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ENGLISH NATURE

Great crested newt mitigation guidelines

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Great crested newt mitigation guidelines

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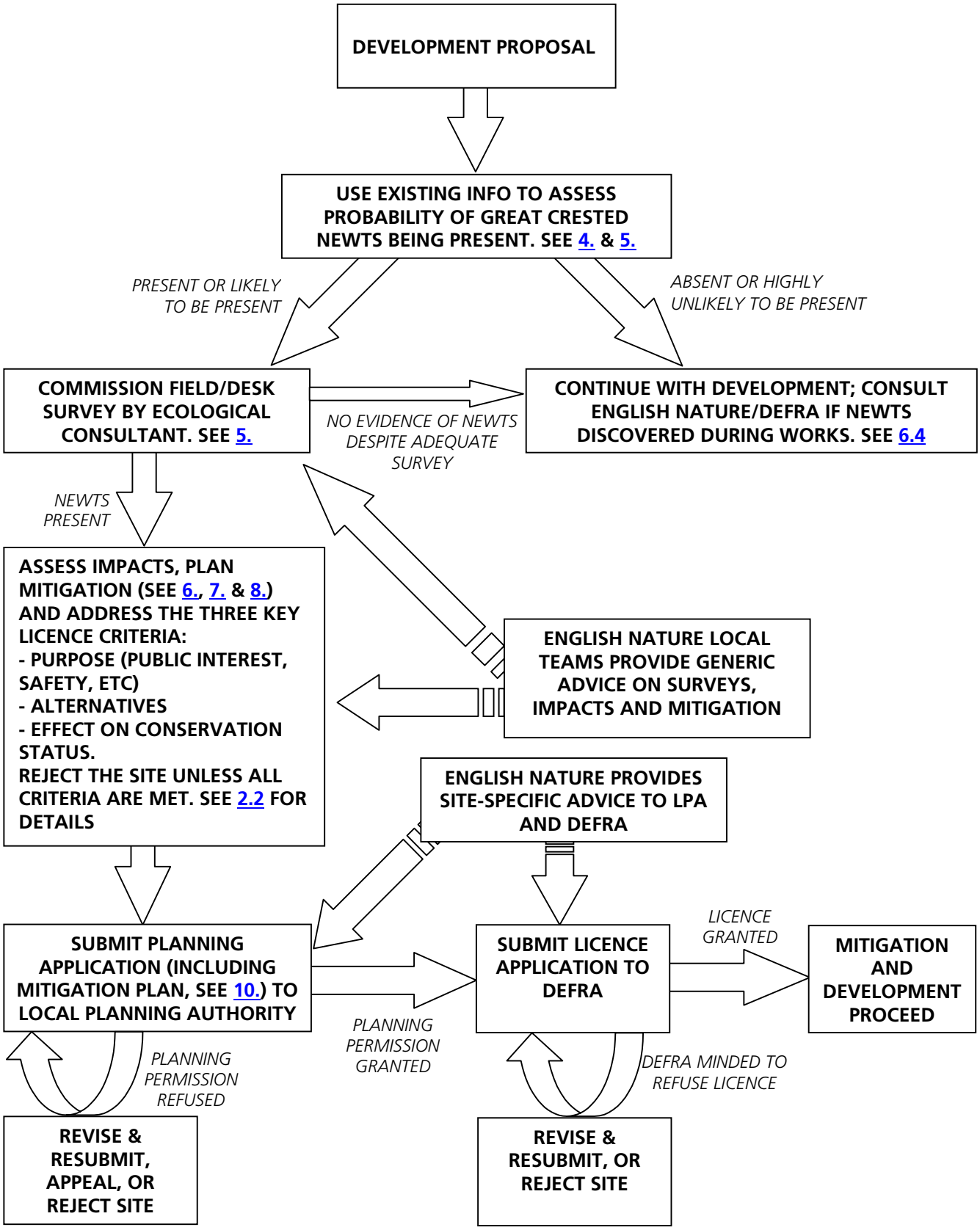
Key messages for developers:

- The great crested newt and its habitat are protected by law because the species has declined significantly over recent decades, largely due to habitat loss.
- Great crested newts breed in ponds but spend much of their lives on land, sometimes venturing several hundred metres from the pond. Their populations are often dependent on there being several ponds close together, linked by suitable land habitats.
- Great crested newts occupy a range of habitats, and occur in rural, suburban and urban areas. They are widespread across lowland England, but are less frequent in the far south-west, in upland areas, in intensively farmed landscapes and where there is a high degree of urbanisation.
- It is advisable to check for the presence of great crested newts as early as possible – ideally before any land purchase. Newt surveys can only be done at certain times of the year and therefore must be carefully programmed, otherwise considerable delays can occur. Alternative sites should be considered and surveyed at an early stage, as activities affecting newts can only be licensed where there is no satisfactory alternative.
- Before applying for planning permission, an appraisal of the impact of development on the newt population is required.
- Planning authorities are required to take account of great crested newts when considering planning permission, and may refuse applications on the basis of an adverse effect on newt populations. Insufficient appraisals can lead to delays or a refusal of planning permission. When granting permission, planning conditions or Section 106 agreements may be used to help ensure appropriate mitigation and aftercare.
- In order to undertake actions affecting great crested newts which would normally be prohibited by law (such as capturing newts, or filling in their breeding ponds), a licence is required. In a development context, a licence may be granted by the Department for Environment, Food and Rural Affairs, ideally after the developer has conducted initial liaison with English Nature. Usually a licence will only be granted after gaining planning consent (where applicable).
- In order to obtain a licence, it must be demonstrated that the project is for the purpose of preserving public health or public safety or other imperative reasons of overriding public interest.
- Mitigation to compensate for any impacts is likely to be a requirement of the licence, and may involve changes in timing of operations, capturing and excluding newts, setting aside land for newts, purchase of additional land, habitat creation, and post-development commitments to ensure the population is safeguarded. The level of mitigation required depends crucially on (a) the size and type of impact, and (b) the importance of the population affected.
- Some mitigation plans may impose a lead-in time of several months to a year before ground clearance or construction works can commence.
- Developments for which planning permission is not required still need to take account of great crested newts, and licensing may still be necessary.
- English Nature strongly advises developers to seek the services of a professional environmental consultant with proven experience in planning great crested newt mitigation, in order to assist with the above stages.
- This document gives generic technical advice to assist in assessing impacts and producing mitigation plans. It is important to note that the document gives general guidance and is not a full explanation of the legislation relating to great crested newts.

