9 ECOLOGY AND NATURE CONSERVATION

9.1 INTRODUCTION

This chapter sets out the findings of the ecological assessment of the proposals. Effects on water quality are appraised in Chapter 8. The findings of that appraisal are taken into account in the assessment of ecological effects.

9.2 SOURCES OF INFORMATION

- Site visits in 2007, 2008 and 2009;
- ecological surveys and Phase 1 Survey check undertaken by ECOS Countryside Services from March to July 2007 (see Appendix 9.1);
- a further check for protected species along the corridor was undertaken by ECOS in June 2009 (see Appendix 9.2);
- information in the 1994 - 1995 Stage 2[122] and Stage 3[123] reports;
- consultations undertaken with SNH, LLTNP, SEPA and other organisations including local bat groups and the Scottish Badgers;
- a desk study of relevant information including the sources listed in the footnotes in this chapter; and
- best practice guidance including that in the DMRB Volume 11 and that of the Institute of Ecology and Environmental Management (IEEM)[124].

9.3 CONSULTATIONS

Key issues raised by consultees included:

- there may be scope to make improvements for bats by incorporating bat boxes, bat tubes or bat bricks into built structures including the proposed underpass for the West Highland Way spur (Local Bat Group, 2007);
- black grouse and merlin are known in the area therefore a comprehensive bird survey is required and works should be undertaken outwith the breeding bird season (LLTNP, 2006);
- a protected species survey for the area should be undertaken and include:
    - badger;
    - bats; and
    - otter (SNH, 2006);
- SNH advised that the scheme is close to the River Fillan part of the River Tay SAC and that an Appropriate Assessment should be carried out for the site and information should be provided in the ES to inform this (SNH, 2006).

9.4 FIELD SURVEY

Natural Capital undertook an initial walkover survey in February 2007 to determine likely survey requirements. A first site walkover was undertaken by ECOS Countryside Services in March 2007 to inform the requirements for seasonal protected species surveys. Recommendations from the findings of these surveys included:

- to undertake a breeding bird survey using a four visit Common Bird Census (CBC)[125] methodology. If merlin were recorded on site then a further four day merlin survey should be undertaken by a licensed surveyor;

[122] Carl Bro Group & Turnbull Jeffrey Partnership, 1994. Crianlarich Project. Stage 2 Scheme Assessment and Environmental Assessment Reports. The Scottish Office Industry Department Roads Directorate
[123] Carl Bro Group & Turnbull Jeffrey Partnership, 1995. Crianlarich Project. Stage 3 Environmental Assessment. The Scottish Office Industry Department Roads Directorate
[124] IEEM, Guidelines for Ecological Assessment in the United Kingdom. IEEM, version 7 July 2006

- a further visual survey for red squirrel to determine areas of importance for feeding and the location of any dreys;
- whilst no potential signs of badger or pine marten were identified a further walkover survey should be undertaken at the same time as the red squirrel survey;
- to make further checks for otter whilst undertaking the other visits and further surveys undertaken if significant signs identified;
- that a specific fish survey was not required because many of the burns were ephemeral and/or culverted long distances through the village and no signs of likely spawning grounds were identified; and
- a bat survey would be unjustified due to the lack of suitable roosting or shelter sites in the area.

The findings from the initial ECOS survey are included in Section 9.5.4.

The recommendations and the scope of further ecological surveys were discussed and agreed with SNH. It is considered that the surveys which were undertaken have provided a good record and understanding of the ecological interests of the area of the proposals and their environs. The detailed survey methodology and the findings of the ecological surveys are included in the Appendix 9.1.

A further protected species survey was undertaken by ECOS in June 2009 to check the corridor for protected species (see Section 9.5.4 and Appendix 9.2).

A Phase 1 type Habitat Survey of the site and its immediate surrounds[126] extended for use in EIA[127] was undertaken in 1995 for the original EIA of the western bypass and this was ground-truthed during site visits between May and June 2007 and found to be an accurate representation of the habitats along the route (see Section 9.6). The findings of the Phase 1 surveys were used to identify areas or species of nature conservation interest. No requirement for further botanical survey was identified. The Phase 1 Map is included in Figure 9.1.

9.5 BASELINE ECOLOGY

9.5.1 Introduction

This section introduces the ecological interests of the site and surrounding environment. Related information is also included in Section 8.5, Road Drainage and the Water Environment. The ecological baseline was collated from the desk review, consultations and the field surveys (see Sections 9.3, 9.4 and Annex A). The detailed findings of the breeding bird survey and the protected species surveys are contained in Appendices 9.1 and 9.2. Figure 9.1 illustrates the Phase 1 mapping of the study area.

9.5.2 General Ecological Context

The scheme area is rural in character and is dominated by non-native coniferous plantation that form the Inverardran and Ewich forest blocks (see Figure 6.1). There are open land buffers between the plantation and Crianlarich village which are dominated by a mosaic of wet heath and acid grassland with pockets of semi-natural woodland and bracken.

[125] Williamson, K. 1964. Bird Census work in woodland. Bird Study 11, 1-22
[126] JNCC, Handbook for Phase 1 habitat survey. A technique for environmental audit. JNCC, 2003
[127] Institute of Environmental Assessment, Guidelines for Baseline Ecological Assessment. Spon, London, 1995

9.5.3 Protected Sites

The River Fillan (see Figure 9.2 and Photographs 8 and 9, Annex E) is some 0.2km from the proposed works and is part of the River Tay Special Area of Conservation (SAC)[128]. The River Tay SAC covers an area of 9497.72ha and is designated for:

- The Annex I Habitat: oligotrophic[129] to mesotrophic[130] standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
- The Annex II species:
    - Atlantic salmon (*Salmo salar)*
    - Otter *(Lutra lutra)*
    - River lamprey *(Lampetra fluviatilis)*
    - Brook lamprey *(Lampreta planeri)*
    - Sea lamprey *(Petromyzon marinus)*

The River Fillan is known for its importance as a salmon spawning area.
There are two Sites of Special Scientific Interest (SSSI)[131] within 3km of the site:

- Ben More SSSI, some 2km east of the Crianlarich is designated for alpine heath, alpine moss heath and associated vegetation, lichen assemblage, tall herb ledge and vascular plant assemblage; and
- Glen Falloch Pinewood SSSI, some 1.8km south west of Crianlarich, is designated for ancient Caledonian pine woodland.

