dunlin and sanderling are primarily present within the SPA during the winter months and migration periods, with significant numbers arriving in the estuary from late summer through autumn (August to November) and returning in spring (March to May) as they migrate to their Arctic breeding grounds. In the Firth of Tay and Eden Estuary, these species inhabit intertidal zones, mudflats, and sandy beaches, where they forage for a diet primarily consisting of invertebrates such as molluscs, crustaceans and worms. Given the distance of the Proposed

Development from the SPA and the lack of available foraging habitats for the qualifying features, it is concluded that there will be **no LSE** on these qualifying features.

3.2.6 Icelandic black-tailed godwit is a migratory wading bird species, primarily present within the SPA during the spring and autumn migration periods, with notable numbers arriving in the estuary from late March to early May as they migrate to their breeding grounds in Iceland and returning from late July to early September during their southward migration. In the Firth of Tay and Eden Estuary SPA, wintering Icelandic black-tailed godwit is a qualifying feature with a population of 150 individuals, 2% of the GB population (NatureScot, 2018a). The species inhabit intertidal zones, mudflats, and salt marshes, where they forage for a diet rich in invertebrates, including worms, molluscs, and crustaceans. As the Proposed Development is not located in any coastal or marine habitats, it is concluded that there will be **no LSE** on this qualifying feature.

3.2.7 Bar-tailed godwit is a migratory wading bird found in the SPA. These birds are typically present during the spring and autumn migration periods, arriving in large numbers from late summer to early autumn (August to October) as they migrate south for the winter, and returning in the spring (March to May) on their way back to Arctic breeding grounds. The wintering population which remains (2,400 individuals, during period 1990/91 to 1994/95) is a qualifying feature of the SPA and Ramsar site (NatureScot, 2018a). Within the site, bar-tailed godwits primarily inhabit intertidal zones, mudflats, and salt marshes, where they forage for invertebrates such as worms, molluscs, and crustaceans. These habitats provide essential feeding opportunities that support the birds during their long migratory journeys. As the Proposed Development is located inland, it does not provide suitable habitat for bar-tailed godwit and therefore it is concluded that there will be **no LSE** on this qualifying feature.

3.2.8 Oystercatcher and redshank are wading bird species typically present year-round within the SPA, with their numbers peaking during the winter months when they gather in larger flocks. Oystercatcher and redshank inhabit a variety of coastal environments within the estuary, including intertidal zones, mudflats, sandy beaches, and rocky shorelines. Their diet primarily consists of molluscs (particularly cockles and mussels for oystercatcher), as well as crustaceans and other invertebrates found in the mud and sand. The SPA and Ramsar site provides essential feeding and roosting habitats that support survival and breeding. During the breeding season, birds nest in nearby grasslands and wetlands, returning to the estuary for feeding. Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on oystercatcher or redshank.

Non-Breeding Waterfowl Assemblage

3.2.9 The SPA is also designated for its non-breeding waterfowl assemblage, however this HRA does not assess impacts on the assemblage itself, as all of the named species in the waterbird assemblage are also qualifying features and so are assessed individually.

Breeding Species

3.2.10 Marsh harrier is a notable raptor species found in SPA and Ramsar site. These birds are primarily present during the breeding season, which typically spans from April to August, although they may be seen year-round in the area. Marsh harriers inhabit wetlands, reed beds, and adjacent grasslands within the estuary, where they utilise dense vegetation for nesting and hunting. They are skilled hunters, preying on small mammals, birds, and amphibians, and are often observed gliding low over the marshes in search of food. The Firth of Tay and Eden Estuary SPA and Ramsar site provides essential breeding and foraging habitats for marsh harriers, supporting their populations during the critical nesting period. There is a lack of suitable nesting and foraging habitat within the Proposed Development site and the distance between the this and the SPA and Ramsar site is over 10km. NatureScot does not report a foraging range for marsh harrier, but reports hen harrier to have a core foraging range of 2km (maximum 10km) (SNH, 2016). Therefore, if marsh harrier is assumed to travel similar distances, it is unlikely that individuals from the SPA/Ramsar site will approach the Proposed Development. No powerlines are necessary for the Proposed Development, so there is no risk of collision. It is concluded that there will be **no LSE** on marsh harrier.

3.2.11 [redacted]

[redacted]

3.2.3 Firth of Forth SPA and Ramsar

Non-breeding Species

3.2.1 Bar-tailed godwit, dunlin, curlew, grey plover, knot, lapwing, oystercatcher, redshank, and ringed plover are primarily present during the winter months, from late summer through spring (August to May). These species inhabit intertidal zones, mudflats, and sandy beaches, where they forage for invertebrates, crustaceans, and small fish. Bar-tailed godwits and dunlins are often seen probing the mud, while curlews and redshanks prefer wetlands and grasslands for foraging. Oystercatchers utilise their long bills to extract molluscs from the mud, and ringed plovers are commonly found along sandy shores (RSPB, 2021a; NatureScot, 2018b). Given the lack of suitable habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on the following qualifying features: bar-tailed godwit, grey plover, knot, oystercatcher, and ringed plover as these species are not known to often utilise farmland habitats.

3.2.2 Dunlin may utilise farmland during the winter months or migration, and similarly redshank may forage here in the winter, however both species have low foraging distances (dunlin = 500m – 3km; redshank = predicted to be 2-3km based on reported foraging range of greenshank; SNH, 2016) when compared to the distance between the SPA and the Proposed Development, thus there will be **no LSE** on these species.

3.2.3 Curlew are known to forage in a variety of habitats, including grasslands and farmland where they feed on earthworms, insects, and other invertebrates. They are often seen in agricultural fields, particularly during the breeding season. During the breeding season, the foraging range of curlew is a maximum of 2km (SNH, 2016), it is therefore unlikely that the individuals from the wintering population, the qualifying feature, will utilise the habitats within the Proposed Development. Therefore, there will be **no LSE** on curlew.

3.2.4 Lapwing forage for invertebrates on winter cereals, bare till and a variety of grasslands, including pasture, and some studies have shown a preference for permanent pasture as these habitats can have a higher density of invertebrates than winter cereals or bare till (Gillings and Fuller, 1999). No published foraging distance was found, but Gillings and Fuller (1999) report that lapwings were observed moving between fields 10km and 12km apart to forage. The habitat within the Proposed Development includes pasture and improved grassland, and therefore there is a **potential for LSE** on lapwings from the SPA.

3.2.5 Common scoter, eider, goldeneye, long-tailed duck, red-breasted merganser, scaup, shelduck and velvet scoter are primarily present from late autumn to early spring (November to March). These diving ducks inhabit coastal waters and sheltered bays, where they forage for molluscs, crustaceans, and fish. Eiders are particularly known for their preference for mussels, while common scoters and velvet scoters also dive for various marine invertebrates. Goldeneyes and red-breasted mergansers are often seen diving for fish in these rich marine environments (SNH, 2018a; Holt and Haines, 2018). Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on these qualifying features.

3.2.6 Great crested grebe and Slavonian grebe are present in winter (November to March), inhabiting coastal waters and estuaries where they forage for fish. The red-throated diver is also present during the winter months, utilising similar habitats for feeding (MacDonald and McGowan, 2019). Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on these qualifying features.

3.2.7 Pink-footed goose is present during migration and winter (September to April), foraging in fields and wetlands near the estuary. As mentioned previously, pink-footed geese predominately forage on winter stubble, grass and winter cereals (Bell, 1988). The habitat within the site provides suitable foraging habitat for geese and is within the 20km foraging range for the species (SNH, 2016), and therefore there is a **potential for LSE** on pink-footed geese from the Firth of Forth SPA and Ramsar site.

Non-Breeding Waterfowl Assemblage

3.2.8 The Firth of Forth SPA supports a diverse assemblage of non-breeding waterfowl, including various duck species and waders, utilising the rich habitats for feeding and roosting. This HRA does not assess impacts on the assemblage itself, as all of the named species in the waterbird assemblage are also qualifying features and so are assessed individually.

Passage Species

3.2.9 Sandwich tern are present during migration (April to September), and utilise coastal waters and estuaries for foraging, primarily feeding on small fish. They are often seen diving to catch their prey and are known for their distinctive calls and striking appearance. Given the lack of suitable foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on sandwich terns.

3.2.4 Outer Firth of Forth and St Andrews Bay Complex SPA

Non-breeding Species

3.2.1 Black-headed gull, common gull, herring gull, and kittiwake are prevalent in the Outer Firth of Forth during the winter months (October to March). These gulls inhabit coastal areas, estuaries, and intertidal zones, where they forage for fish, invertebrates, and refuse. The little gull is also present during winter, often found in coastal waters and estuaries, feeding on small fish and invertebrates (RSPB, 2021a). There is a lack of suitable roosting habitat for all of the mentioned species at the Proposed Development, and there is also no suitable foraging habitat for kittiwake. It is concluded that there will be **no LSE** on kittiwake from the SPA.

3.2.2 For the other gull species mentioned (black-headed gull, common gull, and herring gull) there may be suitable foraging habitat within the Proposed Development. These gulls are central place foragers, meaning that they will disperse out from a central place (in the case of this SPA) to forage before returning. In their guidance for assessing connectivity between breeding SPA sites and offshore wind developments, NatureScot recommended that a foraging range of 18.5km, 50km, and 85.6km should be used for black-headed gull, common gull, and herring gull, respectively, during the breeding season (NatureScot, 2023).

3.2.3 Gulls traditionally forage in intertidal habitats however are considered generalist species that will also forage in rural and urban areas (Clewley *et. al.*, 2021). The Outer Firth of Forth and St. Andrews Bay Complex SPA provides suitable intertidal foraging habitat for gulls, and the land within the Proposed Development is assumed to provide functionally linked habitat for gulls, as they may forage for invertebrates in the pastures or recently tilled land.

3.2.4 As generalist species, gulls are likely to forage in a wide range of habitats, such as coastal and intertidal, marine, agricultural, grassland and urban areas. The land within the Proposed Development boundary is predominantly agricultural and grassland, both of which are suitable for gull foraging. The Proposed Development is 103ha (1.03km^2) in area, which equates to 0.1% of the area within black-headed gull foraging range (total area = 1,075.21km^2), 0.01% of the area within common gull foraging range (total area = 7,853.98km^2), and <0.01% of the area within herring gull foraging range (total area = 23,019.58km^2) from the SPA. This calculation assumes that the entire redline boundary will be unavailable for gull foraging, however much of the land will be planted with grassland which gulls could utilise for foraging during operation of the Proposed Development.

