Appendix A25.4 – Breeding Bird Survey

B1033200 July 2007
Jacobs UK Ltd 95 Bothwell Street, Glasgow G2 7HX
Tel 0141 204 2511 Fax 0141 226 3109

Contents

1 Introduction

1.1 General Background

1.1.1 This report is one of the appendices supporting Chapter 25 (Ecology and Nature Conservation) of the AWPR Environmental Statement. This report is concerned with the impacts on breeding bird assemblages associated with the Southern Leg section of the proposed scheme. The results of the surveys carried out for the purposes of this assessment are also presented and are shown on Figures 25.6a-h.

1.1.2 The six component route sections in this report for the Southern Leg of the proposed scheme are as follows:

- Section SL1: Charleston to Bishopston (ch207200-203150);
- Section SL2: Bishopston to Burnhead (ch203150-200600);
- Section SL3: Burnhead to the A93 (ch200600-102870);
- Section SL4: A93 to Beanshill (ch102870-105900);
- Section SL5: Beanshill to the South Kingswells Junction (ch105900-108500); and
- Section SL6: South Kingswells Junction to Derbeth Overhills (ch108500-111200).

1.1.3 All tables and figures are structured in this manner.

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

1.1.5 These studies included desk-based consultation to collate existing information about breeding bird populations in the area affected by the scheme and field surveys to provide current data about the status of breeding bird populations and the habitats that support them within the study area.

Aims

1.1.6 This report provides an assessment of the current status of breeding birds in the vicinity of the proposed scheme, an assessment of the potential impacts associated with the construction and operation of the scheme, provides appropriate mitigation measures and determines any residual impacts.

Study Area

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

1.2 Legislation and Conservation Status of Birds

National Legislative Protection

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

1.2.1 The Wildlife and Countryside Act (1981) (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain and is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') is implemented.

1.2.2 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, the 'Birds Directive') and Natural Habitats and Wild Fauna and Flora (92/43/FFC, the 'Habitat Directive') are implemented in Great Britain.

Nature Conservation (Scotland) Act 2004

1.2.3 The Nature Conservation (Scotland) Act 2004 (NCSA) implements a series of measures designed to improve the legal protection and enhance the conservation of the natural features of Scotland (natural features, in this context, refer to flora or fauna or geological or geomorphological features).

1.2.4 The NCSA comprises three parts: Part 1 introduces a general duty on public bodies to further the conservation of biodiversity in exercising any of their functions; Part 2 introduces significant changes to the existing arrangements for the establishment and protection of Sites of Special Scientific Interest (SSSIs); and Part 3 strengthens and extends the protection of birds, animals and plants by updating Part I of the WCA (1981).

1.2.5 Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected, and make it an offence to;

- intentionally or recklessly kill, injure or take any wild bird;
- intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
- intentionally or recklessly take or destroy the egg of any wild bird; or
- intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young; or disturb the dependent young of such a bird.

1.2.6 Wildlife and Countryside Act (1981) (as amended) Schedule 1 (WCA1i) bird species are protected by legal penalties at all times.

1.2.7 The acts additionally provide protection for Sites of Special Scientific Interest (SSSI) in particular those that are designated for the presence of wild bird populations.

UK Conservation Status of Birds

Biodiversity Action Plans

1.2.8 The UK Biodiversity Action Plan (UK BAP) was the UK's response to the commitments of the Rio Convention on Biological Diversity. The plan outlines action for 26 species of bird of conservation importance/concern and can be viewed at www.ukbap.org.uk.

1.2.9 In addition to having national priorities and targets, action for biodiversity was also taken at a local level. The local North East Scotland Biodiversity Partnership (LBAP) outlines action for 12 national and 22 local bird species and can be viewed at http://www.nesbiodiversity.org.uk/.

1.2.10 The Scottish Biodiversity Strategy (Scottish Executive, 2004) places a duty of care on public bodies to further the conservation of biodiversity in Scotland, the execution of which is implemented through the local biodiversity action plans (LBAPs).

1.2.11 National Planning Policy Guidance 14 (NPPG 14) outlines planning guidance in relation to the conservation and enhancement of Scotland's natural heritage. NPPG 14 makes the presence of a protected species or habitats in addition to biodiversity habitats/species a material consideration in the assessment of development proposals and requires planning authorities to take particular care to avoid harm to species or habitats protected under the Wildlife and Countryside Act (1981) (as amended), European Directives and/or identified as priorities in the UK Biodiversity Action Plan.

Scottish Biodiversity List

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

UK Birds of Conservation Concern 2002 - 2007

1.2.13 The leading government and non-government conservation organisations in the UK have jointly reviewed the population status of 247 bird species[1] that are regularly found within the United Kingdom using data from national monitoring schemes.

1.2.14 On the basis of seven quantitative criteria, each species was placed on one of three lists, these being:

- Red (red list species are those that are globally threatened, have had an historical population decline in the UK from 1800-1995, a rapid (≥50%) decline in UK breeding population over the past 25 years or a rapid (≥50%) contraction of UK breeding range over the past 25 years);
- Amber (amber listed species have had an historical population decline from 1800-1995, but are recovering; population size has more than doubled over the past 25 years, a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern (SPEC); and
- Green (green listed species have no identified threat to their population status).

1.2.15 Of the 247 species assessed, 40 species were red-listed, 121 were amber-listed and the remaining 86 were green-listed. With respect to this report, key species of conservation concern include CWA (1981) Schedule 1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species.

2 Approach and Methods

2.1 Previous Survey Information

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

2.2 Survey of Breeding Bird Assemblages

2.2.1 Survey methods were developed in consultation with SNH from 2004 to 2006. The following survey method section has been divided into two parts. The first part details the methods used to select and survey sites within the study area for breeding bird assemblages. The second part details the

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

methods used to assess and evaluate habitats within the study area for breeding bird assemblages.

2.2.2 Field surveys were directed/undertaken by experienced ornithological surveyors with extensive background in identifying birds from observations and from bird song. The northernmost part of the Southern Leg (ch207200 – 203150) was previously surveyed in 2004, the results of which survey were used to inform this assessment.

Development of Survey Strategy

2.2.3 A requirement to survey the route corridor of the proposed scheme for breeding bird assemblages to inform the EIA was identified as part of the breeding bird survey for the proposed Northern Leg through initial scoping with SNH in late 2004.

2.2.4 A preliminary walkover survey of the study area corridor was undertaken in early 2006 (following initial consultation with SNH) to assist in the development of an appropriate survey strategy to sample the proposed route corridor for breeding birds.

2.2.5 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 breeding 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 potentially 'high value' habitats and sampling remaining areas using a Line Transect and Quadrat sampling approach. These methods aimed to provide a 'best value' approach where the survey effort produced a level of baseline information that could be practically achieved while also being sufficient to allow the impacts on bird assemblages to be appropriately assessed.

2.2.6 The two-stage breeding bird survey 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). All methods were agreed through consultation with SNH in the form of an Ecology Scoping Report (Jacobs, 2006), prior to survey.

Selection of Survey Areas - High Value Habitats

2.2.7 The first stage in the selection of survey areas involved the identification and selection of high value habitats throughout the study area, referred to as Sites of Ornithological Value (SOV). Potential SOVs located within and/or adjacent to the study area were identified based on the initial walkover survey (as outlined in paragraph 2.2.4) together with an assessment of data supplied by NESBReC and analysis of aerial photographs and Ordnance Survey maps.

Selection of Survey Areas – Remaining Habitats

2.2.8 The second stage in the selection of survey areas involved the use of a Line Transect and Quadrat sampling system to sample habitats (outside of the SOVs) throughout the remainder of the study area for breeding bird species. The Quadrat data were used to infer the importance of all remaining non-surveyed areas throughout the route corridor for breeding birds.

2.2.9 A single transect was established, centered over the Stage 1 Options (based on route option plans dated 23 January 2006), along which 500m square Quadrats were established. A sampling ratio of 1:3 was used resulting in 12 Quadrats being selected along the length of the transect (five of the Quadrats were previously surveyed in 2004). 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.

2.2.10 Approximately 32% (300ha) of the study area was surveyed for breeding birds using the Line Transect and Quadrat sampling system. The selected eight Quadrats were subject to a breeding bird survey (BBS). The following habitats within each selected Quadrat were not surveyed:

- if the Quadrat overlapped the whole or part of any SOV (since these areas would be surveyed in any case); and
- urbanised zones including areas of existing road and/or hard standing.

2.2.11 Limitations to the surveys and the assessment are described in Section 2.6.

Breeding Bird Survey

2.2.12 An adapted breeding bird survey (based on the Common Bird Census (CBC) standard mapping technique as developed by the British Trust for Ornithology (Bibby et al 2000)) method was used to survey SOVs and Quadrats but differed from a full CBC by the following:

- three rather than ten visits were made to each respective SOV/Quadrat; and
- each survey repetition was separated by more than ten days.

2.2.13 Definitions of the criteria used to classify observed birds as either confirmed breeding, potentially breeding and non-breeding are presented in Table 1.

Table 1 – Definitions of Breeding, Possible Breeding and Non-Breeding (Adapted from Buckland et al 1990 and Gilbert et al 1998)

Term	Definition
Breeding	A combination of registrations recorded on two or more survey visits including the following criteria: male in song (on the ground or in flight); male and/or female calling (on the ground or in flight); male and/or female repeatedly calling (on the ground or in flight); aggressive encounters between species (including the same species) perceived to be in the defence of territory, nest or young (on the ground or in flight); a nest (with or without an adult in attendance) or man made structure (e.g. nest box) containing either eggs or young; adult bird/s carrying nesting material or entering/leaving nesting-site with nesting material; adult bird/s carrying food or faecal sack or entering/leaving nesting-site with food or faecal sack; and calling and/or silent juveniles with or without parents in attendance.
Possible Breeding	A combination of registrations recorded on a single survey visit including the above criteria and the following: pair observed in suitable habitat in breeding season; and building or excavating a nest site.
Non Breeding	One or more registration (not including the criteria listed above) recorded on one or more survey visit including the following criteria: adult bird/s carrying or foraging for food not presumed to be for young/juveniles; and species observed during the breeding season but not in habitat deemed to suitable for nesting.

Incidental Observations

2.2.14 Observations of WCA1i, JNCC Red/Amber List and UK BAP / LBAP bird species present within or adjacent to each of the SOV and Quadrat, in addition to the wider study area, were noted during the other ecological surveys that were undertaken for the EIA.

Dates of Survey

2.2.15 The reconnaissance surveys were undertaken from 23 to 26 January 2006. Breeding bird surveys were undertaken from 10 to 14 April 2006, 8 May to 3 June 2006 and 12 to 28 June 2006 (refer to Section 2.6).

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 each SOV and Quadrat and assess their value for breeding birds. A habitat value (expressed as high, medium or low) was assigned to each SOV, Quadrat and Habitat Area (HA) (as described in Appendix A25.1: Terrestrial Habitats) based on the habitat descriptions derived from the Phase 1 Habitat Survey, following the criteria shown in Table 2.

Table 2 – Habitat Assessment Criteria

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

2.4 Evaluation of Ecology and Nature Conservation Value

2.4.1 The method for assessing the value of an ecological receptor uses all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor is determined by reference to statutory and non-statutory site designations, the results of consultation, literature review (including reference to the North-East Scotland Bird Report (North-East Scotland Bird Club, 2004) and The Birds of North-East Scotland (Buckland, et al 1990)) and field surveys. The evaluation method incorporates a geographical framework where ecological receptors are assessed according to a series of criteria that are presented in Table 3, which are based on the Ratcliffe Criteria (Ratcliffe, 1977) used in the selection of biological SSSI and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological/geographical unit.

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

Table 3 – Evaluation of Ecological Receptor

Ecological Importance	Attributes of Ecological Receptor
International (European)	Habitats An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area which meets the published selection criteria for such designation, whether or not it has yet been notified 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 Species Any regularly occurring population of an internationally important species, which is threatened or rare in the UK. i.e. a UK Red Data Book species or listed as occurring in 15 or fewer 10km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP A regularly occurring, nationally significant population/number of any internationally important species.
National (Scottish)	Habitats A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area, which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole 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. Species 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.
Regional (North East Scotland)	Habitats Sites which exceed the county-level designations but fall short of SSSI selection guidelines, where these occur Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat which are essential to maintain the viability of a larger whole Viable areas of key habitat identified as being 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. Species Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation 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.

Ecological Importance	Attributes of Ecological Receptor
Authority Area (e.g. County or District) **(Aberdeenshire / City of Aberdeen)**	Habitats Sites that are recognised by local authorities (e.g. Sites of Interest for Nature Conservation (SINS) and District Wildlife Sites (DWS)) County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR) selected on county/district ecological criteria (county/district sites where they exist, will often have been identified in local plans) 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. Species Any regularly occurring, locally significant population of a species which is listed in a County/District BAP on account of its regional rarity or localisation A regularly occurring, locally significant population of a county/district important species (particularly during a critical phase of its life cycle) Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations. Sites/features that are scarce within the county/district or which appreciably enrich the county/ district habitat resource
Local **(Immediate local area or village importance)**	Habitats Areas of habitat considered to appreciably enrich the habitat resource within the local context (survey area, parish or neighbourhood, e.g. species-rich hedgerows, ponds etc). Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution of such habitats within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25 ha. Any river classified as fair B or poor C and unlikely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is severely modified or above Species 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
Less than Local **(Limited ecological value)**	Sites that retain habitats and/or species that are 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

Evaluation of SOVs, Quadrats and Habitat Areas

2.4.3 The ecological value of each SOV and Quadrat for breeding birds was determined by considering the evaluation of its habitat potential for breeding birds (derived from information in Appendix A25.1: Terrestrial Habitats) combined with the value of the breeding bird assemblage present.

2.4.4 An assessment was then made of the representativeness of the habitats found in each Quadrat or SOV in relation to the non surveyed areas adjacent. The ecological value of the remaining Habitat Areas in each route section was then determined by an initial evaluation of their habitat potential for breeding birds combined with the knowledge of the breeding bird assemblages found in adjacent representative Quadrats or SOVs.

2.5 Impact Assessment

2.5.1 The approach to the assessment of impacts in terms of magnitude and significance is presented in Chapter 25 (Ecology and Nature Conservation), paragraphs 25.1.9 – 25.1.11 and Tables 25.6 and 25.7.

2.6 Limitations to Assessment

Weather

2.6.1 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).

2.6.2 Weather conditions during surveys were generally good with a limited numbers of days affected by rain and heavy cloud. Surveys were suspended if weather conditions were poor (e.g. high winds and persistent rain). Wind speed was relatively high on some days (approximately 12% of survey days), which is likely to have reduced records of singing birds. However, carrying out several survey visits to a site helps to reduce the significance of such effects. All surveys were carried out in suitable weather, although it was not practically possible to limit surveys to only to optimal weather conditions.

Survey Methodology

2.6.3 A full Common Bird Census (CBC) comprises ten survey visits made between March and June, with a minimum of ten days between each of the survey repetition, which enables the calculation of bird territories across an entire season within a given site. However, the adopted methodology included only three survey visits to each SOV and Quadrat with more than ten days between each repetition. There were two grounds for reducing the number of survey repetitions and increasing the number of days between visits. Firstly, it was considered that three survey repetitions (made between April and June) would enable a sufficient representative data set to be collected in order to gain an accurate reflection of the breeding bird assemblage present within each SOV and Quadrat and secondly, it was considered more important to gather an accurate baseline of the bird assemblage within each SOV and Quadrat rather than a full picture of the spatial distribution of all bird territories.

2.6.4 The above survey 'scale down' methodology that was included in the scoping report (Jacobs, 2006) and which is supported by SNH in their current guidance (SNH, 2005; section 6.9) was approved prior to the start of the surveys by SNH.

Changes to the Route Alignment

2.6.5 One Quadrat (SL-Bb04) currently lies outside the route corridor as a result of changes to the preferred route following the DMRB Stage 1 Assessment. Using the Quadrat and Line Transect method, it is possible to infer the potential value of remaining non-sampled areas within the route corridor for breeding bird assemblages.

Access Limitations

2.6.6 Complications in gaining land access to the route corridor were encountered from February to June 2006. As a consequence, only nine SOVs and ten Quadrats received three survey visits as per the methods section. In comparison, seven SOVs and two Quadrats were visited either only once or twice (refer to Table 4).

2.6.7 The ramification of the shortfall in survey complication and hence baseline data is that protected / key species of conservation concern (including CWA1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status) potentially present within SOVs and Quadrats may have gone unrecorded. It is not possible therefore to provide a robust assessment of SOV, Quadrat and

habitat area value for those sites surveyed less than three times. Difficulties in gaining land access did not affect the selection of SOVs.

Table 4 – 2006 Survey Breakdown: Sites of Ornithological Value (SOVs) and Quadrats.

