

5. Ecology and Nature Conservation

5.1 Introduction

5.1.1 Background

This chapter describes and evaluates the current ecological interest in relation to the proposed works on the A96 for the Threapland Junction Improvements scheme, and assesses the potential effects of the road scheme on those interests.

The assessment process requires the identification of key ecological features (resources) in an area and determination of the following:

- Their value;
- Sources of impact and the sensitivity of receptors to these;
- The nature, scale and duration of any effects (both direct and indirect) of the proposal upon sensitive receptors
- Potential mitigation measures to reduce any negative effects; and
- Assessment of the significance of any residual effects.

5.1.2 Study area

The study area for the ecological surveys was a 1km wide corridor centred on the A96 carriageway, dominated by agricultural fields, coniferous and broadleaved woodland, scattered trees and scrub, farmsteads, and a plant nursery. Loch Oire was also surveyed around its perimeter, and a watercourse that crosses the A96 within the study area. Overall the ecological diversity of the survey corridor is not high due to its agricultural and managed nature. There are areas of higher diversity linked to coniferous woodland, hedgerows, the burns, and Loch Oire.

5.2 Policy and guidance

The following general description of the methodology highlights particular features of the techniques used in the assessment of ecological impacts. There is no single agreed method for ecological impact assessment, although certain general principles and approaches appear to be widely accepted. The method used for this study provides a systematic and transparent assessment of the significance of impacts upon ecological features. It is based upon current best practice outlined in legislation and planning policy (e.g. Planning Advice Note 58, Environmental Impact Assessment), incorporates the principles set out in the guidance for Ecological Impact Assessment developed by a working group of the Institute of Ecology and Environmental Management (IEEM) (IEEM, 2006), and incorporates good practice from other published documents e.g. the Design Manual for Roads and Bridges (DMRB) Volume 11: Environmental Assessment (Highways Agency; June 1993 and subsequent amendments) and relevant supplementary guidance. Guidance for environmental mitigation provided in DMRB Volume 10: Environmental Design and Management (Highways Agency; February 2001).

The methodology for the ecology chapter of the Environmental Statement also takes account of The Environmental Impact Assessment (Scotland) Regulations, 1999, and adheres to the requirements of, and advice given in the following legislation and guidance:

- EC Habitats Directive (Annex I, II, IV);
- EC Birds Directive (Annex I, II);
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007;
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- The Nature Conservation (Scotland) Act 2004;
- The UK Biodiversity Action Plan (UKBAP);
- Scottish Biodiversity List;
- Northeast Scotland LBAP and the Moray Structure Plan;
- Water Environment (Controlled Activities) (Scotland) Regulations 2005 and
- Water Framework Directive, 2000.
- The SNH National Biodiversity Network database (NBN).

5.3 Consultations

The consultation and scoping process is based on information about the development scheme and the area that it will affect. It should help to develop an understanding of the ecological context based on the baseline information derived from existing ecological information, data gathering, and literature searches (IEEM, 2006). The scoping exercise should also identify those factors that are required to be assessed in more detail.

The following statutory and non-statutory consultees were contacted for relevant information and comments, with consultation letters sent on October 6th 2007:

- Scottish Natural Heritage (SNH), Area Officer – Moray;
- Scottish Environment Protection Agency (SEPA);
- Royal Society for the Protection of Birds (RSPB);
- Lossie District Salmon Fisheries Board;
- Scottish Executive Environment and Rural Affairs Department (SEERAD), now the Scottish Government;
- Forestry Commission;
- Scottish Badgers;
- Moray Council Biodiversity Officer;
- North East Scotland Biological Records Centre;
- North East Scotland Biodiversity Partnership;

- Highland Red Squirrel Group;
- Grampian Badger Network;
- Scottish Ornithologists Club (SOC);
- Vincent Wildlife Trust;
- Scottish Wildlife Trust, Conservation Officer;
- Bat Conservation Trust, local bat group; and
- Deer Commission for Scotland (DCS).

The purpose of all consultations was to:

- Identify any relevant information that they held, including the presence of protected species or sites e.g. Local Nature Reserves (LNRs) or otter holts;
- Identify any concerns that the organisations may have about the potential development; and
- Identify any issues that the organisations would like to see covered by the environmental impact assessment process.

A formal scoping report was sent on September 10th 2007 to SNH, SEPA, and the Moray Council Biodiversity Officer, requesting a formal scoping opinion for the proposed Scheme. The non-statutory organisations listed above were contacted again, and informed of the scoping report and the preferred scheme, and were asked if they had any further comments relating to ecological issues.

For complete Consultee Response Schedule see Chapter 1. A summary of ecological responses where key issues were raised in time to be included in the E.S. is contained in Table 5.1 below.

Table 5.1: Ecology and Nature Conservation consultation responses

Consultee	Consultee Response Summary
Statutory Consultees	
SNH	There is a risk of sediment or pollution entering Loch Oire Site of Special Scientific Interest (SSSI). Strict adherence to construction method statements required, including SEPA PPGs 5 and 6. Appropriate protected species surveys should be carried out and SNH kept informed. Other ecological areas of concern were European Protected Species (bats and otters), and breeding birds.
SEPA	Main concerns would be the protection of nearby water bodies e.g. Loch Oire. Suitable protection should be taken to ensure no discharges from the works.

Consultee	Consultee Response Summary
Moray Council, Planning & Development	Information relating to locations of Sites of Interest to Natural Science (SINS) was provided, for the area known as Lhanbryde Lochs, though this does overlap with the Loch Oire SSSI area.
Non-statutory Consultees	
Deer Commission for Scotland	No deer collision information for this area, and DCS welcome improvements that will increase driver awareness and vision.
Forestry Commission	No comment, as none of their forestry will be impacted, though they do think the improvements will make the road much safer.
RSPB	Works should be scheduled to begin between August and March to avoid the main breeding bird period. Only other concern is that no adverse effects on Loch Oire SSSI are incurred.
Scottish Badgers	There are records of badger road traffic accidents in this area. Requested that appropriate pre-construction surveys are carried out by a suitably qualified ecologist.
North East Scotland, Biological Records Centre (NESBRC)	The site is adjacent to one SSSI, three non-statutory designated sites, and areas on the ancient woodland inventory.
Lossie District Salmon Fisheries Board	Appropriate method statements to be agreed for the works, and culverts not to impede the passage of fish species.

5.4 Methodology

5.4.1 Field survey

The scope of the fieldwork was informed by research, consultations with statutory and non-statutory consultees, an initial site walkover at the start of the project, and the timing and timescale of the study. Datasets on the National Biodiversity Network (NBN) (www.searchnbn.net), which allows viewing of wildlife data and distribution maps, were also searched. An initial scoping consultation was carried out with Scottish Natural Heritage (SNH), to determine the scope of the ecological survey requirements and to highlight the pertinent issues to this scheme.

The extent or area to be covered by the ecological assessment generally depends on the ecological context and type of development being considered. In this case, the fieldwork has been limited to those areas within a buffer zone of approximately 500m of the proposed scheme and the existing alignment. Any exceptions to this 500m buffer zone are highlighted in the specific survey methodologies below. Generally, this did not include entry to private gardens or residences.

The following ecological surveys were deemed appropriate for the proposed development, and were agreed with the SNH Area Officer, and carried out accordingly:

- A Phase 1 habitat survey with target notes (NCC, 1990) (May-August 2006, several visits);
- Otter (*Lutra lutra*) surveys of all watercourses and waterbodies within 500m of the proposed route (May-August 2006, several visits);
- Water vole (*Arvicola terrestris*) surveys of all watercourses and waterbodies within 500m of the proposed route (May-August 2006, several visits);
- Badger (*Meles meles*) survey of all suitable habitat within the survey area (March 2007) – see Confidential Badger Annex for further details;
- Bat surveys, including roost suitability assessment and emergence surveys (Emergence Survey – 15th August 2006);
- Red squirrel (*Sciurus vulgaris*) surveys (May-August 2006, several visits); and
- Three Common Bird Census (CBC) visits between June and July (2nd May 2006, 17th May 2006, 7th June 2006). No wintering bird surveys were undertaken.

The scoping and consultation exercise did not suggest any other protected species or significant populations of wintering birds, invertebrates, amphibians, reptiles or vascular plants in the proposed development area. These potential ecological receptors were not raised as issues to consider by SNH, RSPB or the NESBRC, nor were they recorded as present within the Loch Oire area in the National Biodiversity Network datasets, and these groups are not considered further within the report.

No fisheries interests were identified for Loch Oire by consultees or desk-based research, and the outfall culvert is currently blocked with sediment, and is not passable to fish moving in either direction. Consequently fisheries surveys were not undertaken and fisheries interests not considered further within the report. However, the water quality of Loch Oire is assessed within the Water Resources section (Chapter 8) of this ES.

However, incidental notes were made of any other species or habitats of note that may be present on or near the site, particularly priority species and habitats in the LBAP.

A Confidential Badger Annex has been produced, which is only to be provided to Transport Scotland and SNH, due to the possible persecution of the species. Therefore specific details relating to badgers are not referred to further within this document.

All surveys were undertaken by experienced ecological Scott Wilson staff, who have been trained in the specific field survey methodologies for each of the species mentioned, or in habitat surveying and CBC. All ecologists working on this scheme had considerable experience of the surveys undertaken.

A Global Positioning System (GPS) was used throughout the field survey work, to assist in the accuracy of the mapping, target note location, and all further observations.

Phase 1 habitat survey

A Phase 1 survey provides a rapid assessment of habitat presence and quality. Whilst it is focussed upon categorisation of parcels of land based on their vegetation, the potential value of areas to fauna is also considered. Blocks of land are assigned to recognised broad-habitat categories (e.g. semi-improved grassland, running water), and marked on a map using either standard alphanumeric codes or standard mapping colour codes. Target notes are used to provide additional descriptions of features of particular note (e.g. key and characteristic species, presence of notable species). The purposes of the Phase 1 habitat surveys undertaken for this study were to identify the type, quality and extent of habitats present within an area, and to identify any habitats or features that might require more detailed field investigations. Phase 1 habitat survey is not to be regarded as a definitive representation of the conservation value or interest of any area of land. In addition, it must be noted that plant lists produced from one field survey do not record all species that may occur on a site in the course of a year, or over time. The Phase 1 habitat survey is also an opportunity to identify stands of invasive non-native species such as Japanese knotweed (*Fallopia japonica*).

A Phase 1 habitat survey was conducted over several visits between May-August 2006, by experienced ecological staff of Scott Wilson, using the standard Nature Conservancy Council (NCC) methodology (NCC, 1990). These survey dates are considered within the suitable season to carry out botanical surveys. The survey area was approximately 500m in all directions from the limits of the scheme. The built-up residential nature of some of the land within the scheme boundary meant there were some constraints in relation to access to private residences and their associated curtilages, but all other areas were comprehensively surveyed.

Otter

An otter survey was undertaken between May and August 2006, by experienced ecological staff of Scott Wilson, to determine whether otter shelters or otter habitat were likely to be affected by the scheme, particularly by the new crossings of watercourses. The watercourse was searched and surveyed up to 500m either side of the existing road crossing and all around the Loch Oire perimeter. A further otter survey was undertaken in October 2007, by a Scott Wilson ecologist.

The surveys involved searching for the range of otter signs (SNH, 1997), listed below:

- Spraints;
- Food remains;
- Rolling places;
- Slides down river banks;
- Footprints or paths; and
- Shelters (either holts or couches).

Notes were also taken of riparian habitat type, suitability and quality. Although sprainting levels may drop in the summer months (Chanin, 2003), the surveys were undertaken during favourable weather conditions. Water levels were low in all of the watercourses, and had been low for some time, meaning that recent signs of activity would not have been washed away by

spate flows. During all surveys the locations of otter signs were established using a Garmin eTrex GPS receiver, which is accurate to approximately 10m.

Water vole

The main watercourse is a land drain running between Loch Oire and the agricultural land to the north of the A96. It was surveyed during between May and August 2006, by experienced ecological staff of Scott Wilson.

The standard methodology involves searching a distance of 500m along a watercourse bank. Signs of water voles are recorded on standard survey forms. These note sightings, sounds of entering water, latrines showing discrete piles of droppings, tunnel entrances (above and below water), cropped 'gardens' or 'lawns' around tunnel entrances, feeding stations of chopped vegetation, paths at waters edge, runs in the vegetation and footprints in the mud (Strachan, 1998).

The number of water vole signs are ranked abundant, frequent, scarce or none. The presence or absence of mink (*Mustela vison*), otter and brown rat (*Rattus norvegicus*) signs are also recorded, noting the relative abundance of footprints and droppings along the watercourse. Any field signs of these species are marked on a sketch map.

Bats

On 15th August 2006, two experienced and qualified ecologists from Scott Wilson carried out a bat survey along the scheme route, paying particular attention to buildings and trees likely to be directly affected as a result of the scheme. The aims of the survey were to identify any evidence of bats in the study area, to assess the impact of a change in use of the study area and to suggest mitigation measures if appropriate.

The survey was restricted to external searches of trees for roost suitability, as there is no requirement for buildings to be demolished as part of this Scheme.

During daylight hours trees were surveyed from the ground for entrance holes to potential roosts. Potential roost sites in trees include obvious features such as cavities, frost cracks and trunk and branch splits, rot holes where branches have been removed and hollow sections of trunk, branches and roots. Bats can also roost in less obvious places such as under ivy (*Hedera helix*), under loose bark, woodpecker holes and in bat or bird boxes. Given the diverse number and size of tree features in which roosts can occur, in practice it can be very difficult to say categorically whether a tree contains a bat roost or not. In addition, many of these features are not easily detectable from the ground; therefore binoculars were used to ascertain greater detail. It should also be noted that it was a sub-optimal time of year in which to be carrying out tree surveys for bats, as the dense tree canopy can mask all but the most obvious of roost sites.