9.5.4 Habitats and Species of Note

This section describes the habitats and species of interest in the area, that is, those that are specially protected by law or which have been identified as being of conservation concern or identified as being worthy of targets for protection and enhancement. The detailed findings of the protected species surveys are contained in Appendices 9.1 and 9.2.

Otter

Otter surveys were undertaken in March and April with incidental recordings on four other site visits until early July 2007 (see Appendix 9.1). Two old and one fresh spraint[132] were identified on a watercourse to the west of the village but no holts or rest areas were identified. It is likely that otter use all ponds and watercourses during different times of the year but activity levels are considered to be low. No signs of otter were identified during the June 2009 walkover survey (see Appendix 9.2).

Otter (*Lutra lutra*) is protected under British and European law under Schedules 5 and 6 of the Wildlife and Countryside Act (1981), as amended by the Nature Conservation (Scotland) Act 2004, and by the Conservation (Natural Habitats &c.) Regulations 1994 and the Conservation (Natural Habitats, &c) Amendment (Scotland) Regulations 2004, the Conservation (Natural Habitats, &c) Amendment

[128] Special Area of Conservation (SAC) are areas designated under the Habitats and Species Directive (92/43/EEC),), implemented in the UK under the provisions of the Conservation (Natural Habitats &c) Regulations 1994 (the Habitats Regulations)
[129] Containing little nutrient material
[130] Containing medium levels of nutrients
[131] A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act, 2004
[132] Otter droppings

(Scotland) Regulations 2007 (see Section 1.2.2). It is also listed on Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); Appendix 2 of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and as a globally threatened species on The World Conservation Union (IUCN) Red Data List. This makes it illegal to:

- intentionally or recklessly kill, injure or take an otter.
- intentionally or recklessly damage or destroy, or obstruct access to, any structure or place used by an otter for shelter or protection.
- intentionally or recklessly disturb an otter, whether in a place of shelter or protection or not.

Red Squirrel

Three red squirrel sighting surveys were undertaken in May and June 2007 and incidental recordings made during other protected species surveys. A further walkover survey was undertaken in June 2009. No sightings of red or grey squirrel were made during the surveys or on any other visit to the sight. Feeding resources in the area are poor as the majority of the plantation is young and is not yet fruiting. Inverardran Forest has some local pockets of Norway spruce (with few Scot's pine) both profusely fruiting however no signs of feeding were identified. Feeding signs were identified at four different locations in Ewich Forest (see Appendix 9.1). During the 2009 update survey no sightings, calls or dreys were recorded. Recently eaten cones were noted (NGR 38225 24919) which were assumed to have been eaten by red squirrel (See Appendix 9.2).

Red squirrel is protected under Schedule 5 of the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act 2004 and this means it is an offence to:

- intentionally or recklessly kill injure or take red squirrels;
- intentionally disturb a red squirrel in its place of shelter;
- intentionally damage , destroy or obstruct red squirrel access to its shelter.

Water Vole

A water vole survey extending 300m beyond the known footprint of the bypass was undertaken in June 2007 with incidental searches undertaken on other protected species surveys between March and July and in June 2009. No water vole activity was identified during the 2007 or 2009 surveys probably due to the seasonal nature of watercourses and pools in the area which would increase the risk of predation. Water vole (*Arvicola terrestris*) is a Priority Species in the UK Biodiversity Action Plan (BAP)[133] as well as being listed in the Stirling Council Local Area Action Plan (LBAP)[134] and Loch Lomond and the Trossachs National Park Biodiversity Action Plan (NPBAP)[135]. Water vole is protected under the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act 2004 and this means it is an offence to:

- intentionally or recklessly kill injure or take water vole;
- intentionally disturb a water vole in its place of shelter;
- intentionally to damage , destroy or obstruct water vole access to its shelter.

[133] Her Majesty's Stationary Office. Biodiversity: The UK Action Plan. 1994 add website
[134] Stirling Council, 2004. Stirling Biodiversity Action Plan: Volume 3
[135] Loch Lomond and the Trossachs National Park (2008) National Park Biodiversity Action Plan, 2008 – 2011

Badger

A walkover survey for badger was undertaken in March 2007 and further checks undertaken during the red squirrel survey, the other protected species surveys and the June 2009 survey. No signs of badger were identified. A badger mortality occurred in 1998 on the A82 1km north of Crianlarich, which indicates that there has been a local social group. Badgers are protected under the Protection of Badgers Act (1992) and the Wildlife and Countryside Act (1981) and subsequent Amendment (1985). This means it is an offence to:

- wilfully kill, injure or to take any badger or attempt to do so;
- to dig for a badger;
- to recklessly or intentionally damage, destroy or obstruct access to any part of the badger sett;
- to cause any dog to enter a sett or to disturb a badger whilst it is occupying the sett.

Pine Marten

A pine marten survey was undertaken in March 2007 and signs searched for during other protected species surveys. No scats were found that could be attributed to pine marten during the walkover or other surveys however one site on the West Highland Way spur was identified that could be suitable as a pine marten shelter, a small outcrop with lush vegetation and a few silver birch and rowan.