SOV / Quadrat	Section	Survey Month/Surveyed		
		April	May	June
Blue Hill	SL1	Surveyed three times in 2004 as part of the assessment of the former Myrtle Route.		
Hare Moss	SL1			
Heatherknowe	SL2	×	✓	✓
South Greenloaning	SL2	✓	✓	✓
Hill of Blairs	SL2	✓	✓	✓
Burnhead	SL2	×	×	✓
Blakiewell Burn	SL3	✓	✓	✓
Cleanhill Wood	SL3	×	×	✓
Crynnoch Burn	SL3	×	×	✓
River Dee	SL3	×	×	✓
Deeside Old Railway	SL3	✓	✓	✓
Beanshill	SL4	✓	×	✓
East Silverburn	SL5	✓	×	×
Gairnhill & Kingshill Wood	SL5	✓	✓	✓
Moss of Auchlea	SL5	✓	✓	✓
West Hatton Wood	SL6	Surveyed three times in 2004 as part of the assessment of a previous route alignment.		
SL-Bb01	SL1			
SL-Bb02	SL1			
SL-Bb03	SL1			
SL-Bb04	SL1			
SL-Bb05	SL2	✓	✓	✓
SL-Bb06	SL2	✓	✓	✓
SL-Bb07	SL3	✓	✓	✓
SL-Bb08	SL4	✓	×	✓
SL-Bb09	SL4	✓	✓	✓
SL-Bb10	SL5	✓	×	×
SL-Bb11	SL5	✓	✓	✓
SL-Bb12	SL6	Surveyed three times in 2004 as part of the assessment of a previous route alignment.		

2.6.8 As mentioned previously, due to difficulties in gaining access to all areas over the full survey period from February to June 2006, a number of SOVs and Quadrats will be re-surveyed in 2007 (see section 6.2) to fully inform the assessment process. These 2007 surveys will include any high value habitats that did not originally occur within the study corridor.

Evaluation Limitations

2.6.9 No limitations associated with the evaluation of SOVs, Quadrats and Habitat Area that were subject to three full surveys were identified.

2.6.10 As it was not possible to undertake three surveys on all SOVs and Quadrats due to access restrictions, some of the SOVs, Quadrats and their represented Habitat Areas were under-surveyed, leading to an incomplete breeding bird baseline on which to base an accurate evaluation (see section 2.6). However, preliminary analysis of 2007 survey data suggests that there are

unlikely to be significant changes to the evaluations in this report and it is envisaged that the further data will re-confirm the initial assessment.

3 Baseline

3.1 Consultation

3.1.1 SNH did not provide any records of key breeding bird species for the proposed scheme in their consultation correspondence.

3.1.2 Consultation with the RSPB did not identify the presence of any RSPB nature reserves or provide any previous records of breeding bird species within or adjacent to the proposed scheme study area.

3.1.3 The Scottish Ornithologists' Club (SOC) and the RSPB are jointly involved in a 5-year project to produce a Breeding Bird Atlas for Aberdeenshire (which was due for completion in 2006 but as yet as not been published). Records of confirmed, possible and probable breeding bird species are available for a selection of areas within the route corridor (not all areas within the route corridor have been surveyed to date) based on a 2km by 2km (tetrad) grid sampling system.

3.1.4 Existing survey data were not obtained from SOC and the RSPB for the following reasons:

- the data were not of sufficient detail in terms of the specific location of bird species for an EIA (i.e. the tetrads were too large); and
- data derived from SOC/RSPB's and Jacobs methodologies are incompatible due to differences employed to gather the data. SOC/RSPB used the Brown and Shepherd (1993) method for surveying upland breeding wader populations while the CBC methodology was used for this assessment.

3.2 Incidental Observations

3.2.1 Records of key bird species that were made incidentally by other surveyors during spring and summer 2006 are shown in Table 5.

Table 5 – Incidental Records of Important Bird Species

Month / Year	Species Name	Scientific Name	Status	Location (NGR)	Comment
July 2006 August 2006	barn owl		WCA1i JNCC Amber list, LBAP	NO 892 992 NJ 852 054	Recorded in flight at Greenloaning, approximately 500m north of Clochandighter Wood and flying from Kingshill Wood to Moss of Auchlea across the proposed route corridor.
April 2006	kingfisher		WCA1i, JNCC Amber list	NO 853 005	Recorded feeding on the River Dee south of Camphill west of the current road bridge (note that surveys confirmed breeding east of the Bridge).
May 2006	osprey		WCA1i, JNCC Amber list	NO 938 011	Recorded over Loriston Loch.
April 2006	linnet		JNCC Red list, N.BAP	NO 845 047	Recorded singing on Beanshill.
April 2006	reed bunting		JNCC Red list, N.BAP	NO 845 047	Recorded singing on Beanshill.
-	skylark		JNCC Red list, N.BAP	-	Recorded in most sections of the survey corridor on a number of occasions

Month / Year	Species Name	Scientific Name	Status	Location (NGR)	Comment
May 2004 June 2004	song thrush		JNCC Red list, N.BAP	NJ 922 004) NJ 857 002	Recorded singing on Blue Hill and singing at the Old Mill Inn at the Dee bridge.
June 2006	bullfinch		JNCC Red list, N.BAP	NJ 857 002	Recorded near the Old Mill Inn at the Dee bridge.
April2006, May 2006, June 2006	yellowhammer		JNCC Red list, LBAP	NJ 848 039 NJ 845 022 NO 897 990	Recorded north of Beanshill, at Nether Beanshill and east of Heatherknowe.
May 2005, June 2006	starling		JNCC Red list	NO 853 009 NO 868 981	Flocks recorded foraging north of Camphill and at Burnhead.
May 2006	curlew		status JNCC amber list, LBAP	NO 897 990 NJ 852 048	Recorded east of Heatherknowe and west of Gairnhill/Kingshill Wood.
May 2006	lapwing		JNCC amber list, LBAP	NO 872 982 NJ 849 052	were recorded near Burnhead and south of Craiglug
April 2006	stock dove		JNCC amber list	NO 867 985	Recorded at Blaikiewell.
June 2006	goldcrest		JNCC amber list	NO 869 992 NO 855 988	Recorded in Cleanhill Wood and Millbank.
June 2006	dunnock		JNCC amber list	NO 869 992 NJ 857 002	Recorded in Cleanhill Wood and near the Old Mill Inn at the Dee bridge.
Apriil 2006	meadow pipit		JNCC amber list	NO 889 989 NJ 845 035	Recorded at Greenloaning and on Beanshill.
-	herring gull		JNCC amber list	NJ 856 010	Recorded foraging across much of the survey corridor, recorded north of the River Dee.
June 2004	oystercatcher		JNCC amber list	NJ 856 010 NJ 857 002 NJ 924 004	Recorded north of the River Dee, near the Old Mill Inn at the Dee bridge and on Blue Hill.
April 2006	woodcock		JNCC amber list	NO 885 987	Recorded near Greenloaning.
-	swallow		JNCC amber list	NO 882 987	recorded at Merchant's Croft and observed frequently throughout the survey corridor
June 2006	grey wagtail (pair)		JNCC amber list	NJ 857 002	Recorded near the Old Mill Inn at the Dee bridge.
June 2006, May 2004	willow warbler		JNCC amber list	NJ 857 002 NJ 924 004	Recorded near the Old Mill Inn at the Dee bridge and on Blue Hill.

Month / Year	Species Name	Scientific Name	Status	Location (NGR)	Comment
June 2006	mistle thrush			NO 881 990	Recorded on Hill of Blairs.

3.3 Survey of Breeding Bird Assemblages

Sites of Ornithological Value (SOV)

3.3.1 A total of 16 SOVs were identified in the Southern Leg study area, within or adjacent to the proposed route corridor (Figures 25.6a-h) and account for an equivalent of approximately 22% of the survey corridor area. A description of each of the SOV is shown in Table 6. Three SOVs (Blue Hill, Hare Moss and West Hatton Wood, highlighted in bold) were previously surveyed in 2004.

Table 6 – Description of Sites of Ornithological Value (SOVs)

SOV Name	Section	Grid Reference	Size (ha)
Blue Hill	SL1	NJ 926 002	6
Hare Moss	SL1	NO 908 994	21.3
Heatherknowe*	SL2	NO 895 989	2.5
South Greenloaning	SL2	NO 886 986	6
Hill of Blairs	SL2	NO 882 989	15.9
Burnhead*	SL2	NO 875 982	6.5
Blakiewell Burn	SL3	NO 867 987	9.6
Cleanhill Wood*	SL3	NO 868 990	44.8
Crynnoch Burn*	SL3	NO 860 996	16.4
River Dee	SL3	NJ 858 003	16.3
Deeside Old Railway	SL3	NJ 854 010	1.8
Beanshill*	SL4	NJ 847 037	18.3
East Silverburn*	SL5	NJ 848 045	3.8
Gairnhill & Kingshill Wood	SL5	NJ 853 048	24.1
Moss of Auchlea	SL5	NJ 848 053	8.9
West Hatton Wood	SL6	NJ 858 067	5.6

* denotes SOVs surveyed on fewer than 3 occasions

3.3.2 Table 7presents the results of the breeding bird surveys undertaken on each SOV in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) and non-breeding (N). The scientific names of bird species are presented in Annex 1.

Table 7 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Birds within each Site of Ornithological Value (SOV)

Species	Status	SOV															
		Blue Hill	Hare Moss	Heatherknowe	South Greenloaning	Hill of Blairs	Burnhead	Blakiewell Burn	Cleanhill Wood	Crynnoch Burn	River Dee	Deeside Old Railway	Beanshill	East Silverburn	Gairnhill & Kingshill Woods	Auchlea Moss	West Hatton Wood
blackbird		P	B	P		B		B	P		B	B	B		B	B	P
blackcap						P				P		P				P	
bullfinch	x & Ψ	P								P						P	P
black-headed gull	+										N						
blue tit		B	P	P		P		P	P	P	P	B	P	P	B	B	B
buzzard		B						N	P	P		P	B		P	N	
carrion crow		P	P	P	N	N			N	N	N		P		B	P	P
chiffchaff		P	B						P								
chaffinch		B	B	B	B	B		B	B		B	B	B	P	B	B	B
common gull	+										N						
common tern											N						
crossbill	%					N											
common sandpiper											P						
coal tit		B		P	P	B		B	P	B		P	B	P	B	B	P
curlew	+ Ψ		P												P	B	
dunnock	+	P	P	B	B	P		N	P	P	N	B		P	P	P	
dipper										P	P						
goldcrest	+	P		P		P		B	B	P			P		B	P	B
goosander											P						
grasshopper warbler	x															P	
grey wagtail	+										P						
goldfinch							N				P	P				P	
greenfinch		P						P	P		P	B			P	P	P
greater spotted woodpecker		P				B			P	P					P		
great tit		P		P		P		P	P	P	P	B	P	P	B	B	B
garden warbler				P					P							P	
grey heron			P								N						
herring gull	+										N	P					
house martin	+						N										
jay										P					B		
jackdaw				P	N	N				P	N	P	P				

Species	Status	SOV															
		Blue Hill	Hare Moss	Heatherknowe	South Greenloaning	Hill of Blairs	Burnhead	Blakiewell Burn	Cleanhill Wood	Crynnoch Burn	River Dee	Deeside Old Railway	Beanshill	East Silverburn	Gairnhill & Kingshill Woods	Auchlea Moss	West Hatton Wood
kingfisher	% + Ψ										B						
lapwing	+ Ψ						P								B	B	
linnet	x & Ψ		B		B	P							B		P		
lesser redpoll	+ Ψ							P							B	P	
long-tailed tit		P						P		P		P				B	
mistle thrush	+	P								P							
mallard			P					N			P				P	P	
magpie					N			N	N	P					P	P	
meadow pipit	+		B		B	P	P						B				
oystercatcher	+		B							N	N	P	N				
pheasant		P	P	P		P									P	P	
pied wagtail					N											P	B
robin		B		P	p	B			P	B	P	B		P	B	P	P
reed bunting	x & Ψ		B				P				P					B	
red-legged partridge					N												
rook											P		B				P
skylark	x & Ψ		B			P	P						B			P	
stonechat	+								P								
starling	x		B	P	N	N	N				N	P	P		B		
sparrowhawk															N		
swift											N				P		
siskin															P	P	
swallow	+		B		N	N				N		P				N	P
sand martin	+										N						
snipe	+ Ψ		P											P			
song thrush	x & Ψ	P			B	P			N	P	P	P	P		B	P	P
sedge warbler			P								P	P					
treecreeper		P		P		P		P	P	P					P	P	
tawny owl															P		
tufted duck											N						
wheatear													P		P		
whinchat													P				
whitethroat			P		N					P	P	B					
woodcock	+				N												
woodpigeon			P	P		P	N	N	P	P	P	P			B	P	B
wren		B	B	B	B	B		P	P	B	B	B	P	P	B	B	B
willow warbler	+	P	B	P	B	B		B	P	P	P	P			B	B	B

Species	Status	SOV															
		Blue Hill	Hare Moss	Heatherknowe	South Greenloaning	Hill of Blairs	Burnhead	Blakiewell Burn	Cleanhill Wood	Crynnoch Burn	River Dee	Deeside Old Railway	Beanshill	East Silverburn	Gairnhill & Kingshill Woods	Auchlea Moss	West Hatton Wood
yellowhammer	x Ψ	P			P	P				P			P	P		P	

Key: % = WCA1i; x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

Quadrats

3.3.3 A total of 12 Quadrats were established within the Southern Leg study area (Figures 25.6a-h). A description of each of the Quadrat is shown in Table 8. Five of the Quadrats (SL-Bb01 – SL-Bb04 and SL-Bb12, highlighted in bold) were previously surveyed in 2004.

Table 8 – Description of Quadrats

Quadrat	Section	Grid Reference
SL-Bb01	SL1	NJ 933 005
SL-Bb02	SL1	NO 929 997
SL-Bb03	SL1	NO 919 997
SL-Bb04	SL1	NO 904 999
SL-Bb05	SL2	NO 886 988
SL-Bb06	SL2	NO 871 985
SL-Bb07	SL3	NO 858 995
SL-Bb08*	SL4	NJ 851 010
SL-Bb09	SL4	NJ 848 025
SL-Bb10*	SL5	NJ 846 041
SL-Bb11	SL5	NJ 849 056
SL-Bb12	SL6	NJ 859 073

* denotes Quadrats surveyed on fewer than three occasions

3.3.4 Table 9 presents the results of the breeding bird surveys undertaken on each Quadrat in terms of species recorded, their status and whether they were recorded as breeding (B), possible breeding (P) or non-breeding (N). Scientific names of bird species are presented in Annex 1.

Table 9 – Bird Species Recorded Breeding (B), Possible Breeding (P) and Non-breeding (N) Birds within each Quadrat

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
blackbird			B	P	B		P	B	B	B		B	B
blackcap								P	P	N			
black-headed gull	+		N	N							N		
blue tit		P	B	B	B	P	P	B	P	B		P	B
bullfinch	x & Ψ		B										
buzzard		P				N			P			N	P
carrion crow		P	B	B	B					B			B
chaffinch		P	B	B	B	P	B	B	B	B	P	B	B
chiffchaff			B		P			P					
coal tit		P		P	P	P	B	P	P	B		P	P
collared dove								P					
common gull	+				N								
common sandpiper													
snipe	+ Ψ		P		P								
common tern													
crossbill	%												
cuckoo	+												
curlew	+ Ψ		P		P							P	P
dipper													
dunnock	+		B	P	B	P	P	P		B		B	B
feral pigeon						P							
garden warbler							P					P	
goldcrest	+			B				P					B
goldfinch					P	P	P			P		P	
goosander													
grasshopper warbler	x Ψ												
greater spotted woodpecker								P					
great tit			B				B	P	N	B		P	B
greenfinch			P	P	B		P	B	P	B		P	P

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
greenshank	%											N	
grey heron													
grey partridge	x & Ψ												P
grey wagtail	+							B					
herring gull	+	N		N								N	
house martin	+	P											B
house sparrow	x	P			P		P	P					
jackdaw				P		P		P	P	B			
jay													
kestrel	+												B
kingfisher	% +												
lapwing	+ Ψ			P	B							P	
lesser redpoll	+						P						
linnet	x & Ψ			P	P	N	B				P	P	P
long-tailed tit								B					
magpie				B	B	N			P	N	P		P
mallard								P			P	N	P
meadow pipit	+	B	B	P	B		B	P			P	B	P
mistle thrush	+	P	P									P	
moorhen								B					
mute swan	+												
oystercatcher	+	B	B	P	P		P	B	N	P		P	
pheasant		P		P			B					P	
pied wagtail			B		B	P		B		P		P	B
red-legged partridge													
redstart	+												
reed bunting	x & Ψ		B		P							P	
robin		P		P	B	P	P	P	B	B		P	B
rook					P		B		N	N		B	
sand martin	+	P											
sedge warbler		B	B				P	P					
siskin													

Common Name	Status	Quadrat											
		1	2	3	4	5	6	7	8	9	10	11	12
skylark	x & Ψ	B	B		B	P	B	B				B	P
song thrush	x & Ψ		P	P	P	B		P	P	P		P	
sparrowhawk													
starling	x	B	P		P	B	P	N		B		N	
stock dove	+								P	P			
stonechat	+												
swallow	+	B	B	P	B	B	P	N	N	N		N	B
swift		P		P									
tawny owl												P	
teal	+										P		
treecreeper													
tufted duck													
wheatear						P					P		P
whinchat													
whitethroat			B			P			P	P		P	
willow warbler	+	P	B		B			B		P		P	B
wood warbler	+			P									
woodcock	+												
woodpigeon			B	B	P		P	P	N	B		B	B
wren		B	B	P	B	B	B	B	B	B		P	B
yellowhammer	x Ψ		P	P	B	B				B		P	

Key: % = WCA1i; x = JNCC Red List; + = JNCC Amber List; & = UKBAP; Ψ = LBAP.

3.4 Habitat Descriptions: SOVs and Quadrats

3.4.1 The following section presents a description of the habitats represented within each SOV and Quadrat together with their associated Habitat Areas.

