



Appendix A10.9 – Amphibians

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Jacobs U.K. Limited 95 Bothwell Street, Glasgow G2 7HX
Tel 0141 204 2511 Fax 0141 226 3109

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1 Introduction

1.1 General Background

- 1.1.1 This Appendix reports the assessment of potential impacts on amphibians in the vicinity of the Northern Leg of the proposed scheme.
- 1.1.2 To aid the interpretation of the assessment, the AWPR Northern Leg study area has been divided into five route sections as follows:
- Section NL1 ch314800 – 316000 (Derbeth to Tulloch Road);
 - Section NL2 ch316000 – 317400 (SAC Craibstone);
 - Section NL3 ch317400 – 322600 (A96 to Nether Kirkton);
 - Section NL4 ch322600 – 325370 (Nether Kirkton to Corsehill); and
 - Section NL5 ch325370 – 331000 (Corsehill to Blackdog).
- 1.1.3 Studies on amphibians were included as part of the Ecological Impact Assessment (EclA), and were undertaken in accordance with the Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11 and the Environment Impact Assessment (Scotland) Regulations 1999. The three stages of EclA have been modified to be directly applicable to the proposed scheme, and are based on matrices from an early draft version of IEEM guidance on EclA (IEEM, 2002) and Transport Advisory Guidance (STAG and WEBTAG). The bulk of the assessment for the AWPR Northern Leg was undertaken before the 2006 issue of the IEEM guidelines. This assessment therefore follows the general approach described in the IEEM 2002 guidelines, with cognisance of the later 2006 guidelines
- 1.1.4 For the purposes of this report, the study area is defined as comprising all areas within 500m of the proposed scheme.

1.2 Aims

- 1.2.1 This report aims to:
- identify waterbodies and terrestrial habitats that may potentially maintain breeding and hibernating amphibian populations located within the route);
 - assess the current status of amphibian populations in the vicinity of the proposed scheme;
 - identify and evaluate potential impacts of the proposed scheme on ponds, terrestrial habitat and amphibian populations associated with it;
 - recommend mitigation measures to prevent, reduce and offset any identified potential impacts; and
 - assess the residual impacts after mitigation has been implemented.

1.3 Background

Biology

- 1.3.1 There are six species of amphibian native to mainland Britain (three species of newt, two species of toad and one species of frog), however only palmate newt (*Triturus helveticus*), common frog (*Rana temporaria*) and common toad (*Bufo bufo*) have been recorded in the Aberdeen area.

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- 1.3.2 Amphibians require areas of permanent or semi-permanent bodies of water for breeding, egg laying and larval development. Eggs are either deposited in open water (frogs), entwined around vegetation (toads) or between folded leaves (newts). The eggs mature into embryos which in turn develop into larvae (tadpoles in the case of frogs and toads). The larvae then metamorphose into adults after several weeks.
- 1.3.3 Breeding takes place in spring (between February and May). After breeding is complete, dispersion of adults commences, leaving their breeding waterbodies in March and April (frog and toad respectively) and late summer for newts. Adults of all species do not return to the waterbody until the following year after overwintering at hibernation sites. Hibernation sites are typically less than 500m from the waterbody (for frogs and newts) and up to a 1000m for toads (Beebee & Griffiths, 2000). In this respect, terrestrial habitat is equally important to amphibians as aquatic habitat. Larvae remain in the waterbody until they develop into juveniles. The juveniles will leave the waterbody dispersing into the surrounding habitat, normally between July and September the same year. Some of these individuals will not return to the natal pond, instead dispersing to other waterbodies. Adult frog and palmate newt larvae can overwinter in the waterbody.
- 1.3.4 Ideal feeding areas include woodland, scrub, rough grassland and gardens with a diversity of habitats. Hibernacula are sought in terrestrial features such as dead wood found along hedgerows, in woodland and as accumulated matter beside streams or on floodplains. Root systems of scrub and trees, including dead roots are also used, as are crevices and gaps in the earth, under rocks and in stonewalls.
- 1.3.5 Amphibian species resident to one isolated waterbody are recognised as comprising a population. However, where amphibian species are associated with two or more waterbodies, within 300m of each other, the ponds are considered to support metapopulations of the species concerned. These metapopulations are also considered to be connected and combined together and are considered to belong to the same population, as there will be interchange of individuals between waterbodies and gene mixing within that group of waterbodies. The distribution of ponds and the importance of metapopulations is often key to the survival of amphibian species within geographical areas. Loss of habitat, such as through destruction of ponds for example, can result in metapopulations becoming isolated and more vulnerable to localised extinction.

Legal Protection

- 1.3.6 All species of amphibian native to the British Isles receive some legal protection, although the degree and type of protection varies between species. Great crested newt (*Triturus cristatus*) and natterjack toad (*Bufo calamita*) are subject to protection from the intentional killing, injury and disturbance to their habitats through their inclusion in Section 9 of the Wildlife and Countryside Act 1981 (WCA) and Regulation 39 of the Conservation (Natural Habitats & c.) Regulations 1994. Further protection is afforded under the Nature Conservation (Scotland) Act 2004, which revised Part 1 of the WCA adding the term 'recklessly'. The three widespread species of amphibian found in the Aberdeen area (palmate newt, common frog and toad) are protected under Section 9(5) of the WCA that makes it an offense to sell, barter, exchange, transport for sale and advertise to sell or buy.
- 1.3.7 Although not UK Biodiversity Action Plan (BAP) 'Priority Species', common toad and palmate newt are listed as Species of Conservation Concern in the UK BAP (DETR, 1995 a/b).

2 Methods

2.1 Existing Data

Consultation

- 2.1.1 Consultation was undertaken with Scottish Natural Heritage (SNH), North East Scotland Biological Records Centre (NESBReC) and the local amphibian recorder to gain information on the status and distribution of amphibians in the Aberdeen area.

2.2 Survey Methods

Walkover Survey

- 2.2.1 Ordnance Survey maps (1:25000) were used to identify waterbodies and areas showing the potential to support amphibian populations which were subject to a reconnaissance survey (undertaken on 25 and 26 March 2004) to determine existence.
- 2.2.2 All waterbodies were recorded and these formed the basis for the presence/absence surveys (detailed below).

Presence / Absence Surveys

- 2.2.3 To determine the presence or absence of amphibian species, surveys approved by SNH prior to their commencement were undertaken following guidelines prescribed by:
- Great Crested Newt Mitigation Guidelines (English Nature, 2001); and
 - JNCC's Herpetofauna Workers Manual (Gent & Gibson, 1998).
- 2.2.4 Surveys were conducted between the 19 April and 2 July 2004, this being in the optimal period for conducting amphibian surveys (for North East Scotland) as it coincides with the breeding season when amphibians are in their aquatic reproductive phase.