During the walkover survey in June 2009 a fresh pine marten spraint was identified within the Ewich Forest (NGR NN 37879 24897) some 400m from the proposed route. Pine marten is protected under Schedule 5 of the Wildlife and Countryside Act 1981 and the Nature Conservation (Scotland) Act 2004 and this means it is an offence to:

- intentionally or recklessly kill, injure or take a pine marten;
- intentionally disturb a pine marten in its place of shelter;
- intentionally to damage , destroy or obstruct pine marten access to its shelter.

Birds

The four breeding bird survey visits carried out between May and July 2007 recorded thirty-eight species of bird in and around the site. Twelve species were confirmed as breeding and eleven possibly breeding within the site (see Appendix 9.1). Table 9.1 outlines the birds of conservation concern[136] potentially breeding within the scheme corridor.

Table 9.1: Birds of Conservation Concern Identified within the Scheme Corridor

Species	Breeding Status within the Scheme Corridor
Red List Species[137]	
• Song thrush	• probably breeding
• Common bullfinch	• visiting
• Lesser redpoll	• visiting

[136] The Population Status of Birds in the UK Birds of Conservation Concern: 2002-2007 from Gregory et al, The Population Status of Birds in the UK, Channel Islands and Isle of Man: an analysis of conservation concern 2002-2007. British Birds, 95, 2002

[137] Red list species are those that are Globally Threatened according IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery

Species	Breeding Status within the Scheme Corridor
Amber List Species[138]	
• Barn swallow	• visiting
• Black-headed gull	• Occasional birds seen overflying site
• Goldcrest	• breeding
• House martin	• visiting
• Sand martin	• visiting
• Tree pipit	• possibly breeding
• Willow warbler	• breeding
• Wood warbler	• possibly breeding

Common Frog
Four breeding sites for common frog were identified in the study area, one within the footprint of the proposed bypass. The common frog (*Rana temporaria)* is protected under Schedule 5 of the Wildlife and Countryside Act 1981. It is illegal to sell a common frog.

Deer
Red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*) have been seen on site in the area of the proposals and local residents have confirmed that deer are frequently seen in the area between the forest edge and the houses at the edge of Crianlarich (see also Section 3.4.2).

Plant Species
No important botanical records have been identified in the scheme corridor or in close proximity to it in consultation or by field survey.

Stirling Council Area Local Biodiversity Action Plan (LBAP)[139] and Loch Lomond and the Trossachs National Park Biodiversity Action Plan (NPBAP)[140] Habitats and Species
Two Stirling LBAP habitats have been identified within the route corridor: coniferous woodland and lowland heath (including examples of wet heath). Mesotrophic standing water, which is a LBAP habitat in the NPBAP, is a habitat found in the River Fillan (see Section 9.5.3). Other NBAP habitats identified within the route corridor include 'transport corridors'. Several priority species have been identified in the Biodiversity Action Plans. These are listed in Table 9.2.

Table 9.2: Priority Species Identified within the Study Area

Priority Species	Recorded Location within the Study Area
Birds	
Bullfinch	Ewich Forest, outwith the route corridor
Song Thrush	At the edge of the plantation forestry
Mammals	
Otter	Spraints identified at a private water supply outwith the road corridor
Red squirrel	Feeding signs were identified within Ewich Forest

[138] Amber list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recovery; rare breeders; and those with internationally important or localised populations
[139] As part of its commitment to sustainable development, the Government accords the planning system an important role in the protection of the natural environment and the maintenance of biodiversity. At the UN Conference on the Environment and Development held in Rio in 1992 (the *"Earth Summit"),* the UK signed the Biodiversity Convention, which requires that the components of the Earths biological diversity should be used in ways, which do not lead to their decline. The UK Biodiversity Action Plan sets out national targets for the conservation of biodiversity and in Scotland the Scottish Biodiversity Group is promoting the preparation of Local Biodiversity Action Plans (LBAPs) as a means of identifying priorities for action at the local level. LBAPs are generally prepared by partnerships of public bodies, local organisations and communities
[140] Loch Lomond and the Trossachs National Park (2008) National Park Biodiversity Action Plan, 2008 – 2011

Priority Species	Recorded Location within the Study Area
Other	
Small pearl-bordered fritillary butterfly	Incidental sightings

9.6 ECOLOGICAL INTERESTS OF THE CORRIDOR

The ecology of the route corridor is typified by a degraded wet heath/acid grassland mosaic with a small area of broad leaved semi-natural woodland that runs along the edge of the West Highland Way spur (see Section 6.4.4 and Figure 9.1). The route crosses the corner of the Ewich forest block an area of coniferous plantation forestry consisting of a mixture of larch and sitka spruce. The route crosses eight unnamed small watercourses some of which are ephemeral (see Section 8.5).

9.7 ASSESSMENT METHODOLOGY

9.7.1 Introduction

The methodology which has been used for assessment of ecological effects is described in the following sections.

9.7.2 Methods of Prediction

An outline of the development proposals has been compared with the known information about the baseline ecology of the site in order to predict the potential ecological impacts which are likely to result from the scheme. In addition likely effects on habitats of known nature conservation importance in the vicinity of the scheme have been considered. The evaluation criteria set out in Section 9.7.3 have been used to consider the significance of potential impacts (see Section 9.8) and of residual effects after having taken agreed mitigation into account (see also Section 9.9 and 9.10).

9.7.3 Evaluation Criteria

The significance of ecological effects is assessed according to the following primary criteria.

- The magnitude of the effect, as determined by its intensity and by its extent in space and time. This takes into account:
    - the vulnerability of the habitat or species to the change caused by the development; and
    - its ability to recover.
- The value, in nature conservation and ecological contexts, of affected receptors including species, populations, communities, habitats and ecosystems.

Significance is determined by the interaction of these primary criteria, being high for large effects on receptors of high value, and lower for smaller effects on receptors of lower value.