External signs that bats are using a tree as a roost site include:

- Suitable entry points in buildings / trees etc;
- Bat droppings: black droppings, 5-10mm long that crumble to a fine dust when crushed and may be located on the ground or stuck to walls;

- Staining: Secretions from bat fur can cause oily brown stains in the vicinity of roost entrances;
- Urine stains below the entrance to the roost;
- Audible squeaking from within the roost site;
- Large roost sites may produce an odour; and
- Flies around the entrance attracted by the smell of guano.

Bat emergence and activity surveys were carried out by trained ecologists using specialist bat equipment on the evening of 15th August 2006, concentrating on trees deemed of potential roost suitability. A heterodyne BatBox III and BatBox Duet bat detectors were utilised to undertake the bat emergence and activity surveys. The first time of emergence varies between bat species and the visits were timed in order to cover emergence of all species and first return to roost site, i.e. 30 minutes before dusk and up to two hours after dusk.

Red squirrel

Signs of red squirrels were surveyed for in all areas where woodland may provide suitable habitat, by experienced and qualified ecologists from Scott Wilson. The surveys were undertaken during site visits between May and August 2006. Red squirrels are active during the daytime and it is possible to make direct sightings, as well as looking for their nests (dreys). Trees were searched for dreys from ground level. Dreys are constructed of twigs in a tree fork or hollow, above a whorl of branches, or close to the stem of a conifer (Gurnell, 1994). They are lined with soft hair, moss and dried grass. Several squirrels may share the same drey, or use the same drey on different days. It is not possible to distinguish dreys of grey squirrels (*Sciurus carolinensis*) from red squirrels without additional supplementary evidence. The only definitive methods of positively identifying red squirrels are through visual surveys and hair tube surveys (Gurnell et al, 2001).

The presence of red squirrels can also be detected by the presence of feeding remains at the base of trees. In broadleaf woods the evidence can be split hazel nuts, shells of acorns or sweet chestnuts, or the wings of ash and maple fruits. In conifer woods (as found at Threapland), cone 'cores' will be found, sometimes scattered, or in little heaps at prominent feeding points such as a stump or a log.

Breeding birds

The standard Common Bird Census methodology (Marchant, 1983) was modified for the proposed scheme. Three visits were undertaken on 2nd May 2006, 17th May 2006, and 7th June 2006.

The majority of the scheme study area is within agricultural fields, coniferous and broadleaved woodland, scattered trees and scrub, farmsteads, open water and a plant nursery. The purpose of the survey was to determine the assemblage of breeding bird species using these areas of land, which may be directly and/or indirectly affected by the scheme. Accordingly, birds seen or heard within 100m of the proposed scheme boundary were recorded.

Surveys were conducted between 0700 and 1200 hours. The survey transect followed the centre of the route of the proposed alignment. Streams and dense woodland areas were investigated closely. The surveyor paused at regular intervals to scan and listen for calling and singing birds. Where access to private dwelling houses and gardens was not possible, the survey was conducted from public walkways. All birds to the rear of private gardens were fully surveyed however from the adjoining farmland, ensuring that all species utilising habitat within the route footprint were likely to be included.

When individuals or pairs of birds were encountered, the fieldworker determined whether the bird(s) were different from any previously encountered. This involved careful attention to the whereabouts and movements of birds, together with birds' sex and plumage characteristics. To minimise the risk of double counting, behaviour and location of birds were carefully observed so that previously encountered birds were not recorded twice. Surveys were not conducted in winds greater than Beaufort Force 5, in persistent rain or when visibility was poor.

The location and activities of all bird species from both visits were recorded on 1:10,000 maps using standard British Trust for Ornithology (BTO) codes (Marchant, 1983). Subsequent map analysis was carried out to produce an index of the species present, the estimated number of breeding territories for each species and the estimated breeding density of each species within the study area. Where birds were recorded in the same location on the first and second visits, the location of birds recorded was taken as equidistant from both mapped observations. Numbers of breeding birds were those recorded as showing the following breeding bird behaviour:

- Displaying or singing;
- Territorial dispute;
- Occupied nests;
- Repeated alarm calling or distraction displays;
- Adult(s) carrying food;
- Adults carrying nest material; and
- Newly fledged young with adult(s).

Other records were considered to be of non-breeding birds, failed breeders or birds loafing, feeding or on passage to other areas.

5.5 Assessment methodology

To determine the significance of any effects of the proposed development, it is necessary to define a robust assessment methodology. The method used is based upon various different protocols for the assessment of significance. The criteria draw on the IEEM guidelines for ecological impact assessment (IEEM, 2006) and also incorporate good practice from other published documents listed in section 5.2 above. The assessment process is summarised below:

- Those habitats and species that might be affected by these elements either directly or indirectly are considered and existing conditions are defined. The existing conditions are known as the baseline;
- The importance of nature conservation resources present is evaluated to place their relative biodiversity value, social/community value and economic value into a geographic context from “international” to “zone of influence” levels;
- Elements of the proposed development that could potentially affect habitats and species or the wider environment are identified, and are known as the scale of effects;
- Likely impacts arising from the development and the effects (beneficial or negative) of these on species and their habitats are predicted, and where possible quantified. The geographic level at which these effects are considered to be significant is determined. The significance of the effects of developments was until recently determined using a standard matrix approach, however, the IEEM guidelines now suggest ecological experience and professional judgement should be integral part of the assessment process and impacts are described simply as “significant” or “not significant” at certain geographical levels, e.g. “significant at a local level” etc.
- Measures to avoid or reduce any significant effects, if possible, are then developed in conjunction with other elements of the design and mitigation for other environmental disciplines. If necessary, measures to compensate for impacts to features of nature conservation importance are also included;
- Any remaining (residual) impacts of the development are reported; and
- Whether there is scope for enhancement is also considered, even if there are no significant negative impacts. Opportunities to benefit nature conservation interests exist without incurring excessive costs on the development are then proposed.

This assessment approach is further described below.

5.5.1 Evaluation of receptor importance to nature conservation

An ecological resource is defined as a species, site or area of nature conservation value. Each site or area may have more than one feature of value that it supports (for example different habitats or populations of species). The IEEM guidance assesses value in terms of the benefits that these features provide to people or society in general, and includes elements such as their contribution to biodiversity. Legal protection is considered separately from value. The values of features are described within a geographical frame of reference (e.g. the feature is of importance at a European level). To attain each level of value and / or importance, an ecological resource or one of the features should meet the criteria set out in Table 5.2 below. In some cases, professional judgement may be required to increase or decrease the allocation of specific value. This judgement is based on consideration of the following additional criteria:

- Population trends;
- Sustainability of resource;
- Representativeness;
- Potential for substitution/re-creation;

- Position in the ecological unit;
- Biodiversity; and/or
- Intrinsic value to stakeholders.

The protection of a particular receptor through national or international legislation does not necessarily relate to the assessment of importance of that receptor to nature conservation. Thus, badgers are protected by national legislation for reasons of animal welfare, but if they are widespread and common in an area they may be of only local or regional conservation importance. Likewise, certain habitats may be important within a regional context, and may have been identified for priority action within the LBAP if this has been prepared for an area, but are not considered to be of national conservation importance. However, the evaluation should be based upon the amount and quality of that habitat type present on the site itself, rather than its presence per se. This ensures that small areas of poor-quality habitat are not over-valued.

Areas considered by SNH to be of national importance for nature conservation are designated as Sites of Special Scientific Interest (SSSI). There are also a range of international designations including Biosphere Reserves, Ramsar sites, Special Areas of Conservation (SAC) and Special Protection Areas (SPA). Wildlife areas of importance at the local level can be designated as non-statutory Sites of Local Nature Conservation Interest (SLNCI) or similar, or as Local Nature Reserves (LNR).

The criteria used to describe the resource value of ecological features for this study are set out in Table 5.2 and are based upon criteria identified in the IEEM guidance and previous Environmental Statements produced by Scott Wilson. To attain each level of value / sensitivity, an ecological feature must meet the criteria in at least one of the areas set out in Table 5.2, although as mentioned previously, in some cases, professional judgement may be required to increase or decrease the allocation of specific value as outlined in the table.

Table 5.2 – Ecological Resource Value (IEEM, 2006)

<p>Nature Conservation Value (Sensitivity)</p>	<p>Examples of Selection Criteria</p>
<p>International (Very High)</p>	<p>European Community and Wider Area</p> <p>A site designated, or identified for designation at the international level e.g. World Heritage Sites, Special Protection Area (SPA), Special Area of Conservation (SAC), and / or Ramsar site. Proposed sites are also given the same consideration as designated sites; A sustainable area of any habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat that are essential to maintain the viability of a larger whole; Any regularly occurring population of an internationally important species e.g. UK Red Data Book species, which is listed as occurring in 15 or fewer 10 km squares in the UK, and that is identified as of unfavourable conservation status in Europe or global conservation concern in the UK BAP.</p>
<p>UK/National (High)</p>	<p>United Kingdom of Britain and Ireland / Scotland</p> <p>A site protected by national designations e.g. Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), or Marine Nature Reserve or a site considered worthy of this designation; A sustainable area of any priority habitat identified in the UK BAP, or smaller areas of such habitat that are essential to maintain the viability of a larger whole; An ecological receptor identified as of critical importance in the UK BAP; Sustainable population of a nationally important species (species listed on Schedules 5 & 8 of the Wildlife and Countryside Act, and amended by the Nature Conservation (Scotland) Act 2004), which is threatened or rare in the region; Any regularly occurring population of a nationally important species that is threatened or rare in that region of the Country, and for which the LBAP identifies the need to protect all remaining sites.</p>
<p>Regional (Medium)</p>	<p>Northeast Scotland / Moray</p> <p>Areas of internationally or nationally important habitats that are degraded but are considered readily restored; Species/Habitat listed as priority in the UKBAP (not covered above); Viable areas of key habitat identified in the Northeast Scotland LBAP, or smaller areas of such habitat that are considered essential to maintain the viability; A site designated as a Wildlife Site or Site of Nature Conservation Interest (SNCI); A regularly occurring, locally significant number of a nationally important species.</p>
<p>Local (Low)</p>	<p>Elgin / Threapland / Lhanbryde Area</p> <p>Areas of internationally or nationally important habitats that are degraded and have little or no potential for restoration; A good example of a common or widespread habitat in the local area, perhaps with the ability to support protected species.</p>

<p>Nature Conservation Value (Sensitivity)</p>	<p>Examples of Selection Criteria</p>
<p>Site (Negligible)</p>	<p>Zone of Direct Influence</p> <p>Common and widespread species; Areas of heavily managed or modified vegetation of low intrinsic interest and low value to species of nature conservation interest, that do not appreciably enrich the site or locally e.g. improved grassland, arable crops.</p>

5.5.2 Method of assessment of effects

Identification of potential impacts of the development has been based on a variety of approaches. The primary source of information has been the review of similar projects and professional experience of the assessment team. The method for assessing the effects follows the Guidelines for Ecological Impact Assessment in the United Kingdom (IEEM, 2006).

The effect of potential impacts depends upon:

- Magnitude: 'size' or 'amount' of impact, determined on a quantitative basis where possible, e.g. the numbers of a species that are influenced;
- Extent: The area over which the impact occurs;
- Duration: The time over which the impact is expected to last prior to recovery or replacement of the resource or feature;
- Reversibility: whether recovery is possible within a reasonable timescale; and
- Timing and Frequency: Whether impacts coincide with critical life changes or seasons (e.g. breeding bird season) and how frequent the impacts are likely to be.

These factors are further presented within Table 5.3 below:

Table 5.3 – Factors that determine effect of impact (IEEM, 2006)

<p>Environmental Parameter</p>	<p>Description</p>
<p>Magnitude</p>	<p>The 'size' or 'amount' of an impact is referred to as the magnitude of the impact, and is determined on a quantitative basis where possible.</p>
<p>Extent</p>	<p>The extent of an impact is the area over which the impact occurs. Habitats, could be considered to be an area, therefore the magnitude and extent of an impact may be synonymous.</p>

<i>Environmental Parameter</i>	<i>Description</i>
Duration	The duration of an impact is the time over which an impact is expected to last prior to recovery or replacement of the resource or feature. This is considered in terms of life cycles of species and regeneration times of habitats. The duration of an impact may be longer than the duration of an activity. For example, construction activity may cause disturbance over 2 years but the impact from that disturbance may continue for 5 years.
Reversible	<p>Reversible (or temporary) impacts are those from which a spontaneous recovery is possible, or for which effective mitigation is possible. Reversible impacts will arise during the construction phase of the development.</p> <p>Irreversible (or permanent) impacts are those from which recovery is not possible within a reasonable timescale, or for which there is no reasonable chance of action being taken to reverse it. The effects of permanent landtake may lead to irreversible fragmentation of habitats. Some indirect effects may also be irreversible or of an unspecified duration (e.g. the effect of noise pollution on breeding and roosting birds).</p>
Timing and Frequency	<p>Some activities or changes may only cause an impact if they coincide with critical life stages or seasons, and therefore timing of the activity or change is important in assessing the impact. Such impacts may be avoided through careful timing of works.</p> <p>The frequency of an activity will influence the resulting impact.</p>

Impacts on the ecology and nature conservation, and its social and economic values relating to the site can be divided into two main types: negative and positive. These **negative** and **positive** impacts can be further sub-divided into those impacts that are **direct** and those that are **indirect**.

Impacts in combination may have a **cumulative effect** that is greater than when the same impacts act in isolation. Cumulative impacts may entail the assessment of all the effects of the scheme upon a feature (e.g. impacts at the construction and operation stage), or the combined impacts of a number of schemes that will affect the same area.

The significance of the effect on the ecological integrity of the receptor or resource depends upon all of these factors. The accepted definition of integrity is 'the coherence of its ecological structure and function, across its whole area, that enables it to sustain that habitat, complex of habitats and/or the levels of populations of the species for which it was classified' (Scottish Executive, 2000).

The effect on ecological integrity of the receptor or resource is either deemed to be significant or not significant. The terms 'significant' and 'not significant' are used as described in Table

5.4. Initially, consideration of the impact on ecological integrity does not take account of any recommendations for mitigation that might subsequently be described. Residual impacts and significance takes these mitigation measures into consideration.