3.2.5 Considering that the Proposed Development provides only a very small amount of suitable foraging habitat for gulls, compared to what is available in the wider area, and the expectation that gulls will preferentially utilise intertidal habitats within the SPA for foraging (Clewley *et. al.*, 2021), it is considered that the Proposed Development will result in a "*de minimis"* impact on black-headed gull, common gull and herring gull, and therefore it is concluded that there will be **no LSE** on these species.

3.2.6 Common scoter, eider, goldeneye, long-tailed duck, red-breasted merganser, and velvet scoter are primarily present from late autumn to early spring (November to March). These diving ducks inhabit coastal waters and sheltered bays, where they forage for molluscs, crustaceans, and fish.

Eiders are particularly known for their preference for mussels, while common scoters and velvet scoters dive for various marine invertebrates (SNH, 2018b). Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on these qualifying features.

3.2.7 Guillemot, razorbill, shag, and red-throated diver are seabirds that are present during the winter months. Guillemots and razorbills inhabit coastal waters and rocky shores, foraging for fish, while shags are often seen diving for fish in coastal waters and estuaries. Red-throated divers are typically found in deeper waters, foraging for fish during the winter (MacDonald and McGowan, 2019). Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on these qualifying features.

3.2.8 Slavonian grebe is present in winter (November to March), inhabiting coastal waters and estuaries where it forages for fish (Holt and Haines, 2018). Given the lack of suitable roosting and foraging habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on this qualifying feature.

Non-Breeding Seabird Assemblage

3.2.9 The SPA is also designated for its non-breeding seabird assemblage, however this HRA does not assess impacts on the assemblage itself, as most of the named species in the seabird assemblage are also qualifying features and so are assessed individually. Kittiwake is listed as part of the non-breeding seabird assemblage but not a qualifying feature itself, however, given that these are seabirds which nest and forage on coastlines and at sea, the Proposed Development does not offer any suitable nesting or foraging habitat for this species and there will be **no LSE** on this species.

Breeding Species

3.2.10 Seabirds: Arctic tern, common tern, gannet, guillemot, herring gull, kittiwake, Manx shearwater, puffin, and shag are all breeding species within the SPA. Breeding typically occurs from late spring to summer (April to August). These species utilise coastal cliffs, islands, and rocky shores for nesting, where they can find suitable sites to raise their young, and forage within coastal and open waters. Arctic and common terns often nest in colonies on sandy or shingle beaches, while gannets and puffins prefer cliff ledges for nesting. Guillemots and razorbills also nest on cliffs, while shags build nests in vegetation near the water. Given the lack of suitable nesting habitat within the site and distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on the following qualifying features: Arctic tern, common tern, gannet, guillemot, kittiwake, Manx shearwater, puffin, and shag.

3.2.11 Considering that the Proposed Development provides only a very small amount of suitable foraging habitat for breeding herring gull, compared to what is available in the wider area (<0.1%; Paragraph 3.2.4), and the expectation that gulls will preferentially utilise intertidal habitats within the SPA for foraging (Clewley *et. al.*, 2021), it is considered that the Proposed Development will result in a "*de minimis"* impact on herring gull, and therefore it is concluded that there will be **no LSE** on this species.

Breeding Seabird Assemblage

3.2.12 The SPA is also designated for its breeding seabird assemblage, however this HRA does not assess impacts on the assemblage itself, as all of the named species in the seabird assemblage are also qualifying features and so are assessed individually.

3.2.5 Cameron Reservoir SPA and Ramsar

Non-Breeding Species

3.2.1 Wintering pink-footed geese is a qualifying feature of the SPA and Ramsar site. They are present at the reservoir from approximately September to April each year, where they roost within the site

and forage both within the SPA and Ramsar site and on adjacent agricultural land. The habitat within the Proposed Development site provides suitable foraging habitat (winter stubble, grass and winter cereals; Bell, 1988) for geese and is within the 20km foraging range for the species (SNH, 2016), and therefore there is a **potential for LSE** on pink-footed geese.

3.2.6 Loch Leven SPA and Ramsar

Non-Breeding Species

3.2.1 Cormorant are present year-round in Loch Leven, often found in the open waters of the loch and along its edges. Cormorants are skilled divers, primarily foraging for fish and aquatic invertebrates. They are frequently seen perched on trees or rocks, drying their wings after diving (SNH, 2018c). As the Proposed Development is located inland and does not provide suitable inland habitat for cormorant (e.g., lakes or rivers with healthy fish population), it is therefore concluded that there will be **no LSE** on this qualifying feature.

3.2.2 Gadwall, goldeneye, pochard, shoveler, teal, and tufted duck are primarily present during the winter months, from late autumn through early spring (November to March). These waterfowl inhabit various wetland habitats within the loch, including shallow bays, marshes, and reed beds. Gadwall and shoveler are often found in shallow areas where they forage for seeds, aquatic plants, and invertebrates. Goldeneye and pochard prefer deeper waters, diving for fish and invertebrates. Teal and tufted ducks are commonly seen in the shallower parts of the loch, feeding on seeds, aquatic plants, and small invertebrates (RSPB, 2021b; NatureScot, 2000). Given the lack of suitable habitat within the site and the distance between the Proposed Development and the SPA and Ramsar site, it is concluded that there will be **no LSE** on these qualifying features.

3.2.3 Whooper swan and pink-footed goose are also present during the winter months, arriving from breeding grounds in Iceland (MacDonald and McGowan, 2019). The loch is used for roosting and foraging, but both species can be found in fields and wetlands surrounding the loch, grazing on grasses and crops during the winter months (RSPB, 2021b; NatureScot, 2000). The habitat within the site provides suitable foraging habitat for pink-footed goose and whooper swan. The foraging range of whooper swan is less than 5km, therefore, the individuals from the SPA are not likely to utilise the Proposed Development area for foraging (SNH, 2016). Thus, there is **no potential for LSE** on whooper swan from the Loch Leven SPA. The Proposed Development is within the 20km foraging range for pink-footed goose from the SPA (SNH, 2016), and therefore there is a **potential for LSE** on pink-footed geese from the SPA.

Waterfowl Assemblage

3.2.4 The SPA is also designated for its diverse waterfowl assemblage which includes various duck species and geese that utilise the rich habitats for feeding and roosting throughout the non-breeding season. This HRA does not assess impacts on the assemblage itself, as all of the named species in the seabird assemblage are also qualifying features and so are assessed individually.

3.2.7 Conclusion

3.2.1 Following the screening assessment, LSEs were identified for some qualifying features of eight sites, four SPAs and their corresponding Ramsar sites, and these sites were brought forward to Stage 2: Appropriate Assessment (Table 2).

Table 2: Summary of Stage 1: Screening. Species in bold are taken forward into Stage 2: Appropriate Assessment.

Site Name (distance to Proposed Development)	Qualifying Features	Potential LSE	Proceed to Stage 2: Appropriate Assessment?
Firth of Tay and Eden Estuary SPA and Ramsar 10.42km	**Non-breeding:** • Bar-tailed godwit • Common scoter • Cormorant • Dunlin • Eider • Goldeneye • Goosander • Grey plover • **Greylag goose** • Icelandic black-tailed godwit • Long-tailed duck • Oystercatcher • **Pink-footed goose** • Red-breasted merganser • Redshank • Sanderling • Shelduck • Velvet scoter • Waterfowl assemblage **Breeding:** • [redacted] • Marsh harrier	The Proposed Development provides suitable foraging habitat for **pink-footed goose** and **greylag goose** and there is a potential for LSEs of the Proposed Development on these qualifying features of the SPA and Ramsar site.	**Yes**
		[redacted]	No
Firth of Forth SPA and Ramsar 11.26km	**Non-breeding:** • Bar-tailed godwit • Common scoter • Cormorant • Curlew • Dunlin	The Proposed Development provides suitable foraging habitat for **pink-footed goose** and **lapwing,** thus there is a potential for LSEs of the Proposed Development on these qualifying features of the SPA and Ramsar site.	**Yes**
		The Proposed Development provides no suitable/accessible foraging or roosting habitat for the remaining non-breeding species, and no suitable breeding or foraging habitat for sandwich tern. Therefore, no impact	No

Site Name (distance to Proposed Development)	Qualifying Features	Potential LSE	Proceed to Stage 2: Appropriate Assessment?
	• Eider • Golden plover • Goldeneye • Great crested grebe • Grey plover • Knot • **Lapwing** • Long-tailed duck • Mallard • Oystercatcher • **Pink-footed goose** • Red-breasted merganser • Red-throated diver • Redshank • Ringed plover • Scaup • Shelduck • Slavonian grebe • Turnstone • Velvet scoter • Wigeon • Waterfowl assemblage **Passage:** • Sandwich tern	pathway was identified between these qualifying features and the Proposed Development.	

Site Name (distance to Proposed Development)	Qualifying Features	Potential LSE	Proceed to Stage 2: Appropriate Assessment?
Outer Firth of Forth and St Andrews Bay Complex SPA 11.44km	**Non-breeding:** • Black-headed gull • Common gull • Common scoter • Eider • Goldeneye • Guillemot • Herring gull • Kittiwake • Little gull • Long-tailed duck • Razorbill • Red-breasted merganser • Red-throated diver • Shag • Slavonian grebe • Velvet scoter • Seabird assemblage • Waterfowl assemblage **Breeding:** • Arctic tern • Common tern • Gannet • Guillemot • Herring gull • Kittiwake • Manx shearwater • Puffin • Shag • Seabird assemblage	The Proposed Development provides no suitable/accessible foraging, roosting or nesting habitat for any of the qualifying features of the SPA. Therefore, no impact pathway was identified between these qualifying features and the Proposed Development.	No

Site Name (distance to Proposed Development)	Qualifying Features	Potential LSE	Proceed to Stage 2: Appropriate Assessment?
Cameron Reservoir SPA and Ramsar 12.57km	**Non-breeding:** • **Pink-footed goose**	The Proposed Development provides suitable foraging habitat for **pink-footed goose** and there is a potential for LSEs of the Proposed Development on this qualifying feature of the SPA and Ramsar site.	**Yes**
Loch Leven SPA and Ramsar 18.23km	**Non-breeding:** • Cormorant • Gadwall • Goldeneye • **Pink-footed goose** • Pochard • Shoveler • Teal • Tufted duck • Whooper swan • Waterfowl assemblage	The Proposed Development provides suitable foraging habitat for **pink-footed goose** and there is a potential for LSEs of the Proposed Development on this qualifying feature of the SPA and Ramsar site.	**Yes**
		The Proposed Development provides no suitable/accessible foraging or roosting habitat for the remaining non-breeding species. Therefore, no impact pathway was identified between these qualifying features and the Proposed Development.	No

4 STAGE 2: APPROPRIATE ASSESSMENT

4.1.1 Stage 2: Appropriate Assessment considers the implications of the LSEs from the Proposed Development identified in Stage 1: Screening on eight European sites:

- Firth of Tay and Eden Estuary SPA and Ramsar (pink-footed goose and graylag goose only);
- Firth of Forth SPA and Ramsar (pink-footed goose and lapwing only);
- Cameron Reservoir SPA and Ramsar (pink-footed goose only); and
- Loch Leven SPA and Ramsar (pink-footed goose only).