Section SL1

3.4.2 Section SL1 is characterised by improved grassland fields with some less intensively managed semi-improved fields together with pockets of marshy grassland and scrub. An extensive contiguous area of conifer plantation woodland, comprising Duff's Hill and Blue Hill, is present at the eastern end of the section together with a small remnant area of wet modified bog just west of Quadrat SL-Bb02 and south of the Blue Hill. A number of discrete stands of mature Scots pine are additionally present throughout the section.

3.4.3 Table 10 presents a detailed description of habitats present within each SOV and Quadrat.

Table 10 - Habitat Descriptions for Section SL1

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Blue Hill	S3	Medium	A mosaic of habitats comprising coniferous plantation woodland, mature deciduous and mixed parkland / scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken.
Hare Moss	S10	High	A mosaic of woodland and remnant heathland/bog habitats, comprising wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland/scattered trees and scattered and dense scrub. Two small areas of marsh/marshy grassland are located in the west of the SOV with an area of standing water (bog pool).
SL-Bb01	S2 S5	Low	Habitats within the Quadrat comprise large fields of improved, semi-improved (acid) grassland with areas of scattered scrub and marsh / marsh grassland around a pond at Gallowhill. An area of bare ground with a boundary of parkland / scattered trees is present in the north-west of the Quadrat.
SL-Bb02	S2	Low	Habitats within the Quadrat comprise fields of improved and poor semi-improved grassland boarded by stone walls with occasional patches of scattered scrub. Areas of semi-improved grassland with lines of parkland / scattered trees are present adjacent to the A90 and A956. Two small fields of marsh / marshy grassland and semi-improved acid grassland are located immediately south of the A956. Isolated stands of mixed plantation woodland are present in fragments of land at the A90/A956 junction.
SL-Bb03	S6 S7 S9	Medium	Habitats within the Quadrat comprise conifer plantation woodland with some neutral semi-improved grassland along rides and pockets of broad-leaved plantation woodland. Others habitats within the Quadrat comprise improved fields and small areas of marshy grassland.
SL-Bb04	S10 S13	Low	Habitats comprise arable and improved grassland fields with farm buildings. Other habitats within the Quadrat comprise areas of scrub and some mixed and coniferous plantation woodland and the Burn of Ardoe.

Section SL2

3.4.4 Section SL2 is characterised by improved agricultural grassland fields separated by stonewalls with patches of dense and scattered scrub (that become extensive in places) and occasional species rich hedgerow. Extensive areas of conifer plantation woodland, comprising Clochandighter Wood and Hill of Blairs, are present in the southeast and northwest of the section together with areas of

semi-natural / plantation broad-leaved woodland at Greenloaning and Heatherknowe in the north-east. Table 11 presents a detailed description of habitats present within each SOV and Quadrat.

Table 11 – Habitat Descriptions for Section SL2

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Heatherknowe SOV	S11	Medium	SOV comprise a small block of scrubby broad-leaved plantation woodland. Occasional conifers are present but mostly confined to the western end of the SOV. The ground layer is dominated by ericaceous species and bracken.
South Greenloaning SOV	S15	Medium	Both halves of the SOV comprise areas of dense gorse scrub and bracken. The eastern half however is dominated by two improved grassland fields.
Hill of Blairs SOV	S15	High	SOV comprises a large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath. Large areas of bracken are present in the east of the SOV together with an area of fen occupying a shallow hollow in the centre of the SOV.
Burnhead SOV	S19 S20	Low	SOV comprises an area of rush dominated improved grassland fields with a seasonal flooded area.
SL-Bb05	S15	Low	Quadrat SL-Bb05 partially occurs within Hill of Blairs and South Greenloaning SOVs and with the exception of these areas is comprised predominantly of improved grassland with small pockets of dense / scattered scrub and bracken.
SL-Bb06	S19 S20	Medium	Quadrat SL-Bb06 partially occurs within Blaikiewell Burn and Cleanhill SOVs. South of the Blaikiewell Burn, the Quadrat is comprised predominantly of poor semi-improved/semi-improved grassland and arable fields bounded by species rich hedgerows with trees. A shelterbelt of mixed plantation woodland is located in the south-east. North of the burn, the Quadrat comprises a large area of conifer plantation woodland.

Section SL3

3.4.5 Section SL3 is characterised by extensive areas of conifer/mixed plantation and semi-natural broad-leaved woodland with large areas of parkland and scattered trees and amenity grassland (represented by Cleanhill Wood and Kingcausie). This section also comprises improved, and to a lesser degree poor semi-improved/semi-improved agricultural grassland fields, many of which are separated by dry stone walls with occasional areas of dense and scattered scrub confined to the south and west of the section. The north of the section is dominated by the River Dee and its tributaries (Crynoch Burn/Blaikiewell Burn) with extensive areas of semi-natural broad-leaved woodland (to the south of the river) and semi-improved grassland (to the north of the river).

3.4.6 Table 12 presents a detailed description of habitats present within each SOV and Quadrat.

Table 12 – Habitat Descriptions for Section SL3

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
Blaikiewell Burn SOV	S22	Medium	SOV comprises a riparian habitat mosaic with areas of dense scrub, marsh / marshy grassland, introduced scrub and parkland / scattered trees.
Cleanhill Wood SOV	S20	High	SOV comprises a mature conifer plantation woodland that contains significant amounts of semi-natural broadleaved woodland. The ground flora is very variable, ranging from heath, acid grassland to bare soil. Rhododendron can also be extensive as a shrub layer.
Crynoch Burn SOV	S22	High	SOV comprises riparian woodland dominated by semi-

SOV / Quadrat	Representative Habitat Areas	Value	Habitat Description
	S24 S27		natural broadleaved woodland that lines much of the burn. Areas of amenity grassland are present within the west of the SOV (Storybook Glen). Towards the River Dee the SOV also includes an area of conifer plantation woodland with parkland and scattered broad-leaved and conifer trees associated with Kingcausie.
River Dee SOV	S27 S28	High	SOV comprises a corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river). Also present are areas of scrub, arable farmland, conifer plantation and open water.
Deeside Old Railway SOV	S31	Medium	SOV comprises a corridor of semi-natural broad-leaved woodland, scrub, tall ruderal and ephemeral / short perennial vegetation.
SL-Bb07	S21 - 23	Medium	Quadrat SL-Bb07 partly occurs within Crynnoch Burn SOV. The Quadrat comprises predominantly improved grassland, but also includes part of the Storybook Glen theme park, which consists of amenity grassland and some mixed plantation with a number of ponds and streams.

Section SL4

3.4.7 Section SL4 is characterised by residential housing (some with mature established gardens), large sports complexes, schools, nursing homes and hotels in the south of the Section. Remaining habitats north of Milltimber comprise improved grassland and occasional arable fields separated by dry stone walls – with tree-lines and scattered scrub along field margins, and areas of broad-leaved and coniferous plantation woodland with pockets of semi-natural broad-leaved woodland. A large area of wet heath/acid grassland and coniferous plantation woodland (Beanshill) is present in the north of the section.

3.4.8 Table 13 presents a detailed description of habitats present within each SOV and Quadrat.

Table 13 – Habitat Descriptions for Section SL4

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
Beanshill SOV	S39	Medium	An acid grassland, part of which is semi-improved and part forming a mosaic with wet heath vegetation. There is also some scrub, marshy grassland and coniferous plantation woodland.
SL-Bb08	S29 - 33	Medium	Quadrat SL-Bb08 partly occurs within Deeside Old Railway SOVs. The Quadrat comprises improved and poor semi-improved grassland fields and built up areas. The Quadrat additionally includes some broad-leaved woodland and part of a golf course comprising amenity grassland and parkland / scattered trees.
SL-Bb09	S36 S37	Medium	Quadrat SL-Bb09 consists mainly of improved grassland with some arable land. There is a significant amount of scrub along field and road edges and a small block of broad-leaved woodland.

Section SL5

3.4.9 Section SL5 is characterised by improved grassland with occasional arable fields, scattered clumps and boundary lines of scrub and conifer plantation. There are numerous small burns and drains through this area. Table 14 presents a detailed description of habitats within each SOV and Quadrat.

Table 14 - Habitat Descriptions for Section SL5

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
East Silverburn SOV	S42	Medium	An area of rough poor semi-improved grassland, dense scrub and parkland / scattered trees together with an area of broad-leaved plantation woodland along Silver Burn.
Gairnhill/Kingshill Wood SOV	S43	Medium	An expansive area of coniferous plantation woodland, with occasional areas of broad-leaved plantation woodland and scrub.
Moss of Auchlea SOV	S45	High	High scrub of willow on wet grassland. Areas of birch are also present. Where trees have been removed, marsh dominates, although areas of swamp are also present.
Quadrat SL-Bb10	S39 S40	Medium	Quadrat SL-Bb10 comprises primarily improved grassland which is bisected by a number of small burns. Two small ponds with patches of rushes and scrub are present in the west while wet heath / acid grassland mosaic adjacent is present in the south adjacent to Beanshill SOV.
Quadrat SL-Bb11	S44	Low	Quadrat SL-Bb11 partly occurs within Moss of Auchlea SOV. The remaining habitats outside the SOV are for the most part comprised of improved grassland with a few patches of scrub and a strip of mixed plantation.

Section SL6

3.4.10 Section SL6 is characterised by fields of improved and poor semi-improved grassland with tree / scrub lined stonewall boundaries and areas of dense and scattered scrub. A mixed shelterbelt plantation with an area of unimproved grassland and scattered trees additionally occur on Cloghill. Table 15 presents a detailed description of habitats within each SOV and Quadrat.

Table 15 - Habitat Descriptions for Section SL6

SOV / Quadrat	Represented Habitat Areas	Value	Habitat Description
West Hatton Wood SOV	S47	Medium	A mosaic of semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub.
Quadrat SL-Bb12	S46 S47 S48	Low	Quadrat SQL partly occurs within West Hatton Wood SOV. The remaining habitats within the Quadrat comprise predominantly improved and poor semi-improved grassland fields with a shelterbelt of mixed plantation on the slopes of Cloghill. Semi-improved grassland with scattered trees and scrub and a small area of broadleaf woodland are located immediately adjacent to Kingswells.

3.5 Survey Results

Consultation

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

3.5.2 Records of breeding bird species were not obtained from the RSPB/SOC as the data were not considered to be sufficient in terms of location detail, and the methods used to collect the data differed from the methods used by Jacobs, as outlined in section 2.2.

Site Access

3.5.3 Due to complications in gaining land access to the route corridor, not all SOVs and Quadrats were subject to three full surveys as outlined in the methods section, which has resulted in an incomplete baseline.

Incidental Observations

3.5.4 24 key bird species were recorded throughout the route section during the other ecological surveys, of which:

- two were WCA1i (barn owl and osprey);
- seven were JNCC Red List Species (bullfinch, linnet, reed bunting, skylark, starling, song thrush and yellowhammer); and
- 17 were JNCC Amber List Species (barn owl, curlew, dunnock, goldcrest, greylag goose, grey wagtail, herring gull, kingfisher, lapwing, mistle thrush, meadow pipit, oyster catcher, osprey, stock dove, swallow, woodcock and willow warbler).

Survey Results

3.5.5 Breeding bird surveys were conducted on 16 SOVs (excluding Camphill SOV, which was not surveyed due to access restrictions) within or adjacent to the study corridor and 12 Quadrats established along the original consultation route.

3.5.6 A total of 69 bird species (59 were recorded as breeding or possibly breeding) were recorded throughout the 16 SOVs, of which:

- one was a WCA1i species (kingfisher);
- eight were JNCC Red List species (bullfinch, grasshopper warbler, linnet, reed bunting, skylark, starling, song thrush, and yellowhammer); and
- 20 were JNCC Amber List species (common gull, common snipe, cuckoo, curlew, dunnock, goldcrest, grey wagtail, herring gull, house martin, kingfisher, lapwing, meadow pipit, mistle thrush, oystercatcher, sand martin, stonechat, swallow, willow warbler and woodcock).

3.5.7 A total of 62 bird species (58 were recorded as breeding or possibly breeding) were recorded throughout the 12 Quadrats, of which:

- one WCA1i species (greenshank) was recorded (non-breeding);
- nine were JNCC Red List species (bullfinch, house sparrow, linnet, grey partridge, reed bunting, skylark, starling, yellowhammer and song thrush); and
- 16 were JNCC Amber List species (common snipe, curlew, dunnock, goldcrest, grey wagtail lapwing, house martin, meadow pipit, mistle thrush, oystercatcher, sand martin, stock dove, swallow, teal, willow warbler and wood warbler).

Habitat Description

3.5.8 The majority of the study area comprises farmland of improved / poor semi-improved grassland and arable (although to a lesser degree with the exception of north of Kingswells) which support areas of dense and scattered frequently located along field boundaries together with parkland / scattered trees. Hedgerows are uncommon in particular species rich hedgerows. Identified SOVs represent the majority of semi-natural habitats within the route corridor which include the following broad habitats; woodland, scrub, heathland, marsh, bog and riparian habitats.

3.5.9 A number of watercourses are present within the route corridor, including the River Dee and Crynoch Burn which are part of the River Dee SAC.

4 Evaluation

4.1 Introduction

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

4.2 Evaluation of SOVs/Quadrats

4.2.1 Species recorded in each of the sections (SOV and Quadrats) are presented in Table 7 and Table 9.

4.2.2 Table 16 provides a list of key bird species that were recorded within each Quadrat or SOV. Where a key bird species was recorded as an incidental sighting only (marked with an asterisk in the text) it has been assigned to the appropriate Quadrat or SOV. Incidental sightings without grid references have not been included in the evaluation below as the information could not be identified with a particular SOV or Quadrat.

Section SL1

4.2.3 Two SOVs (Blue Hill and Hare Moss) and four Quadrats (SL-Bb01 - SLBb04) are located within Section SL1 and are evaluated below.

4.2.4 Blue Hill SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Areas S2 and S3.

4.2.5 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species, of which none were WCA1i species, four were JNCC Red List species (bullfinch, song thrush, starling, yellowhammer), five were JNCC Amber List species (dunnock, goldcrest, mistle thrush, willow warbler, and oystercatcher*, two were UK BAP species (bullfinch, song thrush), three were LBAP species (bullfinch, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a mosaic of habitats dominated by coniferous plantation woodland, mature deciduous and mixed parkland / scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken. (Table 10). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

4.2.6 Hare Moss SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S10.

4.2.7 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, four were JNCC Red List species (linnet, reed bunting, skylark, starling), seven were JNCC Amber List species (curlew, dunnock, meadow pipit, oystercatcher, snipe, swallow, willow warbler), three were UK BAP species (linnet, reed bunting, skylark), five were LBAP species (curlew, linnet, reed bunting, skylark, snipe) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a mosaic of wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland/scattered trees, scattered and

dense scrub, marsh/marshy grassland and standing water (bog pool) (Table 10). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

4.2.8 Quadrat SL-Bb01 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S2 and S5.

4.2.9 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 20 breeding bird species of which none were CWA1i species, three were JNCC Red List species (house sparrow, skylark, starling), nine were JNCC Amber List species (dunnock, house martin, mistle thrush, meadow pipit, oystercatcher, sand martin, swallow, willow warbler, herring gull), one was a UK BAP species (skylark), one was a LBAP species (skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising large fields of improved, semi-improved acid grassland with areas of scattered scrub and marsh / marsh grassland around a pond at Gallowhill together with an area of bare ground and parkland / scattered trees (Table 10). The breeding assemblage found in Quadrat SL-Bb01 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

4.2.10 Quadrat SL-Bb02 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Area S2.

4.2.11 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 27 breeding bird species of which one was a CWA1i species (osprey*, recorded over Loirston Loch), six were JNCC Red List species (bullfinch, reed bunting, skylark, song thrush, starling, yellowhammer), ten were JNCC Amber List species (curlew, mistle thrush, meadow pipit, oystercatcher, swallow, snipe, willow warbler, dunnock, blackheaded gull, and osprey*), four were UK BAP species (bullfinch, reed bunting, skylark, song thrush), seven were LBAP species (bullfinch, reed bunting, skylark, song thrush, yellowhammer, snipe, curlew) and one was a local status species (osprey*). The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising fields of improved, poor semi-improved and semi-improved acid grassland boarded by stone walls with occasional patches of scattered scrub and marsh / marshy grassland, areas of semi-improved grassland with lines of parkland / scattered trees and islands of mixed plantation woodland in isolated junction fragments (Table 10). The breeding assemblage found in Quadrat SL-Bb02 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

4.2.12 Quadrat SL-Bb03 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S6, S7 and S9.

4.2.13 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 23 breeding bird species of which none were CWA1i species, three were JNCC Red List species (linnet, song thrush, yellowhammer), nine were JNCC Amber List species (dunnock, goldcrest, lapwing, meadow pipit, oystercatcher, swallow, wood warbler, blackheaded gull, herring gull), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, yellowhammer, lapwing) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising conifer plantation woodland with some neutral semi-improved grassland and pockets of broad-leaved plantation woodland with improved fields and small areas of marshy grassland (Table 10). The breeding assemblage found in Quadrat SL-Bb03 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

4.2.14 Quadrat SL-Bb04 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S10 and S13.

4.2.15 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 29 breeding bird species of which none were CWA1i species, seven were JNCC Red List species (house sparrow, linnet, reed bunting, skylark, song thrush, starling, yellowhammer), nine were JNCC Amber List species (curlew, dunnock, lapwing, meadow pipit, oystercatcher, swallow, snipe, willow warbler, common gull), four were UK BAP species (linnet, reed bunting, skylark, song thrush), eight were LBAP species (linnet, reed bunting, skylark, song thrush, curlew, lapwing, snipe, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising arable and improved grassland fields/farm buildings, areas of scrub, mixed and coniferous plantation woodland and the Burn of Ardoe (Table 10). The breeding assemblage found in Quadrat SL-Bb04 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Section SL2

4.2.16 Four SOVs (Heatherknowe, South Greenloaning, Hill of Blairs and Burnhead) and two Quadrats (SL-Bb05 and SL-Bb06) are located within Section SL2 and are evaluated below.