Table 5.4 – Description of the terms “significant” and “non-significant”

<i>Scale of impact upon ecological integrity</i>	<i>Description</i>
Significant	The impact is significant if it is assessed to be large in scale or amount, irreversible, have a long-term effect, or coincide with critical life stages. In addition, a combination of any of these parameters will also be assessed as significant.
Not significant	The impact is not significant if it is assessed to be small in scale or amount, reversible within a reasonable timescale and does not coincide with critical life stages.

5.5.3 Confidence of assessment and data

It is valuable to attribute a level of confidence to the accuracy of a prediction. Four levels have been identified for the purposes of this study, as outlined in IEEM guidelines (2006):

- Certain / near-certain: probability estimated at 95% chance or higher;
- Probable: probability estimated above 50% but below 95%;
- Unlikely: probability estimated at less than 50%; and
- Extremely unlikely: probability estimated at less than 5%.

Certain / near-certain confidence is assigned where the anticipated impact is very likely to occur, based on reliable information (e.g. formal surveys undertaken to a standard methodology) or previous experience. Unlikely level of confidence is assigned where the predicted impact and its level are best estimates, generally derived from first principles of ecological theory and the experience of the assessor. This category has also been used where there is limited information about species occurrence. The reason for including a confidence category of ‘extremely unlikely’ is that though some effects may be very improbable, they would have very serious implications should they occur.

Unless otherwise stated, all impacts are given at a certain / near-certain confidence level.

5.6 Baseline conditions

5.6.1 Statutory designated sites

Loch Oire Site SSSI, located at grid reference NJ 289609, is designated for its biological value. The location of the Loch is shown in Figure 5.1, and at the nearest point it is approximately 30m from the existing A96 carriageway. Loch Oire is one of the very few lochans remaining in the hummocky glacial deposits of lowland Moray. It supports an undisturbed aquatic plant

community associated with mesotrophic conditions including diverse submerged and emergent vegetation, sedge fen and marginal carr woodland (SNH citation, www.snh.gov.uk).

The loch is also extremely important for the presence of certain species of breeding waterfowl. Loch Oire was also originally notified for regularly supporting an important breeding population of Slavonian grebe (*Podiceps auritus*), a species listed on Annex 1 of the EC Wild Birds Directive, but these are no longer found at this site (SNH site management statement, www.snh.gov.uk).

It is understood that there is currently no water quality classification assigned to this loch under the SEPA Standing Water Classification scheme. However, given its ecological status the water quality is expected to be Good to Excellent (Water Resources section of this ES, Chapter 8).

5.6.2 Non-statutory designated sites

There are two substantial areas of long-established plantation woodland within the study boundary, as defined in the SNH Ancient Woodland Inventory (AWI) within the study corridor. These are Sleepieshill Wood immediately adjacent to the north of the A96 and Loch na Bo/Threapland Woods, to the south of the A96, bordering the southern edges of Loch Oire. These woodlands are shown in Figure 5.1. This is not a statutory designation, and refers to sites shown as plantation woodland in c.1860 but not shown in 1750 (Roy) maps. It highlights areas of potentially high value ecological habitat. Ancient Woodland Inventory sites are home to more threatened species than any other habitat in the UK and can also be of importance for preservation of archaeological features (www.woodland-trust.org.uk). The SNH AWI states that the area of Sleepieshill Wood is 681ha.

5.6.3 Other relevant records

A search of the NBN yielded no historic records of great crested newt, reptiles or water vole within the study boundary, and none have been brought to our attention by SNH or other consultees. There are some records of red squirrel, badger and otter in the wider area within 10km squares but no records within the immediate study area.

As noted above, statutory and non-statutory designated sites are shown on Figure 5.1, as are signs of protected species observed during field surveys, and the location of a stand of Himalayan balsam (*Impatiens glandulifera*) to the south-east of Muiryhall.

The text relating to badgers has been placed in a Confidential Badger Annex to the ES. This Confidential Annex will only be made available to Transport Scotland and Scottish Natural Heritage.

5.6.4 Field survey

Habitats

The main habitats within the study area are long established coniferous plantation, mixed plantation, scattered trees and scrub, watercourses and waterbodies, grassland, open spaces, arable land and built up areas. These habitats are illustrated in Figure 5.2, and Target Notes are provided within Appendix 4.

A1.1.1 Semi-natural Broadleaved Woodland

There are several compartments of semi-natural broadleaved woodland within the survey area. The northern fringes of Loch Oire are fringed with semi-natural broadleaved woodland dominated by grey willow and downy birch with frequent ground cover species beneath, including marsh bedstraw (*Galium palustre*), water forget-me-not, bramble, creeping buttercup (*Ranunculus repens*) and bog bean. This semi-natural broadleaved woodland habitat is also present to the south of the study area within Threapland Wood, where it is dominated by mature downy birch. Birch dominated semi-natural broadleaved woodland is also present either side of a minor access road (Target Note 5), with a natural ground flora.

A1.1.2 Broadleaved Plantation Woodland

To the south-west of the study area there is a plantation of tall mature beech (*Fagus sylvatica*) with occasional mature oak (*Quercus* sp.) (Target Note 14).

A1.2.2 Coniferous Plantation Woodland

Long-established coniferous plantation, dominated by Scot's pine (*Pinus sylvestris*), is present adjacent to the south and northeast of the A96. These woodland blocks vary in character but generally contain species such as birch (*Betula* sp.), holly (*Ilex aquifolium*), bramble (*Rubus fruticosus*), gorse (*Ulex europaeus*), broom (*Cytisus scoparius*), bracken (*Pteridium aquilinum*), wood sorrel (*Oxalis acetosella*), common nettle (*Urtica dioica*), ivy, creeping soft grass (*Holcus mollis*), common bent grass (*Agrostis capillaris*), wavy-hair grass (*Deschampsia flexuosa*), Yorkshire fog (*Holcus lanatus*), red fescue (*Festuca rubra*), *Sphagnum* and *Polytrichum* mosses. Sleepieshill Wood coniferous woodland to the northeast of the A96 is a large plantation of tall mature Scot's pine with an understorey of widely scattered young rowan (*Sorbus aucuparia*), birch and holly, with a grass-dominated ground flora with creeping soft-grass and common bent grass with locally dominant areas of wavy hair grass and bell heather (*Erica cinerea*), with occasional cross-leaved heather (*E. tetralix*). These plantation compartments provide excellent red squirrel habitat, and signs of deer were also noted throughout. The long established plantation woodland is also likely to be of importance for birds and other protected species.

A1.3.2: Mixed Plantation Woodland

The mixed plantation woodland throughout the study area is typically comprised of birch, larch (*Larix* sp.) and Scot's pine, with a scattered understorey of gorse, elder (*Sambucus nigra*), broom, and rowan, over a ground flora dominated by creeping soft grass, common bent and herbs, including ragwort (*Senecio jacobaea*), Germander speedwell (*Veronica chamaedrys*) and common dog-violet (*Viola riviniana*). These plantation compartments provide habitat for red squirrels, birds and other protected species. There is a young mixed plantation at the south-west of the study area, which is part of the tree nursery for the Garden Centre.

A3: Scattered Trees and A2: Scrub

Scattered trees and scrub, mainly gorse and hawthorn (*Crataegus monogyna*), are present along the roadside, rail embankments, and along the watercourse. These habitats have the potential to provide breeding bird habitat between March and August each year.

B2.2: Semi-improved Grassland, B4: Improved Grassland and J1.1: Arable

Some areas within the study boundary are dominated by agricultural land uses such as arable, improved and semi-improved neutral grassland and set-aside, separated by fencelines and hedgerows. The majority of the road verges are classified as semi-improved neutral grassland and average 3-5m in width on either side of the A96. Roadside verges can often be an important wildlife habitat and feature and can provide refuge for a number of plant species and animals as well as being important wildlife corridors.

G1: Open Water, F1: Swamp, A2.1: Dense Continuous Scrub, G2: Running Water

The open water of Loch Oire has abundant broadleaved pondweed (*Potamogeton natans*) and has fringing bottle sedge (*Carex rostrata*) vegetation throughout its perimeter. The loch provides very suitable bat foraging habitat, and both soprano pipistrelles (*Pipistrellus pygmaeus*) and Daubenton's bats (*Myotis daubentonii*) were observed (visually and by bat detector) feeding in large numbers over the loch in the evening. The small island in the centre of Loch Oire was not accessible, but is dominated by grey willow (*Salix cinerea*) scrub, with narrow peripheral strips of bottle sedge. The loch also provides otter foraging habitat and habitat for tufted duck (*Aythya fuligula*), mallard (*Anas platyrhynchos*) and mute swan (*Cygnus olor*).

Fringing the south of Loch Oire there is swamp dominated by *Sphagnum* spp. (including *S. squarrosum*) and bottle sedge, with frequent bogbean (*Menyanthes trifoliata*), water horsetail (*Equisetum palustris*) and marsh cinquefoil (*Potentilla palustris*).

Dense continuous grey willow carr scrub fringes the southeast of Loch Oire, with some downy birch (*Betula pubescens*) and Scot's pine, and with mosses and sedges dominating the ground flora.

Running Water: G2 / Marginal Inundation: F2, Scattered Scrub: A2.2

A watercourse runs from Loch Oire to the north of the A96. The stretch from the A96 to the farm track crossing has excellent water vole suitability, though no evidence was found. The banks have a steep to gentle slope and are vegetated with a variable mix of neutral grasses, soft rush (*Juncus effusus*), common nettle, gorse, raspberry (*Rubus idaeus*), willow, occasional birch trees and, near the road, a mature Scot's pine with bat roost potential. Aquatic and marginal vegetation includes lesser duckweed (*Lemna minor*), branched bur-reed (*Sparganium erectum*), bottle sedge, water forget-me-not (*Myosotis scorpioides*) and brooklime (*Veronica beccabunga*). Upstream of the farm track crossing bankside vegetation becomes less diverse, and gorse is much more frequent and often completely overhangs the water channel, thus much reducing water vole suitability.

Other Habitats

There are a number of other localised habitats such as tall ruderal (C3.1), amenity grassland (J1.2) and hard-standing areas associated with residential properties and built-up areas.

Otter

Loch Oire and an un-named watercourse crossing beneath the A96 were surveyed for suitability for otter and evidence of their presence. No otter signs were seen along the land drain feeding from Loch Oire northwards crossing the A96, and further, the culvert was clogged with rubbish and woody debris at the time of survey, thus inhibiting otter passage. Otters would also be prevented from moving alongside the outfall drain by the presence of two fences, both of approximately one metre in height, and constructed using a fine metal mesh. Otters would be required to cross the A96 over land to access the watercourse to the north of the A96. Again, there are two post and mesh fences to the north of the A96 carriageway, which although wouldn't prevent all otter movements, it may form sufficient a barrier that otter movements across the carriageway are limited.

Surveyors walked the entire perimeter of Loch Oire searching for otter holts, couches and other signs. There were many suitable locations for otter holts, such as tree root matrices and Rhododendron bushes, right up to the water's edge, though no otter shelters or other signs of activity were seen. However, the boathouse along the western edge of Loch Oire appears to be a sprainting site for otters, and judging by the consistency and appearance of the spraints, it is probable that the spraints are up to several months old. The location of this sprainting site is shown in Figure 5.2. An important caveat is that the vegetated island within Loch Oire contains suitable habitat for otter holts, and was not searched during this current survey period, due to lack of access for health and safety reasons. A further site visit in October 2007 revealed that some of the boathouse had slumped into the water, with the interior platform now below the Loch water levels. No otter spraints were observed at this location on this visit.

Water vole

While the watercourse to the north of the A96 provides highly suitable water vole habitat, no water vole burrows, latrines or other evidence was found during current ecological surveys. The riparian vegetation was quite dense and the surveys were not carried out during the optimum time of March to June. However, the surveys were undertaken within the season where activity can be assessed by the presence of active latrines. American mink are recorded as being found within the 10km grid square in which the Threapland area is located, and they can be a significant contributory factor in the absence of water voles, due to predation.

Bats

No signs of bats were seen during the site walkover, though some trees of low suitability for roosting bats were seen, particularly along the north of the A96 adjacent to the watercourse and within mixed woodland to the east of the watercourse. These were mature Scot's pine with cracks and peeling bark, which could provide temporary bat roost habitat. No private residences or houses were surveyed for bat evidence, as there are no proposals for any direct impacts upon these structures.

Bat emergence surveys on the evening of 15th August 2006 concentrated on these mature Scot's pine trees to the north of the A96, where some bat suitability was evident, and also in the vicinity of Loch Oire. Several soprano pipistrelles were heard and seen along woodland to the north of the A96, including some feeding buzzes. No bats were seen emerging from trees identified as being of suitability for bats. There was an abundance of soprano pipistrelles and

Daubenton's bats seen and heard flying over Loch Oire, gleaning insects and skimming above the water surface, visually surveyed through using a head torch to shine over the water surface.

It is important to note that both soprano pipistrelles and Daubenton's bats are known to use trees for summer roosts, so there is a possibility that they will utilise tree roosts or cavities in the area if present (Limpens, Twisk & Veenbas, 2005).

Red squirrel

There is an abundance of highly suitable red squirrel habitat within the survey area, with the long-established coniferous plantation providing suitable habitat. No red squirrels were visually recorded, however anecdotal evidence from several local individuals suggests that red squirrels are often seen within the long-established plantation both north and south of the A96.

Two squirrel dreys were positively identified within Sleepieshill woodland at the eastern end of the scheme boundary, in two trees c.50m apart and c.30m from the A96 (Target Note 7). The location of the dreys is shown in Figure 5.1. No other definitive signs were found, and it is very difficult to separate grey squirrel dreys from red squirrel dreys without supporting information such as visual sightings or hair tube analysis. Further, while anecdotal evidence suggests these could be red squirrel dreys, a search of the NBN Gateway (SNH, October 2006), yielded a grey squirrel record from Lhanbryde, c.3km from these identified dreys (data from 1984), therefore the possibility of these being grey squirrel dreys cannot be fully ruled out.

A further site visit in November 2007 incidentally recorded a squirrel drey in the coniferous plantation between the A96 carriageway and Loch Oire, at grid reference NJ 2884 6108. No squirrels were observed, so it cannot be confirmed whether this drey is used by red squirrels or greys.