Figure 1: Main steps involved in ensuring that great crested newt issues are properly considered in developments requiring planning permission



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1. Introduction

1.1 Background

This document has been prepared to assist those involved with changes in land-use where great crested newts *Triturus cristatus* are known or suspected to occur. It concentrates on development and other changes of land-use which fall within the remit of the planning system, though it is also applicable to many projects not subject to planning permission. The guidelines should inform projects where there is potential conflict between great crested newts and the purpose of the development, rather than those whose prime aim is to promote the conservation of this species. The guidelines build on previously published information contained in English Nature's 'Great crested newts: guidelines for developers' (now withdrawn), and Herpetofauna Groups of Britain and Ireland's 'Evaluating local mitigation/translocation programmes: maintaining best practice and lawful standards.'

It is important to note that these guidelines are primarily aimed at informing the mitigation process itself, rather than the Local Planning Authority's decision on whether to grant planning permission for sites where great crested newts occur. Hence, nothing in this document should imply that development is acceptable on a given great crested newt site solely because the mitigation measures explained here are feasible at that site. Capturing and moving newts, and destroying their habitats, should only be considered as a last resort, and only when this forms part of a wider mitigation scheme that ensures the future conservation of the population. The Local Planning Authority and DEFRA (as the licensing authority) have other factors to consider, notably the purpose and need for development, and the consideration of alternatives, which are not explored in detail in these guidelines as such matters are largely outside English Nature's remit. Note also that these guidelines apply only to England; whilst some of the practical information will be of use to those operating in Wales and Scotland, differences such as separate legislation and planning arrangements mean that the guidelines will not be directly applicable in their entirety.

1.2 Conservation status of the great crested newt

The great crested newt has suffered a major decline in status in Britain over the last century. Studies of newt status are complicated by the fact that the majority of breeding ponds used over the last few hundred years were artificial. However, these would have taken the place of natural breeding sites lost through extensive drainage of wetlands, and there is good evidence that in many ways these artificial ponds mimic more natural breeding sites. Many ponds were built between the seventeenth and nineteenth centuries, largely for agricultural purposes, but these have been lost at a dramatic rate particularly since the Second World War. With new, piped water supplies, field enlargement and agricultural intensification, many ponds have been destroyed or left unmanaged, and surrounding habitats damaged. Unmanaged ponds can become silted up and over-shaded, leading to reduced viability as breeding sites. Development, in the form of residential, industrial and commercial buildings, has also destroyed ponds and associated terrestrial habitats. Though mineral workings have provided some good habitats for great crested newts, renewed workings and landfill have also damaged some of the largest sites. Newt habitats have become increasingly fragmented through development, roads and other unfavourable land-use; smaller, more isolated populations are more vulnerable to extinction than larger, well-connected populations. The loss of grassland, scrub, and woodland means that there are fewer opportunities for foraging, dispersal and hibernation. Inappropriate management has impacted on some populations. In recent years it has become increasingly recognised that fish

introduction can play a major role in local extinction, as many predatory fish species prey on great crested newt larvae.

Precise figures on the rate of decline are difficult to calculate primarily because of a lack of detailed historical data and a paucity of recent data for large areas of England. It is estimated that the locations of around two-thirds of great crested newt sites are currently unrecorded. However, many repeat survey studies have indicated a worrying rate of colony loss, well above that observed for other amphibians. Ecological studies have also indicated that in several ways the great crested newt's habitat requirements are more restrictive than that of the other species. Local and national surveys have estimated rates of colony loss in England at between 0.5% and 4% a year during the 1960s to 1990s; a conservative estimate gives around 40,000 great crested newt breeding pond losses in this period. Aside from this direct evidence, an array of studies demonstrated that the rate of pond loss in England over the last century has been considerable, and the inference must be that great crested newts have suffered because of this. For example, a 60% loss of field ponds in Cheshire between 1870 and 1960 has been documented. Though new ponds are being created, there is a long way to go before they compensate numerically for the massive twentieth century loss. Moreover, they do not offset past losses qualitatively since many new agricultural ponds are unsuitable for newts, due to their poor surrounding habitat or their function as duck or fish ponds.

A similar pattern of decline has also been noted across the European range of the great crested newt. However, England is thought to support a significant number of newt breeding sites on a European scale, and despite the declines outlined above the species is still fairly widespread in England. Indeed, in some areas it can be found in around 40% of ponds, though this appears to be exceptional. The widespread distribution should not raise false hopes, however, as the status of newt populations, and the prospects for their habitats even in these high density areas, give cause for unease as many threats are still prevalent. It is worth noting that the species may be found on 'brownfield' (previously built on) sites, and not just undeveloped land; with recent trends for the redevelopment of such areas there are fresh concerns for urban great crested newt populations.

The UK Biodiversity Action Plan (BAP) contains a great crested newt Species Action Plan (SAP), aimed at maintaining its existing range and population status, as well as increasing the number of populations through re-colonisation. The SAP calls for a wide range of actions to further the conservation of this species, such further survey, monitoring and the favourable management of sites. Importantly, in the context of this document, the SAP recognises the negative impact of development and includes actions for local authorities to identify known great crested newt breeding sites in Local Plans, and to encourage the retention of these populations.

1.3 Legal status and its implications for developers

In view of its status across Europe, the great crested newt has been listed on Annex IV of the EC 'Habitats and Species Directive' (see 2.1 Legislation). The domestic legislation which implements this directive, combined with other UK law, ensures that individual newts and their habitats are protected, and this has important implications for those who own or manage land where great crested newts occur. Whilst in recent years it has been a familiar complaint of some developers that great crested newts occur on construction sites more often than they would imagine for a strictly protected species, this situation in itself is of concern; indeed, one of the prime reasons for the decline of this species in some areas is loss of habitat through development. That such pressure continues underlines the need for safeguards. Unlike several other species subject to similar levels of protection, great crested newts

occur on habitats which are often prime development areas. By contrast, the hazel dormouse, which enjoys similar protection, is rarely encountered by developers since its primary habitat is established woodland, which is seldom subject to land-use change.