4.1.2 Stage 2: Appropriate Assessment explicitly considers the impact of these LSEs with respect to the conservation objectives for the qualifying species and reaches a conclusion on whether the Proposed Development is considered likely to result in adverse effects on the integrity of the European site, both alone and in combination with other plans or projects.

4.1.3 The boundaries of the Firth of Tay and Eden Estuary Ramsar site, Firth of Forth Ramsar site, Cameron Reservoir Ramsar site and Loch Leven Ramsar site are wholly within the boundaries of their respective SPAs. All of these Ramsar sites are designated for bird species and these species are also qualifying features of their respective SPAs. Ramsar sites do not have conservation objectives and therefore for the purposes of this HRA it is assumed that the conservation objectives for the respective SPA sites are also applicable to the Ramsar site.

4.2 Mitigation and Other Measures

4.2.1 Mitigation measures can be considered in Stage 2: Appropriate Assessment when determining whether a plan or project will result in adverse effects on the integrity of the European site (NatureScot, 2024a).

4.2.2 The Proposed Development includes both mitigation measures which are expected to minimise impacts to pink-footed geese, greylag geese and lapwing and their supporting habitats as well as intrinsic measures that will benefit the aforementioned species but are not specifically included as a part of the Proposed Development to minimise impacts on European sites. These measures include:

4.2.3 Measures to avoid disturbance to pink-footed geese, greylag geese and lapwing:

- a Species Protection Plan for geese will be produced prior to the commencement of construction, which will incorporate all survey information and mitigation measures;
- for works undertaken between October and April, inclusive, a 200m disturbance buffer will apply for geese, and a 400m buffer for lapwing at all times of year, around the active working area(s) (and not the full redline boundary). An Ecological Clerk of Works (ECoW) will be employed who will be suitably empowered to halt or postpone works if necessary to avoid impacts to geese. The ECoW will record all decisions made and actions taken in an ECoW log regarding geese and these records will be made available to NatureScot and the Energy Consents Unit following construction;
- a maximum speed limit will be established on the site to reduce the likelihood of injury and/or mortality to birds;
- no works will be undertaken during hours of darkness unless necessary. Should working during darkness be required, the use of artificial lighting will be minimised where possible and directional lighting and/or screening will be used to avoid illuminating watercourses or other sensitive areas;

- pre-works checks will be undertaken between March to August, inclusive, to check for any signs of nesting or breeding birds, including lapwings. Disturbance buffers may be put in place should any nesting lapwings be identified;
- if a nesting lapwing is observed by any individual on site, the ECoW will be notified immediately for further advice; and
- in the unlikely event that a bird is injured or killed, the ECoW will be notified immediately. The ECoW will attend the site and make a written and photographic record, including details of the time, location and personnel involved in the incident. This information will be communicated to NatureScot within 24 hours.

4.2 Measures to protect and reinstate pink-footed goose and greylag goose habitats:

- Standard pollution prevention measures (e.g., SEPA Pollution Prevention Guidelines/Guidelines for Pollution Prevention) will be put into place to minimise the risk of pollution impacts to watercourses. Measures will include, but not be limited to:
  - a minimum 10m buffer will be maintained around all watercourses;
  - spill kits will be available for use by all vehicles/plant/machinery during construction;
  - silt fencing will be installed around all excavations near watercourses, to prevent silt from entering the channel;
  - an emergency response plan will be developed which will outline the steps to be undertaken in the event of a pollution incident;
  - fuel, oil and other chemicals will be stored at least 50m away from watercourses;
  - the proposed fuel, oil and other chemical storage containers will be surrounded by a bund wall to contain any spills and minimise contamination;
  - toilets for the temporary construction compounds will be self-contained and placed within a bunded area to contain any spills. Disposal will be off-site;
  - the topsoil removed for trenches dug to install underground cabling will be reinstated (excluding the first 150mm which will be infilled with sand) and re-seeded; and
  - following completion of construction works, the compound areas will be reinstated and all hardcore will be removed and the area will either be restored to its former habitat or enhanced (depending on the location of the compound areas).

4.3 Firth of Tay and Eden Estuary SPA and Ramsar site

4.3.1 Stage 1: Screening could not exclude LSEs for pink-footed geese and greylag geese from the Firth of Tay and Eden Estuary SPA (hereafter referred to as the Firth of Tay SPA), and therefore an AA is necessary to determine whether the Proposed Development is expected to result in adverse effects on the integrity of the Firth of Tay SPA.

4.3.2 Pink-footed geese within the Firth of Tay and Eden Estuary SPA and Ramsar site

4.3.1 The Firth of Tay SPA was designated in part due to the pink-footed goose population that use the area, which was considered to be of international importance.

4.3.2 At the time of designation (2 February 2000), the Firth of Tay SPA supported a population of 2,800 individual pink-footed geese, which equated to 1% of the eastern Greenland/Iceland/UK biogeographic population (NatureScot, 2018a). The population size was calculated as the winter mean peak of individuals at the site from 1990/91 to 1994/95.

4.3.3 The population size was assessed in 2012, and was reported to be 3,766 individuals, which was the winter mean peak count of individuals from 2006/7-2010/11 (Mitchell, 2012). The population is considered to be in Favourable Maintained condition (NatureScot, 2024b).

Proposed Development Site Baseline

4.3.4 Over winter, pink-footed geese forage in grasslands and arable lands with winter stubble and cereals (Bell, 1988). Phase 1 Habitat (JNCC, 2010) mapping was undertaken in 2022 to map and classify the habitats within the Proposed Development site and found that they were predominantly arable and likely to be suitable for pink-footed goose foraging. During the wintering goose surveys (October 2022 – April 2023), 14 fields were surveyed and classified depending on their crop: two fields were grass, seven were stubble, four were cereal/crop and one was carrot crop. Therefore, most of the site was considered to be suitable for pink-footed goose foraging.

4.3.5 Wintering goose surveys were undertaken within the site from October 2022 to April 2023, inclusive (Table 3). One survey per month was completed (excluding March, when two surveys were completed) whereby surveyors walked within and around the site looking for field signs of use by geese (e.g., droppings, feathers) and recording all geese observed (either foraging within fields or flying overhead) within a 500m buffer (study area) of the site.

4.3.6 Pink-footed geese were observed within the study area during five of the eight surveys and were recorded within the site boundary on one occasion with a record of 640 individuals across two fields (Figure 3, Table 3). Despite just one record within the site boundary, droppings were recorded on the site in all months except October, with one field consistently showing evidence of goose use. In December and February, groups of 1,900 and 2,000 geese, respectively, were recorded in the west and south west of the survey buffer. The peak count of 2,100 geese within the study area equates to 56% of the Firth of Tay SPA population reported in 2012 (3,766 individuals; Mitchell, 2012), while the peak count of 640 individuals recorded on site in March equates to 17% of the 2012 population. Flocks of pink-footed geese were also observed flying overhead in October, and also November when 10 groups totalling 890 individuals were recorded.

4.3.7 It is not known where the geese observed during field surveys originated from, and there are three other SPAs/Ramsar sites within 20km of the Proposed Development that are designated for pink-footed geese (Firth of Forth SPA and Ramsar site, Cameron Reservoir SPA and Ramsar site, Loch Leven SPA and Ramsar site). Collectively, these four sites support 40,861 pink-footed geese, and thus the peak count of 2,100 geese equates to 5% of the population of these sites (Mitchell, 2012).

Table 3: Summary of pink-footed geese recorded during wintering goose surveys 2022/23

Survey Date	Location	# Pink-footed geese flying overhead	# Pink-footed geese observed in fields	Droppings observed within Site Boundary?
31/10/2022	Site boundary	101	-	No
	Survey buffer	-	3	-
	Outside buffer	-	400	-
14/11/2022	Site boundary	890	-	Yes, old
	Survey buffer	-	-	-
19/12/2022	Site boundary	-	-	Yes, fresh
	Survey buffer	-	2,100	-
17/01/2023	Site boundary	-	-	-
	Survey buffer	-	630	Yes, fresh and old
17/02/2023	Site boundary	-	-	-
	Survey buffer	-	2,000	Yes, fresh and old

Survey Date	Location	# Pink-footed geese flying overhead	# Pink-footed geese observed in fields	Droppings observed within Site Boundary?
01/03/2023	Site boundary	-	640	-
	Survey buffer	-	300	No*
17/03/2023	Site boundary	-	-	Yes, fresh
	Survey buffer	-	-	-
14/04/2023	Site boundary	-	-	Yes, fresh and old
	Survey buffer	-	-	-
Total	**Site boundary**	**991**	**640**	6
	Survey buffer	**0**	**5,033**	-
	Combined	**991**	**5,673**	6

*No droppings recorded, however the fields where droppings had been previously recorded were occupied by geese at time of survey, thus no walkover was completed by surveyor to avoid disturbing the geese.

Likely Impacts

4.3.8 The Proposed Development is not adjacent to the site boundary for the Firth of Tay SPA and therefore no direct impacts to habitats or individual pink-footed geese using the SPA site are anticipated. However, the Proposed Development does provide functionally-linked foraging habitat for pink-footed geese, and therefore the following impacts have been identified for pink-footed geese from the Firth of Tay SPA:

- temporary loss of foraging habitat during construction (including due to disturbance);
- permanent loss of foraging habitat during operation; and
- mortality and/or injury during construction.

Assessment Against Conservation Objectives

4.3.9 The conservation objectives (COs) for the Firth of Tay and Eden Estuary SPA are (NatureScot, 2024c):

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

Conservation Objective 1, 2c, 2d

4.3.10 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is located 10.42km from the SPA, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to pink-footed goose within the SPA itself. CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Firth of Tay SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024c). In the context of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for pink-footed goose is maintained.

4.3.11 There will be a temporary loss of functionally-linked foraging habitat within a 600m buffer (maximum disturbance buffer used for non-breeding pink-footed geese; NatureScot, 2022) of the Proposed Development, as construction installation of site infrastructure will change the land cover amount and type, and construction activities are expected to displace pink-footed geese from using the available habitat.

4.3.12 There will be a permanent loss of functionally-linked foraging habitat during operation of the Proposed Development, as the majority of fields within the Proposed Development site are assumed to become unsuitable for pink-footed goose foraging.

