



Appendix A10.5 – Wintering Birds

B1033200 July 2007

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1 Introduction

1.1 General Background

- 1.1.1 This Appendix reports the assessment of impacts on wintering birds in the vicinity of the Northern Leg of the proposed scheme, supporting Chapter 10 (Ecology and Nature Conservation).
- 1.1.2 To aid the interpretation of the assessment, the AWPR Northern Leg study area has been divided into five route sections as follows:
- Section NL1 ch314800 – 316000 (Derbeth to Tulloch Road);
Section NL2 ch316000 – 317400 (SAC Craibstone);
Section NL3 ch317400 – 322600 (A96 to Nether Kirkton);
Section NL4 ch322600 – 325370 (Nether Kirkton to Corsehill); and
Section NL5 ch325370 – 331000 (Corsehill to Blackdog).
- 1.1.3 Studies on wintering birds were included as part of the Ecological Impact Assessment (EclA), and were undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11 and the Environmental Impact Assessment (Scotland) Regulations 1999. The three stages of EclA have been modified to be directly applicable to the proposed scheme, and are based on matrices from an early draft version of IEEM guidance on EclA (IEEM, 2002) and Transport Advisory Guidance (STAG and WEBTAG). The bulk of the assessment for the AWPR Northern Leg was undertaken before the 2006 issue of the IEEM guidelines. This assessment therefore follows the general approach described in the IEEM 2002 guidelines, with cognisance of the later 2006 guidelines.

Survey Aims

- 1.1.4 This report provides an assessment of the current status of wintering bird populations in the vicinity of the Northern Leg of the proposed scheme, and the potential impacts associated with construction and operation. Measures are proposed to mitigate these impacts, and an assessment is made of the residual impacts remaining after mitigation is implemented
- 1.1.5 A breeding bird assessment has also been undertaken and is provided as Appendix A10.4.

Report Structure

- 1.1.6 This report is presented in the following structure:
- an overview of the legislative status and protection of bird populations;
 - a summary of previous survey information;
 - the objectives and limitations of the present survey;
 - survey and impact assessment methods;
 - baseline information including survey results;
 - an evaluation of the area's sensitivity/importance for birds;
 - an assessment of the potential development impacts;
 - mitigation proposals are described, where and when appropriate; and
 - an assessment of residual impacts of the proposed scheme following mitigation.

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Study Area

- 1.1.7 For the purpose of this report, the study area is defined as comprising all areas within 500m of the Northern Leg of the proposed scheme.

1.2 Legislation and Conservation Status of Birds

International Protection

- 1.2.1 Resident, breeding, wintering and migratory bird populations within the UK are protected under European Legislation by key directives on Wild Birds (EC Directive 79/409/EC) and Habitats (EC Directive 92/43/EC). The identification and classification of Special Protection Areas for rare or vulnerable species, as well as for all regularly occurring migratory species, paying particular attention to the protection of wetlands of international importance is listed in Annex I of the Directive. Together with Special Areas of Conservation (SACs) designated under the Habitats Directive, SPAs form a network of pan-European protected areas known as Natura 2000. This specifies the conditions under which hunting can be undertaken (species that can be hunted are listed on Annex II.1 and Annex II.2 of the Directive).

National Protection

Wildlife and Countryside Act 1981 (as amended)

- 1.2.2 The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain and is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') is implemented.
- 1.2.3 The Conservation (Natural Habitats & c.) Regulations 1994 is the means by which the European Union Directives on the Conservation of Wild Birds (79/409/EEC) and Natural Habitats and Wild Fauna and Flora (92/43/FFC) are implemented in Great Britain.

Nature Conservation (Scotland) Act 2004

- 1.2.4 The Nature Conservation (Scotland) Act 2004 (NCSA) implements a series of measures designed to conserve and enhance the natural features of Scotland (natural features referring in this context to flora or fauna or geological or geomorphological features) in the context of the natural environment within a wider British, European and global context.
- 1.2.5 The Act 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) while Part 3 extends the protection of birds, animals and plants by revising Part I of the WCA (1981) to include the term 'recklessly'.
- 1.2.6 The WCA (1981) and NCSA (2004) taken together ensure that all wild birds, their nests and eggs are protected, which with respect to the proposed scheme makes 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; and
 - 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.
- 1.2.7 WCA Schedule 1 (WCA1i) bird species are protected by legal penalties at all times.

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- 1.2.8 The Acts additionally provides protection for SSSI in particular those that are designated for the presence of wild bird populations.

UK Conservation Status of Birds

Biodiversity Action Plans (UK BAP and L BAP)

- 1.2.9 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.
- 1.2.10 In addition to having national priorities and targets, action for biodiversity is also taken at a local level. The local North East Scotland Biodiversity Partnership outlines action for 12 national and 22 local bird species and can be viewed at <http://www.ukbap.org.uk>.
- 1.2.11 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).
- 1.2.12 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 & Countryside Act (1981), European Directives and/or identified as priorities in the UK BAP.

Scottish Biodiversity List

- 1.2.13 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, in implementing their duty to further the conservation of biodiversity in Scotland. At present, the Scottish Biodiversity List includes 38 species of bird and can be viewed at <http://www.biodiversityscotland.gov.uk>.

Joint Nature Conservation Committee (JNCC): Birds of Conservation Concern 2002 - 2007

- 1.2.14 The leading government and non-government conservation organisations in the UK have jointly reviewed the population status of 247 bird species that are regularly found within the UK using data from national monitoring schemes.
- 1.2.15 On the basis of seven quantitative criteria, each species was placed on one of three lists:
- **red** globally threatened, have had an historical population decline in the UK from 1800 - 1995, a rapid (> or = 50%) decline in UK breeding population over the past 25 years or a rapid (> or = 50%) contraction of UK breeding range over the past 25 years).
 - **amber** historical population decline from 1800 to 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).
 - **green** no identified threat to their population status.
- 1.2.16 Of the 247 species assessed, 40 species were red-listed, 121 were amber-listed and the remaining 86 were green-listed. A full description of the study can be viewed at <http://www.jncc.gov.uk>.

2 Methods

2.1 Existing Data

- 2.1.1 Scottish Natural Heritage (SNH), The British Trust for Ornithology (BTO), The Wildfowl and Wetlands Trust (WWT) and The Royal Society for the Protection of Birds (RSPB) were consulted regarding the existence of previous survey information/data for the route corridor and wider study area.
- 2.1.2 Waterbodies (which are of value to wintering waders and wildfowl) located within and/or adjacent to the route corridor were identified through an assessment of data supplied by North East Scotland Biological Records Centre (NESBReC), and analysis of aerial photographs and Ordnance Survey maps.
- 2.1.3 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. There is limited existing data on wintering wildfowl and waders on Lily and Corby lochs and none on potentially affected sections of the River Don as these areas are outside of those surveyed by the WeBS counts conducted by the British Trust for Ornithology (BTO), and wintering geese surveys conducted by the Wildfowl and Wetlands Trust (WWT).

2.2 Survey Methods

Rationale

- 2.2.1 The following survey method section has been divided into two parts, the survey methods were developed by Jacobs ecologists (Table 1) in consultation with SNH, from 2004 – 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.

Table 1 – Field Surveyor Experience

Name	Qualifications	Years of Ornithological Experience
Graham A. Rankin	B.Sc. & M.Sc.	10 years
Jonathan Huckle	B.Sc., M.Sc. & PhD	12 years
Jonathan L. Durward	B.Sc. & HNC	11 years
Andy Whitfield	MA. & Post-graduate Certificate	15 years
Mark M. Jackson	B.Sc. & M.Res	5 years
Jonathan Kendrew	B.Sc. & M.Sc.	7 years
Alastair J. Miller	B.Sc. & M.Sc.	2 years

- 2.2.2 Field surveys were directed/undertaken by Graham A. Rankin and Jonathan L. Durward with field assistance from Jonathan Kendrew and Alastair Miller. All surveyors are experienced ornithological surveyors with extensive background in identifying birds from observations and from bird calls/song.

Development of Survey Strategy

- 2.2.3 A preliminary walkover survey of the 500m study area was undertaken in early spring 2004 (following initial consultation with SNH) to assist in the development of an appropriate survey strategy to sample the route corridor for breeding birds.

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- 2.2.4 When developing the survey strategy it was determined through professional judgment together with consultation with SNH that a full survey of the entire route corridor of the proposed scheme for wintering bird assemblages would be impractical due to its large size and the excessive resourcing demands such a survey would require. Therefore, it was agreed to survey the route corridor by targeting high value wintering wildfowl habitat comprising large waterbodies within or adjacent to the route corridor and sampling remaining terrestrial areas 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.
- 2.2.5 The wintering bird survey (WBS) strategy outlined below was developed using survey standards outlined in Bird Census Techniques (Bibby et al., 1992) and Bird Monitoring Methods (Gilbert et al 1998).
- 2.2.6 All methods were agreed through consultation with SNH prior to survey in the form of an Ecological Scoping Report (Jacobs, 2004).

Selection of Survey Areas – High Value Waterbodies

- 2.2.7 High value waterbodies (referred to as Waterbodies of Ornithological Value; WOVs) located within and/or adjacent to the study area were identified by experienced ornithologists (shown in Table 1) based on the initial walkover survey together with an assessment of aerial photographs and Ordnance Survey maps.
- 2.2.8 Five counts were undertaken at each identified waterbody once a month at dawn, midday and dusk from 12 November 2004 to 17 March 2005. The survey period was extended into March 2005 to ensure that the period of water bird migration was included. All wildfowl, waterfowl and wading species using the waterbodies and shoreline were recorded from a vantage point near to the edge of the water body. Birds flying overhead were recorded but not included in the data analyses as they were not considered to be using the waterbodies.

Selection of Survey Areas – Terrestrial Habitats

- 2.2.9 A Quadrat sampling methodology was used to survey wintering bird species within the mosaic of arable and grassland fields and at the edge of woodland or scrub habitats present throughout the route corridor. The Quadrat data, in addition data of waterbody counts, was used to infer the importance of all remaining non-surveyed areas throughout the route corridor for wintering birds.
- 2.2.10 A single transect was established centred over the route alignment along which 500m square Quadrats were established. A sampling ratio of 1:3 was used resulting in 13 Quadrats being selected along the length of the transect. This level of sampling was considered to provide field survey data of sufficient representation to allow an effective evaluation of the ecological importance of the breeding bird assemblages found in these areas and the remainder of the study area. The survey did not include urban habitats, including areas of road and/or hard standing and residential gardens.
- 2.2.11 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 birds surveys.
- 2.2.12 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, although observations of breeding behaviour (such as singing) were recorded. However, it was not considered that any birds were breeding. All species were recorded onto 1:10,000 site maps using BTO species codes, flight direction and flock size were included where appropriate to help minimise the potential for

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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 hard standing and residential gardens.

2.2.13 Quadrats were subject to four WBS undertaken between November 2004 and February 2005.

Incidental Records

2.2.14 Casual observations of Birds Directive Annex 1, WCA Schedule 1, JNCC Red / Amber and UK / LBAP bird species present within or adjacent to each of the Quadrats, in addition to 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 250m either side of the proposed scheme made during a dedicated survey undertaken between 15-18 March 2005.

2.3 Habitat Assessment

Habitat Value

2.3.1 Information obtained from the Phase 1 Habitat Survey was used to inform a description of the habitats represented within WOVs or Quadrats and assess their value for birds. A habitat value (expressed as high, medium or low) was assigned to each WOV, Quadrat and Ecological Habitat Area (as described in the Phase 1 Habitat Report, Appendix A10.1) based on the habitat descriptions derived from the Phase 1 Habitat Survey and following the criteria shown in Table 2.

Table 2 – Habitat Assessment Criteria

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

Habitat Representation

2.3.2 In addition to providing a description and value of habitat for each WOV and Quadrat, habitat data from the Quadrats was considered in the context of the Phase 1 Habitat Survey of the route corridor to determine how representative each Quadrat was of surrounding habitats. Where Quadrat habitat data appeared to over or under estimate the value of the surrounding habitat, a compensatory approach was employed where the whole area was assigned a higher or lower evaluation based on professional judgment. In reality, a single Quadrat covers an area of approximately 500m² and the Habitat Areas (un-surveyed for birds) within the route corridor and surrounding each Quadrat cover an area of approximately 4500m², therefore it will be extremely unlikely that habitats within surrounding Habitat Areas will be of less value for wintering birds than those within an individual Quadrat.

2.4 Evaluation of Ecological Importance

Evaluation of Receptors

2.4.1 The method for assessing the value of an ecological receptor used all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor was determined by reference to statutory and non-statutory site designations, the results of the consultations, literature review 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 3. These criteria are based on the Ratcliffe Criteria (Ratcliffe, 1977)

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used in the selection of biological Sites of Special Scientific Interest (SSSI) and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological/ geographical unit.

- 2.4.2 The criteria used in the ecological evaluation process include reference to the legal protection conferred on species or habitats as well as the conservation status of the receptor, such as presence on national 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 red-throated diver that are protected by international legislation are referred to as internationally important in terms of their conservation status. Other species such as song thrush, which are identified as priority species in the North-East Scotland Biodiversity Action Plan (NES BAP) are referred to as regionally important species.
- 2.4.3 The ecological evaluation of a feature or area of habitat takes into account the level of conservation importance of the species, as well as other factors such as the level of use of the habitat or feature by a species, whether the species or habitat is locally or regionally common or rare, as well as other criteria that contribute to a feature's importance. In this way, the method of evaluation provides a system that combines legislative protection on species and/or habitats and conservation parameters that all contribute to the ecological importance of the receptor.
- 2.4.4 For the purpose of evaluating wintering bird populations, the northern section has been sub-divided into five separate sections, these being Sections NL1-5.
- 2.4.5 The ecological value of the populations of wintering birds was established by evaluating the results derived from surveying the WOVs and Quadrats. The status of the species assemblage found in each WOV or Quadrat was used to evaluate the wintering bird populations present in that survey area.
- 2.4.6 The ecological importance and hence value (in terms of bird assemblages) of each WOV/ Quadrat, and the surrounding Habitat Areas was determined by reference to:
- statutory or non-statutory designations relevant to birds;
 - existing information from consultations;
 - a 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, S.T. et al 1990));
 - data derived from the wintering bird surveys of WOVs / Quadrats;
 - evaluation criteria contained in Table 3 – Evaluation of Ecological Receptor.
 - legislative and conservation status of key wintering bird species; and
 - habitat information derived from the Phase 1 Habitat Survey Report (see Appendix A10.1).

Table 3 – Evaluation of Ecological Receptor

Value/ Importance	Criteria
International (European)	<u>Habitats</u> An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area which would meet the published selection criteria for designation. 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. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified. <u>Species</u> Any regularly occurring population of internationally important species, threatened or rare in the UK. i.e. a UK Red Data Book species categories 1& 2 of UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP. A regularly occurring, nationally significant population/number of an internationally important species.

