



Appendix A40.10 – Wintering Birds

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Jacobs U.K. Limited 95 Bothwell Street, Glasgow G2 7HX

Tel 0141 204 2511 Fax 0141 226 3109

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1 Introduction

1.1 General Background

1.1.1 This report is one of the appendices supporting Chapter 40 (Ecology and Nature Conservation) of the AWPR Environmental Statement. This appendix reports on the impacts on wintering bird assemblages associated with the Fastlink section of the proposed scheme. Wintering birds in the context of this report are bird species that are found in the UK during the winter period, i.e. species native to the UK that are resident all year round and b) species that migrate to over-winter in the UK .

1.1.2 The results of the surveys carried out for the purposes of this assessment are also presented and are shown on Figures A40.6a-f.

1.1.3 To aid the interpretation of the assessment, the Fastlink has been sub-divided into three component route sections as follows:

- Section FL1: Stonehaven to Howieshill (ch0-3200);
- Section FL2: Howieshill to Cookney (ch3200-6300); and
- Section FL3: Cookney to Cleanhill Junction (ch6300-10200).

1.1.4 All tables and mapping are structured in this manner.

The Ecological Impact Assessment (EclA) was undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 10 and 11 (Highways Agency, 2001) and the Environmental Impact Assessment (Scotland) Regulations 1999, IEEM (2002) Guidelines for Ecological Impact Assessment, along with cognisance of draft Institute of Ecology and Environmental Management (IEEM) guidelines (2006).

1.1.5 This assessment included desk-based consultation to collate existing information about wintering birds in the area affected by the scheme and field surveys to provide current data about the status of wintering bird populations.

Aims

1.1.6 The purpose of the assessment is to evaluate the current status of wintering bird populations in the vicinity study area, identify the potential impacts of the scheme, provide mitigation measures to ameliorate impacts and identify any residual impacts.

Study Area

1.1.7 For the purposes of this assessment, the study area is defined 500m either side of the centreline of the proposed scheme.

1.2 Legislation and Conservation Status of Birds

National Legislative Protection

Wildlife and Countryside Act (1981) (as amended) & Conservation (Natural Habitats & c.) Regulations (1994)

1.2.1 The Wildlife and Countryside Act (1981) (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain.

1.2.2 The Conservation (Natural Habitats & c.) Regulations 1994 is the means by which the Convention

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on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and the European Union Directives on the Conservation of Wild Birds (79/409/EEC, the 'Birds Directive') and Natural Habitats and Wild Fauna and Flora (92/43/EEC, the 'Habitat Directive') are implemented in Great Britain.

Nature Conservation (Scotland) Act 2004

- 1.2.3 The Nature Conservation (Scotland) Act 2004 (NCSA) implements a series of measures designed to improve the legal protection and enhance the conservation of the natural features of Scotland (natural features, in this context, refer to flora or fauna or geological or geomorphological features).
- 1.2.4 The NCSA comprises three parts: Part 1 introduces a general duty on public bodies to further the conservation of biodiversity in exercising any of their functions; Part 2 introduces significant changes to the existing arrangements for the establishment and protection of Sites of Special Scientific Interest (SSSIs); and Part 3 strengthens and extends the protection of birds, animals and plants by updating Part I of the WCA (1981).
- 1.2.5 Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected, and make it an offence to;
- intentionally or recklessly kill, injure or take any wild bird;
 - intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
 - intentionally or recklessly take or destroy the egg of any wild bird; or
 - intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependent young of such a bird.
- 1.2.6 Wildlife and Countryside Act (1981) (as amended) Schedule 1 (WCA1i) bird species are protected by legal penalties at all times.
- 1.2.7 The acts additionally provide protection for Sites of Special Scientific Interest (SSSI) in particular those that are designated for the presence of wild bird populations.

UK Conservation Status of Birds

Biodiversity Action Plans

- 1.2.8 The UK Biodiversity Action Plan (UK BAP) was the UK's response to the commitments of the Rio Convention on Biological Diversity. The plan outlines action for 26 species of bird of conservation importance/concern and can be viewed at www.ukbap.org.uk.
- 1.2.9 In addition to having national priorities and targets, action for biodiversity was also taken at a local level. The local North East Scotland Biodiversity Partnership (LBAP) outlines action for 12 national and 22 local bird species and can be viewed at <http://www.nesbiodiversity.org.uk/>.
- 1.2.10 The Scottish Biodiversity Strategy (Scottish Executive, 2004) places a duty of care on public bodies to further the conservation of biodiversity in Scotland, the execution of which is implemented through the local biodiversity action plans (LBAPs).
- 1.2.11 National Planning Policy Guidance 14 (NPPG 14) outlines planning guidance in relation to the conservation and enhancement of Scotland's natural heritage. NPPG 14 makes the presence of a protected species or habitats in addition to biodiversity habitats/species a material consideration in the assessment of development proposals and requires planning authorities to take particular care to avoid harm to species or habitats protected under the Wildlife and Countryside Act (1981) (as amended), European Directives and/or identified as priorities in the UK Biodiversity Action Plan.

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Scottish Biodiversity List

- 1.2.12 The Scottish Biodiversity List was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) Act 2004 and includes a list of species and habitats considered to be of principal importance for the purposes of biodiversity in Scotland. The list provides a guide to empower decision-makers such as public bodies, including local authorities, to implement their duty to further the conservation of biodiversity in Scotland. At present, the Scottish Biodiversity List includes 93 species of bird and can be viewed at <http://www.biodiversityscotland.gov.uk>.

UK Birds of Conservation Concern 2002 - 2007

- 1.2.13 The leading government and non-government conservation organisations in the UK have jointly reviewed the population status of 247 bird species¹ that are regularly found within the United Kingdom using data from national monitoring schemes.
- 1.2.14 On the basis of seven quantitative criteria, each species was placed on one of three lists, these being:
- Red - red list species are those that are globally threatened, have had an historical population decline in the UK from 1800-1995, a rapid ($\geq 50\%$) decline in UK breeding population over the past 25 years or a rapid ($\geq 50\%$) contraction of UK breeding range over the past 25 years;
 - Amber - amber listed species have had an historical population decline from 1800-1995, but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
 - Green - green listed species have no identified threat to their population status.
- 1.2.15 Of the 247 species assessed, 40 species were red-listed, 121 were amber-listed and the remaining 86 were green-listed (UK Birds of Conservation Concern 2002 – 2007).
- 1.2.16 With respect to this report, key species of conservation concern include WCA (1981) Schedule 1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species.
- 1.2.17 Additionally the pink-footed goose (*Anser brachyrhynchus*) and greylag goose (*Anser anser*) are species of national importance during the passage and wintering periods and although not listed as either Annex 1, Schedule 1 or as an LBAP species, are considered in this chapter as a species of conservation concern. Both these species are listed on Annex II/1 and Annex II/2 of the Birds Directive as migratory species of conservation importance.

¹ This figure takes into account both breeding and non-breeding bird species within the UK and thus differs from the total given in paragraph 2.2.1 which only pertains to the approximate number of breeding bird species within the UK (an approximation can only be obtained as a result of the variability in the annual total number of breeding bird species recorded within the UK).

2 Approach and Methods

2.1 Previous Survey Information

- 2.1.1 Consultation was undertaken with a variety of statutory and non-governmental organisations including Scottish Natural Heritage (SNH), North East Scotland Biological Records Centre (NESBReC), The Scottish Ornithologists' Club (SOC) and The Royal Society for the Protection of Birds (RSPB). These organisations were consulted regarding previous survey information/data and other bird records for the route corridor and wider study area.

2.2 Survey of Wintering Bird Assemblages

- 2.2.1 The following survey method section has been divided into two parts, the survey methods were developed by Jacobs ecologists in consultation with SNH, from 2004 to 2006. The first part details the methods used to select and survey sites within the study area for wintering bird assemblages. The second part details the methods used to assess and evaluate habitats within the study area for wintering bird assemblages.
- 2.2.2 Field surveys were directed / undertaken by experienced ornithological surveyors with extensive background in identifying birds from observations and from song / calls.

Development of Survey Strategy

- 2.2.3 A requirement to survey the route corridor of the proposed scheme for wintering bird populations in order to inform the assessment was identified through initial scoping with SNH in winter 2004.
- 2.2.4 A preliminary walkover survey of the 500m study area was undertaken in early spring 2006 (following initial consultation with SNH) to assist in the development of an appropriate survey strategy to sample the route corridor for wintering birds.
- 2.2.5 When developing the survey strategy it was determined through professional judgment and consultation with SNH that a full survey of the entire route corridor of the proposed scheme for wintering bird assemblages would be impractical. It was agreed to survey the route corridor by targeting high value wintering habitat comprising large waterbodies within or adjacent to the route corridor. The remaining terrestrial areas were sampled using a Line Transect and Quadrat sampling approach, in addition to collecting incidental records of wintering or migratory waders, wildfowl or geese seen in agricultural areas, wetlands and areas of water. These methods aimed to provide a 'best value' approach where the survey effort produced a level of baseline information that could be practically achieved, while also being sufficient to allow the impacts on bird assemblages to be appropriately assessed.
- 2.2.6 The two-stage wintering bird survey (WBS) strategy detailed below was developed using survey standards outlined in Bird Census Techniques (Bibby et al., 1992) and Bird Monitoring Methods (Gilbert et al., 1998). All methods were agreed through consultation with SNH in the form of an Ecology Scoping Report (Jacobs, 2006) prior to survey.

Selection of Survey Areas - WOVs

- 2.2.7 The first stage in the selection of survey areas involved the identification and selection of waterbodies that are of high value to wintering geese, waders and wildfowl (referred to as Waterbodies of Ornithological Value (WOVs)) located within and/or adjacent to the study area. These were identified during the initial walkover survey and through an assessment of data supplied by the North East Scotland Biological Records Centre (NESBReC) as well as through an analysis of aerial photographs and Ordnance Survey maps. Consultation responses and preliminary survey work did not identify any WOVs within or adjacent to the study area for the

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Fastlink route corridor.

Selection of Survey Areas – Remaining Habitat

- 2.2.8 The second stage in the selection of survey areas involved the use of a Line Transect and Quadrat sampling system to sample habitats throughout the remainder of the 500m study area for wintering bird species. The Quadrat data, in addition data of waterbody counts, were used to infer the importance of all remaining non-surveyed areas throughout the route corridor for wintering birds.
- 2.2.9 A single transect was established, centred over the route alignment (based on route option plans dated 23 January 2006), along which 500m square Quadrats were established. A sampling ratio of 1:3, which resulted in eight Quadrats being selected along the length of the transect. It was considered that this level of sampling would provide field survey data of sufficient representation to allow an effective evaluation of the ecological importance of the wintering bird assemblages found in these areas and the remainder of the study area.
- 2.2.10 It should be noted that the difference in number of breeding and wintering Quadrats is attributed to changes to the route alignment in the intervening period between undertaking the breeding bird surveys and starting the wintering bird surveys.
- 2.2.11 The standard mapping census technique as developed by the British Trust for Ornithology (BTO) (Bibby et al., 2000) was used to survey Quadrats for wintering bird species. Quadrats were subject to five WBS undertaken between October 2006 and February 2007. Observations of territorial behaviour (such as singing) were recorded but it was not considered that any birds were breeding. All species were recorded onto 1:10,000 site maps using standard BTO species codes, flight direction and flock size were included where appropriate to help minimise the potential for double counting. Adverse weather conditions such as strong wind, persistent rain, and dense fog were avoided. The survey did not include urban habitats, including areas of road and/or hardstanding and/or residential gardens
- 2.2.12 Approximately 40% (200ha) of the study area was surveyed for wintering birds using the Line Transect and Quadrat sampling system. Limitations to the surveys and the assessment are described in Section 2.6.

Incidental Records

- 2.2.13 Incidental observations of Birds Directive Annex 1, WCA Schedule 1, JNCC Red/Amber, UK/LBAP biodiversity action plan bird species, in addition to any migratory species of conservation importance included on Annex II/1 and Annex II/2 of the Birds Directive present within or adjacent to each of the Quadrats and within the wider study area, were recorded using BTO species codes. These included incidental observations of any wintering waders, wildfowl or geese in agricultural fields, any associated wetlands and areas of water within the 500m study area.

Dates of Survey

- 2.2.14 The reconnaissance surveys were undertaken from 23 to 26 January 2006. The wintering bird surveys were undertaken from 9 to 11 October 2006, 21 to 23 November 2006, 12 to 14 December 2006, 16 to 18 January 2007 and 13 to 15 February 2007.

2.3 Habitat Assessment

Habitat Value

- 2.3.1 Information obtained from the Phase 1 Habitat Survey (refer to Appendix A40.1) was used to inform a description of the habitats represented within each Quadrat and assess their value for birds. A habitat value (expressed as high, medium or low) was assigned to each Quadrat and Ecological Habitat Area based on the habitat descriptions derived from the Phase 1 Habitat Survey

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and following the criteria shown in Table 1.

Table 1 – Habitat Assessment Criteria

Habitat Value	Criteria
High	Habitats considered offering abundant good quality foraging opportunities for wintering birds.
Medium	Habitats considered offering scattered and/or localised foraging opportunities for wintering birds.
Low	Habitats considered offering occasional or limited foraging opportunities for wintering birds.

2.4 Evaluation of Ecology and Nature Conservation Value

2.4.1 The method for assessing the value of an ecological receptor uses all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor is determined by reference to statutory and non-statutory site designations, the results of consultation, literature review (including reference to the North-East Scotland Bird Report (North-East Scotland Bird Club, 2004) and The Birds of North-East Scotland (Buckland, et al., 1990)) and field surveys. The evaluation method incorporates a geographical framework where ecological receptors are assessed according to a series of criteria that are presented in Table 2, which are based on the Ratcliffe Criteria (Ratcliffe, 1977) used in the selection of biological SSSI and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological / geographical unit.

