

9 ECOLOGY AND NATURE CONSERVATION

9.1 Introduction

9.1.1 This chapter provides a description and evaluation of the existing ecological resource and receptors in the area potentially affected by the Scheme. It identifies ecological impacts that would arise during construction and operation of the bypass, and takes into account the mitigation measures designed to reduce potential adverse effects.

9.2 Methodology

9.2.1 The assessment follows guidance in the Design Manual for Roads and Bridges (DMRB), Volume 10 and appraisal methodologies given in Transport Analysis Guidance (TAG) Units 3.3.10 - Biodiversity Sub Objective - and TAG 3.3.6 - Environmental Capital Approach. Good practice guidance from the Institute of Ecology and Environmental Management was also consulted.

Scope of assessment

9.2.2 The scope of this chapter comprises an assessment of the impacts and effects of the Scheme on a number of features (valued ecological receptors) identified at the desk study or field survey stages within the Scheme corridor. Direct and indirect impacts and effects have been identified and assessed during construction and operational phases. The findings of the assessment process have informed the mitigation design.

The Study Area

9.2.3 The extent of the survey area depended on the exact requirements for each; for example botanical survey generally extended between 200 and 500m from the Scheme centreline, in order to adequately cover features such as Kerswell Down Wood (a County Wildlife Site). In contrast, bat radio tracking occasionally extended several kilometres away from the centreline, in order to track bats to favoured foraging areas or to distant roosts.

Desk studies and consultation

9.2.4 Archive records were requested from Devon Biodiversity Records Centre (DBRC); Devon Bat Group; Royal Society for the Protection of birds (RSPB); Devon Bird Watching and Preservation Society; Environment Agency (EA) and the Barn Owl Trust. Devon County Council (DCC), English Nature (EN), RSPB, Devon Wildlife Trust (DWT) and EA were consulted at various stages during the project.

Field studies

9.2.5 Baseline field studies were undertaken over a two-year period; from summer 2002 to autumn 2004. All work was undertaken in accordance with current best practice procedures. A list of all survey work is listed in Table 9.1 below. Chapter 9.0 in Volume 2 gives a full account of methodology used in each element of the survey.

Table 9.1 Field Studies

Survey type	Year undertaken and details
Extended Phase 1 habitat survey along the corridor	2002 and 2003 – in line with Standard JNCC methodology
Additional botanical survey	2004 – summer 204 – along grass verges at northern end of scheme corridor
Hedgerow survey	2003 & 2004 – checking hedge samples against Hedgerow Regulations
Riparian habitat survey Edginswell stream/Aller brook	Summer 2004 – detailed inspection of full length of Aller Brook and Edginswell Stream
Lesser Horseshoe bat radio-tracking	2003 – over three week-long sessions in May, August and September
Bat habitat use survey of the corridor	2002 – Baseline habitat surveys (using bat detectors) undertaken along transects
Additional bat habitat use survey at southern end of the corridor	2003 – use of transects; checking for lesser horseshoe bats and recording other bat species
Bats in trees: tree assessment	2004 – Winter check of all trees along corridor for potential to support bat roosts
Bats in trees: emergence survey	2004 - autumn check of trees and groups of trees with Medium-High potential to support roosts
Bat roosts (including letter drop)	2002-2004 – letter drop to over 100 households in attempt to find unrecorded roosts and in particular Lesser horseshoe roosts. Follow up check by licensed bat worker.
Badger bait-marking survey	2003 – winter; check extent of badger territory
Badger field signs	2002 – follow up check of setts
Otter field signs	2002 – check of length of Aller Brook and Edginswell Stream
Dormouse nest tube survey	2002 - 100 sample tubes and follow-up nut check
General breeding birds	2002 – Breeding bird survey of corridor
Winter Cirl bunting	2002/03 – Inspection of corridor for winter habitat use by Cirl bunting
Breeding Cirl bunting	2003 - Breeding survey including off line habitat assessment
Barn owl survey	2003 – evening survey along length of corridor
Winter Cirl bunting (including Naptor study)	2003/04 – comparative study of Cirl bunting at site undergoing enhancement for Cirls
Great Crested Newt survey of quarry ponds	2003 & 2004 – full survey of amphibians in all accessible water bodies at this site
Reptile survey	2003 – 100 refuges in 9 sampling stations to establish ‘hotspots’ for reptiles
Fisheries survey of Aller brook and Edginswell stream	2004 – Full fisheries survey
Terrestrial invertebrate sampling Edginswell Farm CWS	2003 – gather baseline data on wetland and dry ground invertebrates
Aquatic invertebrate kick-sampling along Aller brook	2004 – Baseline data gathering below possible discharge points – assessment of water quality. Aller brook and Edginswell Stream
White-clawed crayfish survey of Aller brook	2003 & 2004 - full survey of Aller brook and Edginswell stream.

Assessment Methodology

9.2.6 Construction of the Scheme may result in a range of *impacts* and *effects* on the ecological receptors identified within the corridor.

- An *impact* is any factor that may result in a physical change to an ecological receptor. Once impacts have been determined, the magnitude of each can be assessed using TAG guidance.
- An *effect* results from an impact acting upon an ecological receptor; both direct and indirect effects are considered in this assessment, together with cumulative effects where relevant. The duration of the effect (i.e. permanent or temporary and short, medium or long-term) is taken into account. The *significance* of an effect reflects the relationship between 2 factors:
 - the value of the nature conservation resource
 - the magnitude (or severity) of an impact

9.2.7 The criteria are combined to produce an overall appraisal of whether an effect is considered to be significant and are considered more fully in Volume 2.

9.3 Baseline Conditions

9.3.1 Habitat plans are shown in Figures 9.1 and 9.2. Target Notes and species lists from the botanical surveys are included in Volume 2, Appendix 9.1.

Study Area Overview

9.3.2 Kingskerswell lies within the valley of the Aller Brook, a small tributary of the River Teign, on the edge of the 'Devon Redlands' Natural Area and 'South Devon' Natural Area (Natural Areas are defined in English Nature's 'Natural Areas Programme', which sets out regional conservation priorities based on geology, geomorphology and ecology). The topography within this region comprises steeply sloping land east of Kingskerswell, with gentler slopes rising to the west, reflecting a geological boundary between the Lower Devonian Sandstone in the east, Middle Devonian Sandstone to the south and Carboniferous Limestone in the west.

9.3.3 Land use to the west of Kingskerswell comprises a mix of pastoral and arable, with sheep and cattle grazing on the lower-lying valley floor and sides and arable cropping to the west and north. Land in the vicinity of the proposed junction between Aller Brake Road and St Marychurch Road, comprises secondary woodland and plantation in an urban setting. The A380 between Penn Inn roundabout and Aller Road is fringed by urban development, with Newton Abbot lying to the east and mature non-native conifer trees and scrub fringing the western side, between the road and adjacent railway. A fairly species-rich grassland has developed locally on the A380 embankment on its eastern side. Grazed wet pasture lies to the west beyond the railway line.

9.3.4 Land use intensity appears to be greater between Aller and Maddacombe Road than to the south at Edginswell, with larger, mainly arable, fields and more tightly managed hedges in evidence. Stands of semi-natural vegetation are less widespread here, and botanical interest is mainly restricted to habitat complexes along watercourses. Land to the east of the A380, at Aller, has been extensively quarried for sand and aggregates. Fringing woodland remains along much of the eastern edge of the A380 at this point.

9.3.5 The Aller Brook and Edginswell Stream run along the valley bottom for the length of the Scheme corridor. The watercourses are fringed by scrub, hedges, improved and semi-improved pasture and, locally, by stands of marshy grassland and fen-meadow. Whilst straightened, culverted and artificially raised channels occur in several areas, natural meandering sections also occur and water quality is high (conforms to the EA River Quality Objective Class RQ02).

9.4 Results of Field Surveys – Fauna

Dormouse

- 9.4.1 Despite intensive survey work over two seasons (2002 and 2003) no field evidence of Dormouse *Muscardinus avellanarius* was recorded.

Otter

- 9.4.2 Otter *Lutra lutra* is known to occur along both Edginswell Stream and Aller Brook, and there is abundant lying-up cover locally.

Badger

- 9.4.3 Badger *Meles meles* activity is concentrated between Aller and Kerswell Down; with a main sett lying well to the west of the Scheme corridor. An annex and four outliers lie along the corridor.

Bats

- 9.4.4 A total of six known bat roosts in buildings would be demolished under the Scheme; none supported more than small numbers of Pipistrelle bat *Pipistrellus* sp., Long-eared bat *Plecotus* sp., Lesser horseshoe bat *Rhinolophus hipposideros* or (a single) Greater horseshoe bat *R. ferrumequinum*. A breeding roost and a hibernation site were found for Lesser horseshoe bat; at Abbotskerswell and Edginswell, respectively. Neither would be affected by the Scheme. The approximate locations of bat roosts are shown on Figure 9.3 (excluding those of Lesser horseshoe).

- 9.4.5 Common pipistrelle bat *Pipistrellus pipistrellus* was by far the most abundant species during detector surveys in 2002-2004; activity was fairly evenly distributed; mainly along hedges between Aller and Edginswell. Other species included Whiskered/Brandts *Myotis mystacinus/M. brandtii*, Noctule bat *Nyctalus noctula*, Long-eared bat (almost certainly Brown long-eared bat *Plecotus auritus*), Lesser horseshoe bat and a very small number of Greater horseshoe bats.

- 9.4.6 Only one tree within the Scheme corridor was confirmed as supporting a bat roost (small numbers of Common pipistrelle) during the targeted tree survey in September 2004, although a total of 74 trees along or close to the Scheme corridor were noted as having either Moderate or High potential to support bats.

- 9.4.7 A radio tracking study on Lesser horseshoe bat commenced at the end of May 2003 and continued over three week-long sessions until September 2003. Bats tagged during the first session foraged and roosted north of Kerswell Down and were tracked to a maternity roost site at Abbotskerswell, approximately 1km west of Aller Bridge. 'Core' feeding areas for this colony were around Kerswell Down Wood and in and around Decoy Country Park, south of Newton Abbot. Bats tagged during the second session all foraged south of Kerswell Down and spent a substantial proportion of their time within wetland at Edginswell. A number of these bats were tracked under the Torbay Ring Road, probably via concrete culverts, the railway bridge and/or Edginswell road bridge to roost sites in Edginswell village. Tagged bats crossed the A380 eastwards to feed and roost in the Fluder Hill area. The September session followed bats tagged at both the northern and southern ends of the Scheme; tagged bats from a roost at Edginswell almost exclusively foraged in and around wet pastures at Edginswell CWS (this area clearly comprises extremely important foraging habitat for this species). The bats tagged at the northern end of the corridor were recorded foraging in similar areas to those in May. The results strongly suggest that two separate colonies are present; one north of Kerswell Down, with a probable breeding roost to the north-west of the Scheme corridor, and the second south of

Kerswell Down Wood (breeding roost location unknown³). Lesser horseshoe bat activity data is summarised in Figure 9.4.