Breeding birds

This section details the results for the Common Bird Census (CBC) undertaken, and includes incidental bird sightings. The bird species recorded are presented in Table 5.5, including estimates of the number of breeding pairs, recorded within 100m of the scheme. The conservation status of each species is also included, e.g. birds listed on Annex I of the EC Birds Directive (79/409/EEC)¹, birds listed on Schedule 1² of the Wildlife and Countryside Act 1981 (amended), Red-listed, Amber-listed and Green-listed Birds of Conservation Concern³

¹ The Directive aims to deliver protection, management and control of all species of wild birds where they occur naturally. Member states are required to take steps to maintain populations at levels at which they are sustainable both ecologically and scientifically. For particular species a member state must designate Special Protection Areas (SPAs) of suitable habitat. An Annex 1 species is listed for reason of danger of extinction, vulnerability to specific habitat changes, rarity either by population size or restricted local distribution, or other specific habitat requirements.

² Schedule 1 birds are priority species on which special penalties apply to infringement of the act either against the bird, its nest or eggs. Generally under the Act all wild birds, their nests and eggs are protected.

³ The JNCC publish a list of Birds of Conservation Concern (JNCC, 2002). Red-listed species are generally those whose breeding population or range is declining or that are globally threatened. Amber-listed species are those whose breeding or non-breeding populations are in moderate decline, they are internationally important and localised breeding or non-breeding species, or they hold an unfavourable conservation status in Europe.

(Gregory et al, 2002), and UKBAP⁴ and Northeast Scotland Priority Species and species on the Scottish Biodiversity List⁵.

The locations of birds observed and their activity codes during the two visits are illustrated in Figure 5.3.

Table 5.5: Bird species, including conservation status recorded during Common Bird Census 2006.

Species Common Name Latin Name (BTO Code)	Number of individuals recorded	Estimated number of breeding pairs	Conservation status
Barn swallow <i>Hirundo rustica</i> (SL)	2	0	Amber List
Blackbird <i>Turdus merula</i> (B)	3	2	Green List
Blue tit <i>Parus caeruleus</i> (BT)	11	2	Green List
Buzzard <i>Buteo buteo</i> (BZ)	2	0	Green List
Carrion Crow <i>Corvus corone</i> (C)	10	0	Green List
Chaffinch <i>Fringilla coelebs</i> (CH)	21	18	Green List
Coal tit <i>Parus ater</i> (CT)	3	3	Green List
Coot <i>Fulica atra</i> (CO)	2	1	Green List
Goldcrest <i>Regulus regulus</i> (GC)	2	1	Amber List
Goldfinch <i>Carduelis carduelis</i> (GO)	4	2	Green List
Greenfinch <i>Carduelis chloris</i> (GR)	1	0	Green List
Great tit <i>Parus major</i> (GT)	7	6	Green List
Linnet <i>Carduelis cannabina</i> (LI)	3	1	Red List, UKBAP, LBAP
Meadow pipit <i>Anthus pratensis</i> (MP)	8	0	Amber List
Mallard <i>Anas platyrhynchos</i> (MA)	3	1	Green List

⁴ The UKBAP, revised 2007, contains 1149 species and 65 habitats that have been listed as priorities for conservation action under the UK Biodiversity Action Plan (UK BAP).

⁵ The List of Species and Habitats considered to be of Principal Importance for the purpose of Biodiversity Conservation in Scotland. The publication of the Scottish Biodiversity List satisfies the requirements of Section 2(4) of The Nature Conservation (Scotland) Act 2004.

Species Common Name Latin Name (BTO Code)	Number of individuals recorded	Estimated number of breeding pairs	Conservation status
Mute Swan <i>Cygnus olor</i> (MS)	8	1	Amber List
Oystercatcher <i>Haematopus ostralegus</i> (OC)	2	0	Amber List
Pied wagtail <i>Motacilla alba</i> (PW)	2	0	Green List
Robin <i>Erithacus rubecula</i> (R)	6	6	Green List, Scottish Biodiversity List
Rook <i>Corvus frugilegus</i> (RO)	2	0	Green List
Siskin <i>Carduelis spinus</i> (SK)	2	0	Green List
Skylark <i>Alauda arvensis</i> (S)	4	1	Red List, UKBAP priority, Scottish Biodiversity List, LBAP
Tufted duck <i>Aythya fuligula</i> (TU)	2	1	Green List
Whitethroat <i>Sylvia communis</i> (WH)	1	1	Green List
Willow warbler <i>Phylloscopus trochilus</i> (WW)	7	5	Amber List
Woodcock <i>Scolopax rusticola</i> (WK)	1	0	Amber List
Woodpigeon <i>Columba palumbus</i> (WP)	8	2	Green List
Wren <i>Troglodytes troglodytes</i> (WR)	7	7	Green List
Yellowhammer <i>Emberiza citrinella</i> (Y)	3	1	Red List, UKBAP
Total number species recorded	29		
Total number species showing breeding behaviour	19		

A total of 29 species were recorded during the Common Bird Census (CBC). Of these, 19 species were considered to be breeding (see Table 5.5). The remaining individuals were considered to be failed breeders, or birds loafing, foraging or passing through the site. However, some, or all of these individuals may represent breeding species. These may have not have been displaying breeding behaviour during any of the three visits. Therefore the results should be interpreted as a conservative estimate of the number of breeding species and breeding pairs of birds present within the study area. Three red-listed species, seven amber-listed and one UK BAP species were recorded.

The CBC results provide a useful species index of the bird assemblage present within the study area. The bird assemblage is largely typical of common woodland, grassland and agricultural species. The most common breeding species was chaffinch.

Field survey limitations

For access reasons, private residences and gardens areas were not surveyed. Not all watercourse stretches were accessible along all points, due to dense scrub coverage, so otter and water vole evidence along these stretches, if present, may have been missed. Water vole surveys were not carried out during the most optimal time of year. The vegetated island within Loch Oire was not accessed, therefore any otter signs here would not have been uncovered as part of our ecological surveys.

5.6.5 Value of ecological resources

This section evaluates the nature conservation interest of the study area for its habitats and the species it supports in terms of relative importance in geographical context through the framework shown in Assessment Methodology section, based on relevant legislation and guidance. The importance of the receptor has been assessed with regard to both the local and wider context, with reference to biodiversity audits, and national and regional surveys, where these were available e.g. Alexander *et al*, 1998. This evaluation is shown in Table 5.6.

Table 5.6 – Value of Ecological Resources

ECOLOGICAL RECEPTOR (habitat/species)	STATUS
Loch Oire SSSI – Statutory Designated Site	Loch Oire is one of the very few lochans remaining in the hummocky glacial deposits of lowland Moray. It supports an undisturbed aquatic plant community associated with mesotrophic conditions including diverse submerged and emergent vegetation, sedge fen and marginal carr woodland. The loch is also extremely important for the presence of certain species of breeding waterfowl. The Water Resources section of this ES (Chapter 8) has assessed the water quality as Good to Excellent under the SEPA Standing Water Classification Scheme. Given the SSSI designation of the site it is classed as being of National importance.

ECOLOGICAL RECEPTOR <i>(habitat/species)</i>	STATUS
Ancient Woodland Inventory Plantations - Non-statutory Designated Site	Sleepieshill Wood immediately adjacent to the north of the A96 and Loch na Bo/Threapland Woods, to the south of the A96, bordering the southern edges of Loch Oire are both listed on the SNH woodland inventory as 'long-established woodland of plantation origin'. These are non-statutory designated sites, and are designated for their strong ecological communities and value, and they also provide good habitat for a number of protected species. This habitat is widespread throughout this region of Scotland, and indeed throughout the local Elgin area, and has therefore been assessed as of Local importance.
Habitats (Terrestrial and Freshwater – apart from Statutory and Non-statutory Designated sites listed above)	<p>Apart from Loch Oire and Ancient Woodland Inventory Plantations, the remaining habitats within the area are of limited ecological value, and are widespread in their distribution throughout the UK and local area.</p> <p>Many of the habitats are listed on the Northeast LBAP, such as Wetland and Freshwater, Farmland and Grassland and Woodland and are assessed as of Local importance.</p> <p>The remaining habitats are classed as Site importance.</p>
Otters	Otters receive protection under the Conservation Regulations 1994 and the Nature Conservation (Scotland) Act 2004. They are also a priority species under the UKBAP and also the North-East Scotland LBAP. They are recognised as a species of principal conservation importance on the Scottish Biodiversity List. There are widespread and recovering populations throughout Scotland, and otters occur in every 10km grid square in the north-east of Scotland (Harris <i>et al</i> , 1995). Due to the low levels of activity recorded on site, and the lack of holts or shelters within the study area, they are assessed as Local importance.
Water vole	Water voles have suffered a long-term decline since 1900, with accelerated loss through the 1980s and 1990s, with predictions of a 94% loss of water voles from former sites by the year 2000 (Strachan, 1998). They are also a priority species under the UKBAP and also on the North-East Scotland LBAP. While water voles are not present on site, suitable habitat is available and it is anticipated that there may be available source populations in the wider area. The NBN shows very few records of water voles in the Moray region (one record at NJ 011518 from 1987), and as they are considered absent from the scheme study area, they have been assessed as Local importance.

ECOLOGICAL RECEPTOR <i>(habitat/species)</i>	STATUS
Bats	Of the 16 species of UK bat, nine regularly occur in Scotland and are protected under The Conservation Regulations (Natural Habitats &c.) 1994 and the Nature Conservation (Scotland) Act 2004. Pipistrelle bats are a priority species under the UKBAP and also the North East Scotland LBAP, and Daubenton's bats are listed on the North East Scotland LBAP as a UK species of conservation concern. Of a reported 60 Daubenton's roost sites known in the UK, 10 are recorded as being located in Deeside and Donside (Alexander <i>et al</i> 1998). Pipistrelle and Daubenton's bats are regarded as common throughout Scotland, and they have not been recorded as roosting within the footprint of the scheme, and are therefore assessed as Local importance. Loch Oire is also assessed as being locally important as a foraging resource for the bats.
Red Squirrel	Due to the introduced grey squirrel replacing the species throughout most of England and Wales, the distribution is now largely confined to Scotland and Ireland. The species remains widespread and locally common in Scotland, where they have shown a modest expansion in range and number. The current UK population is estimated to be 160,000 (UKBAP website). They are listed as a Priority Species within the UKBAP and are also listed as such on the North East Scotland LBAP. They are recognised as a species of principle conservation importance on the Scottish Biodiversity List. Red squirrels are widespread and locally common in Scotland, being more and more confined to coniferous woodlands as the grey squirrel colonises areas along broadleaved woodland corridors (Poulsom <i>et al</i> , 2005). Only three dreys have been recorded within the surveyed area, and these have not been confirmed as red squirrel dreys. In this context the red squirrel is classed as Local importance.
Breeding Birds	<p>Skylark, yellowhammer and linnet are UKBAP species, however only one breeding pair of each of these species was recorded during the CBC surveys, and they are therefore assessed as being of Local importance only.</p> <p>The remaining bird species are mainly widespread and common and are assessed as being of Site value.</p>

5.6.6 Predicted trends in the absence of development

It is likely that the Scheme area would remain largely unchanged in the absence of development, and construction is due to start in summer 2009. The residential properties and the garden centre are likely to remain unchanged in their location and extent, and the agricultural land will continue to be used for a mixture of arable crops and grazing. The only possible change could be that the coniferous plantation woodlands could be felled at some stage in the future, though it is not clear whether these would be replanted or changed to other land uses. Loch Oire is surrounded by woodland, and if this remains in situ and is not felled, then there aren't likely to be any significant changes or impacts upon the Loch.

5.7 Environmental effects

5.7.1 Introduction

The Scheme proposals were outlined in Chapter 2. These activities might have a range of effects (both positive and negative) upon ecological features at either the construction or operation phases. A distinction is often made between direct and indirect impacts. Direct impacts occur where the changes to an ecological feature are directly attributable to an action associated with the scheme, such as the loss of woodland for the construction of new buildings. Indirect habitats usually arise as a 'knock-on' effect of a scheme, and would include aspects such as disturbance of otter activity as a result of a change in human use of the site.

Direct and indirect effects can be further sub-divided into temporary or permanent impacts. Permanent impacts include loss of land to the scheme. Temporary impacts arise during the construction phase (e.g. temporary use of land for storage of materials), and whilst short in duration may potentially have longer-lasting effects. For example, temporary loss of habitats of high nature conservation value can be as of great a magnitude as the permanent land take of lower value habitats due to the timescales over which recovery occurs (e.g. the time taken to re-establish woodland). Effects may be cumulative, if, for example, the construction of the Scheme and any adjacent developments were to both cause disturbance to the same ecological receptor.

5.7.2 Potential effects

The impacts of the potential effects arising from the proposed Scheme development are outlined below for the operational and construction phases, following consideration of the baseline conditions.

5.7.3 Effects of site construction

Site construction will involve site clearance (also referred to as enablement), physical removal of soils and vegetation, break-up of existing hard-standing and the introduction of artificial construction materials, active machinery and introduction of plant species as part of the landscape design. It is estimated that the works will take approximately eight months, and are scheduled for mid-2009.

The potential negative ecological effects involved with the construction of the new road scheme may potentially involve:

- Habitat loss (land-take), a direct and permanent effect: The severity of this effect is directly related to the amount of habitat lost and the conservation value of that habitat;
- Habitat fragmentation, a direct and permanent effect: Severance of habitats and/or the wildlife corridors linking them is also considered a direct impact. Fragmentation can lead to reduced genetic diversity and increase the likelihood of species being lost;
- Indirect effects: These arise from disturbance (visual, lighting, noise or vibration), dust deposition, increased vehicle trafficking and changes in patterns of existing drainage. These impacts have the potential to affect habitats outside the boundary of the construction site, and will generally be temporary and link to construction impacts;

- Spread of alien invasive species: Construction traffic could result in fragments of invasive species, such as Himalayan balsam, being spread around the scheme area, leading to the new establishment of this alien species. This would be a permanent direct impact; and/or
- Possible pollution incidents:
 - Release of oils, fuels, chemicals etc. into the watercourses from construction machinery, stockpiles and apparatus; and/or
 - Release of soils, sediments etc from partially constructed embankments or other construction areas;

Statutory designated sites

Loch Oire is located within close proximity to the existing A96 carriageway and the existing Loch Oire junction and side road. The undisturbed aquatic plant communities of Loch Oire should not be directly impacted during construction of the scheme, as there will be no direct landtake, due to the separation distance of approximately 30m between the loch shore and the nearest construction activity. A post and rail fence also acts as a boundary between the Loch Oire side road and the shoreline of the Loch, which should help prevent direct incursion into the aquatic habitats.