2.4.2 The evaluation method additionally includes reference to the legal protection conferred on species or habitats as well as the conservation status of the receptor, such as presence of UK BAPs or LBAPs. These factors give rise to a level of conservation importance being assigned to species/habitats that reflects the geographical framework used in the evaluation process. Thus, for example, Birds Directive Annex 1 species such as kingfisher that are protected by international legislation are referred to as internationally important in terms of their conservation status. Other species such as twite, which are identified as priority species in the North-East Scotland Biodiversity Action Plan (NES BAP) are referred to as regionally important species.

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Table 2 – Evaluation of Ecological Receptor

Site Importance	Site Attributes
International (European)	<p>Habitats</p> <p>An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area which meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified</p> <p>A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole</p> <p>Any river classified as excellent A1 and likely to support a substantial salmonid population.</p> <p>Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified</p> <p>Species</p> <p>Any regularly occurring population of an internationally important species, which is threatened or rare in the UK. i.e. a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP</p> <p>A regularly occurring, nationally significant population/number of any internationally important species.</p>
National (Scottish)	<p>Habitats</p> <p>A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area, which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified</p> <p>A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole</p> <p>Any river classified as excellent A1 and likely to support a substantial salmonid population.</p> <p>Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified.</p> <p>Species</p> <p>A regularly occurring, regionally or county significant population/number of an internationally/nationally important species</p> <p>Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP)</p> <p>A feature identified as of critical importance in the UK BAP.</p>
Regional (North East Scotland)	<p>Habitats</p> <p>Sites which exceed the county-level designations but fall short of SSSI selection guidelines, where these occur</p> <p>Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole</p> <p>Viable areas of key habitat identified as being of regional value in the appropriate SNH Natural Heritage Future area profile</p> <p>Any river classified as excellent A1 or good A2 and capable of supporting salmonid population.</p> <p>Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p>Species</p> <p>Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation</p> <p>A regularly occurring, locally significant population/number of a regionally important species.</p> <p>Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.</p>
Authority Area (e.g. County or District) Aberdeenshire / City of Aberdeen	<p>Habitats</p> <p>Sites that are recognised by local authorities (e.g. Sites of Interest for Nature Conservation (SINS) and District Wildlife Sites (DWS))</p> <p>County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR) selected on county/district ecological criteria (county/district sites where they exist, will often have been identified in local plans)</p> <p>A viable area of habitat identified in County/District BAP or in the relevant SNH Natural Heritage Future Area profile</p>

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Site Importance	Site Attributes
	<p>A diverse and/or ecologically valuable hedgerow network</p> <p>Semi-natural ancient woodland greater than 0.25ha.</p> <p>Any river classified as good A2 or fair B and likely to support coarse fishery.</p> <p>Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p>Species</p> <p>Any regularly occurring, locally significant population of a species which is listed in a County/District BAP on account of its regional rarity or localisation</p> <p>A regularly occurring, locally significant population of a county/district important species (particularly during a critical phase of its life cycle)</p> <p>Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations.</p> <p>Sites/features that are scarce within the county/district or which appreciably enrich the county/district habitat resource</p>
Local (immediate local area or village importance)	<p>Habitats</p> <p>Areas of habitat considered to appreciably enrich the habitat resource within the local context (survey area, parish or neighbourhood, e.g. species-rich hedgerows, ponds etc).</p> <p>Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution of such habitats within the local area are not considered for the above classifications.</p> <p>Semi-natural ancient woodland smaller than 0.25ha.</p> <p>Any river classified as fair B or poor C and unlikely to support coarse fishery.</p> <p>Any river with a Habitat Modification Score indicating that it is severely modified or above</p> <p>Species</p> <p>Populations/assemblages of species that appreciable enrich the biodiversity resource within the local context</p> <p>Sites supporting populations of county/district important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations</p>
Less than Local (limited ecological value)	<p>Sites that retain habitats and/or species that are of limited ecological importance due to their size, species composition or other factors.</p> <p>Any river classified as impoverished D and/or and with a Habitat Modification Score indicating that it is severely modified</p>

Evaluation of Quadrats and Habitat Areas

2.4.3 The ecological value of each Quadrat for wintering birds was determined by considering the evaluation of its habitat potential for wintering birds (derived from information in Appendix A40.1: Terrestrial Habitats) combined with the value of the wintering bird assemblage present.

2.4.4 An assessment was made of how representative the habitats found in each WOV and/or Quadrat in relation to the adjacent non surveyed areas. The ecological value of the remaining Habitat Areas in each route section was then evaluated by an initial determination of their habitat potential for wintering birds. The information regarding the wintering bird assemblages found in adjacent WOVs or Quadrats input to the evaluation.

2.5 Impact Assessment

2.5.1 In the assessment of significance of impact, consideration has been given both to the magnitude of impact and to the sensitivity of the receiving environment or species. The sensitivity of a feature was determined with reference to its level of importance although other elements have been taken into account where appropriate.

Impact Magnitude

2.5.2 Methods of impact prediction used included direct measurements, correlations, expert opinion and information from previous developments. Impacts include those that are predicted to be direct,

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indirect, temporary, permanent, cumulative, reversible or irreversible. The magnitude of each impact was assessed independently of value or statutory status. Magnitude criteria are presented in Table 3 and include positive impact criteria in accordance with IEEM guidance (2002).

Table 3 – Impact Magnitude

Magnitude	Criteria
High negative	The change is likely to permanently, adversely affect the integrity of an ecological receptor, in terms of the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest (at a regional or higher level).
Medium negative	The change is not likely to permanently adversely affect the ecological receptor's integrity but the effect on the receptor is likely to be substantial in terms of its ecological structure and function and may change its evaluation. Likely to result in changes in the localised distribution of a species but not affect its population status at a regional level.
Low negative	The change may adversely affect the ecological receptor, but there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to change its evaluation.
Negligible	The change may slightly adversely affect the receptor but will have no permanent effect on the integrity of the receptor or its key attributes. There are no predicted measurable changes to the species assemblage or population and the effect is unlikely to result in an increased vulnerability of the receptor to future impacts.
Positive	The change is likely to benefit the ecological receptor, but may not improve its evaluation
High positive	The change is likely to restore an ecological receptor to favourable conservation status, or to create a feature of recognisable value (at a regional or higher level).

Impact Significance

2.5.3 The significance of an impact has been determined according to the matrix system illustrated in Table 4. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat. Typically, negative impact significance greater than or equal to Moderate would require mitigation to be undertaken to ameliorate the impact significance to acceptable levels.

Table 4 – Impact Significance

Magnitude \ Importance	High Negative	Medium Negative	Low Negative	Negligible	Positive	High Positive
International	Major	Major	Moderate	Negligible	Moderate	Major
National	Major	Major	Moderate	Negligible	Moderate	Major
Regional	Major	Moderate	Minor	Negligible	Minor	Moderate
County	Moderate	Moderate	Minor	Negligible	Minor	Moderate
Local	Minor	Minor	Minor	Negligible	Minor	Minor
Less than Local	Minor	Negligible	Negligible	Negligible	Negligible	Negligible

2.5.4 The level of significance of impacts predicted on ecological receptors is an important factor in influencing the decision-making process and determining the necessity and/or extent of mitigation measures. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.6 Limitations to Assessment

Survey Timing

2.6.1 The wintering bird surveys were undertaken during the months of October 2006 to February 2007,

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which is the optimal 'core' period to undertake wintering bird surveys.

Weather

- 2.6.2 It has been shown that wind and rain are the two main factors that can limit the number of bird registrations recorded during a breeding bird survey (Gilbert et al., 1998) and it has been assumed that this also applies to the wintering bird survey.
- 2.6.3 The weather conditions throughout the duration of the survey period were moderate to good with limited rain, snow and wind and moderate cloud cover. Surveys were suspended if weather conditions were poor (e.g. high winds, heavy snow and persistent rain). Wind speed was relatively high on some days (approximately 10% of survey days), which is likely to have reduced records of singing/calling birds. However, carrying out several survey visits at a site helps to reduce the significance of such effects. All surveys were carried out in suitable weather, although it was not practically possible to limit surveys to only to optimal weather conditions. It is considered that the assemblages recorded during the surveys of the Quadrats provide a comprehensive representation of the wintering birds present within this section of the route corridor.

Changes to the Route Alignment

- 2.6.4 Minor changes to the route alignment that occurred subsequent to the start of the WBS. These changes could not be incorporated into the survey because a WBS relies on consistency in terms of site boundaries/areas between survey repetitions (Bibby et al., 2000). As a result, the revised route corridor is likely to contain habitats of value to wintering birds that have not been included or surveyed as part of this WBS. However, part of the rationale behind using the Quadrat and Line Transect method was that it systematically sampled a range of habitats throughout the route corridor and therefore while small areas outside of the Quadrats may have gone un-surveyed it is likely that they are not going to differ significantly from those areas surveyed and therefore the value of these un-surveyed habitats can be inferred from the evaluation of the Quadrats.

3 Baseline

3.1 Consultation

- 3.1.1 SNH did not provide and records of key wintering bird species for the proposed scheme in their consultation response.
- 3.1.2 Consultation with the RSPB did not identify the presence of any RSPB nature reserves or provide any previous records of wintering bird species within or adjacent to the proposed scheme study area.
- 3.1.3 The North-East Scotland Bird Report (2005) provided information regarding the wintering species found within the route corridor.
- 3.1.4 Previous records of key wintering bird species and assemblages within the route corridor were also obtained from the British Trust for Ornithology (BTO) and the Wildfowl and Wetlands Trust (WWT) in 2005.

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3.2 Incidental Observations

3.2.1 Table 5 presents incidental records of waders or wildfowl species recorded in agricultural fields or flying over the study area.

Table 5 – Incidental Sightings of Waders, Wildfowl and Geese

Habitat Section	Habitat Area	Month/Year	Species Name	Status	Grid Reference	Comment
FL1	F12	October 2006	pink-footed goose	+	NO870904	150 flying towards Fishermyre Pond
FL3	F18	February 2007	pink-footed goose	+	NO869947	850 flying towards Cookney
	F19	January 2007	curlew	Ψ+	NO876938	Six flying in from west and landing near Harecraig
	F18	October 2006	pink-footed goose	+	NO877953	320 flying towards East Rothnick
	F18	January 2007	pink-footed goose	+	NO873946	220 flying in from the south then landing adjacent to Burnside of Newhall
	F21	November 2006	curlew	Ψ+	NO868963	Three flying to the south then landing south of Crossley
	F22	February 2007	curlew	Ψ+	NO868964	Eight calling near Crossley
	F26	February 2007	curlew	Ψ+	NO868977	36 feeding in fields to the north of the Greens of Crynoch
	F26	February 2007	pink-footed goose	+	NO869975	55 flying in a North Easterly direction towards Craigentath
	F26	February 2007	pink-footed goose	+	NO870976	Two calling to the north of the Greens of Crynoch

3.3 Survey of Wintering Bird Assemblages

Waterbodies of Ornithological Value (WOVs)

3.3.1 No Waterbodies of Ornithological Value (WOVs) were identified within the Fastlink study area.

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Quadrat Survey

3.3.2 A total of eight Quadrats were identified in the Fastlink study area, within or adjacent to the proposed route corridor (Figures 40.6a-f). The location of the Quadrats is presented in Table 6.

Table 6 - Locations of Quadrats

Quadrat	Section	Grid Reference
FL-Wb01	FL1	NO 873 875
FL-Wb02	FL1	NO 874 890
FL-Wb03	FL2	NO 875 904
FL-Wb04	FL2	NO 872 920
FL-Wb05	FL3	NO 863 935
FL-Wb06	FL3	NO 862 950
FL-Wb07	FL3	NO 862 965
FL-Wb08	FL3	NO 861 980

3.3.3 In addition to wintering birds observed flying over the Quadrats, Table 7 shows the frequency, i.e. the number of times seen on each survey visit (these are labelled I-V respectively) and maximum count of wintering bird species recorded in each Quadrat during each of the five survey visits and includes those roosting and feeding. Scientific names of bird species are presented in Annex 1.