Guidance on the consideration that local planning authorities should give to nature conservation interests is contained in Planning Policy Guidance 9: Nature Conservation (October 1994) [note that a revised version is in preparation]. The presence of a protected species is a material consideration when the authority is considering a developmental proposal. The protected status afforded to great crested newts means planning authorities may require extra information (in the form of surveys, impact assessments and mitigation proposals), before determining planning applications for land proposed for a change of land use. Planning authorities may refuse planning permission solely on grounds of the predicted impact on protected species like the great crested newt. Recent case law has underlined the importance of obtaining survey information prior to the determination of planning consent (see 6.1). Areas known to be of significance for the great crested newt may be excluded from development by appropriate allocation in Local Plans. Designations of various kinds, both statutory and non-statutory, may further protect individual sites. Although the presence of great crested newts does not always preclude a land parcel from development, planning and licensing controls may limit the extent of disturbance, the timing of activities, and may well stipulate compensatory measures. Conditions and legally binding arrangements such as Section 106 agreements are often used to this end.

1.4 Development, mitigation and compensation

In this document, the term 'development' is used to cover common forms of land use change or operations that have the potential to negatively impact on great crested newt populations. Typical examples would be the construction of housing developments, retail outlets and factories, and the extraction of aggregates (all of which require planning permission), as well as pipeline or rail projects (which may constitute permitted development and hence not require permission). Likewise, the term 'developer' is used herein to cover individuals, companies or organisations responsible for undertaking these activities, and not simply members of the construction industry.

Where the proposed development will affect land known to be used by great crested newts, consideration needs to be given to the likely impact on the population(s). Even when planning permission is given, or the activity does not require such permission, the wildlife legislation applies; great crested newts and their habitats are still protected. In some cases, this situation may be resolved by the issuing of a licence to facilitate mitigation, which is the term used to cover measures to protect the newt population from damaging activities and to reduce or remove the impact of development; this will often involve trapping and exclusion. Normally, compensation for the loss of habitat is also required, and this often takes the form of habitat creation, restoration or enhancement. Such a programme of mitigation and compensation should allow the conservation status of great crested newts to be maintained or enhanced following development, thus meeting one of the licensing criteria (see 2.2 Exceptions and licensing). Note that in this document, the term 'mitigation' is generally used in its broad sense, to encompass both compensation and mitigation.

1.5 Responsibility for achieving successful outcomes

In order to successfully address land-use conflicts where great crested newts are involved, a number of stages are necessary; these are outlined in Figure 1 and the roles of each key player are given in 3. Roles and responsibilities. The Sustainable Development initiative and the Biodiversity Action Plan

confer general responsibilities on all participants in the development process to take account of protected species. Some important messages resulting from these responsibilities are given here:

For developers: Sustainable Development should be a guiding principle when progressing proposals, and resolving wildlife issues requires specialist ecological knowledge. English Nature recommends that developers seek the services of a professional advisor (environmental consultant) when protected species issues arise in connection with proposed development. Contact details for environmental consultants can be obtained from a number of sources, including their professional bodies and published directories. Two such directories are: the *ENDS Environmental Consultancy Directory* (Environmental Data Services; www.ends.co.uk/consultants/), and the *Directory of Ecologists and Environmental Managers* (IEEM).

For consultants: In order to successfully resolve most great crested newt issues, consultants should have a sound knowledge of, and experience with, the species. A thorough grounding in pond ecosystems in general, including an understanding of hydrology, aquatic vegetation and invertebrates, can be crucial to good survey and mitigation planning. Consultants are expected to apply landscape ecology principles so that the local circumstances relating to a particular development proposal can be interpreted using these generic guidelines. The outline mitigation plan structure (see 10. Presenting mitigation plans) should be used where appropriate. It is expected that consultants will provide advice to clients, and information to English Nature, planners and others, in an impartial and accurate manner. Should cases come to light where consultants appear to have wilfully or negligently misrepresented a situation or site details, English Nature will consider bringing its concerns to the attention of the relevant client and, if applicable, the professional body. The UK Government has underlined obligations under international wildlife legislation by making it an offence under Regulation 46 of the Conservation (Natural Habitats &c.) Regulations 1994 and section 17 of the Wildlife and Countryside Act 1981 to knowingly or recklessly make false statements for the purpose of obtaining a licence, whether for oneself or for another.

General: These guidelines are intended to provide generic advice, and are not meant to be taken as a rigid set of rules. Individual sites vary considerably in terms of population status, habitat type, connectivity, etc, and the potential impacts of different types of development also vary, so it would be impossible to develop an all-encompassing document. Decisions should be made on a site-by-site basis. The methods described are those considered to be practical and effective based on past experience, but this does not mean that other methods are inappropriate or unlawful. Similarly, the levels of mitigation effort suggested herein are based on available information, and do not necessarily constitute a statement of the lawful minimum. It would be for a court to decide as to whether an offence has been committed. The legislation does not specify mitigation methods; it prohibits certain actions. Developers and their consultants may wish to take their own legal advice to provide an interpretation of the law. Notwithstanding the above caveats, these guidelines are currently the most detailed, readily available source of information on mitigation for great crested newts and it is strongly recommended that developers and consultants take them into consideration. Should legal proceedings be initiated, these guidelines will be used as a record of English Nature's approach to best practice, which may have a bearing on the definition of reasonable effort.

2. Legislation and licensing

Note: The information given in this section is intended as general guidance on the law relating to great crested newts and development, and is not comprehensive. When dealing with individual cases, readers should consult the full texts of the legislation, and obtain their own legal advice if necessary. Web addresses for the texts of legislation are given in 11. Further reading.