However, construction activity will be significant in this area due to the closing up of the Loch Oire junction, and the raising of the A96 carriageway at this point, which will involve construction work to the embankment between the A96 and the Loch. There is the potential for the release of soils and sediment during construction work on the embankment, which if not managed satisfactorily, could lead to these falling or being washed in to the Loch e.g. during heavy rainfall. The loch is also described as mesotrophic in the SSSI citation, which would suggest that further input of soils or sediment, would make the Loch vulnerable to eutrophication. Similarly, there is also the potential for the release of oils, fuels and other chemicals from construction machinery, stockpiles and other construction apparatus. Pollution would impact on the 'Good to Excellent' water quality of the site.

Any direct impacts would only affect a small proportion of Loch Oire SSSI along the northern shore, though these would have the potential to be permanent. The potential indirect impacts of sediment or pollution release would impact upon the water quality of the whole Loch, though it is possible that this would just be a reversible and temporary impact. Therefore, the impacts upon the open water habitats of Loch Oire are considered not significant negative at the national level and unlikely to happen, though the impacts may be significant at the local level.

Non-statutory designated sites

There will be no direct or indirect impacts upon the long-established woodland of plantation origin known as Loch na Bo / Threapland Woods. These woodland areas are to the south of the railway and the Loch Oire road, and are therefore well separated from any construction activity, being approximately 75m from the construction of the new Loch Oire junction.

However, there will be limited landtake from a small proportion of the Sleepieshill Wood, which is also long-established woodland of plantation origin. Trees on the very edge of the plantation, to the north-east of the Threapland Junction and immediately north of the A96 carriageway,

would be removed to improve the sightlines to and from the junction. This may be accommodated within the existing verges, but for this assessment it is assumed that some woodland felling is required. This is a direct and permanent impact, but will impact less than 1ha of the Sleepieshill Wood, which is 681ha in total area. Therefore, the direct impacts upon the long-established woodland of plantation origin are assessed to be non-significant negative impact at the regional level and certain to occur, though the impacts may be significant at the site level. The amount of landtake from this area is so limited, that this impact is not assessed as being significant at any level.

Habitats

All further habitats are classified as being of local / site importance. The impacts on habitats can be divided into direct and indirect impacts.

Direct Impacts

Proposals will necessitate the felling of trees both in groups and as individuals, dense gorse scrub clearance, and encroachment upon semi-improved grassland habitats and potential impacts upon running water:

- **Woodland and trees:** A direct impact on a body of woodland can cause fragmentation and affect the wildlife corridor function. It may also have negative impacts on European Protected Species such as bats that are using the woodlands for foraging and potentially for roosting. There will be direct and permanent landtake from the edges of a number of discrete woodland areas in close proximity to the existing A96 carriageway, including semi-natural broadleaved woodland, mixed plantation, and coniferous plantation. The total loss of woodland and tree habitat, not including the areas on the SNH AWI total approximately 1.6ha. However, as the landtake will only impact upon the fringes of these woodland areas they will not suffer fragmentation or loss of the wildlife corridor function, and they should all remain viable areas of woodland habitat. The landtake also represents just a small proportion of the woodland resource within the wider area.
- **Dense and scattered scrub:** Scrub habitats have considerable value as shelter, breeding and foraging habitat for a range of bird species, invertebrates, small mammals, and occasionally larger mammals such as badger and roe deer (*Capreolus capreolus*). This ecological value is usually associated with dense scrub, such as that found alongside the A96 carriageway at Threapland. Approximately 0.3ha of scrub will be removed to accommodate new junction alignments and embankment works, but the impacts are localised, impacting upon just a small proportion of the local scrub resources and can be compensated for (see mitigation section below);
- **Grassland:** The development proposals involve direct impact on semi-improved neutral grassland by removal of small areas to the south of the existing A96 carriageway, to accommodate the new Loch Oire junction. The total landtake from grassland habitats has been assessed as 1.0ha. This semi-improved grassland is of low conservation value, as the fields have previously been used for sand extraction. While the road verges can be relatively richer in diversity, the verges in this area are variable, and by their nature are also limited in their extent.

- Arable: There will be landtake from an arable field immediately north of the A96 carriageway and adjacent to the outfall of Loch Oire, with approximately 0.8ha of landtake. This land will be used for an attenuation pond, which will receive runoff from the carriageway before being discharged into the outfall burn.

Direct impacts on the terrestrial habitats are considered not significant negative at the local level and certain to happen.

- Running water: There could be direct disruption to the banks of the Loch Oire outfall burn during construction due to the work to raise the embankments at this location, and during construction of the attenuation pond to the north of the A96 carriageway. This work could release soils and sediments into the channel of the outfall burn, which would have the potential for further impacts upon aquatic invertebrates and downstream of the A96. However, this running water habitat is highly modified and impacts are anticipated as minimal and short term if construction best practice is followed. Further details are provided in the Water Resources section in Chapter 8.

Direct impacts on running water habitats are considered not significant negative at the local level and unlikely to happen.

Indirect Impacts

The main issues could be dust deposition and the potential for contamination of watercourses and adjacent habitats either by run-off or through ground water.

Dust deposition will arise from site enablement and construction phases. The effects are primarily that vegetation, coated with dust, suffers drought stress. The effects of wind can carry the dust over a greater area. At this site it is considered unlikely that levels of dust or its transportation will significantly affect adjacent vegetation.

These indirect impacts are anticipated to be not significant and negative at the local level and unlikely to happen.

Otters

Direct Impacts

At the time of survey (August 2006), signs of otter activity were evident on Loch Oire, though these were limited to the western side of the Loch, which is approximately 150m from the A96 carriageway and the nearest construction activity. The existing disturbance from A96 carriageway, parked cars and dog walkers along the Loch Oire side road, may limit the extent of otter activity at the north end of the Loch. No active holts or couches were observed, though the presence of so much woodland and scrub around the shore of the Loch does provide areas of potential otter shelter habitat. For instance, the extent of *Rhododendron* around the Loch would provide suitable lying-up sites for otters. There was no evidence during any of the ecological surveys or consultation responses, that otters cross the A96 carriageway. This is perhaps due to the sub-optimal habitat, which is found to the north of the A96 away from Loch Oire, and the blocked culvert and fencing either side of the carriageway preventing easy access. As most otter movement is nocturnal, though they are generally deemed to be

crepuscular, the likelihood of road casualties related to construction vehicles is assessed as 'extremely unlikely'.

Therefore, it is not anticipated that otters will suffer any direct impacts as a result of the Scheme construction. The direct impacts on the otters themselves or their rest areas due to construction activity is anticipated to be not significant negative at the local level and extremely unlikely to happen. This is based on the caveat that there is no further evidence of otters found along the watercourses in the vicinity of works as a result of pre-construction checks (see mitigation section).

Indirect Impacts

There is the potential for disturbance to otters due to construction activity. There will be a considerable increase in vehicle movements due to construction-related vehicles, which could increase the potential for road kill incidents, though as noted above this is minimised by otter's crepuscular activity patterns. There could also be a disturbance effect upon any otters moving throughout the area. This could arise as a result of human activity, vehicle movements, noise and lighting from the construction compounds. However, there is considerable existing vehicular disturbance in the area, and dog walkers and other human activity on the Loch Oire side road, which may already cause otters limited disturbance. The disturbance impacts upon otters are therefore considered to be significant negative at the local level and probable to happen.

Water vole

No signs of water vole activity or burrows were observed within the watercourses in the study area. The Loch Oire outfall may be directly affected by the Scheme proposal. However, impacts are anticipated to be not significant at the local level and extremely unlikely to occur. This is based on the caveat that there is no further evidence of water voles found along the watercourse in the vicinity of works as a result of pre-construction checks.

Bats

Direct Impacts

Direct impacts on bats will relate to potential removal of roost sites and foraging areas, particularly along 'handrail' or navigation features such as hedgerows and woodland.

At the time of survey, no confirmed bat roosts were found, but old trees with suitable cracks were located immediately north of the A96 carriageway. It is not expected that bats are likely to be present in the trees, but as a precautionary assessment, should bat roosts be present in these trees at the time of construction the impacts will be significant negative at the local level, and probable to happen.

Loss of bat foraging habitat relates mainly to woodland edge and dense gorse scrub, but the extent that is likely to be lost is considered not significant such that it would negatively impact the local bat populations. The greatest amount of bat activity was found over Loch Oire, which will not be impacted, and where no bat foraging habitat will be removed. The new roads are likely to only require minimal amount of removal of suitable bat foraging habitat. Although the edge of some woodland areas will be removed, the landtake from these habitats is minimal,

and woodland edge (which acts as a handrail or navigation feature) will remain following construction. The removal of dense scrub and woodland fringes along the rest of the site is considered to be not significant negative impact at the local level, and certain to happen.

Indirect Impacts

Bats may be disturbed by the noise, lighting, vibration and presence of people and machinery during the construction phase. However, as with birds, the bats in this area are presently acclimatised to the noise of the A96 and the activity of local residents. The construction activity will generally be undertaken within daylight hours, which would prevent any disturbance impacts, as bats will only start to forage just before dusk. It is considered that the negative impact on bats of works to the existing road line is not significant, negative at the local level, and extremely unlikely to happen.

Red squirrel

Direct impact

The two squirrel dreys identified during the surveys were recorded in the coniferous plantation at Sleepieshill Wood, towards the eastern end of the Scheme and approximately 30m from the existing A96 carriageway. At this location the Scheme improvements will be constructed within the existing width of the carriageway and verges, and there will be no direct landtake or disturbance to the woodland habitats. The third drey observed is located between the A96 carriageway and Loch Oire, and is in close proximity to where embankment work will be undertaken. At the current time it is not considered that the drey will be lost to the Scheme, but this will only be confirmed at the time of construction. Therefore, direct impacts upon red squirrels are considered to be not-significant negative at the local level and unlikely to happen.

Indirect Impacts

Red squirrels may be disturbed by the noise, lighting, vibration and presence of people and machinery during the construction phase. However, as with birds and bats in this area, they are presently acclimatised to the noise of the A96 and the activity of local residents. There are also significant areas of suitable habitat present in the wider area, well away from the A96 carriageway, and it is likely that red squirrels may move temporarily away from the areas of construction. It is considered that the negative impact on red squirrels of works to the existing road line is not significant, negative at the local level, and extremely unlikely to happen.

Breeding birds

Direct Impact

Impacts on breeding birds can be divided on whether or not construction is carried out during the bird-breeding season.

a) During the breeding bird season: direct impacts relate to removal of foraging habitat in general and potential disturbance to or destruction of active nests and breeding birds. Removal of habitat alters the availability of foraging, roosting, and nesting opportunities, potentially creating changes in the population dynamics of an area. The impacts on a particular species can result in a reduction in population, and certainly in the short-term, in the number of

breeding pairs that can occupy a site. Therefore these impacts would be significant negative at the local and site level and probable to happen.

b) Outwith the breeding bird season: direct impacts would relate to removal of foraging habitat in general and disturbance to birds in the vicinity. Removal of habitat alters the availability of foraging and roosting and may decrease the attractiveness of an area to birds, potentially creating changes in the population dynamics of an area. A significant territorial and forage resource is still available in adjacent areas and areas not directly impacted by the road improvements. Given the availability of comparable habitat in the wider area and minimal land-take required, impacts are anticipated to be not significant negative at the local and site level and unlikely to occur.

Indirect Impacts

Bird species will be potentially indirectly impacted by noise, lighting and visual disturbance of the site during construction. However, a significant consideration is the fact that the A96 currently operates through this corridor, and birds adjacent to it will already be acclimatised to heavy traffic disturbance. Further, breeding species will tend to occur in higher numbers within woodlands and through intact hedgerows. Notwithstanding the direct impact of scrub and individual tree removal, during construction there will likely be a tendency for some species to avoid close proximity to the new construction area and any woodland edges or hedgerows near to that area.

a) Should works be carried out during the breeding bird season, there is the potential that they may abandon nests adjacent to construction works, due to levels of disturbance and indirect affects. Should this happen it would be considered a significant negative impact at the local / site level and probable to happen.

b) Should works be carried out outwith the breeding bird season, birds may choose to forage/roost further from the construction activity area. Once construction is complete it must be assumed that birds currently present along the A96 corridor will re-acclimatise. This would be considered a not significant negative impact at the local / site level and probable to happen.

5.7.4 Effects of operation

The potential negative ecological effects involved with the operation of the new road scheme are:

- Noise due to traffic acting on sensitive species (e.g. sensitive waterfowl, otters, red squirrels);
- Water quality impacts due to contaminated run-off;
- Introduction of new lighting and road signage could disturb sensitive species; and/or
- Increased risk of road mortality to badger, otter and red squirrels due to faster moving traffic.

Statutory designated sites

Without mitigation measures being implemented, there would be potential negative impacts during the operational phase related to pollutant-laden run-off entering any land drains, and subsequently flowing in to Loch Oire. Pollution would likely be in the form of oils and salts washed from the carriageway surface, into the areas of high water quality and undisturbed aquatic plant communities. Mitigation measures to prevent this are specified below and have been incorporated into the Scheme design, and are also discussed within the Water Resources section of this ES (Chapter 8). However, the impact upon the aquatic habitats of Loch Oire SSSI during the operational phase of the scheme, in the absence of mitigation, is assessed as significant at the regional level and probable to occur.