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Value/Importance	Criteria
National (Scottish)	<p><u>Habitats</u> A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat essential to maintain wider viability. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified.</p> <p><u>Species</u> A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP). A feature identified as of critical importance in the UK BAP.</p>
Regional (North East Scotland)	<p><u>Habitats</u> Sites which exceed the County-level designations but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or smaller areas of habitat essential to maintain wider viability. Viable areas of key habitat identified as of Regional value in the appropriate SNH Natural Heritage Future area profile. Any river classified as excellent A1 or good A2 and capable of supporting salmonid population. Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p><u>Species</u> Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10 km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation. A regularly occurring, locally significant population/number of a regionally important species. 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><u>Habitats</u> Sites recognised by local authorities (e.g.) District Wildlife Sites (DWS) and Sites of Interest for Nature Conservation (SINS). County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR). A viable area of habitat identified in County/District BAP or in the relevant SNH Natural Heritage Future area profile. A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25 ha. Any river classified as good A2 or fair B and likely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p><u>Species</u> Any regularly occurring, locally significant population of a species listed in a County/District BAP due to regional rarity or localisation. A regularly occurring, locally significant population of a County/District important species. Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and not integral to maintaining those populations. Sites/features scarce in the County/District or which appreciably enrich the County/ District habitat resource</p>
Local (immediate area or local village importance)	<p><u>Habitats</u> Areas of habitat that appreciably enrich the local habitat resource (e.g. species-rich hedgerows, ponds etc). Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25 ha. Any river classified as fair B or poor C and unlikely to support coarse fishery. Rivers with a Habitat Modification Score indicating that it is severely modified or above.</p> <p><u>Species</u> Populations/assemblages of species that appreciable enrich the biodiversity resource within the local context. 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 importance)	<p>Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors. Any river classified as impoverished D and/or and with a Habitat Modification Score indicating that it is severely modified.</p>

2.5 Impact Assessment

2.5.1 Significance of impact was assessed, taking into account both the evaluated ecological importance (i.e. the value/sensitivity of the receiving environment or species), and the magnitude of impact.

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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, indirect, temporary, permanent, cumulative, reversible or irreversible. The magnitude of each impact was assessed independently of its value or statutory status. Magnitude criteria are presented in Table 4, and include positive impact criteria in accordance with IEEM guidance (2002).

Table 4 – Impact Magnitude

Impact 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 5. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

2.5.4 Generally, negative impact significance greater than or equal to moderate would require mitigation to be undertaken to ameliorate the impact significance to acceptable levels. However, in order to comply with Part 1 of the Nature Conservation (Scotland) Act (2004) mitigation is proposed for negative impacts of minor or above.

Table 5 – 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

2.5.5 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

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measures. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat.

Survey Limitations

Timing

- 2.5.6 The winter bird surveys of the proposed scheme were undertaken during the optimal five months of the year (November - March) in which to survey for the presence of wintering birds.

Climate

- 2.5.7 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 is probable that this is true for a wintering bird survey. The weather conditions throughout the duration of the survey period were moderate to good with limited rain, snow and wind and moderate cloud cover.

Quadrat and Line Transect Study Area

- 2.5.8 As outlined in Section 2.2, a 500m wide study area boundary was selected for the Line Transect Quadrat and sampling system based on available guidance in 2004 together with methods from Gilbert et al. (1998) regarding survey area boundaries for breeding bird surveys (see Appendix A10.4). The selection of a 500m study area was determined to be sufficient to obtain a representative sample of wintering bird species throughout the route corridor.

Wintering Bird Methodology

- 2.5.9 The WBS methodology was ratified with SNH prior to the start of the first bird survey through inclusion in the Ecological Scoping Report (Jacobs, 2004).

Changes to the Route Alignment

- 2.5.10 Changes to the location of the route corridor that occurred subsequent to the start of the WBS could not be incorporated into the WBS because a WBS relies on consistency in terms of site boundaries/areas between survey repetitions (Bibby et al., 2000). As a result, the route corridor for the proposed scheme as assessed in the 2007 ES is likely to contain habitats of value to 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 WOVs and Quadrats may have not have been surveyed it is likely that they will not differ significantly from surveyed areas, and therefore the value can be inferred from the evaluation of WOVs/Quadrats.

3 Baseline

3.1 Data Search

- 3.1.1 SNH did not provide any additional data on wintering bird species within the route corridor.
- 3.1.2 Consultation with the RSPB did not identify the presence of any RSPB nature reserves within or adjacent to the proposed scheme study area.
- 3.1.3 The North-East Scotland Bird Report (2003) was consulted with regards to the wintering species found within the route corridor.
- 3.1.4 Previous records of key wintering bird species and assemblages within the consultation route corridor were obtained from the BTO, WWT and the RSPB.

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- 3.1.5 The latest five-year summary of WeBS data (1999/2000 to 2003/4) for Corby Loch was provided by the British Trust for Ornithology (BTO). For Corby Loch the 5-year peak count for greylag goose was 12 birds seen in October 2002, and the 5-year peak count for pink-footed goose was 11 birds seen in January 2004.
- 3.1.6 Corby, Lily and Bishop Lochs composite SSSI (hereafter referred to as Corby / Lily Loch (SSSI) (see Figure 10.5f) was considered, but not selected as an SPA for grey geese as it was not judged to add significantly to the range or numerical coverage of these species in Grampian (www.jncc.gov.uk). However, the pink-footed goose *Anser brachyrhynchus* and Icelandic greylag goose *Anser anser* are considered to be species of national importance due to forming large assemblages during the passage and wintering periods and although not listed as either Annex 1, Schedule 1, Red List or as an LBAP species, are considered in this chapter as 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.
- 3.1.7 Corby / Lily Loch (SSSI) (grid ref: NJ912143) is notified on account of winter wildfowl assemblages while the River Don is listed as a District Wildlife Site.

3.2 Survey Results

- 3.2.1 Scientific names of wintering bird species recorded within or adjacent to the route corridor are presented in Annex 1.

Waterbodies of Ornithological Value (WOVs)

- 3.2.2 One WOV (Corby / Lily Lochs (SSSI)) was identified within or adjacent to the proposed northern section route corridor (Figure 10.5f).
- 3.2.3 Table 6 shows the total number of wintering waders and wildfowl species recorded at Corby / Lily Loch (SSSI) at dawn, midday and dusk during the five surveys carried out between November 2004 and February 2005. The peak numbers of pink-footed geese were 1850 birds recorded at dawn on 12/11/04 while the peak numbers of Icelandic greylag geese were 335 birds recorded at dawn on 22/12/04.
- 3.2.4 One species; smew (a Birds Directive Annex 1 and JNCC Green List species) was recorded at Corby Loch on 02/02/05.

Quadrat Sampling

- 3.2.5 Thirteen Quadrats were established within the Northern Section (Figures 10.5 a-f). Table 6 and Table 7 show the frequency (number of times seen in 4 visits, I-IV) and abundance (peak mean count) of wintering bird species recorded. This includes birds seen flying over the Quadrat, as well as those roosting or feeding within the Quadrat.
- 3.2.6 Four species protected under Schedule 1 of the WCA (1981) were recorded in the Quadrats; whooper swan (also a JNCC Amber List), fieldfare (also a JNCC Amber List), redwing (also a JNCC Amber List) and merlin (also a JNCC Amber List). Merlin and smew (also JNCC Green List species) are also listed on Annex 1 of the EC Birds Directive. Eleven JNCC Red List species were also recorded including; grey partridge, skylark, song thrush, starling, house sparrow, tree sparrow, linnet, twite, bullfinch, yellowhammer and reed bunting.

Incidental Observations

- 3.2.7 Table 9 shows the number of waders or wildfowl recorded in agricultural fields or flying over within 250m of the proposed Four JNCC Amber List species (curlew, lapwing, oystercatcher and snipe) where recorded feeding or roosting in Habitat Areas. All these species apart from oystercatcher are listed as local priority species in the LBAP.

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Table 6 – Wintering Bird Species Recorded within Quadrats WB1-7. Key: f = frequency; a = abundance

Species present	Quadrat	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07	
		f	a	f	a	f	a	f	a	f	a	f	a	f	a
Grey heron		-	-	-	-	-	-	-	-	-	-	I	1	III	2
Pink-footed Goose		I	200	I	51	-	-	I	60	-	-	I	130	-	-
Whooper swan		-	-	-	-	-	-	-	-	-	-	I	5	-	-
Mute swan		-	-	-	-	-	-	-	-	-	-	I	5	-	-
Smew		-	-	-	-	-	-	-	-	-	-	I	1	-	-
Goldeneye		-	-	-	-	-	-	-	-	-	-	I	8	I	1
Mallard		-	-	-	-	-	-	-	-	-	-	II	10	-	-
Goosander		-	-	-	-	-	-	-	-	-	-	I	3	-	-
Cormorant		-	-	-	-	-	-	-	-	-	-	I	1	-	-
Sparrowhawk		-	-	-	-	-	-	-	-	I	1	-	-	I	1
Buzzard		-	-	IV	3	I	1	I	2	I	4	I	1	I	1
Kestrel		I	1	-	-	-	-	-	-	-	-	-	-	-	-
Merlin		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grey Partridge		-	-	-	-	I	8	-	-	-	-	-	-	-	-
Pheasant		-	-	-	-	-	-	I	1	-	-	-	-	-	-
Lapwing		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Curlew		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moorhen		-	-	III	2	-	-	-	-	-	-	-	-	-	-
Snipe		IV	10	-	-	-	-	-	-	-	-	IV	4	-	-
Jack snipe		I	2	-	-	-	-	-	-	-	-	II	3	-	-
Woodcock		-	-	-	-	I	1	-	-	I	1	-	-	-	-
Black-headed gull		-	-	-	-	-	-	-	-	-	-	I	5	-	-
Common Gull		-	-	-	-	-	-	-	-	-	-	II	26	II	5
Lesser Black-backed gull		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greater Black-backed gull		-	-	-	-	-	-	-	-	-	-	I	2	-	-
Herring Gull		I	1300	I	90	-	-	I	9	I	4	II	24	III	20

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Species present	Quadrat	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07	
		f	a	f	a	f	a	f	a	f	a	f	a	f	a
Wood Pigeon	I	4		IV	46	-	-	IV	19	III	71	-	-	I	1
Skylark	II	5		-	-	II	38	-	-	-	-	-	-	I	1
Meadow Pipit	I	1		-	-	II	4	I	4	-	-	I	1	II	6
Grey Wagtail	I	1		I	1	-	-	-	-	-	-	-	-	I	2
Pied Wagtail	II	4		II	2	III	2	I	2	-	-	-	-	II	1
Wren	IV	5		II	7	III	5	II	7	IV	4	II	4	I	3
Dunnock	III	9		II	5	II	2	III	8	I	1	I	3	-	-
Robin	III	4		IV	8	II	2	III	3	II	4	-	-	-	-
Blackbird	III	4		IV	8	IV	3	II	4	II	3	-	-	I	1
Fieldfare	I	24		II	25	I	11	I	30	-	-	I	13	III	38
Song Thrush	I	2		-	-	-	-	-	-	-	-	-	-	I	1
Redwing	-	-		I	3	-	-	I	3	-	-	-	-	I	2
Mistle Thrush	-	-		II	3	I	1	I	2	I	2	-	-	-	-
Long-tailed tit	-	-		-	-	-	-	-	-	-	-	-	-	-	-
Goldcrest	-	-		IV	5	-	-	III	5	III	3	-	-	-	-
Coal Tit	-	-		-	-	-	-	-	-	II	4	-	-	-	-
Blue Tit	-	-		IV	12	I	2	II	4	IV	5	I	1	-	-
Great Tit	II	1		I	1	-	-	-	-	I	2	-	-	I	1
Treecreeper	-	-		I	2	-	-	I	1	I	2	-	-	-	-
Jay	-	-		I	1			I	1	-	-	-	-	-	-
Magpie	I	1		I	2	I	1	-	-	-	-	I	2	-	-
Jackdaw	-	-		-	-	I	50	-	-	-	-	-	-	-	-
Rook	III	69		-	-	I	50	-	-	-	-	-	-	-	-
Carrion Crow	III	7		IV	6	III	15	II	6	II	2	-	-	-	-
Raven	-	-		-	-	-	-	-	-	-	-	-	-	-	-
Starling	III	52		I	50	II	2	-	-	-	-	-	-	-	-
House Sparrow	I	5		-	-	I	7	-	-	-	-	I	80	III	17

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Species present	Quadrat	Wb01		Wb02		Wb03		Wb04		Wb05		Wb06		Wb07	
		f	a	f	a	f	a	f	a	f	a	f	a	f	a
Tree Sparrow		-	-	-	-	-	-	-	-	-	-	-	-	I	3
Chaffinch		I	1	IV	5	II	1	IV	6	IV	6	I	1	I	1
Greenfinch		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goldfinch		-	-	-	-	I	1	II	3	I	7	-	-	I	2
Linnet		III	50	II	2	II	16	III	141	I	1	I	60	-	-
Twite		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bullfinch		-	-	II	10	I	2	-	-	-	-	-	-	-	-
Reed Bunting		-	-	-	-	-	-	-	-	-	-	-	-	I	1
Yellowhammer		-	-	I	3	I	6	I	5	-	-	-	-	I	3

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Table 7 – Wintering Bird Species Recorded within Quadrats WB8-13. Key: f = frequency; a = abundance

Species present	Quadrat	Wb08		Wb09		Wb10		Wb11		Wb12		Wb13	
		f	a	f	a	f	a	f	a	f	a	f	a
Grey heron		I	2	-	-	-	-	-	-	-	-	-	-
Pink-footed goose		I	163	-	-	II	62	I	14	I	150	I	30
Whooper swan		-	-	-	-	-	-	-	-	-	-	-	-
Mute swan		-	-	-	-	-	-	-	-	-	-	-	-
Smew		-	-	-	-	-	-	-	-	-	-	-	-
Goldeneye		-	-	-	-	-	-	-	-	-	-	-	-
Mallard		-	-	-	-	-	-	-	-	-	-	-	-
Goosander		-	-	-	-	-	-	-	-	-	-	-	-
Cormorant		-	-	-	-	-	-	-	-	-	-	-	-
Sparrowhawk		-	-	-	-	-	-	-	-	I	1	-	-
Buzzard		I	1	I	1	I	1	-	-	I	1	I	1
Kestrel		-	-	II	1	I	1	-	-	I	1	I	2
Merlin		-	-	-	-	-	-	-	-	-	-	I	1
Grey partridge		-	-	-	-	-	-	I	1	-	-	-	-
Pheasant		-	-	I	1	-	-	-	-	I	3	-	-
Lapwing		-	-	-	-	-	-	-	-	II	7	I	70
Curlew		-	-	-	-	-	-	-	-	I	5	-	-
Moorhen		-	-	-	-	-	-	-	-	-	-	-	-
Snipe		II	4	-	-	-	-	-	-	-	-	-	-
Jack snipe		-	-	-	-	-	-	-	-	-	-	-	-
Woodcock		-	-	-	-	-	-	-	-	-	-	-	-
Black-headed gull		-	-	-	-	-	-	-	-	-	-	-	-
Common gull		-	-	I	2	I	150	I	32	II	4	II	17
Lesser Black-backed gull		-	-	-	-	-	-	-	-	-	-	I	1
Greater Black-backed gull		-	-	-	-	-	-	-	-	-	-	-	-
Herring gull		I	1	-	-	-	-	II	9	IV	2	I	2

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Species present	Quadrat	Wb08		Wb09		Wb10		Wb11		Wb12		Wb13	
		f	a	f	a	f	a	f	a	f	a	f	a
Wood pigeon		-	-	I	2	-	-	-	-	I	2	I	4
Skylark		-	-	I	1	I	16	II	2	-	-	I	12
Meadow pipit		I	2	-	-	I	15	I	2	I	4	II	30
Grey wagtail		-	-	-	-	-	-	-	-	-	-	-	-
Pied wagtail		-	-	-	-	-	-	-	-	I	2	-	-
Wren		II	2	I	1	I	1	I	1	II	5	II	2
Dunnock		I	1	I	1	I	2	I	3	II	1	II	4
Robin		-	-	II	5	-	-	-	-	I	1	I	2
Blackbird		I	1	III	2	I	1	-	-	III	5	-	-
Fieldfare		I	20	-	-	-	-	III	20	-	-	-	-
Song thrush		I	60	-	-	-	-	I	1	-	-	I	1
Redwing		-	-	-	-	-	-	I	7	-	-	-	-
Mistle thrush		-	-	I	1	-	-	-	-	I	3	I	2
Long-tailed tit		-	-	I	2	-	-	-	-	-	-	-	-
Goldcrest		-	-	-	-	-	-	-	-	-	-	-	-
Coal tit		-	-	III	4	-	-	-	-	I	3	-	-
Blue tit		I	1	IV	20	I	1	-	-	II	1	-	-
Great tit		II	3	III	3	-	-	-	-	I	2	-	-
Treecreeper		-	-	II	1	-	-	-	-	-	-	-	-
Jay		-	-	-	-	-	-	-	-	-	-	-	-
Magpie		-	-	-	-	-	-	-	-	III	4	-	-
Jackdaw		I	3	I	70	-	-	-	-	-	-	-	-
Rook		I	160	-	-	-	-	-	-	I	40	-	-
Carrion crow		-	-	-	-	-	-	I	80	-	-	-	-
Raven		-	-	-	-	-	-	-	-	-	-	I	1
Starling		II	50	I	2	I	2	IV	200	I	2	I	11
House sparrow		-	-	-	-	-	-	-	-	I	4	-	-