Bird assemblage

- 9.4.8 The bird assemblage along the Scheme corridor was typical of lowland Devon, with the exception of Cirl bunting, a nationally scarce species. Whilst arable is an important habitat for several key species of national 'conservation concern' (including Cirl bunting) the majority of species were associated with hedgerows, woodland, and gardens, in particular along the western fringes of Kingskerswell. Tall hedgerows and scrub were important for RSPB 'Red List' species such as Yellowhammer, Song thrush *Turdus philomelos* and Bullfinch *Pyrrhula pyrrhula*, as well as for Willow warbler *Phylloscopus trochilus*, an 'Amber List' species. Such habitats were also valuable for Cirl bunting, which is covered separately below. The main blocks of woodland within the Scheme corridor (Kerswell Wood and woodland alongside Churchway Lane) supported several woodland species of 'conservation concern', including Marsh tit *Parus palustris* (Red List) and Green woodpecker *Picus viridis* (Amber List), as well as commoner woodland species such as Tree creeper *Certhia familiaris*, Great spotted woodpecker *Dendrocopus major* and Nuthatch *Sitta europaea*. Watercourses support breeding Grey wagtail *Motacilla cinerea* and Kingfisher, the latter being listed on Schedule 1 of the Wildlife and Countryside Act 1981 (WCA). Ford Fields is an important site for birds such as Snipe *Galinago galinago*, especially during winter.
- 9.4.9 Cirl bunting is listed on Schedule 1 of the Wildlife and Countryside Act 1981, and is a priority species for conservation on the UK BAP (Middle List) and on the Devon BAP; virtually the entire UK breeding population being confined to South Devon. The small population at Kingskerswell is ranked as of national significance (TAG High Value), although densities here are much lower than the best county sites. (Figure 9.5 shows Cirl bunting territories during 2002 and 2003.) Only a single territory was recorded in 2003, on the western edge of Kingskerswell around the eastern edges of Kerswell Down Wood; this area comprised ideal habitat, with a mosaic of unimproved rough grassland, arable field margin, tall, unmanaged hedgerows, old orchards and overgrown gardens. Figure 9.5 shows Cirl bunting records obtained during surveys in 2002 and 2003, and indicates possible territory extent.
- 9.4.10 Barn owl *Tyto alba* is listed on Schedule 1 of the Wildlife and Countryside Act 1981. The population here appeared very low; with only one sighting of Barn owl being made during evening/dusk surveys between 2002 and 2004. Suitable foraging habitat is present, but a lack of local roost and nest sites is probably a likely factor contributing to the species apparent low population.

Reptiles and Amphibians

- 9.4.11 Reptiles are widespread and locally abundant along the length of the Scheme, with Slow-worm *Anguis fragilis* being the most frequent species. Grass snake *Natrix natrix* was recorded in Edginswell CWS and is probably also present in Ford Fields. The European protected species Great crested newt *Triturus cristatus* is known to occur in waterbodies some 300m from the Scheme, just west of Ford Fields CWS. It is absent from ponds and ephemeral waterbodies in Royal Aller Vale and Zig Zag quarries.

Fish and Aquatic macro-invertebrates

- 9.4.12 The 2004 study found good numbers of the migratory species Atlantic salmon and Common eel *Anguilla anguilla*, together with Brown Trout *Salmo trutta*, Brook lamprey and Bullhead (Salmon, Bullhead and Brook lamprey are European protected

³ A leaflet drop to local residents in late 2003 / early 2004 failed to find the breeding roost for this southern colony.

species). Edginswell Stream and Aller Brook are of Medium to High biological quality, based on the BMWP (Biological Monitoring Working Party) and ASPT (average score per taxa). Field surveys indicated that the protected White-clawed crayfish *Austropotamobius pallipes* is absent from the Study Area.

Key Ecological Receptors

9.4.13 Table 9.2 shows the TAG evaluation for key ecological receptors known to occur within the Study Area:

Table 9.2 Evaluation of Key Features

Feature	Value	Legislative status and National / Local Conservation Status
Non-Statutory Sites of Nature Conservation Importance		
Site 13 – Torbay Ring Road (SX886663)	Lower	LWS – Grassland (road verge)
SX87/144 Milber Wood	Lower	LWS – plantation and semi-natural broad-leaved woodland
SX86/091 Ford Fields	Medium	CWS – Unimproved wet neutral grassland and marsh with bird interest.
SX86/073 Aller Bridge	Medium	PCWS – non-statutory site. Recently improved grassland with well-developed hedges
SX86/092 Yannon Lane Fields	Lower	CWS – NB. This site is designated for breeding Cirl bunting interest; however it is known breeding Cirl bunting territory was not confined to the CWS boundary, but extends some distance outside. The species was absent from this site in 2003 and the site boundaries were undergoing reappraisal in 2004.
SX86/161 and SX86/063 Manor House and Manor House Fields	Medium	Unimproved grasslands and scrub on limestone
SX86/065 Kerswell Down and Whilborough Common	Medium	Secondary limestone broad-leaved woodland and scrub and small quarry cutting used as a car park
SX86/162 Kerswell Down Hill Fields	Lower	PCWS – non-statutory site – unimproved /semi-improved grasslands and scrub on limestone
SX86/068 Edginswell Farm	Medium	CWS – on-statutory site. Wetland; semi-improved damp grassland and mature hedges
Habitats		
Hedges	Medium	Hedgerow Regulations 1997; listed in Devon BAP as a priority habitat; National BAP priority
Dry Woodland	Medium	Oak woodland listed in Devon BAP as a priority habitat; broad-leaved woodland listed as a National BAP priority
Wet <i>Salix</i> carr	Medium	Wet woodland listed in the National BAP and Devon BAP as priority habitats
Fen meadow	Medium	Included in the complex of wetland habitats that are listed as National BAP priority
Species-rich calcareous grassland	Medium	Flower rich meadows and pastures listed as priority habitat in Devon BAP; lowland calcareous grasslands listed as a National BAP priority
Rivers and streams	High	Priority habitat in UK and Devon BAP
Arable habitats	Lower	Cereal field margins National BAP priority
Species-poor grazed damp pasture	Lower	Rush pasture listed as a national BAP priority
Fauna		

Feature	Value	Legislative status and National / Local Conservation Status
Otter	High	<ul style="list-style-type: none"> Wildlife and Countryside Act 1981 Conservation Regulations 1994 UK BAP priority – Action Plan prepared
Badger	Lower	<ul style="list-style-type: none"> Protection of badgers Act 1992 Wildlife and Countryside Act 1981
Farmland breeding and wintering bird assemblage	Lower	<ul style="list-style-type: none"> Nests and eggs - Wildlife and Countryside Act 1981 Action plans for the following UK BAP priority species have been prepared: Cirl bunting; Skylark; Linnet; Grey partridge; Bullfinch; Song thrush
Cirl bunting	High	<ul style="list-style-type: none"> Specially protected - Schedule 1 Wildlife and Countryside Act 1981 Devon BAP priority – entire UK population confined to S Devon UK BAP priority and Action Plan Specially protected Schedule 1 Wildlife and Countryside Act 1981
Barn owl	High	<ul style="list-style-type: none"> Devon BAP priority Specially protected - Schedule 1 Wildlife and Countryside Act 1981; Devon and National BAP priority
Kingfisher	High	<ul style="list-style-type: none"> Specially protected - Schedule 1 Wildlife and Countryside Act 1981; National BAP priority
Reptiles	Lower	<ul style="list-style-type: none"> All 'widespread and abundant' British reptiles protected from intentional killing and injuring under the Wildlife and Countryside Act 1981.
Great crested newt	Very High	<ul style="list-style-type: none"> Wildlife and Countryside Act 1981 Conservation Regulations 1994 UK BAP priority – Action Plan prepared
General bat assemblage	Medium	<ul style="list-style-type: none"> British bats and their roosts are fully protected under Schedule 5(9) of the WCA 1981 and the Schedule 2 of the Conservation Regulations 1994. Pipistrelle bats (both <i>P. pipistrellus</i> and <i>P. pygmaeus</i>) are subject to a UK BAP Species Action Plan.
Horseshoe bats (in particular Lesser horseshoe bat)	Very High	<ul style="list-style-type: none"> The two species of horseshoe bat present on the eastern corridor are listed on Annexe II of the EC Habitats and Species Directive which enables Special Areas of Conservation to be designated for the protection of important local populations. These species (together with Barbastelle and Bechstein's bat) are accorded high priority by English Nature during consultations on planning applications. Greater horseshoe bat is listed on the Devon BAP (found in very low numbers in survey) Both Greater and Lesser horseshoe bats are subject to UK BAP Species Actions Plans (found in high numbers during survey)
Atlantic salmon	Very high	<ul style="list-style-type: none"> Conservation Regulations 1994 National BAP (long list) Devon BAP priority species
Bullhead	Very high	<ul style="list-style-type: none"> Conservation Regulations 1994 National BAP (long list)
Brook lamprey	Very high	<ul style="list-style-type: none"> Conservation Regulations 1994 National BAP (long list)

9.5 Mitigation and Compensatory Measures

9.5.1 This section describes the mitigation and compensation measures included within the Scheme. Site-specific details are shown on Figures 9.7a to 9.7f in Volume 3. Key principles adopted are as follows:

- To retain key features of nature conservation interest wherever possible, in particular veteran trees and the most species-rich sections of hedge
- To maintain habitat connectivity wherever possible
- To take all appropriate measures to ensure that populations of key fauna such as Bats, Badger and Otter are maintained at or close to pre-Scheme levels
- To maintain levels of principal habitats, such as grassland, wetland, hedges and scrub, as close as possible to existing levels, post construction, by strategic planting and habitat creation
- To provide mitigation wherever key habitats would be lost to the Scheme, for example, to provide replacement bat roosts in suitable locations
- To encourage continuation of existing site management patterns, in particular grazing, as far is practicable
- To pursue offsite habitat management and enhancement where possible, via management agreements with local landowners and tenant farmers

Habitats

9.5.2 Trees and hedges would be retained wherever possible. Where retained trees lie close to works, a protection zone of adequate size would be retained around their bases to minimise risk of root damage from plant / stockpiling of spoil etc. Felled trunks and limbs would be stacked as 'habitat piles'. Where hedges occur within retained landscape areas, these would be subject to a less intensive management regime than at present. Devon County and Torbay Councils are committed to negotiating agreements with local landowners involving new hedge planting and a low-key approach to (offline) management. Where consistent with health and safety requirements, ring-bark trees such as Sycamore, and allow to develop standing deadwood.

9.5.3 To compensate for loss of habitat at the eastern end of Kerswell Down Wood CWS, a small privately-owned woodland north of Churchway Lane (referred to elsewhere in this ES as the 'exchanged Kerswell Down Common land') would be transferred into the ownership of the Parish Council and public access secured northwards onto Kerswell Down.

9.5.4 Compensation for loss of hedges and woodland would be achieved via landscape planting using native (ideally local provenance) species and translocation of the most species-rich stretches of hedge.