Non-statutory designated sites

It is not expected that any further changes to the long established woodland of plantation origin are likely following the completion of the construction activity. There should be no operational impacts upon either Loch na Bo / Threapland Wood, or Sleepieshill Wood. There will be no further landtake during the operational phase, and construction impacts such as dust deposition causing water stress to vegetation, will have subsided. The impact upon the non-statutory designated sites during the operational phase of the scheme is assessed as not significant at the local level and extremely unlikely to occur.

Habitats

It is not expected that any further changes to the terrestrial habitats are likely following the completion of the construction activity, and the associated habitat loss outlined above. Indeed, the landscape planting proposed as a mitigation measure will mature over time, and will provide further scrub habitat to be used by birds and other species. The impact upon the terrestrial habitats during the operational phase of the scheme is assessed as not significant at the site/local level and extremely unlikely to occur.

Without mitigation measures being implemented, there would be potential negative impacts during the operational phase related to pollutant-laden run-off entering any land drains, such as the outfall from Loch Oire. Mitigation measures to prevent this are specified below and within the Water Resources section of this ES (Chapter 8), and have been incorporated into the scheme design. The construction of an attenuation pond to the north of the carriageway should add further ecological diversity to the area as the existing field is used for arable crops at the current time. However, the impact upon the Loch Oire outfall during the operational phase of the scheme is assessed as significant at the local level and probable to occur.

Otter

It is not expected that the Scheme implementation will affect traffic flows on the main A96 carriageway, and with the closure of the Loch Oire junction there should be less vehicular traffic using the road alongside the Loch. It is likely that the vast majority of otter activity within the Threapland area is on Loch Oire. Therefore there is the potential that this reduction in vehicular traffic, although fairly minor, could lead to a decrease in the potential for otter road kill incidents. The reduction in traffic will also lead to less disturbance, from noise and vehicle lights and from human movements such as dog walking, along the shore of Loch Oire.

Therefore, the operational impacts are deemed to be positive, but not significant at the local level, and unlikely to occur.

Water vole

No signs of water vole activity or burrows were observed within the watercourses in the study area. Furthermore, no suitable habitat for water voles will be affected by operational phase the proposed scheme. Therefore, impacts are anticipated to be not significant at the local level and extremely unlikely to occur.

Bats

Bats in this area are presently acclimatised to the noise and lights of the traffic on the A96 and the activity of local residents, and it is not considered that there will be an increase in such impacts during the operation of the scheme. The main foraging habitat within the immediate area of the Scheme is Loch Oire, and this resource will remain unchanged for foraging bats. It is considered that the negative impact on bats of works to the A96 and their foraging habitat is not significant, negative at the local level, and extremely unlikely to happen.

Red squirrel

Red squirrels in this area are presently acclimatised to the noise of the A96 and the activity of local residents. There are also significant areas of suitable habitat present in the wider area, well away from the A96 carriageway. The improvements to the A96 carriageway as the Scheme is implemented will not pose further risks to red squirrels if they are attempting to cross from one side to the other, and their foraging habitats will not have been significantly impacted. It is considered that the negative impact on red squirrels of the operation of the Scheme is not significant, negative at the local level, and extremely unlikely to happen.

Breeding birds

Birds in this area are presently acclimatised to the noise of the A96 and the activity of local residents, and it is not considered that there will be an increase in noise impacts during the operation of the scheme. Due to the loss of some nesting habitat at the time of construction, there will be less of this habitat in the site area until the Scheme planting matures. It is considered that the negative impact on birds of the operation of the Scheme is not significant, negative at the local / site level, and extremely unlikely to happen.

5.7.5 Summary of Significance of Environmental Effects

A summary of the potential sources of impact is set out in Table 5.7 at the end of this chapter, and also in Chapter 9 – Summary of Effects and Mitigation. These have been divided into two categories, those impacts occurring during construction, and those occurring during operation of the proposed scheme. The significance of the identified impacts is also set out in the table. This is based on the criteria highlighted in Tables 5.2-5.4.

5.8 Mitigation and Monitoring

5.8.1 Introduction

This section provides a summary of the principles of mitigation considered during the preparation of proposals, and the legal requirements associated with the ecological features of the site. It also highlights mitigation measures necessary to reduce any negative effects upon ecological receptors, identified in the previous sections.

5.8.2 Principles of Mitigation

The principles of mitigation applied here, in order of priority are as follows:

- Avoid any negative impact on the target habitat or species;
- Minimise impacts by input into the scheme design.

If this is not possible, then:

- Minimise the scale and magnitude of the impact, and then;
- Compensate for the impact through provision of alternatives.

Environmental mitigations have been incorporated at the design stage of the Scheme to ensure that:

- Sensitive habitats are identified and avoided where possible during development;
- Works are designed to avoid harm to protected species, including the choice of construction method;
- Works are timed to avoid the periods of maximum sensitivity of receptors; and
- Pollution incidents are avoided e.g. incorporation of the attenuation pond.

In the following sections, the extent of mitigation will be assessed as follows:

- Fully - impact fully mitigated, no residual effects predicted;
- Substantially - impact substantially mitigated, some residual effects possible; or
- Partially - impact partially mitigated, some residual effects predicted;

General mitigation measures

The general mitigation measures identified below should be included within the final design, and the construction contractor's employer's requirements for the Scheme:

- A Scheme Ecologist will be employed for the duration of the scheme, henceforth referred to as the 'Ecological Clerk of Works'. The Ecological Clerk of Works would be an experienced ecologist, retained (on a part-time or ad-hoc basis) during construction work to deal with any protected species or other ecological issues that may arise. They

would liaise with relevant specialists and SNH to provide mitigation as necessary, and would undertake any specified pre-construction surveys;

- The Ecological Clerk of Works will be responsible for 'toolbox talks', whereby all appropriate workers would be briefed on the ecological sensitivity of the site, and would have clear notification of protected species and restricted areas. These briefing meetings would be carried out on a regular basis, as they provide a convenient and effective method of communicating and reinforcing the key environmental messages throughout the workforce;
- The Ecological Clerk of Works would also be responsible for ensuring that appropriate ecological and environmental information is included within the site briefing or induction received by all construction or site staff;
- The Ecological Clerk of Works will also be responsible for the implementation and supervision of mitigation measures, and for any work that would be required under protected species licenses. This individual will also undertake pre-construction checks for otters, water vole and badgers where instructed in following sections (also see Confidential Badger Annex);
- Any haul roads and construction areas will be clearly defined and marked. Vehicles will be restricted to the marked routes to avoid incursion into sensitive surrounding habitats, especially in close proximity to Loch Oire SSSI;
- All relevant guidelines for working near water must be followed, including PPG5 'Works in, near or liable to affect watercourses', in accordance with the Joint Environment Agency Regulations. Other relevant PPGs to be implemented on site during construction include PPG6 'Working at Construction and Demolition Sites' and PPG2 'Above Ground Oil Storage Tanks';

5.8.3 Legal Requirements

Introduction

In addition to the general legal requirements that planners must consider in regard to potential environmental impacts of proposed activities or developments, certain habitats and species are afforded specific protection under European and national legislation. Several European Directives and conventions have been implemented using national legislation. Protected species in the UK are covered by Regulation 39(1) of the Conservation (Natural Habitats, &c) 1994, which makes it an offence to deliberately or recklessly;

- Capture, injure or kill a wild animal of a European Protected Species;
- Harass a wild animal while it is occupying a structure or place which it uses for shelter or protection;
- Disturb such an animal while it is rearing or otherwise caring for its young;
- Obstruct access to a breeding site or resting place of such an animal or otherwise to deny the animal use of the breeding site or resting place;
- Disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;

- Disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- Damage or destroy a breeding site or resting place of such an animal

Schedule 6 of the Wildlife and Countryside Act (1981) also covers animals (other than birds) that may not be killed or taken by specific methods. The WCA is the national legislation by which Scotland, England and Wales implement the Bern Convention (The Convention on the Conservation of European Wildlife and Natural Habitats).

Most protected species in Scotland are also protected by Schedule 2 of the Conservation (Natural Habitats &c.) Regulations 1994 (CNH), which is the legislation by which the UK implements the European Habitats and Birds Directives. The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007, have also recently been approved by the Scottish Parliament to improve transposition of the Habitats Directive within Scotland. The Nature Conservation Act (2004) has also been introduced into Scotland, and amends some of the WCA to afford wildlife a greater degree of protection.

The legislative requirements associated with the protected habitats and species along the A96, and the implications of these for development and mitigation are considered below for the habitats and species of interest.

Statutory designated sites

Legislative Framework

SSSIs encompass a national suite of sites providing statutory protection for the best examples of the UK's flora, fauna, or geological or physiographical features. SSSIs were originally notified under the National Parks and Access to the Countryside Act 1949 and have since been re-notified under the WCA. In 2004 the Nature Conservation (Scotland) Act strengthened the WCA giving SNH greater powers to prevent damage to SSSIs. In Scotland the statutory nature conservation body, SNH, are responsible for identifying and protecting these special sites. A large majority of SSSIs are owned by private landowners and are given certain protection against potentially damaging operations, which must be authorised by SNH as 'operations requiring consent'. A SSSI also has a certain amount of planning protection, which varies depending upon specific proposals, though no implications are expected for this scheme.

Mitigation

There are a number of mitigation measures that are required to safeguard Loch Oire SSSI and the associated woodland and aquatic habitats for which it is designated. While the details of design in relation to construction in the vicinity of watercourses and Loch Oire have not been completely finalised, and are subject to clarification during detailed design, as a minimum the following mitigation measures must be implemented, and should form part of any construction method statements and / or construction environmental management plan:

- The Ecological Clerk of Works will be retained throughout the construction period, and consulted on all issues that have the potential to cause impacts upon Loch Oire SSSI and notified features of interest;
- Method statements for construction activity in close proximity to Loch Oire SSSI, must be agreed in advance with SEPA and SNH, before any work commences;
- Working areas must be clearly defined, preventing access to the SSSI site boundary and the notified habitats of the site;
- Litter management schemes will be implemented to prevent loss of material into the Loch;
- Stockpiles of earth and construction materials will not be kept near Loch Oire. Where possible earth stockpiles will be covered to prevent run-off of sediment-laden water into the Loch;
- On-site storage of chemical, fuel or construction materials will be limited to those needed for immediate construction. All surplus materials will be removed from the works site as soon as their immediate purpose has been concluded;
- Any fuel or chemical stores will be secure from vandalism and appropriately bunded to at least 110% capacity. These stores shall be kept a safe distance (refer to relevant guidance at the time of construction) away from Loch Oire and watercourses, in locations agreed with the Ecological Clerk of Works;
- All potentially polluting liquids and solids associated with vehicles, equipment and machinery need to be identified to all site staff so that spillages and washwaters can be prevented from entering Loch Oire and the outfall burn;
- Pollution contingency plans will be developed and approved by the SEPA in advance of construction commencing. These should include designated members of staff to deal with emergencies if they arise;
- CIRIA Report SP156, Control of Water Pollution from Construction Sites – Guide to Good Practice will also be referred to. Contractors will also have to comply with the regulatory controls of the Water Environment (Controlled Activities) (Scotland) Regulations 2005;
- The contractor shall not wash tools and equipment in any watercourse, including Loch Oire. Washwater shall not be discharged into Loch Oire or the outfall drain, or disposed of in any way that could result in a discharge to controlled water;
- Mobile bunding or material for bund construction will be available should an emergency barrier need to be constructed to prevent material leakage from a works site into Loch Oire or any other watercourses;
- Quantities of absorbent substrate or spill kits will be available to soak up spillages or leaks;
- At present there is no intention for works within the boundary of Loch Oire, but any changes to these plans would have to be agreed with SNH;

- Road drainage will not drain directly into the Loch Oire outfall, but will be channeled to a settlement / attenuation pond immediately north of the A96 carriageway and downstream of Loch Oire;
- The Water Resources (Chapter 8) section of the ES also includes additional mitigation measures to safeguard Loch Oire and the other watercourses within the Scheme area.

These mitigation measures should form substantial mitigation of the anticipated impacts.

Non-statutory designated sites

Legislative Framework

The two areas of long-established woodland of plantation origin, as identified by SNH, do not have any legal protection. However, Sleepieshill Wood does have areas of locally valuable ecological habitat, and such woodlands can provide suitable habitat for a number of protected species as described elsewhere in this chapter.

Mitigation

Proposals involve works on the long-established woodland of plantation origin at Sleepieshill Wood, with a limited amount of permanent landtake. The area of landtake should be minimised, retaining as many mature trees as possible. Once the necessary trees have been felled during enablement, fencing and signage may be required to prevent further access by staff and construction machinery. Any landscape planting on the Urquhart junction should be native species in keeping with the habitat of the long-established woodland, of local provenance, and in accordance with best practice (see also Chapter 6 – Landscape and Visual Effects). The removal and retention of trees should be undertaken in accordance with ‘BS5837:2005, Trees in relation to construction’

These mitigation measures should form partial mitigation of the anticipated impacts.

Habitats

Legislative Framework

The habitats present within the study boundary are not subject to specific legal protection but are deemed to be of local or site importance. They perhaps act as habitat for a number of protected species, and the implications of this are outlined below.

Mitigation

Mitigation measures suggested to protect the terrestrial habitats and watercourses on site are:

- Direct habitat loss will be minimised where this is possible within the design of the Scheme. As the priority habitat along this Scheme corridor any impacts on woodlands will need to be minimised. This would take the form of avoiding direct intervention into woodland areas where possible, minimising any edge disturbance, and retaining mature trees where the Scheme allows. Where removal or arboricultural works are to be undertaken, the trees will be subject to assessment with regard particularly to their bat roost potential and nesting bird potential. Once the necessary trees have been felled

during enablement, fencing and signage may be required to prevent further access by staff and construction machinery;

- Landscape planting will be undertaken along the length of the scheme, and further details of this are detailed in the Chapter 6 – Landscape and Visual Effects and in Figure 6.3. The trees, scrub and any grassland mixes specified will be native species and have local provenance, in accordance with best practice. These should be confirmed with the Ecological Clerk of Works as being appropriate to the habitats and species on site. The tree species planted will be species suitable for red squirrels (see below);
- Sustainable Urban Drainage System (SUDS) principles should be applied at suitable locations to trap operational related run-off to watercourse. It is anticipated that the requirement for a SUDS system, and its exact locations will be decided in agreement with SEPA in accordance with the technical guidance set out in CIRIA Report C697 'The SUDS Manual'. This will include provision of a SUDS pond immediately north of the A96 carriageway, downstream of the Loch Oire outfall, in what is currently an arable field. Any planting associated with the SUDS pond must be native and non-invasive wetland species of local provenance, and also in accordance with the CIRIA Report C697 guidance;
- The mitigation measures outlined above for Loch Oire SSSI, should also apply to the other habitats on site, where applicable e.g. working areas will be clearly defined, that prevent access to Loch Oire, adjacent watercourses, and other ecologically sensitive habitats.