2.1 Legislation

The Wildlife and Countryside Act 1981 (as amended) transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (commonly referred to as the 'Bern Convention'). The 1981 Act was recently amended by the Countryside and Rights of Way ['CRoW'] Act 2000. The great crested newt is listed on Schedule 5 of the 1981 Act, and is therefore subject to the provisions of Section 9, which make it an offence to:

- Intentionally kill, injure or take a great crested newt [Section 9(1)]
- Possess or control any live or dead specimen or anything derived from a great crested newt [Section 9(2)]
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt [Section 9(4)(a)]
- Intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for that purpose [Section 9(4)(b)]

The Conservation (Natural Habitats &c.) Regulations 1994 (the Habitats Regulations) transpose into UK law Council Directive 92/43/EEC of 21st May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (often referred to as the 'Habitats [and Species] Directive.') The great crested newt is listed on Annex II and Annex IV of the Directive. The former Annex relates to the designation of Special Areas of Conservation (SACs) for this species; even where great crested newts occur outside SACs, the inclusion on Annex II serves to underline their conservation significance. Inclusion on Annex IV ('European protected species') means that member states are required to put in place a system of strict protection as outlined in Article 12, and this is done through inclusion on Schedule 2 of the Regulations. Regulation 39 makes it an offence to:

- Deliberately capture or kill a great crested newt [Regulation 39(1)(a)]
- Deliberately disturb a great crested newt [Regulation 39(1)(b)]
- Deliberately take or destroy the eggs of a great crested newt [Regulation 39(1)(c)]
- Damage or destroy a breeding site or resting place of a great crested newt [Regulation 39(1)(d)]

The legislation applies to all life stages of great crested newts.

2.2 Exceptions and licensing

There are several exceptions (or 'defences') to the provisions listed in section 2.1 above. For example, a disabled great crested newt may be lawfully captured for the purpose of restoring it back to health for subsequent release, and 'mercy killing' of severely injured newts is also permissible without a licence. Both the 1981 Act and the Habitats Regulations provide a defence to the offences listed in section 2.1 above in cases where "*the act was the incidental result of a lawful operation and could not reasonably have been avoided.*" [Section 10(3)(c) of the 1981 Act and Regulation 40 (3)(c) of the Habitats

Regulations]. Readers may wish to seek their own legal advice as to the applicability of the exceptions. As there is a licensing system in place, it is generally recommended that this system is used (rather than proceeding with works without a licence and relying on exceptions if challenged).

Licences permit otherwise unlawful activities, and can only be granted for certain purposes. English Nature issues licences for scientific, educational and conservation purposes. Surveys for great crested newts which involve otherwise unlawful acts (such as disturbance) may be authorised for scientific and educational purposes; this includes surveys of potential development sites. The Department for Environment, Food and Rural Affairs (DEFRA) issues licences for the purposes of "*preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment*" [Regulation 44(2)(e)].

In every case, a licence cannot be granted unless:

- "*There is no satisfactory alternative*" [Regulation 44(3)(a)], and
- "*The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range*" [Regulation 44(3)(b)].

'Favourable conservation status' is defined in the Habitats and Species Directive (Article 1(i)); one of the key aims of the Directive is to encourage member states to maintain at, or restore to, favourable conservation status those species of community interest (Article 2(2)). Conservation status is defined as "*the sum of the influences acting on the species concerned that may affect the long term distribution and abundance of its population within the territory*." It is assessed as favourable when:

- "*population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, or will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis*."

For the great crested newt, evidence of past and current decline indicate that its conservation status does not currently satisfy the criteria required for it to be taken as favourable. Hence, in order to obtain a licence to allow the capture of newts, destruction of breeding sites, etc, in advance of any otherwise legitimate development which further impacts on the status of great crested newts, it has to be clearly demonstrated that the damage will be adequately compensated for (to satisfy Regulation 44(3)(b)). Current English Nature advice is that there should be no net loss in local great crested newt status, taking into account factors such as population size, viability and connectivity. Hence, when it is unavoidable that a development will affect a great crested newt population, the mitigation should aim to maintain a population of equivalent status on or near the original site, and should address links to adjacent (indirectly affected) populations where present.

Note that even though there is apparent overlap between the 1981 Act and the Habitats Regulations, they run concurrently. Licences issued by DEFRA to permit capture, breeding site destruction, etc are issued under the Conservation (Natural Habitats &c.) Regulations 1994, and reflect the derogations in Article 16 of the Directive. It should also be noted that a licence only allows what is permitted

within its terms and conditions; it does not legitimise all actions related to great crested newts at a given site.

2.2.1 When is a licence required?

English Nature and DEFRA are frequently asked by consultants whether a licence is required for a particular activity. However, this is a decision to be made by the consultant. A licence simply permits an action that is otherwise unlawful. A licence should be applied for if, on the basis of survey information and specialist knowledge, it is considered that the proposed activity is reasonably likely to result in an offence (killing, breeding site destruction, etc – see above). No licence is required if, on balance, the proposed activity is unlikely to result in an offence. The advice given in this document should assist the consultant in arriving at a decision on this matter.

2.3 Interpretation and enforcement

As the legislation applies to a wide range of species, its provisions are generic in nature and there are no detailed definitions of, for instance, exactly what constitutes a 'resting place' for a great crested newt, nor what has to be proved to establish that an act could not reasonably have been avoided. Were a breach of the law to be alleged, a court would have to decide whether an offence did in fact occur. Note that under the 1994 Regulations, damaging or destroying a breeding site or resting place is an offence regardless of whether the act was deliberate or not.

The police are the main enforcement body for wildlife offences, and in some cases local authorities may also take action. Section 24(4) of the 1981 Act gives English Nature the function of providing advice or assistance to the police in respect of alleged offences. The maximum fine on conviction of offences under Section 9 and Regulation 39 currently stands at £5000. The CRoW Act 2000 amended the 1981 Act to allow for a custodial sentence of up to six months instead of, or in addition to, a fine. Note that fines may be imposed in relation to each offence committed, so operations involving many animals or repeated offences can potentially accrue large fines. In addition, items which may constitute evidence of the commission of an offence may be seized and detained. The CRoW Act 2000 also amends the Police and Criminal Evidence Act 1984 to render Section 9 offences 'arrestable', giving the police significant additional powers.