4.3.13 Pink-footed geese require large and open fields for foraging, as this allows for early detection of predators. Therefore, although the land between the solar PV panels will be planted with a grazing mix which could be used by pink-footed geese for foraging, the presence of the solar PV panels will obscure any visual detection of predators, and therefore it is assumed that the entire area of all fields with solar PV panels will be permanently lost as foraging habitat for pink-footed geese.

4.3.14 The non-breeding disturbance buffer for pink-footed goose is 200m – 600m (NatureScot, 2022), and as a precautionary measure, the disturbance buffer is assumed to be 600m for assessment of temporary habitat loss due to displacement. Pink-footed geese are known to forage up to 20km from their roosting sites (SNH, 2016), and therefore this distance was used to assess impacts of permanent habitat loss on pink footed-geese.

4.3.15 When considering a 20km foraging range, this equates to an area of 250,044ha available to foraging pink-footed geese. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for geese, equating to an area of 25,004.4ha. The site plus a 600m buffer, would cover an area of 554ha. This amount of temporary habitat loss during the construction phase equals 2.2% of that available to foraging pink-footed geese. The permanent habitat loss would be even less (0.4%), since it is anticipated the suitable foraging areas within the 600m disturbance buffer would be available to the geese once construction is complete.

4.3.16 In the most recent assessment, the area where the Proposed Development is situated in Fife was not shown considered to be a key area of the feeding distribution of pink-footed geese from the SPA, based on a low concentration of Sensitivity Index points (Mitchell, 2012). The key feeding areas for pink-footed geese from the SPA were to the south east and south west, and were concentrated close to known roost areas.

4.3.17 Considering that a small proportion of available foraging habitat for pink-footed geese would be lost (both temporarily and permanently), and that the Proposed Development is not in a key foraging area for pink-footed geese, it is concluded that the Proposed Development would result in **no AESI on pink-footed geese from the Firth of Tay SPA** as a result of temporary or permanent loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.3.18 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site. There is a small potential for mortality and/or injury to individual pink-footed geese during construction of the Proposed Development. However, it is expected that pink-footed geese would avoid the active construction works area. If geese are found to be present on the site during construction, works will adhere to a minimum 200m disturbance buffer to avoid disturbance, as enforced by the ECoW. Other mitigation measures will be in place to protect individual pink-footed geese from injury or mortality during construction (e.g., minimising working over winter, adhering to a speed limit at the site).

4.3.19 The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds, however this is a short-term impact over a small area of suitable habitat for geese, and therefore no significant impacts are expected during construction.

4.3.20 The Proposed Development is small in scale and is not expected to result in any significant barriers to pink-footed geese moving between the Firth of Tay SPA and adjacent habitats. During

operation, the land within the Proposed Development would not be suitable for pink-footed goose foraging, minimising the risk of any injury or mortality. As a result, it is not anticipated that the Proposed Development would result in significant impacts to population dynamics of pink-footed geese from the SPA

4.3.21 Considering the nature and scale of the Proposed Development, it is concluded that there would be **no AESI** on pink-footed goose from the Firth of Tay SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.3.22 The aim of CO 2b is to ensure that pink-footed geese are not restricted in accessing all areas of the Firth of Tay SPA for all aspects of their life history (NatureScot, 2024c). The Firth of Tay SPA is an important wintering ground for pink-footed geese which arrive in September/October from their breeding grounds in Greenland and Iceland. The birds use the site primarily for roosting in intertidal areas, saltmarsh, mudflats and agricultural land for foraging and day roosting. Pink-footed geese are sensitive to disturbance and may be displaced from roosting areas if disturbed.

4.3.23 The Proposed Development is located 10.42km away from the Firth of Tay SPA, and therefore there is no risk of direct disturbance to pink-footed geese within the SPA. It is concluded that there would be **no AESI** for this conservation objective.

4.3.3 Greylag geese within the Firth of Tay and Eden Estuary SPA and Ramsar site

4.3.1 The Firth of Tay SPA was designated in part due to the greylag goose population that use the area, which was considered to be of international importance.

4.3.2 At the time of designation (2 February 2000), the Firth of Tay SPA supported a population of 1,200 individual greylag geese, which equated to 1% of the Iceland/UK/Ireland biogeographic population (NatureScot, 2018a). That population size was calculated as the winter mean peak of individuals at the site from 1990/91 to 1994/95.

4.3.3 The population size was assessed in 2012, and was reported to be 1,458 individuals, which was the winter mean peak count of individuals from 2006/7-2010/11 (Mitchell, 2012).

4.3.4 The Firth of Tay SPA population of greylag goose declined by more than 50% between 1994-1999 and 1999-2004, and therefore is considered to be in Unfavourable Declining condition (SNH, 2010a; NatureScot, 2024b).

Proposed Development Site Baseline

4.3.5 Greylag geese forage on agricultural land, typically cereal stubbles, potatoes, swedes and carrots, though grass is also used (Bell, 1988). The habitats within the Proposed Development site boundary were predominantly agricultural, including grass, cereal, and carrots, which are suitable foraging habitat for greylag geese.

4.3.6 As mentioned previously, wintering goose surveys were conducted onsite October 2022 – April 2023, with one survey per month (excluding March, which comprised two surveys).

4.3.7 Small numbers of greylag geese were recorded within the study area during three surveys: November (eight individuals located south of site boundary), December (seven individuals located west of site boundary) and February (one individual located south west of site boundary). Fresh and old droppings were observed regularly over the survey period so there is a possibility that some of these were from greylag geese.

Table 4: Summary of greylag goose results from wintering goose surveys in 2022/2023

Survey Date	Location	# Greylag geese flying overhead	# Greylag geese observed in fields	Droppings observed?*
14/11/2022	Site boundary	-	-	Yes, old
	Survey buffer	-	8	-
19/12/2022	Site boundary	-	-	Yes, fresh
	Survey buffer	-	7	-
17/02/2023	Site boundary	-	-	Yes, fresh and old
	Survey buffer	-	1	-

*Droppings were only searched for within site boundary.

Likely Impacts

4.3.8 The Proposed Development is not adjacent to the site boundary for the Firth of Tay SPA and therefore no direct impacts to habitats or individual greylag geese using the SPA site are anticipated. However, the Proposed Development site does provide functionally-linked foraging habitat for greylag geese, and therefore the following impacts and therefore the following impacts have been identified for greylag geese from the Firth of Tay SPA:

- temporary loss of foraging habitat during construction (including due to disturbance);
- permanent loss of foraging habitat during operation; and
- mortality and/or injury during construction.

Assessment Against Conservation Objectives

4.3.9 The conservation objectives (COs) for the Firth of Tay and Eden Estuary SPA are (NatureScot, 2024c):

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

4.3.10 Although greylag geese are in a Unfavourable Declining condition, NatureScot (2024b) reports no negative pressures on the SPA population within the Firth of Tay SPA, and the population decline is said to be in line with the recent change in distribution of the wintering greylag population which has tended to remain in northern Scotland following migration from its Icelandic breeding grounds (SNH, 2010a).

Conservation Objective 1, 2c, 2d

4.3.11 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is not directly adjacent to the SPA, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to greylag goose within the SPA itself. CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Firth of Tay SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024c). In the context

of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for greylag goose is maintained.

4.3.12 The non-breeding disturbance buffer for greylag goose is 200m – 600m (NatureScot, 2022), and as a precautionary measure, the disturbance buffer is assumed to be 600m for assessment of temporary habitat loss due to displacement. Greylag geese are known to forage up to 20km from their roosting sites (SNH, 2016), and therefore this distance was used to assess impacts of permanent habitat loss on greylag geese.

4.3.13 There will be a temporary loss of functionally-linked foraging habitat within a 600m buffer of the Proposed Development, as construction installation of site infrastructure will change the land cover amount and type and construction activities are expected to displace greylag geese from using the available habitat.

4.3.14 There will be a permanent loss of functionally-linked foraging habitat during operation of the Proposed Development, as all fields within the Proposed Development site are assumed to become unsuitable for greylag goose foraging.

4.3.15 Greylag geese require large and open fields for foraging, as this allows for early detection of predators. Therefore, although the land between the solar PV panels will be planted with a grazing mix which could be used by greylag geese for foraging, the presence of the solar PV panels will obscure any visual detection of predators, and therefore it is assumed that the entire area of all fields with solar PV panels will be permanently lost as foraging habitat for greylag geese.

4.3.16 When considering a 20km foraging range of greylag goose, this equates to an area of 250,044ha available to foraging greylag geese from the SPA. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for geese, equating to an area of 25,004.4ha. The site plus a 600m buffer would cover an area of 554ha. This amount of temporary habitat loss during the construction phase equals 2.2% of that available to foraging greylag geese. The permanent habitat loss would be even less (0.4%), since it is anticipated the suitable foraging areas within the 600m disturbance buffer would be available to the geese once construction is complete.

4.3.17 In the most recent assessment, the area where the Proposed Development is situated in Fife was used by greylag geese but not shown to be a key area of the feeding distribution from the SPA, based on a low concentration of Sensitivity Index points (Mitchell, 2012). It was reported that geese roosting on the Firth of Tay typically fed to the north of the SPA in Southern Angus, often flying over the Sidlaw Hills into Strathmore (Mitchell, 2012).

4.3.18 Considering that a small proportion of available foraging habitat for greylag geese would be lost (both temporarily and permanently), and that the Proposed Development is not in a key foraging area greylag geese, it is concluded that the Proposed Development would result in **no AESI on greylag geese from the Firth of Tay and Eden Estuary SPA** as a result of temporary or permanent loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.3.19 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site. There is a small potential for mortality and/or injury to individual greylag geese during construction of the Proposed Development. However, it is expected that geese will avoid the active construction works area. If greylag geese are found to be present on the site during construction, works will adhere to a minimum 200m disturbance buffer to avoid disturbance, as enforced by the ECoW. Other mitigation measures will be in place to protect individual greylag geese from injury or mortality during construction (e.g., minimising working over winter, adhering to a speed limit at the site). As a result, it is not anticipated that the Proposed Development would result in significant impacts to population dynamics of greylag geese from the SPA.

4.3.20 The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds,

however this is a short-term impact over a small area of suitable habitat for geese, and therefore no significant impacts are expected during construction.

4.3.21 The Proposed Development is small in scale and is not expected to result in any significant barriers to greylag geese moving between the Firth of Tay SPA and adjacent habitats. During operation, the land within the Proposed Development will not be suitable for greylag goose foraging, minimising the risk of any injury or mortality.