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Species present	Quadrat	Wb08		Wb09		Wb10		Wb11		Wb12		Wb13	
		f	a	f	a	f	a	f	a	f	a	f	a
Tree sparrow		-	-	-	-	-	-	-	-	-	-	-	-
Chaffinch		I	1	III	12	II	10	I	1	II	6	I	70
Greenfinch		-	-	-	-	-	-	-	-	I	1	I	10
Goldfinch		-	-	-	-	-	-	I	13	I	6	I	10
Linnet		-	-	I	30	-	-	II	122	-	-	I	4
Twite		-	-	-	-	-	-	II	58	-	-	-	-
Bullfinch		-	-	I	2	-	-	-	-	-	-	-	-
Reed bunting		-	-	-	-	I	1	-	-	-	-	-	-
Yellowhammer		-	-	-	-	-	-	I	15	-	-	-	-

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Table 8 – Number of Wintering Waders, Wildfowl and Other Species Recorded at Corby and Lily Loch (in brackets) during Dawn (da), Midday (md) and Dusk (du) Counts

Date	12/11/2004			22/12/2004			11/01/2005			02/02/2005			16/03/2005		
Species	Da	md	du	da	md	du	da	md	du	da	md	du	da	md	du
Black-headed gull	-	50	-	-	-	-	-	24	-	-	180	-	-	-	-
Common gull	1	100	15	-	-	-	-	10	-	-	10	-	-	-	-
Coot	15	15	15	-	-	-	-	-	-	-	-	-	2	-	-
Cormorant	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-
Curlew	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Goldeneye	-	-	-	-	-	-	-	-	-	-	(1)	14	-	-	-
Goosander	(2)	-	25	-	-	-	-	(2)	-	-	-	-	-	-	-
Grey heron	-	-	-	-	-	-	-	1	-	-	1(1)	3	-	-	-
Greylag goose	200	-	*(28)	335	90	-	70*	-	12	49	2	-	2	-	-
Grey goose sp.	-	-	-	-	-	-	560+	-	-	-	-	500+	-	-	-
Herring gull	-	50	-	-	-	-	-	55	-	-	70	-	-	-	-
Lapwing	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Lesser black-backed gull	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Mallard	70(2)	8(25)	7(55)	63	26	26	15(27)	(30)	(25)	(2)	2(3)	5(12)	-	1	-
Moorhen	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1
Mute swan	17	17	17	18	18	17	13	12	-	10	15	8	-	-	7
Oystercatcher	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Pink-footed goose	1850	-	1300*(2)	1300	-	400+	170	(1)	-	36	-	-	82	-	303
Smew	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Teal	(150)	12(30)	(21)	7	4	4	(14)	(40)	(30)	9(17)	(10)	3(34)	14	6	4
Tufted duck	6	5	-	-	-	-	1	-	-	-	-	-	8	-	5
Wigeon	-	-	-	-	-	-	-	-	-	(3)	-	-	4	5	-

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Table 9 – Results of Incidental Sightings of Waders, Wildfowl and Geese

Habitat Section	Habitat Area	Grid Reference	Species Present and Behaviour
NL1	N3	NJ863087	Five lapwing roosting
	N13	NJ866093	40 oystercatcher flying
	N12	NJ867097	Curlew flying
	N12	NJ867097	Two oystercatchers
NL2	N28	NJ871110	60 pink-footed geese flying
NL3	N28	NJ862119	Two lapwing roosting
	N33	NJ860121	Two curlew feeding
	N33	NJ862123	Lapwing roosting
	N50	NJ871143	Lapwing roosting
NL4	N68	NJ901153	Lapwing flying
NL5	N80	NJ910151	Three lapwing flying
	N80	NJ910151	Two lapwing feeding
	N80	NJ912152	Three lapwing flying
	N80	NJ914152	Lapwing feeding
	N82	NJ918147	Four curlew flying
	N84	NJ920147	16 curlew feeding
	N80	NJ914152	Two lapwing feeding
	N84	NJ922150	11 curlew feeding
	N87	NJ923150	35 curlew feeding
	N87	NJ924150	Lapwing flying
	N85	NJ924147	17 fieldfare flying
	N87	NJ930145	Four lapwing roosting
	N87	NJ931145	Oystercatcher flying
	N90	NJ935141	118 pink-footed geese roosting
	N90	NJ940144	40 redwingflying
	N90	NJ937147	Four snipe feeding
N91	NJ954142	Two oystercatchers feeding	
N97	NJ959145	Two oystercatchers flying	

3.3 Survey Results Summary

3.3.1 A winter bird survey was undertaken in 13 Quadrats in the Northern Leg established along or adjacent to the route corridor.

3.3.2 68 wintering bird species (see Annex 1) were recorded within 250m of the proposed scheme (resulting from surveys of the 13 Quadrats, Corby and Lily Loch and incidental observations). Of these, 37 species are of conservation concern. Merlin and smew are listed under Annex 1 of the EC Birds Directive, while merlin, fieldfare, redwing and whooper swan are protected under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended). Thirteen of the 37 species are JNCC Red List species; skylark, bullfinch, song thrush, starling, house sparrow, tree sparrow, yellowhammer, reed bunting, grey partridge, linnet and twite. 26 JNCC Amber List species (including merlin and whooper swan) were also recorded. Seven of the JNCC Red List Species (grey partridge, skylark, song thrush, tree sparrow, linnet, bullfinch and reed bunting) are also listed

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on the UK BAP and LBAPs, whereas yellowhammer and twite are listed solely on the Local Biodiversity Action Plan. A further five species (curlew, kestrel, goldeneye, snipe and lapwing) are additionally listed on the LBAP.

3.3.3 Pink-footed geese were recorded flying over nine of the 13 Quadrats (scheme between November 2004 and March 2005: one species is a widespread resident, 50 species are common residents, one species is common throughout the year, one species is a locally common resident, one species is an uncommon resident, nine species are common winter visitors, three species are uncommon residents, winter visitors and passage migrants, two species are common summer visitors and passage migrants, one species is a common passage migrant and declining winter visitor, one species is a scarce winter visitor, rare on passage and one species is an uncommon summer visitor and passage migrant which is scarce in winter (North-East Scotland Bird Report, 2003).

3.3.4 Wintering bird species of conservation concern that were seen within 250m of the proposed scheme are listed in Table 10..

Table 10 – Wintering Bird Species of Conservation Concern Seen within 500m of Proposed Scheme

Species Scientific Name	EC Birds Directive Annex 1	WCA 1981 Schedule 1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Locally Uncommon or scarce species
Merlin (<i>Falco columbarius</i>)	Yes	yes	-	yes	-	-	yes
Smew (<i>Mergus albellus</i>)	Yes	-	-	-	-	-	yes
Fieldfare (<i>Turdus pilaris</i>)	-	yes	-	yes	-	-	-
Redwing (<i>Turdus iliacus</i>)	-	yes	-	yes	-	-	-
Whooper swan (<i>Cygnus Cygnus</i>)	-	yes	-	yes	-	-	-
Skylark (<i>Alauda arvensis</i>)	-	-	yes	-	yes	yes	-
Linnet (<i>Carduelis cannabina</i>)	-	-	yes	-	yes	yes	-
Tree sparrow (<i>Passer montanus</i>)	-	-	yes	-	yes	yes	-
Grey partridge (<i>Perdix perdix</i>)	-	-	yes	-	yes	yes	-
Bullfinch (<i>Pyrrhula pyrrhula</i>)	-	-	yes	-	yes	yes	-
Song thrush (<i>Turdus philomelos</i>)	-	-	yes	-	yes	yes	-
Reed Bunting (<i>Emberiza schoeniclus</i>)	-	-	yes	-	yes	yes	-
Starling (<i>Sturnus vulgaris</i>)	-	-	yes	-	-	-	-
House sparrow (<i>Passer domesticus</i>)	-	-	yes	-	-	-	-
Yellowhammer (<i>Emberiza citronella</i>)	-	-	yes	-	-	yes	-
Twite (<i>Carduelis flavirostris</i>)	-	-	yes	-	-	yes	yes

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Species Scientific Name	EC Birds Directive Annex 1	WCA 1981 Schedule 1i	JNCC Red List	JNCC Amber List	UK BAP	LBAP	Locally Uncommon or scarce species
Cormorant (<i>Phalacrocorax carbo</i>)	-	-	-	yes	yes	-	-
Mute swan (<i>Cygnus olor</i>)	-	-	-	yes	-	-	-
Greylag goose (<i>Anser anser</i>)	-	-	-	yes	-	-	-
Pink-footed goose (<i>Anser brachyrhynchus</i>)	-	-	-	yes	-	-	-
Wigeon (<i>Anas Penelope</i>)	-	-	-	yes	-	-	-
Teal (<i>Anas creca</i>)	-	-	-	yes	-	-	-
Goldeneye <i>Bucephala clangula</i>)	-	-	-	yes	-	yes	-
Oystercatcher (<i>Haematopus ostralegus</i>)	-	-	-	yes	-	-	-
Lapwing (<i>Vanellus vanellus</i>)	-	-	-	yes	-	yes	-
Snipe (<i>Gallinago gallinago</i>)	-	-	-	yes	-	yes	-
Woodcock (<i>Scolopax rusticola</i>)	-	-	-	yes	-	-	-
Curlew (<i>Numenius arquata</i>)	-	-	-	yes	-	yes	-
Kestrel (<i>Falco tinnunculus</i>)	-	-	-	yes	-	yes	-
Black-headed gull (<i>Larus ridibundus</i>)	-	-	-	yes	-	-	-
Common gull (<i>Larus canus</i>)	-	-	-	yes	-	-	-
Lesser black-backed gull (<i>Larus fuscus</i>)	-	-	-	yes	-	-	-
Herring gull (<i>Larus argentatus</i>)	-	-	-	yes	-	-	-
Meadow pipit (<i>Anthus pratensis</i>)	-	-	-	yes	-	-	-
Grey wagtail (<i>Motacilla cinerea</i>)	-	-	-	yes	-	-	-
Dunnock (<i>Prunella modularis</i>)	-	-	-	yes	-	-	-
Goldcrest (<i>Regulus regulus</i>)	-	-	-	yes	-	-	-
Mistle thrush (<i>Turdus viscivorus</i>)	-	-	-	yes	-	-	-
Raven* (<i>Corvus corax</i>)	-	-	-	-	-	-	yes
Jack snipe* (<i>Lymnocyptes minimus</i>)	-	-	-	-	-	-	yes

Note: *Not of Species Concern

3.4 Habitat Assessment

3.4.1 In terms of habitats, the Northern Leg is dominated by an intensively farmed agricultural landscape consisting of improved grassland, semi-improved grassland (both neutral and acidic) and marsh/marshy grassland either grazed by sheep, cattle and horses and arable (with arable more dominant in the north and improved grassland more dominant in the south) typically bounded by fences and/or stone walls.

3.4.2 The remaining areas of the Northern Leg comprises a mosaic of semi-natural habitats (scattered between the agricultural fields) dominated by semi-natural broad-leaved woodland, deciduous plantation woodland, coniferous plantation woodland, mixed woodland, deciduous parkland/scattered trees (both deciduous and coniferous), scattered/dense scrub, amenity grassland (associated with residential building), residential gardens, marsh/marshy grassland, acid unimproved grassland, wet heath/acid grassland mosaic, wet and dry modified bog, dry dwarf scrub heath, dense/continuous bracken, tall ruderal and running/standing water.

3.4.3 Habitat within Section NL1 to NL5 is assessed below.

Section NL1 (Derbeth to Tulloch Road)

3.4.4 Farmland with large fields of predominantly improved grassland, amenity planting, scattered gorse and extensive area of dense gorse scrub (to the east of Brimmond Hill). Mosaic of semi-natural habitats including marshy grassland, wet heath/mire, swamp, wet woodland and scrub, and a small area of coniferous plantation.

Section NL2 (SAC Craibstone)

3.4.5 Farmland with improved grassland and riparian habitats, and extensive area of mown grassland with scattered tree saplings. Relatively extensive areas of semi-mature mixed plantation and semi-natural broad-leaved woodland interlinked with a mosaic of farmland and blocks of semi-mature coniferous plantation woodland around Craibstone SAC.

Section NL3 (A96 to Nether Kirkton)

3.4.6 Extensive area of farmland with large fields of arable, improved and semi-improved grassland, scattered scrub and relatively species-rich hay meadows with species rich verges. Extensive areas of commercial forest plantation include: mature coniferous species, blocks of young spruce and larch, mixed woodland plantation. Other habitats found in NL3 include a diverse range of habitats, including semi-natural and planted broad-leaved woodland, mature semi-natural pinewood of long-established plantation origin, semi-natural broad-leaved riparian woodland, localised areas of scrub, wet heath and unimproved acid grassland and marshy grassland, and small areas of parkland with woodland and ornamental gardens.

Section NL4 (Nether Kirkton to Corsehill)

3.4.7 Farmland of arable and improved grassland fields and an extensive area of marshy grassland at edge of flood plain. Riparian habitats on both banks of River Don with additional important freshwater habitats in the river channel. Both banks support species-rich grassland, scattered scrub and tall herb habitats. Goval Burn and reservoir with marginal habitats and wayside trees, support a diverse mosaic of habitats such as tall herb, grassland, scrub, woodland and semi-improved pasture. Woodland areas comprise small areas of semi-natural broad-leaved woodland, mature broadleaved woodland of long established plantation origin, wet woodland, and mixed and coniferous commercial plantation. Other habitats found in NL4 include parkland and wood pasture, species-rich grassland, tall herb, scrub, semi-improved pasture, unimproved acid grassland, and wet heath.

Section NL5 (Corsehill to Blackdog)

- 3.4.8 Extensive area of farmland with fields of arable, improved and semi-improved grassland. Relatively extensive area of conifer plantation at Littlejohn's Wood with naturally regenerated birch woodland bounded by mature beech trees connected to Red Moss: a lowland raised bog habitat comprised of wet modified bog with a central dome supporting drier peat bog vegetation; surrounded by mature semi-natural broad-leaved woodland with localised areas of wet woodland, wet heath and acid grassland, scattered and dense gorse scrub habitat. Approximately 50% of the Corby and Lily Lochs SSSI is located within NL5. It includes a diverse range of habitats that include open water, swamp, basin mire (poor-fen vegetation), wet heath, wet woodland, scrub and drainage channels. Other habitats include: recently planted semi-mature conifer, broad-leaved and mixed plantation woodland; occasional mature trees; scattered ruderal and tall herb vegetation; marshy grassland and; a small water body supporting swamp and marginal vegetation.

4 Evaluation

4.1 Rationale

- 4.1.1 The level of importance (conservation value) of the Northern Leg (established using data collected during Quadrat surveys and water body counts) is assessed with reference to designations, consultations, literature review, field surveys, evaluation criteria and legislative and conservation status of recorded key bird species (see Table 7) together with habitat information derived from the Phase 1 Habitat Survey Report (see Appendix A10.1).
- 4.1.2 The wintering bird assemblage present in an area depends on the habitat types present and the suitability of those habitats for individual bird species, for example, foraging and shelter. Wintering bird surveys were undertaken at one WOV (chosen for its likely value to wintering birds) and 13 Quadrats selected along the route corridor. The status of birds recorded by the surveys was used to assign a bird conservation value to these discrete areas. The habitat types in un-surveyed areas that occur within, surrounding or near to the selected Quadrats are compared to the habitat types within the Quadrats so that a bird conservation value can then be assigned to un-surveyed Habitat Areas.