2.4 Other legislation

Once captured, great crested newts may become subject to the Protection of Animals Act 1911, which prohibits cruelty and mistreatment. Releasing a great crested newt in such a way as to cause undue suffering may be an offence under the Abandonment of Animals Act 1960. There are various statutory provisions relating to the transport of animals, designed to ensure their welfare. These provisions are taken into consideration in the guidelines in 8.6 Welfare considerations for capture programmes.

3. Roles and responsibilities

3.1 Introduction

In order for great crested newts to be protected successfully when development is planned, a number of organisations will need to interact. Each organisation has its own role, and in some cases its statutory duties, to carry out. This section spells out the roles and responsibilities of the main players in connection with development, with the intention of promoting more effective liaison.

3.2 English Nature

English Nature is the Government's statutory nature conservation advisor. In the current context it has the following functions:

- Provision of advice to Local Planning Authorities on European protected species issues, including consultations on planning applications where great crested newts are thought to occur (as described in PPG9)
- Provision of general advice to developers, consultants and others on protected species cases (through documents such as the current one; English Nature Local Teams may also provide site-specific advice, though this will be constrained by local circumstances)
- Provision of advice to Local Planning Authorities on forward planning (eg commenting on Local Plans)
- Provision of generic advice to Local Planning Authorities, including the legal background to protected species casework
- Determining applications for licences for great crested newt survey work
- Provision of advice to DEFRA over great crested newt licences applied for under Regulation 44, both generally and on a case-by-case basis
- Provision of specialist advice to those involved with enforcement (primarily the police).

Contact details (head office): English Nature, Northminster House, Peterborough PE1 1UA; tel 01733 455000; web www.english-nature.org.uk [for initial discussions about individual sites, the relevant Local Team should be contacted; contact details for Local Teams are available from the head office or the website].

3.3 The Department for Environment, Food and Rural Affairs

DEFRA has the following roles in connection with great crested newts and development:

- Assisting in the development of wildlife legislation
- Producing guidance for Local Planning Authorities on planning policy (notably PPG9)
- Determining licence applications for great crested newt activities under Regulation 44(2)(e) of the 1994 Regulations
- Determining planning applications which are 'called in' (public inquiry).

Contact details: Licensing Section, European Wildlife Division, DEFRA, Zone 1/08, Kite Wing, Temple Quay House, 2 The Square, Temple Quay, Bristol BS1 6EB; tel 0117 372 8291; fax 0117 372 8182; web www.defra.gov.uk/wildlife-countryside/ewd/index.htm .

3.4 Developers and environmental consultants

The developer and their advisor(s) share the responsibility for the following:

- Ensuring that they provide to Local Planning Authorities an accurate assessment of application sites, including surveys for great crested newts if their presence is suspected
- Applying for a licence to DEFRA should mitigation be required
- Providing a sound and objective assessment of the potential impact of proposed development on great crested newt populations
- Where necessary, designing and undertaking a mitigation scheme that meets planning and licensing requirements, and in particular will ensure as far as possible the long term future of any populations affected; such schemes should ideally employ 'best practice'
- Where necessary, agreeing with Local Planning Authorities a Section 106 agreement or similar, to ensure continued support for affected populations
- In many cases, monitoring affected populations after completion of development

3.5 Local Planning Authorities

Local Planning Authorities have the following roles:

- Ensuring that protected species issues are taken into account as a material consideration when determining planning applications, as set out in PPG9; this may involve refusal, deferral, conditions or agreements
- Ensuring that protected species issues are taken into account in preparation of Local Plans, UDPs, etc (this is best addressed through species protection policies in development plans, and allocations based on the distribution of great crested newts and their habitats). This and the above point are underlined by Regulation 3(4) of the Conservation (Natural Habitats &c.) Regulations 1994, which require authorities to have regard to the conservation of European Protected Species
- In order to achieve the above, developing means of assessing information on the presence of great crested newts, in order to better inform planning decisions; this may include the operation of Local Records Centres, or liaison with local voluntary groups
- Raise awareness of protected species in their area, and, in some cases, enforce wildlife legislation (s.25 of the Wildlife and Countryside Act 1981)
- According to information available, advising developers about statutory species protection provisions affecting an application site
- Enforcement of planning obligations

3.6 Other organisations

Enforcement of most relevant legislation is carried out by the police, and in most areas there is now a Wildlife Liaison Officer who will assist. The Environment Agency may have an involvement where water quality and drainage issues are raised; it also has a general remit to promote the conservation of wetland wildlife and may therefore comment to Local Planning Authorities on planning applications concerning great crested newt ponds. Local Records Centres often have useful information on the distribution of great crested newts, and can provide such details to consultants, developers and Local Planning Authorities (note that English Nature does not generally hold records of protected species except on designated sites). Similarly, local amphibian and reptile groups often collect data and may be able to provide a more detailed assessment of status; some may also be willing to undertake great crested newt surveys in advance of planning applications. Most of these voluntary groups are part of the Herpetofauna Groups of Britain and Ireland (HGBI) network, which has produced guidance for

the involvement of volunteers in development-related work, and has also developed guidance on mitigation standards (see 11. Further reading). The county Wildlife Trust may also be able to give advice about local great crested newt sites.