Habitats are assessed according to the widely accepted criteria of which the most important are naturalness, extent, rarity and diversity. Existing statutory and non-statutory designations for the nature conservation importance and amenity value of the sites are also taken into consideration. In addition it is now generally considered that special importance be attached to ancient semi-natural habitats that depend for their survival upon traditional kinds of land management, for example, ancient coppice woodlands or meadows. These support special plant

and animal communities that cannot be recreated quickly (if at all) and have suffered large reductions in the post-war period due to development and agricultural intensification.

Species are similarly assessed according to accepted criteria and the extent to which they are under threat. The importance of species to wider communities is considered. Protection of species by the relevant legislation including the Wildlife and Countryside Act, 1981, the Nature Conservation (Scotland) Act, 2004, and the Conservation (Natural Habitats &c) Regulations, 1994 and non-statutory regulations is taken into account.

Professional judgement is used by ecologists in the assessment of significance of effects. In this appraisal the criteria in the following tables have been used to help inform and guide the assessment[141].

Table 9.3: Criteria for defining the Importance of the Nature Conservation Resource

Value	Examples
International	Internationally designated or proposed sites including SACs; SPAs and Ramsar Sites; or sites which are not designated but meet the criteria for international designation e.g. sites supporting populations of internationally important species or internationally important numbers of species/assemblages
National	Nationally designated sites-SSSIs and National Nature Reserves or sites which are not designated but meet the criteria for national designation. Sites supporting viable populations of nationally important habitats and species as defined in the literature or by consultation
Regional	Sites designated for their recognised importance at regional level. Sites supporting UK BAP and/or LBAP habitats; viable breeding populations of regionally important species as defined in the literature or by consultation
Local	Undesignated sites but with habitats or species recognised as enriching local biodiversity
Negligible	Sites with little or no local biodiversity interest

Table 9.4: Criteria for determining the Magnitude of Impact

Magnitude of Impact	Guideline Criteria
Major negative	The proposal (either on its own or with other proposals) may adversely affect the integrity of the site, in terms of the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and / or the population levels of species of interest with long-term effects
Moderate negative	The site's integrity will not be adversely affected, but the effect on the site is likely to be significant in terms of its ecological objectives
Minor negative	Some minor negative impact – e.g. short-term disturbance but no permanent reduction in population size, habitat diversity or species-richness
Neutral	No detectable impact (+ or -)
Positive	Impacts which provide a net gain for wildlife

Table 9.5: Definitions of Levels of Significance of Effect

Significance	Definition	Guideline Criteria
Major	A fundamental change to ecological resources	Major impacts to resources of high value e.g. national or regional value
Moderate	A material but non-fundamental change	Moderate impacts to resources of regional or local value or minor impacts to a resource of high value
Minor	A detectable but non-material change	Limited impacts to resources of low (local or negligible) value

[141] Informed by IEEM guidance and www.webtag.org.uk etc

Significance	Definition	Guideline Criteria
Neutral	No detectable change	Effects neutral
Positive	Improvement to baseline ecological conditions	Increase in nature conservation value

9.8 POTENTIAL IMPACTS

Nature conservation impacts that may result from the proposals include:

9.8.1 Permanent

- Permanent loss of habitat or species due to permanent or temporary landtake for the proposals;
- creation of barriers to the movements of animals, especially mammals, amphibians and invertebrates and plants with limited powers of dispersal by the permanent works;
- fragmentation of habitat or severance of ecological corridors between isolated habitats of ecological importance;
- alterations to drainage regimes which may affect adjacent habitats; and
- creation of new habitats and introduction of species as a result of reinstatement works, habitat enhancement proposals and landscaping.

9.8.2 Construction

- Disturbance or damage to adjacent habitat not required for the proposals through construction activities (movement of vehicles and personnel, artificial lighting, dust, spillage of fuels and chemicals, emissions and noise);
- disturbance to or displacement of wildlife in proximity to the site through construction activities including noise and vibration from piling activities;
- temporary severance of wildlife corridors;
- pollution containing high levels of sediment entering the watercourses and indirectly impacting on the River Tay SAC; and
- introduction of alien species during the construction works.

9.8.3 Operational

- Kills, disturbance or displacement of animals from increase in speed/volume of traffic;
- effects on wildlife from increased noise from the road;
- effects on wildlife from changes in night-time lighting conditions;
- effects from the discharge of site run-off which could be contaminated with oil, de-icing salts, heavy metals and suspended solids which could impact on water quality or adjacent habitats, in particular the River Fillan, part of the River Tay SAC; and
- damage or disturbance to habitat or species adjacent to the proposals through operational activities.

9.9 MITIGATION MEASURES

EC1 Habitat loss would be restricted to that required for safe construction of the works.

EC2 New habitats created as part of the landscaping works for the scheme would be designed to enhance the biodiversity of the road corridor.

EC3 New tree planting (other than where specimen tree planting is identified in the outline landscape design) would be with native species typical of the local area, obtained from local sources wherever possible.

EC4 The new basins created as part of the site drainage would be designed as far as practicable to benefit nature conservation.

EC5 All new planting would be, where possible, of local provenance.

EC6 Culverts would be designed for wildlife in accordance with best practice.

EC7 The site would be checked for the presence of protected species prior to construction work beginning and appropriate mitigation measures would be discussed and agreed with SNH and implemented if any new activity was identified before or during construction.

EC8 The need for a licence[142] would be discussed with the Scottish Government before construction (because of the potential for otter to cross the site) and if considered necessary a licence would be applied for from the Government.

EC9 Specific measures to protect otters (fencing, culverts with ledges etc) have been identified and these would be included in the contract requirements. The detailed location would be finalised when the final scheme is defined with input from an appropriate expert.

EC10 All tunnels and culverts would be checked regularly when the scheme was operational by Transport Scotland's maintenance contractor to ensure fencing was in good condition and that no culverts or tunnels were blocked.