- 2.2.5 The following survey techniques were employed:

Egg / Visual Search

- 2.2.6 Live and dead submerged vegetation was manually searched for the presence of newt eggs (embryos). The eggs are usually wrapped in the leaves of aquatic plants such as water mint (*Mentha aquatica*) and water forget-me-not (*Myosotis scorpioides*), but can also be wrapped in dead leaves or overhanging grasses. It is not possible to distinguish between smooth and palmate newt eggs. In addition, the perimeter of each waterbody was walked and visually searched for frog and toad spawn. Any individual newts, frogs or toads found were also recorded.

Torch Survey

- 2.2.7 Amphibians were searched for at night (shortly after dusk) by shining a torch into the pond margins. A 1,000,000 candlepower torch was used to conduct the torch surveys. The perimeter of each pond (where accessible) was slowly walked once, checking for amphibians. Species, sex and number of individuals were recorded.

Bottle Trapping

- 2.2.8 Bottle trapping (for newts) was undertaken on two waterbodies (Craibstone and Corsehill) that were selected having satisfied the following criteria:

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- any waterbody that did not have a previous positive egg search or torch survey result;
- any waterbody that was either directly impacted or within 100m of the proposed scheme (and so likely to be impacted); and/or
- any waterbody with a score of moderate or high quality, after applying the results of the aquatic habitat survey.

2.2.9 Bottle traps were set around waterbody margins at a density of one trap approximately every 2m of shoreline (where accessible). The traps were set in the evening and checked again at dawn. The species, sex and number of individual newts caught were recorded.

Evaluation of Species Assemblages

2.2.10 The numbers of each amphibian species were evaluated using criteria outlined in Nature Conservancy Council Guidelines for the selection of biological SSSIs (NCC, 1989) and JNCC's Herpetofauna Workers Manual (Gent & Gibson, 1998).

2.2.11 Amphibian species found in waterbodies within 300m of each other and connected by suitable habitat are considered as the same meta-population and as such, species population abundance were combined. Amphibian abundance was evaluation in accordance with Table 1 below.

Table 1 – Assessment of Amphibian Abundance

Species	Method	Low Population	Good Population	Exceptional Population
Great Crested Newt	Seen/netted in day/counted at night	<5 <10	5-50 10-100	>50 >100
Smooth Newt	Netted in day/counted at night	<10	10-100	>100
Palmate Newt	Netted in day/counted at night	<10	10-100	>100
Toad	Estimated Counted	<500 <100	500-5,000 100-1,000	>5,000 >1,000
Frog	Spawn clumps counted	<50	50-500	>500

Habitat Surveys

Rationale

2.2.12 Surveys were conducted to assess the suitability of both the aquatic and terrestrial habitats for amphibians. This information was used to inform the evaluation and impact assessment, in addition to formulating appropriate mitigation measures for a particular site. Assessments were mostly qualitative, based on known characteristics beneficial or adverse to amphibians. This evaluation of habitat quality reflects the suitability of the habitats for amphibians and is not an assessment of its value in nature conservation terms. However, the habitat evaluation and the results of the amphibian surveys are combined to provide the evaluation of the ecological importance of the sites and features for amphibians.

2.2.13 The information gathered was also used to determine which waterbodies would meet the criteria for further survey (i.e. bottle trapping) by eliminating any waterbody that was assessed as having low quality aquatic habitat.

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Aquatic Habitat Survey

- 2.2.14 The quality of aquatic habitat was assessed for its suitability to hold breeding amphibians, using parameters identified by Oldham et al. (2000) that are of particular value to this stage in their life cycle. This involved walking the perimeter of the waterbody and noting the presence and amount of marginal vegetation, the percentage of water that was shaded, and the presence of fish or wildfowl.
- 2.2.15 The turbidity (the amount of organic/inorganic particles suspended in the water that reduce water clarity) of the water was estimated based on how clear the water appeared. When the bottom of the waterbody was clearly visible there was no apparent or very little turbidity, and when the water clarity was such that it wasn't possible to see into the water then the turbidity was very high.
- 2.2.16 The proximity of other waterbodies was also taken into account, as neighbouring suitable waterbodies can increase the quality of the site. A combination of the presence, quantity and absence of parameters were used to evaluate the aquatic habitat quality as detailed in Table 2.

Table 2 – Evaluation of Aquatic Habitat Quality

Rating	Criteria
High	1. Lack of fish or waterfowl with aquatic vegetation, clear water, areas of shading and/or areas of shallow and deep water and/or within 300m of a waterbody suitable for amphibians.
Moderate	1. Occasional aquatic vegetation or dominated by <i>Glyceria fluitans</i> and a lack of shading. 2. Less than 50% shading and no waterbody within 300m suitable for amphibians and/or a low population of fish or waterfowl. 3. In late successional stage.
Low	1. A high fish, wildfowl or black headed gull population 2. Very turbid water, with no aquatic vegetation 3. Above 75% shading.

Terrestrial Habitat Survey

- 2.2.17 Each site was assessed for the quality of its terrestrial habitat using key parameters identified by Oldham et al. (2000) that indicate habitat of particular value, as well as considering the dispersion of habitats throughout the local landscape and the presence of any barriers to amphibian migration throughout the landscape. Favourable terrestrial habitat for amphibians would provide places for refuge, hibernacula and foraging opportunities. The surrounding habitat up to a radius of 250m was recorded, with an emphasis on recording the presence and size of woodland, presence and amount of rocks, walls, scrub, rough grassland and bog habitats.
- 2.2.18 A combination of the presence, quantity and absence of parameters were used to assign a rating of suitability to sites according to the criteria identified in Table 3.

Table 3 – Evaluation of Terrestrial Habitat Quality

Rating	Criteria
High	Presence of substantial woodland and/or large areas of scrub or rank grassland or large rock piles or many stone walls.
Moderate	Presence of a large area scrub and/or small spinney/copse or areas of rank grassland or rock piles or stone walls.
Low	Lack of woodland, scrub, rank grassland and rock piles.

2.3 Survey Limitations

- 2.3.1 One pond (Middlefield) was discovered in September 2004 and it was therefore too late to perform amphibian surveys. As such, only habitat surveys of this pond were undertaken. A further pond (Cranbog) was discovered post survey and as such, has not been surveyed. The surveys undertaken can determine the presence of amphibians but it is very difficult to demonstrate that amphibians are completely absent as small populations at low densities may remain undetected despite the survey effort. Even if amphibians are absent in one season they could colonise waterbodies in subsequent seasons. This will depend on the connectivity to nearby populated waterbodies and the suitability of the waterbodies to amphibians.

2.4 Evaluation of Ecological Importance

Evaluation of Receptors

- 2.4.1 The method for assessing the value of an ecological receptor uses all information collated in determining the baseline status of the resource. The ecological evaluation of a receptor is determined by reference to statutory and non-statutory site designations, the results of consultation, literature review and field surveys. The evaluation method incorporates a geographical framework where ecological receptors are assessed according to a series of criteria that are presented in Table 4 which is based on the Ratcliffe Criteria (Ratcliffe 1977) used in the selection of biological Sites of Special Scientific Interest (SSSI) and include size (extent), naturalness, rarity, typicality, vulnerability and position in an ecological / geographical unit.
- 2.4.2 The evaluation method additionally includes reference to the legal protection conferred on species or habitats as well as the conservation status of the receptor, such as UK BAP or LBAP. These factors give rise to a level of conservation importance being assigned to species/habitats that reflects the geographical framework used in the evaluation process. Thus, for example species such as otters and bats are protected by international legislation, are referred to as internationally important in terms of their conservation status. Other species such as wych elm, which are identified as priority species in the Northeast Scotland BAP are referred to as regionally important species.