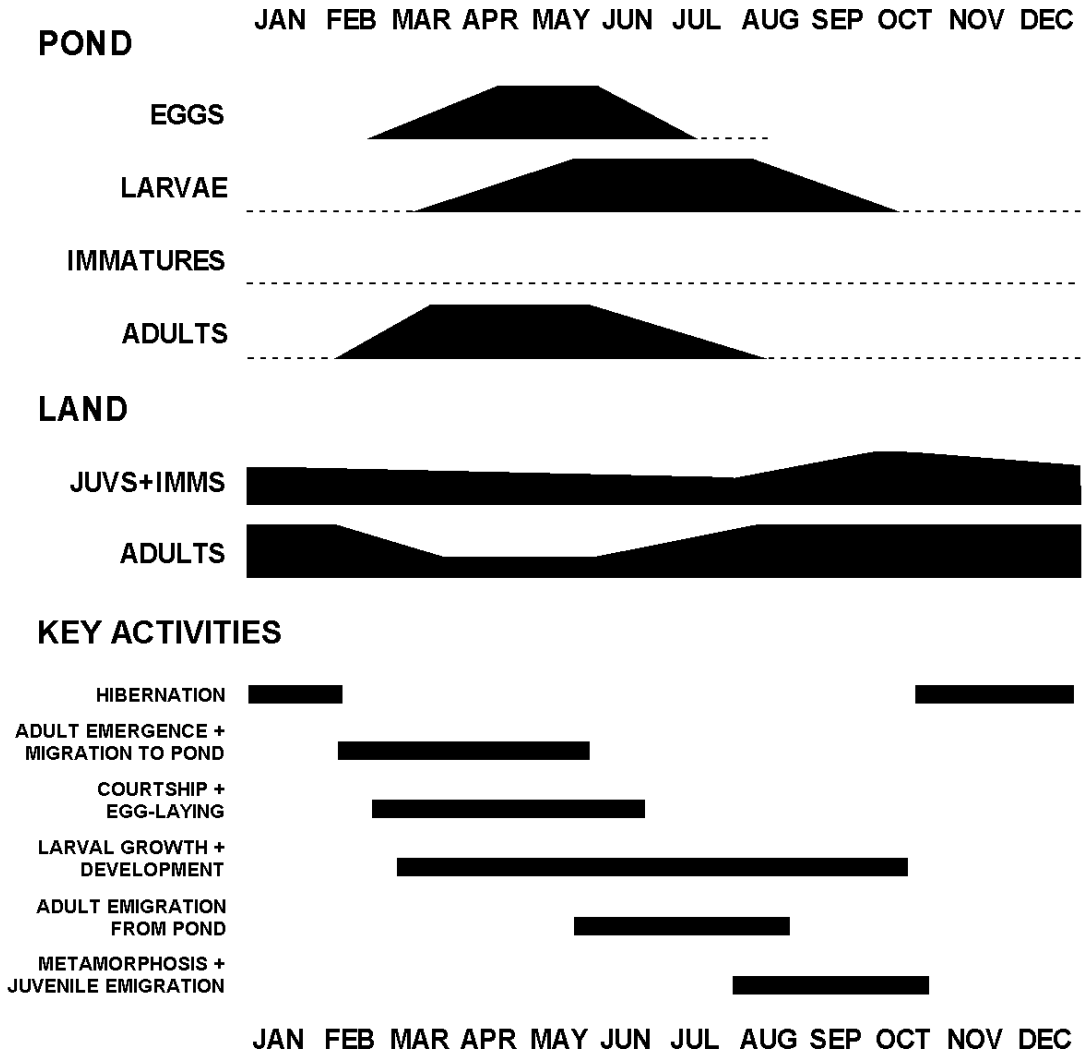
4. Introducing the great crested newt

4.1 General

In order to understand the potential effects of development work, and in turn to plan effective mitigation, it is essential to have a knowledge of great crested newt ecology. This knowledge is likely to be most relevant to environmental consultants, whose role it is to undertake site surveys, predict impacts and propose mitigation. English Nature and Local Planning Authority staff will also benefit from such understanding. This section is not intended as a comprehensive description of great crested newt ecology, as consultants are expected to have developed their own knowledge through study and field experience. It is meant as a general introduction, mainly for developers, to the great crested newt lifecycle and its habits. A range of more detailed references is given in 11. Further reading for those who wish to investigate more. Specialist amphibian conservation organisations, and local amphibian groups, are also a good source of knowledge about great crested newts in a given area.

Figure 2: The newt year

The upper two diagrams show the changes in the numbers of newts found in the breeding pond and in the surrounding terrestrial habitat. The thickness of the bar indicates the proportion of individuals; a dotted line indicates that small numbers of individuals follow this pattern at some sites. The lower diagram illustrates the timing of key activities in the newt life cycle. Based on typical, lowland, central England activity. Upper two diagrams modified after BHS (1996).



4.2 Summary of great crested newt ecology and habitat requirements

Like all British amphibians, great crested newts rely on waterbodies for breeding but otherwise they spend much of their lives on land (see Figure 2: The newt year). Some adult great crested newts commence migration to their breeding ponds as early as the first frost-free days in late January, but most move later, with the majority reaching the ponds by mid March. This movement, like most overland dispersal in the great crested newt, is influenced by a range of factors, notably evening temperatures and rain. Great crested newts are ectotherms (ie they rely on external heat sources to raise their body temperature to a level that allows activity) and have permeable skins, so most movement occurs when the air temperature is above around 5°C and there is, or has recently been, rain. Movement at night may reduce predation risk, and certainly makes desiccation (dehydration) less likely. This gradual migration to the breeding pond is in contrast to the shorter period of migration to ponds observed in frogs and toads.

The peak courtship and egg-laying period is normally from mid-March to mid-May. During this time, adult males attract females by undertaking a complicated courtship 'dance', which may result in the female taking up his sperm (in the form of a packet called a spermatophore) into her cloaca. Following this, the female lays eggs individually, mostly on the leaves of submerged plants. She may lay around 200 eggs per season, over a period of several weeks. The larvae hatch out after around 3 weeks, and then take another 2 to 3 months to complete larval development. During this time they feed on a range of prey, including small crustaceans, fly larvae, frog and toad tadpoles and other newt larvae. Adult newts generally leave the breeding ponds from late May onwards, this dispersal being gradual, and newts may return occasionally to feed. Adult males tend to remain in the pond for longer than females.

Once the larvae have completed metamorphosis (the transition from aquatic larvae to land-adapted juveniles, also called efts), they emerge from the pond. This emergence generally begins in early August and lasts for around two months. It then takes between 2 and 4 years to reach sexual maturity, during which time the immature newts will be largely terrestrial (based on land). Adults and immature newts spend the winter in places that afford protection from frost and flooding, often underground amongst tree roots, in mammal burrows, or above ground under suitable refuges like deadwood or rubble piles. Hibernation may last from October to February.

Whilst on land and outside of the hibernation period, great crested newts require refuge from extremes of weather, meaning that during the day they will rest in dense vegetation, under refuges, or underground. They will also forage on land, taking a range of invertebrate prey.