4.2.17 Heatherknowe SOV was subject to only two breeding bird surveys and therefore the evaluation below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S11.

4.2.18 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 19 breeding bird species of which none were WCA1i species, two were JNCC Red List species (starling, yellowhammer*), four were JNCC Amber List species (dunnock, goldcrest, willow warbler, curlew*), none were UK BAP species, two were LBAP species (yellowhammer*, curlew*) and none were local status species. Two of the species (yellowhammer*, curlew*) were recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a small block of scrubby broad-leaved plantation woodland with occasional conifers and a ground layer dominated by ericaceous species and bracken (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

4.2.19 South Greenloaning SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S15.

4.2.20 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 11 breeding bird species of which one was a WCA1i species (barn owl*), four were JNCC Red List species (linnet, song thrush, yellowhammer, starling), six were JNCC Amber List species (dunnock, willow warbler, meadow pipit, swallow, woodcock, barn owl*), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, yellowhammer, barn owl*) and none were local status species. One of the species (barn owl*) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising areas of dense gorse scrub and bracken and improved grassland fields (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than local ecological value.

4.2.21 Hill of Blairs SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S15.

4.2.22 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 21 breeding bird species of which one was WCA1i species (crossbill), five were JNCC Red List species (linnet, skylark, song thrush, yellowhammer, starling), six were JNCC Amber List species

(dunnock, goldcrest, meadow pipit, willow warbler, swallow, mistle thrush*), three were UK BAP species (linnet, skylark, song thrush), four were LBAP species (linnet, skylark, song thrush, yellowhammer) and none were local status species. One of the species (mistle thrush*) was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath together with a large areas of bracken and a fen occupying a shallow hollow in the centre of the SOV (Table 11). The breeding assemblage combined with the habitat value considers the SOV to be of county ecological value.

4.2.23 Burnhead SOV was subject to only one breeding bird survey and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Areas S19 and S20.

4.2.24 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with four breeding bird species of which none were WCA1i species, three were JNCC Red List species (reed bunting, skylark, starling), three were JNCC Amber List species (lapwing, meadow pipit, house martin), two were UK BAP species (reed bunting, skylark), two were LBAP species (reed bunting, skylark, lapwing) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising an area of rush dominated improved grassland field with a seasonal flooded area (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than less than local ecological value.

4.2.25 Quadrat SL-Bb05 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Area S15.

4.2.26 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 17 breeding bird species of which none were CWA1i species, four were JNCC Red List species (skylark, song thrush, starling, yellowhammer), two were JNCC Amber List species (dunnock, swallow), three were UK BAP species (linnet, skylark, song thrush), four were LBAP species (linnet, skylark, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising improved grassland with small pockets of dense/scattered scrub and bracken (Table 11). The breeding assemblage found in Quadrat SL-Bb05 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

4.2.27 Quadrat SL-Bb06 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S19 and S20.

4.2.28 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 23 breeding bird species of which none were CWA1i species, four were JNCC Red List species (house sparrow, linnet, skylark, starling), four were JNCC Amber List species (dunnock, lesser redpoll, meadow pipit, oystercatcher, swallow), two were UK BAP species (linnet, skylark), two were LBAP species (linnet, skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising poor semi-improved/semi-improved grassland/arable fields bordered by species-rich hedgerows with trees, mixed plantation woodland and conifer plantation woodland (Table 11). The breeding assemblage found in Quadrat SL-Bb06 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Section SL3

4.2.29 Six SOVs (Blaikiewell Burn, Cleanhill Wood, Crynnoch Burn, River Dee, Camphill and Deeside Old Railway) and one Quadrat (SL-Bb07) are located within Section SL3 and are evaluated below.

4.2.30 Blaikiewell Burn SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S22.

4.2.31 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with 13 breeding bird species of which none were WCA1i species, none were JNCC Red List species, five were JNCC Amber List species (dunnock, goldcrest, lesser redpoll, willow warbler, stock dove*) and none were UK BAP, LBAP or local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a riparian habitat mosaic with areas of dense scrub, marsh/marshy grassland, introduced scrub and parkland/scattered trees (Table 12). One of the species, stock dove* was recorded as an incidental and thus the total number of species presented here differs from the total given in the baseline. The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than less than local ecological value.

4.2.32 Cleanhill Wood SOV was subject to only one breeding bird survey and therefore the evaluation outlined below is considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S20.

4.2.33 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 18 breeding bird species of which none were WCA1i species, one was a JNCC Red List species (song thrush), four were JNCC Amber List species (dunnock, goldcrest, stonechat, willow warbler), one was a UK BAP species (song thrush), one was an LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a riparian habitat mosaic with areas of dense scrub, marsh / marshy grassland, introduced scrub and parkland / scattered trees (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of less than local ecological value.

4.2.34 Crynnoch Burn SOV was subject to only one breeding bird survey and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Areas S22, S24 and S27.

4.2.35 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, three were JNCC Red List species (bullfinch, song thrush, yellowhammer), six were JNCC Amber List species (dunnock, goldcrest, mistle thrush, oystercatcher, swallow, willow warbler), two were UK BAP species (bullfinch, song thrush), three were LBAP species (bullfinch, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising riparian woodland dominated by semi-natural broadleaved woodland with areas of amenity grassland, conifer plantation woodland with parkland and scattered broad-leaved woodland associated with Kingcausie (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of less than county ecological value.

4.2.36 River Dee SOV was subject to only one breeding bird survey and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S27 and S28.

4.2.37 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which one was a WCA1i species (kingfisher), four were JNCC Red List species (reed bunting, song thrush, starling, bullfinch*), ten were JNCC Amber List species (black-headed gull, common gull, dunnock, grey wagtail, herring gull, kingfisher, oystercatcher, sand martin, willow warbler, goldcrest*), three were UK BAP species (reed bunting, song thrush, bullfinch*), four were LBAP species (kingfisher, reed bunting, song thrush, bullfinch*) and one was local status species (kingfisher). The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of high value for birds, comprising a corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river) with areas of scrub, arable farmland, conifer plantation and open water (Table 12). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of less than county ecological value. There is a high diversity of species recorded as non-breeding along the Dee including reports of osprey (JNCC Amber list, WCA1i) hunting. The River Dee is also a designated SAC (Special Area of Conservation), although birds are not a cited interest.

4.2.38 Deeside Old Railway SOV was subject to three breeding bird surveys and therefore the evaluation outlined below should be considered an accurate assessment of the site's ecological value for breeding birds.

4.2.39 The SOV includes all or parts of Habitat Area S31. The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 23 breeding bird species of which none were WCA1i species, two were JNCC Red List species (song thrush, starling), five were JNCC Amber List species (dunnock, herring gull, oystercatcher, swallow, willow warbler), one was a UK BAP species (song thrush), one was a LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a corridor of semi-natural broad-leaved woodland, scrub, tall ruderal and ephemeral / short perennial vegetation (Table 11). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

4.2.40 Quadrat SL-Bb07 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S21, S22 and S23.

4.2.41 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 28 breeding bird species of which none were CWA1i species, four were JNCC Red List species (house sparrow, skylark, song thrush, starling), seven were JNCC Amber List species (dunnock, goldcrest, grey wagtail, meadow pipit, oystercatcher, swallow, willow warbler), two were UK BAP species (skylark, song thrush), two were LBAP species (skylark, song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising predominantly improved grassland, amenity grassland and some mixed plantation with a number of ponds and streams (Table 11). The breeding assemblage found in Quadrat SL-Bb07 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

4.2.42 The remaining Habitat Areas within Section SL3 are dominated by arable, improved and semi-improved grassland fields with occasional area of marsh/marshy grassland, avenues of parkland / scattered trees, residential gardens with pockets of woodland and ancient hedgerows and plantation broad-leaved / coniferous woodland that are considered to be of high value to birds.

Section SL4

4.2.43 One SOVs (Beanshill) and two Quadrats (SL-Bb08 and SL-Bb09) are located within Section SL4 and are evaluated below.

4.2.44 Beanshill SOV was subject to only two breeding bird surveys and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of S39.

4.2.45 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 21 breeding bird species of which none were WCA1i species, six were JNCC Red List species (linnet, skylark, song thrush, starling, yellowhammer, reed bunting*), three were JNCC Amber List species (goldcrest, meadow pipit, oystercatcher), four were UK BAP species (linnet, skylark, song thrush, reed bunting*), five were LBAP species (linnet, skylark, song thrush, yellowhammer, reed bunting*) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising acid grassland, part of which is semi-improved and part forming a mosaic with wet heath vegetation with scrub, marshy grassland and coniferous plantation woodland (Table 13). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

4.2.46 Quadrat SL-Bb08 was subject to only two breeding bird surveys and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S29 –S33.

4.2.47 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with 15 breeding bird species of which none were CWA1i species, two were JNCC Red List species (song thrush, starling*), three were JNCC Amber List species (oystercatcher, stock dove, swallow), one was a UK BAP species (song thrush), one was a LBAP species (song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising improved and poor semi-improved grassland fields and built up areas with broad-leaved woodland and amenity grassland and parkland/scattered trees (Table 13). The breeding assemblage found in Quadrat SL-Bb08 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

4.2.48 Quadrat SL-Bb09 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S36 and S37.

4.2.49 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 21 breeding bird species of which none were CWA1i species, three were JNCC Red List species (song thrush, starling, yellowhammer), five were JNCC Amber List species (dunnock, oystercatcher, stock dove, swallow, willow warbler), one was a UK BAP species (song thrush), two were LBAP species (song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising arable farmland and improved grassland fields with scrub along field and road edges together with small blocks of broad-leaved woodland (Table 13). The breeding assemblage found in Quadrat SL-Bb09 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Section SL5

4.2.50 Three SOVs (East Silverburn, Gairnhill/Kingshill Wood and Moss of Auchlea) and two Quadrats (SL-Bb10 and SL-Bb011) are located within Section SL5 and are evaluated below.

4.2.51 East Silverburn SOV was subject to only one breeding bird survey and therefore the evaluation outlined below should be considered a provisional assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S42.

4.2.52 The breeding bird assemblage recorded in this SOV is considered to be of low diversity, with nine breeding bird species of which none were WCA1i species, one was a JNCC Red List species (yellowhammer), two were JNCC Amber List species (dunnock, snipe), none were UK BAP species, two were LBAP species (snipe, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising an area of rough poor semi-improved grassland, dense scrub and parkland/scattered trees, together with an area of broad-leaved plantation woodland along Silver Burn (refer to Table 14). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the less than local context and therefore is assessed to be of less than local ecological value.

4.2.53 Gairnhill/Kingshill Wood SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S43.

4.2.54 The breeding bird assemblage recorded in this SOV is considered to be of high diversity, with 30 breeding bird species of which none were WCA1i species, three were JNCC Red List species (linnet, starling, song thrush), six were JNCC Amber List species (curlew, dunnock, goldcrest, lapwing, willow warbler, lesser redpoll), two were UK BAP species (linnet, song thrush), four were LBAP species (linnet, song thrush, lapwing, curlew) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising an expansive area of coniferous plantation woodland, with occasional areas of broad-leaved plantation woodland and scrub. The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

4.2.55 Moss of Auchlea SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S45.

4.2.56 The breeding bird assemblage recorded in this SOV is considered to be of high diversity, with 33 breeding bird species of which one was a WCA1i species (barn owl), seven were JNCC Red List species (reed bunting, skylark, song thrush, yellowhammer, bullfinch, grasshopper warbler), eight were JNCC Amber List species (curlew, dunnock, goldcrest, lapwing, willow warbler, swallow, lesser redpoll, barn owl), four were UK BAP species (reed bunting, skylark, song thrush, bullfinch), eight were LBAP species (reed bunting, skylark, song thrush, yellowhammer, curlew, lapwing, bullfinch, barn owl*) and one was a local status species (grasshopper warbler). The habitats within the Quadrat are assessed as being of high value for birds, comprising broad-leaved woodland/scrub with wet grassland, marsh and areas of swamp (refer to Table 14). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the county context and therefore is assessed to be of county ecological value.

4.2.57 Quadrat SL-Bb10 was subject to only one breeding bird survey and therefore the evaluation outlined below should be considered a provisional assessment of the ecological value of the site for breeding birds. The Quadrat includes all or parts of Habitat Area S39 and S40.

4.2.58 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with seven breeding bird species of which none were CWA1i species, two were JNCC Red List species (linnet, starling), three were JNCC Amber List species (meadow pipit, teal, black-headed gull), one was a UK BAP species (linnet). The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising improved grassland bisected by a number of small burns, two small ponds with patches of rushes and scrub and wet heath / acid grassland mosaic (refer to Table 14). The breeding assemblage found in Quadrat SL-Bb09 is considered to enrich the biodiversity resource within the less than local context and therefore is considered to be of less than local ecological value.

4.2.59 Quadrat SL-Bb11 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Area S44.

4.2.60 The breeding bird assemblage recorded in this Quadrat is considered to be of medium diversity, with 28 breeding bird species of which one was a WCA1i species (greenshank), six were JNCC Red List species (linnet, reed bunting, skylark, song thrush, starling, yellowhammer), nine were JNCC Amber List species (curlew, dunnock, herring gull, lapwing, meadow pipit, mistle thrush, oystercatcher, swallow, willow warbler), four were UK BAP species (linnet, reed bunting, skylark, song thrush), seven were LBAP species (curlew, lapwing, linnet, reed bunting, skylark, song thrush, yellowhammer) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising improved grassland with a few patches of scrub and a strip of mixed plantation (Table 13). The breeding assemblage found in Quadrat SL-Bb11 is considered to enrich the biodiversity resource within the county context and therefore is considered to be of county ecological value.

Section SL6

4.2.61 One SOV (West Hatton Wood) and one Quadrat (SL-Bb12) are located within Section SL6 and are evaluated below.

4.2.62 West Hatton Wood SOV was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The SOV includes all or parts of Habitat Area S42.

4.2.63 The breeding bird assemblage recorded in this SOV is considered to be of medium diversity, with 17 breeding bird species of which none were WCA1i species, three were JNCC Red List species (bullfinch, song thrush, starling) three were JNCC Amber List species (goldcrest, swallow, willow warbler), two were UK BAP species (bullfinch, song thrush), two were LBAP species (bullfinch, song thrush) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of medium value for birds, comprising a mosaic of woodland and scrub habitats dominated by semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub (Table 15). The breeding assemblage found in this SOV is considered to enrich the biodiversity resource within the local context and therefore is assessed to be of local ecological value.

4.2.64 Quadrat SL-Bb12 was subject to three breeding bird surveys and therefore the evaluation outlined below is considered an accurate assessment of the site's ecological value for breeding birds. The Quadrat includes all or parts of Habitat Areas S46 to S48.

4.2.65 The breeding bird assemblage recorded in this Quadrat is considered to be of low diversity, with 26 breeding bird species of which none were WCA1i species, three were JNCC Red List species (grey partridge, linnet, skylark), ten were JNCC Amber List species (curlew, dunnock, goldcrest, house martin, kestrel, lapwing, meadow pipit, swallow, willow warbler), three were UK BAP species (grey partridge, linnet, skylark), four were LBAP species (curlew, grey partridge, linnet, skylark) and none were local status species. The habitats that comprise the Habitat Areas within the Quadrat are assessed as being of low value for birds, comprising improved and poor semi-improved grassland fields, mixed plantation and semi-improved grassland with scattered trees and areas of broad-

leaved woodland (Table 15). The breeding assemblage found in Quadrat SL-Bb12 is considered to enrich the biodiversity resource within the local context and therefore is considered to be of local ecological value.