4.2 Evaluation of Habitats and Wintering Bird Populations

Section NL1 (Derbeth to Tulloch Road)

Quadrat Wb1 (Keppelestone)

- 4.2.1 This Quadrat is evaluated to be of county importance based on a total bird assemblage of 24 species, of which; one was a WCA1i species, five were JNCC Red List species, 13 were JNCC Amber List species, two were UK BAP species and four were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: dense/continuous scrub, scattered scrub, marsh/marshy grassland, improved grassland and coniferous plantation.

Surrounding Habitats

- 4.2.2 The surrounding Habitat Areas include areas of improved grassland, scrub, scattered trees, coniferous plantation, arable fields, amenity planting, riparian habitats, semi-mature mixed plantation and semi-natural broad-leaved woodland. Habitat Area N14 includes a DWS and SINS, a mosaic of semi-natural habitats including marshy grassland, wet heath/mire, swamp, wet woodland and scrub. Wet woodland is a UKBAP priority habitat. This Habitat Area also comprises several viable areas of habitats prioritised in the NES LBAP. The surrounding Habitat Areas are assessed to be of medium value and county importance for wintering bird populations.

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Section NL2 (SAC Craibstone)

Quadrat Wb2 (Craibstone)

- 4.2.3 This Quadrat is evaluated to be of county importance based on a total bird assemblage of 26 species, of which two were WCA1i species, four were JNCC Red List species, 12 were JNCC Amber List species, three were UK BAP species and four were NES LBAP species. The habitats within this Quadrat included the following: running water, standing water, improved grassland semi-natural broad-leaved woodland, mixed and coniferous plantation. Habitat Area N24 includes semi-mature mixed plantation and semi-natural broad-leaved woodland, part of an area of semi-natural woodland within the SAC campus that represents a viable area of NES LBAP priority habitat. Overall the habitats this Quadrat were evaluated to be of medium value for wintering birds.

Surrounding Habitats

- 4.2.4 The surrounding Habitat Areas include areas of amenity grassland, dense scrub, riparian habitats, running water, improved grassland, arable, mature conifer plantation, semi-mature mixed plantation, semi-natural broad-leaved woodland. Habitat Area N25 includes semi-mature mixed plantation and semi-natural broad-leaved woodland, part of an area of semi-natural woodland within the SAC campus that represents a viable area of NES LBAP priority habitat. The surrounding Habitat Areas are assessed to be of medium value and county importance for wintering bird populations.

Section NL3 (A96 to Nether Kirkton)

Quadrat Wb3 (Howemoss)

- 4.2.5 This Quadrat is evaluated to be of county importance based on a total bird assemblage of 24 species, of which; one was a WCA1i species, seven were JNCC Red List species, 12 were JNCC Amber List species, four were UK BAP species and five were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: scattered scrub, semi-improved grassland and arable grassland.

Surrounding Habitats

- 4.2.6 The surrounding Habitat Areas include semi-mature broad-leaved woodland plantation, young to mature coniferous plantation, semi-natural broad-leaved woodland, scattered scrub, arable, semi-improved and improved grassland. These are assessed to be of medium value and county importance for wintering bird populations.

Quadrat Wb4 (Kirkhill)

- 4.2.7 This Quadrat is evaluated to be of local importance based on a total bird assemblage of 23 species, of which; two were WCA1i species, two were JNCC Red List species, ten were JNCC Amber List species, two were UK BAP species and three were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: dense and scattered scrub, unimproved, improved and arable grassland, scattered broad-leaved trees and coniferous plantation.

Surrounding Habitats

- 4.2.8 The surrounding Habitat Areas include dense and scattered scrub, arable, semi-improved and improved grassland, young to mature coniferous plantation semi-natural broad-leaved woodland, mixed woodland plantation and naturally developing young broad-leaved woodland, scrub, wet heath and grassland, dry heath, bracken, scrub and tall herb vegetation. These are assessed to be of medium value and county importance for wintering bird populations.

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Quadrat Wb5 (Bogenjoss Burn Wood)

- 4.2.9 This Quadrat is evaluated to be of less than local importance based on a total bird assemblage of 19 species, of which; none were WCA1i species, one was a JNCC Red List species, six were JNCC Amber List species, one was a UK BAP species and one an NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: semi-improved and improved grassland, semi-natural broad-leaved and coniferous woodland and coniferous plantation.

Surrounding Habitats

- 4.2.10 The surrounding Habitat Areas include arable and improved grassland with localised areas of unimproved acid grassland, conifer plantation, with open habitats, broad-leaved woodland plantation, scattered broad-leaved trees, semi-natural riparian broad-leaved woodland and mixed plantation. Habitat Area N45 includes viable areas of NES LBAP priority riparian woodland, parkland with wood and ornamental gardens and dense scrub. Overall, these Habitat Areas are assessed to be of high value and regional importance for wintering bird populations.

Section NL4 (Nether Kirkton to Corsehill)

Quadrat Wb6 (Nether Kirkton)

- 4.2.11 This Quadrat is evaluated to be of regional importance based on a total bird assemblage of 26 species, of which; one was an Annex 1 species, two were WCA1i species, two were JNCC Red List species, 14 were JNCC Amber List species, two were UK BAP species and three were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: running water, scattered scrub, marsh/marshy grassland, semi-improved and improved grassland, broad-leaved plantation, tall ruderal vegetation and scattered trees.

Surrounding Habitats

- 4.2.12 The surrounding Habitat Areas include semi-improved acid grassland, improved grassland pasture, arable fields, scattered and continuous scrub, small blocks of broad-leaved woodland plantation, standard trees and shelterbelts of mature mixed plantation. Riparian habitats on banks of River Don DWS with additional important in-channel freshwater habitats, species-rich grassland, and tall herb habitats. The semi-natural habitats represent viable areas of priority habitats identified in the NES LBAP. These Habitat Areas are assessed to be of high value and regional importance for wintering bird populations.

Quadrat Wb7 (Goval Mill Lade)

- 4.2.13 This Quadrat is evaluated to be of county importance based on a total bird assemblage of 23 species, of which; two were WCA1i species, six were JNCC Red List species, 13 were JNCC Amber List species, four were UK BAP species and six were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: running water, improved and arable grassland, broad-leaved plantation, tall ruderal vegetation and scattered trees.

Surrounding Habitats

- 4.2.14 The surrounding Habitat Areas include arable, improved and species-rich grassland, and scattered scrub, a shelterbelt of broad-leaved woodland, dominated by mature birch and rowan with records of Wych Elm. River and reservoir with marginal habitats and scattered trees, tall herb, grassland, scrub, woodland and semi-improved pasture. These are assessed to be of medium value and county importance for wintering bird populations.

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Quadrat Wb8 (Goval Burn)

- 4.2.15 This Quadrat is evaluated to be of less than local importance based on a total bird assemblage of 17 species, of which; none were WCA1i species, two were JNCC Red List species, eight were JNCC Amber List species, one was a UK BAP species and two were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: running water, unimproved, semi-improved, improved and arable grassland, dense and scattered scrub.

Surrounding Habitats

- 4.2.16 The surrounding Habitat Areas include improved grassland, river and reservoir with marginal habitats and scattered trees, tall herb, grassland, dense and scattered scrub, woodland and semi-improved pasture, arable and improved grassland, localised species rich verges and scrub, marshy grassland and arable fields, small blocks of conifer and mixed plantation, species-rich grassland. These are assessed to be of medium value and county importance for wintering bird populations.

Section NL5 (Corsehill to Blackdog)

Quadrat Wb9 (Littlejohn's Wood)

- 4.2.17 This Quadrat is evaluated to be of local importance based on a total bird assemblage of 21 species, of which; none were WCA1i species, four were JNCC Red List species, eight were JNCC Amber List species, three were UK BAP species and four were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: wet heath/acid grassland mosaic, running water, improved and arable grassland, semi-natural broad-leaved woodland, broad-leaved and coniferous plantation and scattered trees.

Surrounding Habitats

- 4.2.18 The surrounding Habitat Areas include conifer plantation with mature and young blocks, improved and arable grassland, species-poor semi-improved grassland, scattered trees, scattered and continuous scrub, localised species rich verges, marshy grassland and modified burn channels, mature semi-natural broad-leaved woodland dominated by birch and rowan with localised areas of wet woodland, wet heath and acid grassland. These are assessed to be of medium value and county importance for wintering bird populations.

Quadrat Wb10 (Lochgreens Farm)

- 4.2.19 This Quadrat is evaluated to be of less than local importance based on a total bird assemblage of 13 species, of which; none were WCA1i species, three were JNCC Red List species, eight were JNCC Amber List species, three were UK BAP species and four were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: improved and arable grassland, broad-leaved and coniferous plantation, tall ruderal vegetation and scattered trees.

Surrounding Habitats

- 4.2.20 The surrounding Habitat Areas include two small ponds, gravel and sand quarry, with areas of bare ground and sparse vegetation, arable fields, species-poor semi-improved grassland, species-poor hay meadows, grazing pasture and improved grassland, with localised semi-natural habitats and scattered scrub,. Semi-natural broad-leaved woodland, bog habitats, semi-natural ground flora. Habitat Area N85 (SSSI, DWS and SINS). Approximately 50% of the Corby and Lily Lochs area of the SSSI is located within this section of the study area. It includes a diverse range of habitats that include open water, swamp, basin mire (poor-fen vegetation), wet heath, wet woodland, scrub and

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drainage channels. These habitats are assessed to be of high value and regional importance for wintering bird populations.

Quadrat Wb11 (Backhill of Cranbog)

- 4.2.21 This Quadrat is evaluated to be of county importance based on a total bird assemblage of 18 species, of which; two were WCA1i species, seven were JNCC Red List species, 14 were JNCC Amber List species, four were UK BAP species and six were NES LBAP species. The habitats within this Quadrat were evaluated to be of low value for wintering birds due to the presence of the following habitats: improved and arable grassland, broad-leaved plantation, tall ruderal vegetation, scattered scrub and scattered trees.

Surrounding Habitats

- 4.2.22 The surrounding Habitat Areas include species-poor hay meadows and grazing pasture, arable and improved grassland with localised semi-natural habitats. Habitat Area N88 is a small water body supporting swamp and marginal vegetation, with localised areas of dense and scattered scrub. Other habitats include broad-leaved woodland plantation, immature conifer plantation woodland, scattered trees, small ponds and marshy grassland. These are assessed to be of medium value and county importance for wintering bird populations.

Quadrat Wb12 (Harehill)

- 4.2.23 This Quadrat is evaluated to be of local based on a total bird assemblage of 27 species, of which; none were WCA1i species, two were JNCC Red List species, 11 were JNCC Amber List species, none were UK BAP species and three were NES LBAP species. The habitats within this Quadrat were evaluated to be of medium value for wintering birds due to the presence of the following habitats: semi-improved and arable grassland, running water, scattered and dense scrub, scattered and continuous bracken, mixed and coniferous plantation and scattered trees.

Surrounding Habitats

- 4.2.24 The surrounding Habitat Areas include improved and arable grassland, marshy grassland, dense, scattered scrub and bracken, patches of broad-leaved and coniferous woodland plantation and occasional mature trees. These are assessed to be of low value and local importance for wintering bird populations.

Quadrat Wb13 (Backhill of Cranbog)

- 4.2.25 This Quadrat is evaluated to be of regional importance based on a total bird assemblage of 22 species, of which; one was an Annex 1 species, one was a WCA1i species, four were JNCC Red List species, 14 were JNCC Amber List species, two were UK BAP species and four were NES LBAP species. The habitats within this Quadrat were evaluated to be of low value for wintering birds due to the presence of the following habitats: coniferous plantation, dense scrub, bare ground, arable grassland and scattered bracken.

Surrounding Habitats

- 4.2.26 The surrounding Habitat Areas include arable and improved grassland, semi-mature and young conifer and mixed plantation woodland blocks, dense and scattered scrub and bracken, semi-improved grassland, young broad-leaved woodland plantation, unmanaged grassland with scattered ruderal and tall herb vegetation. These are assessed to be of medium value and county importance for wintering bird populations.

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Waterbody of Ornithological Value (WOV)

- 4.2.27 Corby/Lily Loch (SSSI) WOV is evaluated to be of national importance based on a total bird assemblage of 21 species, of which; one was an Annex 1 species, two were assemblages of Annex II species, 14 were JNCC Amber List species, and three were NES LBAP species. The habitats within this Quadrat were evaluated to be of high value for wintering birds due to the presence of the following habitats: large areas of standing water, with swamp, fen, wet dwarf shrub heath, marsh/marshy grassland, dense scrub and broad-leaved semi-natural woodland around the margins.

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Table 11 – Evaluation of Wintering Bird Species of Conservation Concern: WOV and Quadrats Wb1-13

Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation		
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce	
NL1 ch314750-316000 Derbeth-Tulloch Road	Wb1 Kepplestone	N12 Farmland with predominantly improved grassland and dry stone walls and occasional scattered gorse scrub.	N14 Gough Burn DWS to west	24		Fieldfare	Skylark Song thrush Starling House sparrow Linnet	13	2	4	1	medium	county	
		N13 Farmland with improved grassland and an area of dense gorse scrub to the east of Brimmond Hill and a small pond.												
		N14 DWS and SINS. Mosaic of semi-natural habitats including marshy grassland, wet heath/mire, swamp, wet woodland and scrub. Wet woodland is a UKBAP priority habitat. This habitat area also comprises several viable areas of habitats prioritised in the NES LBAP.												
		N15 Series of large fields, of limited ecological value.												
	Surrounding Habitat	N11 Large area of small fields of improved grassland with a network of intact dry stone walls and abundant scrub and scattered trees.							N12: Oystercatcher				medium	county
		N12 Farmland with predominantly improved grassland and dry stone walls and occasional scattered gorse scrub.												
		N13 Farmland with improved grassland and an area of dense gorse scrub to the east of Brimmond Hill and a small pond.												
		N14 DWS and SINS. Mosaic of semi-natural habitats including marshy grassland, wet heath/mire, swamp, wet woodland and scrub. Wet woodland is a UKBAP priority habitat. This habitat area also comprises several viable areas of habitats prioritised in the NES LBAP. N16 Commercial coniferous plantation that enhances the local habitat resource.												