For their size, great crested newts are relatively long-lived animals. There is often a high mortality during the egg and larval stage (indeed, 50% of all eggs die before hatching due to a chromosome abnormality), but once on land year to year survival is relatively high. Post-metamorphic great crested newts have toxins in their skins which make them unpalatable to many predators, and this may aid survival. Exceptionally, adults can live for over 15 years, but the majority will survive only a few years past sexual maturity. Juvenile and immature animals normally outnumber adults considerably, though sometimes a cohort (the collective name for all animals hatched in a single year) may be reduced or absent because of poor survival, perhaps due to early pond drying.

Great crested newts in a given area often form a metapopulation, ie a series of sub-populations that are linked by dispersal of individuals. This system often applies to species which depend on habitats which vary in quality over time, and where the distribution of suitable habitats may change. Great crested newts often inhabit ponds that are part of a 'pond cluster', and individuals (and hence genes) may move between ponds with varying frequency. This ability to shift between locations is beneficial, for example, if a pond were to become less suitable for breeding through prolonged drought, as great crested newts may move to newly created or restored ponds. Small, isolated populations based on a single pond are normally less likely to persist in the long term. To some extent, the metapopulation concept complicates the study and conservation of this species, since impacts on a single pond may have knock-on effects on newts in nearby ponds.

Though adult newts often return to the same breeding site, they may also move between different ponds both within and between years. Adults may occasionally skip a reproductive season in order to move to a new pond. Dispersal to new sites may thus occur by both adult and immature newts. However, it would be very unusual for a given pond that was previously the centre of breeding activity for a viable population, to suddenly 'lose' its newts (unless a major catastrophe occurred, such as predatory fish introduction). Even if other, good quality sites were created nearby it is likely that a population would remain at the original site, but that some dispersal would occur resulting in breeding in the new ponds.

Great crested newts have been found to move over considerable distances (up to 1.3km from breeding sites). However, the vast majority of newts will inhabit an area much closer to the pond, and the exact distribution and migration patterns of newts on land depends on a variety of factors. The quality of terrestrial habitat near to breeding ponds is important, as are the lack of barriers to dispersal (such as fast-flowing rivers, or very busy roads). The distribution of ponds and hibernation opportunities may also influence movements. Only detailed survey at a given site will reveal the direction and amount of dispersal that occurs. Several studies have been conducted which reveal a great deal of variation, but great crested newts commonly move between ponds that are within around 250m of each other.

To summarise habitat requirements, great crested newts require waterbodies to be able to reproduce effectively, and these are typically ponds. Various types of ponds are used, most commonly medium sized ones, such as field ponds, clay pits, marl pits, moats, large ditches and quarry ponds. Great crested newts are most commonly found in lowland, neutral to high pH ponds, which are well-vegetated and not too shaded. Ponds that occasionally dry out in summer, even if this kills larvae, may still be suitable. The presence of predatory fish and a high density of waterfowl reduces the value of ponds, often to the point where they will not be used for breeding. Ponds not used by great crested newts for breeding can still be of importance for the population as they may support prey (for instance, temporary ponds used by frogs may be visited by adult newts). Terrestrial habitats are required for feeding, dispersal and hibernation, and typically this would include grassland, scrub, woodland, hedgerows, 'wasteground' or quarry floors. The key factors seem to be the availability of prey species combined with the presence of dense ground vegetation or voids in the substrate to allow refuge; shelters on the surface, such as logs and rocks, are also valuable. Great crested newts often occur in metapopulations, so connections between ponds (and between populations more distant) are also important.

The above account gives a general picture of great crested newt biology, based on a range of references given in 11. Further reading. Note that populations will be influenced by factors such as altitude,

weather, geology, vegetation and disturbance. For instance, it is known that at some sites, low numbers of adults remain in the pond to over-winter, and that in some populations (particularly in cool, upland, low nutrient areas) larvae regularly overwinter, to emerge the following spring.

5. Survey objectives, methods and standards

5.1 The importance of a good survey

The importance of a thorough site survey prior to considering development cannot be over-emphasised. The following descriptions of survey techniques and their correct application are aimed at assisting consultants (to appreciate the type of survey that is expected), the developer (to be assured that their consultant is recommending a survey to help them meet legal and policy requirements), and planning officers and English Nature staff (to be sure that an accurate assessment of the site and the extent of its population has been made). Without a sound survey that includes an assessment of all available evidence, it is difficult to accurately predict the impact of development.

5.2 Some general points on surveys

A survey for great crested newts may be indicated when background information on distribution suggests that they may be present. More detailed indicators are:

- any historical records for great crested newts on the site, or in the general area.
- a pond on or near the site (within around 500m), even if it holds water only seasonally. Note that muddy, cattle-poached, heavily vegetated or shady ponds, ditches and temporary, flooded hollows can be used by great crested newts
- sites with refuges (such as piles of logs or rubble), grassland, scrub, woodland or hedgerows within 500m of a pond

Note that if the proposed development site has been ploughed, soil stripped, or had ponds in-filled within the last four or so years, it should not automatically be assumed that the site will not support great crested newts. It is possible for this species to survive for several years on sites where the breeding pond has been destroyed. Survey data that are more than a few years old normally cannot be relied upon for details on which to base mitigation schemes, as populations and sites may change in nature and extent.

It is the responsibility of the developer to produce, normally via a consultant, evidence on the presence of great crested newts on a site at which works are proposed. It is for the consultant to decide on the level of survey required (taking these guidelines into account). English Nature will not generally agree or endorse the methods and effort prior to a survey, as this is not English Nature's role, and site circumstances vary considerably. However, if English Nature or the Local Planning Authority consider that an inadequate survey has been conducted, further work may be required of the developer and consultant. English Nature staff will generally visit sites only where there is an exceptional need to do so, so it is crucial that survey reports are thorough.

Considering the great variation between sites, it is not possible to give exact prescriptions for survey work here that will cover all circumstances. Therefore, survey proposals needs to be formulated on a site basis, and the experience of the consultant should help shape this. Survey projects must not involve any translocation or obstruction of great crested newts, aside from that which is required to fulfil the survey objectives. Surveys should not entail undue site damage or disturbance to the population.