Table 16 - Summary Evaluation of Breeding Bird Assemblages and Habitats (SOV, Quadrats)

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Section SL1												
Blue Hill SOV	S2 S3	Medium	-	23	-	-	bullfinch starling song thrush yellowhammer	dunnock goldcrest mistle thrush willow warbler oystercatcher*	bullfinch song thrush	bullfinch song thrush yellowhammer	-	Local
Hare Moss SOV	S10	High	-	23	-	-	linnet reed bunting skylark starling	curlew dunnock meadow pipit oystercatcher swallow snipe willow warbler	linnet reed bunting skylark	linnet reed bunting skylark curlew snipe	-	County
Quadrat SL-Bb01	S2 S5	Low	-	20	-	-	house sparrow skylark starling	dunnock house martin mistle thrush meadow pipit oystercatcher sand martin swallow willow warbler herring gull	skylark	skylark	-	Less than local

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb02	S2	Low	-	27	osprey*	osprey*	bullfinch reed bunting skylark song thrush starling yellowhammer	curlew mistle thrush meadow pipit oystercatcher swallow snipe willow warbler osprey* dunnock blackheaded gull	bullfinch reed bunting skylark song thrush	bullfinch reed bunting skylark song thrush yellowhammer snipe curlew	osprey*	Local
Quadrat SL-Bb03	S6 S7 S9	Medium	-	23	-	-	linnet song thrush yellowhammer	dunnock goldcrest lapwing meadow pipit oystercatcher swallow wood warbler black-headed gull herring gull	linnet song thrush	linnet song thrush yellowhammer lapwing	-	Local

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb04	S10 S13	Low	-	29	-	-	house sparrow linnet reed bunting skylark song thrush starling yellowhammer	curlew dunnock lapwing meadow pipit oystercatcher swallow snipe willow warbler common gull	linnet reed bunting skylark song thrush	linnet reed bunting skylark song thrush curlew lapwing snipe yellowhammer	-	Local
Section SL2												
Heatherknowe SOV	S11	Medium	-	19	-	-	starling yellowhammer*	dunnock goldcrest willow warbler curlew*	-	yellowhammer* curlew*	-	Local
South Greenloaning SOV	S15	Medium	-	11	-	barn owl*	linnet song thrush yellowhammer starling	dunnock willow warbler meadow pipit swallow woodcock barn owl*	linnet song thrush	linnet song thrush yellowhammer barn owl*	-	Local
Hill of Blairs SOV	S15	High	-	21	-	crossbill	linnet skylark song thrush yellowhammer starling	donnock goldcrest meadow pipit willow warbler swallow mistle thrush*	linnet skylark song thrush	linnet skylark song thrush yellowhammer	-	County

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Burnhead SOV	S19 S20	Medium	-	4	-	-	reed bunting skylark starling	lapwing meadow pipit housemartin	reed bunting skylark	reed bunting skylark lapwing	-	Less than local
Quadrat SL-Bb05	S15	Low	-	17	-	-	skylark song thrush starling yellowhammer	dunnock swallow	linnet skylark song thrush	linnet skylark song thrush yellowhammer	-	Less than local
Quadrat SL-Bb06	S19 S20	Medium	Cleanhill Wood SINS[1]	23	-	-	house sparrow linnet skylark starling	dunnock meadow pipit oystercatcher swallow lesser redpoll	linnet skylark	linnet skylark	-	Local
Section SL3												
Blaikiewell Burn SOV	S22	Medium		13	-	-	0	goldcrest willow warbler dunnock stock dove* lesser redpoll	-	-	-	Less than local
Cleanhill Wood SOV	S20	High	SESA	18	-	-	song thrush	dunnock goldcrest stonechat willow warbler	song thrush	song thrush	-	Local

[1] Designated area within quadrat surveyed as part of SOV, not included on Quadrat survey.

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Crynnoch Burn SOV	S22 S24 S27	High	River Dee SAC, SSSI, DWS, SESA	23	-	-	song thrush bullfinch yellowhammer	dunncok goldcrest mistle thrush willow warbler swallow oystercatcher	song thrush bullfinch	song thrush bullfinch yellowhammer	-	County
River Dee SOV	S27 S28	High	River Dee SAC, SSSI, DWS, SESA	25	kingfisher	kingfisher	reed bunting song thrush starling bullfinch*	grey wagtail kingfisher willow warbler dunnock common gull black-headed gull herring gull oystercatcher sand martin goldcrest*	reed bunting song thrush bullfinch*	reed bunting song thrush kingfisher bullfinch*	kingfisher	County
Deeside Old Railway SOV	S31	Medium	Deeside Old Railway DWS	22	-	-	starling song thrush	dunnock oystercatcher swallow willow warbler herring gull	song thrush	song thrush	-	Local

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Quadrat SL-Bb07	S21 S22 S23	Medium	River Dee SAC, SSSI, DWS, SESA[1]	28	-	-	house sparrow skylark song thrush starling	dunnock goldcrest grey wagtail meadow pipit oystercatcher willow warbler swallow	skylark song thrush	skylark song thrush	-	Local
Section SL4												
Beanshill SOV	S39	Medium	-	20	-	-	linnet skylark song thrush yellowhammer starling reed bunting*	goldcrest meadow pipit oystercatcher	linnet skylark song thrush reed bunting*	linnet skylark song thrush yellowhammer reed bunting*	-	Local
Quadrat SL-Bb08	S29 S30 S31 S32 S33	Medium	Deeside Old Railway DWS[1]	15	-	-	song thrush starling	stock dove oystercatcher swallow	song thrush	song thrush	-	Less than local
Quadrat SL-Bb09	S36 S37	Medium		21	-	-	song thrush starling yellowhammer	dunnock oystercatcher stock dove willow warbler swallow	song thrush	song thrush yellowhammer	-	Local
Section SL5												
East Silverburn SOV	S42	Medium	Rotten o' Gairn DWS	9	-	-	yellowhammer	dunnock snipe	-	Snipe yellowhammer	-	Less than local

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Gairnhill/Kingshill Wood SOV	S43	Medium		30	-	-	linnet starling song thrush	curlew dunnock goldcrest lapwing willow warbler lesser redpoll	linnet song thrush	linnet song thrush lapwing curlew	-	County
Moss of Auchlea SOV	S45	High	Moss of Auchlea DWS	33	-	barn owl	reed bunting skylark song thrush bullfinch grasshopper warbler yellowhammer	curlew dunnock goldcrest lapwing willow warbler swallow barn owl lesser redpoll	reed bunting skylark song thrush bullfinch	reed bunting skylark song thrush yellowhammer curlew lapwing bullfinch barn owl	grasshopper warbler	County
Quadrat SL-Bb10	S39 S40	Medium	-	7	-	-	linnet starling	meadow pipit teal black-headed gull	linnet	linnet	1	Less than local
Quadrat SL-Bb11	S44	Low	Moss of Auchlea DWS[1]	28	-	greenshank	reed bunting song thrush yellowhammer skylark linnet starling	curlew dunnock mistle thrush meadow pipit oystercatcher willow warbler lapwing herring gull swallow	reed bunting song thrush skylark linnet	reed bunting song thrush yellowhammer skylark linnet curlew lapwing	-	Local

SOV / Quadrat	Habitat Areas Contributing to the Value of the SOV / Quadrat	Value of Habitats	Designated Sites Within or Adjacent to SOV / Quadrat	Total Number of Breeding Bird Species	Legal / Conservation Status of key bird species (Breeding, Possibly Breeding, Non Breeding and Incidentals)							Value Of Breeding Bird Population
					Ec Birds Directive Annex I	Wca1i	Jncc Red List	Jncc Amber List	Uk Bap	L Bap	Local Status (Uncommon / Rare)	
Section SL6												
West Hatton Wood SOV	S42	Medium	West Hatton Woods DWS	17	-	-	starling song thrush bullfinch	goldcrest swallow willow warbler	song thrush bullfinch	song thrush bullfinch	-	Local
Quadrat SL-Bb12	S46 S47 S48	Low		26	-	-	grey partridge linnet skylark	curlew dunnock goldfinch house martin lapwing meadow pipit swallow willow warbler goldcrest kestrel	grey partridge linnet skylark	grey partridge linnet curlew skylark	-	Local

4.3 Evaluation of Habitat Areas

Section SL1

4.3.1 An evaluation of Habitat Areas within Section SL1 is presented in Table 17.

Table 17 – Evaluation of Habitat Areas for Section SL1

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S1	Low	Birch wood, which, although derived from plantation, is beginning to develop a semi-natural ground flora.	Composed of similar habitats to Blue Hill SOV but is small in size and less diverse and therefore is likely to support a similar but less diverse breeding assemblage. Less than local
S2	Low	A series of largely improved fields, many of which are separated by dry stone walls.	Habitats within the Habitat Area were partially sampled by Blue Hill SOV, Quadrat SL-Bb1 and S2 which are considered to be representative of HA2 and therefore the Habitat Area is likely to support a similar breeding bird assemblage. Local
S3	Medium	A mosaic of habitats comprising coniferous plantation woodland, mature deciduous and mixed parkland / scattered trees, dense scrub, semi-improved neutral grassland and continuous bracken.	The majority of habitats within the Habitat Area are composed of Blue Hill SOV and therefore the area is likely to support a similar breeding bird assemblage. Local
S4	Medium	Small area of modified degraded bog habitats. The west is slightly drier than the east due to a slope, thereby resulting in different bog communities, for example, ericoids are more extensive in the west.	Habitats within S4 were not sampled by either a SOV or Quadrat. The area is composed of similar habitats to Hare Moss SOV, however this area is smaller in size and degraded in nature and is therefore less likely to support a diverse breeding assemblage as the SOV. Local
S5	Low	Dominated by large arable and improved fields, this area also contains a drain-associated marshy grassland with influence of bog species. A woody element is provided by conifers to the south of un-named farm buildings.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb01 which is considered to be representative of S5 and therefore the area is likely to support a similar breeding bird assemblage. Less than local
S6	Medium	Young coniferous plantation with broadleaved edges and occasional blocks. A species poor semi-improved ground flora is limited to these broadleaved sections. A patch of marsh is present to the west, whilst a pond with surrounding wet grassland is located in the northwest.	Habitats within the area were partially sampled by Quadrat SL-Bb03 which is considered to be representative of S6 and therefore the Habitat Area is likely to support a similar breeding bird assemblage. Local
S7	Low	Dense pine plantation with broadleaved edge and a strip of scrub, however, virtually no ground flora is associated with this forest.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb01 which is considered to be representative of S7 and therefore the area is likely to support a similar breeding bird assemblage. Local

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S8	Low	Series of improved, poor semi-improved and arable fields. Walls are present though limited, whilst shrubs are extremely sparse.	Habitats within the area were partially sampled by Quadrat SL-Bb02 and are similar to those represented by Quadrat SL-Bb03, which are considered to be representative of the Habitat Area and therefore the area is likely to support a similar breeding assemblage. Local
S9	Medium	The majority of this area is composed of young spruce plantation with little ground flora. Other habitats present include amenity grassland with scattered trees and more mature conifer plantation with poor to good semi-improved field flora. To the south, semi-improved acid grassland with scrub gives way to a small semi-natural broadleaved woodland.	Habitats within the area were not sampled by either a SOV or Quadrat. However, the habitats within the Habitat Area are similar to habitats represented by part of Quadrat SL-Bb03 (which is considered to be representative) and Blue Hill SOV and therefore this area is likely to support a similar breeding assemblage. Local
S10	High	A mosaic of woodland and remnant heathland/bog habitats, comprising wet modified bog and semi-natural broad-leaved woodland with areas of deciduous parkland / scattered trees and scattered and dense scrub. Two small areas of marsh / marshy grassland are located in the west of the SOV with an area of standing water (bog pool).	Composed entirely of Hare Moss SOV. County

Section SL2

4.3.2 An evaluation of Habitat Areas within Section SL2 is presented in Table 18.

Table 18 – Evaluation of Habitat Areas for Section SL2

Habitat Areas	Habitat Value	Description	Value of Breeding Bird Assemblage
S11	Medium	SOV comprise a small block of scrubby broad-leaved plantation woodland. Occasional conifers are present but mostly confined to the western end of the SOV. The ground layer is dominated by ericaceous species and bracken.	The Habitat Area is comprised entirely of Heatherknowe SOV. Local
S12	Medium	Two distinct areas of woodland. To the east is a dense birch woodland plantation with other occasional broadleaved shrubs. The east is dominated by a semi-natural mix of broadleaves though birch is dominant. Pools, burns and channels are present in both woods.	Habitats within the area were not sampled by either a SOV or Quadrat. However, the habitats within the area are similar to habitats occurring within part of Heatherknowe and Hill of Blairs SOVs and therefore this area is likely to support a similar breeding assemblage, although possibly less diverse. Local
S13	Low	A series of improved and horse-grazed semi-improved fields. Small copses of broadleaves surrounded by walls are present though the ground flora is species poor.	Habitats within the area were not surveyed by either SOV or Quadrat. However, the habitats within the Habitat Area are similar to habitats represented by Quadrat SL-Bb05 which are representative of the area with the exception of small broad-leaved copses and therefore the area is likely to support a similar or more diverse breeding assemblage. Local
S14	Low	Mature conifer plantation woodland. A sizeable portion of this area has been felled, with the remaining portion being dominated by lodgepole pine and spruce. Dry heath dominates the rides and is also present under much of the plantation. A concrete water storage system is at the centre of this area.	Habitats within the area were not surveyed by either SOV or Quadrat. However, the habitats within the area are similar to habitats represented by Hill of Blairs SOV but the habitat mosaic within the area is less diverse and therefore is less likely to support as diverse breeding assemblage. Local
S15	High	A large mosaic of conifer plantation woodland with pockets of semi-improved grassland, dense and scattered scrub and dry/wet dwarf scrub heath together with a large areas of bracken and a shallow fen that occupies the centre of the wood providing high value habitat to breeding birds.	The majority of the habitats within the Habitat Area are composed of Hill of Blairs SOV and therefore the area is likely to support a similar breeding bird assemblage. County
S16	Low	Improved grassland dominates this area. Soft rush dominated marshy grassland is present within the field. Trees and hedgerows are present within some of the fields and surrounding the area, as are dry stone walls.	Habitats within the area were partially sampled by Quadrat SL-Bb05 which although not considered to be representative of the Habitat Area are similar in composition and therefore the area is likely to support a similar breeding assemblage. Local

Section SL3

4.3.3 An evaluation of Habitat Areas within Section SL3 is presented in Table 19.

Table 19 – Evaluation of Habitat Areas for Section SL3

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S17	Low	Dominated by improved fields with a small area of species poor marshy grassland. Separating these fields is an avenue of long established broad-leaved trees with ancient woodland indicator species.	Habitats within the area were not sampled by either SOV or Quadrat. However, the habitats within Habitat Area are similar habitats represented by Quadrat SL-Bb05 and SL-Bb06 and therefore the area is likely to support a similar breeding assemblage. Local
S18	Low	Large expanse of plantation woodland, both of broad-leaved and conifer habitat. The conifers are mature and have little ground flora associated with them, whilst the broadleaved birch dominated wood is relatively young and planted upon marshy and acid grassland. Dry heath is often associated with the paths through the wood.	Habitats within the area were not sampled by either SOV or Quadrat. However the habitats within the area are similar in composition to the habitat mosaic represented by Cleanhill Wood SOV although is less diverse and therefore the Habitat Area is likely to support a similar or less diverse breeding assemblage. Local
S19	Medium	Sequence of horse-grazed semi-improved fields with occasional buildings. The fields rise sharply from Blaikiewell Burn (i.e. not part of the flood plain) but are gently sloping thereafter towards the south. The rides are lined with shrubs approaching hedgerows. An arable field is also present.	Habitats within the area were partially sampled by Quadrat SL-Bb06 which is considered to be representative of the Habitat Area and therefore is likely to support a similar breeding assemblage. Local
S20	High	Comprises a mature conifer plantation woodland that contains significant amounts of semi-natural broadleaved woodland. The ground flora is very variable, ranging from heath, acid grassland to bare soil. Rhododendron can also be extensive as a shrub layer.	Habitats within the area were partially sampled by Cleanhill Wood SOV, which is similar in composition and therefore the Habitat Area is likely to support a similar species assemblage/ Local
S21	Medium	Series of arable and improved fields with shrubs and trees provided by the border with the riparian woodland.	Habitats within the Habitat Area were partially sampled by Quadrat SL-Bb07 and therefore it is likely it supports a similar breeding assemblage. Local
S22	High	Riparian woodland dominated by semi-natural broadleaved woodland that lines much of the burn. Areas of amenity grassland are present within the west of the SOV (Storybook Glen). Towards the River Dee the SOV also includes an area of conifer plantation woodland with parkland and scattered broad-leaved and conifer trees associated with Kingcausie.	Habitats within the area were partially sampled by Quadrat SL-Bb07 and by Crynoch Burn SOV, which are considered to be similar in composition and therefore is likely to support a similar or more diverse breeding assemblage. County

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S23	High	Series of predominantly improved grassland bordered by woodland and with occasional trees and shrubs located on field boundaries. The area also contains a number of dwelling areas with gardens and amenity grasslands. Ancient hedgerows are present within the vicinity of the dwelling houses. Also present is a small broadleaved plantation which is located close to swamp/wet woodland.	Habitats within the area were partially sampled by Quadrat SL-Bb07, which is similar in composition and therefore is likely to support a similar breeding assemblage. County
S24	Medium	Series of predominantly improved grassland bordered by woodland and with occasional trees and shrubs located on field boundaries. The area also contains a number of dwelling areas with gardens and amenity grasslands. Ancient hedgerows are present within the vicinity of the dwelling houses. Also present is a small broadleaved plantation which is located close to swamp/wet woodland.	Habitats within the area were partially sampled by Crynoch Burn SOV and are similar to habitats represented by Quadrat SL-Bb07, although more diverse. Therefore, the Habitat Area is likely to support a similar or more diverse breeding assemblage. County
S25	Low	Caravan park with amenity grassland and scattered trees and shrubs.	Habitats within S25 were not sampled by either SOV or Quadrat. However, the habitats present were similar to those represented by Quadrat SL-Bb07, although are less diverse. Therefore, it is likely that this Habitat Area supports a less diverse breeding assemblage. Less than local
S26	Low	Agricultural fields of improved or semi-improved grassland with scattered broadleaves and conifers and a well-vegetated field drain.	Habitats within S26 were not sampled by either SOV or Quadrat but are similar in composition to habitats represented by Quadrat SL-Bb07 and therefore the habitats within this Habitat Area are likely to support a similar breeding assemblage. Local
S27	Medium	This area consists of improved fields with trees and scrub frequent along the margins and two wooded pockets of plantation and scrub in the north of the area.	Habitats were partially sampled by the River Dee SOV and are similar in composition to Quadrat SL-Bb07. Therefore, the Habitat Area is likely to support as similar breeding assemblage. County
S28	High	The western section of this area is dominated by wet willow/alder woodland, with tall ruderals also present. The northeastern banks contain species rich mesotrophic grassland with scattered and dense scrub, plus occasional trees. The southeastern section, however, is primarily composed of woodland.	Habitats within the area were entirely sampled by the River Dee SOV and therefore it is likely to support an identical species assemblage. County