9.5.5 Loss of grassland along the Scheme corridor would be compensated for via grassland creation on embankments and verges, based wherever possible on a 'nurse' mix of limited competitive ability to help stabilise newly established (nutrient-poor) soil, but not so vigorous as to out-compete colonising herbs. Verges and earthworks would be micro-landscaped locally, allowing water to collect and assist development of a more diverse flora (Ramsay, 1993).

9.5.6 Scheme design minimises land take and loss of wetland habitat at Edginswell and Ford Fields CWS's as far as is possible; the retained wetland at Edginswell would be extended as shown on Figures 9.7e and 9.7f and access for stock would be provided from Yon Street. A conservation management plan would be compiled. The track

and site compound at Ford Fields CWS would be reinstated and enhanced following construction.

- 9.5.7 Discharge of highway drainage into Aller Brook and Edginswell Stream would be via a series of full bypass interceptors and attenuation ponds (details in Chapter 11 Water Quality and Drainage).

Fauna

Badger

- 9.5.8 Badger tunnels would be installed at two points to enable continued use of foraging area east of the Scheme, whilst reducing the risk of road casualties. Guide fences would direct animals toward tunnel entrances. Three setts are present close to or along the Scheme; if these were still active prior to construction, they would be excluded and closed under English Nature licence. An artificial sett may be required within existing territory, depending on patterns of habitat-use prior to construction.

Otter

- 9.5.9 A tunnel and Otter guide fencing is included in the Scheme design at Aller Junction, as the culverts here would run full at peak flow, forcing Otter to cross the road rather than use the watercourse to move through the catchment. The alternative tunnel would be constructed adjacent and parallel to, but slightly higher than the culverts, to facilitate Otter passage. Planting would be undertaken to compensate for loss of Otter lying-up habitat along watercourses.

Bats

- 9.5.10 Mitigation would ensure that bats can continue to commute and forage in optimal habitat and would reduce the risk of road traffic mortality as far as possible. The use of culverts, strategic planting, temporary low level lighting and back-shielded street lamp design should ensure that bats, in particular Lesser horseshoe bats, could continue to safely cross the line of the road to access feeding habitat in the valley base. Five culverts would be installed along known Lesser horseshoe bat flight routes at Edginswell; entrances would be planted at an early stage using fast-growing species to help guide bats in, and low-level lighting would be used locally to minimise risk of bats over-flying entrances and onto the carriageway. Road lighting utilises back shields to reduce light spill into adjacent feeding habitat at Edginswell and Aller Junctions.
- 9.5.11 In the longer term, planting would be allowed to grow dense and tall in the vicinity of the main bat crossing points between Aller and Edginswell. This would encourage species that are less likely to use culverts to fly up and over the road, reducing risk of traffic collisions.
- 9.5.12 Wherever possible, new culverts would incorporate cavities to provide additional roost opportunities for 'crevice dwelling' species. Culvert soffits would be finished with an exposed aggregate to provide rough surfaces favoured by free hanging horseshoe bats. Where there is a potential for culverts to flood, surfaces would be of smooth concrete and joints would be in-filled to prevent bat ingress.
- 9.5.13 No planting is proposed within 3-4m of the carriageway edge, to discourage Lesser horseshoe bats from foraging nearby, and thereby attempting to cross and risk colliding with traffic.
- 9.5.14 Devon County Council is committed to ensuring that cattle grazing continues on the remainder of its land holdings, in order to benefit wildlife, in particular bats.
- 9.5.15 All trees and the existing underbridge at Edginswell would be resurveyed for bats prior to the Scheme proceeding and trees with potential to support bats (where these

would either be felled or affected by lighting or noise disturbance) would be subject to inspection by a qualified and licensed bat worker *via* a tree access survey. Additional emergence and swarming survey would be undertaken where necessary. If bats are confirmed in a tree, it would constitute a 'roost' and a license from the appropriate authority (presently the Department of Environment, Food and Rural Affairs - DEFRA) would be obtained prior to such works being carried out.⁴

- 9.5.16 Prior to demolition of house roosts, a formal 'exclusion' would be required under appropriate licence and in accordance with a detailed 'method statement'. Techniques are dependent on the nature of the building, status of the roost and species present, and are described in Mitchell-Jones (2004). Purpose-built replacement roosts would be provided to compensate for loss of building roosts⁵. These would include a crevice-type roost for Pipistrelle bats, as well as a purpose-built structure for species such as Long-eared and Horseshoe bats close to known commuting routes and foraging habitat as shown on Figure 9.7c. All such works would be in accordance with best practice recommendations in the Bat Mitigation Guidelines (Mitchell-Jones, 2004).
- 9.5.17 Bat boxes would be offered to landowners of woodland and hedges with hedgerow trees away from the line of the Scheme, as compensatory roost sites. Boxes would be subject to periodic long-term checking and maintenance.
- 9.5.18 Devon County Council and Torbay Council are committed to working closely with local landowners to secure an early habitat enhancement strategy for bats *via* land management agreements.

Birds

- 9.5.19 Careful timing of vegetation clearance and construction would minimise potential disturbance to nesting birds and avoid damaging nest sites in contravention of the WCA. Major habitat clearance would be undertaken outside the breeding season (March-August inclusive). Clearance of Cirl bunting breeding habitat at Maddacombe would take place outside early March to end September, inclusive.
- 9.5.20 Kingfisher nest habitat comprising steep earth banks would be incorporated in the new section of replacement watercourse at Aller Junction as shown on Figure 9.7b. Landscape planting on the embankments at this location would in the long term encourage birds to fly up and over the carriageway.
- 9.5.21 Devon County and Torbay Councils are committed to working with local landowners to secure early habitat enhancements for Cirl bunting. In this regard, work commenced to enhance Cirl bunting habitat during May 2004, when two parcels of land were ploughed and cultivated under the guidance of the County Ecologist at Manor Farm, at Aller. Under this programme, one field was experimentally sown with Spring barley and another with Spring barley, Quinoa and Linseed. A permanent grass margin was retained around the crops, which would be left to over-winter. Future agreements would be sought in order to enhance areas of farmland habitat adjacent to existing Cirl bunting territory in areas where the 2002-03 survey work showed the species to be absent as a result of the presently sub-optimal habitat. Techniques would follow those successfully used during agri-environment schemes aimed at enhancing farmland biodiversity, such as Countryside Stewardship (see Peach *et al*, 2001).

Reptiles and Amphibians

⁴ At present, a full planning consent is required, prior to submitting the application for a licence from the Department of Environment, Food and Rural Affairs.

⁵ Day roosts for small numbers of Pipistrelle and Long-eared bat; seasonal night roosts for very small numbers of Lesser horseshoe (and one Greater horseshoe bat)

- 9.5.22 New verges and embankments would be enhanced for reptiles by inclusion of hibernacula and basking sites.
- 9.5.23 All species of reptile likely to occur in the Study Area are protected under the Wildlife and Countryside Act 1981 and there is an implied duty on developers to take 'reasonable' steps to avoid intentional killing and injury. Loss of key verges would be supervised by an ecologist with experience in reptile handling, in particular of the poisonous species Adder. Trapping and translocation from 'hotspots' (i.e. at Edginswell and Ford Fields) and on some road verges and field edges would also be undertaken.
- 9.5.24 A trapping and translocation programme for Great crested newt would be undertaken at Ford Fields prior to construction of the compound, access track and culvert, in accordance with existing good practice as outlined in DMRB Volume 10, Section 4, part 6. A license from the appropriate authority (presently DEFRA) would be obtained prior to works commencing, and suitable mitigation in the form of pond and hibernacula construction would be implemented at an early stage.

Fish

- 9.5.25 A new channel would be excavated at Aller Junction to offset habitat degradation and loss of a section of Aller Brook. The new feature would be constructed whilst the existing channel is still fully functioning and would comprise unlined earth banks and bed, as the existing soils would have varying erosion rates and this approach would allow development of a suitable substrate. New gravel of a suitable size distribution (average 30mm) would be imported if required, prior to the existing channel being blocked. New channels would also be created at Daccabridge and at Manor Gardens, as shown on Figures 9.7d and 9.7e, would include measures to allow passage of migratory fish, as well as meanders and pools.
- 9.5.26 The old stream channel at Aller Junction would be electro-fished to ensure complete fish removal. Where possible operations would be timed to avoid the most sensitive stages of lifecycles of valued species (a late summer fish removal would ensure that spawning and migration behaviour is not compromised). New channel banks would be sympathetically planted with native species and excavated to ensure that a natural channel form may develop.

Pre-construction Surveys

- 9.5.27 Pre-construction surveys are likely to include those items listed in Table 9.9 below.

Table 9.3 Pre-construction Surveys

Species	Survey type	Purpose
Badger	<ul style="list-style-type: none"> Detailed area survey to re-establish current sett status and activity patterns. 	<ul style="list-style-type: none"> To provide sufficient detail for English Nature exclusion and closure licence To establish exact location of badger tunnels and extent of fencing To establish whether artificial sett is required
Great crested newt	<ul style="list-style-type: none"> Bottle trapping and torch surveys of nearby ponds 	<ul style="list-style-type: none"> To establish conservation status prior to application for license to undertake trapping and translocation
Bats	<ul style="list-style-type: none"> Repeat 'risk assessment' of trees for potential bat roosts and undertake. 'Climb and inspect' surveys to visually inspect crevices and holes in trees. Endoscope inspection of Edginswell bridge. Building surveys – interior and emergence – prior to obtaining appropriate licence to exclude bats and undertake demolition. Tree emergence/swarming surveys to support above, as required. Habitat surveys to determine which hedges used as crossing points by bats and which therefore require special mitigation 	<ul style="list-style-type: none"> Establish roost sites and provide sufficient data to support licence application to appropriate authority.

Maintenance and Management of Landscaping and Habitat Creation Works

9.5.28 All proposed landscape planting and habitat creation works require follow-up management and maintenance. Habitat creation, such as the planting schemes proposed at the entrances to bat culverts, would require trimming or possibly laying as part of normal agricultural operations. Early agreement with landowners would be sought. Devon County and Torbay Councils are committed to ensuring sensitive long-term maintenance of the existing pattern of land use, in particular at the southern end of the corridor (i.e. grazing with appropriate stock).

Monitoring

9.5.29 Monitoring would enable appraisal of whether the mitigation strategy has succeeded, and would allow refinement. Table 9.4 lists proposed monitoring works.