EC11 All trees and woodlands in proximity to the works but which do not require to be removed would be fenced off. Only essential tree loss would be permitted.

EC12 Any mature and dead trees would be checked by an appropriate expert for bats prior to removal and appropriate mitigation measures agreed with SNH and implemented if bats were found.

EC13 All woodland, scrub and other habitat would be checked for nesting birds before removal if this is programmed for the bird nesting season. If any are identified appropriate mitigation would be agreed with SNH and implemented. Wherever possible trees would be removed outwith of the breeding period.

EC14 Any land degraded by construction would be restored after construction was completed.

EC15 Turfs from the site would be recovered and re-used in the restoration of the site.

EC16 Any surface water features[143] affected by the proposals would be made good unless destroyed by construction of the scheme.

EC17 Best site management practices would be implemented on site to minimise the risk of intrusion into adjacent habitats and the risk of pollution incidents which could affect neighbouring habitats.

EC18 Method statements would be drawn up by the contractor and those for activities which could affect the freshwater/marine environment would be agreed with SEPA to ensure all necessary pollution prevention measures were included within them.

EC19 The contractors would follow best practice including the relevant SEPA pollution prevention guidelines (see www.sepa.org.uk).

EC20 Detailed contingency plans would be developed by the contractors for implementation in case of spillage during construction.

[142] Where proposals have potential to affect European protected species a licence must be obtained from the Scottish Executive as described in European Protected Species, Development and the Planning System. Interim guidance for Local Authorities in licensing arrangements. October 2002, SEERAD

[143] Further mitigation relating to water and drainage is contained in Section 9.8

EC21 Wooden ramps (or similar) would be placed in any excavations during construction with potential to trap animals to allow easy escape. Open trenches would be checked each day for entrapments.

EC22 Surface road run-off from the A82 would pass through sustainable urban drainage systems (SUDS) prior to discharge to a local watercourse.

9.10 RESIDUAL EFFECTS

9.10.1 Permanent

There would be no direct effects to any area designated for its nature conservation interests. These areas are all outwith the site (see Section 9.5.3).

Construction of the scheme would result in loss of habitat along the route corridor. For the purposes of this assessment it has been assumed that all vegetation would be lost within the land made available for construction (10ha). The majority of habitat which would be lost is degraded wet heath/acid grassland mosaic (some 7ha) with small areas of broad-leaved semi-natural woodland and scrub (1ha) also being lost. In total some 5ha of coniferous woodland would be lost, 2ha required for the construction of the scheme and a further 3ha to take the forestry back to a wind-firm edge (see Section 3.4.1).

Lowland heath and coniferous woodland are habitats in the Stirling Local Biodiversity Action Plan however the areas lost are small in the context of the wider area and the habitat degraded and the loss is not considered to be significant. Vegetation would be removed outwith the bird breeding period but where this was not possible checks would be made to ensure no breeding birds were affected. If any potential impacts were identified these would be discussed with SNH and appropriate mitigation designed and implemented.

Construction of a scheme in an area of extensive peat would result in substantial changes to existing hydrological patterns and the peat communities which are present on site. The new drainage would result in some peat areas becoming drier and it is considered likely that wet heath community areas could dry out and become more heath or grassy in their make up in the longer term although the actual effects would depend on detailed changes on site. The effects are not considered to be significant. Turfs from the site would be removed and re-used in restoration of the site to encourage re-establishment of the local vegetation.

There would be new planting of some 1.5ha at the edge of the new road following the works. This has been designed to benefit local biodiversity in the longer term (including native tree and shrub species of local provenance where possible) and would mitigate the loss of habitats in the longer term (see Section 10.7 and Figures 10.9a-c). New planting (some 0.5ha) would also be undertaken in the area where additional forestry would be felled to the wind-firm edge but maintenance of this area would be the responsibility of the Forestry Commission. Deer graze the area at the edge of the forest (see Section 9.5.4). A fencing strategy has been developed to protect new planting (see Section 3.4.2). The new works could result in deer changing their patterns of coming down to the lower slopes with resultant additional grazing pressures elsewhere. Deer are frequent in the Highlands and the effects are considered unlikely to be significant given current grazing pressures from deer.

Several minor watercourses (some ephemeral) would require to be realigned as a result of the scheme. These would be realigned into a ditch and run under the road in several culverts. The design of the alignment would follow best practice

guidance[144]. All watercourses affected by the works would be culverted under the works and culverts would be designed following best practice for wildlife[145]. None of the watercourses affected have been identified to be of more than local interest for nature conservation (apart from transient use by otter) and the effects are not predicted to be significant provided best management practices are implemented on site (see Section 9.9). The hydrological assessment (see Section 8.9.1) has indicated that hydrological effects would be limited in extent. One common frog breeding site identified during the protected species surveys would be lost as a result of the scheme. Two new basins would be created as part of the scheme and these would be likely to benefit nature conservation in the longer term.

A summary of the key habitats lost and the new habitats that would be created is given in Table 9.6.

The field surveys indicated that otter are present and are likely to make use of all ponds and watercourses in the area (see Appendix 9.1). Otter passes would be provided on all the newly culverted watercourses (see Section 3.2.2) to allow passage up and down the burns.