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Table 7 – Wintering Bird Species Recorded within Quadrats FL-Wb01-08

Species present	Status	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07		Wb08	
		f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m
blackbird	-	IV	7 (2)	III	2 (1,2)	IV	3 (1)	III	5 (4)	II	1 (4,5)	II	2 (1)	I	2 (4)	III	2 (3,5)
black-headed gull	+	I	1 (2)	I	4 (2)	-	-	I	1 (1)	-	-	-	-	-	-	I	1 (2)
blue tit	-	I	6 (2)	IV	10 (5)	V	2 (1-5)	IV	4 (3)	IV	5 (4)	-	-	-	-	-	-
bullfinch	x & Ψ	-	-	-	-	I	2 (2)	-	-	-	-	-	-	-	-	I	2 (5)
buzzard	-	-	-	II	1 (2,5)	I	1 (2)	IV	2 (3)	-	-	-	-	-	-	-	-
carrion crow	-	I	4 (2)	I	3 (2)	I	5 (5)	II	8 (2)	I	159 (2)	II	75 (2)	I	2 (2)	II	8 (2)
chaffinch	-	IV	51 (3)	IV	6 (2,4)	II	4 (1)	IV	16 (3,4)	IV	30 (4)	-	-	II	3 (2)	II	3 (5)
coal tit	-	-	-	I	6 (2)	II	2 (2)	-	-	-	-	-	-	-	-	-	-
common gull	+	-	-	-	-	-	-	-	-	-	-	I	499 (2)	I	1 (2)	I	1 (2)
coot	-	-	-	-	-	-	-	II	2 (2,3)	-	-	-	-	-	-	-	-
cormorant	+ &	-	-	-	-	-	-	-	-	-	-	-	-	I	1 (4)	-	-
curlew	+ Ψ	-	-	-	-	-	-	-	-	I	6 (4)	I	2 (1)	I	10 (5)	I	1 (5)
duncock	+	IV	2 (1)	II	3 (4)	-	-	I	3 (5)	II	5 (2)	I	2 (3)	-	-	II	3 (2)
feral pigeon	-	-	-	-	-	I	5 (3)	-	-	-	-	-	-	-	-	-	-
fieldfare	% +	I	15 (2)	-	-	-	-	-	-	I	1 (3)	-	-	I	1 (4)	-	-
goldcrest	+	-	-	III	11 (1)	II	8 (1)	I	1 (5)	I	1 (4)	-	-	-	-	-	-
goldfinch	-	II	4 (1,2)	II	2 (1)	II	9 (2)	II	3 (4)	I	4 (1)	-	-	-	-	I	1 (4)
great tit	-	I	1 (2)	III	3 (3,4,5)	II	2 (5)	III	4 (2)	-	-	-	-	-	-	I	2 (5)
green woodpecker	+	-	-	I	1 (3)	-	-	-	-	-	-	-	-	-	-	-	-
greenfinch	-	III	4 (3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
grey heron	-	I	1	-	-	-	-	-	-	I	1 (2)	-	-	-	-	-	-

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Species present	Status	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07		Wb08	
		f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m
grey partridge	x & Ψ	-	-	-	-	III	1 (3-5)	I	1 (1)	I	2 (1)	-	-	-	-	-	-
greylag goose	+	-	-	-	-	-	-	-	-	-	-	I	60 (3)	-	-	III	179 (3)
herring gull	+	III	50 (5)	-	-	I	8 (4)	-	-	II	30 (1)	I	1 (2)	-	-	I	2 (5)
house sparrow	x	I	1 (2)	-	-	-	-	-	-	II	3 (2)	-	-	-	-	II	4 (4)
jackdaw	-	-	-	I	1 (1)	-	-	II	14 (5)	I	22 (2)	-	-	-	-	I	3 (5)
kestrel	+ Ψ	-	-	-	-	-	-	I	1 (4)	-	-	-	-	I	1 (1)	-	-
lesser redpoll	+	-	-	-	-	I	25 (2)	-	-	-	-	-	-	-	-	-	-
linnet	X & Ψ	-	-	I	3 (4)	I	3 (1)	III	5 (4)	I	28 (1)	I	1 (5)	-	-	I	2 (1)
long-tailed tit	-	-	-	-	-	I	6 (1)	-	-	-	-	-	-	-	-	-	-
magpie	-	-	-	-	-	I	3 (1)	-	-	III	10 (4)	-	-	I	1 (1)	II	24 (5)
mallard	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	II	17 (2)
meadow pipit	+	I	1 (3)	I	1 (1)	I	1 (3)	II	4 (3,5)	II	3 (1)	I	1 (3)	III	4 (1)	IV	16 (1)
mistle thrush	+	-	-	-	-	I	1 (5)	I	1 (3)	-	-	-	-	-	-	I	2 (4)
moorhen	-	-	-	-	-	-	-	I	1 (1)	-	-	-	-	-	-	-	-
mute swan	+	-	-	-	-	-	-	I	3 (4)	-	-	-	-	-	-	-	-
oystercatcher	+	I	2 (5)	-	-	-	-	-	-	-	-	-	-	I	1 (5)	-	-
pheasant	-	-	-	III	2 (5)	-	-	-	-	-	-	-	-	-	-	I	2 (5)
pie wagtail	-	I	1 (2)	-	-	-	-	I	8 (1)	I	7 (2)	-	-	-	-	I	1 (3)
pink-footed goose	+	-	-	-	-	-	-	-	-	-	-	IV	1500 (3)	-	-	II	86 (2)
redwing	% +	-	-	-	-	-	-	-	-	-	-	-	-	I	1 (4)	II	5 (4)
reed bunting	x & Ψ	-	-	-	-	-	-	I	5 (5)	I	1 (3)	I	1 (1)	I	2 (1)	II	5 (1)
robin	-	II	2 (1)	II	6 (5)	II	2 (5)	III	4 (5)	III	2 (1)	-	-	II	1 (1,5)	II	2 (5)

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Species present	Status	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07		Wb08	
		f	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m
rook	-	I	1 (2)	I	1 (2)	-	-	III	3 (5)	-	-	-	-	-	-	II	51 (5)
siskin	-	I	2 (1)	I	3 (1)	I	3 (1)	-	-	-	-	I	8 (1)	I	10 (1)	I	4 (1)
skylark	x & Ψ	-	-	-	-	I	4 (5)	I	4 (5)	-	-	III	2 (2,3,5)	II	21 (5)	II	13 (5)
snipe	+ Ψ	-	-	-	-	I	2 (2)	-	-	-	-	1	1 (3)	IV	40 (5)	II	4 (5)
song thrush	x & Ψ	I	3 (2)	-	-	-	-	-	-	I	1 (5)	-	-	I	4 (1)	-	-
sparrowhawk	-	-	-	I	1 (1)	-	-	-	-	-	-	-	-	-	-	-	-
starling	x	-	-	-	-	-	-	-	-	II	5 (1)	I	10 (1)	II	150 (5)	III	350 (5)
stock dove	+	-	-	-	-	-	-	-	-	I	2 (2)	-	-	-	-	-	-
tree sparrow	x & Ψ	-	-	-	-	-	-	I	8 (2)	-	-	-	-	-	-	-	-
unidentified goose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I	2 (3)
willow tit	x	-	-	I	2 (4)	-	-	-	-	-	-	-	-	-	-	-	-
wood pigeon	-	IV	9 (2)	V	8 (1)	III	14 (3)	III	12 (5)	V	6 (4)	II	2 (2,4)	-	-	-	-
woodcock	+	-	-	I	1 (1)	I	1 (2)	-	-	-	-	-	-	-	-	-	-
wren	-	III	4 (2)	IV	9 (3)	IV	3 (4,5)	III	3 (2,3,5)	V	4 (5)	V	2 (1,3,4)	I	1 (2)	III	3 (12)
yellowhammer	x Ψ	I	1 (2)	-	-	I	10 (2)	III	7 (3)	III	12 (3)	-	-	-	-	-	-

3.3.4 Key: f = frequency; m = maximum count (survey visit number in brackets) % = WCA1i; x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP

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Monthly Summary of Key Species Recorded in Quadrats

October 2006

- 3.3.5 No wintering geese were recorded throughout any of the Quadrats. In terms of other key bird species, five redwing (WCA1i and JNCC Amber List status) were recorded in Quadrat FL-Wb08 while 28 linnet (JNCC Red List, UK BAP and LBAP status) were recorded in Quadrat FL-Wb05.

November 2006

- 3.3.6 No wintering geese were recorded throughout any of the Quadrats. However, 15 fieldfare (WCA1i and JNCC Amber List status) were recorded in Quadrat FL-Wb01 while eight tree sparrows (JNCC Red List, UK BAP and LBAP status) were recorded in Quadrat FL-Wb04.

December 2006

- 3.3.7 In terms of grey geese, 1500 pink-footed geese (JNCC Amber List status) and 179 greylag geese (JNCC Amber List status) were recorded in Quadrats FL-Wb06, and FL-Wb08 respectively. With respect to remaining key species, a single fieldfare (WCA1i and JNCC Amber List status) was recorded in Quadrat FL-Wb05 while 12 yellowhammer (JNCC Red List, LBAP and locally rare/uncommon status) were recorded in Quadrat FL-Wb05.

January 2007

- 3.3.8 No wintering geese were recorded throughout any of the Quadrats during this survey. In terms of other key species, a single fieldfare (WCA1i and JNCC Amber List status) was recorded in Quadrat FL-Wb08.

February 2007

- 3.3.9 No wintering geese were recorded throughout any of the Quadrats during this survey. In terms of remaining key bird species, 21 skylark (JNCC Red List, LBAP and locally rare/uncommon status) were recorded in Quadrat FL-Wb08.

3.4 Habitat Descriptions: Quadrats

- 3.4.1 The following section presents a description of the habitats represented within each Quadrat and their associated habitat areas.

Section FL1

- 3.4.2 The habitats within section FL1 are comprised predominantly of arable farmland with some improved grassland fields and areas of scattered scrub and hedgerows (species rich) along the field margins. Table 8 presents a detailed description of habitats present within each Quadrat, together with their associated habitat areas.

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Table 8 – Habitat Descriptions for Section FL1

Quadrat	Represented Habitat Area	Value	Habitat Description
FL-Wb01	F1 F2 F3 F4	Low	Quadrat comprised of fields of arable (with areas of scattered scrub and parkland/scattered trees) and improved grassland (the later associated with the existing Stonehaven bypass and junction). Megray Burn bisects the Quadrat south of H Ram Wood. Areas of broad-leaved woodland (Ury Shelter Belt) constitute the remainder of the habitats.
FL-Wb02	F6 F7 F8	Medium	Approximately half of the Quadrat is comprised by Limpet Burn and the surrounding riparian woodland. The remaining areas within the Quadrat comprise immature coniferous plantation woodland and arable fields boarded by native species-rich hedgerows with pockets of scattered and dense scrub.
FL-Wb03	F8 F11 F12	High	Habitats within the Quadrat are dominated by fen and acid dry heath/acid grassland mosaic. Some improved grassland fields are present, which have some scattered scrub at the margins. Other habitats include mixed scattered standard trees, a small area of bare ground and several small pockets of semi-natural, broad-leaved woodland located throughout the Quadrat.

Section FL2

3.4.3 Habitats within section FL2 are entirely comprised of arable farmland with some improved and semi-improved grassland fields with occasional hedgerows. A description of habitats present within each Quadrat, together with their associated habitat areas is provided in Table 9.

Table 9 – Habitat Descriptions for Section FL2

Quadrat	Represented Habitat Area	Value	Habitat Description
FL-Wb04	F13 F15 F16	Medium	Habitats within the Quadrat are comprised of arable fields bounded by native species-poor hedgerows, earth banks and stone walls. The Burn of Muchalls bisects the Quadrat from west to east, the northern bank of which supports semi-natural wet woodland in the east and a band of semi-improved acid grassland in the west. Lines of broad-leaved standard trees occur at the field boundaries and around an area of semi-improved neutral grassland in the north west of the Quadrat.

Section FL3

3.4.4 The majority of section FL3 is comprised of improved grassland with some arable fields, hedgerows and scattered stands of scrub and woodland. There are a number of minor burns and stands of marshy grassland. A description of habitats present within each Quadrat, together with their associated habitat areas are presented in Table 10.

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Table 10 – Habitat Descriptions for Section FL3

Quadrat	Represented Habitat Area	Value	Habitat Description
FL-Wb05	F16 F17 F18 F19	High	Habitats within the Quadrat are largely comprised of arable and improved grassland fields with an area of marshy grassland. However, in the northeast an area of dense/continuous scrub is also present.
FL-Wb06	F18	Medium	Habitats within the Quadrat are comprised predominantly of arable and improved grassland fields. The fields are bounded by stone walls and occasional species rich intact and defunct hedgerows. North Rothnick Burn and a tributary of Elsick Burn flow from the west into areas at the north of the Quadrat. In addition, a small area of marshy grassland lies in the northeast.
FL-Wb07	F21 F22 F23	Medium	Habitats within the Quadrat are largely comprised from improved grassland, which are bordered to the north by an area of dense/continuous scrub. To the north of the scrub, the Quadrat encompasses an area of dry heath/acid grassland mosaic. At the south, lies marshy grassland dominated by <i>Juncus effusus</i> .
FL-Wb08	F26 A small section of the Quadrat is located in the southern leg section of the route	Low	Habitats within the Quadrat are comprised of semi-improved, improved and arable grassland fields which are largely bounded by post and rail fencing. Occasional broad-leaved standard trees have been planted around Blaikiewell in the northwest. A small area of marshy grassland lies in the south.

3.5 Survey Results Summary

Consultation

- 3.5.1 Consultation with SNH and the RSPB did not identify the presence of any bird nature reserves or provide any previous records of key wintering bird species within or adjacent to the proposed scheme study area.

Incidental Observations

- 3.5.2 Two key species were recorded within the route corridor outside the Quadrats, of which:
- none were EU Birds Directive Annex 1 species; and
 - two were Amber List species (pink-footed goose and curlew).

Survey Results

- 3.5.3 Wintering bird surveys were undertaken at eight Quadrats established along, or adjacent to, the route corridor.
- 3.5.4 A total of 59 wintering bird species were recorded throughout the eight Quadrats, of which:
- two were WCA1i (fieldfare and redwing);
 - 11 were JNCC Red List species (skylark, bullfinch, song thrush, starling, house sparrow, tree sparrow, yellowhammer, reed bunting, grey partridge, linnets and willow tit); and

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- 20 were JNCC Amber List species (black-headed gull, common gull, cormorant, curlew, dunnoek, fieldfare, goldecrest, greylag goose, herring gull, kestrel, lesser redpoll, meadow pipit, mistle thrush, mute swan, oystercatcher, pink-footed goose, redwing, snipe, stock dove and woodcock.

3.5.5 Pink-footed geese and greylag geese (identified in this report as species of conservation importance) were recorded in or two of the eight Quadrats, these being; FL-Wb06 and FI-Wb08.

Habitat Description

3.5.6 The majority of the study area consists of arable farmland and improved or semi-improved grassland. This farmland also supports species-rich hedgerows and stands of scrub. Semi-natural habitats within the route corridor were dominated by heath, scrub, woodland, marshy and riparian habitats. A number of watercourses are present within the route corridor, including the Burn of Muchalls.