4.3.22 Considering the nature and scale of the Proposed Development, it is concluded that there would be **no AESI** on greylag goose from the Firth of Tay SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.3.23 The aim of CO 2b is to ensure that greylag geese are not restricted in accessing all areas of the Firth of Tay SPA for all aspects of their life history (NatureScot, 2024c). The Firth of Tay SPA is an important wintering ground for greylag geese which arrive here in September/October from their breeding grounds in Greenland and Iceland. The birds use the site primarily for roosting in intertidal areas, saltmarsh, mudflats and agricultural land for night and day roosting. Greylag geese are sensitive to disturbance and may be displaced from roosting areas if disturbed.

4.3.24 The Proposed Development is located 10.42km away from the Firth of Tay SPA, and therefore there is no risk of direct disturbance to greylag geese within the SPA. Therefore, it is concluded that there would be **no AESI** for this conservation objective.

4.3.4 Cumulative Impact Assessment

4.3.1 A search was undertaken on the Fife Council planning portal, Angus Council planning portal and the Energy Consents Unit website for planning applications within 20km of the Firth of Tay SPA that could result in a cumulative impact on pink-footed geese or greylag geese. The search focussed on larger developments that could result in additional habitat loss for pink-footed goose and greylag geese, as habitat loss is the main impact of the Proposed Development.

4.3.2 Six projects were identified through this search, two residential developments, three solar developments and one quarry (Table 5). The boundaries for these six developments are all primarily on agricultural land or grassland, which provides suitable foraging habitat for pink-footed goose and greylag goose.

4.3.3 Assuming that all of the habitat within the boundaries for these developments will be lost, this would result in a total of 484.77ha of permanent habitat loss, when added to the 103ha lost to the Proposed Development. Based on a total amount of suitable foraging habitat for pink-footed goose and greylag goose (based on 20km foraging range) of 25004.40ha, this equates to 1.9% of the total available foraging habitat for pink-footed goose and greylag from the Firth of Tay SPA.

4.3.4 For both species, the cumulative impact of permanent habitat loss from these developments and the Proposed Development was less than 2% of the total suitable foraging habitat available to individuals of both species from the Firth of Tay SPA. Considering this, it is concluded that there will be no cumulative impacts on the qualifying bird species from the Firth of Tay and Eden Estuary SPA, when considered with other plans and projects.

Table 5: Other projects considered in the cumulative impact assessment for the Firth of Tay SPA

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
23/02826/FULL	Erection of 158 residential dwellings	NO 39653 25309 (< 1km south east)	Permanent habitat loss	5.37
23/01505/FULL	St Michaels Quarry Fife	NO 43177 23550 (4km south east)	Permanent habitat loss	46.09
22/02493/PAN	20MW solar farm (land 800m south of Winthank Farm)	NO 47636 12563 (6km south)	Permanent habitat loss	81.40

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
23/02831/SCR	Kilmux Solar Park (Kilmux Farm)	NO 36907 05534 (18km south)	Permanent habitat loss	50.99
21/01319/PAN	Residential led mixed use development (Milldeans Farm, Prinlaws Road, Leslie, Fife)	NO 24198 00610 (17km south)	Permanent habitat loss	27.92
ECU00003459	Tealing Solar Energy Park	NO 45062 36846 (10km north)	Permanent habitat loss	170.0

4.4 Firth of Forth SPA and Ramsar site

4.4.1 Stage 1: Screening could not exclude LSEs for pink-footed geese and lapwing from the Firth of Forth SPA, and therefore an AA is necessary to determine whether the Proposed Development is expected to result in adverse effects on the integrity of the Firth of Forth SPA.

4.4.2 Pink-footed geese within the Firth of Forth SPA and Ramsar site

4.4.1 The Firth of Forth SPA was designated in part due to the pink-footed goose population that use the area, which was considered to be of international importance.

4.4.2 At the time of designation (30 October 2021), the Firth of Forth SPA supported a population of 10,852 individual pink-footed geese, which equated to 6% of the eastern Greenland/Iceland/UK biogeographic population (NatureScot, 2018b). That population size was calculated as the winter mean peak of individuals at the site from 1993/94 to 1997/98.

4.4.3 The population size was last assessed in 2011, and was reported to be 18,484 individuals, which was the winter mean peak count of individuals from 2006/7-2010/11 (Mitchell, 2012). Based on that assessment, the population is considered to be in Favourable Maintained condition (NatureScot, 2024d).

Proposed Development Site Baseline

4.4.4 See section 4.3.5 for site baseline results for pink-footed geese. The peak count of 2,100 pink-footed geese within the study area equates to 11% of the Firth of Forth SPA population reported in 2012 (18,484; Mitchell, 2012), while the peak count of 640 individuals recorded on site in March equates to 3% of the 2012 population.

4.4.5 The peak count of 2,100 pink-footed geese within the study area equates to 5.1% of the population of pink-footed geese from the four SPA's within a 20km buffer of the Proposed Development.

Likely Impacts

4.4.6 The Proposed Development is not adjacent to the site boundary for the Firth of Forth SPA and therefore no direct impacts to habitats or individual pink-footed geese using the SPA site are anticipated. However, the Proposed Development does provide functionally-linked foraging habitat (see paragraph 4.3.4 and 4.3.5) for pink-footed geese, and therefore the following impacts have been identified for pink-footed geese from the Firth of Forth SPA:

- temporary loss of foraging habitat during construction (including due to disturbance);
- permanent loss of foraging habitat during operation; and
- mortality and/or injury during construction.

Assessment Against Conservation Objectives

4.4.7 The conservation objectives (COs) for the Firth of Forth SPA are (NatureScot, 2024e):

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

Conservation Objective 1, 2c, 2d

4.4.8 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is located 11.26km from the SPA, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to pink-footed goose within the SPA itself. CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Firth of Tay SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024c). In the context of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for pink-footed goose is maintained.

4.4.9 There will be a temporary loss of functionally-linked foraging habitat within a 600m buffer of the Proposed Development, as construction installation of site infrastructure will change the land cover amount and type and construction activities are expected to displace pink-footed geese from using the available habitat.

4.4.10 There will be a permanent loss of functionally-linked foraging habitat during operation of the Proposed Development, as all fields within the Proposed Development site are assumed to become unsuitable for pink-footed goose foraging.

4.4.11 Pink-footed geese require large and open fields for foraging, as this allows for early detection of predators. Therefore, although the land between the solar PV panels will be planted with a grazing mix which could be used by pink-footed geese for foraging, the presence of the solar PV panels will obscure any visual detection of predators, and therefore it is assumed that the entire area of all fields with solar PV panels will be permanently lost as foraging habitat for pink-footed geese.

4.4.12 The non-breeding disturbance buffer for pink-footed goose is 200m – 600m (NatureScot, 2022), and as a precautionary measure, the disturbance buffer is assumed to be 600m for assessment of temporary habitat loss due to displacement. Pink-footed geese are known to forage up to 20km from their roosting sites (SNH, 2016), and therefore this distance was used to assess impacts of permanent habitat loss on pink footed-geese.

4.4.13 When considering a 20km foraging range of pink-footed goose, this equates to an area of 449,973ha available to foraging pink-footed geese. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for geese, equating to an area of 44,997.3ha. The site plus a 600m buffer would cover an area of 554ha. This amount of temporary habitat loss during the construction phase equals 1.2% of that available to foraging pink-footed geese. The permanent habitat loss would be even less (0.2%), since it is anticipated the suitable foraging areas within the 600m disturbance buffer would be available to the geese once construction is complete.

4.4.14 In the most recent assessment, the area where the Proposed Development is situated in Fife was not shown considered to be a key area of the feeding distribution of pink-footed geese from the Firth of Forth SPA, based on a low concentration of Sensitivity Index points (Mitchell, 2012). Aberlady Bay (~30km south/south east of Proposed Development) is one of the main pink-footed goose roosts within the SPA, with individuals typically remaining within 10km of the estuary to forage (Mitchell, 2012), and thus foraging far from the Proposed Development. Furthermore, geese from the Skinflats roost, were shown to forage west of the Proposed Development (Mitchell, 2012).

4.4.15 Considering that a small proportion of available foraging habitat for pink-footed geese would be lost (both temporarily and permanently), and that the Proposed Development is not in a key foraging area for pink-footed geese, it is concluded that the Proposed Development would result in **no AESI on pink-footed geese from the Firth of Forth SPA** as a result of temporary or permanent loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.4.16 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site. There is a small potential for mortality and/or injury to individual pink-footed geese during construction of the Proposed Development. However, it is expected that pink-footed geese will avoid the active construction works area. If geese are found to be present on the site during construction, works will adhere to a minimum 200m disturbance buffer to avoid disturbance, as enforced by the ECoW. Other mitigation measures will be in place to protect individual pink-footed geese from injury or mortality during construction (e.g., minimising working over winter, adhering to a speed limit at the site). As a result, it is not anticipated that the Proposed Development would result in significant impacts to population dynamics of pink-footed geese from the SPA

4.4.17 The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds, however this is a short-term impact over a small area of suitable habitat for geese, and therefore no significant impacts are expected during construction.

4.4.18 The Proposed Development is small in scale and is not expected to result in any significant barriers to pink-footed geese moving between the Firth of Forth SPA and adjacent habitats. During operation, the land within the Proposed Development would not be suitable for pink-footed goose foraging, minimising the risk of any injury or mortality.

4.4.19 Considering the nature and scale of the Proposed Development, it is concluded that there would be **no AESI** on pink-footed goose from the Firth of Forth SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.4.20 The aim of CO 2b is to ensure that pink-footed geese are not restricted in accessing all areas of the Firth of Forth SPA for all aspects of their life history (NatureScot, 2024c). The Firth of Forth SPA is an important wintering ground for pink-footed geese which arrive here in September/October from their breeding grounds in Greenland and Iceland. The birds use the site primarily for roosting in intertidal areas, saltmarsh, mudflats and agricultural land for foraging and day roosting. Pink-footed geese are sensitive to disturbance and may be displaced from roosting areas if disturbed.

4.4.21 The Proposed Development is located 11.26km away from the Firth of Forth SPA, and therefore there is no risk of direct disturbance to pink-footed geese within the SPA. Therefore, it is concluded that there would be **no AESI** for this conservation objective.

4.4.3 Lapwing within the Firth of Forth SPA and Ramsar site

4.4.1 The Firth of Forth SPA is designated in part due to its wintering population of lapwing, which use the SPA for roosting over winter and forage in adjacent agricultural land. It is presumed that some of the lapwings that make up the SPA population come from British breeding populations outside of the SPA boundary, however many are from breeding populations in Scandinavia, The Netherlands, Denmark and north Germany (Lack, 1986).

4.4.2 At the time of designation (30 October 2001) the SPA supported a population of 4,148 individual lapwings, calculated as the winter mean peak from 1991/92 to 1995/96 (NatureScot, 2018b). At that time, this was considered a population of national importance, and it made up 0.3% of the total population in Great Britain.