Table 9.6: Indicative Scheme Habitat Loss and Gain (ha)[146]

HABITAT TYPE	LOSS	GAIN	TOTAL +/-
WITHIN THE SITE AREA			
Native Woodland scrub woodland required to be removed for construction of the scheme, replacement planting	1ha	1ha	**0ha**
Coniferous plantation Plantation woodland required to be removed for construction of the scheme	2ha	-	**-2ha**
Mixed native and ornamental landscape planting	-	<0.5ha	**+<0.5ha**
Wet heath/acid grassland	7ha	-[147]	**-7ha**
Single trees	-	14 trees	**+14 trees**
Detention Basin (two)	-	<0.2ha	**+<0.2ha**
Area of land left to naturally regenerate		6.3ha[146]	**+6.3**
TOTAL[148]	10ha	8ha	**-2ha**
OUTWITH THE SITE AREA			
Coniferous plantation Additional plantation woodland to be removed	3ha	-	**-3ha**
Native Woodland Additional native scrub woodland planting	-	0.5ha	**+0.5ha**
Area of land left to naturally regenerate		2.5ha	**+2.5ha**
TOTAL	3ha	3ha	**0ha**
OVERALL TOTAL	**13ha**	**11ha**	**-2ha**

No bat records have been identified in the scheme corridor. Any mature or senescent trees which could potentially provide bat habitat would be checked before removal to ensure no bats were affected by construction without

[144] For example, Watercourses in the Community, A Guide to Sustainable Watercourse Management in the Urban Environment. SEPA, June 2000
[145] River Crossings and Migratory Fish: Design Guidance: A consultation paper. Scottish Executive, April 2000
[146] All habitat loss and gain figures are approximate and based on assumptions about the final scheme design and construction outlined in Chapter 3
[147] Some seeding may be undertaken on bunds close to houses or if slopes do not regenerate satisfactorily
[148] This figure is based on the scheme including approximately 2ha of blacktop, surfaced paths and carriageway filter drains

appropriate mitigation having been implemented. The breeding bird survey indicated that although some species of Conservation Concern (see Table 9.1) were found to be breeding in or close to the scheme corridor that the local breeding populations would not be significantly affected by the development (see Appendix 9.1). The new woodland and scrub planting would have potential to benefit breeding birds in the longer term as it matures and provides new feeding and nesting habitats.

9.10.2 Construction

Construction activities would be confined to the minimum area required for the works. All construction activities would be undertaken in accordance with best practice and the contractor would be required to ensure all works were undertaken in accordance with best practice. The success of all protection and mitigation measures would be audited throughout the construction period by Transport Scotland representatives. If any measures were found not to adequately protect the environment they would be amended.

Some animals could be disturbed by construction activities and in particular piling and other noisy activities. These would be short term and experience elsewhere suggests that effects would be unlikely to be significant. Any open excavations which animals could not easily get out of would be capped or be ramped for easy exit at the end of each working day to reduce the potential for animals being trapped.

Traffic flows on some roads may increase during construction as a result of construction traffic accessing the site or short term diversions. This may increase the barrier effects of a particular road to some wildlife and increase in the risk of mortalities. It is assumed that usually the greatest increase in flows would be likely to happen during peak times and that most wildlife movements would be likely to be at night, and the effect is not considered to be significant.

Contractors would be required to draw up detailed method statements, following best practice, which indicate how watercourses would be protected from pollution during construction. These would include detailed contingency plans for implementation in case of spillage during construction. The importance of the River Fillan would be described to all working on site and the importance of protecting the river from pollution stressed. SNH has raised during consultation concerns about increased nutrient levels and sediment loads in the River Fillan resulting from run-off during construction (see Annex A). It is considered that early construction of cut-off ditches and detention basins and implementation of all best management practices on site would reduce the risk of unnecessary or sediment rich run-off. These measures would ensure the European site is protected and that there would be no effect on their integrity.

The effects of the scheme on the European site are summarised in Table 10.7 and detailed in Annex B.

Table 9.7: Residual Effects on European Site

Information Relevant to the Appropriate Assessment	Residual Effects
River Tay SAC	
Description of the Proposals	
Description of the Qualifying Features of the SAC:	
▪ Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorea and/or of the Isoëto-Nanojuncetea	No direct disturbance
▪ Atlantic salmon (*Salmo salar*)	No direct disturbance
▪ Sea lamprey (*Petromyzon marinus)*	No direct disturbance
▪ Brook lamprey (*Lampetra planeri)*	No direct disturbance
▪ River lamprey (*Lampreta fluviatilis)*	No direct disturbance
▪ Otter (*Lutra lutra)*	No direct disturbance
Conservation Objectives: *To ensure for the qualifying habitats and species that the following are maintained in the long term:*	
▪ Extent of the habitat on site	No direct effects on site
▪ Distribution of the habitat within site	Control of run-off would ensure no effects on habitats
▪ Structure and function of the habitat	Control of run-off would ensure no effects on habitats
▪ Processes supporting the habitat	No direct effects on any processes supporting the habitats
▪ Distribution of species	No direct or indirect effects
▪ Viability of species	No impacts to viability of species
▪ No significant disturbance of species	
Relevant Operations (i.e. those that could cause damage to the qualifying features)	
▪ Civil engineering	No works in SAC
▪ Discharges (run-off from the road)	Early construction of cut-off ditches and detention basins and implementation and audit of success of best practice measures on site would reduce the risk of any significant effects from run-off. During operation run-off would be attenuated and if necessary controlled via the scheme detention basins

There would be a risk of alien species being brought to site by traffic etc during construction. This would be monitored as part of the landscaping checks and any invasive alien species dealt with immediately and in accordance with best practice.

Provided all the mitigation measures were implemented the nature conservation effects during construction are considered to be minor adverse (not significant).

9.10.3 Operational

During operation of the road the main potential impacts are mortality to animals crossing the road and the risk of pollution of the River Fillan through road run-off containing de-icer, oil etc entering burns or groundwater and reaching the SAC.

Otter activity has been identified in the corridor. Ledges would be included in the culverts of the larger watercourses (see Section 8.5.1) to maintain access and fencing would be incorporated into the scheme design to prevent access to the carriageway and reduce the risk of mortalities (see Section 9.9). Birds, invertebrates and other fauna (including deer) using the habitats adjacent to the road could also become casualties. The landscape design has taken account of the risks to travellers from deer and to deer themselves (see Section 3.4.2). No particularly sensitive species have been identified and potential effects are considered to be minor adverse (not significant).