Table 9.4 Post Construction Monitoring

Taxa	Method	Purpose
Lesser horseshoe bat	<ul style="list-style-type: none"> • Detector surveys at tunnel entrances • Mortality counts on road • Possibly limited radio tracking 	<ul style="list-style-type: none"> • Determine whether bats using culverts and effectiveness of planting/lighting. • Confirm patterns of habitat use are continuing. • Determine whether additional planting / other measures required.
Bats (general)	<ul style="list-style-type: none"> • Inspection of all new roosts (including culverts) for presence of bats • Maintenance and monitoring of bat boxes – ongoing • Mortality counts on road • Fixed point counts with bat detectors 	<ul style="list-style-type: none"> • Determine whether bats using new roosts. • - Monitor effectiveness of other crossing mitigation elements (i.e. high slung wires and tree / mesh screens)
Badger	<ul style="list-style-type: none"> • Mortality counts on road • Condition of fencing 	<ul style="list-style-type: none"> • Determine whether additional fencing required.
Otter	<ul style="list-style-type: none"> • Survey key sections for spraints (droppings) 	<ul style="list-style-type: none"> • Determine whether Otter are using the Aller tunnel and whether modifications required.
Cirl bunting	<ul style="list-style-type: none"> • Monitor effectiveness of offline habitat management scheme and review programme • Monitor Cirl bunting populations and whether CB moved into new habitats 	<ul style="list-style-type: none"> • Determine whether programme is adequate or whether additional work required / fine tuning of programme needed.
Great crested newt	<ul style="list-style-type: none"> • Bottle trapping and torchlight survey 	<ul style="list-style-type: none"> • Determine whether newly created ponds habitat being colonised
Fish – Salmon, Lamprey and Bullhead	<ul style="list-style-type: none"> • Electro-fishing 	<ul style="list-style-type: none"> • Determine whether programme adequate or whether additional work required / changes to programme needed.
Aquatic macro invertebrates	<ul style="list-style-type: none"> • BMWP sampling downstream of discharge points 	<ul style="list-style-type: none"> • Determine whether measures incorporated within the design are maintaining existing water quality.

9.6 Environmental Impacts and Effects

9.6.1 Summary tables showing mitigation, impacts and an overall appraisal of effects for each ecological receptor is shown at the end of this section (Table 9.5 - During Construction Phase and Table 9.6 - Operational Phase).

Effects During Construction on Habitats

General

9.6.2 Permanent land take would result in loss of a number of habitats, in particular hedgerow, woodland and scrub, damp pasture, dry species-poor semi-improved pasture, improved pasture, arable and pockets of species-rich grassland (most of which is on artificial substrate).

Permanent land take would result in loss of a number of habitats, in particular hedgerow, woodland and scrub, damp pasture, dry species-poor semi-improved pasture, improved pasture, arable and pockets of species-rich grassland (most of which is on artificial substrate).

Arable

- 9.6.3 Loss of arable habitat would occur to the north of the Maddacombe Road overbridge. This habitat derives its nature conservation value mainly as a result of its potential value to foraging birds, in particular Cirl bunting. Taking account of the commitment by Devon County and Torbay Councils to pursue early land management agreements involving arable holdings, the impact magnitude after mitigation would be Positive resulting in a **Slight Beneficial** effect.

Grassland

- 9.6.4 A large grassland loss would occur, in particular along the southern section of the Scheme from Maddacombe to Edginswell. At present, most comprises species-poor, semi-improved habitat and mitigation by grassland creation on verges and embankments should provide help replace losses in the long term. Use of infertile subsoil as a planting medium, sowing of a grass nurse crop and profiling the soil surface to create a range of micro-topographical features would help ensure that new verge grasslands eventually develop a substantial species-richness locally. These habitats are of Lower Value overall. Taking account of the extent of land take, the impact magnitude after mitigation would be Major Negative resulting in a **Slight adverse** effect.

Hedgerow and hedgerow trees and woodland

- 9.6.5 A total of 5.5km of hedgerow (which includes some 70 mature trees), as well as pockets of woodland at Kerswell Down and along St Marychurch Road, would be lost during the construction phase. Establishment of some 3.5 km of new and translocated hedges; 15.43 ha of new woodland, woodland edge and scrub planting, with over 100 new specimen trees is proposed. This would help to compensate in part for loss and fragmentation of the field boundary network. However, it is possible to fully compensate for the loss of these mature features within a reasonable time frame. These habitats are of Medium Value overall. Taking account of the extent of land take, the impact magnitude after mitigation would be Major negative resulting in a **Moderate adverse** effect.

Wetland

- 9.6.6 The Scheme would result in loss of approximately 1ha of wet grassland, fen meadow and possibly a small amount of wet woodland at Edginswell and construction of a compound, access track and flood bund at Ford Fields would directly affect a belt of wet Rush-pasture. Habitat creation is proposed at Edginswell, as well as at Ford Fields. These habitats are of Medium Value. Taking account of the extent of land take affecting these habitats, the impact magnitude after mitigation would be Major negative resulting in a **Moderate adverse** effect.

Riparian

- 9.6.7 The greatest disruption to watercourses would be at Aller, where diversion of approximately 300m of the Aller Brook would occur and over 100m of the brook would be culverted permanently. Minor changes to downstream water quality are expected in the short-term; however, conditions would return to baseline within a few days of diversion. These habitats are of High Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Effects of construction on designated sites

Milber Wood LWS (Site Ref. SX87/144)

9.6.8 Junction realignment would result in loss of 0.02ha of this designated site. Mature trees (including a veteran Oak) and older sections of woodland would be cordoned off to prevent damage. The site is of Lower Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

9.6.9 Torbay Ring Road LWS (Site 13 Torbay Local Plan)
The Scheme would result in land take of 0.6ha of this designated site. The site includes areas of rich grassland stands. The site is of Lower Value. Taking account of the extent of land take the impact magnitude would be Intermediate negative resulting in a **Slight adverse** effect.

Ford Fields CWS (Site Ref. SX86/091)

9.6.10 Work at Ford Fields would comprise a narrow belt of planting along the western base of the railway embankment and construction of a flood bund/culvert and associated site compound at the extreme north-eastern corner and access track from the west. Works would commence outside the breeding season and the compound and track would be situated so as to avoid areas of valuable wetland. Adjacent wetland would be cordoned off. Landscape planting would be matched to existing habitats. The compound and access track would be restored to wetland following completion of site works. The site is of Medium Value. The impact magnitude after mitigation would be Intermediate negative resulting in a **Moderate adverse** effect.

Aller Bridge pCWS (Site Ref. SX86/073)

9.6.11 Permanent land-take here would be high and mitigation would comprise landscape planting. The site is of Medium Value. Taking account of the extent of land take the magnitude of impact after mitigation would be Major negative resulting in a **Moderate adverse** effect.

Kerswell Down and Whilborough Common CWS (Site Ref. SX86/065)

9.6.12 Some 0.93ha of habitat would be lost to land-take at the eastern end. Woodland planting is proposed as mitigation. Sensitive habitat would be cordoned off. The site is of Medium Value. Taking account of the extent of land take the impact magnitude after mitigation would be Intermediate negative resulting in a **Moderate adverse** effect.

Yannon Lane Fields CWS (Site Ref. SX86/092)

9.6.13 Approximately one third of this site would be lost to the Scheme. In light of a commitment by Devon County Council and Torbay Council to secure early land management agreements to benefit Cirl bunting, and in view of the apparent unsuitability of this site for this species at present, the site is of Lower Value. The impact magnitude after mitigation would be Positive resulting in a **Slight Beneficial** effect.

Manor House and Manor House Fields pCWS (Site Ref. SX86/161 and SX86/063)

9.6.14 The 2002 survey indicated that floristic interest was still present in SX86/161, where a complex of scrub and rank grassland supports large numbers of Pyramidal orchid over a limestone substrate. This area would be retained and the habitat would be cordoned off. The western section of the main field (SX86/063) is of lower floristic value and a total of 1.75ha would be lost. Compensation is by grassland creation

alongside the new Scheme. These sites are of Medium Value. The impact magnitude after mitigation would be Intermediate negative resulting in a **Moderate adverse** effect.

Kerswell Down Hill Fields pCWS (Site Ref. SX86/162)

- 9.6.15 Intensive horse grazing and improvement has reduced the floristic interest at in this complex of fields to a small zone of approximately 15m² of unimproved calcareous grassland at the eastern end. A total of 0.53ha would be lost, including the small section of unimproved pasture and part of a small former orchard north of Churchway Lane. The species-rich sward would be cut in late summer and the cut material spread onto a calcareous section of new embankment. The remainder of the orchard would be cordoned off. This site is of Lower Value. The impact magnitude after mitigation would be Intermediate negative resulting in a **Slight adverse** effect.

Edginswell Farm CWS (Site Ref. SX86/068)

- 9.6.16 Scheme design includes creation and management of new wetland. Continued stock access would maintain vegetation structure and enhancements to the retained land would be undertaken in line with a conservation management plan. Nearby sensitive habitat would be cordoned off. This site is of Medium Value. The impact magnitude after mitigation would be Intermediate negative resulting in a **Moderate adverse** effect.

Effects of Construction on Fauna

Badger

- 9.6.17 Four small Badger setts lie on or very close to the Scheme and may require exclusion and licensed removal to avoid killing and injuring animals. Losses to the Badger social group would be minimal, as there are numerous opportunities nearby for new sett excavation. The Badger is assessed as Lower Value in terms of its nature conservation importance. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Otter

- 9.6.18 There may be a minor impact during the construction phase, in the form of noise disruption to animals lying-up in cover. There may be local, small-scale and short-term losses of lying-up habitat along Edginswell Stream (scrub and wet woodland), but planting would be undertaken in compensation. The Otter is assessed as High Value in terms of its nature conservation value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Bats

- 9.6.19 Land take, in particular at Edginswell, would result in a substantial and sudden loss of foraging habitat for all bat species, in particular for Lesser horseshoe bat, for which the wetland at Edginswell is especially important. Loss of flight routes, roost sites and foraging habitat would affect bats along the length of the Scheme, although mainly in the section from Aller to Edginswell.

- 9.6.20 Demolition of building roosts would require replacement roost provision in suitable locations, prior to obtaining a licence from the appropriate authority (DEFRA). Replacement roosts would be constructed in advance of licensed exclusion and demolition.

- 9.6.21 Bats are vulnerable to killing and injury during tree felling and pruning, and loss of roost sites may have a negative effect on local bat populations. Potential roost sites in trees would be inspected during a 'climb and inspect' survey, prior to construction

works commencing and best-practice exclusion and felling principles would be adopted, under licence if required. Mitigation for loss of tree roosts is based on installation of a large-scale bat box scheme prior to construction.

- 9.6.22 Devon County and Torbay Council are committed to pursuing conservation management for bats via land management agreements in advance of works. Notwithstanding this, it would not be possible to fully compensate for loss of such a large amount of foraging habitat and for loss of so many potential tree roost sites. The bat assemblage is assessed as Very High Value. The impact magnitude is anticipated to be Intermediate negative resulting in a **Large adverse** effect.

Bird Assemblage – General

- 9.6.23 During-construction effects are likely to be connected with disturbance (primarily noise and visual) and habitat loss as a result of land take. Effects would depend largely on timing of operations, availability of suitable foraging habitat elsewhere, regularity of impact (temporal and spatial) and 'tolerance' of individual species. Small passerines, including those of conservation concern such as Yellowhammer and Linnet, are likely to be most tolerant, as their distribution appears to be solely due to food availability (mainly field edges and ditches), and cover (scrub and trees). The effect of habitat loss and of severing existing breeding territories is unclear for most species, with the possible exception of Cirl bunting, which has been dealt with below. It is likely that slight declines may occur in species dependent on open grassland, such as Skylark and Grey partridge, and woodland (woodpeckers; nuthatch; tree-creeper etc).