4 Evaluation

4.1 Introduction

4.1.1 The ecological value of Quadrats and habitat areas for wintering birds was determined by considering the habitat evaluation of each area combined with the value of the wintering bird assemblage present. The ecological value of remaining ecological habitat areas in each route section was determined by an initial evaluation of habitat potential for wintering birds combined with the knowledge of the wintering bird assemblages found in adjacent representative Quadrats.

4.1.2 A list of key bird species recorded within each Quadrat is provided in Table 11. Where a key bird species was recorded as an incidental sighting, it has been assigned to the appropriate Quadrat and marked with an asterisk. Incidental sightings without grid references have not been included in the evaluation below, as the information could not be identified with a particular Quadrat.

Section FL1

4.1.3 Quadrat FL-Wb01 includes all or parts of Habitat Areas F1, F2, F3 and F4. The wintering bird assemblage recorded in this Quadrat is considered to be of a medium diversity. Twenty-five wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, one was a WCA1i species (fieldfare), three were JNCC Red List species (house sparrow, song thrush, yellowhammer), six were JNCC Amber List species (oystercatcher, dunnoek, fieldfare, herring gull, meadow pipit, black headed gull), one was a UK BAP species (song thrush), two were LBAP species (yellowhammer and song thrush) and none were locally uncommon/rare species. The habitats that comprise the habitat areas within the Quadrat have been assessed as being of low value for birds as it largely comprises arable fields, areas of scattered scrub, improved grassland and a section of Megray Burn. The wintering assemblage found in Quadrat FL-Wb01 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

4.1.4 Quadrat FL-Wb02 includes all or parts of Habitat Areas F6, F7 and F8. The wintering bird assemblage recorded in this Quadrat is considered to be of a medium diversity. Twenty-five wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, none were WCA1i species, one was a JNCC Red List species (willow tit), seven were JNCC Amber List species (goldcrest, meadow pipit, linnet, black-headed gull, dunnoek, woodcock, green woodpecker), one was a UK BAP species (linnet), one was a LBAP species (linnet) and none were locally uncommon/rare species. The habitats that comprise the habitat areas within the Quadrat have been assessed as being of medium value for birds as it comprises an area of immature coniferous plantation woodland, arable fields bound

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by native species-rich hedgerows and scattered/dense scrub. The wintering assemblage found in Quadrat FL-Wb02 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

- 4.1.5 Quadrat FL-Wb03 includes all or parts of Habitat Areas F8, F11 and F12 and the wintering bird assemblage recorded in this Quadrat is considered to be of a medium diversity. Twenty-seven wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, none were WCA1i species, four were JNCC Red List species (grey partridge, skylark, yellowhammer, bullfinch), nine were JNCC Amber List species (meadow pipit, woodcock, snipe, herring gull, mistle thrush, lesser redpoll, goldcrest, linnet, pink-footed goose), four were UK BAP species (linnet, grey partridge, skylark, bullfinch, linnet, snipe), six were LBAP species (yellowhammer, grey partridge, skylark, bullfinch) and none were locally rare/uncommon. The habitats that comprise the habitat areas within the Quadrat are assessed as being of high value for birds as they contain fen, an acid dry heath/acid grassland mosaic, improved grassland, scattered scrub, mixed standard trees, bare ground and several pockets of semi-natural broad-leaved woodland. The wintering assemblage found in Quadrat FL-Wb03 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section FL2

- 4.1.6 Quadrat FL-Wb04 includes all or parts of Habitat Areas F13, F15 and F16. The wintering bird assemblage recorded in this Quadrat is considered to be of a medium diversity. Twenty-eight wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, none were WCA1i species, five were JNCC Red List species (tree sparrow, grey partridge, skylark, yellowhammer, reed bunting), eight were JNCC Amber List species (linnet, dunnock, goldcrest, black-headed gull, mistle thrush, meadow pipit, kestrel, mute swan), five were UK BAP species (linnet, tree sparrow, skylark, grey partridge, reed bunting), seven were LBAP species (linnet, yellowhammer, kestrel, grey partridge, skylark, yellowhammer, reed bunting) and none were locally rare/uncommon species. The habitats that comprise the habitat areas within the Quadrat are assessed as being of medium value for birds as they contain arable fields occasional native species-rich hedgerows, a watercourse, an area of semi-natural wet woodland, young mixed plantation woodland, naturalised planted mixed woodland and marshy grassland. The wintering assemblage found in Quadrat F-Wb04 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section FL3

- 4.1.7 Quadrat FL-Wb05 includes all or parts of Habitat Areas F16, F17, F18 and F19. The wintering bird assemblage recorded in this Quadrat is considered to be of a medium diversity. Twenty-six wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, one was WCA1i species (fieldfare), seven were JNCC Red List species (house sparrow, linnet, reed bunting, starling, song thrush, yellowhammer, grey partridge), seven were JNCC Amber List species (curlew, meadow pipit, goldcrest, herring gull, dunnock, stock dove, fieldfare), four were UK BAP species (linnet, reed bunting, song thrush, grey partridge), six were LBAP species (linnet, reed bunting, curlew, yellowhammer, song thrush, grey partridge) and none were local status species. The habitats that comprise the habitat areas within the Quadrat are assessed as being of high value for birds as they contain arable/improved grassland fields, marshy grassland and dense/continuous scrub. The wintering assemblage found in Quadrat FL-Wb05 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.
- 4.1.8 Quadrat FL-Wb06 includes all or parts of Habitat Area F18. The wintering bird assemblage recorded in

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this Quadrat is considered to be of low diversity. Seventeen wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, none were WCA1i species, four were JNCC Red List species (linnet, starling, skylark, reed bunting), eight were JNCC Amber List species (common gull, dunnoek, curlew, herring gull, snipe, meadow pipit, pink-footed goose, greylag goose), three were UK BAP species (linnet, skylark, reed bunting), five were LBAP species (snipe, curlew, linnet, skylark, reed bunting) and none were locally uncommon/rare species. The habitats that comprise the habitat areas within the Quadrat are assessed as being of medium value for birds as they contain arable and improved grassland, species rich intact and remnant hedgerows, two water courses and an area of marshy grassland. The wintering assemblage found in Quadrat FL-Wb06 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

- 4.1.9 Quadrat FL-Wb07 includes all or parts of Habitat Areas F21, F22 and F23. The wintering bird assemblage recorded in this Quadrat is considered to be of a low diversity. Twenty wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, two were WCA1i species (fieldfare, redwing), four were JNCC Red List species (reed bunting, song thrush, skylark, starling), nine were JNCC Amber List species (curlew, snipe, meadow pipit, kestrel, fieldfare, oystercatcher, redwing, cormorant, common gull), four were UK BAP species (reed bunting, skylark, song thrush, cormorant), six were LBAP species (curlew, snipe, kestrel, reed bunting, song thrush, skylark) and none were locally uncommon/rare species. The habitats that comprise the habitat areas within the Quadrat are assessed as being of medium value for birds as they comprise improved grassland, dense/continuous scrub, dry heath/acid grassland mosaic and marshy grassland. The wintering assemblage found in Quadrat FL-Wb07 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.
- 4.1.10 Quadrat FL-Wb08 includes all or parts of Habitat Area F26. The wintering bird assemblage recorded in this Quadrat is considered to be of high diversity. Thirty-three wintering bird species were recorded, of which none were EU Birds Directive Annex 1 species, one was an WCA1i species (redwing), six were JNCC Red List species (linnet, reed bunting, skylark, starling, bullfinch, house sparrow), 11 were JNCC Amber List species (dunnoek, herring gull, curlew, black-headed gull, mistle thrush, meadow pipit, common gull, redwing, pink-footed goose, greylag goose, snipe), four were UK BAP species (linnet, reed bunting, skylark, bullfinch), six were LBAP species (snipe, curlew, linnet, reed bunting, skylark, bullfinch) and none were local status species. The habitats that comprise the habitat areas within the Quadrat are assessed as being of medium value for birds as they contain semi-improved, improved and arable grassland, broad-leaved standard trees and a small area of marshy grassland. The wintering assemblage found in Quadrat FL-Wb08 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

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Table 11 – Summary Evaluation of Wintering Bird Assemblages and Habitats

Quadrat	Habitat Area Contributing to the Value of the Quadrat	Value of Habitats for Wintering Birds	Total Number of Wintering Bird Species Recorded in Quadrat	Legal / Conservation Status of Key Bird Species (Wintering and Incidentals)							Value of Wintering Bird Assemblage
				EU Birds Directive Annex I	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Section FL1											
Quadrat FL-Wb01 Stonehaven Junction	F1 F2 F3 F4	Low	25	-	fieldfare	house sparrow song thrush yellowhammer	oystercatcher dunnock fieldfare herring gull meadow pipit black-headed gull	song thrush	yellowhammer song thrush	-	Local
Quadrat FL-Wb02 South of Coneyhatch	F6 F7 F8	Medium	25	-	-	willow tit	goldcrest meadow pipit linnet dunnock woodcock green woodpecker black-headed gull	linnet	linnet	-	Local
Quadrat FL-Wb03 West of Cantlayhills	F8 F11 F12	Medium	27	-	-	grey partridge skylark yellowhammer bullfinch	goldcrest linnet meadow pipit woodcock snipe	grey partridge linnet skylark bullfinch	yellowhammer snipe grey partridge skylark linnet	-	County

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Quadrat	Habitat Area Contributing to the Value of the Quadrat	Value of Habitats for Wintering Birds	Total Number of Wintering Bird Species Recorded in Quadrat	Legal / Conservation Status of Key Bird Species (Wintering and Incidentals)							Value of Wintering Bird Assemblage
				EU Birds Directive Annex I	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
							herring gull mistle thrush lesser redpoll pink-footed goose*		bullfinch		
Section FL2											
Quadrat FL-Wb04 Northwest of Burnside	F13 F15 F16	High	28	-	-	tree sparrow grey partridge skylark yellowhammer reed bunting linnet	dunnock goldcrest black-headed gull mistle thrush meadow pipit kestrel mute swan	tree sparrow skylark grey partridge reed bunting linnet	yellowhammer kestrel tree sparrow skylark grey partridge reed bunting linnet	-	County
Section FL3											
Quadrat FL-Wb05 Cookney	F16 F17 F18 F19	High	26	-	fieldfare	house sparrow linnet reed bunting starling song thrush yellowhammer grey partridge	curlew* goldcrest herring gull meadow pipit dunnock stock dove fieldfare	linnet reed bunting song thrush grey partridge	curlew* yellowhammer linnet reed bunting song thrush grey partridge	-	County

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Quadrat	Habitat Area Contributing to the Value of the Quadrat	Value of Habitats for Wintering Birds	Total Number of Wintering Bird Species Recorded in Quadrat	Legal / Conservation Status of Key Bird Species (Wintering and Incidentals)							Value of Wintering Bird Assemblage
				EU Birds Directive Annex I	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Quadrat FL-Wb06 South of North Rothnick	F18	Medium	17	-	-	linnet starling skylark reed bunting	dunnock curlew herring gull snipe meadow pipit pink-footed goose* greylag goose common gull	linnet skylark reed bunting	curlew linnet skylark reed bunting snipe	-	Local
Quadrat FL-Wb07 Stranog Hill	F21 F22 F23	Medium	20	-	fieldfare redwing	reed bunting song thrush skylark starling	curlew* snipe meadow pipit kestrel fieldfare oystercatcher redwing cormorant common gull	reed bunting skylark song thrush cormorant	curlew* kestrel reed bunting skylark song thrush snipe cormorant	-	County

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Quadrat	Habitat Area Contributing to the Value of the Quadrat	Value of Habitats for Wintering Birds	Total Number of Wintering Bird Species Recorded in Quadrat	Legal / Conservation Status of Key Bird Species (Wintering and Incidentals)							Value of Wintering Bird Assemblage
				EU Birds Directive Annex I	WCA1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Local Status (Uncommon / Rare)	
Quadrat FL-Wb08 Blaikiewell	F26	Low	33	-	redwing	linnet reed bunting skylark starling bullfinch house sparrow	dunnock herring gull curlew black-headed gull mistle thrush meadow pipit common gull redwing pink-footed goose* greylag goose snipe	linnet reed bunting skylark bullfinch	curlew linnet reed bunting snipe skylark bullfinch	-	County

* indicates incidental recording.