The increase in noise along the new route could result in reduced densities of birds and other animals in areas adjacent to the road although this would be in part off set by the new planting which would create new habitats for birds and other fauna. It is also likely that most wildlife would become habituated to the regular noise from the road. The area has not been identified as one of particular value to wildlife and no species of note have been identified which it is considered could be particularly vulnerable to noise or air pollutants[149].

Some small areas of the corridor would be lit however lighting would be in areas already lit (i.e. close to the village) and so this is not considered to cause additional significant disturbance to wildlife (see Section 3.2.2).

All road run-off would be carried through filter drains to detention basins at the south and north ends of the scheme where pollutants would be filtered out prior to discharge into burns (see Section 3.2.2). The risk assessment (see Appendix 8.3 – 8.5 and Section 8.9) has indicated that there would be no significant risk of pollution once the scheme was operational and that run-off would be adequately controlled to ensure that there was no risk of pollution to groundwater or of the burns to which drainage would discharge including those which drain to the River Fillan. The detention basins would be managed to ensure efficient attenuation of pollutants so some habitat in the basins or adjacent to them could be disturbed or lost during maintenance.

De-icing salt may have some impact on new vegetation in proximity to the road corridor and there may be some natural selection towards salt tolerant species.

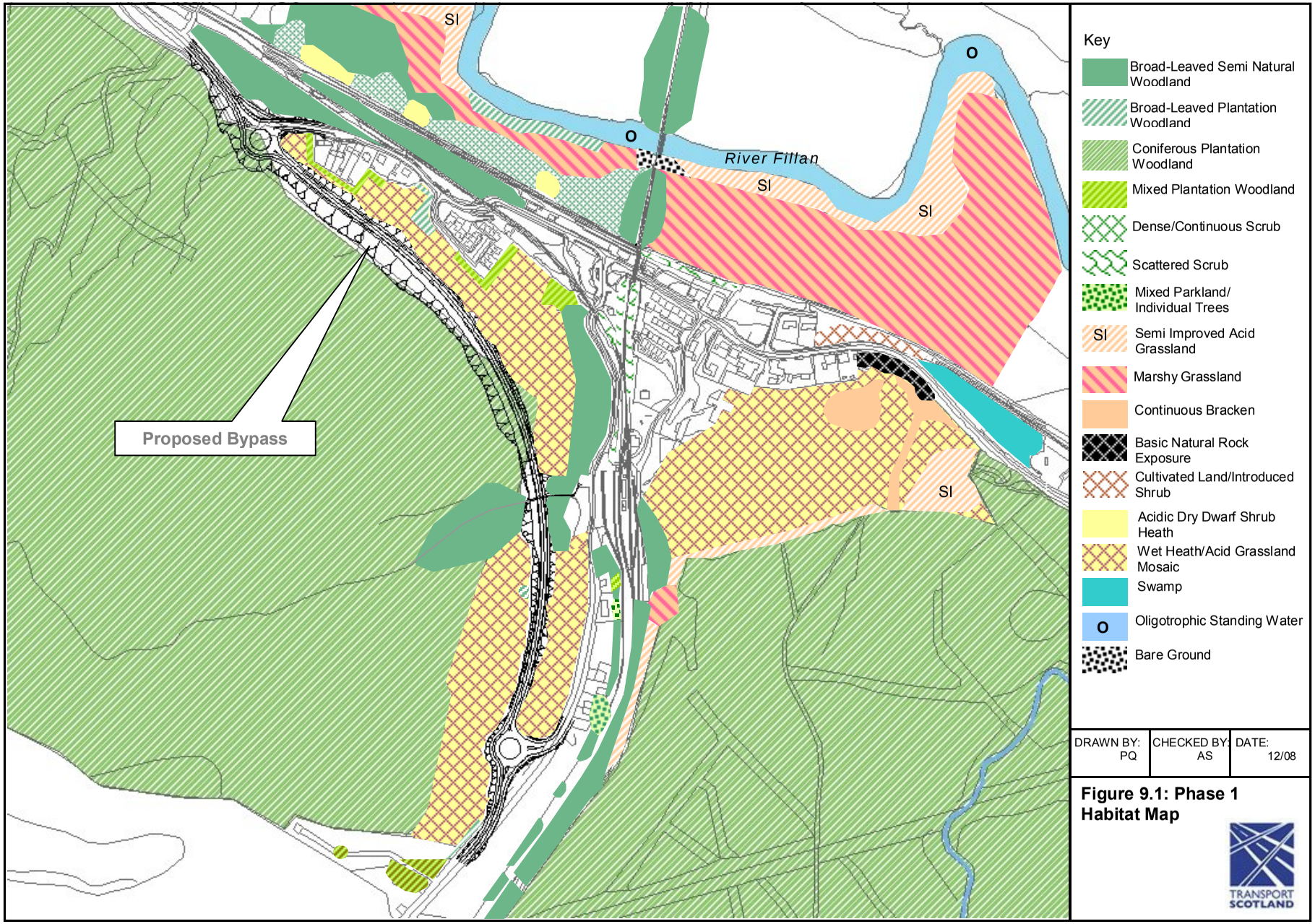
Disturbance from future maintenance operations, including noise and human presence would be temporary and restricted to the road corridor. Possible damage to habitats associated with watercourses and the detention basins as a result of maintenance activities would be kept to a minimum through restricting access to the immediate areas of the works. Disturbance would be infrequent and no significant effects on wildlife are predicted.