Habitat Area	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S29	Low	This area comprises of modern buildings with amenity grassland and sculptured gardens on one hand and woodland, much of it broadleaved semi-natural derived from plantation on the other. Trees line most of the area.	Composed of a similar habitat to part of Quadrat SL-Bb08 which is considered to be representative of the surrounding area. However the habitats within this Habitat Area are more diverse, in particular those linear habitats along the River Dee. Therefore, the habitats and breeding assemblage within this area are likely to be more diverse. Local
S30	Medium	This area comprises of modern buildings with amenity grassland and sculptured gardens. Woodland (AWI), much of it broad-leaved semi-natural derived from plantation, is also present. Trees line most of the area.	Habitats within S30 were partially sampled by Quadrat SL-Bb08 (which spans Sections SL3 and SL4) and are similar in composition and therefore the Habitat Area is likely to support a similar breeding assemblage. Local
S31	Medium	A corridor of riparian broad-leaved semi-natural woodland (to the south of the river) and semi-improved grassland (to the north of the river). Also present are areas of scrub, arable farmland, conifer plantation and open water.	Habitats within the area were partially sampled by the Deeside Old Railway SOV. Therefore, the area is likely to support a similar breeding assemblage. Local

Section SL4

4.3.4 An evaluation of Habitat Areas within Section SL4 is presented in Table 20.

Table 20 – Evaluation of Habitat Areas for Section SL4

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S32	Medium	Large sports complexes, schools, nursing homes and hotels dominate the built environment. Amenity grassland dominates the habitat, though areas of woodland and ancient hedgerows are also present. Wooded areas are primarily plantation with occasional patches of semi-natural broadleaves and frequent scattered trees.	Habitats within the area were partially sampled by Quadrat SL-Bb08 which is composed of a similar habitat, although the Habitat Area is more diverse, in particular well established parkland habitats in Milltimber. Therefore, the area is likely to support a similar or more diverse breeding assemblage. Local
S33	Medium	This area consists of relatively large dwelling houses with gardens, many with mature scattered trees as a border.	Habitats within the area were partially sampled by Quadrat SL-Bb08 which is partially composed of similar habitats, although the area is more diverse and therefore likely to support a similar or more diverse breeding assemblage. Local
S34	Medium	This area consists of relatively large dwelling houses with gardens, many with mature scattered trees as a border.	Habitats within the area are composed of similar habitats to part of Quadrat SL-Bb08. Therefore, the habitats and breeding assemblage within this area are likely to be of similar diversity. Local

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S35	Low	Scots pine plantation with birch surround. Much of the woodland has now been felled, with abundant dead wood now littering the site.	The habitats within the area were not sampled by SOV or Quadrat. However, the habitats present are likely to be of value to a range of woodland breeding species, e.g. species recorded in Hill of Blairs SOV in Section SL2. However, the habitat composition within this area is less diverse. Therefore, the breeding assemblage is likely to be similarly less diverse. Local
S36	Medium	A mixture of arable and improved fields with shrubs lining many of the fields. Small pockets of woodland are occasional. A large shelter belt (Western Stretch of Stone Circle) containing matures Scots pine, plus a variety of other conifers and broadleaves is present. Walls divide fields across the majority of the area. Species poor marshy grassland is rare.	Habitats within the area were partially sampled by Quadrat SL-Bb09, which is considered to be representative of the habitats within the Habitat Area, although less diverse in terms of habitats. Therefore, likely to support a similar or more diverse breeding assemblage. Local
S37	Medium	Although all connected and, therefore, providing a wooded wildlife corridor, the structure is varied. The west contains a wood with ancient woodland indicators, however, this has been cut back, so the wood is now little more than a large garden. This connects to an area of dense scrub with a new plantation on amenity grassland to the north, before eventually connecting with areas of predominantly conifer plantation to the north and south.	Habitats within S37 were partially sampled by Quadrat SI-HA09, which is considered to be representative of habitats within the Habitat Area. Therefore, likely to support a similar species assemblage. Local
S38	Low	Series of improved fields with frequent pockets and field borders of gorse scrub. Walls line many of the fields.	Habitats within S38 were not sampled by either SOV or Quadrat but are similar in composition to Quadrat SI-HA09 which is considered to be representative of habitats within the Habitat Area. Therefore, the area is likely to support a similar species assemblage. Local
S39	Medium	Upland habitats dominate this area. Acid grassland is particularly dominant, though dry heath increases in abundance in the south west. Gorse is scattered occasionally around the area. Wall enclosed sheep grazed improved grassland is dominant to the east with occasional trees.	Habitats within S39 were partially sampled by Beanshill SOV and therefore the area is likely to support a similar breeding assemblage. Local

Section SL5

4.3.5 An evaluation of Habitat Areas within Section SL5 is presented in Table 21.

Table 21 – Evaluation of Habitat Areas for Section SL5

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S40	Medium	Improved fields with abundant marshy grassland and rocky outcrops dominate. The small channel of Silver Burn runs through the area.	Habitats within S40 were partially sampled by Quadrat SL-Bb10 which is considered to be representative of habitats within the Habitat Area and therefore likely to support a similar breeding assemblage. Local
S41	Medium	Coniferous plantation woodland with open clearings.	Habitats within S41 were not sampled by either SOV or Quadrat but are similar in composition to habitats represented by Gairnhill / Kingshill SOV. However, the area is smaller in size and botanically less diverse and therefore it is likely to support a similar or less diverse breeding assemblage. Local
S42	Medium	Improved/semi-improved grasslands with frequent areas of species poor marshy grassland.	Habitats within S42 were sampled by East Silverburn SOV which is considered to be representative of the Habitat Area. Therefore, the Habitat Area is likely to support a similar breeding assemblage. Less than local
S43	Medium	Plantation conifer woods dominate. Beech can be frequent and sometimes dominant in the canopy. Scots pine probably dominates overall but there is a mix of plantings. Under the Scots pine and larch woodlands, a dry heath community is present.	Habitats within S43 were partially sampled by Gairnhill / Kingshill SOV which is considered to be representative of the Habitat Area and therefore likely to support a similar breeding assemblage. County
S44	Low	This area is dominated by improved and arable fields. Walls are dominant feature of the borders between fields with gorse occasional.	Habitats within S44 were partially sampled by Quadrat SL-Bb11 which is considered to be representative of the Habitat Area and therefore it is likely that it supports a similar breeding assemblage. Local
S45	High	High scrub of willow on wet grassland. Areas of birch are also present. Where trees have been removed, marsh dominates, although areas of swamp are also present.	Habitats within the area were entirely sampled by Moss of Auchlea SOV and therefore the Habitat Area will support an identical breeding assemblage. County

Section SL6

4.3.6 An evaluation of Habitat Areas within Section SL6 is presented in Table 22.

Table 22 – Evaluation of Habitat Areas for Section SL6

Habitat Areas	Habitat Value	Habitat Description	Value of Breeding Bird Assemblage
S46	Low	This area is comprised of many relatively small improved and poor semi-improved fields. Dry stone walls surround many of the fields with gorse and broom shrubs frequently lining many of the fields.	Habitats within S46 were partially sampled by Quadrat SL-Bb12 which is considered to be representative of habitats within the Habitat Area and therefore it is likely that it supports a similar breeding assemblage. Local
S47	Medium	A mosaic of semi-natural broad-leaved woodland, deciduous parkland/scattered trees and dense scrub.	Habitats within S46 were partially sampled by West Hatton Wood SOV, which is considered to be representative of habitats within the Habitat Area. Therefore, it is likely that it supports a similar breeding assemblage. Local
S48	Medium	This mosaic of communities is dominated by improved grassland bordered by stone walls, the majority of which are tree and shrub lined. Pockets of coniferous woodland, with some dense scrub are frequent in the northern half. The south of the site is dominated by mesotrophic semi-improved grassland with acid characteristics, plus pockets of more typical acid grassland. Scattered trees and scrub are present throughout.	Habitats within the area were not sampled by either a SOV or Quadrat. However, some of the habitats within the Habitat Area are represented by Quadrat SL-Bb12 although it contains great habitat diversity. As such, the area is likely to support a more diverse breeding assemblage. Local

5 Potential Impacts

5.1 Introduction

5.1.1 The following issues associated with road construction and operation of the proposed scheme are set out following the Design Manual for Roads and Bridges (DMRB) guidelines and recommendations (Highways Agency, 2001).

5.1.2 Potential impacts associated with construction and operation of the proposed scheme on breeding bird assemblages are likely to include: direct mortality, habitat loss, habitat fragmentation/isolation, disturbance (in particular during the bird breeding season) and pollution/other indirect impacts.

5.1.3 It should be noted that 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 adverse impact of the proposed scheme (Luell et al 2003). Furthermore, 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.

5.2 General

5.2.1 The following comprises a description of the types of potential impacts that would occur during construction and operation of the proposed scheme.

Direct Mortality

Construction

5.2.2 Direct mortality of adult birds, their eggs and un-fledged/fledged young during road construction is directly linked to pre-construction habitat loss and disturbance.

5.2.3 Habitat loss resulting from clearance of vegetation prior to construction would be unlikely to result in direct mortality of adults and/or sufficiently fledged young since they are able to escape by moving into unaffected adjacent habitats. Birds' eggs and un-fledged young however are vulnerable to direct mortality impacts associated with habitat loss with species located in denser habitats, such as dense scrub, grassland or woodland being the most effected as the nests cannot be easily detected by contractors.

5.2.4 Disturbance to birds could occur as a result of construction activities and the presence of workers near breeding sites. This could lead to lack of breeding success if adult bird behaviour is disrupted and they are not able to spend sufficient time incubating eggs to tending dependant young.

5.2.5 Direct mortality of bird eggs and young (from habitat loss and disturbance) would be most likely to occur during the breeding season, typically March to July, and would constitute a prosecutable offence under the Wildlife and Countryside Act (1981) (as amended), in particular for those species listed within Schedule 1 of the act.

Operation

5.2.6 Many bird species will attempt to cross active roads to move between habitat fragments that arise as a direct result of operational habitat fragmentation and isolation (refer to paragraph 5.2.21) and the barrier effects that road development imposes on species movement (Salter, 1994).

5.2.7 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 (Van Apeldoorn, 1995). While there are no data available for the numbers of birds killed on roads in Scotland, a review undertaken by Slater (1994) estimated that a total of 653,000 and 7,000,000 birds per annum were killed on Dutch and Bulgarian roads.

5.2.8 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 (a WCA Schedule 1 species). It has been observed that 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 1950s and in some areas suitable habitat no longer supports barn owl populations (English Nature, 1996).

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

5.2.10 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) and common kestrel, which hunts for small rodents along suitable roadside verges. However, none of these species are considered to be species of conservation concern.

5.2.11 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 both adult and juvenile birds (with the greatest hazard presented to juvenile birds) through road traffic accidents (RTAs). RTAs would be most likely to occur where birds do not have time to avoid road traffic travelling at speed. RTAs typically occur where woodland or scrub habitats are located immediately adjacent to busy roads and it is likely that low flying bird species (e.g. members of the thrush family, owls and game birds) would be the greatest affected.

Habitat Loss

Construction and Operation

5.2.12 The direct impact of road construction is the physical loss of breeding and foraging habitats along a route corridor, as they 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 (Luell et al., 2003).

5.2.13 Pre-construction habitat clearance would result in the destruction of potential breeding habitat for bird species. Cumulative impacts would also be likely to arise as a consequence of the destruction of birds' eggs and direct mortality of un-fledged young and the displacement of adults and fledglings by means of disturbance into adjacent un-affected habitat.

5.2.14 Habitat clearance would additionally 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 as these form a major dietary constituent for the majority of small to medium sized bird species (e.g. blue tit or song thrush).

5.2.15 Removal/clearance of surrounding vegetation and/or buildings (which may or may not provide nesting sites) could alter the available shelter for breeding birds, increasing vulnerability to a range of external factors such as adverse conditions and/or predators.

5.2.16 The total amount of landtake required in order to construct the Southern Leg of the proposed scheme is estimated at approximately 2.77km^2 / 277ha. Table 23 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.

Table 16 – Phase 1 Habitat Areas Pre and Post Construction

Phase 1 Habitat Description	Phase 1 Habitat Categories within scheme land-take	
	Pre-construction (ha)	Post-construction (ha)
Woodland mixed plantation	2.43	27.86
Woodland broadleaved plantation (Including standard trees)	2.78	7.43
Woodland broadleaved semi-natural	2.90	1.25
Woodland coniferous plantation	15.41	8.59
Scattered scrub	3.55	6.78
Dense continuous scrub	3.58	7.73
Riparian woodland	0	3.03
Acid grassland semi-improved	4.84	3.40
Acid grassland unimproved	0.09	0.06
Amenity grassland	0.01	0.01

Phase 1 Habitat Description	Phase 1 Habitat Categories within scheme land-take	
	Pre-construction (ha)	Post-construction (ha)
Improved grassland	122.66	66.29
Marshy grassland	4.66	3.63
Neutral grassland semi-improved	3.59	1.85
Neutral grassland unimproved	1.57	0.79
Poor semi-improved grassland	23.45	12.77
Disturbed amenity grassland	0.08	0.06
Arable	43.92	18.70*
Built up areas (buildings)	2.51	3.03
Open water	0.36	0.57
Parkland mixed	3.22	4.35
Fen	0.39	0.60
Heath - acid grassland dry mosaic	0.08	0.13
Recently felled coniferous	0.34	0.58
Wet bog	0.52	0.63
Bare ground	1.58	1.80
Herb and fern tall ruderal	0.18	0.36
Total	244.70	182.29

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

5.2.17 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 loss of potential breeding bird habitat, the effects of which are described above. It should be noted however that the level of permanence (in terms of loss) would vary and is dependant on location/s, which are currently unknown at this stage.

5.2.18 Aside from permanent habitat loss described above, no significant additional habitat loss within the route corridor associated with operation of the proposed scheme is envisaged, with the possible exception of occasional routine operational management of roadside habitats (comprising mowing of verges or trimming of scrub/trees).

5.2.19 Operation of the proposed scheme could result in a reduction in the abundance of invertebrate communities within the immediate vicinity of the proposed scheme, in particular as a result of pollution. Pollution might include road salting, oil and fuel spillage resulting in an indirect impact to bird populations through a reduction in food availability.

5.2.20 In addition, indirect habitat loss (i.e. habitat degradation) could occur in areas adjacent to the proposed scheme, where an increase in noise and pollution from the traffic using the road could lead to birds moving out of the area and thus rendering potentially suitable habitat unsuitable for breeding bird populations. Studies undertaken in the Netherlands demonstrated that approximately 60% of species exhibited reduced breeding densities close to roads, with the distance over which the effect was measurable varying depending on how busy the roads were (Reijnen and Foppen, 1994; and 1995b). The research observed that very busy roads (up 60,000 vehicles per day) affected breeding birds up to 2.9km away, with less busy roads (up to 10,000 vehicles per day) affecting birds up to 1.5km from the road. It is likely that the proposed scheme would result in significant disturbance to breeding birds in adjacent unaffected habitats during periods of peak traffic flow. Breeding bird species affected could potentially include; buzzard, woodcock, cuckoo, woodpeckers, tree pipit, goldcrest, chaffinch and warblers (wood and willow warbler) with significantly lower breeding success (or complete absence) near the road.

Habitat Fragmentation and Isolation

Construction and Operation

5.2.21 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).

5.2.22 The loss of contiguous habitat due to fragmentation is now considered to be one of the most important factors in accelerating the reduction in worldwide biodiversity (Wilson, 1992, In: English Nature, 2001).

5.2.23 Previous studies of breeding birds in highly fragmented woodland have shown that greater number of species were recorded in larger areas of woodland, but that factors such as available hedgerows within 0.5km of the woodland and species composition of the woodland were significant contributors to the variation in the number of breeding birds. The research also found that local species extinctions were more pronounced in smaller woods than in larger areas of woodland (Hinsley et al 1992; in: English Nature, 2001).

5.2.24 English Nature (1994) reports that the habitats most likely to be affected by fragmentation are woodland, heathland and species-rich grassland, and that bird species which move between habitats in order to maintain genetic diversity and avoid inter-breeding are the most affected. The ability to use fragmented habitats varies according to species, with greater impacts on those species less able to cross gaps. Some bird species such as the great spotted woodpecker are not significantly affected by fragmentation and easily cross gaps between pockets of woodland. However, other species (e.g. cuckoo) will not live within several hundred meters of a road. While the barrier effect imposed by the proposed scheme to birds is difficult to assess due to it being variable between species, as a general rule, the busier and wider the road the more effective barrier it is to dispersion (English Nature, 2001).

5.2.25 With respect to the above research, the proposed scheme is likely to constitute a significant dispersion barrier between habitats which could have the ability to adversely impact a range breeding bird species, some of which may not normally be significantly impacted by habitats gaps.