4.2 Evaluation of Habitat Areas

Section FL1

4.2.1 An evaluation of habitat areas within section FL1 is provided in Table 12.

Table 12 – Evaluation of Habitat Areas for Section FL1

Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
F1	Low	Series of agricultural fields with scattered scrub. A railway line runs through F1 which is characterised by areas of scattered scrub, rank grassland and tall ruderal.	Habitats within F1 were partially sampled by Quadrat FL-Wb01, which is considered to be representative and therefore likely to support a similar wintering bird assemblage. Local
F2	Low	Large expanse of south sloping agricultural fields. Broadleaved shelter belts between fields and the road are relatively species rich and, in some cases, of semi-natural status (though derived from plantation).	Habitats within F2 were partially sampled by Quadrat FL-Wb01, which is considered to be representative of F2 and therefore likely to support a similar wintering bird assemblage. Local
F3	Medium	Very large area comprising arable fields with a small occasional pockets of scattered scrub. A species rich arable border is present around some of the fields. Dwelling houses with tree surrounds are present to the south.	Habitats within F3 were partially sampled by Quadrat FL-Wb01, which is considered to be representative of F3 and therefore likely to support a similar wintering bird assemblage. Local
F4	Medium	Small pocket of mature plantation woodland representing H Ram Wood.	Habitats within F4 were partially sampled by Quadrat FL-Wb01 and are considered to be of a similar composition. The habitats within F4 are considerably less diverse than in Quadrat FL-Wb01 and are therefore likely to support a less diverse wintering bird assemblage. Less than local
F5	Medium	Semi-natural broad-leaved woodland co-dominated by rowan <i>Sorbus aucuparia</i> and birch (<i>Betula</i> sp.). The woodland near Coneyhatch Farm is comprised of similar species, but also includes abundant goat willow <i>Salix caprea</i> .	Habitats within F5 were not sampled by a Quadrat, but are similar to habitats represented by Quadrat FL-Wb02. Therefore, F5 is likely to support a similar wintering assemblage. Local
F6	Low	Mature conifer plantation dominated by sitka spruce <i>Picea stichensis</i> . A small burn runs through the upper portion, which connects to the richer Habitat Area F7.	Habitats within F6 were partially sampled by Quadrat FL-Wb02, which are of a similar composition. The habitats within F6 are less diverse, and as such, F6 is likely to support a similar and less diverse wintering bird assemblage. Less than local
F7	Medium	Mosaic of semi-natural communities lining the heavily vegetated Limpet Burn. Communities include a dense marsh of scattered willow / birch woodland with dense bracken and continuous gorse scrub.	Habitats within F7 were partially sampled by Quadrat FL-Wb02, which is considered to be representative of F7 and therefore is likely to support a similar wintering bird assemblage. Local
F8	Low	Series of arable and improved fields, with occasional marshy grassland and scattered scrub.	Habitats within F8 were partially sampled by Quadrats FL-Wb02 and FL-Wb03, which are both considered to be

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Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
			representative of F8. Therefore, F8 is likely to support a similar wintering bird assemblage. Local
F9	Medium	A large area of gorse scrub-acid grassland mosaic with some dry heath vegetation.	Habitats within F9 were not sampled by a Quadrat but are similar to habitats represented by Quadrat FL-Wb03. Therefore, F9 is likely to support a similar wintering assemblage. County
F10	Medium	A large area of gorse scrub-acid grassland mosaic with patches of dry heath vegetation.	Habitats within F10 were not sampled by a Quadrat but are similar to habitats represented by Quadrat FL-Wb03 and therefore F10 is likely to support a similar wintering assemblage. County
F11	Medium	A mix of semi-natural broadleaved birch wood towards the edge with road, combined with dense continuous gorse scrub. Behind the birch wood is a Scots pine conifer plantation, with acid grassland underneath and beyond. The hill to the north is composed of semi-improved neutral grassland.	Habitats within F11 were partially sampled by Quadrat FL-Wb03, which is considered to be representative of F11. Therefore, F11 is likely to support a similar wintering bird assemblage. County

4.2.2 An evaluation of habitat areas within section FL2 is provided in Table 13.

Table 13 – Evaluation of Habitat Areas for Section FL2

Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
F12	High	The majority of F12 is dominated by dry heath. The north and north west is lined with dense gorse scrub. Mixed semi-natural woodland is present towards the south west with scattered pockets of willow dominated wet woodland ranging across the south. Marsh is present in the environs of the wet woods.	Habitats within F12 were partially sampled by Quadrat FL-Wb03, which is considered to be representative of F12. Therefore, F12 is likely to support a similar wintering bird assemblage. County
F13	Medium	This area is comprised of agricultural land that is predominantly improved grassland or grasses cropped for silage. There are small areas of mature mixed plantation woodland and shelter belts throughout that are co-dominated by beech and Scots pine and occasional patches of dense gorse scrub.	Habitats within F13 were partially sampled by Quadrat FL-Wb04, which is considered to be representative of F13 although more diverse. Therefore F13 is likely to support a similar wintering bird assemblage. County
F14	Low	A small area comprised of bare ground and arable fields the east and acid grassland mosaic with patches of dense scrub and improved grassland to the west.	Habitats within F14 were not sampled by a Quadrat. However, the habitats within F14 are similar to habitats represented by part of Quadrat FL-Wb05, which is considered to be representative of F14. However, the habitats within F14 are less diverse and as such the wintering assemblage is likely to be correspondingly less diverse. Local
F15	High	Riparian habitat surrounding the Burn of	Habitats within F15 were partially

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Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
		Muchalls. This varied riparian zone includes semi-natural wet woodland consisting of rowan, alder and willow in the eastern section with young mixed plantation woodland in the western section that consists of Scots pine, birch, rowan, hazel, whitebeam, a number of willow species, bird cherry and wild cherry.	sampled by Quadrat FL-Wb04, which is considered to be representative of F15. Therefore, F15 is likely to support a similar wintering bird assemblage. County
F16	Medium	This habitat area is predominantly agricultural land consisting of improved pasture and cropped silage. The management of the area has however been sympathetic and there are many newly planted hedgerows and rows and groups of standards trees. Mature Scots pine and beech line many of the lanes in the area and shelter belts comprised of these species are frequent throughout the landscape.	Habitats within the area were partially sampled by Quadrats FL-Wb04 and FL-Wb05, which are considered to be representative of F16. Therefore, F16 is likely to support a similar wintering bird assemblage to both Quadrats. County

Section FL3

4.2.3 An evaluation of habitat areas within section FL3 is provided in Table 14.

Table 14 – Evaluation of Habitat Areas for Section FL3

Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
F17	Medium	A large area dominated by patches of bog and heath, characterised by hare's tail cotton grass humps with abundant heather and common cotton grass dominant in the bog pools. The moss species in this area are predominantly <i>Sphagnum sp.</i> There are also areas of wet and dry heath throughout this habitat consisting of heather, cross leaved heath, crowberry, bilberry and occasional purple moor grass. Here <i>Sphagnum sp</i> is not a major constituent.	Habitats within F17 were partially sampled by Quadrat FL-Wb05, which is considered to be similar to F17. The habitats within F17 are less diverse. Therefore, it is likely to support a less diverse wintering bird assemblage. I Local
F18	Medium	Large area of predominantly improved grassland but also occasional arable farms. Marshy grassland is present though rare. Scrub is present throughout the habitat, usually scattered around field edges and boundaries, however dense pockets of continuous gorse scrub are also present.	Habitats within F18 were sampled by Quadrat FL-Wb06 which is considered to be representative. Therefore, F18 is likely to support a similar wintering bird assemblage. Local
F19	Medium	Patchy alder, willow and birch scrub/ woodland on an area of marsh/marshy grassland. There are patches of wet heath vegetation and gorse scrub.	Habitats within F19 were partially sampled by Quadrat FL-Wb05, which is considered to be of a similar composition. The habitats within F19 are less diverse therefore, it is likely to support a similar but less diverse wintering bird assemblage. Local
F20	Low	Series of improved agricultural fields with occasional pockets of scattered scrub, notably within the vicinity of both new and established dwelling houses.	Habitats within F20 were not sampled by a Quadrat. However, the habitats are similar to habitats occurring within part of Quadrat FL-Wb06. However,

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Habitat Area	Habitat Value	Habitat Description	Value of Wintering Bird Assemblage
			the habitats within F20 are less diverse and therefore the wintering assemblage is likely to be correspondingly less diverse. Local
F21	Medium	The habitats grade from soft rush dominated improved fields in the north to a dry heath/acid grassland mosaic dominated by wavy-hair grass and ericoids, plus cotton grasses in the south. Scrub is frequent and is particularly invasive within the dry heath habitat.	Habitats within the area were partially sampled by Quadrat FL-Wb07, which is considered to be representative of F21. Therefore it is likely to support a similar wintering bird assemblage. County
F22	Low	A series of improved fields. Soft rush is prominent in the mid-section, whilst scattered and dense gorse scrub is the distinguishing feature in the north.	Habitats within the area were partially sampled by Quadrat FL-Wb07, which is considered to be similar to F22. However, the habitats within F22 are less diverse and therefore the wintering assemblage is likely to be correspondingly less diverse. County
F23	Medium	Dry heath/acid grassland mosaic on a level area of ground. Grassland dominates overall with scattered shrub occasional. Patches of wet heath leading onto bog are also present.	Habitats within the area were partially sampled by Quadrat FL-Wb07, which is considered to be similar to F23. However, the habitats within F23 are less diverse and therefore the wintering assemblage is likely to be correspondingly less diverse. County
F24	High	Wet modified bog is the dominant habitat, this being of a higher value in the western section. The eastern section of this area is more modified, containing areas of dry heath, wet birch woods and scattered broadleaves and conifers. A small vegetated burn is present with a pool of standing water.	Habitats within F24 were not sampled by a Quadrat. However, the habitats are similar to habitats represented by part of Quadrat FL-Wb07. Therefore the Quadrat is likely to support a similar wintering bird assemblage. County
F25	Medium	An area of young mixed plantation woodland underlain by dry heath / acid grassland mosaic similar to that of F24.	Habitats within F25 were not sampled by a Quadrat. However, the habitats within F25 are similar to habitats represented by part of Quadrat FL-Wb07 and therefore the wintering assemblage is likely to be of a similar diversity. County
F26	Low	Dominated by improved fields, scrub is rare but marshy grassland is present to the west of Burnhead.	Habitats within the area were entirely sampled by Quadrat FL-Wb08 which is considered to be representative of F26 and therefore the habitat area is likely to support an similar wintering bird assemblage. County
F27	Medium	Mesotrophic semi-improved grassland is dominant to the south, giving way to improved fields with abundant gorse scrub.	Habitats within F27 were not sampled by a Quadrat. However, the habitats within F27 are similar to habitats represented by part of Quadrat FL-Wb07. and therefore the wintering assemblage is likely to be of a similar diversity. County

5 Potential Impacts

5.1 Introduction

5.1.1 Impacts (both short- and long-term) can either be positive or negative and are identified and described for both construction and operation of the proposed scheme in the absence of mitigation. It should be noted that the impacts associated with the operational phase of the scheme are considered to be permanent, whereas temporary impacts, which are only apparent while the road is being built, are discussed in association with the construction phase.

5.1.2 Potential impacts associated with construction and operation of the proposed scheme on wintering bird assemblages include direct mortality, habitat loss, habitat fragmentation/isolation, disturbance and pollution/other indirect impacts. These adverse effects frequently interact (i.e. habitat loss during construction can potentially result in disturbance and habitat fragmentation) and the resulting combination of impacts may, through synergistic effects, significantly increase the overall negative impact of the proposed scheme (Luell et al., 2003).

Direct Mortality

Construction

5.1.3 Habitat loss resulting from clearance of vegetation prior to construction is unlikely to result in the direct mortality of wintering birds as they are able to escape by moving into unaffected adjacent habitats.

Operation

5.1.4 Many bird species will attempt to cross active roads to move between habitat fragments that arise as a direct result of operational habitat fragmentation and isolation (refer to Section 5.2.17) and the barrier effects that road development imposes on species movement (Salter, 1994).

5.1.5 Van Apeldoorn (1995) states that high mortality rates associated with operational roads reduces the exchange of bird populations between habitats and thus increases isolation effects, demonstrating the link between mortality and barrier effects caused by fragmentation.

5.1.6 An increase in direct mortality resulting from habitat fragmentation associated with an increase in number of roads and road traffic within the UK has been highlighted as a major component in the decline of some bird species such as the barn owl. Indeed, twice as many barn owls are now killed by road traffic (an estimated 5,000 individuals per annum) on UK roads as compared with the 1950's, and in some areas suitable habitat no longer supports barn owl populations (English Nature, 1996).

5.1.7 Roads can also create unexpected sources of mortality, for example, there have been several documented cases of bird mortality from road salt. Finches, in particular, are attracted to salt, probably to satisfy a dietary need. This can cause mortality through vehicle collision and also through the toxic effects of the ingested salt (Mineau and Brownlee, 2005).

5.1.8 In contrast, some bird species actively benefit from living near roads such as certain members of the corvid family, for example magpie and carrion crow, which regularly scavenge on road kills (Slater, 1994). However, none of these species are species of conservation concern.

5.1.9 The proposed scheme would constitute a new off-line road through a range of habitats where no comparable road currently exists. The scheme may result in an increase in mortality (in addition to fragmentation and isolation) of wintering birds through road traffic accidents (RTAs) and is most likely to occur where birds do not have time to avoid road traffic travelling at speed. RTAs typically occur where woodland or scrub habitats are located immediately adjacent to busy roads and it is

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likely that low flying bird species (e.g. members of the thrush family) will be the greatest affected.

Habitat Loss

Construction and Operation

- 5.1.10 One of the direct impacts of road construction would be the physical loss of breeding and foraging habitats along a route corridor that would be replaced or altered by transport infrastructure. The impacts associated with direct habitat loss are additionally increased by the interaction of disturbance and fragmentation/isolation impacts which, if combined, can lead to a change in the distribution of species within a route corridor or wider study area (Luell et al., 2003).
- 5.1.11 Habitat clearance would also result in the direct loss of foraging habitat through the loss of plant food groups such as buds or berries and the indirect loss of invertebrate communities (which form a major dietary constituent for the majority of small to medium sized bird species (e.g. redwing or fieldfare).
- 5.1.12 Removal/clearance of surrounding vegetation and/or buildings may possibly alter the availability of shelter for wintering birds increasing their vulnerability to a range of external factors such as adverse conditions and/or predators.
- 5.1.13 The total amount of landtake required in order to construct the Fastlink of the proposed scheme is estimated at approximately 1.20km² / 120ha. Table 15 shows the estimated total pre-construction and post-construction areas of Phase 1 Habitats present within the proposed landtake of the scheme. The post-construction figures take into account both anticipated habitat loss to construction and habitat that would be created or changed as a result of mitigation.