These mitigation measures will partially mitigate against impacts upon habitats within the Scheme area.

Otter

Legislative Framework

The otter is protected in the UK by Regulation 39(1) of the Conservation (Natural Habitats, &c) 1994 (Amended 2007) and Schedule 6 of the WCA 1981. Under the provisions of these Regulations it is a criminal offence to deliberately or recklessly;

- Capture, injure or kill an otter;
- Harass an otter while it is occupying a structure or place which it uses for shelter or protection;
- Disturb an otter while it is rearing or otherwise caring for its young;
- Obstruct access to a breeding site or resting place of an otter or otherwise to deny an otter use of the breeding site or resting place;
- Disturb an otter in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of otters;
- Disturb an otter in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; and
- Damage or destroy a breeding site or resting place of an otter

Mitigation

The Ecological Clerk of Works should conduct pre-construction checks for otter activity along Loch Oire and the outfall burn, to see if they are utilising habitat on the site, in close proximity to any of the construction activities. These checks should continue throughout the construction period. Should otter shelters be found, there are provisions in the legislation to allow actions to take place under licence that would otherwise contravene the above law. The implications for the proposed development are that any couches or holts found within the site, must not be disturbed either during development works or during the operation of the proposed road scheme. Guidance from SNH and the Scottish Government suggests that any disturbance within 30-50m of an otter shelter may require a licence. However, as a precautionary approach, any otter shelters found within 100m of construction activity should be brought to the attention of the SNH Area Officer for further guidance on licence requirements and possible mitigation.

A number of general precautionary measures should be implemented. Site compounds where lighting is used should be located well away from any of the watercourses, and Loch Oire in particular, so that the lighting does not disturb otter activity during the hours of darkness. Site staff should be made aware of the potential presence of otters crossing roads within the development area and on nearby roads, which can be included in the site induction.

It is not anticipated that there will be a requirement for culvert replacement for the Loch Oire outfall drain as it passes under the A96 carriageway, and there has been evidence of otter passage across the carriageway at this location. Therefore, no measures are proposed for an otter passable culvert or mammal underpass at this location.

These measures should substantially mitigate against negative impacts.

Water voles

Legislative Framework

Since 1998, the water vole has received limited legal protection through its inclusion on Schedule 5 of the WCA, in respect of Section 9(4) only (Strachan, 1998). This section of the Act protects the water vole's places of shelter or protection, but does not protect the voles themselves. At the current time there are proposals for further protection to be afforded to the water vole. Legal protection makes it an offence to intentionally or recklessly damage or destroy or obstruct access to any structure or place that water voles use for shelter or protection or disturb water voles while they are using such a place. There is no provision for licensing the intentional destruction of water vole burrows for development or maintenance operations. The water vole is listed as priority species in the UKBAP.

Mitigation

The Ecological Clerk of Works should conduct pre-construction checks for water vole activity along the Loch Oire outfall, both upstream and downstream of the A96 carriageway, to ensure that water voles are not utilising this habitat or have not moved into the area since the initial surveys undertaken for this ES. It is not expected that any further mitigation measures will be required, but if signs of water voles were subsequently recorded, then detailed mitigation measures would have to be formulated and agreed with SNH.

These measures should substantially mitigate against negative impacts.

Bats

Legislative Framework

All British bat species are protected by Regulations 39(1) of the Conservation (Natural Habitats, &c) 1994 and Schedule 6 of the WCA. They are also covered by Regulation 38 (Schedule 2) of the CNH Regulations. Under the Bern Convention, Pipistrelle bats are listed on Schedule III as 'protected' species, while the other species of bats are on Schedule II ('strictly protected'). It is an offence to deliberately or recklessly;

- Kill, injure or capture (take) a bat;
- Deliberately disturb a bat (whether in a roost or not); and
- Damage, destroy or obstruct access to a bat roost.

For the purposes of bat protection, a bat roost is defined as "any structure or place, which is used for shelter or protection", regardless of whether it is in use or not. It is a legal requirement to consult SNH before any work is carried out that might affect bats or their roosts. This might include building, alteration or maintenance work; exclusion of bat colonies; reproofing; and remedial timber treatment and removing hollow trees. Provisions are made within the legislation to allow works to take place under licence from the Scottish Government that will otherwise contravene the Acts.

Mitigation

As many deciduous trees as possible should be retained to provide potential bat roost and foraging habitat. Continuous strips of woodland should be maintained wherever possible, in order to provide corridors for bats to access their foraging sites. If mature trees are to be felled and they have the potential to be bat roosts, they should be checked immediately prior to felling by the Ecological Clerk of Works. This should be done by climbing and inspecting the tree, or by undertaking further emergence surveys, ideally just before dawn. Inspecting potential trees roosts would require a licence. The felling should be done in a step-wise manner, with the bat specialists checking for signs of bats and bat activity as each limb of the tree is removed. This will be of particular importance to the north of the A96 carriageway, where mature Scot's pine trees are present, which have some potential for bat roosts. If a bat roost is confirmed, trees will have to be felled under licence to the Scottish Government, and at a time when it has been confirmed that no bats are present within the roost. Works on summer or maternity roosts can only safely be undertaken between October and April, when bats will have moved to hibernation roosts.

As a compensation or enhancement measure, bat boxes should be installed within areas of retained woodland habitat to provide replacement or further potential roosts for bats. The number, specification and location of these will have to be agreed with SNH, however the following factors should be considered. The location of these roosts will also have to be in an area that the Ecological Clerk of Works deems to be suitable, and where permission has been agreed with the landowner. At least one artificial bat roost should be implemented for each mature tree removed, which could have had bat roost potential, and a maximum number of 20

would offer significant enhancement opportunities. The type of bat box provided should be appropriate for the species present, in this case soprano pipistrelles and Daubenton's bats, both of which have been recorded as having nursery roosts in such structures. Daubenton's bats are known to prefer tree hollow-type bat boxes, which provide a void in which bats can cluster, whereas soprano pipistrelles generally prefer tree crevice-type boxes with 25-35mm crevices (English Nature, 2004). Woodcrete (cement and sawdust) or clay bat boxes appear to be as least as successful as wooden boxes in attracting bats and have the advantage of being far more durable and thus needing less maintenance. The key is that artificial roosts should be draught-free, secure and weatherproof. New designs are continually being developed and SNH and the Bat Conservation Trust will be able to provide up to date information at the time of construction. To increase the chance of the boxes being used, the box should be located at a site where bats are known to feed and where it will be sheltered from strong winds and exposed to the sun for part of the day. Bat boxes should be located close to a linear vegetation feature such as a tree line or hedgerow, and placed on a tree as high as it is safe to do so (Bat Conservation Trust, 2003).

These measures should form substantial mitigation for bats.

Red squirrel

Legislative Framework

Red Squirrels have been protected against intentional acts of damage or disturbance since 1981 under WCA, Schedules 5 and 6. Protection for red squirrels and other species was amended by the Nature Conservation (Scotland) Act 2004 to include both intentional and reckless acts. Subject to certain exceptions, it is now an offence to intentionally or recklessly kill, injure or take (capture) a red squirrel; damage, destroy or obstruct access to any structure or place which a red squirrel uses for shelter or protection; or to disturb a red squirrel while it is occupying a structure or place which it uses for that purpose'. There is no provision to licence such activities for the purpose of development under the Nature Conservation Act. However, further clarification should be sought at the time of construction from the Scottish Government, who is the licensing authority for such activities.

Mitigation

Any trees to be felled during construction must first be checked by the Ecological Clerk of Works for squirrel shelters (dreys) prior to any tree felling, and to determine the presence or absence of red squirrels. Trees must not have any red squirrels, feeding signs or dreys if they are to be removed. If red squirrels are present, then method statements would need to be drawn up by the contractor or Ecological Clerk of Works, and agreed with SNH. If at all possible, felling should be minimised between February and July, as this is when it would cause maximum disturbance to the red squirrel breeding season (<http://www.red-squirrels.org.uk/>). As outlined below in the breeding bird section, it is recommended that no tree or scrub removal be undertaken at this time, as it coincides with the breeding bird season, with the exception of February. This has implications for the squirrel drey located between the A96 carriageway and Loch Oire, if the woodland in which it is located, has to be removed to facilitate construction activity.

As the presence of red squirrels has not specifically been confirmed and there are no records of road kill incidents in this area, the use of rope bridges crossing the carriageway have not been recommended.

Suitable tree species for red squirrels, and which are also native to the Threapland area, include Scot's pine, rowan and ash. It is recommended that these small-seeded tree species are included as part of the landscape design for the Scheme, as they are of most benefit to red squirrels (see Chapter 6 – Landscape and Visual Effects).

These measures should form substantial mitigation for red squirrels.

Breeding birds

Legislative Framework

All wild bird species are protected from killing, injury and taking under the Schedule 6 of the WCA. In addition, this legislation makes it an offence to take, damage or destroy a nest while in use or being built, and to take or destroy the eggs of any nesting bird. In addition, certain species are listed on Schedule 1 of the WCA. This makes it an additional offence to intentionally or recklessly disturb the adults while they are in and around their nest or intentionally or recklessly disturb their dependent young. Several bird species protected by the WCA (as amended) are also covered by Annex I of the EC Birds Directive (1979), affording them European protection.

Mitigation

To avoid impacts, all tree or scrub removal should be undertaken outwith the breeding bird season, which is regarded as being between March and August. This will fully mitigate against the potential damage and destruction of nests and removal of foraging habitat for breeding birds and juveniles.

If vegetation clearance cannot be undertaken at this time, then all trees and scrub will need to be checked thoroughly immediately prior to clearance works by the Ecological Clerk of Works, and trees with active nests will need to be left undisturbed. In certain circumstances nests can be moved under licence from Scottish Government. This will partially mitigate against the potential damage and destruction of nests and removal of foraging habitat for breeding birds and juveniles.

Vegetation and tree removal should be avoided and minimised where possible. Landscape planting will be undertaken around the proposed scheme to compensate for the loss of potential breeding habitat and further details of this will be provided in the landscape section of this ES (Chapter 6). These plants should be native and of local provenance. This will partially mitigate against the potential impacts on breeding birds.

In order to provide alternative nesting habitat to replace the vegetation that will be lost during the construction phase and to provide measures that will enhance the biodiversity of the site, artificial bird nest boxes should be installed within areas of retained woodland habitat to provide replacement nest sites and further nesting potential. The location of these nest boxes will have to be in an area that the Ecological Clerk of Works deems to be suitable, and where permission has been agreed with the landowner. It is recommended that one nest box is implemented for

every 100 metres of the development. This would result in approximately twenty nest boxes (ten on either side of the proposed development corridor), which would offer significant enhancement opportunities for the local bird populations. The type of bird nest box used will depend on the species present. Following breeding bird surveys it was established that several bird species are breeding along the proposed development corridor including blue tit, garden warbler, willow warbler, wren, robin and goldfinch. The dimensions of the nest box are dependent on the species that they are meant to attract. For example, small bird species such as blue tits require a nest box with an entrance hole of 25mm, great tits require a nest box with an entrance hole of 28mm and species such as robin and wren prefer an open fronted nest box located within vegetation. A mix of these different types of nest box should be implemented for this scheme. In order to provide maximum levels of shelter, nest boxes should be located on the dry side of the tree, on the opposite side from where the majority of rainwater flows down the trunk. In addition, further shelter can be provided to the nest boxes by angling them forwards slightly, particularly if the nest box roof has little overhang (Du Feu, 2005).

These measures should form substantial mitigation for birds.

5.8.4 Monitoring

At the current time it is not proposed that any ecological monitoring is required for this scheme and the ecological receptors outlined above, following the construction of the Scheme. However, the Water Resources section of this ES (Chapter 8) does specify various monitoring activities that the contractor should monitor during the construction period, with regard to surface and groundwater.

5.9 Residual Impacts

Residual impacts are placed in context within the summary Table 5.7 below, which shows source of impacts (construction and operation), impact significance prior to mitigation, mitigation measures, mitigation extent, and residual impacts after mitigation.

All residual impacts are deemed to be not significant at the national / regional / local levels, based on the presumption that all mitigation measures are fully implemented, as outlined in this ES chapter. These mitigation measures should be implemented by making them conditions of the construction contract and outlining them within the employer's requirements for the Scheme.

5.10 Summary

Detailed field survey work has been undertaken as part of the scheme assessment process, by suitably trained ecologists, and within the appropriate seasonal constraints for such work. The scope of this work was agreed with SNH.

Loch Oire SSSI is the key ecological receptor within close proximity to the Scheme. It is approximately 30m from the Scheme at the nearest point, so although no landtake or direct impacts should occur, detailed mitigation measures are proposed to minimise the risk of any impacts upon the notified features of the site. During construction safeguards will have to be in place to prevent the release of soils, sediment or construction chemicals into the Loch. During

the operational phase, mitigation measures have been proposed to prevent potentially pollutant-laden runoff from entering the Loch. It is proposed that runoff in close proximity to the Loch will enter an attenuation pond immediately downstream of the Loch outfall. With mitigation measures applied as outlined above, for both the construction and operational stages, anticipated impacts will be substantially mitigated. There will be no significant impacts upon Loch Oire SSSI.