- 9.6.24 Careful timing of construction would minimise disturbance to nesting birds and avoid damaging nest sites in contravention of the WCA. The commitment by Devon County and Torbay Councils to securing early land management agreements for Cirl bunting would also benefit other birds, helping to offset losses to land take. A bird box scheme would be pursued at an early stage, in conjunction with the bat box scheme. The bird assemblage is assessed as Lower Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Birds – Wildlife and Countryside Act Schedule 1 taxa

- 9.6.25 Land take would result in the loss and fragmentation of at least half the known Cirl bunting habitat within the Scheme corridor. The species is especially sensitive to timing of vegetation clearance, particularly between early March and the end of September. Mitigation is, therefore, based in part on careful timing of works, with habitat clearance in known breeding territories timed to take place outside this critical period. Habitat loss would have a negative effect on Cirl bunting breeding and foraging, as birds are displaced into less suitable habitat nearby. The sedentary nature of the species may result in birds being reluctant to colonise alternative habitats and the area may be abandoned altogether. Devon County Council and Torbay Council are committed to pursuing conservation management via landowner agreements well in advance of works, in order to improve offline habitat quality. Cirl bunting is assessed as High Value. Given this provision of alternative high-quality habitat nearby, the impact magnitude is Minor negative resulting in a **Slight adverse** effect.
- 9.6.26 In view of the loss of potential foraging habitat for small numbers of Barn owl, the impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.
- 9.6.27 Breeding Kingfisher were not recorded and no constraints on works timing are envisaged. Some noise disturbance may occur during construction, but these effects would be short term. The Kingfisher is assessed as High Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Reptiles and Amphibians

- 9.6.28 Reptiles are vulnerable primarily to killing and injuring during construction. Loss of habitat would be supervised and a trapping and translocation programme carried out in important reptile habitat. Habitat within the corridor would be enhanced wherever possible by creation of hibernacula and basking sites. Reptiles are assessed as Lower Value. The impact magnitude after mitigation would be minor negative resulting in a **Slight adverse** effect.
- 9.6.29 Great crested newts using terrestrial habitat in Ford Fields are vulnerable to killing and injuring during the construction phase. Trapping and translocation would remove animals from affected areas in the Ford Fields CWS, minimising risk as far as possible to individuals of this European protected species. The Great crested newt is assessed as Very High Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

Fish and Aquatic Invertebrates

- 9.6.30 The mitigation strategy would ensure that loss of sections of the Aller Brook during construction would not result in fish death and emigration, overcrowding stress within receiving habitat or habitat fragmentation and would ensure that migration of Atlantic salmon could continue during the construction phase. Impact on aquatic invertebrates would be highly localised and the new channel is expected to develop a natural assemblage fairly quickly following flow establishment. The fish and aquatic invertebrates are assessed as Very High Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

General Summary

- 9.6.31 Table 9.5 below shows the overall significance of effects for key ecological features (ecological receptors) during the construction phase of the project. Each feature is followed by its assigned value, then by predicted impacts for each and details of proposed mitigation. The final column gives an assessment of effect.

Table 9.5 Significance of Effects for Ecological Features – During Construction Phase

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Habitats					
Arable habitats	<u>Lower</u> <i>(assigned mainly on account of local significance for wintering and breeding Cirl bunting)</i>	<ul style="list-style-type: none"> Loss of habitat confined to northern end of Scheme 	<ul style="list-style-type: none"> Devon County Council and Torbay Council committed to early securing management of field margins/ boundary features under management agreement 	<u>Positive</u>	<u>Slight Beneficial</u>
Grassland including species-poor semi-improved; species-rich of anthropogenic origin; species-rich unimproved (very small pockets only)	<u>Lower</u>	<ul style="list-style-type: none"> Land take resulting in loss of grassland habitat along Scheme 	<ul style="list-style-type: none"> New grassland establishment Spreading of cut calcareous material 	<u>Major Negative</u>	<u>Slight Adverse</u>
Hedges and hedgerow trees, woodland and scrub	<u>Medium</u>	<ul style="list-style-type: none"> Land take - loss of hedges and hedgerow trees Land take resulting in loss of small area of woodland along Maddacombe Road Ring barking selected trees to create standing dead wood of value to decomposers Create habitat piles in hedge bases and on embankments 	<ul style="list-style-type: none"> Hedgerow and woodland planting on embankments and along Scheme corridor 	<u>Major Negative</u>	<u>Moderate Adverse</u>
Wet pastures and fen meadow	<u>Medium</u>	<ul style="list-style-type: none"> Land take resulting in loss of approximately one ha of this habitat in the Edginswell area and small pockets elsewhere 	<ul style="list-style-type: none"> Wetland creation and habitat enhancements 	<u>Major Negative</u>	<u>Moderate Adverse</u>
Riparian	<u>High</u>	<ul style="list-style-type: none"> Habitat loss Aller Brook diversion Habitat degradation and fragmentation (diversion, bypass channels and loss of wetland, increased impermeable surfaces) Possible pollution 	<ul style="list-style-type: none"> New channel would replicate natural habitat New channel at Daccabridge designed to take flood flows and allow passage of larger fish. Existing channel would remain wet (low flows) 	<u>Minor Negative</u>	<u>Slight Adverse</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
			<ul style="list-style-type: none"> New channel designed to take flood flows and allow passage of fish at Manor Gardens. New spawning and resting areas. Existing channel would remain wet Attenuation ponds and full bypass interceptors at strategic locations 		
Designated and potential sites					
Milber Wood LWS	<u>Lower</u>	<ul style="list-style-type: none"> Loss of 0.02ha along northern boundary 	<ul style="list-style-type: none"> Cordoning off to prevent plant access to main body of LWS 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Torbay Ring Road LWS	<u>Lower</u>	<ul style="list-style-type: none"> Loss of 0.6ha of verge on N side 	<ul style="list-style-type: none"> Design to minimise habitat loss as far as possible 	<u>Intermediate Negative</u>	<u>Slight Adverse</u>
Ford Fields CWS SX86/091	<u>Medium</u>	<ul style="list-style-type: none"> Planting up in CWS – small loss of grassland Site compound and access track at northern end, to facilitate culvert and flood bund construction - possible loss of approximately 0.5ha of Rush-pasture 	<ul style="list-style-type: none"> Planting to be compatible with local habitat type Sensitive landscape planting of open grassland on eastern boundary; construction of small flood bund in extreme northern corner Careful location of compound and access track to minimise effects on wetland Restoration to wetland 	<u>Intermediate Negative</u>	<u>Moderate Adverse</u>
Aller Bridge pCWS SX86/073	<u>Medium</u>	<ul style="list-style-type: none"> Land take - most of pCWS under junction at Aller. However, a large section of the site at the southern end has been improved. 	<ul style="list-style-type: none"> Scrub / woodland and grassland establishment elsewhere on the Scheme 	<u>Major Negative</u>	<u>Moderate Adverse</u>
Yannon Lane Fields CWS SX86/092	<u>Lower</u> <i>(the CWS presently appears to be outside known Cirl bunting breeding territory)</i>	<ul style="list-style-type: none"> Loss of approximately one third of arable site (boundaries under revision at time of writing to more accurately reflect possible Cirl bunting habitat) 	<ul style="list-style-type: none"> Devon County Council and Torbay Council are committed to pursuing early landowner agreements to manage adjacent arable habitats sensitively (some work already underway at Aller) 	<u>Positive</u>	<u>Slight Beneficial</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Manor House and Manor House Fields pCWSs SX86/063 and SX86/161	<u>Medium</u>	<ul style="list-style-type: none"> Land take of semi-improved grasslands 	<ul style="list-style-type: none"> Avoid most species-rich area (SX86/161) in design Cordon SX86/161 from plant access 	<u>Intermediate negative</u>	<u>Moderate Adverse</u>
Kerswell Down and Whilborough Common CWS SX86/065	<u>Medium</u>	<ul style="list-style-type: none"> Land take - around 1ha of secondary woodland and scrub at eastern end of CWS 	<ul style="list-style-type: none"> Early purchase of replacement 'common land' gifted to Parish Council (off Churchway Lane) Scrub / woodland planting in close proximity 	<u>Intermediate Negative</u>	<u>Moderate Adverse</u>
Kerswell Down Hill Fields SX86/162	<u>Lower</u>	<ul style="list-style-type: none"> Loss of c1ha of grassland at eastern end of pCWS complex 	<ul style="list-style-type: none"> Cut most species-rich sward and spread on appropriate section of new embankment Cordon remainder of site to prevent plant and personnel access 	<u>Intermediate Negative</u>	<u>Slight Adverse</u>
Edginswell Farm CWS SX86/068					
Fauna					
Badger	<u>Lower</u>	<ul style="list-style-type: none"> Severing territory and reduction of potential foraging area Risk of road kill Risk of killing animals in setts during construction 	<ul style="list-style-type: none"> Possible artificial sett construction (following pre-construction survey) Use of tunnels and fencing in strategic areas Licensed exclusion and sett removal 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Otter	<u>High</u>	<ul style="list-style-type: none"> Risk of road kill to otters crossing roads at times of flood Habitat loss 	<ul style="list-style-type: none"> Use of tunnel at Aller to ensure continued movement along watercourses; habitat establishment along watercourse at Edginswell and Aller 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Bats (in particular Lesser horseshoe bat)	<u>Very High</u>	<ul style="list-style-type: none"> Land take – loss of important feeding habitat at Edginswell (Lesser horseshoe) Physical severance of flight routes Loss of roosts in built structures Potential loss of tree roosts 	<ul style="list-style-type: none"> Use of temporary netting to guide LHS bats across the road at key points Wetland habitat creation at Edginswell 	<u>Intermediate Negative</u>	<u>Large Adverse</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
			<ul style="list-style-type: none"> • New roosts to replace those to be lost • Climb-and-inspect survey of trees • Re-survey of bridge at Edginswell and all building roosts and preparation of detailed mitigation method statements • Bat box scheme to replace tree roosts • Devon County Council and Torbay Council committed to reaching agreements with local landowners in advance in order to secure sensitive land management and substantially improve offline habitat for bats 		
Cirl bunting	<u>High</u>	<ul style="list-style-type: none"> • Long term loss of breeding and wintering habitat • Destruction of nest sites • Fragmentation of nest sites from quality feeding areas • Sensitivity to disturbance in nesting season 	<ul style="list-style-type: none"> • Timing of works to avoid breeding season • Devon County Council and Torbay Council committed to reaching agreements with local landowners well in advance of work in order to secure sensitive land management and substantially improve offline habitat for Cirl bunting. To this end, enhancement work commenced in May 2004 on land at Manor Farm, Aller Bridge 	<u>Minor Negative</u> - based on implementation of sensitive land management agreements. Without this, impact magnitude increases to Major Negative	<u>Slight Adverse</u> - based on implementation of sensitive land management. Without this, the overall score increases to Very Large Adverse
Barn Owl	<u>High</u>	<ul style="list-style-type: none"> • Owls are known to occur occasionally in the area; only one was recorded during surveys in 2002/04. 	<ul style="list-style-type: none"> • None proposed 	<u>Minor negative</u>	<u>Slight Adverse</u>
Kingfisher	<u>High</u>	<ul style="list-style-type: none"> • Land take during culverting of Aller Brook would result in loss of 100m section of foraging habitat • Possible short term noise disturbance 	<ul style="list-style-type: none"> • Creation of earth bank nest sites 	<u>Minor Negative</u>	<u>Slight Adverse</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Bird assemblage (general)	<u>Lower</u>	<ul style="list-style-type: none"> • Land take - loss of some feeding and displaying bird habitat • Damage or destruction of nest sites • Short-term noise disturbance 	<ul style="list-style-type: none"> • Devon County Council and Torbay Council committed to reaching agreements with local landowners well in advance of work in order to secure sensitive land management and substantially improve offline habitat for Cirl bunting – this should benefit other species • Main habitat clearance outside breeding season 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Reptiles	<u>Lower</u>	<ul style="list-style-type: none"> • Land take – loss of field edge and grassy banks of value to Common lizard and Slow worm. Loss of wet habitats at Edginswell of value to Grass snake • Potential for killing and injuring during construction 	<ul style="list-style-type: none"> • Habitat creation along new embankments and verges • Translocation from key areas 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Great crested newt	<u>Very High</u>	<ul style="list-style-type: none"> • Short and long term loss of terrestrial habitat (at Ford Fields) • Risk of killing and injuring animals during construction 	<ul style="list-style-type: none"> • Trapping and translocation 	<u>Minor negative</u>	<u>Slight Adverse</u>
Fish (Salmon, Lamprey and Bullhead) and aquatic invertebrates	<u>Very high</u>	<ul style="list-style-type: none"> • Habitat loss (100m of Aller Brook at northern culvert) • Habitat degradation and fragmentation (bypass channels and loss of wetlands, impermeable surfaces) • Pollution of watercourses 	<ul style="list-style-type: none"> • Aller – construct new channel prior to electro-fishing old channel and translocation • Time fish removal and construction operations to occur in late summer • New channel to replicate old habitat • Fish traverses and pools will allow passage of migratory fish • Create flood and sediment storage areas to minimise pollution risk • Direct surface water to balancing ponds and soakaways • Adopt best site-working practice with EA before works commence 	<u>Minor Negative</u>	<u>Slight Adverse</u>