Evaluation of Features and/or Habitat Areas

- 2.4.3 The ecological evaluation of a feature or area of habitat takes into account the level of conservation importance of the species, as well as other factors such as the level of use of the habitat or feature by a species, whether the species or habitat is locally or regionally common or rare, as well as other criteria that contribute to a feature's importance. In this way, the method of evaluation provides a system that combines legislative protection of species and/or habitats and conservation parameters that all contribute to the ecological importance of the receptor.
- 2.4.4 The value of the local amphibian populations was determined by reference to any designations and the results of the consultations, literature review and field surveys.

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Table 4 – Evaluation of Ecological Receptor

Value/ Importance	Criteria
International (European)	<p><u>Habitats</u></p> <p>An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, Ramsar site, Biogenetic/Biosphere Reserve, World Heritage Site) or an area which would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified.</p> <p><u>Species</u></p> <p>Any regularly occurring population of internationally important species, threatened or rare in the UK. i.e. a UK Red Data Book species categories 1& 2 of UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP. A regularly occurring, nationally significant population/number of an internationally important species.</p>
National (Scottish)	<p><u>Habitats</u></p> <p>A nationally designated site (SSSI, ASSI, NNR, Marine Nature Reserve) or a discrete area which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat essential to maintain wider viability. Any river classified as excellent A1 and likely to support a substantial salmonid population. Any river with a Habitat Modification Score indicating that it is Pristine or Semi-Natural or Obviously Modified.</p> <p><u>Species</u></p> <p>A regularly occurring, regionally or county significant population/number of an internationally/nationally important species. Any regularly occurring population of a nationally important species which is threatened or rare in the region or county (see local BAP). A feature identified as of critical importance in the UK BAP.</p>
Regional (North East Scotland)	<p><u>Habitats</u></p> <p>Sites which exceed the County-level designations but fall short of SSSI selection criteria. Viable areas of key habitat identified in the Regional BAP or smaller areas of habitat essential to maintain wider viability. Viable areas of key habitat identified as of Regional value in the appropriate SNH Natural Heritage Future area profile. Any river classified as excellent A1 or good A2 and capable of supporting salmonid population. Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p><u>Species</u></p> <p>Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10 km squares in the UK or in a Regional BAP or relevant SNH Natural Heritage Future area on account of its regional rarity or localisation. A regularly occurring, locally significant population/number of a regionally important species. Sites maintaining populations of internationally/nationally important species that are not threatened or rare in the region or county.</p>
Authority Area (e.g. County or District) Aberdeenshire/ City of Aberdeen	<p><u>Habitats</u></p> <p>Sites recognised by local authorities (e.g.) District Wildlife Sites (DWS) and Sites of Interest for Nature Conservation (SINS). County/District sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNR). A viable area of habitat identified in County/District BAP or in the relevant SNH Natural Heritage Future area profile. A diverse and/or ecologically valuable hedgerow network. Semi-natural ancient woodland greater than 0.25 ha. Any river classified as good A2 or fair B and likely to support coarse fishery. Any river with a Habitat Modification Score indicating that it is significantly modified or above.</p> <p><u>Species</u></p> <p>Any regularly occurring, locally significant population of a species listed in a County/District BAP due to regional rarity or localisation. A regularly occurring, locally significant population of a County/District important species. Sites supporting populations of internationally/nationally/regionally important species that are not threatened or rare in the region or county, and not integral to maintaining those populations. Sites/features scarce in the County/District or which appreciably enrich the County/ District habitat resource</p>
Local (immediate area or local village importance)	<p><u>Habitats</u></p> <p>Areas of habitat that appreciably enrich the local habitat resource (e.g. species-rich hedgerows, ponds etc). Sites that retain other elements of semi-natural vegetation that due to their size, quality or the wide distribution within the local area are not considered for the above classifications. Semi-natural ancient woodland smaller than 0.25 ha. Any river classified as fair B or poor C and unlikely to support coarse fishery. Rivers with a Habitat Modification Score indicating that it is severely modified or above.</p> <p><u>Species</u></p> <p>Populations/assemblages of species that appreciably enrich the biodiversity resource within the local context. Sites supporting populations of county/district important species that are not threatened or rare in the region or county, and are not integral to maintaining those populations.</p>

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Value/ Importance	Criteria
Less than Local (Limited ecological importance)	Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors. Any river classified as impoverished D and/or and with a Habitat Modification Score indicating that it is severely modified.

2.5 Impact Assessment

2.5.1 In the assessment of significance of impact, consideration has been given both to the magnitude of impact and to the sensitivity of the receiving environment or species (receptor). For this assessment the sensitivity of a receptor (watercourse and the ecosystem it supports) was determined with reference to its level of ecological importance although other elements (e.g. presence of protected species) have been taken into account where appropriate.

Impact Magnitude

2.5.2 Methods of impact prediction used included direct measurements, correlations, expert opinion and information from previous developments. Impacts include those that are predicted to be direct, indirect, temporary, permanent, cumulative, reversible or irreversible. The magnitude of each impact was assessed independently of its value or statutory status. Magnitude criteria are presented in Table 5.

Table 5 – Impact Magnitude

Impact Magnitude	Criteria
High negative	The change is likely to permanently, adversely affect the integrity of an ecological receptor, in terms of the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest.
Medium negative	The change is not likely to permanently adversely affect the ecological receptor's integrity but the effect on the receptor is likely to be substantial in terms of its ecological structure and function and may be significant in terms of its ecological objectives. Likely to result in changes in the localised or temporary distribution of a species but not affect its population status at a regional scale or permanently.
Low negative	The change may adversely affect the ecological receptor, but there will probably be no permanent effect on its integrity and/or key attributes and is unlikely to be significant in terms of its ecological objectives.
Negligible	The change may slightly adversely affect the receptor but will have no permanent effect on the integrity of the receptor or its key attributes. There are no predicted measurable changes to the species assemblage or population and the effect is unlikely to result in an increased vulnerability of the receptor to future impacts.
Positive	The change is likely to benefit the ecological receptor, and/or enhance the biodiversity resource of the receptor.
High positive	The change is likely to restore an ecological receptor to favourable conservation status, contribute to meeting BAP objectives (local and national) and/or create a feature that is of recognisable value for biodiversity.