4.4.3 The non-breeding lapwing population within the Firth of Forth SPA is considered to be in Favourable Declining condition (NatureScot, 2024d).

Proposed Development Site Baseline

4.4.4 Lapwings feed on invertebrates and can typically be found foraging on winter cereals, bare till or grasslands, and many studies show a preference for grassland types, possibly due to the prevalence of earthworms in grasslands (Gillings and Fuller, 1999). Lapwings nest on the ground in small bare patches in agricultural or grassland habitats (Natural England, 2011). The habitats within the Proposed Development site boundary were predominantly agricultural, which are suitable foraging and nesting habitat for lapwings.

4.4.5 Breeding bird surveys were completed in April, May, June and July 2024. The surveys comprised one walkover survey per month, with at least two weeks separating surveys. The study area encompassed the site plus a 50m buffer and all surveys were completed in the early morning (i.e. between 4am and 11am). The surveys followed guidance from Gilbert *et. al.* (1998), with surveyors walking along transect routes ensuring all of the site within 100m was covered. Any lapwings either seen or heard were recorded on a map. Evidence of breeding behaviour was also recorded.

4.4.6 No lapwing were recorded within the site or survey buffer during the breeding bird surveys completed at the Proposed Development between April and July 2024.

Likely Impacts

4.4.7 The Proposed Development is not adjacent to the site boundary for the Firth of Tay Forth and therefore no direct impacts to habitats or individual lapwing using the SPA site are anticipated. However, the Proposed Development does provide functionally-linked foraging habitat for non-breeding lapwing, as well as suitable nesting and foraging habitat for breeding lapwing. Therefore the following impacts have been identified for lapwings from the Firth of Forth SPA:

- temporary loss of foraging habitat during construction;
- permanent loss of foraging habitat during operation;
- temporary loss of breeding habitat during construction;
- permanent loss of breeding habitat during operation;
- disturbance to breeding individuals during construction; and
- mortality and/or injury, including of nests, during construction.

4.4.8 The non-breeding lapwing population within the Firth of Forth SPA is considered to be in Favourable Declining condition, though no negative pressures are reported (NatureScot, 2024d). However, it is reported that breeding lapwing have been negatively impacted by agricultural intensification in the lowlands of Britain (Hudson *et. al.,* 1994).

Assessment Against Conservation Objectives

4.4.9 The COs for the Firth of Forth SPA (NatureScot, 2024e) are:

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

Conservation Objective 1, 2c and 2d

4.4.10 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is not located adjacent to or within the SPA boundary, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to lapwing using the SPA itself.

4.4.11 CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Firth of Forth SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024e). In the context of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for pink-footed goose is maintained.

4.4.12 The Proposed Development is not situated adjacent to the Firth of Forth SPA, and therefore there will be no direct impacts on the SPA, its habitats or water quality. The Proposed Development site does provide some suitable foraging habitat for lapwing, as they forage on adult and larval insects (e.g., beetles, ants, true flies, crickets, grasshoppers, dragonflies, mayflies, lepidoptera species), spiders, snails, earthworms and frogs, all of which could be present in habitats within the Proposed Development site boundary.

4.4.13 Lapwings are considered to be of moderate sensitivity to noise and/or visual disturbance and it was suggested that lapwings showed no response to visual disturbance at 300-400m (Cutts *et. al.*, 2013). Considering this, a disturbance buffer of 400m was used on a precautionary basis to determine the extent of temporary habitat loss. No specific guidance for foraging distances of lapwing were found, however, it is recognised that lapwings may forage up to 12km (10-12km reported, Gillings and Fuller, 1999), and therefore this was used a precaution.

4.4.14 Broad habitats within this 400m buffer of the Proposed Development include agricultural land, neutral and marshy grasslands, woodland, and small areas of residential and agricultural buildings. The arable land, which makes up the majority of the site, and the marshy grassland areas provide suitable foraging and nesting habitat for lapwing. Although lapwings will use multiple types of grasslands for foraging, wet grasslands of lower management intensity where rushes are abundant are particularly important, as these habitats provide optimal foraging for lapwing chicks (Eglington *et. al.,* 2010). These grassland types are abundant in north east Scotland, however, wet grassland made up only a small proportion of the available grassland habitat within the site boundary. Therefore, the Proposed Development would result is a loss of only a small amount of potential foraging habitat for lapwing.

4.4.15 During operation of the Proposed Development, the fields will be sown with grassland mixes that could provide invertebrate prey. However, lapwings prefer to forage in open fields so that

predators can be detected (Natural England, 2011), and thus as a precautionary measure all of the land within the Proposed Development is considered to be permanently lost as foraging habitat.

4.4.16 Using a precautionary 12km foraging range of lapwing (Gillings and Fuller, 1999), this equates to an area of 263,033ha available from the SPA. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for lapwing, equating to an area of 26,303.3ha. The site plus a 400m buffer would cover an area of 390ha. This amount of temporary habitat loss during the construction phase equals 1.5% of the suitable habitat within the foraging range from the SPA. However, this is likely an overestimate as much of the site and surrounding 400m buffer do not provide optimal foraging habitat (e.g., wet grassland) for lapwing prior to construction. The permanent habitat loss would be even less (0.4% of suitable foraging area available), since it is anticipated the suitable foraging areas within the 400m disturbance buffer would be available to lapwing once construction is complete.

4.4.17 Although there will be some temporary and permanent loss of foraging habitat, these made up a small percentage of the total available foraging habitat for lapwing from the Firth of Forth SPA. Furthermore, much of the neutral (semi-improved) and marshy grassland onsite is to be left in-situ, meaning this suitable habitat will be available to lapwing for breeding and/or foraging post-construction. Given this, and the fact no lapwing were recorded on the site during breeding and wintering bird surveys, it is concluded that the Proposed Development will result in **no AESI on lapwing from the Firth of Forth SPA** as a result of temporary loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.4.18 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site.

4.4.19 The Proposed Development is located 11.26km inland from the Firth of Forth SPA, and therefore no direct impacts on lapwings within the SPA boundary are envisaged. The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds, however this is a short-term impact over a small area of suitable habitat for lapwing, and therefore no significant impacts to dispersal are expected during construction. Considering this, it is concluded that the Proposed Development would result in **no AESI** on lapwing, with respect to CO 2a.

4.4.20 Construction is expected to occur at least in part during the breeding bird season, therefore, mitigation measures will be in place during construction that will minimise impacts on nesting lapwing (Section 4.2). An ECoW will be present onsite to carry out bird monitoring and nest checks. If lapwings are found to be present on the site during construction, works will adhere to a minimum 400m disturbance buffer to avoid disturbance (NatureScot, 2022). Other mitigation measures will be in place to protect individual lapwing from injury or mortality during construction (e.g., appropriate exclusions zones around nests, adhering to a speed limit at the site etc).

4.4.21 There is a small potential for mortality and/or injury to individual lapwing during construction of the Proposed Development. However, lapwing were not recorded on the site or survey buffer 2023/2024, and it is expected that lapwing will avoid the active construction works area. As a result, it is not anticipated that the Proposed Development would result in significant impacts to population dynamics of lapwing from the SPA

4.4.22 The Proposed Development is small in scale and is not expected to result in any significant barriers to lapwing moving between the Firth of Forth SPA and adjacent habitats.

4.4.23 Considering the nature and scale of the Proposed Development, it is concluded that there would be **no AESI** on lapwing from the Firth of Forth SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.4.24 CO 2b is aimed at ensuring that lapwings have access to use all areas of the Firth of Forth SPA throughout their life history (NatureScot, 2024e). When assessing impacts on lapwing with respect to this CO, the following must be ensured:

- lapwings continue to have access to and can utilise all optimal habitats suitable for all relevant aspects of their life cycle associated with the site; and
- avoid significant disturbance to lapwing an ensure individuals can move safely between these areas within the Firth of Forth SPA.

4.4.25 The Proposed Development is located 11.26km away from the Firth of Forth SPA, and therefore there will be no direct impacts to lapwings within the SPA site. As this CO is associated with lapwings within the SPA site, it is concluded that the Proposed Development will result in **no AESI** on lapwing, with respect to CO 2b.

4.4.4 Cumulative Impact Assessment

4.4.1 A search was undertaken on the Fife Council planning portal, Angus Council planning portal, Edinburgh planning portal, and the Energy Consents Unit website for planning applications within 20km of the Firth of Forth SPA that could result in a cumulative impact on pink-footed geese or lapwing. The search focussed on larger developments that could result in additional habitat loss for pink-footed goose and lapwing, as habitat loss is the main impact of the Proposed Development.

4.4.2 Eight projects were identified through this search, five solar developments, one residential area and one data centre (Table 6). The boundaries for these developments are all primarily on agricultural land or grassland, which provides suitable foraging habitat for pink-footed goose and lapwing, and suitable nesting habitat for lapwing.

4.4.3 Assuming that all of the habitat within the boundaries for these developments will be lost, this would result in a total of 588.60ha of permanent habitat loss, when added to the 103ha lost to the Proposed Development. Based on a total amount of suitable foraging habitat for pink-footed goose of 44,997.30ha, this equates to 1.3% of the total available foraging habitat for pink-footed goose from the Firth of Forth SPA.

4.4.4 Of these eight developments, five were within a 6km foraging buffer of the Firth of Forth SPA. The total habitat loss for lapwing from this development plus the Proposed Development is 433.19ha, equating to 1.6% of the available lapwing foraging and nesting habitat (26,303.30ha).

4.4.5 For both species, the cumulative impact of permanent habitat loss from these developments and the Proposed Development was less than 2% of the total suitable foraging habitat available to individuals of both species from the Firth of Forth SPA. Considering this, it is concluded that there will be no cumulative impacts on the qualifying bird species from the Firth of Forth SPA, when considered with other plans and projects.

Table 6: Other projects considered in the cumulative impact assessment for the Firth of Forth SPA

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
22/02493/PAN	20MW solar farm (land 800m south of Winthank Farm)	NO 47636 12563 (10km south)	Permanent habitat loss	81.40
23/02831/SCR	Kilmux Solar Park (Kilmux Farm)	NO 36907 05534 (4km north)	Permanent habitat loss	50.99
21/01319/PAN	Residential led mixed use development (Milldeans Farm, Prinlaws Road, Leslie, Fife)	NO 24198 00610 (9km north)	Permanent habitat loss	27.92
21/03961/SCR	Solar farm and battery storage development (Glenniston Farm)	NT 21013 92658 (6km north)	Permanent habitat loss	71.2

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
25/00552/PAN	Data centre complex (land north of Camilla Rd, Gleniston)	NT 21052 91043 (5km north)	Permanent habitat loss	73.00
22/03982/FULL	Solar Development (Parkend, Crossgates, Fife)	NT 17107 87144 (3km north)	Permanent habitat loss	30.00
23/01196/FULL	Construction of an Energy Park (land south of Lochead Landfill Site, Fife)	NT 07856 90016 (7km north)	Permanent habitat loss	46.09
23/00922/PAN	Solar Farm and battery store for up to 49.9MW (Craigluscar Road, Milesmark, Fife)	NT 06482 90385 (6km north)	Permanent habitat loss	105.00

4.5 Cameron Reservoir SPA and Ramsar site

4.5.1 Stage 1: Screening could not exclude LSEs for pink-footed geese from the Cameron Reservoir SPA, and therefore an AA is necessary to determine whether the Proposed Development is expected to result in adverse effects on the integrity of the Cameron Reservoir SPA.