Effects During Operation on Habitats

Arable

- 9.6.32 Securing early landowner agreement and implementation of sensitive management should more than offset losses of arable habitat. This habitat is of Lower Value. The impact magnitude after mitigation would be Positive resulting in a **Slight Beneficial** effect.

Grasslands

- 9.6.33 New verge and embankment grasslands are expected to develop a substantial species-richness locally, as a result of use of infertile sub-soil and sowing with a 'nurse' crop. This habitat is of Lower Value. The impact magnitude after mitigation would be Neutral resulting in a long term **Neutral** effect.

Hedges, Trees and Woodland

- 9.6.34 Translocation of the richest sections of hedge and planting of new scrub/woodland would help compensate, in part, for loss and fragmentation of the field boundary network. However, it would not be possible to fully compensate for these long-established habitats, however, in particular for loss of mature trees. These habitats are of Medium Value. The impact magnitude after mitigation would be Major negative resulting in a **Moderate adverse** effect.

Wetlands

- 9.6.35 Habitat creation in the Edginswell area and sensitive management under the guidance of a management plan would assist in ameliorating the main negative impact of habitat loss on this section of wetland.
- 9.6.36 The increased area of impermeable surface may potentially disrupt local hydrology, and may affect base flows and thus affect the local water table. This may alter ecological integrity of wetland ecosystems, possibly resulting in changes to invertebrate biomass with consequent effects on predators such as bats. There may also be negative effects on ecological integrity of watercourses, as a result of changes to base flows, alterations in bank profiles, stream vegetation, invertebrate assemblages and fish communities. Calculations carried out during the baseline hydrological studies indicate, however, that existing winter flooding of damp grassland, for example at Edginswell, would continue as at present, and it is predicted that the ecological characteristics of the wetland communities (including riparian habitats) would remain unaltered.
- 9.6.37 Landscape planting into grassland at Ford Fields north of Aller Junction would not significantly affect the integrity of the wetland habitats, however construction of a site compound, access track and flood bund would effect the integrity of habitats at the northern end of this site. Habitat restoration would be undertaken once operations are complete. Habitat restoration here would include excavation of ponds, as mitigation for the nearby Great crested newt population. The habitats are of Medium Value. The impact magnitude after mitigation would be Intermediate negative resulting in a **Moderate adverse** effect.

Riparian

- 9.6.38 Mitigation works on the Aller Brook and Edginswell Stream Would enable most of the potentially negative effects to be ameliorated. Over 100m of the Aller Brook would however be culverted permanently. These habitats are of High Value. The impact magnitude after mitigation would be Minor negative resulting in a **Slight adverse** effect.

General comments

9.6.39 Pollution from road spray during wet weather, in particular during winter when water may be salt-laden, presents a slight risk to the integrity of (anthropogenic) vegetation communities along verges. Development of a specialist salt-tolerant plant community, dominated for example by native halophyte grass species such as *Puccinellia*, might be viewed as adding to the overall ecological diversity of the site.

9.6.40 The types of plant community present along the road corridor are not considered especially vulnerable to air pollution as a result of NO_x deposition or eutrophication, in the same manner as for example acidic communities such as heath or bog.

Effects of Operation on Designated Sites

Milber Wood LWS (Site Ref. SX87/144)

9.6.41 In view of the very small extent of land take and the proposals to cordon the Scheme would result in a **Slight adverse** effect.

Torbay Ring Road LWS

9.6.42 The site is of Lower Value. The impact magnitude would be Neutral resulting in a **Neutral** effect.

Ford Fields CWS (Site Ref. SX86/091)

9.6.43 The site compound and access track would be restored to wetland following construction. Pond creation (to benefit Great crested newt) would add to the overall habitat complexity and would help compensate for longer-term losses of some stands of wetland to the flood bund. The site is of Lower Value. The impact magnitude would be negative resulting in a Negative resulting in a **Slight adverse** effect.

Aller Bridge pCWS (Site Ref. SX86/073)

9.6.44 In the long term new planting at Aller Junction and development of embankment and verge grasslands would help compensate somewhat for loss of most of this site. The impact magnitude would be Major negative, due to the extent of land take, resulting in a **Moderate adverse** effect.

Yannon Lane Fields CWS (Site Ref. SX86/092)

9.6.45 Following implementation of land management agreements with local landowners to benefit Cirl bunting, Impact magnitude would be Positive resulting in a **Slight Beneficial** effect.

Manor House and Manor House Fields pCWS (Site Ref. SX86/063 and SX86/161)

9.6.46 Development of new embankment grasslands should compensate in part for loss of a section of pCWS SX86/063. SX86/161 would be cordoned off to avoid negative impacts. The site is of Medium Value. The impact magnitude would be Minor negative resulting in a **Slight adverse** effect.

Kerswell Down and Whilborough Common CWS (Site Ref. SX86/065)

9.6.47 In the long term, new planting north and south of Kerswell Down and provision of exchange common land off Churchway Lane would help compensate for loss of around 1ha of this secondary limestone woodland. These sites are of Medium Value. The impact magnitude would be Intermediate negative resulting in a **Moderate adverse** effect.

Kerswell Down Hill Fields (Site Ref. SX86/162)

- 9.6.48 Development of the new embankment grasslands would compensate in part for loss of part of the pCWS, which appears to have been impoverished in the recent past by intensive horse grazing and agricultural improvement. This site is of Lower Value. The impact magnitude would be Minor negative resulting in a **Slight adverse** effect.

Edginswell Farm CWS (Site Ref. SX86/068)

- 9.6.49 Creation of new wetland habitat and sensitive management of the site would maintain vegetation structure on the remaining habitats. This site is of Medium Value. The impact magnitude would be Intermediate negative resulting in a **Moderate adverse** effect.

Effects of Operation on Fauna

Badger

- 9.6.50 The Scheme would sever existing Badger territory and thus may restrict movement of animals from setts on the western side of the Scheme to foraging areas in damper pastures on the valley floor (which may be seasonally important during dry periods).
- 9.6.51 All recorded setts belong to badgers from the same social group and animals excluded from setts along the Scheme corridor would be able to use others within their existing territory. Disused setts would be available for use in the future.
- 9.6.52 Tunnels and fencing would enable Badger to continue to access foraging habitat on the eastern side of the Scheme and would minimise risk of road traffic casualties. Depending on habitat use at the time, an artificial sett may be required in compensation for those setts that would be lost. This species is assessed as Lower Value. The impact magnitude would be Neutral resulting in a **Neutral** effect.

Otter

- 9.6.53 The development of landscape planting along watercourses would more than adequately compensate for small-scale losses of existing woodland and scrub. However, over 100m of riparian habitat along Aller Brook would be culverted. The provision of an Otter tunnel at this point would enable continued movement through the catchment, minimising risk of road traffic accidents to Otter during high flow conditions. This species is assessed as High Value. The impact magnitude would be Neutral resulting in a **Neutral** effect.

Bats

- 9.6.54 Land take along the Scheme would result in loss of a substantial amount of grazed pasture that currently provides foraging habitat for six bat species. In addition, a large number of hedges used by bats for commuting and feeding would be severed, fragmenting the landscape and potentially cutting bats off from foraging habitat along the valley bottom. The wet pasture at Edginswell appears to be the most important such habitat within the Scheme corridor, especially for foraging Lesser horseshoe; its partial loss may have deleterious consequences for this species locally, as there appears to be no alternative habitat of similar extent and quality in the area. Habitat creation and management of retained land at Edginswell would compensate in part for habitat loss here, and continuation of grazing would ensure that the high insect biomass required by feeding Lesser horseshoe (and other bat species) in this area is maintained.
- 9.6.55 The negative effects of physical habitat loss may be exacerbated by several factors. Bats, in particular Lesser horseshoe bats, are known to be faithful to existing patterns of landscape-use and will often continue to use long-established flight routes in the

event that these are severed. High numbers of road traffic casualties may occur as bats attempt to cross a carriageway, with low-flying species such as horseshoe bats being especially vulnerable in this respect. In addition, some species, in particular horseshoe bats and *Myotis* bats, are known to avoid bright conditions associated with street lighting, and lit junctions such as those proposed at Aller and Edginswell are likely to present an barrier for individuals attempting to reach foraging habitat from roosts on the western side of the corridor. The bright conditions may completely preclude some species from foraging around lit junctions, further reducing levels of available habitat. Mitigation at Aller and Edginswell junctions include provision of crossing points, including tall sections of adjacent trees and underpasses, together with careful lighting design to minimise light spill and maximise extent of retained habitat. Use of strategic planting and low level lighting during the establishment phase would help guide low-flying horseshoe bats into culverts.