Impact Significance

2.5.3 The significance of impact has been determined according to the matrix system illustrated in Table 6.

Table 6 – Impact Significance

Magnitude Importance	High Negative	Medium Negative	Low Negative	Negligible	Positive	High Positive
International	Major	Major	Moderate	Negligible	Moderate	Major
National	Major	Major	Moderate	Negligible	Moderate	Major
Regional	Major	Moderate	Minor	Negligible	Minor	Moderate
Authority Area	Moderate	Moderate	Minor	Negligible	Minor	Moderate
Local	Minor	Minor	Minor	Negligible	Minor	Minor
Less than Local	Minor	Negligible	Negligible	Negligible	Negligible	Negligible

2.5.4 The level of significance of impacts predicted on ecological receptors is an important factor in influencing the decision-making process and determining the necessity and/or extent of mitigation measures. Impacts can be beneficial or adverse, either improving or decreasing the ecological status health or viability of a species, population or habitat. In general, impact significance greater than or equal to Moderate would require specific mitigation to be undertaken to ameliorate the impact significance to acceptable levels.

3 Baseline

3.1 Data Search

Consultation

3.1.1 None of the consultees provided any historic or recent records of amphibians for the route corridor and/or study area.

3.2 Survey Results

Pond Identification

3.2.1 Four waterbodies identified through analysis of Ordnance Survey maps (1:25 000) no longer exist. These included: Gravel Pit (V) at NJ 873148 and the three smaller waterbodies at Gourdieburn at NJ 939152.

3.2.2 A total of 16 ponds were identified during this survey (one pond - Cranbog Pond - was identified post survey and was not surveyed). Fifteen of the ponds were subject to a further aquatic and terrestrial habitat survey of which 14 ponds were subsequently searched for eggs and torched searched at night.

Presence / Absence Surveys

3.2.3 The 15 ponds surveyed had a mean pond density of 0.95/km² (see Figures 10.9a-g), and 14 supported amphibian populations. Common frog was the most common and widespread species, recorded in 11 ponds distributed across the whole of the route alignment. Common toad and palmate newt were less common, recorded in five and six ponds respectively. Common toad and palmate newt populations were localised although isolated in some places (see Table 7).

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Table 7 – Survey Results and Evaluation of Amphibian Populations

Waterbody Name and Habitat area	OS Grid Reference	Distance from Alignment (m)	Surveys Performed	Amphibian Species		Amphibian Habitat Quality		Description of Waterbody & Terrestrial Habitat Utilised by Amphibians	Conservation Value
				Species	Details	Aquatic	Terrestrial		
Section NL 1 ch314800 – 316000									
Keppeystone N3	NJ866094	255	Habitat surveys Torch & Egg search	Frog	1 juvenile frog, and < 50 tadpoles	Moderate	Moderate	A medium round artificial pond (447m ²). The water is slightly turbid with frequent aquatic vegetation. 5% shading occurs on the south- west bank. The depth at the water edge was 15 cm to 50cm towards the centre. Terrestrial habitat surrounding the site is mainly arable and improved grassland. However, within 200m to the North connected by a hedgerow, a low proportion of extensive marshy grassland exists with scattered willow species.	Local
				Toad	1 adult				
Section NL 2 ch316000 – 317400									
Craibstone N26	NJ868109	<10	Habitat surveys Torch, Egg & bottle trap survey	Palmate newt	4 male and 2 female adults: one gravid female.	High	High	A large irregular shaped artificial pond (1048m ²). The water is clear to slightly turbid with frequent submergent and emergent vegetation. In places the pond is shallow dropping to approximately 1m towards the centre. There are several stages with shaded and open areas of water. A moderate proportion of terrestrial habitat comprised semi-natural broadleaved woodland, broadleaved plantation, conifer plantation and unimproved neutral grassland.	Local
Section NL 3 ch317400 – 322600									
Pitmedden House N45	NJ865148	265	Habitat surveys Torch & Egg search	Frog	1 adult	Low	Moderate	A medium round artificial pond (670m ²). The water was slightly turbid with occasional vegetation. Wildfowl were present. The pond is shaded on the southern and western sides by tall trees. Depth ranges from less than 10cm to approximately 50cm. A low proportion of terrestrial habitat comprised semi-natural broad-leaved woodland.	Less than local
Gravel Pit I N49	NJ871149	440	Habitat surveys Torch & Egg search	Palmate newt	1 adult	Moderate	Moderate	A large round artificial pond (1827m ²). The water is clear with occasional aquatic vegetation. There is a lack of shading. Depth increases steeply to deeper than 1.5m. A low proportion of terrestrial habitat comprised stone walls, tall ruderal herb and fern.	Local
				Toad	< 50 toad tadpoles				

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Waterbody Name and Habitat area	OS Grid Reference	Distance from Alignment (m)	Surveys Performed	Amphibian Species		Amphibian Habitat Quality		Description of Waterbody & Terrestrial Habitat Utilised by Amphibians	Conservation Value
				Species	Details	Aquatic	Terrestrial		
Gravel Pit II N49	NJ873148	420	Habitat surveys Torch & Egg search	Palmate newt	2 adult male and 1 gravid female	High	Moderate	A small linear natural pond (132m ²). The water is clear and shallow (less than 30cm) with abundant aquatic vegetation. The pond is shaded on the southern side by trees and at a late successional stage. A low proportion of terrestrial habitat comprised stone walls, tall ruderal herb and fern.	Local
Gravel Pit III N49	NJ872149	270	Habitat surveys Torch & Egg search	Palmate newt	1 adult female	Low	Low	A large oval shallow depression (751m ²) less than 40cm deep. The water is clear with no existing aquatic vegetation. There is a lack of shading. A low proportion of terrestrial habitat comprised stone walls, tall ruderal herb and fern.	Local
				Toad	1 adult				
Gravel Pit IV N49	NJ874147	210	Habitat surveys Torch & Egg search	Palmate newt	2 adults	Moderate	Low	A medium round artificial waterbody (1304m ²). The water is clear with frequent aquatic vegetation. The waterbody experiences no shading. The depth ranges from 20cm at the water's edge to approximately 1m. A low proportion of terrestrial habitat comprised stonewalls scattered trees and a nearby strip of tall ruderal herb. A dried out waterbody that has become vegetated is also situated nearby.	Local
				Toad	< 50 tadpoles				
Section NL 4 ch322600 – 325370									
Goval reservoir N61	NJ894153	120	Habitat surveys Torch & Egg search	Frog	1 adult frog and 1 clump of frog spawn	Low	Moderate	A rectangular artificial reservoir (7500m ²). Wildfowl were present. The water is clear to slightly turbid with no aquatic vegetation. The waterbody experiences no shading. The depth ranges from 1m to probably over 3m. A moderate proportion terrestrial habitat comprised broad leaved plantation, scattered trees, unimproved acid grassland and areas of tall ruderal herb and fern.	Less than local
Corsehill N68	NJ899152	0	Habitat surveys Torch, Egg & bottle trap survey	Frog	< 50 frog tadpoles.	Moderate	Moderate	A medium rectangular artificial pond (223m ²). The water is clear to slightly turbid with dominant (70%) submergent and emergent vegetation. There is a lack of shading. The depth ranged from approximately 30cm to 1.5m. A low proportion of terrestrial habitat comprised stone walls, marshy grassland and a large rock pile nearby.	Local