The long-established woodland of plantation origin at Sleepieshill Wood (as designated by SNH) is in close proximity to the proposed re-alignment of the road and will be directly affected due to the Urquhart junction improvements. This is a direct and permanent impact, but the area of woodland to be removed is limited, and forms only a small proportion of this habitat within the Scheme and wider Threapland area. The impact is significant at the site level of importance, but will be partially mitigated, and the residual impact is considered not significant.

Other habitats will also be directly impacted during construction, as limited areas of semi-improved grassland, dense gorse scrub and other woodland / scattered trees areas will be removed to allow the improvements. However, these are limited in extent and ecological value, though they do have the potential to provide shelter habitat to protected species.

No otter shelters or rest areas should be directly impacted by the scheme, and to date there has been no evidence or records of otters crossing the A96 carriageway. Therefore, direct impacts upon otters are not anticipated, though construction disturbance to the species is possible. The operational reduction of traffic along Loch Oire road will decrease the likelihood of disturbance and road kill incidents at this location.

Significant impacts are not anticipated for bats, water voles, red squirrels or breeding birds, or any other features of ecological interest, subject to the implementation of specific mitigation measures such as pre-construction checks and methods to avoid disturbance during construction and operation.

The ecological assessment undertaken has not identified any residual impacts that are considered to be significant.

Impacts upon badgers are considered separately within the Confidential Badger Annex.

Table 5.7 – Summary of Impacts Before Mitigation, Mitigation and Residual Impacts

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
CONSTRUCTION					
<p>Site clearance and construction operations: Physical removal of soils and vegetation, break-up of hardstanding and the consequent loss or substantial modification of the whole or part of a habitat. This may result in the removal or fragmentation of habitats and breeding and foraging areas of faunal species. Noise, lighting and vibration disturbance to species, and potential effects of dust on vegetation remaining on-site, and adjacent to the site may occur from construction operations. Discharge of sediments and possible pollutants to surrounding watercourses during construction is also possible.</p>	<p>Statutory designated sites: Loch Oire SSSI will not be directly affected due to no direct landtake. However, construction in the area will be significant and there may therefore be release of soils, sediment or construction chemicals into the loch if not managed properly.</p>	<p>Any such impacts would only affect a small proportion of the SSSI and would be expected to be reversible if they did occur.</p>	<p>Not significant negative impact at national level: unlikely, but impacts may be significant at the local level.</p>	<p>Substantial mitigation of anticipated impacts</p>	<p>Any construction impacts upon Loch Oire SSSI are unlikely to occur, and will be non-significant if mitigation measures are implemented.</p>

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	<p>Non-statutory designated sites: Long established woodland of plantation origin will not be affected at Loch na Bo / Threapland Woods, however possibly at a small proportion of the Sleepieshill Wood would be removed to improve sightlines to and from the junction.</p>	<p>This is a direct and permanent impact, but it will only 1.33ha of the Sleepieshill Wood, which is 681ha in total.</p>	<p>Not significant negative impact at regional level: certain. Not a significant negative impact at the regional level: certain, though the impacts may be significant at the site level.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>The construction impacts upon the long-established woodland of plantation origin are certain to occur, though the residual impact is considered non-significant.</p>
	<p>Terrestrial habitats: Felling of trees, gorse scrub clearance, loss of semi-improved grassland and arable.</p>	<p>Landtake from woodland habitats and clearance of scrub will be limited and localised and can be partially compensated for. The semi-improved grassland is of low conservation value due to previous use and approximately 1ha will be lost. Limited arable land will be taken, 0.8ha. Dust deposition may provide an indirect impact on all terrestrial habitats.</p>	<p>Direct impacts on these habitats are considered not significant negative at the local level: certain.</p> <p>Indirect impacts are considered not significant and negative at the local level: unlikely.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>Direct impacts upon terrestrial habitats are certain to occur, but the impacts are considered to be non-significant.</p>

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	<p>Aquatic Habitats: Direct disruption to the banks of Loch Oire outfall burn and during construction of the attenuation pond. Potential for the release of soils and / or sediment into the burn.</p>	<p>This running water habitat is highly modified and impacts are anticipated as minimal and short term if construction best practices are followed.</p>	<p>Direct impacts on these habitats are considered not significant negative at the local level: unlikely.</p> <p>Indirect impacts are considered not significant and negative at the local level: unlikely.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>Construction impacts are unlikely to occur, and residual impacts are considered to be non-significant.</p>
	<p>Otters: The impacts on the otters themselves or their rest areas due to construction activity.</p>	<p>No active holts were found although there were areas of potential otter habitat. The nearest otter signs were 150m from the carriageway and the nearest construction compound, and there was no evidence of otters crossing the A96 carriageway.</p> <p>There is potential for indirect disturbance to otters in or passing through the area as a result of human activity, vehicular movements and increased noise and lighting.</p>	<p>Not significant negative at the local level and extremely unlikely to happen.</p> <p>Indirect impacts are considered significant negative at the local level: probable.</p>	<p>Substantial mitigation of anticipated impacts</p>	<p>Direct construction impacts are extremely unlikely to happen, and indirect impacts unlikely. With mitigation in place neither of these impacts is considered significant.</p>

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	Water Voles: The direct impacts on the water voles, their burrows, or their suitable habitat due to site clearance and construction activity.	No signs of water vole activity or burrows were observed within the watercourses in the study area, but there is suitable habitat available.	Not significant at the local level and extremely unlikely to occur.	Substantial mitigation of anticipated impacts	Any construction impacts upon water voles are extremely unlikely and residual impacts are non-significant.
	Bats: a) The permanent and irreversible loss/disturbance of roosting bats through tree felling	a) At the time of survey time no roosts were found, but old trees with suitable cracks/ivy matrices were located, which may be felled.	a) Should bat roosts be present in these trees at the time of construction the impacts will be significant negative at the local level: probable.	Substantial mitigation of anticipated impacts	The construction impacts upon potential bat roosts will only be non-significant if mitigation measures are enforced.
	b) Permanent and irreversible loss of bat forage habitat	b) Loss of bat forage relates mainly to woodland edge and hedgerows, but the extent that is likely to be lost is considered not significant such that it would negatively impact the local bat populations. The greatest amount of bat activity was found over Loch Oire, which will not be impacted. The new roads are likely to only require minimal amount of removal of suitable bats habitat.	b) The removal of woodland fringes and dense scrub along the rest of the site is considered to be not-significant negative at the local level: certain.	Substantial mitigation of anticipated impacts	The loss of some foraging habitat is a non-significant impact.

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	c) Disturbance by the noise, lighting, vibration and presence of people and machinery	Bats in the area will be habituated to localised disturbance of traffic and low-level lighting, and construction activity will largely be undertaken within daylight hours.	Negative indirect impacts on bats from construction works and disturbance are non-significant negative at the local level, and extremely unlikely to happen.	Substantial mitigation of anticipated impacts	
	Red Squirrels: The direct impacts on the red squirrels, their dreys, or their suitable habitat due to site clearance and construction activity.	Evidence of red squirrels was found in the Sleepieshill Wood approximately 30 metres from the A96. At this location the scheme improvements will be constructed within the existing boundaries of the carriageway and verges. Red squirrels may be indirectly disturbed by human activity, light and noise, however, they will be currently acclimatised to the noise of the road and activity of the local residents.	Direct impacts are considered not-significant negative at the local level: unlikely. Indirect impacts are considered not-significant and negative at the local level: extremely unlikely.	Substantial mitigation of anticipated impacts	The construction impacts upon red squirrels are considered extremely unlikely, and are non-significant.

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	<p>Breeding Birds: a) During the breeding bird season: direct impacts relate to removal of foraging habitat in general and potential disturbance to or destruction of active nests and breeding birds. Additional indirect disturbance may also occur due to human activity, lighting and noise.</p> <p>b) Outside the breeding season: direct impacts would relate to removal of foraging habitat in general and disturbance to birds in the vicinity. Additional indirect disturbance may also occur due to human activity, lighting and noise.</p>	<p>a) Removal of habitat alters the availability of forage, roosting, and nesting opportunities, potentially creating changes in the population dynamics of an area. The impacts on a particular species can result in a reduction in population, and certainly in the short-term, in the number of breeding pairs that can occupy a site.</p> <p>b) Removal of habitat alters the availability of forage and roosting and may decrease the attractiveness of an area to birds, potentially creating changes in the population dynamics of an area. A significant territorial and forage resource is still available in adjacent areas and areas not directly impacted by the road improvements.</p>	<p>a) Therefore these impacts would be significant negative at the local and site level: probable.</p> <p>b) Given the availability of comparable habitat in the wider area, minimal land-take required and pre-existing exposure to indirect disturbance, impacts are anticipated to be not significant negative at the local and site level: probable.</p>	<p>Full mitigation of anticipated impacts</p> <p>Partial mitigation of anticipated impacts</p>	<p>The residual impacts will only be non-significant if the prescribed mitigation measures are implemented.</p>
OPERATION					

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
<p>The potential negative ecological impacts involved with the operation of the new road scheme may potentially involve noise, water quality impacts, air quality impacts, new lighting and road signage, increased risk of road mortality to badger, otter and birds.</p>	<p>Statutory designated sites: Pollution could enter the Loch in the form of oils and salts washed from the carriageway surface.</p>	<p>Without the stated mitigation measures being implemented, there would be potential negative impacts during the operational phase related to potentially pollutant-laden run-off entering any drains, and subsequently flowing in to Loch Oire, and areas of high water quality and undisturbed aquatic communities.</p>	<p>Impacts are considered significant at the regional level: probable.</p>	<p>Substantial mitigation of anticipated impacts</p>	<p>The residual impacts are considered to be non-significant, but only if mitigation measures are strictly implemented and enforced.</p>
	<p>Non-statutory designated sites: Long established woodland of plantation origin will not be affected at Loch na Bo / Threapland Woods, however possibly at a small proportion of the Sleepieshill Wood would be removed to improve sightlines to and from the junction.</p>	<p>It is not expected that any further changes to the long established woodland of plantation origin are likely following the completion of the construction activity. There should be no operational impacts upon either Loch na Bo / Threapland Wood, or Sleepieshill Wood.</p>	<p>The impacts are considered not significant at the local level: extremely unlikely.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>The residual operational impacts upon the long-established plantation woodland are considered to be non-significant.</p>
	<p>Terrestrial habitats: Felling of trees, gorse scrub clearance, loss of semi-improved grassland and arable.</p>	<p>It is not expected that any further changes to the terrestrial habitats are likely following completion of the construction activity, and the associated habitat loss outlined above.</p>	<p>The impacts are considered not significant at the site and local level: extremely unlikely.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>The residual impacts upon the terrestrial habitats are considered to be non-significant.</p>

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	Aquatic habitats: Potential road run-off and pollutants to enter the Loch Oire outfall burn.	Without the stated mitigation measures being implemented, there would be potential negative impacts during the operational phase related to potentially pollutant-laden run-off entering any drains, and subsequently flowing in to Loch Oire.	Impacts are considered significant at the local level: probable.	Partial mitigation of anticipated impacts	The residual impacts upon the aquatic habitats are considered to be non-significant, but only if mitigation measures are implemented and enforced.
	Otters: The impacts on the otters themselves or their rest areas due to construction activity.	It is not expected that the scheme implementation will affect traffic flows on the main A96 carriageway but with the closure of the Loch Oire junction there should be less vehicular traffic using the road alongside the loch. The reduction of traffic will lead to a reduction in disturbance from noise and vehicular lights and potentially roadkills.	Impacts are considered positive and not significant at the local level: unlikely.	Substantial mitigation of anticipated impacts	Operational impacts upon otters are considered to be non-significant.
	Water Voles: The direct impacts on the water voles, their burrows, or their suitable habitat due to site clearance and construction activity.	No signs of water vole activity or burrows were observed within the watercourses in the study area and no suitable habitat will be affected by the operational phase.	Impacts are anticipated to be not significant at the local level and extremely unlikely to occur.	Substantial mitigation of anticipated impacts	The operational impacts upon water voles are considered to be non-significant.

<i>Proposed activity, duration of activity, biophysical change and relevance to receptor in terms of ecosystem structure and function</i>	<i>Characterisation of unmitigated impact on feature</i>	<i>Rational for prediction of effect on integrity or conservation status</i>	<i>Significance without mitigation and confidence in assessment</i>	<i>Mitigation Extent</i>	<i>Residual significance and confidence level</i>
	<p>Bats: The permanent and irreversible loss/disturbance of roosting bats through tree felling. Permanent and irreversible loss of bat foraging habitat</p>	<p>Bats in the local area are currently acclimatised to the noise of the A96 and activity of the local residents, and it is not considered that there will be an increase in impacts during operation of the scheme. The main foraging habitat in the immediate area, Loch Oire, will remain unchanged.</p>	<p>Impacts are anticipated negative and not significant at the local level and extremely unlikely to occur.</p>	<p>Substantial mitigation of anticipated impacts</p>	<p>The operational impacts upon bats are considered to be non-significant.</p>
	<p>Red Squirrels: The direct impacts on the red squirrels, their dreys, or their suitable habitat due to site clearance and construction activity.</p>	<p>Red squirrels in the area are currently acclimatised to the noise of the A96 and activity of local residents. There are also significant areas of suitable habitat in the wider area well away from the development. The improvements will pose no additional risk to the red squirrels if they are attempting to cross from one side to the other.</p>	<p>Impacts are anticipated negative and not significant at the local level and extremely unlikely to occur.</p>	<p>Substantial mitigation of anticipated impacts</p>	<p>The operational impacts upon red squirrels are considered to be non-significant.</p>
	<p>Breeding Birds: Due to the loss of some nesting habitat at the time of construction there will be less of this habitat in the site area until the Scheme planting matures.</p>	<p>Birds in this area are currently acclimatised to the noise of the A96 and the activity of local residents, and it is not considered that there will be an increase in impacts during the operation of the scheme.</p>	<p>Impacts are anticipated negative and not significant at the local and site level and extremely unlikely to occur.</p>	<p>Partial mitigation of anticipated impacts</p>	<p>The operational impacts upon breeding birds are considered to be non-significant.</p>