9.6.56 In addition to maintaining access to foraging habitat along the valley base, it is also considered important to secure an important flight route for Lesser horseshoe bats moving between Edginswell and Fluder Hill, east of Kingskerswell. This would be achieved by securing land between the railway branch line and existing A380 (south of Stadium Drive) that presently comprises a mosaic of scrub and open habitat.

9.6.57 Other factors that may negatively affect local bat populations include loss of roosts in built structures and trees, and changes in prey availability in the event that offline grazing patterns change during the operational phase. Cessation of grazing would result in development of a uniform rank sward with lower insect biomass and diversity and, ultimately, by colonisation of scrub. New roost provision and maintenance of land-management patterns, especially in the Edginswell area is, therefore, considered to be a vital element of the mitigation strategy. In this respect, Devon County and Torbay Councils are committed to securing agreements with local landowners in order to enhance the local environment for bats.

9.6.58 The bat assemblage is assessed as Very High Value. The impact magnitude is expected to be Intermediate Negative, because of the loss of access to a large number of potential tree roosts, hedges and grazed pasture along the Scheme corridor, and because of the loss of valuable foraging habitat for Lesser horseshoe bat (at Edginswell). This results in a **Large adverse** effect on bats

Cirl bunting

9.6.59 Land take would result in the loss of at least half the known Cirl bunting habitat along the Scheme, and fragmentation of the remainder. Habitat loss is likely to have a negative effect on breeding and foraging during the operational phase, as much of the habitat outside existing Cirl bunting territories appears to be of limited suitability. The effect of severing territory or removing key habitat may be that birds move away from the site completely.

9.6.60 However, Devon County and Torbay Councils are committed to pursuing early conservation management agreements with landowners, as is evidenced by initial works that commenced in May 2004 at Aller Bridge, in order to improve offline habitat quality for this species. Cirl bunting at this site is assessed as High Value. With the proposed agreements in place to provide compensation, it should be possible to reduce the Impact Magnitude to Minor Negative in the long term resulting in a **Slight adverse** effect.

Barn owl

9.6.61 Risk of collision with vehicles would be low, as the species appears to be present in the area only at very low levels. This species is assessed as High Value. The impact magnitude would be Minor negative resulting in a **Slight adverse** effect.

Kingfisher

9.6.62 Just over 100m of potential foraging habitat may be lost at Aller to the culvert and dispersing Kingfisher would have to fly through the culvert or up and over the new Aller Junction. The birds are not expected to use this length of culvert and the substantial planting is aimed at encouraging birds to fly up and over the junction, thus reducing the likelihood of vehicle collisions. The provision of new nest habitat along the new section of the diverted Aller brook would be beneficial. The species is of High Value. The impact magnitude would be Minor negative resulting in a **Slight adverse** effect.

Bird assemblage

9.6.63 Operational phase impacts are likely to be connected mainly with loss of habitat to land-take, severing existing breeding territories and by loss of breeding sites for some specialist birds of woodland and grassland. The large amount of grassland and hedgerow/scrub woodland planting proposed within the design should compensate in part for the loss of hedges and pasture. However open ground species such as Skylark and Grey partridge are more vulnerable than birds of woodland edge or open country species. Loss of mature trees may result in local declines in some hole-nesting bird populations. The commitment by Devon County and Torbay Councils to securing an early land management agreement for Cirl bunting would also benefit other bird species, helping to offset some of these losses. Use of bird boxes to compensate for losses of nest sites in mature trees would be of benefit. This bird assemblage is assessed as Lower Value. The impact magnitude would be Minor negative resulting in a **Slight adverse** effect.

Reptiles

9.6.64 The majority of the most valuable reptile habitat lies away from the Scheme; for Slow worm in particular this is mainly along existing road verges. Grass snake is most vulnerable as it depends upon wetland, part of which (at Edginswell and probably also at Ford Fields) would be lost to the Scheme. In the longer term, provision of an extensive area of ungrazed grassland along embankments and verges (which would include hibernacula and basking sites) should provide substantial benefit. These species are assessed as Lower Value. The impact magnitude would be Neutral in the long term resulting in a **Neutral** effect.

Great crested newt and Riparian fauna

9.6.65 Only a small amount of terrestrial Great crested newt habitat would be lost to the Scheme, at the extreme north east of Ford Fields CWS and no aquatic habitat (i.e. breeding ponds) would be lost. Construction of ponds and hibernacula would more than compensate for terrestrial habitat loss. This species is assessed as High Value. The impact magnitude would be Positive resulting in a **Beneficial** effect.

9.6.66 Use of attenuation ponds and other measures to ameliorate the quality of discharged water in the watercourses would minimise negative effects on aquatic macro-invertebrates. In long term, effects on the riparian fauna should be **Slight adverse**.

9.6.67 Potential noise and visual disturbance to wildlife would be attenuated within the Scheme design by the use of planted bunds and false cuttings, and is not expected to significantly affect existing ecological receptors.

General Summary

9.6.68 Table 9.6 below shows the overall significance of effects for key ecological features (ecological receptors) during the operational phase of the project. Each feature is followed by its assigned value, then by predicted impacts for each and details of proposed mitigation. The final column gives an assessment of effect.

Table 9.6 Significance of Effects for Principal Ecological Receptors – Operational Phase

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Habitats					
Arable habitats	<u>Lower</u> <i>(assigned mainly on account of local significance for wintering and breeding Cirl bunting)</i>	<ul style="list-style-type: none"> Loss of habitat at northern end of Scheme 	<ul style="list-style-type: none"> Devon County Council and Torbay Council committed to early securing management of field margins / boundary features under management agreement 	<u>Positive</u>	<u>Slight Beneficial</u>
Grassland including species-poor semi-improved; species-rich of anthropogenic origin; species-rich unimproved (very small pockets only)	<u>Lower</u>	<ul style="list-style-type: none"> Loss of grassland along Scheme 	<ul style="list-style-type: none"> New grassland establishing and developing increasing interest 	<u>Neutral</u>	<u>Neutral</u>
Hedges and hedgerow trees, woodland and scrub	<u>Medium</u>	<ul style="list-style-type: none"> Land take – loss of hedges and hedgerow trees Land take resulting in loss of small area of woodland along Maddacombe Road 	<ul style="list-style-type: none"> Hedgerow and woodland planting maturing on embankments and along corridor Ring barking selected trees to create increasing levels of standing dead wood of value to decomposers Habitat piles decaying on embankments 	<u>Major Negative</u>	<u>Moderate Adverse</u>
Wet pastures and fen meadow	<u>Medium</u>	<ul style="list-style-type: none"> Land take resulting in loss of approximately one ha of this habitat in the Edginswell area and small pockets elsewhere 	<ul style="list-style-type: none"> Wetland creation and habitat enhancements – habitat establishment and increasing in diversity 	<u>Intermediate Negative</u>	<u>Moderate Adverse</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
River and stream	<u>High</u>	<ul style="list-style-type: none"> Habitat loss Aller Brook diversion Habitat degradation and fragmentation (diversion, bypass channels and loss of wetland, increased impermeable surfaces) 	<ul style="list-style-type: none"> New channel at Aller developing natural habitat New channel at Daccabridge taking flood flows but allowing passage of migratory fish. Old channel remaining wet (low flows). 	<u>Minor Negative</u>	<u>Slight Adverse</u>
		<ul style="list-style-type: none"> Possible pollution 	<ul style="list-style-type: none"> New channel takes flood flows and allowing passage of fish at Manor Gardens. Old channel remaining wet. New spawning and resting areas at Manor Gardens establishing Attenuation ponds and petrol/oil interceptors situated at strategic locations 		
Designated and potential sites					
Milber Wood LWS	<u>Lower</u>	<ul style="list-style-type: none"> No effect 	<ul style="list-style-type: none"> Small land take only Cordoning off to protect main area of LWS 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Torbay Ring Road	<u>Lower</u>	<ul style="list-style-type: none"> 0.6ha of Habitat loss at eastern end (N verge) 	<ul style="list-style-type: none"> Compensation with development of species-rich grassland elsewhere 	<u>Intermediate Negative</u>	<u>Slight Adverse</u>
Ford Fields CWS SX86/091	<u>Medium</u>	<ul style="list-style-type: none"> Planting up in CWS – conversion of strip of grassland to scrub planting Construction of site compound and access track in Rush-pasture and drier grassland habitat 	<ul style="list-style-type: none"> Restoration to wetland and grassland Pond creation will add to overall habitat matrix 	<u>Minor negative</u>	<u>Slight Adverse</u>
Aller Bridge pCWS SX86/073	<u>Medium</u>	<ul style="list-style-type: none"> Land take – loss of hedges and fields 	<ul style="list-style-type: none"> Scrub / woodland and grassland establishment elsewhere on the Scheme 	<u>Major Negative</u>	<u>Moderate Adverse</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Yannon Lane Fields CWS SX86/092	<u>Lower</u> <i>(the CWS presently appears to be outside known Cirl bunting breeding territory)</i>	<ul style="list-style-type: none"> Loss of approximately one third of arable site (boundaries under revision at time of writing to more accurately reflect possible Cirl bunting habitat) 	<ul style="list-style-type: none"> Landowner agreements reached and arable and fringing habitats under sensitive management 	<u>Positive</u>	<u>Slight Beneficial</u>
Manor House and Manor House Fields pCWSs SX86/063 and SX86/161	<u>Medium</u>	<ul style="list-style-type: none"> Land take approximately one third of semi-improved grassland site 	<ul style="list-style-type: none"> Most species-rich section of turf retained in Scheme design New grassland developing to compensate for loss of grassland to land take 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Kerswell Down and Whilborough Common CWS SX86/065	<u>Medium</u>	<ul style="list-style-type: none"> Land take – c 0.5ha of secondary woodland and scrub at eastern end of CWS 	<ul style="list-style-type: none"> Early purchase of replacement 'common land' gifted to Parish Council (off Churchway Lane) Scrub / woodland planting maturing Management plan would guide site works in exchange common land during a 5-year period 	<u>Intermediate Negative</u>	<u>Moderate Adverse</u>
Kerswell Down Hill Fields SX86/162	<u>Lower</u>	<ul style="list-style-type: none"> Loss of c1ha of grassland at eastern end of pCWS complex 	<ul style="list-style-type: none"> New embankment grassland developing calcareous character 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Edginswell Farm CWS SX86/068					
Fauna		<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> 		
Badger	<u>Lower</u>	<ul style="list-style-type: none"> Severing territory and reduction of potential foraging area Risk of road kill 	<ul style="list-style-type: none"> Possible need to artificial sett construction (following pre-construction survey) Use of tunnels and fencing in strategic areas keep animals off road and reduce road traffic accidents 	<u>Neutral</u>	<u>Neutral</u>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Otter	<u>High</u>	<ul style="list-style-type: none"> • Risk of road kill to otters crossing roads at times of flood • Habitat loss 	<ul style="list-style-type: none"> • Use of tunnel at Aller to ensure continued movement along watercourses • Early replacement habitat well established along watercourses at Edginswell and Aller 	<u>Neutral</u>	<u>Neutral</u>
Bats (in particular Lesser horseshoe bat)	<u>Very High</u>	<ul style="list-style-type: none"> • Land take – loss of important feeding habitat at Edginswell (Lesser horseshoe) • Severance of flight routes and disruption to commuting patterns • Disruption to foraging and commuting at lit junctions • Risk of road casualties at unlit crossing points and subsequent colony decline • Loss of building roost opportunities • Potential loss of tree roost opportunities 	<ul style="list-style-type: none"> • Use of culverts to divert bats under road at key points • Use of strategic planting to guide bats into culvert entrances. • Maintain wide open verges to discourage bats foraging close to road • Use of tall vegetation near road at strategic crossing points to encourage bats to fly up and over road • Wetland habitat creation at Edginswell and management by grazing • Newly constructed roosts operational • Bat box scheme operational • Pursue early landowner agreement 	<u>Intermediate Negative</u>	<p><u>Large Adverse</u></p> <p><i>(see note on overall assessment score as foot of table)</i></p>
Cirl bunting	<u>High</u>	<ul style="list-style-type: none"> • Long term loss of breeding and wintering habitat • Fragmentation of nest sites from old feeding areas 	<ul style="list-style-type: none"> • Pursue early landowner agreements - sensitive land management in place improving offline habitat for Cirl bunting. • Some land management enhancement works already in place at Aller 	<p><u>Minor Negative</u></p> <p>- based on implementation of sensitive land management agreements. Without this, impact magnitude increases to Major Negative</p>	<p><u>Slight Adverse</u></p> <p>- based on implementation of sensitive land management. Without this, the overall score increases to Large Adverse</p>