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Waterbody Name and Habitat area	OS Grid Reference	Distance from Alignment (m)	Surveys Performed	Amphibian Species		Amphibian Habitat Quality		Description of Waterbody & Terrestrial Habitat Utilised by Amphibians	Conservation Value
				Species	Details	Aquatic	Terrestrial		
Section NL 5 ch325370 – 331000									
Loch-Hills Farm N80	NJ912149	220	Habitat surveys Torch & Egg search	Palmate newt,	4 adults	High	Moderate	A large oval artificial pond (1806m ²). The water is clear with abundant submergent and emergent vegetation. In places the pond is shallow dropping to approximately 70cm towards the centre. A low proportion of terrestrial habitat comprised stonewalls, rank and marshy grassland.	Local
				Frog	1 adult and 8 clumps of frog spawn				
				Toad	14 adult toads (three pairs observed in amplexus)				
Loch Greens pond N80	NJ913152	0	Habitat surveys Torch & Egg search	None recorded		Low	Moderate	A medium oval artificial pond (m ²). The water quality is very turbid with no aquatic vegetation. There is a lack of shading. The depth at the water's edge was approximately 30cm. A low proportion of terrestrial habitat comprised stone walls, marshy grassland with scattered boulders.	Less than local
Sand Pit N88	NJ933143	355m	Habitat surveys Torch & Egg search	Frog	1 adult	Low	Moderate	A medium oval artificial pond (2500m ²). The water was clear to slightly turbid with frequent aquatic vegetation. There was a lack of shading. Depth ranged from less than 10cm at the water's edge to approximately 1m towards the centre. A low proportion of terrestrial habitat comprised swamp, broadleaved plantation woodland and dense continuous scrub.	Local
Cranbog N90	NJ934148	470	Not surveyed					(Discovered as a pond post survey) Considered to be of local value as situated within 500m of ponds that support amphibian populations.	Local
Middlefield N91	NJ954153	295	Habitat surveys	Not surveyed for amphibians		Moderate	Moderate	A large oval artificial pond (1289m ²). The water is slightly turbid with occasional aquatic vegetation. There is a lack of shading. Depth ranges from 30cm at the water's edge to probably deeper than 1.5m towards the centre. A large proportion of terrestrial habitat comprised scattered bracken and scrub.	Local

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Waterbody Name and Habitat area	OS Grid Reference	Distance from Alignment (m)	Surveys Performed	Amphibian Species		Amphibian Habitat Quality		Description of Waterbody & Terrestrial Habitat Utilised by Amphibians	Conservation Value
				Species	Details	Aquatic	Terrestrial		
Black Dog I N95	NJ957140	55	Habitat surveys Torch & Egg search	Frog	< 20 frog tadpoles	Low	Moderate	A small rectangular artificial pond (120m ²) used for shooting ducks. The water is clear with no aquatic vegetation. There is 20% shading. Depth was uniform and approximately 50cm. A low proportion of terrestrial habitat comprised a small area of marshy grassland.	Less than local
Black Dog II N95	NJ957140	60	Habitat surveys Torch & Egg search	Frog	< 10 frog tadpoles	Low	Moderate	A small rectangular artificial pond (120m ²) used for shooting ducks. The water is clear with no aquatic vegetation. Fish were present. There is 20% shading. Depth was uniform and approximately 50cm. A low proportion of terrestrial habitat comprised a small area of marshy grassland.	Less than local

4 Evaluation

4.1 Habitats

- 4.1.1 Standing water has been described as the ‘least common habitat type in Aberdeenshire district covering 37ha’ (Nature Conservation Strategy for Aberdeen 1994). Due to the scarcity of standing water within the local area, the importance of any waterbody within the scheme footprint that contained or is considered suitable to support a viable population of amphibians is evaluated as being of **local** importance.
- 4.1.2 Waterbodies that did not contain amphibians and are considered not capable of supporting a viable population of amphibians are evaluated as being of **less than local** importance (see Table 7).
- 4.1.3 Where waterbodies are in close proximity to one another and are considered to be supporting amphibian ‘meta’ populations that are connected to other ponds, these are considered to be of increased ecological importance and are sufficient to enhance the biodiversity resource at the county level and therefore be of **authority area** importance.

4.2 Species

- 4.2.1 Evaluation of amphibian assemblage and abundance were scored using the scoring systems taken from Nature Conservancy Council Guidelines for the selection of biological SSSIs (1989) and JNCC’s Herpetofauna Workers Manual (1998). Amphibian species found in waterbodies within 300m of each other and connected by suitable habitat are considered as the same population and as such, species population abundance is combined.

4.3 Sections NL 1- 5

Section NL 1

- 4.3.1 There were two ponds within Section NL 1 of the proposed scheme. Both were found to support amphibian populations. Based on the quality of the habitat, the populations present this section are assessed as being of **local** importance.

Table 8 – Section NL 1: Ecological Evaluation of Waterbodies

Waterbody	Evaluation
Kingswells North	Local
Kepplestone	Local

Section NL 2

- 4.3.2 One pond was surveyed in Section NL2 and supported a palmate newt population. This section is assessed as being of **local** importance due to its suitable habitat and newt population.

Table 9 – Section NL 2: Ecological Evaluation of Waterbodies

Waterbody	Evaluation
Craibstone Pond	Local

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Section NL 3

4.3.3 Five ponds were surveyed in Section NL3, with moderate quality terrestrial and aquatic vegetation. Based on the quality of habitat and the populations of amphibian present, this section is assessed as being of **local** importance.

Table 10 – Section NL 3: Ecological Evaluation of Waterbodies

Waterbody	Evaluation
Pitmedden House	Less than local
Gravel Pit I	Local
Gravel Pit II	Local
Gravel Pit III	Local
Gravel Pit IV	Local

Section NL 4

4.3.4 The two ponds were surveyed in Section NL4; both supported amphibians, and assessed as being of **local** importance for the amphibians.

Table 11 – Section NL 4: Ecological Evaluation of Waterbodies

Waterbody	Evaluation
Goval reservoir	Less than local
Corsehill	Local

Section NL 5

4.3.5 The amphibian populations discovered in the seven ponds surveyed in Section NL5 indicate an overall **local** importance.

Table 12 – Section NL 5: Ecological Evaluation of Waterbodies

Waterbody	Evaluation
Loch-Hills Farm	Local
Loch Greens pond	Less than local
Sand Pit	Local
Cranbog	Local
Middlefield	Local
Black Dog I	Less than local
Black Dog II	Less than local

5 Potential Impacts

5.1 Generic Impacts

- 5.1.1 There are many aspects of road construction and operation that can have adverse impacts on amphibian populations. The DMRB (Highways Agency 2001) identifies the potential impacts that road developments may have on amphibians. It should be noted that the impacts associated with the operational phase of the scheme are considered to be permanent, whereas temporary impacts, which are only apparent while the road is being built, are discussed in association with the construction phase.