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Table 15 – Phase 1 Habitat Areas Pre and Post Construction

Phase 1 Habitat Description	Phase 1 Habitat Categories within proposed scheme land-take	
	Pre-construction (ha)	Post-construction (ha)
Woodland mixed plantation	2.46	13.23
Woodland broadleaved plantation (including standard trees)	0.10	0.78
Woodland broadleaved semi-natural	2.11	0.55
Woodland coniferous plantation	1.28	0.31
Scattered scrub	0.59	1.20
Dense continuous scrub	3.58	7.17
Riparian woodland	0	3.37
Acid grassland semi-improved	0.15	0.13
Acid grassland unimproved	0.40	0.19
Improved grassland	46.29	26.39
Marshy grassland	5.21	2.87
Neutral grassland semi-improved	0.26	0.21
Poor semi-improved grassland	2.96	1.51
Disturbed amenity grassland	0.83	0.37
Arable	49.21	19.64*
Built up areas (buildings)	0.49	0.49
Fen	3.87	1.41
Heath - acid grassland dry mosaic	1.88	1.67
Total	121.67	81.49

**Figure assumes all potential return to agriculture is achieved.*

- 5.1.14 Although occurring during the construction phase, habitat loss is regarded as an operational impact as the loss would be permanent. Further permanent habitat loss may occur through the occasional operational management of roadside habitats (i.e. mowing of verges or trimming of scrub/trees). Operation of the proposed scheme could also result in a reduction in the abundance of invertebrate communities within the immediate vicinity of the proposed scheme and thus indirectly impact bird populations through a reduction in food availability.
- 5.1.15 Temporary habitat loss associated with the construction and use of site compounds and other temporary structures, for example, access tracks, bridges or storage areas will result in the temporary destruction of potential wintering bird habitat, the effects of which are described above. However, it should be noted that the level of permanence (in terms of loss) will vary and is dependant on location/s that are currently unknown.
- 5.1.16 Operation of the proposed scheme could result in a reduction in the abundance of invertebrate communities within the immediate vicinity of the proposed scheme in particular as a result of pollution, which may include road salting, oil and fuel spillage resulting in an indirect impact to bird populations through a reduction in food availability.
- 5.1.17 In addition, indirect habitat loss can occur in areas adjacent to the proposed road, where an increase in noise and pollution from the traffic using the road can lead to birds moving out of the

area and thus rendering potentially suitable habitat as unsuitable for wintering bird populations.

Habitat Fragmentation and Isolation

Construction and Operation

- 5.1.18 Habitat fragmentation occurs when a road development imposes a barrier to the natural dispersal of animals resulting in disrupted movement across a site (English Nature, 2001). Research undertaken by English Nature (1994) suggests that habitat fragmentation may have a greater impact than isolation but that the isolation effect incurred by species imposed by fragmentation is increased by the barrier effects of roads in conjunction with disturbance and mortality, (particularly with regard to low flying species).
- 5.1.19 The loss of contiguous habitat due to fragmentation is now considered to be one of the most important factors in accelerating the reduction in worldwide biodiversity (Wilson, 1992, In: English Nature, 2001).
- 5.1.20 Some species will not inhabit areas within several hundred meters of a road. While the barrier effect imposed by the proposed scheme to birds is difficult to assess due to it being variable between species, as a general rule, the busier and wider the road the more effective barrier it is to dispersion (English Nature, 2001).
- 5.1.21 Construction of the proposed scheme is likely to have significant fragmentation and isolation impacts on bird populations within the survey corridor through the severing and subsequent isolation of bird populations within pre-existing habitats. This fragmentation and isolation will have a negative impact on local bird populations through a reduction in dispersal and subsequent isolation of species, which could potentially result in a reduction in population size and in some instances localised extinction of bird species. The extent of these impacts is likely to be dependent on the size of the isolated area of habitat and the species affected, as the ability to avoid genetic isolation and localised extinctions by moving between fragmented habitats varies between bird species.

Operation

- 5.1.22 Operation of the proposed scheme is also likely to have significant fragmentation and isolation impacts on bird populations through a restriction in dispersal and movement of species between habitats (fragmented by construction) resulting from habitat loss associated with minimal operational maintenance and noise and vibration disturbance (caused by road traffic). The continued fragmentation and isolation of bird species within severed habitats could have a detrimental effect on species population dynamics and ultimately viability.

Disturbance

Construction

- 5.1.23 Disturbance resulting from noise and vibration associated with construction of the proposed scheme will occur in two stages. The first will comprise disturbance resulting from construction habitat clearance, while the second will comprise both direct disturbance (for example, from excavation) and indirect disturbance. This would result from human activity associated with construction of the proposed scheme which will contribute to an increase in the effects of fragmentation and isolation.
- 5.1.24 Disturbance resulting from light pollution associated with construction during low light levels in winter/autumn and/or 24-hour construction could result in disturbance to wintering birds located within habitats adjacent to the proposed scheme, potentially leading to some species of bird abandoning their habitats at a local level if the disturbance reaches a significant level. The severity of the impact will vary according to the frequency and magnitude of the disturbance and the

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species involved.

- 5.1.25 The location of temporary site compounds/offices (which may be operational 24 hours a day) near sensitive habitats, for example wetlands, could result in significant disturbance to wintering birds resulting from noise, vibration and light pollution in addition to physical disturbance from the presence of construction workers and heavy plant.

Operation

- 5.1.26 Research undertaken by Reijnen et al. (1997) and Reijnen and Foppen (1994) has shown that operational noise is a primary factor in altering the density of bird populations adjacent to roads and highways.
- 5.1.27 Studies have shown that road traffic noise exceeding 50dBA can reduce bird density (40dBA for some woodland species) in adjacent habitats, while in comparison, some bird species appeared unaffected by disturbance but had lower breeding success (COST, 2004).
- 5.1.28 Light pollution can have adverse impacts on wintering bird species and can affect foraging behaviour in a number of species of bird. This impact was first observed by Rawson (1923) who demonstrated the correlation between critical light levels at dawn and singing in thrushes and suggested that artificial lighting could modify the timing of natural behavioural patterns.
- 5.1.29 Hill (1992) observed that seabirds were disorientated by street lights on cloudy nights and observed that redshank and oystercatchers were observed feeding within 50m of artificial lighting at night, while flocks of dunlin were observed roosting near a large roundabout with flood lighting.
- 5.1.30 Outen (undated) and Hill (1992) found that nocturnal bird species such as barn owl are sensitive to the presence of bright illumination and that artificial lighting has the potential to provide more feeding time for birds but could have a negative impact on prey abundance leading to food shortages.
- 5.1.31 Disturbance resulting from noise and vibration associated with operation of the proposed scheme will be mainly influenced by traffic type, traffic intensity, road surface properties, topography and structure/type of adjacent vegetation, the magnitude and spread of which is in turn influenced by underlying geology and soil characteristics (COST, 2004).
- 5.1.32 Disturbance during operation of the proposed scheme will result from noise and vibration associated with road traffic, artificial lighting (that will be installed at all major junctions along the proposed scheme) and occasional operational maintenance of the proposed scheme. As with disturbance associated with construction, an increase in traffic noise and lighting could result in sensitive bird species abandoning habitats adjacent to the scheme. This impact may be more pronounced given that the majority of habitats within the route corridor are currently subject to either low or no artificial lighting.

Pollution and Other Indirect Impacts

Construction

- 5.1.33 Accidental spills of chemicals and other potentially toxic substances during construction of the proposed scheme may occur and are of particular concern within proximity of ecological sensitive communities or rivers and/or streams. The severity and magnitude of the pollution impact would depend on the constituents, toxicity to biodiversity and discharge/spill volume of the pollutant in question.

Operation

- 5.1.34 Pollutants and toxins are derived from road traffic and road surfaces. The exhaust fumes produced

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by road vehicles contain a number of pollutants ranging from carbon monoxide, nitrogen oxide and sulphur dioxide to hydrocarbons and dioxins, while cars themselves produce a number of heavy metals ranging from lead to cadmium. These chemicals and gases can potentially pollute surface and groundwater, soil and vegetation (Luell et al., 2003).

- 5.1.35 Research conducted by Ballard and Hacker (1996) has shown that de-icing salt used in the winter to keep roads ice-free can potentially result in the death of seed eating birds such as finches, which consume seeds contaminated by salt. The application of de-icing salt to the proposed scheme during the winter and the indirect pollution of adjacent habitats via vehicle spray could potentially result in the death of seed eating bird species foraging in habitats located adjacent to the proposed scheme. It is not possible to estimate the average amount of salt spread because this is dependant on the rate of salt spread and speed of the spreader.
- 5.1.36 It is likely that pollution derived from road traffic at a local level would decrease as a result of a reduction in local congestion associated with a movement of traffic onto the AWPR, for example, within the City of Aberdeen. However, a reduction in local traffic congestion would result in an increase in road traffic pollution at district to regional level as more road traffic uses the AWPR to avoid local congestion. Furthermore, current road traffic pollution effects habitats and species within a built up environment, the proposed scheme and the road traffic using it would introduce pollution into greenspace habitats and associated species.
- 5.1.37 Insufficient research has been undertaken to date regarding the direct impacts that operational roads have on the abundance of invertebrate communities and the indirect impacts on bird species through a reduction in food availability. The only survey conducted to date in the UK was undertaken by the RSPB in 2004 (www.rspb.org.uk/bugcount). The study observed that in total one invertebrate was killed for every five miles travelled.

5.2 Specific Impacts

- 5.2.1 The potential impacts on bird species as a result of the scheme, in the absence of appropriate mitigation, are provided, in Table 16.

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Table 16 – Potential Impacts on Bird Species of Conservation Concern

Bird Species	Habitat/s of Value	Impacts
black-headed gull	Resident species. Breeds and winters in coastal marshes, upland pools, farmland and in built up areas.	Loss of wintering habitat (farmland) during construction and operation phases. Species unlikely to be disturbed as it has habituated to human development.
bullfinch	Resident species. Breeds and winters in orchards, parks, woodlands and scrub.	Loss of wintering habitat (woodland and scrub) during operation of the scheme. Disturbance during construction and operation.
common gull	Resident species. Breeds on moorland, marshes, bogs and cliffs. Winters on farmland, playing fields and reservoirs.	Loss of wintering habitat (farmland) during construction and operation phases. Species unlikely to be disturbed as it has habituated to human development.
cormorant	Resident species. Breeds on coastal cliffs and rocky islands. Often winters inland in trees by freshwater lakes, gravel pits and reservoir.	Some loss of wintering habitat (riparian trees). Most of these habitats will remain post development. Disturbance during construction and operation.
curlew	Resident species. Breeds on areas of damp moorland and pasture. Winters on estuaries and damp grassland.	Loss of wintering habitat (heathland, pasture and marshy grassland) during operation. Disturbance during construction. Species in the long term is unlikely to be disturbed during operation due to habituated of road traffic.
dunnock	Resident species. Breeds and winters in gardens, parks, woodland, waste ground and hedges.	Loss of wintering habitat (woodland, hedgerow and scrub) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
fieldfare	Winter visitor. Winters in open countryside, grass fields and (particularly hawthorn) hedgerows, fruit bearing trees and gardens.	Some loss of wintering habitat, (fields and hedgerows), although sufficient suitable habitat will remain following the implementation of the proposals.
goldcrest	Resident species. Breeds and winters in coniferous woodlands, occurring in deciduous woodland, scrub and even gardens in winter.	Loss of wintering habitat (conifer woodlands) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
green woodpecker	Resident species. Breeds and winters in broad-leaved woodland, venturing into farmland and heaths.	Loss and fragmentation of wintering habitat (broad-leaved woodland) during operation. Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
grey partridge	Resident species. Breeds and winters on farmland, grassland and arable fields.	Loss and fragmentation of wintering habitat (arable farmland and fields) during operation. Disturbance during both construction and operation. Possible risk of RTAs due to low flight pattern.
greylag goose	Winter visitor. Winters on arable fields, pastures, lakes and reservoirs.	Loss of wintering habitat during construction and operation phases. Species unlikely to suffer greatly from disturbance as plenty suitable wintering habitat will remain away

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Bird Species	Habitat/s of Value	Impacts
		from the cutting following development.
herring gull	Resident species. Breeds on rocky coastal edges and more recently, buildings. Winters more inland by freshwater lakes.	Unlikely to be impacted by loss of wintering habitat or disturbance. Direct mortality from ingestion of pollutants due to scavenging behaviour could occur.
house sparrow	Resident species. Breeds in urban environment, in rood tiles, air ducts, recesses and occasionally trees. Winters gregariously in farmland fields and hedgerows.	Loss of wintering habitat (buildings, farmland and hedgerows). Unlikely to be impacted by disturbance. Direct mortality from ingestion of pollutants due to scavenging behaviour could occur.
kestrel	Resident species. Found ubiquitously providing open rough ground for foraging is within the local proximity.	Loss of wintering habitat (unmanaged grassland, farmland). Disturbance unlikely to be a threat as this species thrives beside the roadside.
linnet	Resident species. Breeds in scrub on moorland, heaths and farmland. Winters in stubble and weedy fields.	Loss of breeding and wintering habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
meadow pipit	Resident species. Breeds in open country, moors and heaths, coastal meadows, pastures and bogs.	Loss and fragmentation of wintering habitat (grassland, heathland and bog). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
mistle thrush	Resident species. Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.	Loss and fragmentation of wintering habitat (gardens, agricultural fields). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
mute swan	Resident species. Breeds and winters on lakes, slow flowing rivers and nearby fields.	Disturbance during construction and operation phases. Risk of pollution to waterbodies during construction.
oystercatcher	Resident species. Breeds on grass fields and shingle beside lakes, rivers and seashores. Winters on estuaries, sandy beaches and open fields.	Loss of wintering habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
pink-footed goose	Winter visitor. Winters on moorland, lowland marshes, arable farmland, mudflats and freshwater lakes.	Loss of wintering habitat during construction and operation phases. Species unlikely to suffer greatly from disturbance as plenty suitable wintering habitat will remain away from the cutting following development.
redwing	Winter visitor. Winters in open countryside, grass fields and (particularly hawthorn) hedgerows, fruit bearing trees and gardens.	Some loss of wintering habitat such as fields and hedgerows. Although plenty suitable habitat will remain following the implementation of the proposals.
reed bunting	Resident species. Breeds and winters in reedbeds, upland and lowland marshes and farmland. Also visits gardens in winter.	Loss, fragmentation and possible pollution of wintering habitat (riparian corridors, marshland and scrub/hedgerows operation) during

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Bird Species	Habitat/s of Value	Impacts
		operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
skylark	Resident species. Breeds on moorland, farmland, dunes and grassland. Winters on rough grassland, stubble and saltmarsh.	Loss of wintering habitat (i.e. arable and grassland) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.
snipe	Resident species. Breeds in marshes and boggy areas. Winters on salt marshes, coastal lagoons and other marshy areas.	Loss and fragmentation of wintering habitat (marshland and boggy areas) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
song thrush	Resident species. Breeds and winters in gardens, farmland, woodland and hedges.	Loss and fragmentation of wintering habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
starling	Resident species. Breeds in towns, woods, parks, and on farms. Winters in cities, gardens and farmland.	Loss of wintering habitat (agricultural land, parks and gardens). Disturbance during construction and operation is unlikely to constitute a significant impact.
tree sparrow	Resident species. Breeds and winters in woodland, farmland and scrub, nesting in holes in trees or buildings.	Loss and fragmentation of wintering habitat (scrub/woodland and hedgerows) during operation. Disturbance during construction and operation.
willow tit	Rare resident. Breeds and winters in wet broad-leaved and coniferous woodland, scrub and hedgerows.	Loss and fragmentation of wintering habitat (scrub/woodland and hedgerows) during operation. Disturbance during construction and operation.
woodcock	Resident species. Large tracts of open woodland with open glades and rides.	Loss and fragmentation of wintering habitat (scrub/woodland and hedgerows) during operation. Disturbance during construction and operation.
yellowhammer	Resident species. Breeds and winters in hedgerows and scrub, especially gorse and hawthorn thickets.	Loss and fragmentation of wintering habitat (farmland and grassland) during operation. Disturbance during construction and operation.