9.11 SUMMARY

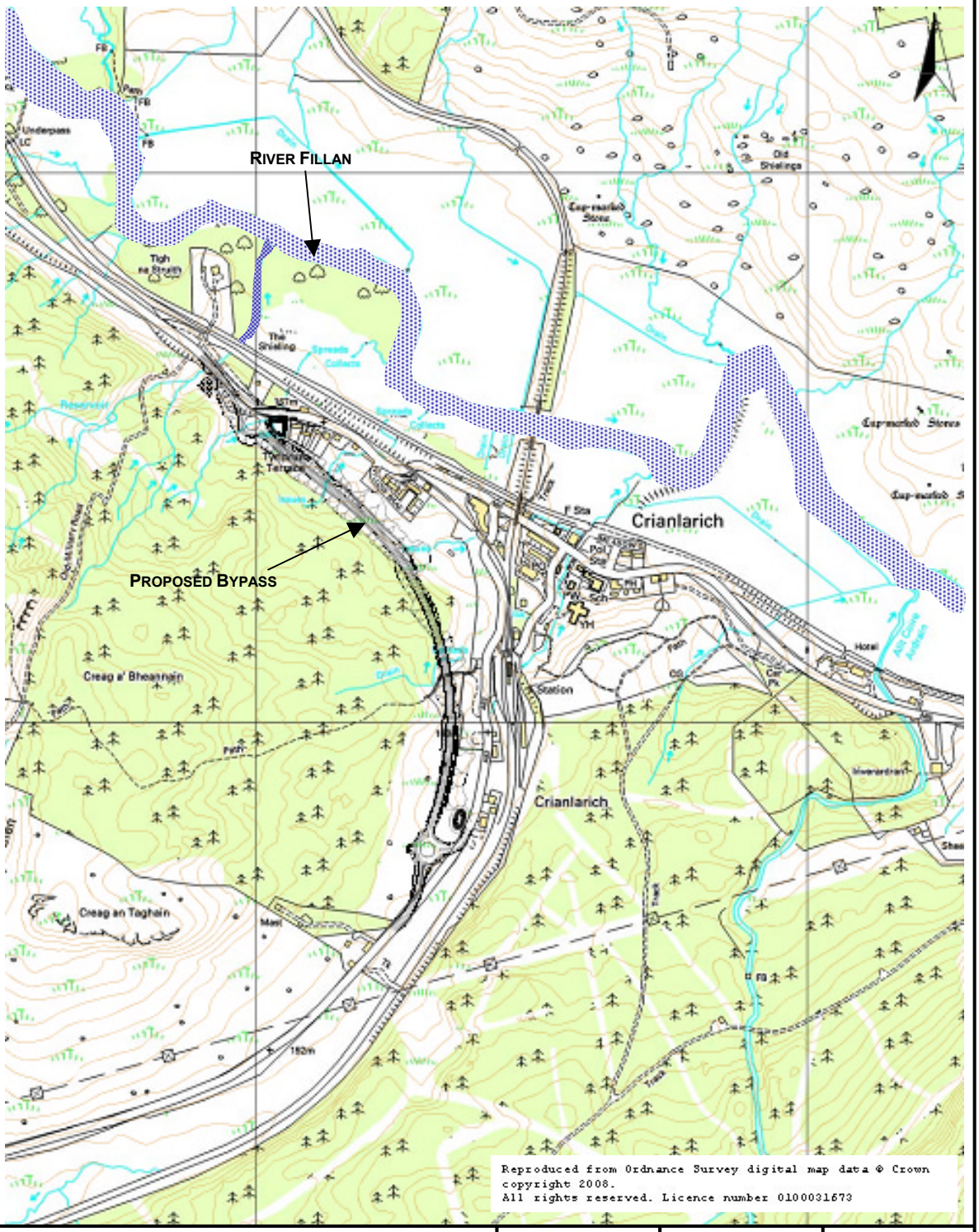
- No statutory designated sites would be directly impacted on by the proposals.
- The proposed scheme lies within 0.2km of the River Fillan part of the River Tay SAC which is designated for its international nature conservation value. Implementation of best management practices during construction and design and implementation of effective drainage features including detention basins and other SUDS measures would ensure that there were no significant indirect effects on the river.
- The qualifying features of the site would not be affected by construction or operation of the scheme.
- Two LBAP habitats have been identified within the route corridor, coniferous woodland and lowland heath. Some 7ha of wet heath/acid grassland mosaic and some 5ha (3ha outwith the site boundary) of coniferous woodland would be lost to the proposals however the areas lost are small in the context of the wider area and the loss is not considered to be significant.
- Construction of the bypass would be in an area of extensive peat and existing hydrological patterns would change which could affect the character of remaining habitat in the corridor. This is not considered to be significant.

[149] The air quality assessment reported in Chapter 15 indicates effects would not be significant

- There would be new planting of some 1.5ha at the edge of the new road following the works. New planting would also be undertaken in the felled area outwith site boundary (some 0.5ha). Maintenance of this are would be the responsibility of the Forestry Commission.
- Casual otter activity has been identified along the route corridor. Otter ledges and fencing would be incorporated into the detailed design of the scheme to reduce the potential for severance effects from the new road.
- A variety of birds have been identified as breeding in the scheme corridor or in proximity to it but no significant effects to any have been identified.
- Deer patterns could change in the area as a result of the construction of the new road which could result in additional grazing pressures in other areas.
- The new landscape proposals have been designed to provide a range of habitats for birds and other animals and have potential to enhance local biodiversity in the longer term.



Digitised version of Phase 1 Habitat Map from Crianlarich Project: Stage 3 Environmental Assessment: Volume 2 Detailed Environmental Assessment. June 1995



Key:

River Tay Special Area of Conservation (SAC)

DRAWN BY: OC	CHECKED BY: AS	DATE: 12/08

A82 (T) Crianlarich Bypass

Figure 9.2: Protected Sites within 1km of the Proposals

TRANSPORT SCOTLAND