Direct Mortality

Construction

- 5.1.2 Direct mortality of amphibian species is highly dependant on the time of year that works are conducted. When amphibian species are in their breeding habitat (e.g. early spring/early summer), construction works resulting in destruction or pollution of that waterbody would result in the greatest risk of mortality. However, if construction were to take place from late-summer to early spring, mortality would mainly occur to amphibian species in adjacent terrestrial habitats. The risk of mortality would increase the closer the destruction of terrestrial habitat is to a waterbody. If the loss of amphibians is sufficiently high, then amphibian populations could become locally extinct. Any amphibians in close proximity to the waterbody while migrating or feeding could be trampled or killed by the wheels of machinery. During late October to early March amphibians present in any hibernacula destroyed during site clearance and top-soiling, would be killed or die through exposure.

Operation

- 5.1.3 Amphibian mortality on roads is most obvious during breeding migrations in the early spring when hundreds of individuals may be lost on a single night within a short stretch of road (Highways Agency, 2001). A study undertaken by SNH (1994) estimated that 20-40% of breeding amphibians are killed each year from road traffic accidents (RTAs). The impact of such mortality on the wider population will vary according to a range of factors such as the proximity of the road to the breeding site, the proportion of the population that crosses the road and the volume of traffic on the road.

Habitat Loss

Construction & Operation

- 5.1.4 Although habitat loss would occur during the construction phase of the road, the associated impacts are regarded as being relevant to the operational scheme since the habitat loss would be permanent. The direct loss of breeding ponds is the most obvious impact. Any loss of aquatic habitat can potentially lead to a reduction of breeding habitat, possibly resulting in a localised decrease in breeding success, especially in areas that have a low pond density. In addition, the loss of pond habitats can have severe impacts on the metapopulation structure of amphibians by reducing the density of ponds within an area and isolating potentially non-viable populations.
- 5.1.5 Direct loss of certain terrestrial habitats is also important as such habitats are essential in supporting a substantial phase of an amphibian's life cycle. Land-take required for the construction of the proposed scheme, access roads and construction of temporary onsite installations has the potential to adversely affect amphibians. Refer to Table 11 in the Terrestrial Habitats report (Appendix A10.1) for information regarding specific habitat loss.

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- 5.1.6 Habitat loss over 250m from a breeding pond is unlikely to have a significant effect on amphibian populations (English Nature 2001), while Oldham (1994) concluded that blocks of suitable habitat less than 0.4ha within 250m of a waterbody are unlikely to support a viable population.
- 5.1.7 Valuable amphibian habitat includes semi-improved grassland, scrub and woodland, wet and dry modified bog, swamp, marshy grassland and tall ruderal herb and fern. Loss of this habitat would reduce available refugia, hibernation sites and feeding opportunities and lead to exposure, predation and failure to breed. All of these effects have the potential to reduce recruitment and ultimately population size.
- 5.1.8 Alteration of natural drainage (e.g. seepage lines, burns and springs) and artificial drainage (e.g. ditches and land drains) systems, as a result of road construction, may have a significant effect on amphibian populations. Water levels in breeding ponds may be critically raised or lowered such that conditions become less suitable or even unsuitable for some amphibian species (Highways Agency, 2001).
- 5.1.9 During the operational phase maintenance operations and vegetation management could potentially result in short-term periodic terrestrial habitat loss.

Habitat Fragmentation and Isolation

Construction & Operational Phases

- 5.1.10 Previous studies have shown roads to be a significant barrier to amphibian dispersal, interrupting migration between terrestrial and aquatic habitats (Voss, 1995). Reduced dispersal between populations can lead to breeding ponds becoming isolated from the terrestrial habitat used by amphibians during non-breeding stages of their life cycle. In addition, the barrier effect of new roads can result in populations becoming isolated, increasing the risk of local extinction and genetic impoverishment. It is possible that amphibian populations living near major roads may be reduced in size dramatically or lost completely after 5-10 years exposure (Highways Agency, 2001).

Disturbance

Construction & Operation

- 5.1.11 Artificial lighting has been shown to affect the feeding behaviour of nocturnal frogs reducing their visual acuity and ability to find prey (Buchan 1993). It is reasonable to assume that the effect of light disturbance could also affect nocturnal native amphibian species. If roadside lighting at junctions illuminates areas of feeding habitat adjacent to the road then it may constitute a disturbance impact to amphibians.

Pollution and Other Indirect Impacts

Construction

- 5.1.12 Accidental spills during construction of the proposed scheme could potentially contaminate breeding ponds and terrestrial habitat, resulting in a hazard to amphibians. The magnitude of this impact would depend on the volume and toxicity of the substance entering the waterbody. There is also the potential for sediment runoff to block rain seepage lines and alter the depth and size of the pond, adversely affecting resident amphibian populations

Operation

- 5.1.13 Inorganic diffuse runoff from the road could pollute waterbodies, adversely affecting amphibian populations. The use of salt to de-ice roads in winter may have adverse impacts on amphibians in areas close to the road.

5.2 Specific Impacts

- 5.2.1 Since habitat loss over 250m from a breeding pond is unlikely to have an effect on amphibian populations (English Nature 2001), only ponds that support amphibians and are within 250m of the alignment are considered in this section (see Table 13).
- 5.2.2 The distance of a pond from the proposed scheme and the number of amphibians it supports would have a significant bearing on the magnitude of impact. The impact to ponds further away would be Negligible. Loch Greens pond is in the direct line of the proposed alignment and would be totally destroyed during construction but due to its less than local importance, its sub-optimal habitat and that no amphibians were recorded it will not be considered for specific mitigation.
- 5.2.3 Fifteen ponds were surveyed and the amphibian species associated with seven ponds would be directly impacted (see Table 13).

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Table 13– Assessment of Potential Impacts

Pond Name	Chainage	Impact Description	Potential Impact	
			Magnitude	Significance
Kepplestone	ch315400	Direct Mortality <u>Construction</u> Amphibians are likely to suffer direct mortality during site clearance of a strip of sub-optimal habitat under the footprint of the scheme	Low negative	Minor
		<u>Operation</u> Amphibians are unlikely to be affected by the operational scheme as the terrestrial habitat between the pond and the alignment is of low quality	Low negative	Minor
		Habitat Loss <u>Construction and Operation</u> Loss of low value terrestrial habitat comprising marshy grassland and willow.	Low negative	Minor
		Habitat Fragmentation & Isolation <u>Operation</u> The scheme would act as a barrier to amphibian movements between the pond and habitats to the east of the scheme. However, corridors of hedgerows provide dispersal; routes to high value habitat to the north of the pond.	Low negative	Minor
		Disturbance <u>Construction and Operation</u> Pond is 200m away from scheme so disturbance is likely to be minimal.	Negligible	Negligible
		Pollution & Other Indirect Impacts <u>Construction and Operation</u> The pond is sufficient distance from the alignment that pollution incidents are likely to be minimal.	Negligible	Negligible
Craibstone	ch317140	Direct Mortality <u>Construction</u> Amphibians are likely to suffer direct mortality as a result of the destruction of woodland in Craibstone, Parkhead and Chapel Croft Woods, where amphibians are likely to seek refuge.	High negative	Minor
		<u>Operation</u> Road mortality is likely to occur when remaining amphibian populations are dispersing to and from the pond during spring and autumn respectively. The scheme is very close to the pond and thus potentially large numbers of amphibians may be killed as they attempt to cross the scheme. Further mortalities may occur during vegetation clearance along road embankments and cuttings.	High negative	Minor
		Habitat Loss <u>Construction and Operation</u> High value terrestrial habitat comprising mixed woodland would be lost.. Further loss of habitat is likely to occur through the siting of works compounds and storage areas.	High negative	Minor
		Habitat Fragmentation & Isolation <u>Construction and Operation</u> The scheme would act as a barrier to amphibian movements, preventing amphibians from reaching high value terrestrial habitat to the east of the alignment. While ample high value terrestrial habitat exists, amphibians migrating to the pond in spring would be prevented from reaching it thus affecting breeding success.	High negative	Minor