4.5.2 Pink-footed geese within the Cameron Reservoir SPA and Ramsar site

4.5.1 The Cameron Reservoir SPA was designated in part due to the pink-footed goose population that use the area, which was considered to be of international importance.

4.5.2 At the time of designation (14 March 1994) the Cameron Reservoir SPA supported a population of 6,760 individual pink-footed geese, which equated to 6% of the Iceland/Greenland population (NatureScot, 2010). That population size was calculated as the winter mean peak of individuals at the site from 1986/87 to 1990/91.

4.5.3 The population was last assessed in 2009 and considered to be in Favourable Declining condition (NatureScot, 2024f). The population size in 2012 and was reported to be 374 individuals, which was the winter mean peak count of individuals from 2006/7-2010/11 (Mitchell, 2012). Therefore, the SPA is no longer holding internationally important numbers of pink-footed geese (Mitchell, 2012).

Proposed Development Site Baseline

4.5.4 See section 4.3.5 for site baseline results for pink-footed geese. The peak count of 2,100 pink-footed geese within the study area equates to over five times the Cameron Reservoir SPA population reported in 2012 (374; Mitchell, 2012). This peak count equates to 5.1% of the population of pink-footed geese from the four SPA's within a 20km buffer of the Proposed Development.

Likely Impacts

4.5.5 The Proposed Development is not adjacent to the site boundary for the Cameron Reservoir SPA and therefore no direct impacts to habitats or individual pink-footed geese using the SPA site are anticipated. However, the Proposed Development does provide functionally-linked foraging habitat (see paragraph 4.3.4 and 4.3.5) for pink-footed geese, and therefore the following impacts have been identified for pink-footed geese from the Cameron Reservoir SPA:

- temporary loss of foraging habitat during construction (including due to disturbance);
- permanent loss of foraging habitat during operation; and
- mortality and/or injury during construction.

Assessment Against Conservation Objectives

4.5.6 The conservation objectives (COs) for the Cameron Reservoir SPA are (NatureScot, 2024g):

1. To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. To ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

4.5.7 The maintenance of the site as a goose roost depends on (SNH, 2010b):

1. maintaining low levels of disturbance during the winter months and from before sunset to dawn each night; and
2. maintain sufficient water quality and high-water levels to provide the geese with a secure roosting location.

Conservation Objective 1, 2c, 2d

4.5.8 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is located 12.57km from the SPA, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to pink-footed goose within the SPA itself. CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Cameron Reservoir SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024g). In the context of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for pink-footed goose is maintained.

4.5.9 There will be a temporary loss of functionally-linked foraging habitat within a 600m buffer of the Proposed Development, as construction installation of site infrastructure will change the land cover amount and type and construction activities are expected to displace pink-footed geese from using the available habitat.

4.5.10 There will be a permanent loss of functionally-linked foraging habitat during operation of the Proposed Development, as all fields within the Proposed Development site are assumed to become unsuitable for pink-footed goose foraging.

4.5.11 Pink-footed geese require large and open fields for foraging, as this allows for early detection of predators. Therefore, although the land between the solar PV panels will be planted with a grazing mix which could be used by pink-footed geese for foraging, the presence of the solar PV panels will obscure any visual detection of predators, and therefore it is assumed that the entire area of all fields with solar PV panels will be permanently lost as foraging habitat for pink-footed geese.

4.5.12 The non-breeding disturbance buffer for pink-footed goose is 200m – 600m (NatureScot, 2022), and as a precautionary measure, the disturbance buffer is assumed to be 600m for assessment of temporary habitat loss due to displacement. Pink-footed geese are known to forage up to 20km from their roosting sites (SNH, 2016), and therefore this distance was used to assess impacts of permanent habitat loss on pink footed-geese.

4.5.13 When considering a 20km foraging range of pink-footed goose, this equates to an area of 72,953ha available to foraging pink-footed geese. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for geese, equating to an area of 7,295.3ha.

The site plus a 600m buffer would cover an area of 554ha. This amount of temporary habitat loss during the construction phase equals 7.6% of that available to foraging pink-footed geese. The permanent habitat loss would be less (1.4%), since it is anticipated the suitable foraging areas within the 600m disturbance buffer would be available to the geese once construction is complete.

4.5.14 In the most recent assessment, the area where the Proposed Development is situated in Fife was not shown considered to be a key area of the feeding distribution of pink-footed geese from the SPA, based on a low concentration of Sensitivity Index points (Mitchell, 2012). The key feeding areas for pink-footed geese from the SPA were to the east and south east of the Proposed Development, and were concentrated close to the roost location at Cameron Reservoir.

4.5.15 Considering that a small proportion of available foraging habitat for pink-footed geese would be lost (both temporarily and permanently), and that the Proposed Development is not in a key foraging area for pink-footed geese, it is concluded that the Proposed Development would result in **no AESI on pink-footed geese from the Cameron Reservoir SPA** as a result of temporary or permanent loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.5.16 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site. There is a small potential for mortality and/or injury to individual pink-footed geese during construction of the Proposed Development. However, it is expected that pink-footed geese will avoid the active construction works area. If geese are found to be present on the site during construction, works will adhere to a minimum 200m disturbance buffer to avoid disturbance, as enforced by the ECoW. Other mitigation measures will be in place to protect individual pink-footed geese from injury or mortality during construction (e.g., minimising working over winter, adhering to a speed limit at the site). As a result, it is not anticipated that the Proposed Development will result in significant impacts to population dynamics of pink-footed geese from the SPA.

4.5.17 The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds, however this is a short-term impact over a small area of suitable habitat for geese, and therefore no significant impacts are expected during construction.

4.5.18 The Proposed Development is small in scale and is not expected to result in any significant barriers to pink-footed geese moving between the Cameron Reservoir SPA and adjacent habitats. During operation, the land within the Proposed Development will not be suitable for pink-footed goose foraging, minimising the risk of any injury or mortality.

4.5.19 Considering the nature and scale of the Proposed Development, it is concluded that there will be **no AESI** on pink-footed goose from the Cameron Reservoir SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.5.20 The aim of CO 2b is to ensure that pink-footed geese are not restricted in accessing all areas of the Cameron Reservoir SPA for all aspects of their life history (NatureScot, 2024g). The SPA is an important wintering ground for pink-footed geese which arrive here in September/October from their breeding grounds in Greenland and Iceland. The birds use the site primarily for roosting and forage in nearby agricultural areas. Pink-footed geese are sensitive to disturbance and may be displaced from roosting areas if disturbed.

4.5.21 The Proposed Development is located 12.57km away from the Cameron Reservoir SPA, and therefore there is no risk of direct disturbance to pink-footed geese within the SPA. Therefore, it is concluded that there will be **no AESI** for this conservation objective.

4.5.3 Cumulative Impact Assessment

4.5.1 A search was undertaken on the Fife Council planning portal and the Energy Consents Unit website for planning applications within 20km of the Cameron Reservoir SPA that could result in a cumulative impact on pink-footed geese. The search focussed on larger developments that could result in additional habitat loss for pink-footed goose, as habitat loss is the main impact of the Proposed Development.

4.5.2 Four projects were identified through this search, two solar developments, one residential area and one quarry (Table 7). The boundaries for these developments are all primarily on agricultural land or grassland, which provides suitable foraging habitat for pink-footed goose.

4.5.3 Assuming that all of the habitat within the boundaries for these developments will be lost, this would result in a total of 205.45ha of permanent habitat loss, when added to the 103ha lost to the Proposed Development. Based on a total amount of suitable foraging habitat for pink-footed goose of 7,295.30ha, this equates to 2.8% of the total available foraging habitat for pink-footed goose from the SPA.

4.5.4 The cumulative impact of permanent habitat loss from these developments and the Proposed Development was less than 3% of the total suitable foraging habitat available to individuals of both species from the Cameron Reservoir SPA. Considering this, it is concluded that there will be no cumulative impacts on the qualifying bird species from the SPA, when considered with other plans and projects.

Table 7: Other projects considered in the cumulative impact assessment for Cameron Reservoir SPA

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
23/02826/FULL	Erection of 158 residential dwellings	NO 39653 25309 (15km north)	Permanent habitat loss	5.37
23/01505/FULL	St Michaels Quarry Fife	NO 43177 23550 (12km south)	Permanent habitat loss	46.09
22/02493/PAN	20MW solar farm (land 800m south of Winthank Farm)	NO 47636 12563 (<1km north)	Permanent habitat loss	81.40
23/02831/SCR	Kilmux Solar Park (Kilmux Farm)	NO 36907 05534 (11km west)	Permanent habitat loss	50.99

4.6 Loch Leven SPA and Ramsar site

4.6.1 Stage 1: Screening could not exclude LSEs for pink-footed geese from the Loch Leven SPA, and therefore an AA is necessary to determine whether the Proposed Development is expected to result in adverse effects on the integrity of the Loch Leven SPA.

4.6.2 Pink-footed geese within the Loch Leven SPA and Ramsar site

4.6.1 The Loch Leven SPA was designated in part due to the pink-footed goose population that use the area, which was considered to be of international importance.

4.6.2 At the time of designation (27 March 2000) the Loch Leven SPA supported a population of 17,163 individual pink-footed geese, which equated to 8% of the eastern Greenland/Iceland population (NatureScot, 2000). That population size was calculated as the winter mean peak of individuals at the site from 1993/94 to 97/98.

4.6.3 The population size was assessed in 2012, and was reported to be 17,853 individuals, which was the winter mean peak count of individuals from 2006/7-2010/11 (Mitchell, 2012). The population is considered to be in Favourable Maintained condition (NatureScot, 2024h).

Proposed Development Site Baseline

4.6.4 See section 4.3.5 for site baseline results for pink-footed geese. The peak count of 2,100 pink-footed geese within the study area equates to 12% of the Loch Leven SPA population reported in 2012 (17,853; Mitchell, 2012), while the peak count of 640 individuals recorded on site in March equates to 4% of the 2012 population.