5.2.2 With respect to construction and operation and unless otherwise stated in Table 17, the risk of direct mortality (including operational RTAs), fragmentation and disturbance resulting from clearance and loss of low value habitats (arable or improved/amenity grassland) is assessed as being a low negative impact. In comparison, the above impacts resulting from clearance and loss of high value habitats (such as woodland, scrub, unimproved/semi-improved/marshy grassland, heath and bog) is assessed as being a medium negative impact. Pollution to aquatic habitats resulting from accidental spills or surface runoff is assessed as being a medium negative impact. Whereas, pollution to solely terrestrial habitats is assessed as being a low negative impact.

5.2.3 Impacts associated with the location of temporary work compounds will be assessed at a later

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stage when the location of temporary work compounds within the footprint of the proposed scheme has been determined.

Section FL1

- 5.2.4 Eight Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including F1, F3, F4, F6, F7, F8, F10 and F12. The potential impact significance for wintering birds during construction and operation would be Moderate in Habitat Area F12 due to potential pollution of Green Burn, direct mortality through RTA, fragmentation and isolation and habitat loss.

Section FL2

- 5.2.5 Three Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including F13, F15 and F16. The significance of potential impacts for wintering birds during construction and operation has been assessed as Moderate in Habitat Areas F13, F15 and F16 due to potential pollution of field ditches which form the Allochie Burn, the Burn of Muchalls and the Burn of Blackbutts.

Section FL3 (Cookney to Cleanhill Junction)

- 5.2.6 Eight Habitat Areas and the bird assemblages they support would be affected during construction and operation of the proposed scheme, including F18, F19, F20, F21, F22, F23, F25 and F26. The significance of impacts on wintering birds during construction and operation has been assessed as Moderate in Habitat Areas F21, F22, F23, F25 and F26 due to potential pollution of Whiteside Burn, Cairns Burn, Crossley Burn, Circle Burn, Square Burn Craigentath Burn and Wedderhill Burn.
- 5.2.7 A description and assessment of specific impacts is provided in Table 17.

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Table 17 –Assessment of Potential Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
Section FL1				
F1	Local	Construction	Disturbance due to clearance.	Negligible/Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 0.25ha of riparian habitats	Low negative/Minor
			Potential for pollution of Megray Burn due to runoff.	Medium negative/Minor
F3	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 9ha of arable land.	Low negative/Minor
			Potential for pollution of Megray Burn due to runoff	Medium negative/Minor
F4	Less than local	Construction	Disturbance due to clearance.	High negative/Minor
			Potential for pollution of Megrey Burn due to accidental spills.	Medium negative/Negligible
		Operation	Direct mortality through RTA, disturbance, habitat loss of approximately 1.5ha of broad-leaved and coniferous plantations.	High negative/Minor
			Potential for pollution of Megrey Burn due to runoff.	Medium negative/Negligible
F6	Less than local	Construction	Disturbance due to clearance.	Negligible/Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of approximately 1ha of coniferous plantation.	Low negative/Negligible
F7	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential pollution of the Limpet Burn due to accidental spills,	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 5.25ha of dense, continuous scrub, bracken, and a small area of semi-natural broad-leaved woodland.	
F8	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 4.75ha of improved grassland and scattered scrub.	Medium negative/Minor
F10/F12	County	Construction	Fragmentation and isolation disturbance and potential pollution of the Green burn due to accidental spills.	Medium negative/Moderate
			Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of approximately 11ha of dry heath, acid	

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
Section FL1				
		Operation	grassland and marsh/marshy grassland and potential pollution of the Green Burn due to runoff.	
Section FL2				
F13	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential of field ditches which form the Allochie Burn due to accidental spills	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 13.75ha of improved and arable grassland and small areas of native species rich hedgerows.	Low negative/Minor
			Potential of field ditches which form the Allochie Burn due to runoff.	Medium negative/Moderate
F15	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of the Burn of Muchalls due to accidental spills	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 0.5ha of semi-improved acid grassland and arable.	Low negative/Minor
			Potential for pollution of the Burn of Muchalls due to runoff,	Medium negative/Moderate
F16	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of the Burn of Blackbutts due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 15ha of arable and improved grassland.	Medium negative/Moderate
			Potential for pollution of the Burn of Blackbutts due to runoff.	
Section FL3				
F18	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 7.25ha of arable, improved and marshy grassland and small areas of native species rich hedgerows.	Medium negative/Minor
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to runoff.	
F19	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Stoneyhill Ditch due to accidental spills.	Medium negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 1.25ha of marshy grassland.	Low negative/Minor

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance
Section FL1				
			Potential for pollution of Stoneyhill Ditch due to runoff.	Medium negative/Minor
F20	Local	Construction	Disturbance due to clearance.	Negligible/Negligible
		Operation	Direct mortality through RTA, disturbance and habitat loss of approximately 0.75ha of improved grassland.	Low negative/Minor
F21	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Whiteside burn due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and habitat loss of approximately 2.5ha of acid grassland and scattered scrub. Potential for pollution of Whiteside Burn due to runoff.	Medium negative/Moderate
F22	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Cairns Burn and Crossley Burn due to accidental spills	Medium negative/Moderate
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of approximately 3.75ha of improved fields and marshy grassland.	Low negative/Minor
			Potential for pollution of Cairns Burn and Crossley Burn due to runoff.	Medium negative/Moderate
F23	County	Construction	Fragmentation / isolation and disturbance due to clearance. Potential for pollution of Circle Burn due to accidental spills	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of approximately 3.75ha of acid grassland and scattered/dense scrub.	Medium negative/Moderate
			Potential for pollution of Circle Burn due to runoff.	
F25	Local	Construction	Fragmentation / isolation and disturbance due to clearance. Potential for pollution of Square Burn due to accidental spills.	Low negative/Minor
		Operation	Direct mortality through RTA, fragmentation and isolation disturbance and habitat loss of approximately 2.75ha of mixed plantation woodland underlain by dry heath and acid grassland. It should be noted that the dry heath and acid grassland have degraded as a result of the plantation woodland, and as such, impacts have been assessed at a low negative magnitude.	Low negative/Minor
			Potential for pollution of Square Burn due to runoff.	
F26	County	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, habitat loss of approximately 14ha of improved and arable grassland and small areas of semi-improved and marshy grassland. Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.	Medium negative/moderate

6 Mitigation

6.1 Introduction

6.1.1 An Environmental Management Plan (EMP) will be prepared and submitted to SEPA and SNH for approval prior to construction. The purpose of the EMP will be to specify when and how the required mitigation will be implemented. Table 18 presents mitigation measures to reduce potential impacts within each Habitat Area during construction and operation of the proposed scheme. The application of mitigation follows a hierarchy, which comprises prevention/avoidance, reduction and offset/compensation measures. In addition, an Ecological Clerk of Works will be on site during construction to ensure all mitigation measures are implemented.

6.1.2 It should be noted that offset measures are not direct mitigation, but act as compensation measures that produce benefits to birds in order to offset adverse impacts that cannot be prevented or reduced. Measures for WCA1i bird species are highlighted in bold.

Table 18 – Mitigation for Construction and Operation

Mitigation Type	Potential Impact	Description of Mitigation
Construction		
Prevent	Direct Mortality Disturbance	Barn Owl (WCA1i species) All buildings (in particular farm or other vacant structures with open access) that need to be demolished prior to construction will be checked at least one year in advance of construction to ensure that they are not in use by barn owl. The structure should be destroyed immediately after survey providing that barn owl is not present. The building should be secured to prevent access should demolition not be feasible before construction.
Prevent	Direct Mortality Disturbance	Kingfisher (WCA1i species) A pre-construction survey of all suitable watercourses will be undertaken at least one breeding season in advance of construction. This will follow the methods outlined by Gilbert et al. (1998) to confirm the potential presence of kingfisher. Should the presence of kingfisher be confirmed, any river or stream bank that is likely to be directly affected by works that exhibits potential roosting habitat for kingfisher is subject to two options. It must either be destroyed, (only if strictly necessary and under supervision of the ecological clerk of works), or securely covered (which ever is applicable) in advance of construction, in order to prevent access by kingfishers. Once construction of the proposed scheme is completed, all protective covering must be removed. Any suitable kingfisher river or stream bank habitat that is not directly impacted (but is likely to be disturbed) during construction should be securely covered. Again only under the supervision of the ecological clerk of works, and in advance of construction in order to prevent access by kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed. It should be noted that the above mitigation measure cannot be undertaken without taking into consideration indirect impacts (disturbance and pollution) to other ecology, for example, protected mammal species such as otter and freshwater ecology, for example, fish.
Prevent	Direct Mortality Habitat Loss Disturbance	Plant and personnel should be restricted to a prescribed working corridor through the use of temporary barriers. This will minimise damage to habitats and potential direct mortality and disturbance to wintering birds located within and adjacent to the proposed scheme working corridor.
Prevent	Habitat Loss Disturbance	Works compounds, storage sites and access roads must not be located within 30m of areas of woodland, wetland and scrub to prevent damage of habitats and disturbance of wintering birds.
Prevent	Disturbance	Ensure that any lighting associated with construction, during low light levels

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Mitigation Type	Potential Impact	Description of Mitigation
	Pollution	and/or night, is minimised as far as practical by the adoption of best working practices associated with the use of artificial light.
Prevent	Pollution	Strict adherence to SEPA pollution prevention guidelines PPG1, PPG2 and PPG6.
Prevent	Pollution	Minimise the amount of dust and other airborne debris produced during construction by the adoption of best working practices.
Prevent	Pollution	The use of approved pollution prevention schemes (e.g. oil separators) should be installed to prevent potentially polluted surface water from flowing into wetlands and/or other waterbodies.
Reduce	Direct Mortality Disturbance	Construction activities such as blasting, piling, grouting or any other activity likely to result in significant disturbance to wintering birds must (as far as practical) be undertaken outside sensitive periods of the day. In particular, dusk and dawn. Where it is not possible to sympathetically time works, consideration should be given to avoiding works near habitats identified by the Ecological Clerk of Works as being of high value / sensitivity for wintering birds.
Operation		
Prevent	Direct Mortality	Where the alignment passes through existing areas of established woodland, potential RTAs should be prevented by removing or significantly thinning all trees within 5m of the road. Exceptions will be made for trees which are considered to be of significant ecological value (i.e. mature oak, wych elm or ash).
Prevent	Direct Mortality	A bird hazard management plan (BHMP) should be produced in consultation with Aberdeen Airport and the British Airport Authority (BAA). This will ensure that ecological and landscape mitigation is compatible with the operation of Aberdeen Airport in terms of aircraft and passenger safety. The management plan will ensure that there is no increase in the hazard posed by birds as a result of ecological and landscape mitigation planting. It should be noted that as part of this BHMP, berried shrubs or trees may be avoided within 2km of Aberdeen Airport and/or along the alignment of aircraft flight paths.
Prevent	Disturbance Pollution	Roadside lighting throughout the proposed scheme will be strategically sited only where strictly necessary (e.g. major junctions). This will ensure that it complies with guidelines / guidance produced by the Environment Agency (http://www.environment-agency.gov.uk/yourenv/eff/pollution/) and Institute of Lighting Engineers (http://www.ile.org.uk/lighting_technical.htm) concerning the reduction of unnecessary light pollution within urban and rural areas. In particular the requirement for fitting all lights with shades and ensuring that lighting only illuminates chosen areas.
Prevent	Direct Mortality Habitat Loss Disturbance	Kingfisher (WCA1i species) Any sand and/or gravel bank/s within 500m of the proposed scheme should be surveyed for potential kingfisher roosting habitat in advance of any operational habitat management and/or maintenance. This should follow the methodology outlined by Gilbert et al. (1998). Works cannot be undertaken if occupied roosting habitat is confirmed. If suitable habitat is identified, the banks should be securely covered in advance of any management in order to prevent access by kingfishers.
Prevent	Direct Mortality Habitat Loss Disturbance	Operational maintenance of areas of woodland, scrub and/or grassland is minimised as far as practical.
Reduce	Direct Mortality	Landscape planting (including berry / fruit bearing trees and shrubs) at all junctions (regardless of size), embankments, or any point of the proposed scheme that is below vehicle height will be not be planted within 5m of the carriageway to ensure that potential RTAs are minimised as far as practical. Use of temporary fencing (prior to the development of the planting) will be considered where appropriate to reduce the risk of RTA for species of particular sensitivity (e.g. barn owl).
Reduce	Direct Mortality	A grassland verge (approximately 5m in width) should be maintained between the edge of the hard shoulder and any areas of scrub or woodland. This will ensure that bird species can easily see any on-coming vehicles before they attempt to cross the proposed scheme.