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Pond Name	Chainage	Impact Description	Potential Impact	
			Magnitude	Significance
Craibstone [cont'd]		Disturbance <u>Construction</u> The pond is less than 10m away from the scheme alignment and therefore amphibians in both aquatic and terrestrial habitat would be vulnerable to disturbance from plant personnel, lighting and machinery.	Medium negative	Minor
		Pollution & Other Indirect Impacts <u>Construction and Operation</u> The close distance of the pond to the scheme increases the chances of pollution incidents occurring.	Medium negative	Minor
Goval Reservoir	ch324600	Direct Mortality <u>Construction</u> Direct mortality as a result of the destruction of a strip of woodland 160m south of the waterbody, although the majority of amphibians are likely to be present in the terrestrial habitat immediately surrounding the pond.	Low negative	Minor
		<u>Operation</u> Road mortality is likely to occur during spring and autumn dispersal. However, only small numbers of amphibians are likely to cross the proposed scheme as the majority of favourable habitat lies on the same side of the alignment as the waterbody.	Low negative	Minor
		Habitat Loss <u>Construction and Operation</u> High value terrestrial habitat (mixed woodland) would be lost.	Negligible	Negligible
		Habitat Fragmentation & Isolation <u>Operation</u> The scheme would act as a barrier to amphibian movements between the pond and the strip of woodland adjacent to Goval Burn. However, ample high value habitat exists to the north of the alignment.	Low negative	Minor
		Disturbance <u>Construction and Operation</u> Pond is 250m away from proposed scheme so disturbance is likely to be minimal.	Negligible	Negligible
		Pollution & Other Indirect Impacts <u>Construction and Operation</u> The pond is sufficient distance from the alignment that pollution incidents are likely to be minimal.	Negligible	Negligible
Corsehill	ch325100	Direct Mortality <u>Construction</u> Pond would be destroyed by construction of the road scheme as will terrestrial habitat during site clearance. High risk of mortality to newts in pond and surrounding terrestrial habitat.	High negative	Minor
		<u>Operation</u> Road mortality likely to occur when amphibian populations are dispersing to/ from breeding ponds during spring and autumn respectively. However, only small numbers are likely to cross the scheme and therefore the risk of mortality would be low.	Medium negative	Minor
		Habitat Loss <u>Construction and Operation</u> Aquatic habitat and low value terrestrial habitat comprising wet grassland and large rock pile would be lost.	Medium negative	Minor

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Pond Name	Chainage	Impact Description	Potential Impact	
			Magnitude	Significance
Loch Hills Farm	ch326500	Direct Mortality <u>Operation</u> Road mortality is likely to occur when amphibians are moving between the pond and woodland/grassland to the north of the alignment at ch326500. Amphibians are unlikely to be killed as a result of the operational road due to the unfavourable nature of the habitat between the pond and the scheme acting as a barrier to movement between the two.	Negligible	Negligible
		Habitat Fragmentation & Isolation <u>Operation</u> The scheme would form a barrier to amphibian movements between the pond and woodland grassland habitat north of the scheme. However, ample suitable terrestrial habitat exists to the south of the alignment.	Low negative	Minor
Blackdog I & II	n/a	Direct Mortality <u>Construction</u> Site clearance activities associated with the provision of works compounds and access roads may result in amphibian mortalities. Amphibians are likely to suffer direct mortality as a result of the destruction of terrestrial habitat surrounding the waterbody.	Low negative	Minor
		Habitat Loss <u>Construction and Operation</u> Low value terrestrial habitat comprising wet grassland and scrub would be lost.	Low negative	Minor
		Habitat Fragmentation & Isolation <u>Operation</u> The pond is already isolated by the A90 so the scheme is unlikely to impact upon amphibian migration.	Negligible	Negligible
		Disturbance <u>Construction</u> Compounds sited in the vicinity of the pond are likely to disturb hibernating amphibians.	Low negative	Minor
		Pollution & Other Indirect Impacts <u>Construction and Operation</u> The proximity of the pond to the scheme makes it susceptible to pollution incidents.	Low negative	Minor

6 Mitigation

6.1 Rationale

- 6.1.1 The results of the survey indicated relatively low amphibian populations of species that do not receive high levels of statutory protection. Therefore, while many ponds support amphibian populations that are of local importance, no populations were evaluated as being of county importance or greater. Consequently, all adverse impacts on amphibians have been assessed as being of Minor significance, and generic mitigation measures, as described below, are considered sufficient to reduce the impacts to Negligible significance. However, where impacts involve the destruction of ponds, and result in impacts of medium or high negative magnitude, specific mitigation measures are identified.
- 6.1.2 The impacts on pond habitats are included in the Terrestrial Habitats Report (A10.1), and are not dealt with in detail here. However, it is important to note that pond habitats are considered to be an important biodiversity resource in northeast Scotland and are a priority habitat in the NES LBAP (NES LBAP, 2005). Therefore, the mitigation measures to offset the loss of pond habitats as a result of the proposed scheme involve the creation of riparian habitats with wetland areas as appropriate, close to the existing pond where possible.
- 6.1.3 The creation of riparian incorporating wetland to offset loss of pond habitat will provide appropriate mitigation for amphibian habitat lost as result of the construction of the proposed scheme. Correct siting of replacement will ensure that metapopulation connectivity is maintained and will offset the adverse impacts associated with genetic isolation of widely dispersed populations.
- 6.1.4 The following section outlines the mitigation measures that will be implemented in the current scheme. These measures are largely based on recommendations given in the DMRB: Nature Conservation Advice in Relation to Amphibians (Highways Agency 2001), Great Crested Newt Mitigation Guidelines (English Nature 2001) and The Herpetofauna Workers Manual (Gent and Gibson 1998), all of which provide 'best practice' guidance for construction and improvements of new schemes in relation to amphibians. The techniques recommended are widely applied in the UK and across Europe, and aim to prevent activities that put amphibians in danger, reduce the impacts on amphibian populations and offset damage to habitat by compensating for any habitat loss.