5.2.26 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[1]. 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 sizes. The extent of these impacts would likely 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.

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

[1] Dispersal of species between habitats is one of the key factors that enables species to maintain their population viability.

Disturbance

Construction

5.2.28 Disturbance resulting from noise and vibration associated with construction of the proposed scheme would occur in two stages. The first stage would comprise disturbance resulting from pre-construction habitat clearance. The second stage would comprise both direct disturbance (for example, from rock chipping or possible blasting) and indirect disturbance (for example, human activity associated with construction of the proposed scheme). Both direct and indirect disturbance would be likely to contribute to an increase in the effects of fragmentation and isolation (refer to paragraph 5.2.21). Should either form of disturbance reach a level considered to be significant, it might lead to some species of bird failing to nest[1] during the breeding season.

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

5.2.30 Disturbance resulting from light pollution associated with construction during low light levels in winter/autumn and/or 24-hour construction could result in disturbance to both breeding and non-breeding bird species located within habitats adjacent to the proposed scheme. This could potentially lead to some species of bird failing to breed or completely 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.

5.2.31 It should be noted that it is illegal to disturb breeding birds under the Wildlife and Countryside Act (1981) (as amended), in particular, for those species listed within Schedule 1 of the Act.

Operation

5.2.32 Research undertaken by Reijnen et al (1997) and Reijnen and Foppen (1994) has shown that operational noise is a primary factor in altering the density of bird populations adjacent to roads and highways.

5.2.33 A detailed study on the effects of road traffic noise on breeding bird populations in the Netherlands by Reijnen et al (1995a) observed that roads used for high speed travel reduced the density of breeding birds within adjacent woodland and grassland habitats. Their research additionally noted that the distances at which species were affected varied between species. For example, the greatest sensitivity to disturbance was observed in black-tailed godwits and cuckoo, located 1.13km and 0.9km respectively from the study highway.

5.2.34 Further research undertaken by Reijnen et al (1995b) has shown that road traffic noise accounted for lower densities of 43 songbird species in habitats adjacent to operational roads and that the distance from a motorway at which breeding bird densities were affected was influenced by the intensity and speed of traffic (Reijnen et al 1995a).

5.2.35 Other 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 (Luell et al 2003).

5.2.36 Light pollution can have adverse impacts on bird species and can affect both breeding and foraging behaviour in a number of species of bird. This impact was first observed by Rawson (1932) who

[1] The number of failed nesting attempts will depend on the frequency and magnitude of the disturbance and the species involved.

demonstrated the correlation between critical light levels at dawn and singing in thrushes and suggested that artificial lighting could modify the timing of natural behavioural patterns.

5.2.37 Farner (1964) demonstrated photoperiodic control of reproduction in birds and observed that increasing artificial day length induced hormonal, physiological and behavioural changes initialling breeding. Lofts and Merton (1968) demonstrated photoperiodic control of reproduction in birds, showing that 50 species of wild bird could be brought into breeding condition prematurely by exposure to artificially long days in winter.

5.2.38 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.

5.2.39 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 an adverse impact on prey abundance leading to food shortages.

5.2.40 Disturbance resulting from noise and vibration associated with operation of the proposed scheme would be mainly influenced by traffic type, traffic intensity, road surface properties, topography and structure/type of adjacent vegetation, the magnitude and spread of which is in turn influenced by underlying geology and soil characteristics (Luell et al., 2003).

5.2.41 Disturbance during operation of the proposed scheme would result from noise and vibration associated with road traffic, artificial lighting (that would be installed at all major junctions along the proposed scheme) and occasional operational maintenance of the proposed scheme. As with disturbance associated with construction, an increase in traffic noise and lighting could result in sensitive bird species failing to breed or abandoning habitats adjacent to the scheme. This impact might 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

5.2.42 Accidental spills of chemicals and other potentially toxic substances during construction of the proposed scheme might occur and would be of particular concern if they were to 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 cSAC (refer to ES Chapter 24: Water Environment). The severity and magnitude of the pollution impact would depend on the on the constituents, toxicity to biodiversity and discharge/spill volume of the pollutant in question.

Operation

5.2.43 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 could potentially pollute surface and groundwater, soil and vegetation (Luell et al 2003).

5.2.44 Research conducted by Ballard and Hacker (1996) has shown that de-icing salt used in the winter to keep roads ice-free can potentially result in the death of seed eating birds such as finches, which consume seeds contaminated by salt. The application of de-icing salt to the proposed scheme during the winter and the indirect pollution of adjacent habitats via vehicle spray could therefore 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, and hence potential impact to bird populations since this is dependant on the rate of salt spread and speed of the spreader. However, wide verges with varied nut or berry bearing planting are likely to be most impacted.

5.2.45 Accidental spills of chemicals and other potentially toxic substances during operation of the proposed scheme could occur as a consequence of inadvertent discharge or indirectly as a result of road traffic accidents. As with the construction phase, these pollution incidents would be of particular concern if they were to happen within proximity of ecological sensitive communities or rivers and/or streams identified above (refer to ES Chapter 24: Water Environment).

5.2.46 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 (please refer to Chapters 44: Air Quality, Fastlink, and 55: Air Quality Cumulative Impact Assessment). Findings indicate air quality within the vicinity of the proposed scheme would remain very good.

5.2.47 Insufficient research has been undertaken to date regarding the direct impacts that operational roads have on the abundance of invertebrate communities and the indirect impacts on bird species through a reduction in food availability. The only survey conducted to date in the UK was undertaken by the RSPB in 2004 (www.rspb.org.uk/bugcount). The study observed that in total one invertebrate was killed for every five miles travelled.

5.2.48 Spills and/or accidental discharge associated with construction and operation within or in close proximity to the following watercourses, waterbodies and/or wetland areas could constitute a key impact; Loirston Burn, Greengate Ditch, Burn of Ardoe, Bishopston Ditch, Heathfield Burn, Jameston Ditch, Hare Moss, Whitestone Burn, Burnhead Burn, Crynoch Burn, Blaikiewell Burn, Kingcausie Burn, River Dee, Milltimber Burn, Culter House Ditch, Beans Burn, Upper Beanshill Burn, Gairn Burn, Moss of Auchlea, Moss of Auchlea drainage system and Westholme Burn.

Impacts on Key Bird Species

5.2.49 A summary description of generic impacts on key bird species (WCA1i, JNCC Red List, JNCC Amber List, UK BAP, LBAP and local status species) is shown in Table 24.

Table 23 – Summary Description of Impacts on Bird Species of Conservation Concern

Bird Species	Habitats of Value	Impacts
barn owl	Resident species. Open farmland and rough grassland habitats with suitable old buildings or trees for roosting/ nesting.	Loss and fragmentation of breeding habitat (buildings, in particular, farm out buildings and open fields) during operation. Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
bullfinch	Resident species. Breeds and winters in orchards, parks, woodlands and scrub.	Loss of breeding habitat (woodland and scrub) during operation of the scheme. Disturbance during construction and operation.
common gull	Resident species. Breeds on bare ground, or rocky grassy slope less often on coastal edges and more recently, buildings.	Unlikely to be impacted by loss of breeding habitat or disturbance. Direct mortality from ingestion of pollutants due to savaging behaviour could occur.
curlew	Resident species. Breeds on areas of damp moorland and pasture. Winters on estuaries and damp grassland.	Loss of breeding habitat (heathland, pasture and marshy grassland) during operation. Disturbance during construction. Species in the long term is unlikely to be disturbed during operation due to habituated of road traffic.
dunnock	Breeds and winters in gardens, parks, woodland, waste ground and hedges.	Loss of breeding habitat (woodland, hedgerow and scrub) during operation. Disturbance during construction. Disturbance during operation is unlikely to constitute a significant impact.

Bird Species	Habitats of Value	Impacts
goldcrest	Breeds and winters in coniferous woodlands, occurring in deciduous woodland, scrub and even gardens in winter.	Loss of breeding habitat (conifer woodlands) during operation Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
grasshopper warbler	Summer visitor. Breeds in habitats with low thick vegetation, marshland, beside lakes or watercourses, in young conifer plantations or clear felled areas, among tall grass and herbage with scattered bushes.	Loss and fragmentation of breeding riparian habitats (marsh/marshy grassland and areas of wet woodland/scrub) during operation. Disturbance and pollution to wet areas during construction and operation.
greenshank	Breeds in bog and moorland habitats, wintering on the coast and using fresh and salt-water bodies during passage.	Unlikely to be significantly impacted through loss, fragmentation and disturbance of breeding habitat during operation. Disturbance during construction might occur.
grey partridge	Breeds and winters on farmland, grassland and arable fields.	Loss and fragmentation of breeding habitat (arable farmland and fields) during operation. Disturbance during both construction and operation. Possible risk of RTAs due to low flight pattern.
grey wagtail	Resident species. Breeds in sheltering trees, shrubs, or dense herbage, holes, ledges, or hollows for nesting. Usually but not exclusively associated with water, such as river or streams.	Loss and fragmentation of breeding habitat during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible direct mortality from ingestion of pollutants.
herring gull	Resident species. Breeds on rocky coastal edges and more recently, buildings.	Unlikely to be impacted by loss of breeding habitat or disturbance. Direct mortality from ingestion of pollutants due to savaging behaviour could occur.
house martin	Migrant species. Breeds on the sides or buildings or other structure with vertical sides. Feeds on insects over fields and other areas.	Loss and fragmentation of breeding habitat (buildings and open fields) during operation. Unlikely to be subject to disturbance. Possible risk of RTAs due to low flight patterns.
house sparrow	Resident species. Breeds in urban environment, in rood tiles, air ducks, recesses and occasionally trees.	Loss of breeding habitat (buildings and hedgerows). Unlikely to be impacted by disturbance. Direct mortality from ingestion of pollutants due to savaging behaviour could occur.
kingfisher	Resident species. Breeds in step or vertical bank of stream, river or gravel pit, usually over water.	Loss and fragmentation of breeding habitat (riverine banks) during operation. Disturbance, in particular during construction, as species is sensitive to human presence. Direct mortality from pollution of watercourses could occur.
lapwing	Resident species. Breeds from the coast to the uplands on marshy areas and farmland. Winters on estuaries and farmland.	Loss and fragmentation of breeding habitat (farmland) during operation. Disturbance, in particular during construction, as species is sensitive to human presence.
linnet	Resident species. Breeds in scrub on moorland, heaths and farmland. Winters in stubble and weedy fields.	Loss of breeding and wintering habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
meadow pipit	Resident species. Breeds in open country, moors and heaths, coastal meadows, pastures and bogs.	Loss and fragmentation of breeding habitat (grassland, heathland and bog). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
mistle thrush	Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
osprey	Migrant species. Breeds in trees favouring Scots pine woodland but dependent on large freshwater bodies (rivers or lochs) for feeding.	Loss and fragmentation of the River Dee during operation. Disturbance during both construction and operation at the River Dee and Loirston Loch. Direct mortality from ingestion of pollutants.
oystercatcher	Breeds on grass fields and shingle beside lakes, rivers and seashores. Winters on estuaries, sandy beaches and open fields.	Loss of breeding habitat (farmland and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.

Bird Species	Habitats of Value	Impacts
reed bunting	Resident species. Breeds and winters in reedbeds, upland and lowland marshes and farmland. Visits gardens in winter.	Loss, fragmentation and possible pollution of breeding habitat (riparian corridors, marshland and scrub/hedgerows operation) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
sand martin	Breeds in riverbanks, lakesides and sandpits. Usually seen over water.	Loss of breeding habitat (sandbanks, in particular along the River Dee and Crynoch Burn) during operation. Unlikely to be subject to disturbance other then in proximity of breeding areas. Possible risk of RTAs due to low flight patterns.
skylark	Resident species. Breeds on moorland, farmland, dunes and grassland. Winters on rough grassland, stubble and saltmarsh.	Loss of breeding habitat (arable and grassland) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
snipe	Breeds in marshes and boggy areas. Winters on salt marshes, coastal lagoons and other marshy areas.	Loss and fragmentation of breeding habitat (marshland and boggy areas) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
song thrush	Breeds and winters in gardens, farmland, woodland and hedges.	Loss and fragmentation of breeding habitat (woodland, scrub, gardens, agricultural fields). Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact. Possible risk of RTAs due to low flight patterns.
starling	Resident species. Breeds in towns, woods, parks, and on farms. Winters in cities, gardens and farmland.	Loss of breeding habitat (woodland, agricultural land, parks and gardens). Disturbance during construction and operation would be unlikely to constitute a significant impact.
stock dove	Resident species. Breeds in wooded areas, forest edges and larger undisturbed parks.	Loss and fragmentation of breeding habitat (woodland and parkland). Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns.
stonechat	Migrant species. Breeds in dense vegetation on or close to the ground. Winters in southern Europe.	Loss and fragmentation of breeding habitat (scrub, rank grassland) during operation. Disturbance during construction and operation.
swallow	Summer visitor. Breeds mostly in farm buildings. Feeds in the air usually over open country.	Loss and fragmentation of breeding habitat (buildings, in particular, farm out-buildings and open fields) during operation. Unlikely to be subject to disturbance. Possible risk of RTAs due to low flight patterns.
teal	Resident species. Breeds and wintering in areas of seasonal / permanent open water such as lochs.	Loss and fragmentation of breeding habitat (rivers or other open areas of water) during operation. Disturbance during construction and operation. Possible risk of RTAs due to low flight patterns. Direct mortality from ingestion of pollutants.
willow warbler	Breeds in thick ground cover in woodland, farmland and scrub.	Loss and fragmentation of breeding habitat (woodland and areas dense scrub) during operation. Disturbance during construction. Disturbance during operation would be unlikely to constitute a significant impact.
wood warbler	Migrant species. Breeds in woodland with little secondary growth and sparse ground cover.	Loss and fragmentation of breeding habitat (mature woodland) during operation. Disturbance during construction and operation
woodcock	Resident species. Breeds in extensive woodland, whether broad-leaved, mixed, or coniferous, for cool shade, humidity and soft humus apt to retain moisture.	Loss and fragmentation of breeding habitat (mature woodland) during operation. Disturbance during construction and operation
yellowhammer	Resident species. Breeds and winters in hedgerows and scrub, especially gorse and hawthorn thickets.	Loss and fragmentation of breeding habitat (farmland and grassland) during operation. Disturbance during construction and operation.

5.3 Specific Impacts

5.3.1 Potential construction impacts would include fragmentation/isolation and disturbance at Blue Hill Plantation (S2 and S3), Greenhowe Wood (S6) and Hare Moss (S10). In addition, there is a risk of pollution of areas surrounding Greenhowe Wood and Hare Moss due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. Potential key impacts occur at Greenhowe Wood (fragmentation/isolation, disturbance and pollution) and Hare Moss (pollution), due to their being assessed as areas of county importance for breeding birds. Key impacts are all assessed as being of medium negative magnitude and Moderate significance. All other construction impacts within SL1 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.2 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance and habitat loss at Blue Hill Plantation (S2 and S3), Greenhowe Wood (S6) and Hare Moss (S10). The additional risk of pollution exists at areas surrounding Greenhowe Wood and Hare Moss due to run off. Predicted impacts are generally of low negative magnitude and Minor significance. Potential key impacts occur at Greenhowe Wood (direct mortality due to RTA, fragmentation/isolation, disturbance, habitat loss and pollution) and Hare Moss (pollution), due to their being assessed as areas of county importance for breeding birds. Key impacts are all assessed as being of medium negative magnitude and Moderate significance. All other impacts within SL1 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

Section SL2

5.3.3 Potential construction impacts would include fragmentation/isolation, disturbance and pollution due to accidental spills around the agricultural fields from Sunnyside to Causeyport (S13) and around the agricultural fields East of Burnhead to Greenloaning (S16). Although both areas are assessed as being of county importance for breeding birds, the majority of impacts are of low negative magnitude and Minor significance. The exception is pollution which is assessed as being of medium negative magnitude and Moderate significance. All other impacts within SL2 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.4 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance, habitat loss and pollution due to run off. The areas around the agricultural fields from Sunnyside to Causeyport and around the agricultural fields East of Burnhead to Greenloaning are assessed as having the highest value for breeding birds (county) within SL2. All operational impacts within these areas are predicted to be of medium negative magnitude and Moderate significance. All other impacts within SL2 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

Section SL3

5.3.5 Potential construction impacts would include fragmentation/isolation and disturbance at Blaikiewell Burn (S22), Cleanhill (S20), the River Dee (S27 and S28) and the Old Deeside Railway (S31). In addition, there is a risk of pollution of Blaikiewell Burn and the River Dee due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. The River Dee is assessed as of county importance for breeding birds and pollution to this watercourse is assessed as being of medium negative magnitude and Moderate significance within this context. All other construction impacts within SL3 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.6 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance, habitat loss at Blaikiewell Burn, Cleanhill, the River Dee and the Old Deeside Railway. The additional risk of pollution due to runoff exists at Blaikiewell Burn and the River Dee. Impacts to these areas are generally assessed as low negative magnitude and

Minor significance. The exception is pollution, which is assessed as medium negative magnitude and Minor significance for Blaikiewell Burn (local importance); and medium negative magnitude and Moderate significance for the River Dee (county importance). All other impacts within SL3 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

Section SL4

5.3.7 Potential construction impacts would include fragmentation/isolation and disturbance Guttrie Wood (S34) and Beanshill (S38 and S39). In addition, there is a risk of pollution of watercourses surrounding Beanshill due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. The exception is pollution, which is assessed as medium negative magnitude and Minor significance for example in Beans Burn, adjacent to Beanshill (assessed as being of local importance). All other impacts within SL4 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.8 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance and habitat loss; particularly at Guttrie Wood and Beanshill. The additional risk of pollution exists within watercourses, such as Beans Burn due to run off. Predicted operational impacts are generally of low negative magnitude and Minor significance. The exception is pollution, which is assessed as medium negative magnitude and Minor significance for example in Beans Burn, adjacent to Beanshill (local importance). All other impacts within SL4 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

Section SL5

5.3.9 Potential construction impacts would include disturbance at East Silverburn (S42) and Kingshill/Gairnhill Wood (S43). In addition, there is a risk of fragmentation/isolation and pollution of watercourses surrounding East Silverburn due to accidental spills. Predicted construction impacts are generally of low negative magnitude and Minor significance. Pollution is a potential key impact at the watrercourses within the East Silverburn area, due to its assessment as an area of county importance for breeding birds. Key impacts in SL5 are all assessed as being of medium negative magnitude and Moderate significance. All other impacts within SL5 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.10 During the operation of the road, there is the potential risk of direct mortality, disturbance and habitat loss at East Silverburn and Kingshill/Gairnhill Wood. Additionally, there is a risk of fragmentation/isolation and pollution of watercourses at East Silverburn due to run off. Predicted impacts to these areas are generally of low negative magnitude and Minor significance. However, pollution at East Silverburn (county importance) is assessed as being of medium negative magnitude and Moderate significance. All other impacts within SL5 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

Section SL6

5.3.11 Potential construction impacts would include fragmentation/isolation, disturbance and pollution at the agricultural fields north of the A944 (S46) and Cloghill (S48). Although both areas have been evaluated as being of county importance for breeding birds, the majority of impacts are of low negative magnitude and Minor significance. The exception is pollution which is assessed as being of medium negative magnitude and Moderate significance. All other impacts within SL6 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

5.3.12 During the operation of the road, there is the potential risk of direct mortality, fragmentation/isolation, disturbance, habitat loss and pollution due to run off. The areas around agricultural fields north of the A944 (S46) and Cloghill are assessed as having a local ecological

value for breeding birds. As such operational impacts within these areas are predicted to be of low negative magnitude and minor significance. The exception is pollution which is assessed at medium negative magnitude and minor significance. All other impacts within SL6 are predicted to be between negligible to low negative magnitude and between negligible and Minor significance.