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation	
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
		<p>N17 Farmland with predominantly arable fields and amenity planting associated with Newhills Cemetery.</p> <p>N18 Farmland with improved grassland and riparian habitats adjacent to Gough Burn.</p> <p>N19 Extensive area of mown grassland with scattered tree saplings.</p> <p>N20 Relatively small habitat area with farmland.</p> <p>N24 Semi-mature mixed plantation and semi-natural broad-leaved woodland. Part of an area of semi-natural woodland within the SAC campus that represents a viable area of NES LBAP priority habitat.</p>											
Section NL2 ch. 316000 – 317400 SAC Craibstone	Wb2 Craibstone	<p>N26 Two areas with semi-mature mixed plantation and semi-natural broad-leaved woodland. Forms part of semi-natural woodland within the SAC campus that represents a viable area of NES LBAP priority habitat.</p> <p>N27 Relatively small area of semi-mature mixed plantation woodland.</p> <p>N28 Farmland within the SAC campus.</p> <p>N30 Extensive area of farmland with large fields.</p>		26		Fieldfare Redwing	Starling Linnet Bullfinch Yellowhammer	12	3	4		medium	county
	Surrounding Habitat	<p>N21 Small block of mature conifer plantation.</p> <p>N23 Mosaic of farmland and small blocks of plantation woodland.</p> <p>N25 Two areas with semi-mature mixed plantation and semi-natural broad-leaved woodland. Forms part of semi-natural woodland within the SAC campus that represents a viable area of NES LBAP priority habitat.</p> <p>N27 Relatively small area of semi-mature mixed plantation woodland.</p> <p>N28 Farmland within the SAC campus.</p>					N28: Lapwing				medium	county	

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation	
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
		N30 Extensive area of farmland with large fields. N32 Large area of farmland with arable, improved and semi-improved grassland, dry stone walls, scattered scrub and species-rich grass verges. The habitats towards Upper Corsehill are a particularly important network of dry stone walls and species-rich grassland.											
Section NL3 ch. 317400 – 322600 A96 – Nether Kirkton	Wb3 Howemoss	N32 Large area of farmland with arable, improved and semi-improved grassland, dry stone walls, scattered scrub and species-rich grass verges. The habitats towards Upper Corsehill are a particularly important network of dry stone walls and species-rich grassland. N33 Farmland that includes large arable fields on lower ground to the east and less intensively managed fields on higher ground to the west of the study area. In these areas are species-rich hay meadows with species rich verges along tracks and dry stone walls.		24		Fieldfare	Grey partridge Skylark Starling House sparrow Linnet Bullfinch Yellowhammer	12	4	5		medium	county
	Surrounding Habitat	N31 Small area of semi-mature broad-leaved woodland plantation. N32 Large area of farmland with arable, improved and semi-improved grassland, dry stone walls, scattered scrub and species-rich grass verges. The habitats towards Upper Corsehill are a particularly important network of dry stone walls and species-rich grassland. N33 Farmland that includes large arable fields on lower ground to the east and less intensively managed fields on higher ground to west of study area. In these areas, there are species-rich hay meadows with species rich verges along tracks and dry stone walls.	N36 Farburn Wood DWS to east of AWPR					N33: Lapwing, Curlew				medium	county

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP		
		N34 Extensive area of young to mature coniferous plantation that extends further west and north. Diverse range of semi-natural habitats, including localised areas of broad-leaved woodland, scrub, wet heath and grassland.										
	Wb4 Kirkhill	N37 Extensive area of commercial forest plantation with localised areas of semi-natural habitats such as marshy grassland, acid grassland and scrub habitats. N38 Mosaic of open semi-natural habitats along the course of Bogenjoss Burn including acid grassland, scrub and marshy grassland. N39 Farmland comprising arable and improved grassland with well-maintained dry stone walls, and localised areas of scrub and woodland.		23		Fieldfare Redwing	Linnet Yellowhammer	10	2	3		medium local
	Surrounding Habitat	N35 Area of Kirkhill Forest that extends downhill almost as far as Farburn Wood, comprising blocks of young spruce and larch. A dry valley extends along the south edge and supports a mosaic of habitats including dry heath, bracken, scrub and tall herb vegetation. This mosaic of habitats and the connectivity of the area with Kirkhill Forest to the west.	N36 Farburn Wood DWS to east of proposed scheme									medium county
N37 Extensive area of commercial forest plantation with localised areas of semi-natural habitats such as marshy grassland, acid grassland and scrub habitats.												
N38 Mosaic of open semi-natural habitats along the course of Bogenjoss Burn including acid grassland, scrub and marshy grassland.												
N39 Farmland comprising arable and improved grassland with well-maintained dry stone walls, and localised areas of scrub and woodland.												

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation	
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
		N40 Commercial conifer plantation with localised areas of mixed woodland plantation and naturally developing young broad-leaved woodland.											
	Wb5 Bogenjoss Burn Wood	N41 Farmland between forest areas with small fields with improved grassland with localised areas of unimproved acid grassland on steep valley sides.		19			Linnet	6	1	1		medium	less than local
N42 Linear series of habitats along the course of the burn including marshy grassland, scrub and semi-natural, riparian broad-leaved woodland along the valley bottom that forms a viable area of priority NES LBAP habitat.													
N45 Semi-natural riparian broad-leaved woodland and mixed and conifer plantation. Includes viable areas of NESLBAP priority riparian woodland, and small areas of parkland with wood and ornamental gardens.													
N46 Farmland with predominantly grazing and silage fields with occasional areas of scrub and mature trees. This area includes a large field of semi-improved acid grassland.													
N47 Commercial conifer woodland with a small area of mature semi-natural pinewood of long-established plantation origin.													
N48 Farmland with improved grassland fields, well-maintained walls and localised areas of less intensive grassland and scrub at West Overton.													
	Surrounding Habitat	N41 Farmland between forest areas with small fields with improved grassland with localised areas of unimproved acid grassland on steep valley sides.						N50: Lapwing				high	regional

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP		
		<p>N42 Linear series of habitats along the course of the burn including marshy grassland, scrub and semi-natural, riparian broad-leaved woodland along the valley bottom that forms a viable area of priority NES LBAP habitat.</p> <p>N43 Area of conifer plantation, with open habitats, broad-leaved woodland plantation and a line of mature beech trees along a former land boundary. These habitats include areas of priority NESLBAP habitat.</p> <p>N44 Farmland comprising large arable and improved grassland fields of limited ecological value.</p> <p>N45 Semi-natural riparian broad-leaved woodland and mixed and conifer plantation. Includes viable areas of NESLBAP priority riparian woodland, and small areas of parkland with wood and ornamental gardens.</p> <p>N46 Farmland with predominantly grazing and silage fields with occasional areas of scrub and mature trees. This area includes a large field of semi-improved acid grassland.</p> <p>N47 Commercial conifer woodland with a small area of mature semi-natural pinewood of long-established plantation origin.</p> <p>N48 Farmland with improved grassland fields, well-maintained walls and localised areas of less intensive grassland and scrub at West Overton.</p> <p>N50 Extensive area of farmland with improved grassland and arable fields and localised areas with small blocks of broad-leaved woodland plantation, occasional standard trees and Gorse scrub.</p>										

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status							Value of Habitats for Wintering Birds	Ecological Evaluation
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP	Locally uncommon or scarce		
Section NL4 ch. 322600 – 325370 Nether Kirkton – Corsehill	Wb6 Nether Kirkton	N50 Extensive area of farmland with improved grassland and arable fields and localised areas with small blocks of broad-leaved woodland plantation, occasional standard trees and Gorse scrub. N51 Farmland with improved grassland and an area of marshy grassland (Moss Fetach) at the edge of the flood plain. N52 DWS. Riparian habitats on banks of River Don with additional important in-channel freshwater habitats. Banks support species-rich grassland, scattered scrub and tall herb habitats. The semi-natural habitats represent a viable areas of priority habitats identified in NESLBAP.	N52 River Don DWS directly adjacent	26	Smew	Whooper swan Fieldfare	House sparrow Yellowhammer	14	2	3	2	high	regional
	Surrounding Habitat	N46 Farmland with predominantly grazing and silage fields with occasional areas of scrub and mature trees. This area includes a large field of semi-improved acid grassland. N49 Farmland north of the Inverness to Aberdeen railway line. N50 Extensive area of farmland with improved grassland and arable fields and localised areas with small blocks of broad-leaved woodland plantation, occasional standard trees and Gorse scrub. N52 DWS. Riparian habitats on banks of River Don with additional important in-channel freshwater habitats. Banks support species-rich grassland, scattered scrub and tall herb habitats. The semi-natural habitats represent a viable areas of priority habitats identified in NESLBAP. N54 Farmland large arable fields and improved grassland pasture with scattered scrub and shelterbelts of mature mixed plantation.					N50: Lapwing				high	regional	

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Habitat Section and Location	WOV / Quadrat / Surrounding Habitat Areas	Description of Habitat Areas partially within, adjacent or near to Quadrat	Designated Sites	Total number of Bird Species Recorded	Conservation Status						Value of Habitats for Wintering Birds	Ecological Evaluation	
					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
Wb7 Goval Mill Lade	Surrounding Habitat	N55 Farmland comprising arable and improved grassland fields with well-maintained dry stone walls and scattered scrub.		23		Fieldfare Redwing	Skylark Song thrush House sparrow Tree sparrow Reed bunting Yellowhammer	13	4	6		medium	county
		N60 Small area of farmland with arable and silage fields and increased habitat diversity due to the Mill Lade Aqueduct and Goval Burn which both flow along field margins.											
		N64 Relatively small area of farmland with arable and improved grassland fields.											
		N62 The Formartine and Buchan way supports species-rich grassland along its embankments and cuttings with scattered areas of scrub and occasional mature trees.											
		N55 Farmland comprising arable and improved grassland fields with well-maintained dry stone walls and scattered scrub.										medium	county
		N58 Relatively wide shelterbelt of broad-leaved woodland, dominated by mature birch and rowan with records of Wych elm. This habitat area forms an important ecological link between Goval Burn and Goval Wood and supports woodland.											
		N61 River and reservoir with marginal habitats and wayside trees, and diverse mosaic of habitats tall herb, grassland, scrub, woodland and semi-improved pasture.											

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
		<p>N62 The Formartine and Buchan way supports species-rich grassland along its embankments and cuttings</p> <p>N63 Semi-natural broad-leaved woodland and mature beech plantation of long-established plantation origin, amongst cattle-grazed improved grassland. This area is a small proportion of a much larger area that includes the NE LBAP priority habitat, parkland and wood pasture, with records of wych elm.</p> <p>N64 Relatively small area of farmland with arable and improved grassland fields.</p>											
	Wb8 Goval Burn	<p>N59 Farmland, with improved grassland.</p> <p>N73 Farmland with marshy grassland and occasional arable fields, and occasional small blocks of conifer and mixed plantation.</p> <p>N62 The Formartine and Buchan way supports species-rich grassland along its embankments and cuttings with scattered areas of scrub and occasional mature trees.</p>		17		Fieldfare	Song thrush Starling	8	1	2		medium	less than local

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
	Surrounding Habitat	<p>N59 Farmland, with improved grassland.</p> <p>N61 River and reservoir with marginal habitats and wayside trees, and diverse mosaic of habitats tall herb, grassland, scrub, woodland and semi-improved pasture.</p> <p>N69 Extensive area of farmland with arable and improved grassland and well-maintained dry stone walls. Farm access tracks support localised species rich verges and have numerous wayside trees and scrub.</p> <p>N73 Farmland with imarshy grassland and occasional arable fields, and occasional small blocks of conifer and mixed plantation.</p> <p>N62 The Formartine and Buchan way supports species-rich grassland along its embankments and cuttings with scattered areas of scrub and occasional mature trees.</p>									medium	county	
Section NL5 ch. 325370–330900 Corsehill – Blackdog	Wb9 Littlejohn's wood	<p>N71 Relatively small area of plantation and semi-natural broad-leaved woodland that is connected to woodland habitats at Den Wood to the south and Littlejohn's Wood to the northeast.</p> <p>N72 Relatively area woodland, mostly conifer plantation with naturally regenerated birch woodland in the northwest and boundary features of mature beech trees. Forms important ecological links to Red Moss and Corsehill Wood.</p> <p>N80 Large arable fields with dry stone walls and several fields with species-poor semi-improved grassland, with areas of scattered scrub. Two small ponds surrounded by marshy grassland and scrub habitat.</p>		21			Skylark Starling Linnet Bullfinch	8	3	4		medium	local

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
	Surrounding Habitat	N67 Commercial conifer plantation with mature and young blocks. N68 Extensive area of farmland with predominantly improved grassland, well-maintained dry stone walls and occasional trees and scrub. N69 Extensive area of farmland with arable and improved grassland and well-maintained dry stone walls. Farm access tracks support localised species rich verges and have numerous wayside trees and scrub. N70 Extensive area of farmland with improved grassland, marshy grassland and modified burn channels. N74 Mature semi-natural broad-leaved woodland dominated by birch and rowan with localised areas of wet woodland, wet heath and acid grassland. Habitat diversity, size and connectivity with Littlejohns Wood and Red Moss. N80 Large arable fields with dry stone walls and several fields with species-poor semi-improved grassland, with areas of scattered scrub. Two small ponds surrounded by marshy grassland and scrub habitat.						N80: Lapwing				high	regional
	Wb10 Lochgreens Farm	N84 Farmland with large arable and improved and marshy grassland fields, and including a small copse of mature beech around a walled area of acid grassland.		13			Skylark Starling Reed bunting	8	2	3		medium	less than local
	Surrounding Habitat	N80 Large arable fields with dry stone walls and several fields with species-poor semi-improved grassland, with areas of scattered scrub. Two small ponds surrounded by marshy grassland and scrub habitat.	N85 Corby Loch SSSI, DWS					N80: Lapwing N84: Curlew N87: Curlew, Lapwing				high	regional

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP		
		<p>N81 Gravel and Sand Quarry, with areas of bare ground, and localised areas of scrub and sparse vegetation.</p> <p>N83 Semi-natural broad-leaved woodland on south side of Red Moss (N82) and encroaching into bog habitats. The woodland supports a semi-natural ground flora.</p> <p>N84 Farmland with large arable and improved and marshy grassland fields, and including a small copse of mature beech around a walled area of acid grassland.</p> <p>N85 Site of Special Scientific Interest, District Wildlife Site and Site of Interest to Natural Science. Approximately 50% of the Corby and Lily Lochs area of the SSSI is located within this Section of the study area. It includes a diverse range of habitats that include open water, swamp, basin mire (poor-fen vegetation), wet heath, wet woodland, scrub and drainage channels. Citation states that '...is important for roosting wildfowl and breeding birds.'</p> <p>N86 Extensive area of farmland with large fields of species-poor hay meadows and grazing pasture.</p> <p>N87 Extensive area of farmland with predominantly improved grassland and two arable fields, with localised semi-natural habitats.</p>	and SINS.									