4.6.5 The peak count of 2,100 pink-footed geese within the study area equates to 5.1% of the population of pink-footed geese from the four SPA's within a 20km buffer of the Proposed Development.

Likely Impacts

4.6.6 The Proposed Development is not adjacent to the site boundary for the Loch Leven SPA and therefore no direct impacts to habitats or individual pink-footed geese using the SPA site are anticipated. However, the Proposed Development does provide functionally-linked foraging habitat (see paragraph 4.3.4 and 4.3.5) for pink-footed geese, and therefore the following impacts have been identified for pink-footed geese from the Loch Leven SPA:

- temporary loss of foraging habitat during construction (including due to disturbance);
- permanent loss of foraging habitat during operation; and
- mortality and/or injury during construction.

Assessment Against Conservation Objectives

4.6.7 The conservation objectives (COs) for the Loch Leven SPA are (NatureScot, 2024i):

1. to avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
2. to ensure for the qualifying species that the following are maintained in the long term:
    a. population of the species as a viable component of the site;
    b. distribution of the species within site;
    c. distribution and extent of habitats supporting the species;
    d. structure, function and supporting processes of habitats supporting the species; and
    e. no significant disturbance of the species.

4.6.8 The qualifying feature pink-footed goose is considered to be in Favourable Maintained condition within the Loch Leven SPA (NatureScot, 2024h).

Conservation Objective 1, 2c, 2d

4.6.9 CO 1 is partly aimed at avoiding the deterioration of the habitats of the qualifying features of the site. Since the Proposed Development is located 18.23km from the Loch Leven SPA, it is anticipated there will be no direct impacts to the habitats and no direct disturbance to pink-footed goose within the SPA itself. CO 2c is aimed at ensuring that the current distribution and extent of habitats supporting the qualifying interests of the Loch Leven SPA are maintained, and CO 2d is aimed at maintaining the structure, function and supporting processes of these habitats (NatureScot, 2024g). In the context of the Proposed Development, this includes ensuring that the quality, abundance and availability of food resources for pink-footed goose is maintained.

4.6.10 There will be a temporary loss of functionally-linked foraging habitat within a 600m buffer of the Proposed Development, as construction installation of site infrastructure will change the land cover amount and type and construction activities are expected to displace pink-footed geese from using the available habitat.

4.6.11 There will be a permanent loss of functionally-linked foraging habitat during operation of the Proposed Development, as all fields within the Proposed Development site are assumed to become unsuitable for pink-footed goose foraging.

4.6.12 Pink-footed geese require large and open fields for foraging, as this allows for early detection of predators. Therefore, although the land between the solar PV panels will be planted with a grazing mix which could be used by pink-footed geese for foraging, the presence of the solar PV panels will obscure any visual detection of predators, and therefore it is assumed that the entire area of all fields with solar PV panels will be permanently lost as foraging habitat for pink-footed geese.

4.6.13 The non-breeding disturbance buffer for pink-footed goose is 200m – 600m (NatureScot, 2022), and as a precautionary measure, the disturbance buffer is assumed to be 600m for assessment of temporary habitat loss due to displacement. Pink-footed geese are known to forage up to 20km from their roosting sites (SNH, 2016), and therefore this distance was used to assess impacts of permanent habitat loss on pink footed-geese.

4.6.14 When considering a 20km foraging range of pink-footed goose, this equates to an area of 141,750ha available to foraging pink-footed geese. As a precautionary approach, it is assumed that 10% of this area provides suitable foraging habitat for geese, equating to an area of 14,175ha. The site plus a 600m buffer would cover an area of 554ha. This amount of temporary habitat loss during the construction phase equals 3.9% of that available to foraging pink-footed geese. The permanent habitat loss would be even less (0.7%), since it is anticipated the suitable foraging areas within the 600m disturbance buffer would be available to the geese once construction is complete.

4.6.15 In the most recent assessment, the area where the Proposed Development is situated in Fife was not shown considered to be a key area of the feeding distribution of pink-footed geese from the SPA, based on a low concentration of Sensitivity Index points (Mitchell, 2012). The key feeding areas for pink-footed geese from the SPA were to the south west of the Proposed Development, and were concentrated close to the roost location at Loch Leven.

4.6.16 Considering that a small proportion of available foraging habitat for pink-footed geese would be lost (both temporarily and permanently), and that the Proposed Development is not in a key foraging area for pink-footed geese, it is concluded that the Proposed Development would result in **no AESI on pink-footed geese from the Loch Leven SPA** as a result of temporary or permanent loss of foraging habitat, with respect to CO 1, 2c and 2d.

Conservation Objective 1, 2a and 2e

4.6.17 CO 1 is partly aimed at avoiding disturbance to the qualifying species of the SPA, as is CO 2e, while CO 2a relates to the population remaining a viable component of the site. There is a small potential for mortality and/or injury to individual pink-footed geese during construction of the Proposed Development. However, it is expected that pink-footed geese will avoid the active construction works area. If geese are found to be present on the site during construction, works will adhere to a minimum 200m disturbance buffer to avoid disturbance. Other mitigation measures will be in place to protect individual pink-footed geese from injury or mortality during construction (e.g., minimising working over winter, adhering to a speed limit at the site). As a result, it is not anticipated that the Proposed Development would result in significant impacts to population dynamics of pink-footed geese from the SPA.

4.6.18 The Proposed Development includes no overhead lines or other infrastructure that could result in collision, and therefore it is not expected to impact movement between the SPA and functionally-linked land during operation. During construction, noise and vibration may displace some birds, however this is a short-term impact over a small area of suitable habitat for geese, and therefore no significant impacts are expected during construction.

4.6.19 The Proposed Development is small in scale and is not expected to result in any significant barriers to pink-footed geese moving between the Loch Leven SPA and adjacent habitats. During

operation, the land within the Proposed Development will not be suitable for pink-footed goose foraging, minimising the risk of any injury or mortality.

4.6.20 Considering the nature and scale of the Proposed Development, it is concluded that there will be **no AESI** on pink-footed goose from the Loch Leven SPA, with respect to CO 1, 2a and 2e.

Conservation Objective 2b

4.6.21 The aim of CO 2b is to ensure that pink-footed geese are not restricted in accessing all areas of the Loch Leven SPA for all aspects of their life history (NatureScot, 2024i). The SPA is an important wintering ground for pink-footed geese which arrive here in September/October from their breeding grounds in Greenland and Iceland. The birds use the site primarily for roosting and forage in nearby agricultural areas. Pink-footed geese are sensitive to disturbance and may be displaced from roosting areas if disturbed.

4.6.22 The Proposed Development is located 18.23km away from the Loch Leven SPA, and therefore there is no risk of direct disturbance to pink-footed geese within the SPA. Therefore, it is concluded that there would be **no AESI** for this conservation objective.

4.6.3 Cumulative Impact Assessment

4.6.1 A search was undertaken on the Fife Council planning portal, Angus Council planning portal, Edinburgh planning portal, and the Energy Consents Unit website for planning applications within 20km of the Loch Leven SPA that could result in a cumulative impact on pink-footed geese. The search focussed on larger developments that could result in additional habitat loss for pink-footed goose, as habitat loss is the main impact of the Proposed Development.

4.6.2 Seven projects were identified through this search, five solar developments, one residential area and one data centre (Table 8). The boundaries for these developments are all primarily on agricultural land or grassland, which provides suitable foraging habitat for pink-footed goose.

4.6.3 Assuming that all of the habitat within the boundaries for these developments will be lost, this would result in a total of 507.2ha of permanent habitat loss, when added to the 103ha lost to the Proposed Development. Based on a total amount of suitable foraging habitat for pink-footed goose of 14,175.0ha, this equates to 3.6% of the total available foraging habitat for pink-footed goose from the SPA.

4.6.4 The cumulative impact of permanent habitat loss from these developments and the Proposed Development was less than 4% of the total suitable foraging habitat available to individuals of both species from the Loch Leven SPA. Considering this, it is concluded that there will be no cumulative impacts on the qualifying bird species from the SPA, when considered with other plans and projects.

Table 8: Other projects considered in the cumulative impact assessment for Loch Leven SPA

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
23/02831/SCR	Kilmux Solar Park (Kilmux Farm)	NO 36907 05534 (19km east)	Permanent habitat loss	50.99
21/01319/PAN	Residential led mixed use development (Milldeans Farm)	NO 24198 00610 (6km west)	Permanent habitat loss	27.92
21/03961/SCR	Solar farm and battery storage development (Glenniston Farm)	NT 21013 92658 (7km south)	Permanent habitat loss	71.20
25/00552/PAN	Data centre complec (land north of Camilla Rd, Gleniston)	NT 21052 91043 (9km south)	Permanent habitat loss	73.00
22/03982/FULL	Solar Development (Parkend, Crossgates, Fife)	NT 17107 87144 (12km south)	Permanent habitat loss	30.00
23/01196/FULL	Construction of an Energy Park (land south of Lochead Landfill Site, Fife)	NT 07856 90016 (11km south west)	Permanent habitat loss	46.09

Application Number and Description		NGR (distance to SPA)	Potential Impact	Area Lost (ha)
23/00922/PAN	Solar Farm and battery store for up to 49.9MW (Craigluscar Road, Milesmark, Fife)	NT 06482 90385 (11km south west)	Permanent habitat loss	105

5 CONCLUSION

5.1.1 Nine European sites were identified within 20km of the Proposed Development that were considered in this HRA:

- Firth of Tay and Eden Estuary SPA;
- Firth of Tay and Eden Estuary Ramsar site;
- Firth of Forth SPA;
- Firth of Forth Ramsar;
- Outer Firth of Forth and St Andrews Bay SPA;
- Cameron Reservoir SPA;
- Cameron Reservoir Ramsar site;
- Loch Leven SPA; and
- Loch Leven Ramsar site.

5.1.2 Following the Stage 1: Screening assessment, it was concluded that there were LSE on pink-footed goose and greylag goose from the Firth of Tay and Eden Estuary SPA and Ramsar site; pink-footed goose and lapwing from the Firth of Forth SPA and Ramsar site; pink-footed goose from the Cameron Reservoir SPA and Ramsar site; and pink-footed goose from the Loch Leven SPA and Ramsar site.

5.1.3 It is anticipated that the main impacts of the Proposed Development will be temporary and permanent habitat loss, but there is also a potential for injury and/or mortality during construction. After considering the impact of habitat loss in the context of the amount of functionally-linked habitat available, and the mitigation measures during construction to minimise the risk of injury and/or mortality, it was concluded that there would be **no adverse effects** on the integrity of any SPA or Ramsar site with respect to the qualifying interests' conservation objectives.

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FIGURES