6.2 Generic Mitigation

Direct Mortality

Construction

- 6.2.1 In order to prevent and reduce numbers of amphibian mortalities, destructive searching of terrestrial habitat will be undertaken prior to site clearance (Appendix A10.12: Reptiles). This destructive searching makes the habitat unsuitable for amphibians and should be carried between March-October when amphibians are active and out of hibernation. Amphibians captured during this procedure should be relocated to pre-identified areas that are sheltered and close to a suitable refuge or pond, in weather conditions conducive to activity.
- 6.2.2 Adopting best practice guidelines such as restricting works to a prescribed working corridor will also reduce the number of amphibians killed during construction of the scheme.
- 6.2.3 Where ponds would be destroyed, best practise measures should be undertaken to ensure that no or very few amphibians remain, which could involve netting, bottle trapping and draining down.

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Operation

- 6.2.4 The drainage design of the proposed scheme has been developed following Sustainable Urban Drainage Systems (SUDS) guidance, as described in Chapter 9 (Water Environment). This will minimise the potential for accidental pollution of water features.

Habitat loss

Construction & Operation

- 6.2.5 Destruction of aquatic and terrestrial habitat will be offset through the creation of riparian and wetland habitats as part of the mitigation for other species like otters and water voles. These habitats will directly benefit amphibians and are sufficient to compensate for this loss.

Habitat Fragmentation and Isolation

Construction and Operation

- 6.2.6 Mitigation proposals to offset for impacts on other ecological receptors is likely to mitigate for fragmentation and severance on amphibians. This will be through compensatory planting and landscaping of road verges and additional habitat creation areas. Underpasses provided for badgers and otters (see Badger and Otter Reports in Appendices A10.2 and A10.6 respectively) should also allow reduce fragmentation of habitat used by amphibians..

Disturbance

Construction

- 6.2.7 Disturbance to amphibians during the construction phase would be unavoidable although it can be reduced through siting construction compounds and storage areas away from waterbodies and high value terrestrial habitat. All plant and personnel will be restricted to working within a prescribed working corridor.

Operation

- 6.2.8 To reduce light pollution, trees, scrub and marginal vegetation can be planted between and around any receptor ponds that would enhance the habitat and prevent light disrupting feeding/breeding amphibians.

Pollution and Other Indirect Impacts

Construction

- 6.2.9 All contractors must adhere to SEPA pollution prevention guidelines PPG1, PPG3 and PPG5 and follow 'best practice' standards regarding minimising the amounts of airborne debris or other potential pollutants.

Operation

- 6.2.10 During operation, effective drainage systems will minimise the impacts of road runoff and reduce the risk and impact of spill events as explained in ES Chapter 9 (Water Environment).
- 6.2.11 Drainage systems will include features to divert run-off into drains, soak-aways and balancing ponds thus avoiding contamination of watercourses.

6.3 Specific Mitigation

Rationale

- 6.3.1 The implementation of generic mitigation measures as detailed in Section 6.2 above will be sufficient to alleviate the impacts of the proposed scheme on amphibian populations. However, a number of ponds would be lost, and to offset these impacts habitat creation is proposed. Where the loss of ponds also results in the loss of amphibian populations, the creation of replacement habitats will provide specific mitigation to offset adverse impacts of high magnitude. Specific mitigation measures are detailed below and are included in the Terrestrial Habitats Report (see Appendix A10.1). Waterbodies that are likely to receive direct or indirect impacts but had no amphibian interest at the time of survey will not be considered below. Only terrestrial habitat directly under the route alignment will be considered for destructive searches.

Craibstone Pond

- 6.3.2 Destructive searches of the terrestrial habitat within the footprint of the proposed scheme in Parkhead, Craibstone and Chapel Croft Woods will be undertaken between ch316700-317350. The loss of this terrestrial habitat will be offset through the creation of mixed woodland and riparian habitats as part of other species mitigation designs. The loss and severance of suitable terrestrial habitat will be offset by providing hibernacula (log/brush piles) in the local vicinity of Craibstone Pond.

Goval Reservoir

- 6.3.3 Destructive searches of the terrestrial habitat within the footprint of the proposed scheme will be undertaken at ch324500 where a strip of mixed woodland would be lost (see Figure 10.9e).

Corsehill Pond

- 6.3.4 The loss of Corsehill Pond will be offset through the creation of a new pond and marginal habitat.
- 6.3.5 In addition, a destructive search of the wet grassland habitat surrounding the pond will be undertaken.

7 Residual Impacts

Direct Mortality

- 7.1.1 With mitigation, the proposed scheme is unlikely to compromise the long-term survival of amphibians in the study area. However, despite adopting a precautionary principle when destroying ponds and clearing terrestrial habitat, it is still likely that small numbers of amphibians would be killed. The magnitude associated with this impact is low negative and the residual significance is **Minor** in all five sections of the proposed scheme.

Habitat Loss

- 7.1.2 The road would result in the loss of three ponds and terrestrial habitat suitable for amphibian habitation. In general, there is ample existing habitat for amphibians in the study area and in conjunction with the creation of riparian/wetland habitat, newly created terrestrial habitat for amphibians and other species, and the careful siting of construction compounds, the residual magnitude and significance of this impact will be reduced to **Negligible**.

Habitat Fragmentation and Isolation

- 7.1.3 The provision of fauna over/underpasses and habitat creation will help reduce the effects of this impact although the road will still act as a barrier to amphibian migration. This impact is therefore

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assessed as being of low negative magnitude and **Minor** residual significance in all five sections of the proposed scheme.

Disturbance

- 7.1.4 Disturbance would be unavoidable although if basic measures are followed such as siting compounds and machinery away from areas likely to harbour amphibians, as indicated in the mitigation section, disturbance can be alleviated. The residual impacts are assessed as being of negligible magnitude and **Negligible** significance in all five sections of the proposed scheme.

Pollution and Other Indirect Impacts

- 7.1.5 The water quality mitigation proposed in Chapter 9 of the ES will minimise the potential for pollutant escape into ponds, and therefore the magnitude and significance of impact associated with these are assessed as being **Negligible** in all five sections of the proposed scheme.

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Annex 1

Objective System for Scoring Amphibian Assemblages

Feature	Observation	Score
Species assemblage	Presence of smooth newt, palmate newt, frog, toad	1 point for each present
	Presence of great crested newt	2 points for presence
Species abundance	Smooth newt, palmate newt, frog, toad estimated to be over 500 but less than 1,000 adults	1 point per species meeting this criterion
	Smooth newt, palmate newt, frog, toad estimated to be over 1,000 adults	2 points per species meeting this criterion
	Great crested newt populations estimated to be over 100 adults but less than 500 adults	2 points
	Great crested newt populations estimated to be over 500 adults	4 points
Local significance	Palmate newts in Midlands or East Anglia	2 points
	Great crested newts in south-west England, Wales or Scotland	4 points
Habitat quality	Assessment of pond and terrestrial habitat quality	No score – but note relevant features