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
	Corby/Lily Loch SSSI	N85 Site of Special Scientific Interest, District Wildlife Site and Site of Interest to Natural Science. Approximately 50% of the Corby and Lily Lochs area of the SSSI is located within this Section of the study area. It includes a diverse range of habitats that include open water, swamp, basin mire (poor-fen vegetation), wet heath, wet woodland, scrub and drainage channels. SSSI citation states that '...is important for roosting wildfowl and breeding birds.'	N85 Corby Loch SSSI, DWS and SINS.	21	Smew Pink-footed goose Greylag goose			14		3	1	high	national
	Wb11 Backhill of Cranbog	N87 Extensive area of farmland with predominantly improved grassland and two arable fields, with localised semi-natural habitats. N90 Farmland comprising arable fields and improved grassland mature sycamore trees that form boundary features.		18		Fieldfare Redwing	Grey partridge Skylark Song thrush Starling Linnet Bullfinch Yellowhammer	14	4	6	1	low	county
	Surrounding Habitat	N86 Extensive area of farmland with large fields of species-poor hay meadows and grazing pasture. N87 Extensive area of farmland with predominantly improved grassland and two arable fields, with localised semi-natural habitats. N88 DWS. A small habitat area comprising a small water body supporting swamp and marginal vegetation, with localised areas of Gorse scrub. A recent broad-leaved woodland plantation is located along the roadside at Newtonhill. N89 Farmland with predominantly arable fields with dry stone walls and a extensive, recently planted conifer plantation woodland. It also includes a series of small ponds and marshy grassland. N90 Farmland comprising arable fields and improved grassland. Mature sycamore trees form boundary features.	N88 Newton of Shielhill DWS to south of AWPR		Pink-footed goose in N90			N87: Curlew, Lapwing.				medium	county

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP			Locally uncommon or scarce
Wb12 Harehill		N92 Farmland comprising arable fields, with occasional mature trees and dry stone walls and gorse. N93 Farmland with improved grassland well-maintained network of dry stone walls, and a series of semi-mature and young conifer and mixed plantation woodland blocks. N94 Farmland comprised of arable fields, with scattered Gorse scrub and bracken.		27			Starling House sparrow	11		3		medium	local
	Surrounding Habitat	N91 Farmland that comprise predominantly improved grassland with stands of dense Gorse scrub and localised patches of broad-leaved woodland plantation. N92 Farmland comprising arable fields, with occasional mature trees and dry stone walls and gorse. N93 Farmland with improved grassland well-maintained network of dry stone walls, and a series of semi-mature and young conifer and mixed plantation woodland blocks. N94 Farmland comprised of arable fields, with scattered Gorse scrub and bracken.					N91: Oystercatcher				low	local	
Wb13 Fife Hill		N94 Farmland comprised of arable fields, with scattered Gorse scrub and bracken. N96 Farmland comprising arable and improved grassland fields with localised areas of dense Gorse scrub, semi-improved grassland, and young broad-leaved woodland plantation. N97 Farmland, comprising arable and improved grassland fields, with localised areas of unmanaged grassland with scattered ruderal and tall herb vegetation and a young conifer plantation.		22	Merlin	Merlin	Skylark Song thrush Starling Linnet	14	2	4	2	low	regional

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					EC Birds Directive Annex 1 (or Annex II assemblage)	WCA Schedule 1i	JNCC Red List	JNCC Amber List	UKBAP	LBAP		
	Surrounding Habitat	<p>N93 Farmland with improved grassland well-maintained network of dry stone walls, and a series of semi-mature and young conifer and mixed plantation woodland blocks.</p> <p>N94 Farmland comprised of arable fields, with scattered Gorse scrub and bracken.</p> <p>N95 Farmland of poor semi-improved grassland with areas of marsh/marshy grassland and conifer plantation woodland.</p> <p>N96 Farmland comprising arable and improved grassland fields with localised areas of dense gorse scrub, semi-improved grassland, and young broad-leaved woodland plantation.</p> <p>N97 Farmland, comprising arable and improved grassland fields, with localised areas of unmanaged grassland with scattered ruderal and tall herb vegetation and a young conifer plantation.</p>									medium	county

4.3 Summary Evaluation of WOVs, Quadrats and Surrounding Habitats

Waterbodies of Ornithological Value (WOVs)

- 4.3.1 Twenty-one bird species were recorded at Corby / Lily Loch (SSSI) WOV including 14 JNCC Amber List species and seven JNCC Green List species. The majority of species recorded were common residents or common winter visitors. However, smew (an Annex 1 species of the European Birds Directive and JNCC Green List species) is a scarce winter visitor to the north-east of Scotland.
- 4.3.2 Of the other species recorded within or adjacent to the WOV, the most important were the large assemblages of pink-footed and greylag geese that were recorded mainly in November and December 2004, with smaller numbers occurring from January to March 2005.
- 4.3.3 On account of the grey geese assemblages (1850 pink-footed geese (representing 0.1% of the UK population) and 335 greylag geese (representing 0.04% of the UK population) recorded roosting on Corby Loch) Corby and Lily Loch (SSSI) WOV is assessed as being of national conservation value for wintering birds.

Quadrats

- 4.3.4 Quadrat Wb6 (Nether Kirkton) in Section NL4 on the west bank of the River Don was the most valuable Quadrat for wintering birds, where 26 species were recorded including; one Annex 1 species (smew; a scarce winter visitor, rare on passage, more usually recorded at Loch of Strathbeg, near Fraserburgh), two WCA Schedule 1i listed species (fieldfare and whooper swan) and 14 JNCC Red and Amber List species (see Table 8).
- 4.3.5 Quadrat Wb13 (Fife Hill) in Section NL5 (near the Blackdog Industrial Estate) also supported a diverse assemblage of wintering birds. In total 22 were recorded including 14 JNCC Red and Amber List species, together with two uncommon residents in the Aberdeen area; merlin (listed on Annex 1 of the European Birds Directive and WCA Schedule 1i) and raven.
- 4.3.6 The wintering bird assemblages in these two Quadrats confer a regional conservation value for wintering birds.
- 4.3.7 Five Quadrats have been assessed as being of county conservation value; Wb1 (Kepplestone) in Section NL1 (near the Gough Burn DWS), Wb2 (Craibstone) in Section NL2 (including Craibstone pond), Wb3 (Howemoss Burn) in Section NL3 (at Newton across the A96 from Craibstone), Wb7 (Goval Mill Lade) in Section NL4 and Wb11 (Backhill of Cranbog) in Section NL5 (to the east of Corby Loch). The total number of wintering birds recorded within these Quadrats ranged from 18 to 26 species with between one and two WCA Schedule 1i listed species and 12 to 14 JNCC Red and Amber List species.
- 4.3.8 The least valuable Quadrats were Wb5 (Bogenjoss Burn) in Section NL3, Wb8 (Goval Burn) in Section NL4 and Wb10 (Lochgreens Farm) in Section NL5. The total number of species recorded within these Quadrats ranged from 13 to 19 with the number of JNCC Red and Amber List species ranging from six to eight species.

Surrounding Habitats

- 4.3.9 Habitat Areas partially within, surrounding or near to Quadrats Wb5, Wb6 and Wb10 have been assessed as being of regional value to wintering birds according to the Phase 1 Habitat types that are present within them. There is also a DWS adjacent to Quadrat Wb6 and a SSSI adjacent to Wb10. Habitat Areas partially within, surrounding or near to Quadrats Wb1, Wb2, Wb3, Wb4, Wb7, Wb8, Wb11 and Wb13 have been assessed as of county value to birds according to the Phase 1 Habitat types that are present within them. There are also a DWS adjacent to Quadrats

Wb1 and Wb4 and near to Quadrats Wb3 and Wb4. Habitat Areas partially within, surrounding or near to Quadrats Wb9 and Wb12 have been assessed as being of local value to birds according to the Phase 1 Habitat types that are present within them.

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 measures.
- 5.1.2 The following key issues associated with road construction and operation are set out following the Design Manual for Roads and Bridges (DMRB) guidelines and recommendations.
- 5.1.3 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.
- 5.1.4 Potential impacts associated with construction and operation of the proposed scheme on wintering bird populations may include direct mortality, habitat loss, habitat fragmentation/isolation, disturbance and pollution/other indirect impacts.
- 5.1.5 The potential impacts outlined above 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 negative impact of the proposed scheme (Luell et al., 2003).

5.2 Generic Impacts

- 5.2.1 The following comprises a description of the general potential impacts that would be likely to occur during construction and operation of the proposed scheme throughout the majority of the route sections, in addition to Corby / Lily Loch (SSSI) WOV.

Direct Mortality

Construction

- 5.2.2 Habitat loss resulting from clearance of vegetation prior to construction would be unlikely to result in the direct mortality of wintering birds since they are able to escape by moving into unaffected adjacent habitats.

Operation

- 5.2.3 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 and the barrier effects that road development imposes on species movement (Salter, 1994).
- 5.2.4 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.
- 5.2.5 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

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1950s, and in some areas suitable habitat no longer supports barn owl populations (English Nature, 1996).

- 5.2.6 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.
- 5.2.7 The proposed scheme would constitute a new off-line road through a range of habitats where no comparable road exists and would be likely to result in an increase in mortality (in addition to fragmentation and isolation of wintering birds through road traffic accidents (RTAs) 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 likely that low flying bird species (e.g. members of the thrush family) will be the greatest affected.

Habitat Loss

Construction and Operation

- 5.2.8 The direct impact of road construction is the physical loss of foraging habitats along a route corridor, which are 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 (COST, 2004).
- 5.2.9 Although occurring during the construction phase, this habitat loss is regarded as an operational impact because the loss would be permanent. Further permanent habitat loss may occur through the occasional operational management of roadside habitats (comprising mowing of verges or trimming of scrub/trees). Operation of the proposed scheme could 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.
- 5.2.10 Removal/clearance of surrounding vegetation and/or buildings may alter the availability of shelter for wintering birds increasing their vulnerability to a range of external factors such as adverse conditions and/or predators.
- 5.2.11 The total amount of land-take required in order to construct the Northern Leg of the proposed scheme is estimated at approximately 3.16km² / 316ha. Table 12 shows the estimated total pre-construction and post-construction areas of Phase 1 Habitats present within the proposed land-take. The post-construction figures take account of both anticipated habitat loss to construction and habitat created or changed as a result of mitigation. For specific habitat loss information refer to the Terrestrial Habitats report in Appendix A10.1.

Table 12 – Summary of Areas of Land-take by Phase I Habitat Category

Phase 1 Habitat Description	Phase 1 Habitat Categories within proposed scheme land-take	
	Pre-construction (Ha)	Post-construction (Ha)
Woodland mixed plantation	6.57	25.53
Woodland broadleaved plantation (including standard trees)	3.57	4.22
Woodland broadleaved semi-natural	7.06	2.16
Woodland coniferous plantation	19.19	14.28
Scattered scrub	4.30	11.30
Dense continuous scrub	4.94	13.56
Acid grassland semi-improved	2.32	1.86
Acid grassland unimproved	0.47	0.43
Amenity grassland	0.83	0.63

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Phase 1 Habitat Description	Phase 1 Habitat Categories within proposed scheme land-take	
	Pre-construction (Ha)	Post-construction (Ha)
Improved grassland	153.04	112.41
Marshy grassland	1.91	1.44
Neutral grassland semi-improved	0.41	0.36
Neutral grassland unimproved	0.16	0.16
Poor Semi-improved grassland	18.06	13.13
Arable	88.42	39.61*
Built up areas (buildings)	1.42	0.72
Herb & Fern bracken continuous	1.71	0.24
Open water	0.29	0.13
Parkland broadleaved	0.59	0.26
Parkland coniferous	0.22	0.07
Heathland wet heath acid	0.15	0
Total	315.63	242.50

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

- 5.2.12 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. blue tit or song thrush). In-combination impacts would also be likely to arise as a consequence of the displacement of wintering birds by means of disturbance into adjacent un-affected habitat.
- 5.2.13 Temporary habitat loss associated with the construction and use of site compounds and other temporary structures, for example, access tracks, bridges or storage areas would 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) would vary and is dependant on location/s that are currently unknown.
- 5.2.14 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

- 5.2.15 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.
- 5.2.16 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)
- 5.2.17 Some species will not inhabit areas within several hundred metres 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).

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- 5.2.18 Construction of the proposed scheme would be 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 would have an adverse 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 would be 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

- 5.2.19 Operation of the proposed scheme would also be 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 direct mortality, habitat loss associated with minimal operational maintenance and noise and vibration disturbance. 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

- 5.2.20 Disturbance resulting from noise and vibration associated with construction of the proposed scheme would occur in two stages. The first would comprise disturbance resulting from construction habitat clearance while the second would comprise both direct disturbance (for example, from rock chipping) and indirect disturbance resulting from human activity associated with construction of the proposed scheme, which would contribute to an increase in the effects of fragmentation and isolation.
- 5.2.21 Disturbance resulting from light pollution associated with artificial lighting construction in 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 would vary according to the frequency and magnitude of the disturbance and the species involved.
- 5.2.22 The location of temporary site compounds/offices 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

- 5.2.23 Research undertaken by Reijnen et al., (1987) 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.
- 5.2.24 Studies have shown that road traffic noise exceeding 50dBA can reduced 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).
- 5.2.25 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 (1932) 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.

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- 5.2.26 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 to a large roundabout lit by flood lighting.
- 5.2.27 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.
- 5.2.28 Disturbance resulting from noise and vibration associated with operation of the proposed scheme would mainly be 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).
- 5.2.29 Disturbance during operation of the proposed scheme would result from noise and vibration associated with road traffic, artificial lighting (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 proposed 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

- 5.2.30 Accidental spills of chemicals and other potentially toxic substances during construction of the proposed scheme may occur and are of particular concern if they happen within proximity of ecological sensitive communities or rivers and/or streams (especially if they are designated or form a tributary to a site designated at a national or European level, for example, SSSI or SAC (refer to Appendix A9.4: Water Quality)). 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

- 5.2.31 Pollutants and toxins are derived from road traffic and road surfaces. The exhaust produced by road vehicles contains 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 (COST, 2004).
- 5.2.32 Impacts on bird populations from vehicle-derived atmospheric pollution are not envisaged as an air quality assessment has been undertaken for the route corridor and also for the wider area including the city of Aberdeen (refer to Chapters 14 and 55). Findings indicate air quality within the vicinity of the proposed scheme will remain very good.
- 5.2.33 Research conducted by Ballard & 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.
- 5.2.34 Accidental spills of chemicals and other potentially toxic substances during operation of the proposed scheme may occur as a consequence of inadvertent discharge or indirectly as a result of road traffic accidents and as with construction are of particular concern if they happen within proximity of ecological sensitive communities or rivers and/or streams (refer to Appendix A9.4: Water Quality)).

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- 5.2.35 The application of de-icing salt to the proposed scheme during the winter 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 since this is dependant on the rate of spread and speed of spreader.
- 5.2.36 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.

5.3 Specific Impacts

- 5.3.1 In this section the potential impacts that are likely to occur in each Quadrat, WOV and surrounding Habitat Areas of the Northern Leg of the proposed scheme are detailed and assessed according to the criteria outlined in Tables 4 and 5 in terms of impact magnitude and significance. Typically, an adverse impact significance greater than or equal to Moderate would require mitigation to be undertaken to ameliorate the impact significance to acceptable levels. However, in order to comply with the Nature Conservation (Scotland) Act (2004) mitigation is proposed for adverse impacts of Minor significance or above.

WOVs, Quadrats and Surrounding Habitats

- 5.3.2 Potential impacts, impact magnitude and impact significance for Quadrats, WOVs, and surrounding Habitat Areas are presented in Table 13.