Ecological Receptor	Value of Receptor	Nature of Impact	Proposed Mitigation	Impact Magnitude after Mitigation	Assessment
Barn Owl	<u>High</u>	<ul style="list-style-type: none"> Owls are known to occur occasionally in area but none were recorded at all during 2002/03 surveys. 	<ul style="list-style-type: none"> None proposed 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Kingfisher	<u>High</u>	<ul style="list-style-type: none"> Land take during culverting of Aller Brook would result in loss of 100m section of foraging habitat Possible vulnerability to road traffic accidents if birds overfly Aller Junction 	<ul style="list-style-type: none"> Creation of earth bank nest sites Embankment planting at Aller Junction Habitat developing along new channel at Aller 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Bird assemblage (general)	<u>Lower</u>	<ul style="list-style-type: none"> Long term loss of breeding and wintering habitat 	<ul style="list-style-type: none"> Early landowner agreements - sensitive land management in place improving offline habitat other species in addition to Cirl bunting Bird boxes installed 	<u>Minor Negative</u>	<u>Slight Adverse</u>
Reptiles	<u>Lower</u>	<ul style="list-style-type: none"> Land take – loss of field edge and grassy banks of value to Common lizard and Slow worm. Loss of wet habitats at Edginswell of value to Grass snake 	<ul style="list-style-type: none"> Habitat creation along new embankments and verges becoming colonised by reptiles 	<u>Neutral</u>	<u>Neutral</u>
Great crested newt	<u>Very High</u>	<ul style="list-style-type: none"> Land take for small flood bund in Ford Fields – resulting in loss of small amount of terrestrial habitat 	<ul style="list-style-type: none"> Construction of ponds and hibernacula 	<u>Positive</u>	<u>Large Beneficial</u>
Aquatic riparian fauna	<u>Very high</u>	<ul style="list-style-type: none"> Long-term habitat loss (100m of Aller Brook at northern culvert) Habitat degradation and fragmentation (bypass channels and loss of wetlands, impermeable surfaces) Potential pollution of watercourses and effects on aquatic macro-invertebrates and fish 	<ul style="list-style-type: none"> New Aller channel developing complex of habitats Passage of migratory fish secured Flood and sediment storage areas minimising pollution risk (surface water directed to attenuation ponds and soakaways; these being routinely inspected and cleared of pollutants) 	<u>Minor Negative</u>	<u>Slight Adverse</u>

9.7 Summary

- 9.7.1 A total of seven designated, or potential, County Wildlife Sites would be directly affected by the Scheme. The most important and vulnerable sites are Edginswell Farm at the southern end of the corridor, which consists of a complex of small wet pastures, together with broad old hedgerows and wet woodland, and Ford Fields CWS at the northern end of the Scheme, which comprises an extensive area of unimproved wet grassland. Construction of the Aller junction would result loss of most of the Aller Bridge pCWS; whilst the Scheme to the west of Kingskerswell would result in loss of part of Yannon Lane CWS; part of Manor House farm pCWS, and the eastern end of Kerswell Down Wood CWS. Widening of the Torbay Ring Road at the southern end of the Scheme would result in loss of a 600m stretch of the northern verge within the Torbay Ring Road LWS. Milber Wood, also a LWS, lies adjacent to the proposed junction realignment at St Marychurch Road and, with careful mitigation, it would be possible to avoid significant impact.
- 9.7.2 A number of protected, rare and locally notable fauna are present along the Scheme corridor and some would be affected directly by the Scheme. The key taxa are bats, in particular Lesser horseshoe bat, fish (in particular Atlantic salmon, Bullhead and Brook lamprey) and Cirl bunting. Great crested newt occurs to the west of Ford Fields CWS.
- 9.7.3 Two separate populations of Lesser horseshoe bat are known to be present along the corridor; one north and one south of Kerswell Down. Activity of the 'southern' colony was concentrated at the extreme southern end of the Scheme, in the Edginswell wetland. Whilst adequate mitigation is possible for the 'northern colony', options for the 'southern colony' are more limited. Mitigation includes a range of measures to retain the colonies integrity, including use of five culverts to enable continued bat access to foraging on either side of the Scheme and to minimise risk of bat collisions with vehicles. Other measures would be implemented to benefit commoner bat species, for example Pipistrelle bats and Long-eared bats, which were also recorded along the Scheme corridor during the study. Residual effects would be compensated for by Devon County Council and Torbay Council pursuing compensatory habitat enhancement works through landowner agreements.
- 9.7.4 Land take would result in loss of hedge, pasture and arable habitats, of value to a number of breeding and wintering farmland birds, in particular Cirl bunting. The effect of the Scheme on Cirl bunting is difficult to predict; the species being highly sedentary, and it is possible that the disruption may cause territory abandonment. Mitigation for this species is based on a commitment by Devon County and Torbay Councils to securing land management agreements with local landowners, in order to compensate for habitat loss.
- 9.7.5 Reptiles and amphibians, in particular Great crested newt, are vulnerable to killing, injuring and habitat loss. Mitigation for both groups is possible; this involves trapping and translocation and compensation via habitat creation.
- 9.7.6 Fish and aquatic macro-invertebrate populations are vulnerable to channel design, changes in local hydrology and river base flows and pollution incidents. The mitigation strategy includes fishways at Aller, open channels and culvert sections designed to ensure fish passage is possible under all flow conditions and use of attenuation ponds and other remediation measures to ensure that pollution incidents are contained. Maintenance and management of wetlands adjacent to the watercourses would maintain existing hydrological baseline conditions.
- 9.7.7 In addition to impact on bats, watercourses and Cirl bunting, a number of other fauna were identified during the surveys as in need of specific conservation measures in order to retain local populations at favourable conservation status. These include Otter, Badger and reptiles. The mitigation measures to be implemented for each of these taxa are considered sufficient to reduce residual effects to acceptable levels.

References and bibliography

- Anon (1995). *Biodiversity: the UK Steering Group Report. Volume 2: Action Plans*. HMSO, London.
- Anon (1998). *The Nature of Devon: A Biodiversity Action Plan*. Devon County Council.
- Anon (2001). *The Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.
- Anon. (2003). *The Management of Roadside Verges in Devon*. 7th Edition. Environment Directorate, Exeter.
- Anon (2004). *Reptiles: Guidelines for Developers*. English Nature, Peterborough.
- Bright, D. and Edwards, K. (2004). *Ecological Impact Assessment of Fisheries Resource in Relation to Scheme TUE43444A A380 Kingskerswell Bypass for Devon County Council*. Tamar Consulting, Lifton, Devon. Unpublished report.
- Catherine Bickmore Associates (2003). *Review of work carried out on the trunk road network in Wales for bats*. Catherine Bickmore Associates, London. Unpublished.
- Gent, T. and Gibson, S. (eds.). (1998). *The Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- Jessop, H. (2001). *Cirl buntings – legal/conservation status and brief habitat details*. *RSPB Guidance Notes*. RSPB, Exeter.
- Gregory, R.D., Wilkinson, N.I., Noble, D.G., Robinson, J.A., Brown, A.F., Hughes, J., Procter, D.A., Gibbons, D.W. and Galbraith, C.A. (2002). *The Population Status of birds in the United Kingdom, Channel Isles and the Isle of Man: an analysis of conservation concern 2002 – 2007*. *British Birds* 95: 410-450.
- Hendry, K. and Cragg-Hine, D. (1997). *Restoration of Riverine Salmon Habitats – A Guidance Manual*. Fisheries technical Manual 4. R & D Technical report W44. Environment Agency, Bristol.
- IEA (1995). *Guidelines for Baseline Ecological Assessment*. Institute of Environmental Assessment. E & F Spon, London and Glasgow.
- JNCC (1990). *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Joint Nature Conservation Committee, Peterborough.
- Limpens, H. (2004). *The Role of Development in Planning and Development in Europe*. Paper presented at the Bat Conservation Trust National Bat Conference 2004. Unpublished.
- Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.
- Peach, W.J, L. Lovatt, S.R. Wotton and Jeffs. C. (2001). *Countryside Stewardship delivers Cirl buntings (Emberiza cirulus) in Devon, UK*. *Biological Conservation* 101 (2001): 361-373.
- Ramsay, D. (ed.). 1994. *Roads and nature Conservation; Guidance on Impacts, Mitigation and Enhancement*. English Nature Research report, English Nature, Peterborough.
- Ramsden, D. J. (2003). *Barn owls and major roads: results and recommendations from a 15-year research study*. Barn Owl Trust, Ashburton.
- Ratcliffe, D.A. (1977). *A Nature Conservation Review*. Cambridge University Press, Cambridge.
- Stace, C. (1997). *New Flora of the British Isles*. Second edition. Cambridge University Press.
- Strachan, R. (1998). *Water Vole Conservation Handbook*. Wildlife Conservation Research Unit, University of Oxford.
- Delahay R.J.; Brown J.A.; Mallinson P.J.; Spyvee P.D.; Handoll D.; Rogers L.M.; Cheeseman C.L. *The use of marked bait in studies of the territorial organisation of the European Badger*. *Mammal Review*. June 2000 vol. 30 (2): 73-87(15).