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Mitigation Type	Potential Impact	Description of Mitigation
Offset	Habitat Loss	Barn owl (WCA1i species) Replacement boxes suitable for roosting should be provided in suitable adjacent buildings/habitat (subject to consultation and verification with SNH) in the event that they are identified in buildings that need to be demolished prior to construction of the proposed scheme.
Offset	Habitat Loss	Additional planting within and adjacent to existing areas of woodland/scrub. This will comprise native scrub and tree species thereby creating additional wintering foraging bird habitat and compensating for habitat clearance, fragmentation and isolation and disturbance impacts. Habitat creation should include areas of core woodland (>30 m from woodland edge) and areas located at least 50m from route alignment.
Offset	Habitat Loss	Appropriate management of existing boundary habitats such as hedgerows or rough edges. This will benefit of key farmland species of conservation concern such as yellowhammer, skylark, linnet, tree sparrow, meadow pipit and grey partridge.
Offset	Habitat Loss	Appropriate habitat management of existing woodland/scrub habitats by selective thinning to create open glades. In addition, additional planting of native broad-leaved species to enhance existing woodland/scrub habitat and compensate for habitat lost to the scheme thereby creating a habitat structure of greater value to wintering birds.
Offset	Habitat Loss Fragmentation Disturbance	Kingfisher (WCA1i species) Where a pre-construction survey of all suitable watercourses (undertaken in advance of construction following methods outlined by Gilbert et al (1998) confirms the presence of kingfisher, replacement roosting habitat in the form of sand and/or gravel banks should be created in order to compensate for any habitat loss. This will be carried out during construction and should be sited as close to the location where the original habitat was lost (taking into account disturbance impacts associated with operation of the proposed scheme). Habitat loss will be identified and quantified in the course of a pre-construction survey.
Offset	Habitat Loss Fragmentation	Vegetated strips, wildlife overbridges or similar should be created to offset the loss of wildlife corridors (e.g. woodland, scrub, rivers, streams or disused railways etc) severed by the proposed scheme. These should be planted with native shrub and/or tree species to facilitate the movement of bird species along the these severed corridors either above or below the alignment.
Offset	Fragmentation Disturbance	Planting of dense native tree and scrub species (>25m from the carriageway) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats. The screening must ensure that noise levels are maintained less than 40dBA on the side opposite to the carriageway.
Offset	-	An Environmental management Plan (EMP) will be prepared in consultation with SNH and should be followed throughout operation of the proposed scheme.

6.2 Specific Mitigation

6.2.1 The current mitigation proposals do not include any scope to mitigate for the loss of ecologically valuable farmland (arable, improved, poor semi-improved and semi-improved grassland fields). These areas are likely to provide foraging opportunities (to a greater or lesser degree) for populations of the following key bird species: barn owl, curlew, grey partridge, kestrel, linnet, meadow pipit, oystercatcher, skylark and yellowhammer as well as populations of wintering waders, wildfowl and geese.

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Table 19 - Residual Impacts

Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
Section FL1						
F1	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 18)	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of riparian habitat.	Low negative/Minor		
			Potential for pollution of Megray Burn due to runoff.	Medium negative/Minor		
F3	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation. Loss of arable land.	Low negative/Minor		
			Potential for pollution of Megray Burn due to runoff	Medium negative/Minor		
F4	Less than local	Construction	Disturbance due to clearance.	High negative/Minor	Generic mitigation (Table 18).	Negligible
			Potential for pollution of Megray Burn due to accidental spills.	Medium negative/Negligible		
		Operation	Direct mortality through RTA, disturbance, loss of broad-leaved and coniferous plantations.	High negative/Minor	Habitat creation	
			Potential for pollution of Megray Burn due to runoff.	Medium negative/Negligible	Mixed woodland planting to the east of the proposed scheme in HA F4 at ch70 - 310 (Figure 41.5a).	
F6	Less than local	Construction	Disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 18) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, loss of coniferous plantation.	Low negative/Negligible		
F7	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation	Negligible

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
			Potential for pollution of Limpet Burn due to accidental spills.	Medium negative/Minor	(Table 18).	Low negative/minor adverse
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of dense, continuous scrub, bracken and a small area of semi-natural broad-leaved woodland.		Generic mitigation (Table 18). Habitat creation Mixed woodland planting to the east of the proposed scheme in HA F4 at ch70 - 310 (Figure 41.5a) and riparian woodland planting to the east and west of the proposed scheme in HA F7 at ch1290 (Figure 41.5b).	
			Potential for pollution of Limpet Burn due to runoff.		Generic mitigation (Table 18).	
F8	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of improved grassland and scattered scrub.	Medium negative/Minor		
F10/F12	County	Construction	Fragmentation and isolation, disturbance and potential pollution of the Green Burn due to accidental spills.	Medium negative/Moderate	Generic mitigation (Table 18) apart from habitat loss.	Negligible
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance, loss of dry heath, acid grassland and marsh/marshy grassland and potential pollution of the Green Burn due to runoff.		Offset mitigation Habitat loss will be mitigated for by offset mitigation.	
Section FL2						
F13	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of field ditches which form the Allochie Burn due to accidental spills.	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of improved and arable grassland; and small areas of native, species rich hedgerows.	Low negative/Minor		

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
			Potential for pollution of field ditches which form the Allochie Burn due to runoff.	Medium negative/Moderate		
F15	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18).	Negligible
			Potential for pollution of Burn of Muchalls due to accidental spills	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation. Loss of semi-improved acid grassland and arable.	Low negative/Minor		
			Potential for pollution of the Burn of Muchalls due to runoff,	Medium negative/Moderate		
F16	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of the Burn of Blackbutts due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of arable and improved grassland.	Medium negative/Moderate		
			Potential for pollution of the Burn of Blackbutts due to runoff.			
Section FL3						
F18	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of Balnagubs Burn and a tributary of the Elsick Burn due to accidental spills.			
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of arable, improved and marshy grassland; and small areas of native, species rich hedgerows.	Medium negative/Minor		
			Potential pollution of the Balnagubs Burn and a tributary of the Elsick Burn due to runoff.			
F19	Local	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of Stoneyhill Ditch due to accidental spills.	Medium negative/Minor		
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of marshy grassland.	Low negative/Minor		
			Potential for pollution of Stoneyhill Ditch due to runoff.	Medium negative/Minor		
F20	Local	Construction	Disturbance due to clearance.	Negligible/Negligible	Generic mitigation (Table 18).	Negligible
		Operation	Direct mortality through RTA, disturbance and loss of improved grassland.	Low negative/Minor		
F21	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18).	Negligible
			Potential for pollution of Whiteside burn due to accidental spills.		Generic mitigation (Table 18).	
		Operation	Direct mortality through RTA, fragmentation and isolation, disturbance and loss of acid grassland and scattered scrub.	Medium negative/Moderate		

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
			Potential for pollution of Whiteside Burn due to runoff.		Habitat creation Scrub planting to the east of the proposed scheme in HA F18 and F21 at ch8550 - 8630 (Figure 41.5i) Acid grassland to be retained where possible.	
F22	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of Cairns Burn and Crossley Burn due to accidental spills	Medium negative/Moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation. Disturbance and loss of improved fields and marshy grassland.	Low negative/Minor		
			Potential for pollution of Cairns Burn and Crossley Burn due to runoff.	Medium negative/Moderate		
F23	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18).	Negligible
			Potential for pollution of Circle Burn due to accidental spills	Medium negative/Moderate		
		Operation	Fragmentation / isolation, disturbance and loss of acid grassland and scattered/dense scrub.	Low negative/Minor	Generic mitigation (Table 18). Habitat creation Scrub planting to the west of the proposed scheme in HA F21 at ch8640 - 8760 (Figure 41.5i).	
			Potential for pollution of Circle Burn due to runoff, direct mortality through RTA.	Medium negative/Moderate	Generic mitigation (Table 18).	
F25	Local	Construction	Fragmentation / isolation and disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18).	Negligible
			Potential for pollution of Square Burn due to accidental spills.	Low negative/minor		
		Operation	Direct mortality through RTA, fragmentation and isolation disturbance and loss of mixed plantation woodland underlain by dry heath and acid grassland. It should be noted that the dry heath and acid grassland have degraded as a result of the plantation woodland, and as such, impacts have been assessed at a low negative magnitude.		Generic mitigation (Table 18). Habitat creation	

Mixed woodland planting to the west

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Habitat Area	Evaluation	Phase	Description of Impacts	Impact Magnitude / Significance	Mitigation	Residual Impacts
			Potential for pollution of Square Burn due to runoff.		of the proposed scheme in HA F25 at ch9950 - 10200 (Figure 41.5j). Generic mitigation (Table 18).	
F26	County	Construction	Fragmentation and isolation, disturbance due to clearance.	Low negative/Minor	Generic mitigation (Table 18) apart from habitat loss.	Negligible
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to accidental spills.	Medium negative/moderate		
		Operation	Direct mortality through RTA, fragmentation and isolation, loss of improved and arable grassland; and small areas of semi-improved and marshy grassland.			
			Potential for pollution of Craigentath Burn and Ditch, Wedderhill Burn and Burnhead Burn due to runoff.			

7 Residual Impacts

7.1.1 This section provides an assessment of residual impacts in light of the mitigation measures proposed in Section 6.

Section FL1

7.1.2 Predicted impacts of low negative magnitude and Minor Adverse significance in this section on wintering birds remain in areas surrounding Limpet Burn (F7). Residual impacts are predicted due to the risk of direct mortality from RTAs, fragmentation / isolation, disturbance and habitat loss during operation.

Section FL2

7.1.3 All predicted impacts in this section on wintering birds are reduced to residual impacts of Negligible significance through the application of mitigation proposed in Section 6.

Section FL3

7.1.4 All predicted impacts in this section on wintering birds are reduced to residual impacts of Negligible significance through the application of mitigation proposed in Table 19.

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Annex 1

Species list for wintering birds recorded in the Fastlink

Species	Scientific name
blackbird	<i>Turdus merula</i>
black-headed gull	<i>Larus ridibundus</i>
blue tit	<i>Parus caeruleus</i>
bullfinch	<i>Pyrrhula pyrrhula</i>
buzzard	<i>Buteo buteo</i>
carrion crow	<i>Corvus corone</i>
chaffinch	<i>Fringilla coelebs</i>
coal tit	<i>Parus ater</i>
common gull	<i>Larus canus</i>
coot	<i>Fulica atra</i>
cormorant	<i>Phalacrocorax carbo</i>
curlew	<i>Numenius arquata</i>
dunnock	<i>Prunella modularis</i>
feral pigeon	<i>Columba livia</i>
fieldfare	<i>Turdus pilaris</i>
goldcrest	<i>Regulus regulus</i>
goldfinch	<i>Carduelis carduelis</i>
Grasshopper Warbler	<i>Locustella naevia</i>
great tit	<i>Parus major</i>
Green Woodpecker	<i>Picus viridis</i>
greenfinch	<i>Carduelis chloris</i>
grey heron	<i>Ardea cinerea</i>
grey partridge	<i>Perdix perdix</i>
greylag goose	<i>Anser anser</i>
herring gull	<i>Larus argentatus</i>
house sparrow	<i>Passer domesticus</i>
jackdaw	<i>Corvus monedula</i>
kestrel	<i>Falco tinnunculus</i>
Lesser Redpoll	<i>Carduelis cabaret</i>
linnet	<i>Carduelis cannabina</i>
long-tailed tit	<i>Aegithalos caudatus</i>
magpie	<i>Pica pica</i>
mallard	<i>Anas platyrhynchos</i>
meadow pipit	<i>Anthus pratensis</i>
mistle thrush	<i>Turdus viscivorus</i>
moorhen	<i>Gallinula chloropus</i>
mute swan	<i>Cygnus olor</i>
oystercatcher	<i>Haematopus ostralegus</i>
pheasant	<i>Phasianus colchicus</i>
pied wagtail	<i>Motacilla alba</i>
pink-footed goose	<i>Anser brachyrhynchus</i>

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redwing	<i>Turdus iliacus</i>
reed bunting	<i>Emberiza schoeniclus</i>
robin	<i>Erithacus rubecula</i>
rook	<i>Corvus frugilegus</i>
Siskin	<i>Carduelis spinus</i>
skylark	<i>Alauda arvensis</i>
snipe	<i>Gallinago gallinago</i>
song thrush	<i>Turdus philomelos</i>
sparrowhawk	<i>Accipiter nisus</i>
starling	<i>Sturnus vulgaris</i>
Stock Dove	<i>Columba oenas</i>
tree sparrow	<i>Passer montanus</i>
wigeon	<i>Anas penelope</i>
woodcock	<i>Scolopax rusticola</i>
woodpigeon	<i>Columba palumbus</i>
wren	<i>Troglodytes troglodytes</i>
yellowhammer	<i>Emberiza citrinella</i>