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Table 13 – Description and Assessment of Potential Impacts: Sections NL1-5

WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Section NL1 (Derbeth – Tulloch Road)					
Wb1 Kepplestone	N12 N13 N14 N15	County	Construction	Direct mortality, temporarily fragmentation, disturbance (in particular N14 – Gough Burn DWS) and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of improved grassland and scattered scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Kepplestone Burn.	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb1	N11 N12 N13 N16 N17 N18 N19 N20 N24	County	Construction	Direct mortality, temporarily fragmentation, disturbance.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of arable and improved grassland, mixed and coniferous plantation, dense and scattered scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Gough Burn.	Medium negative / Moderate Adverse
Section NL2 (SAC Craibstone)					
Wb2 Craibstone	N26 N27 N28 N30	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution from accidental spills in particular within the vicinity of Craibstone Burn / Pond and Green Burn.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of improved grassland, mixed plantation and semi-natural coniferous and mixed woodland and dense scrub (Table 12). Pollution resulting from surface water run-off may potentially occur and are of particular concern within the vicinity of Craibstone Burn / Pond and Green Burn.	Medium negative / Moderate Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Habitats Surrounding Quadrat Wb2	N21 N23 N25 N27 N28 N30 N32	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution from accidental spills in particular within the vicinity of Parkhead Burn, Craibstone Burn / Pond, Green Burn and Watson Field Ditch.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation and disturbance. Habitat loss will result in the permanent loss of arable, improved / poor semi-improved grassland with parkland/scattered trees, mixed plantation woodland, coniferous plantation, semi-natural coniferous and mixed woodland, scattered scrub and trees (Table 12). Pollution resulting from surface water run-off may potentially occur and is of particular concern within the vicinity of Parkhead Burn, Craibstone Burn / Pond, Green Burn and Watson Field Ditch.	Medium negative / Moderate Adverse
Section NL3 (A96 – Nether Kirkton)					
Wb3 Howemoss	N32 N33	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Howemoss Burn due to accidental spills.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution to Howemoss Burn due to run off. Habitat loss will result in the permanent loss of arable, semi-improved, improved grassland and scattered scrub (Table 12).	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb3	N31 N32 N33 N34	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Howemoss Burn due to accidental spills.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution to Howemoss Burn due to surface run-off.. Habitat loss will result in the permanent loss of arable, semi-improved, improved grassland and scattered scrub and trees.	Medium negative / Moderate Adverse
Wb4 Kirkhill	N37 N38 N39	Local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of coniferous plantation, arable, unimproved acid grassland, improved grassland and scattered scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Minor Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Habitats Surrounding Quadrat Wb4	N35 N37 N38 N39 N40 N41	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of coniferous plantation, arable, improved grassland and dense scrub and scattered trees (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Moderate Adverse
Wb5 Bogenjoss Burn Wood	N41 N42 N45 N46 N47 N48	Less than local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low Negative / Negligible
			Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of coniferous plantation and semi-natural broad-leaved and coniferous woodland, semi-improved and improved grassland and amenity grassland (Table 10). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Negligible
Habitats Surrounding Quadrat Wb5	N41 N42 N43 N44 N45 N46 N47 N48 N50	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance Habitat loss will result in the permanent loss of coniferous plantation, semi-natural broad-leaved woodland, continuous bracken, semi-improved and improved grassland and dense scrub and scattered trees (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Moderate Adverse
Section NL4 (Nether Kirkton – Corsehill)					
Wb6	N50	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Medium negative / Moderate Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Nether Kirkton	N51 N52		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of improved and marshy grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of River Don.	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb6	N46 N49 N50 N51 N52 N54	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of mixed plantation, arable, improved and marshy grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of River Don.	Medium negative / Moderate Adverse
Wb7 Goval Mill Lade	N55 N60 N64 N62	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of mixed plantation, improved and arable grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb7	N55 N58 N61 N63 N64 N62	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of coniferous woodland, scattered trees, arable, improved and semi-improved grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse
Wb8 Goval Burn	N59 N73 N62	Less than local	Construction	None	none
			Operation	None	none
Habitats Surrounding	(N59)	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Quadrat Wb8	N61 N69 (N73) (N62)		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, arable, improved and semi-improved grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse
Section NL5 (Corsehill - Blackdog)					
Wb9 Littlejohn's wood	N71 N72 N80	Local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of coniferous and mixed plantation, semi-natural broad-leaved woodland, marshy grassland and scattered trees (Table 12).	Medium negative / Minor Adverse
Habitats Surrounding Quadrat Wb9	N67 N68 N69 N70 N74 N80	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Lochgreens Pond and Loch-Hills Farm Pond.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance and pollution to Lochgreens Pond and Loch-Hills Farm Pond. Habitat loss will result in the permanent loss of semi-natural broad-leaved woodland, coniferous plantation woodland, scattered trees and scrub, marshy grassland, arable, improved, poor semi-improved and amenity grassland and small waterbodies (Table 12).	Medium negative / Moderate Adverse
Wb10 Lochgreens Farm	N84	Less than local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of Red Moss Burn and Corby/Lily Loch.	Low negative / Negligible
			Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of improved grassland and areas of scattered scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn and Corby/Lily Loch.	Medium negative / Negligible
Habitats Surrounding	N80	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of Red Moss Burn and Corby/Lily Loch.	Low negative / Minor Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
Quadrat Wb10	N81 N83 N85 N86 N87		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, marshy, improved and semi-improved grassland and dense scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn and Corby/Lily Loch.	Medium negative / Moderate Adverse
Corby/Lily Loch SSSI	N85	National	Construction	Temporarily fragmentation, disturbance and potential pollution.	Low negative / Moderate Adverse
			Operation	Permanent fragmentation, disturbance. Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn that runs in to Corby Loch.	Low negative / Moderate Adverse
Wb11 Backhill of Cranbog	N87 N90	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of scattered scrub, arable and improved grassland (Table 12).	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb11	N86 N87 N88 N89 N90	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of scattered trees, dense and scattered scrub, arable, semi-improved and improved grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn.	Medium negative / Moderate Adverse
Wb12 Harehill	N92 N93	Local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Low negative / Minor Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
	N94		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of arable grassland and scattered scrub (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Medium negative / Minor Adverse
Habitats Surrounding Quadrat Wb12	N91 N92 N93 N94	Local	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of scattered trees, dense and scattered scrub, arable, semi-improved, improved and marsh/marshy grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Medium negative / Minor Adverse
Wb13 Fife Hill	N94 N96 N97	Regional	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution due to accidental spills particularly within the vicinity of Middlefield Burn.	Low negative / Minor Adverse
			Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of scattered trees, dense scrub, arable and improved grassland (Table 12). Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Middlefield Burn.	Medium negative / Moderate Adverse
Habitats Surrounding Quadrat Wb13	N93 N94	County	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution due to accidental spills particularly within the vicinity of Middlefield Burn.	Low negative / Minor Adverse

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WOV / Quadrat / HA	Impacted Habitat Areas	Evaluation	Phase	Description of Impacts	Impact Magnitude/Significance
	N95 N96 N97		Operation	<p>Direct mortality, permanent fragmentation, disturbance.</p> <p>Habitat loss will result in the permanent loss of scattered trees, dense scrub, immature coniferous woodland, arable, semi-improved, poor semi-improved, marsh/marshy grassland, improved grassland, poor semi-improved grassland and semi-improved acid grassland (Table 12).</p> <p>Pollution resulting from surface water run-off may potentially occur and are of particular concern within the vicinity of Middlefield Burn.</p>	Medium negative / Moderate Adverse

6 Mitigation

6.1 Generic Mitigation

- 6.1.1 A Habitat Management Plan should be written and approved by SNH prior to construction of the proposed scheme. The purpose of the management plan will be to specify where and when the generic / specific mitigation proposed below should be implemented.
- 6.1.2 Table 14 presents a suite of generic mitigation measures to address generic impacts (as identified and described in Section 5.2) within each Habitat Area during construction and operation of the proposed scheme.

Table 14 – Generic Mitigation Measures: Construction and Operation

Mitigation Type	Generic Impact	Description of Generic Mitigation
Construction		
Prevent	Direct Mortality Disturbance	<u>Barn Owl (WCA1i species)</u> All buildings (in particular farm or other vacant structure with open access) that need to be demolished prior to construction must be checked one year in advance of construction to ensure that they are not in use by barn owl and should be destroyed immediately after survey provided barn owl is not present or should be secured to prevent access should demolition is not feasible before construction.
Prevent	Direct Mortality Disturbance	<u>Kingfisher (WCA1i species)</u> A pre-construction survey of all suitable watercourses should be undertaken at least one breeding season in advance of construction following 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 impacted by the proposed scheme that exhibits potential roosting habitat for kingfisher must 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 river or stream bank that is not directly impacted (but is likely to be disturbed) by construction of the proposed scheme that exhibits potential roosting habitat for kingfisher should be securely covered under the supervision of the ecological clerk of works 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.
Prevent	Direct Mortality Habitat Loss Disturbance	Plant and personnel should be restricted to a prescribed working corridor through the use of temporary barriers thereby minimising 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 Pollution	Ensure that any lighting associated with construction during low light levels 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, 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.

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Mitigation Type	Generic Impact	Description of Generic Mitigation
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 to within 5m of the road unless 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 Aviation Authority (BAA) to 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) and 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 following methods outlined by Gilbert et al (1998). Works cannot be undertaken if occupied roosting habitat is confirmed. If suitable roosting 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 thereby ensuring that bird species can easily see any on-coming vehicles before they attempt to cross the proposed scheme.
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 using 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 (>30m from woodland edge) and areas located at least 50 m from route alignment.
Offset	Habitat Loss	Appropriate management of existing boundary habitats such as hedgerows or rough edges for the 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 and 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	Off-line compensatory habitat creation will be undertaken at a location still to be determined. The area of habitat creation will be managed to create a mosaic of habitats of value to a range of key priority wintering bird species.
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 during construction and should be sited as close to the location where the original habitat was lost (taking into account disturbance

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Mitigation Type	Generic Impact	Description of Generic Mitigation
		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 and 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 Table 15 presents more specific mitigation measures to offset direct mortality, habitat loss, habitat fragmentation and disturbance in the Quadrats, WOV and surrounding Habitat Areas during construction and operation. Specific mitigation measures are also shown on Figures 11.5a-11.5p.
- 6.2.2 For details on specific habitat creation refer to Section 6 in the Terrestrial Habitats report in Appendix A10.1.

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Table 15 – Specific Mitigation Measures and Residual Impacts: Sections NL1-NL5

Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Section NL1 (Derbeth – Tulloch Road)						
Wb1 Kepplestone	N12 N13 N14 N15	Construction	Direct mortality, temporarily fragmentation, disturbance (in particular N14 – Gough Burn DWS) and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of improved grassland and scattered scrub	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for the loss of scrub habitats includes: <ul style="list-style-type: none"> • an area of ecological/landscape scrub woodland to the east of the proposed scheme in EHA N55 from ch314870 (Figure 11.5a); and • an area of ecological/landscape scrub woodland comprising to the west of the proposed scheme in EHA N11 from ch314800 (Figure 11.5a). • No specific mitigation is proposed for the loss of improved fields and stonewalls. 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Kepplestone Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Water Environment: Chapter 9).	Negligible
Habitats Surrounding	N11	Construction	Direct mortality, temporarily fragmentation, and disturbance.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Quadrat Wb1	N1 N13 N16 N17 N18 N19 N20 N24	Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of arable and improved grassland, mixed and coniferous plantation, dense and scattered scrub. Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Gough Burn.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> • Two blocks (for ecological mitigation, mixed ecology and landscape mitigation) of coniferous woodland to the west of the proposed scheme in EHAs N25 and N28 from ch316470 - 316800 (Figure 11.5c) • Narrow linear corridor of ecology and landscape mitigation mixed plantation to the east of the proposed scheme, surrounding the attenuation ponds, in EHA N26 and N28 from ch317100 – 317260 (Figure 11.5c). • Two blocks of coniferous plantation woodland to the west of the proposed scheme either side of the A96 junction in EHA N28 at ch317000 - 317500 (Figure 11.5c) and a block of coniferous plantation to the east of the proposed scheme in HA N28 at ch317000-317050. • Specific mitigation outlined for amphibian habitat loss that will provide secondary mitigation benefit for birds includes: <ul style="list-style-type: none"> • Two ecological ponds to be created within EHA N28 and N29. • Landscape planting comprising scrub and mixed woodland to be provided north and south of the A96 Junction at ch317300 – 317550. 	Negligible
Section NL2 (SAC Craibstone)						
Wb2 Craibstone	N26 N27 N28 N29 N30	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution in particular from accidental spills within the vicinity of Craibstone Burn / Pond and Green Burn.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of improved grassland, mixed plantation and semi-natural coniferous woodland and dense scrub.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss (see above)	Minor adverse
			Pollution resulting from surface water run-off may potentially occur and are of particular concern within the vicinity of Craibstone Burn / Pond and Green Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Habitats Surrounding Quadrat Wb2	N21 N23 N25 N27 N28 N30 N32	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution from accidental spills may potentially occur and are of particular concern within the vicinity of Parkhead Burn, Craibstone Burn / Pond, Green Burn and Watson Field Ditch.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of arable and improved grassland, mixed and coniferous plantation, semi-natural coniferous woodland, scattered scrub and trees	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss (see above)	Minor adverse
			Pollution resulting from surface water run-off may potentially occur and are of particular concern within the vicinity of Parkhead Burn, Craibstone Burn / Pond, Green Burn and Watson Field Ditch.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Section NL3 (A96 – Nether Kirkton)						
Wb3 Howemoss	N32 N33	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Howemoss Burn due to accidental spills.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of arable, semi-improved, improved grassland and scattered scrub.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). No specific mitigation for habitat loss is proposed.	Minor adverse
			Potential pollution to Howemoss Burn due to surface run-off.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding Quadrat Wb3	N31 N32	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Howemoss Burn due to accidental spills.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
	N33 N34	Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of arable, semi-improved, improved grassland and scattered scrub and trees.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). No specific mitigation for habitat loss is proposed.	Minor adverse
			Potential pollution to Howemoss Burn due to surface water run-off.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Wb4 Kirkhill	N37 N38 N39	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of coniferous plantation, arable, unimproved acid grassland, improved grassland and scattered scrub.	Medium negative / Minor Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> Two blocks of mixed woodland to the west of the road in HA N33 and N35, at ch318900-39730 and ch318930-319430 (Figure 11.5f); A block of ecological coniferous woodland to the west of the proposed scheme in EHA N35 from ch319430 - 319700 (Figure 11.5f). A linear strip of ecological / landscape scrub woodland to the west of the proposed scheme located in EHA N37 from Ch. 319970 - 320400 combined with ecological/landscape riparian woodland to the west of the proposed scheme located in EHA N37 and N41 from ch320000 – 320500 (Figures 11.5f-g). Specific mitigation for habitat fragmentation includes: <ul style="list-style-type: none"> Kirkhill Wildlife Overbridge at ch319960 in N38. Specific mitigation for the loss of scrub habitats includes: <ul style="list-style-type: none"> Localised ecological/landscape scrub patches to the east of the proposed scheme located in EHA N41 and N42 from ch320450 - 320950 (Figure 11.5g) 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Minor Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding	N35	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Quadrat Wb4	N37 N38 N39 N40 N41	Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of coniferous plantation, arable, improved grassland and dense scrub and scattered trees.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> • A block of ecological mixed woodland to the west of the proposed scheme in EHA N33 at ch318900 (Figure 11.5e). • A block of ecological coniferous woodland to the west of the proposed scheme in EHA N35 from ch319430 - 31970 (Figure 11.5f). A linear strip of ecological / landscape scrub woodland to the west of the proposed scheme located in EHA N37 from ch 319970 - 320400 combined with ecological/landscape riparian woodland to the west of the proposed scheme located in EHA N37 and N41 from ch320000 – 320500 (Figures 11.5f-g). • A block of ecological/landscape mixed woodland to the west of the proposed scheme from ch320400 - 320870 located in EHA N41 (Figure 11.5g) • Specific mitigation for habitat fragmentation (applicable only to operation) includes: <ul style="list-style-type: none"> • Kirkhill Wildlife Over-bridge at ch319960 in N38. • Specific mitigation for the loss of scrub habitats includes: <ul style="list-style-type: none"> • Localised ecological/landscape scrub patches to the east of the proposed scheme located in EHA N41 and N42 from ch320450 - 320950 (Figure 11.5g). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Wb5 Bogenjoss	N41	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Negligible	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Burn Wood	N42 N45 N46 N47 N48	Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution. Habitat loss will result in the permanent loss of coniferous plantation and semi-natural broad-leaved and coniferous woodland, semi-improved and improved grassland and amenity grassland. Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Negligible	Generic mitigation should be applied to account for direct mortality, disturbance and pollution impacts within the vicinity of Bogenjoss Burn. Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> • A block of ecological/landscape mixed woodland to the west of the proposed scheme from ch320400 - 320870 located in EHA N41 (Figure 11.5g). • A block of ecological coniferous woodland to the north of the proposed scheme in EHA N46 and N47 from ch319430 - 319700 (Figure 11.5h). • Three blocks of ecological/landscape mixed woodland north of the proposed scheme in EHA N50 at ch321630 (Figure 11.5h). 	Negligible
Habitats Surrounding Quadrat Wb5	N41 N42 N43 N44 N45 N46 N47 N48 N50	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance Habitat loss will result in the permanent loss of coniferous plantation, semi-natural broad-leaved woodland, continuous bracken, semi-improved and improved grassland and dense scrub and scattered trees.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss (see above)	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Bogenjoss Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Water Environment: Chapter 9).	Negligible
Section NL4 (Nether Kirkton - Corsehill)						
Wb6 Nether Kirkton	N50 N51 N52	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). The River Don is considered, based on professional judgement, to offer suitable nesting and foraging habitat for kingfisher (a WCA1i species). Despite not being recorded by the surveys, all pertinent generic mitigation for kingfisher (as outlined in Section 6.1) should be implemented.	Minor adverse