6 Mitigation

6.1 Generic Mitigation

6.1.1 A detailed mitigation plan (including a habitat management plan that will detail all habitat creation/enhancement prescriptions) written prior to construction will be required covering all areas affected throughout the Southern Leg of the proposed scheme and will specify where and when generic mitigation should be undertaken.

6.1.2 Table 25 presents generic mitigation measures that are applicable during construction and operation of the proposed scheme. The mitigation measures outlined below comprise prevention/avoidance, reduction and offset/compensation measures, which form a hierarchy of measures that should be adopted preferably in this order.

6.1.3 It should be noted that offset measures are not strictly mitigation but compensation measures that are designed to produce benefits to birds in order to offset adverse impacts that cannot be prevented or reduced.

Table 24 – Generic Mitigation Measures: Construction and Operation

Mitigation Type	Impact	Description of Generic Mitigation
Construction		
Prevent	Direct Mortality Disturbance	All habitat clearance and building demolition must take place outside the main bird breeding season (March – July inclusive) and must be maintained in such a condition as to ensure that it is not used for breeding purposes. The potential presence of bird nests should be taken into consideration when planning the demolition of buildings or clear felling of trees.
Prevent	Direct Mortality Disturbance	All cleared material must be either be chipped or moved and stored off-site to ensure that birds do not use the cleared material for nesting during the breeding season.
Prevent	Direct Mortality Disturbance	Barn Owl (WCA1i species) All buildings (in particular farm buildings 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. All buildings will be destroyed immediately after survey provided evidence of barn owl is not recorded. Alternatively, if demolition is not feasible, all entrances into the structure will be secured and covered to prevent access by barn owl.
Prevent	Direct Mortality Disturbance	Kingfisher (WCA1i species) 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 would be likely to be directly impacted by the proposed scheme that exhibits potential nesting 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) outside the main breeding season (March – October) at least one year in advance of construction in order to prevent access by potentially breeding 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 nesting habitat for kingfisher should be securely covered under the supervision of the ecological clerk of works out with the main breeding season (March – October) at least one season in advance of construction in order to prevent access by potentially breeding kingfishers. Once construction of the proposed scheme is completed all protective covering must be removed.

Mitigation Type	Impact	Description of Generic Mitigation
		It should be noted that the above mitigation measure cannot be undertaken without taking into consideration indirect impacts (disturbance and pollution) to other ecology, for example, protected mammal species such as otter and freshwater ecology, for example, fish.
Prevent	Direct Mortality Habitat Loss Disturbance	Plant and personnel should be restricted to a prescribed working corridor through the use of temporary barriers, thereby minimising damage to habitats and potential direct mortality and disturbance to breeding/non-breeding 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 30 m of areas of woodland, wetland and scrub to prevent damage of habitats and disturbance of breeding 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 breeding birds must (as far as practical) be undertaken outside the main bird breeding season (March – July inclusive). Where it is not possible to time works outside the breeding season, consideration should be given to avoiding works near habitats identified (by the Ecological Clerk of Works) as being of high value / sensitivity for breeding birds.
Operation		
Prevent	Direct Morality	Where the alignment passes through existing areas of established woodland, potential RTAs should be prevented by removing or significantly thinning all trees within 5m of the road unless considered to be of significant ecological value (i.e. mature oak, wych elm or ash).
Prevent	Direct Mortality Disturbance	Habitat management of areas of woodland, scrub and/or grassland should occur out with the main bird breeding season (March – July inclusive) to ensure that breeding birds, their eggs and/or nestlings are not subject to direct mortality / disturbance impacts during operational habitat management.
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 nesting kingfisher one breeding season in advance of any operational habitat management and/or maintenance following methods outlined by Gilbert et al (1998). Works cannot be undertaken if breeding is confirmed. If suitable nesting habitat is identified, the banks should be securely covered out with the main breeding season (March – October) in order to prevent access by potentially breeding kingfishers, one breeding season in advance of any works.
Prevent	Direct Mortality Habitat Loss Disturbance	Operational maintenance of areas of woodland, scrub and/or grassland is minimised as far as practical.
Prevent	Direct Mortality Pollution	The use of de-icing salt during winter periods should be kept to an absolute minimum.
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.

Mitigation Type	Impact	Description of Generic Mitigation
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).
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	Habitat Loss	Barn owl (WCA1i species) Replacement nest boxes 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 breeding and 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 50m 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 breeding and non-breeding birds.
Offset	Habitat Loss	Bird boxes (suitable for a range of species) should be considered (at a density of 20 boxes for every 0.5ha of woodland lost) in severed areas of woodland in order to compensate for the loss of suitable breeding habitat.
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 breeding bird species.
Offset	Habitat Loss Fragmentation Disturbance	Kingfisher (WCA1i species) Where a pre-construction survey of all suitable watercourses (undertaken at least one breeding season in advance of construction following methods outlined by Gilbert et al (1998) confirms the presence of kingfisher, replacement breeding habitat in the form of sand and/or gravel banks should be created in order to compensate for any nesting habitat loss during construction and should be sited as close to the location where the original habitat was lost (taking into account disturbance impacts associated with operation of the proposed scheme). Habitat loss will be identified and quantified in the course of a pre-construction survey.
Offset	Habitat Loss Fragmentation	Vegetated strips, wildlife overbridges or similar should be created to offset the loss of wildlife corridors (e.g. woodland, scrub, rivers, streams or disused railways etc) severed by the proposed scheme 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	-	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 A description of specific mitigation measures is presented in Chapter 25 (Ecology and Nature Conservation), Table 25.22. The approach to breeding bird mitigation includes the following elements:

- construction activities, including the felling of trees and clearing of scrub, will be timed to avoid periods when birds are nesting (i.e. March to July inclusive), where possible, preventing disturbance to breeding birds. Areas may be pre-felled or cleared in winter to make habitat undesirable for nesting;
- construction activities in the vicinity of key winter bird habitats will be timed to avoid October to March to prevent disturbance to wintering birds;
- areas of habitat will be created to offset habitat loss although these areas will be situated away from the scheme to prevent RTAs. This will include the provision of a grassland buffer either side of the road before any scrub or woodland planting therefore allowing a clear sightline of the traffic;
- planting of dense native tree and scrub species (taking into account direct mortality impacts) to screen noise and vibration disturbance associated with operation of the proposed scheme from birds located within adjacent habitats; and
- sympathetic planting of second (and subsequent) stage detention basins to allow use by wintering birds.

7 Residual Impacts

7.1.1 Residual impacts on breeding birds throughout the Southern Leg of the proposed scheme would remain due to the risk of direct mortality from RTAs, fragmentation/isolation and habitat loss during operation despite application of applicable generic and site specific mitigation. These impacts are assessed as being of Negligible to minor residual significance.

8 References

Ballard, S. and Hacker, S. (1996) Slaughter Captured in the Headlights. The Times, 6 January 1996.

Bibby, C., Burgess, N.D., Hill, D. and Mustoe, S. (2000) Bird Census Techniques, Second Edition. Academic Press, London, England.

Brown, A. F. and Shepherd, K. B. (1993) A Method for Censusing Upland Breeding Waders. Bird Study 40, 189-195

Buckland, ST., Bell, M.V. and Picozzi, N. (Ed). (1990) The Birds of North-East Scotland. North-East Scotland Bird Club, Aberdeen.

English Nature. (1996) The Significance of Secondary Effects from Roads and Road Transport on Nature Conservation. English Nature, Peterborough, England.

English Nature (1994) Are Habitat Corridors Conduits for Animals and Plants in a Fragmented Landscape? A review of the scientific evidence. English Nature Research Report 94. Peterborough, England.

Farner, D. S. (1964) The Photoperiodic Control of Reproductive Cycles in Birds. American Scientist 52:137-156

Gilbert, G., Gibbons, D.W. and Evans, J. (1998) Bird Monitoring Methods: A Manual of Techniques for UK Key Species. The Royal Society for the protection of Birds, Sandy, Bedfordshire, England.

Highways Agency (2001) The Design Manual for Roads and Bridges. Vol 10. HMSO, London.

Hill, D. (1992) The Impact of Noise and Artificial Light on Waterfowl Behaviour: A Review and Synthesis of Available Literature British Trust for Ornithology. British Trust for Ornithology, Norfolk.

Hinsley, S., Bellmy, P., and Newton, I. (1992) Habitat Fragmentation, Landscape Ecology and Birds Report 1991-92. The NERC Institute of Terrestrial Ecology. Within English Nature (2001).

Jacobs UK Ltd (2006) Aberdeen Western Peripheral Route: Southern Link - Ecology Scoping Report for Stage 3 EIA

Lofts, D., and Merton, G. (1968) Photoperiodic and Physiological Adaptations Regulating Avian Breeding Cycles and their Ecological Significance Journal of Zoological Society of London 155,327-394

Luell, B., Bekker, G.J., Cuperus, R., Dufek, J., Fry, G., Hicks, C., Hlavá˘c, V., Keller, V.B., Rosell, C., Sangwine, T., Tørsløv, N., le Maire, B., and Wandall, L. (Eds.) (2003) Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions. Nederlandse Ornithologische Unie, The Netherlands.

North-East Scotland Bird Club (2003). North-East Scotland Bird Report 2003. North-East Scotland Bird Club, Aberdeen.

North-East Scotland Bird Club (2004). North-East Scotland Bird Report 2004. North-East Scotland Bird Club, Aberdeen.

Outen, A. R. (undated) The Possible Ecological Implications of Artificial Lighting. Hertfordshire Environmental Records Centre.

Ratcliffe, D. A. (1977) Nature Conservation Review. Nature Conservancy council. JNCC, Peterborough, UK.

Rawson, H. E. A. (1932) Bird's Song in Relation to Light. Trans. Herts Natural History Society 17 1932.

Reijnen, A.J.S.M. and Thissen, T.B.M. (1987) The Effects from Road Traffic on Breeding-Bird Populations in Woodland. Annual Report 1986 pp 121-132. Research Institute for Nature management. Leersum.

Reijnen, R. and Foppen, R. (1994) The Effects of Car Traffic on Breeding Bird Populations in Woodland I: Evidence of Reduced habitat Quality for Willow Warblers (*Phylloscopus trochilus*) Breeding Close to a Highway. Journal of Applied Ecology 31, 85-91

Reijnen, M.J.S.M., Veenbaas, G., and Foppen, R.P.B. (1995a) The Effects of Motorway Traffic on Breeding Bird Populations. Ministry of Transport and Public Works. Directorate-General for Public Works and Water Management, Roads and Hydraulic Engineering Division. Institute for Forestry and Nature Research.

Reijnen. R. and Foppen, R. (1995b) The Effects of Car Traffic on Breeding Bird Populations in Woodland III: Reduction in Density in Relation to the Proximity of Main Roads. Journal of Applied Ecology, 32, 187-202

Scottish Executive. (2004) A Strategy for the Conservation and Enhancement of Biodiversity in Scotland. Scottish Executive, Edinburgh.

Slater, F. (1994) Wildlife Road Casualties. British Wildlife 5(4), 214-221

The Nature Conservation (Scotland) Act 2004. HMSO, London. http://www.opsi.gov.uk/legislation/scotland/acts2004/20040006.htm

Van Apeldoorn, R. (1995) Fragmented Mammals; What Does that Mean? Paper presented at the International Conference on Habitat Fragmentation, Infrastructure and the role of Ecological Engineering, MECC, Maastricht, 38-21 September 1995.

Wilson E. O. (1992) The Diversity of Life, London: Allen Lane.

Annex 1

Species list for birds recorded in the Southern Leg

Common Name	Latin Name
barn owl	*Tyto alba*
blackbird	*Turdus merula*
blackcap	*Sylvia atricapilla*
black-headed gull	*Larus ridibundus*
blue tit	*Parus caeruleus*
bullfinch	*Pyrrhula pyrrhula*
buzzard	*Buteo buteo*
carrion crow	*Corvus corone*
chaffinch	*Fringilla coelebs*
chiffchaff	*Phylloscopus collybita*
coal tit	*Parus ater*
collared dove	*Streptopelia decaocto*
common gull	*Larus canus*
common sandpiper	*Actitis hypoleucos*
common tern	*Sterna hirundo*
coot	*Fulica atra*
crossbill	*Loxia curvirostra*
cuckoo	*Cuculus canorus*
curlew	*Numenius arquata*
dipper	*Cinclus cinclus*
dunnock	*Prunella modularis*
feral pigeon	*Columba livia x*
garden warbler	*Sylvia borin*
goldcrest	*Regulus regulus*
goldfinch	*Carduelis carduelis*
goosander	*Mergus merganser*
grasshopper warbler	*Locustella naevia*
great spotted woodpecker	*Dendrocopos major*
great tit	*Parus major*
greater spotted woodpecker	*Dendrocopos major*
greenfinch	*Carduelis chloris*
greenshank	*Tringa nebularia*
grey heron	*Ardea cinerea*
grey partridge	*Perdix perdix*
grey wagtail	*Moctacilla cinerea*
herring gull	*Larus argentatus*
house martin	*Delichon urbica*
house sparrow	*Passer domesticus*
jackdaw	*Corvus monedula*
jay	*Garrulus glandarius*
kestrel	*Falco tinnunculus*

Common Name	Latin Name
kingfisher	*Alcedo atthis*
lapwing	*Vanellus vanellus*
lesser redpoll	*Carduelis flammea cabaret*
linnet	*Carduelis cannabina*
long-tailed tit	*Aegithalos caudatus*
magpie	*Pica pica*
mallard	*Anas platyrhynchos*
meadow pipit	*Anthus pratensis*
mistle thrush	*Turdus viscivorus*
moorhen	*Gallinula chloropus*
osprey	*Pandion haliaetus*
oystercatcher	*Haematopus ostralegus*
pheasant	*Phasianus colchicus*
pied wagtail	*Motacilla alba*
red-legged partridge	*Alectoris rufa*
reed bunting	*Emberiza schoeniclus*
robin	*Erithacus rubecula*
rook	*Corvus frugilegus*
sand martin	*Riparia riparia*
sedge warbler	*Acrocephalus schoenobaenus*
siskin	*Carduelis spinus*
sky lark	*Alauda arvensis*
snipe	*Gallinago gallinago*
song thrush	*Turdus philomelos*
sparrowhawk	*Acipiter nisus*
starling	*Sturnus vulgaris*
stock dove	*Columba oenas*
stonechat	*Saxicola torquata*
swallow	*Hirundo rustica*
swift	*Apus apus*
tawny owl	*Strix aluco*
teal	*Anas crecca*
treecreeper	*Certhia familiaris*
tufted duck	*Aythya fuligula*
wheatear	*Oenanthe oenanthe*
whinchat	*Saxicola rubetra*
whitethroat	*Sylvia communis*
willow warbler	*Phylloscopus trochilus*
wood warbler	*Phylloscopus sibilatrix*
woodcock	*Scolopax rusticola*
woodpigeon	*Columba palumbus*
wren	*Troglodytes troglodytes*
yellowhammer	*Emberiza citrinella*