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of improved and marshy grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for the loss of deciduous plantation woodland includes: <ul style="list-style-type: none"> three blocks of ecological/landscape mixed woodland north of the proposed scheme in EHA N50 at ch321630 (Figure 11.5h). The River Don is considered, based on professional judgement, to offer suitable nesting and foraging habitat for kingfisher (a WCA1i species). Despite not being recorded by the surveys, all generic mitigation for kingfisher (as outlined in Section 6.1) should be implemented. 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of River Don.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding Quadrat Wb6	N46 N49 N50 N51 N52 N54	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of mixed plantation, arable, improved and marshy grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss (see above)	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of River Don.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Water Environment: Chapter 9).	Negligible
Wb7 Goval Mill Lade	N55 N60 N64 N62	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of mixed plantation, improved and arable grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). No specific mitigation for habitat loss is proposed.	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Habitats Surrounding Quadrat Wb7	N55 N58 N61 N63 N64 N62	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of coniferous woodland, scattered trees, arable, improved and semi-improved grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14) Specific mitigation for habitat loss of riverine habitats represented by Goval Burn and Goval Mill Lade includes: <ul style="list-style-type: none"> north of the road, east of the A947 in EHA N61, creation of ecological/landscape mixed woodland including a 100m long, 10m wide strip of riparian woodland along the Mill Lade at ch324400 (Figure 11.5j). South of the road, east of the A947 in EHA N61, ecological/landscape mixed woodland at ch324400 including a 150m long, 10m wide strip of riparian woodland north of Goval Burn (Figure 11.5j). South of the road, east of the A947 in EHA N61, a small triangle of mixed woodland including a 10m wide, 50m long strip of riparian woodland at ch324400 (Figure 11.5j). Specific mitigation outlined for landscape impacts that will provide secondary mitigation benefit for birds includes: mosaics of scrub and mixed woodland planting in flood plain field fragments adjacent to Goval Burn, EHA N61, N68 and N69 (Figure 11.5j). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Wb8 Goval Burn	N59 N73 N62	Construction	None	-	None	-
		Operation	None	-	None	-
Habitats Surrounding	(N59)	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
Quadrat Wb8	N61 N69 (N73) (N62)	Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, arable, improved and semi-improved grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss of riverine habitats represented by Goval Burn and Goval Mill Lade includes: <ul style="list-style-type: none"> north of the road, east of the A947 in EHA N61, creation of ecological/landscape mixed woodland including a 100m long, 10m wide strip of riparian woodland along the Mill Lade at ch324400 (Figure 11.5j). South of the road, east of the A947 in EHA N61, ecological/landscape mixed woodland at ch324400 including a 150m long, 10 m wide strip of riparian woodland north of Goval Burn (Figure 11.5j). South of the road, east of the A947 in EHA N61, a small triangle of mixed woodland including a 10m wide, 50m long strip of riparian woodland at ch324400 (Figure 11.5j). Specific mitigation outlined for landscape impacts that will provide secondary mitigation benefit for birds includes: mosaics of scrub and mixed woodland planting in flood plain field fragments adjacent to Goval Burn, EHA N61, N68 and N69 (Figure 11.5j). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Goval Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Section NL5 (Corsehill - Blackdog)						
Wb9 Littlejohn's wood	N71 N72 N80	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of coniferous and mixed plantation, semi-natural broad-leaved woodland, marshy grassland and scattered trees.	Medium negative / Minor Adverse	Generic mitigation (Table 14) Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> An area of ecological mixed woodland south of the proposed scheme in EHA N72 from ch325700 - 325900 (Figure 11.5k). 	Minor adverse
Habitats Surrounding Quadrat Wb9	N67 N68	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution to Lochgreens Pond and Loch-Hills Farm Pond.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
	N69 N70 N74 N80	Operation	Direct mortality, permanent fragmentation, disturbance and potential pollution to Lochgreens Pond and Loch-Hills Farm Pond. Habitat loss will result in the permanent loss of semi-natural broad-leaved woodland, coniferous plantation woodland, scattered trees and scrub, marshy grassland, arable, improved, poor semi-improved grassland and amenity grassland and small water bodies.	Medium negative / Moderate Adverse	Generic mitigation (Table 14) Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> An area of ecological mixed woodland south of the proposed scheme in EHA N72 from ch325700 - 325900 (Figure 11.5k). 	Minor adverse
Wb10 Lochgreens Farm	N84	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of Red Moss Burn and Corby/Lily Loch.	Low negative / Negligible	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation and disturbance. Habitat loss will result in the permanent loss of improved grassland and areas of scattered scrub.	Medium negative / Negligible	Generic mitigation (Table 14). No specific mitigation for habitat loss is proposed.	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of within the vicinity of Red Moss Burn and Corby/Lily Loch.	medium negative / negligible	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding Quadrat Wb10	N80 N81 N83 N85 N86 N87	Construction	Direct mortality, temporary fragmentation, disturbance and potential pollution within the vicinity of Red Moss Burn and Corby/Lily Loch.	Low negative / minor adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, disturbance. Habitat loss will result in the permanent loss of scattered trees, marshy, improved and semi-improved grassland and small areas of scattered scrub.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> a block of scrub woodland to the north of the proposed scheme in HA N87 at ch328030-328300 (Figure 11.5m). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of within the vicinity of Red Moss Burn and Corby/Lily Loch.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Water Environment: Chapter 9).	Negligible
Corby/Lily Loch SSSI	N85	Construction	Temporarily fragmentation, disturbance and potential pollution.	Low negative / Moderate Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
		Operation	Permanent fragmentation, disturbance. Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn that runs in to Corby Loch.	Low negative / Moderate Adverse	Generic mitigation (Table 14).	Negligible
Wb11 Backhill of Cranbog	N87 N90	Construction	Direct mortality, temporarily fragmentation and disturbance.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered scrub, arable and improved grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14). Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> • a block of scrub woodland to the north of the proposed scheme in HA N87 at ch328030-328300 (Figure 11.5m) • ecological/landscape riparian habitat, south of the proposed scheme and east of Blackdog Burn in EHA N91 from ch330000 (Figure 11.5n); and • ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). 	Minor adverse
Habitats Surrounding Quadrat Wb11	N86 N87 N88 N89 N90	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution.	Low negative / minor adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, dense and scattered scrub, arable, semi-improved and improved grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14) Specific mitigation for habitat loss includes: <ul style="list-style-type: none"> • a block of scrub woodland to the north of the proposed scheme in HA N87 at ch328030-328300 (Figure 11.5m) • ecological/landscape riparian habitat, south of the proposed scheme and east of Blackdog Burn in EHA N91 from ch330000 (Figure 11.5n); and • ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Red Moss Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Wb12 Harehill	N92 N93 N94	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of arable grassland and scattered scrub.	Medium negative / Minor Adverse	Generic mitigation (Table 14) Specific mitigation for the loss of areas of dense and scattered scrub includes: <ul style="list-style-type: none"> ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Medium negative / Minor Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding Quadrat Wb12	N91 N92 N93 N94	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, dense and scattered scrub, arable, semi-improved, improved and marsh/marshy grassland.	Medium negative / Minor Adverse	Generic mitigation (Table 14) Specific mitigation for the loss of areas of dense and scattered scrub includes: <ul style="list-style-type: none"> ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of within the vicinity of North Tarbothill Ditch and Blackdog Burn.	Medium negative / Minor Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Wb13 Fife Hill	N94 N96 N97	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution from accidental spills particularly within the vicinity of Middlefield Burn.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible

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Quadrat/ WOV	Habitat Areas affected (within or surrounding Quadrats)	Phase	Description of Potential Impacts on Habitats	Impact Magnitude/ Significance	Mitigation	Residual Impact Significance
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, dense scrub, arable and improved grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14) Specific mitigation for the loss of areas of dense and scattered scrub includes: <ul style="list-style-type: none"> Ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). South-east of Blackdog Junction and east of the A90 at Blackdog Croft, landscape scrub woodland planting. Above Fife Hill (HA N97) east of the road and east of the A90 Junction there will be a strip of scrub woodland surrounding a detention basin. (Figure11.5p). 	Minor adverse
			Pollution resulting from accidental spills may potentially occur and are of particular concern within the vicinity of Middlefield Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible
Habitats Surrounding Quadrat Wb13	N93 N94 N95 N55 N97	Construction	Direct mortality, temporarily fragmentation, disturbance and potential pollution from accidental spills particularly within the vicinity of Middlefield Burn.	Low negative / Minor Adverse	Generic mitigation (Table 14).	Negligible
		Operation	Direct mortality, permanent fragmentation, and disturbance. Habitat loss will result in the permanent loss of scattered trees, dense scrub, immature coniferous woodland, arable, semi-improved, poor semi-improved, marsh/marshy grassland, improved grassland, poor semi-improved grassland and semi-improved acid grassland.	Medium negative / Moderate Adverse	Generic mitigation (Table 14) Specific mitigation for the loss of areas of dense and scattered scrub includes: <ul style="list-style-type: none"> Ecological/landscape scrub and riparian mosaic north of road and either side of the Blackdog Burn at ch329900 – 329950 in EHA N91 (Figure 11.5n). South-east of Blackdog Junction and east of the A90 at Blackdog Croft, landscape scrub woodland planting. Above Fife Hill (HA N97) east of the road and east of the A90 Junction there will be a strip of scrub woodland surrounding a detention basin. (Figure11.5p). 	Minor adverse
			Pollution from surface water run-off may potentially occur and is of particular concern within the vicinity of Middlefield Burn.	Medium negative / Moderate Adverse	Generic mitigation (see Table 14 and Chapter 9: Water Environment).	Negligible

6.3 Further Work

- 6.3.1 It will be the responsibility of the contractor to appoint an Ecological Clerk of Works, whose primary role will be to ensure the implementation of all proposed mitigation measures during construction of the proposed scheme.

7 Residual Impacts

7.1 Rationale

- 7.1.1 This section of the report provides an assessment of residual impacts in light of the generic and specific mitigation measures proposed.

7.2 Specific Residual Impacts

Section NL1 (Derbeth to Tulloch Road)

- 7.2.1 Residual impacts of Minor significance during operation are predicted for wintering birds around the Gough Burn and Kepplestone Burn areas including the surrounding agricultural land and Newhill Woods (HAs N11-N17). Impacts relate to a risk of direct mortality from RTAs, fragmentation and disturbance.

Section NL2 (SAC Craibstone)

- 7.2.2 In this Section of the route, residual impacts of Minor significance are predicted for wintering birds around the SAC Craibstone Campus, including woodlands and Craibstone Burn and Pond (HAs N23, N25- N28) due to a risk of direct mortality from RTAs, permanent habitat loss, fragmentation and disturbance during operation. Impacts to Habitat Areas N18-N20 and N24 will be reduced to Negligible.

Section NL3 (A96 to Nether Kirkton)

- 7.2.3 Residual impacts of Minor significance during operation are predicted for wintering birds around the Bogenjoss area including Howemoss, Kirkhill Forest and surrounds (N30-N35 and N37-N48) due to risk of direct mortality from RTAs, permanent habitat loss, fragmentation and disturbance.

Section NL4 (Nether Kirkton to Corsehill)

- 7.2.4 Residual impacts of Minor significance are predicted during construction for wintering birds in the River Don (N52) due to temporary fragmentation and disturbance impacts.

- 7.2.5 Residual impacts of Minor significance are predicted during operation for wintering birds in agricultural areas surrounding the River Don / Goval Burn and the Formartine and Buchan Way (N49-N52, N54-N55, N58, N60-N64 and N67-N70) due to direct mortality from potential RTAs, permanent habitat loss, fragmentation and disturbance.

Section NL5 (Corsehill to Blackdog)

- 7.2.6 Residual impacts of Minor significance are predicted for wintering birds in agricultural areas surrounding Lochgreens Farm / Corby Loch, Backhill of Cranbog and Fifehill (N74, N80-N81, N83, N85-N90, N93-N94 and N96-N97) due to direct mortality from potential RTAs, permanent habitat loss, fragmentation and disturbance.

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ANNEX 1

Wintering bird species recorded within 500m of route

Species	Scientific name	BTO code	Species	Scientific name	BTO code
grey heron	<i>Ardea cinerea</i>	H.	redwing	<i>Turdus iliacus</i>	RE
mute swan	<i>Cygnus olor</i>	MS	mistle thrush	<i>Turdus viscivorus</i>	M.
pink-footed goose	<i>Anser brachyrhynchus</i>	PG	raven	<i>Corvus corax</i>	RN
mallard	<i>Anas platyrhynchos</i>	MA	goldcrest	<i>Regulus regulus</i>	GC
tufted duck	<i>Aythya fuligula</i>	TD	long-tailed tit	<i>Aegithalos caudatus</i>	LT
sparrowhawk	<i>Accipiter nisus</i>	SH	coal tit	<i>Parus ater</i>	CT
buzzard	<i>Buteo buteo</i>	BZ	blue tit	<i>Parus caeruleus</i>	BT
kestrel	<i>Falco tinnunculus</i>	K.	great tit	<i>Parus major</i>	GT
merlin	<i>Falco columbarius</i>	ML	tree creeper	<i>Certhia familiaris</i>	TC
grey partridge	<i>Perdix perdix</i>	P.	jay	<i>Garrulus glandarius</i>	J.
pheasant	<i>Phasianus colchicus</i>	PH	magpie	<i>Pica pica</i>	MG
moorhen	<i>Gallinula chloropus</i>	MH	jackdaw	<i>Corvus monedula</i>	JD
coot	<i>Fulica atra</i>	CT	rook	<i>Corvus frugilegus</i>	RO
oystercatcher	<i>Haematopus ostralegus</i>	OC	carrion crow	<i>Corvus corone</i>	C.
lapwing	<i>Vanellus vanellus</i>	L.	starling	<i>Sturnus vulgaris</i>	SG
snipe	<i>Gallinago gallinago</i>	SN	house sparrow	<i>Passer domesticus</i>	HS
woodcock	<i>Scolopax rusticola</i>	WK	tree sparrow	<i>Passer montanus</i>	TS
curlew	<i>Numenius arquata</i>	CU	chaffinch	<i>Fringilla coelebs</i>	CH
black-headed gull	<i>Larus ridibundus</i>	BH	greenfinch	<i>Carduelis chloris</i>	GR
common gull	<i>Larus canus</i>	CM	goldfinch	<i>Carduelis carduelis</i>	GO
lesser black-backed gull	<i>Larus fuscus</i>	LB	bullfinch	<i>Pyrrhula pyrrhula</i>	BF
herring gull	<i>Larus argentatus</i>	HG	yellowhammer	<i>Emberiza citrinella</i>	Y.
great black-backed gull	<i>Larus marinus</i>	GB	greylag goose	<i>Anser anser</i>	GJ
woodpigeon	<i>Columba palumbus</i>	WP	whooper swan	<i>Cygnus cygnus</i>	WS
skylark	<i>Alauda arvensis</i>	S.	smew	<i>Mergus albellus</i>	SY
meadow pipit	<i>Anthus pratensis</i>	MP	goldeneye	<i>Bucephala clangula</i>	GN
grey wagtail	<i>Motacilla cinerea</i>	GW	goosander	<i>Mergus merganser</i>	GD
ped wagtail	<i>Motacilla alba</i>	PW	twite	<i>Carduelis flavirostris</i>	TW
wren	<i>Troglodytes troglodytes</i>	WR	linnet	<i>Carduelis cannabina</i>	LI
mistle thrush	<i>Prunella modularis</i>	D.	cormorant	<i>Phalacrocorax carbo</i>	CA
robin	<i>Erithacus rubecula</i>	R.	jack snipe	<i>Lymnocyptes minimus</i>	JS
blackbird	<i>Turdus merula</i>	B.	reed bunting	<i>Emberiza schoeniclus</i>	RB
fieldfare	<i>Turdus pilaris</i>	FF	wigeon	<i>Anas penelope</i>	WN
song thrush	<i>Turdus philomelos</i>	ST	Teal		T.