Survey reports are expected to:

- State what the survey objective was, what work was done, by whom, and when. A suggested outline for survey reports within mitigation plans is given in 10. Presenting mitigation plans.
- Be clear and unambiguous, with appropriate evidence to support conclusions. For instance, it is unhelpful simply to state that a given area of habitat is 'good' or 'poor'; remember that the reader may not have visited the site and needs to understand the reasoning behind such assertions
- Contain relevant raw data as well as processed data, and any negative results obtained
- Contain contextual information, such as weather conditions, which may have affected results
- Contain good site descriptions (pond type, water depth, profile, aquatic vegetation description, degree of shading, terrestrial habitat descriptions, etc)
- Include a summary which is understandable by people without detailed knowledge of great crested newts.
- Be accessible to third parties. Note that as survey reports are used in the decision-making process for licences, they should not be confidential. Under the Environmental Information Regulations 1992, DEFRA (or English Nature) is obliged to make such information available to third parties on request wherever possible.

5.3 Setting survey objectives

Before setting foot in the field, it is important to define the purpose of the survey; in other words, why is it being undertaken? In turn, objectives for field survey can be set, the two most common objectives in relation to development being:

- Presence/absence survey: how likely is it that great crested newts use a particular area of land (typically a pond)?
- Population size class assessment: how large is the population of great crested newts?

The former may be a first stage, when assessing potential development sites from a list of several. Undertaking the latter will normally be required prior to applying for planning permission, to inform an opinion as to what effect development will have on a particular piece of land (see 6. Predicting the impact of development).

5.4 Survey area

As a minimum, the area of survey should normally cover any land which is proposed for development. For phased developments, the entire site should be surveyed, not just the first phase, and considered as a whole unit when assessing impacts and possible mitigation. Remember that as well as construction work itself, there are other development-related activities which can affect great crested newt sites (see 6.2 Major types of impact and their effects on populations). However, certain parts of the land may be excluded from survey if it is considered that (a) great crested newts are highly unlikely to be present (normally due to habitat unsuitability or distance from great crested newt locations), or (b) development on that area would not affect the great crested newt population. Examples include areas which are isolated from known newt sites because of barriers to dispersal, or areas of intensive land use which would preclude newt habitation. Ponds should not be excluded simply because they appear superficially unsuitable; even heavily shaded ponds may still support newts, and ponds containing fish should not always be disregarded as newt habitat.

For a common situation, where a plot of land containing a pond is proposed for development, the pond itself should be surveyed, and other ponds up to 500m away should also be checked, if it is

thought likely that great crested newt populations centred on these ponds would be affected by changes to the plot. The decision as to whether to survey other ponds will be influenced by surrounding land use. A survey of the terrestrial habitats around the target pond may also be required, depending on the type and extent of development and the habitats to be disturbed. However, where a great crested newt breeding pond is within the development footprint a survey of the use of terrestrial habitats by newts will often not be required; such surveys can be very difficult to conduct thoroughly, and the extent of likely terrestrial habitat disturbance can normally be assessed by a knowledgeable consultant.

It should be noted that development planned on a given plot may affect newt populations on adjoining plots that are not in the developer's ownership. Although this may make the developer's and consultant's task more difficult, licences can only be issued if the range of likely impacts are explored, regardless of ownership. It is the developer's responsibility to finance this work; this may involve surveys of adjacent land and garden ponds. Note however that studies indicate that in general, typical garden ponds are less likely than larger field ponds to support great crested newt populations. Typically, if there is a larger pond nearby in which breeding occurs, garden ponds may often be used by low numbers of great crested newts for foraging and/or for limited breeding activity. It is for the consultant to decide whether other ponds in the area, but outside the ownership of the developer, should be surveyed, based on relevance to the proposed disturbance.

5.5 Desk study

The following sources can be asked for existing information on local great crested newt distribution: Local Planning Authorities (eg on 'constraint plans'), Local Record Centres, county Wildlife Trust, local Amphibian and Reptile Groups, natural history societies, and museums. Ideally, there will be one organisation, often the Local Record Centre, that compiles the information, but in many areas it is fragmented between the other bodies. This consultation can result in lists of recent sightings and an indication of status and distribution in the general area. However, it should only used as background information, because such archives are likely to become out-of-date quite quickly, and should never be considered as a substitute for a field study.

5.6 Field survey methods

This section describes the main methods used to detect great crested newts. How often these methods are used, and exactly how they are implemented depends on the purpose of the survey, and the confidence the surveyor wishes to attach to the resulting data (this is discussed later.) Environmental consultants working on great crested newt projects are expected to have a good working knowledge of these techniques, so the information below is a summary of the most salient points, rather than a set of instructions. Details on methods are given in a range of other publications, notably the *Herpetofauna Worker's Manual* (Gent & Gibson, 1998) and *Froglife Advice Sheet 11: Surveying for (Great Crested) Newt Conservation* (Froglife, 2001). English Nature licences will generally be required for all of these activities except egg searching.

5.6.1 Bottle (or funnel) trapping

This method involves setting bottle traps (normally made from 2-litre plastic bottles) around the pond margin, and leaving the traps set overnight. A density of one trap per two metres of shoreline is recommended for general survey purposes. Some studies indicate that bottle trapping is the most reliable method for detecting the presence of great crested newts, and it is especially useful for surveying turbid or weedy ponds. The main disadvantages are susceptibility to damage by vandals and

possible harm to newts; certainly there is a need for careful training to minimise such risks. Bottle trapping can be used to catch adults during the breeding season and larvae during summer. It should only be used when the night-time air temperature is >5°C, but note that very high temperatures can increase the likelihood of harm to trapped newts, especially larvae. This method must be carried out strictly in accordance with guidelines on animal welfare (see 8.6.3 Bottle traps).

5.6.2 Egg search

This method involves searching both live and dead submerged vegetation for great crested newt eggs (or rather, strictly speaking, embryos). This is often a very effective method for detecting great crested newt presence, but eggs can prove difficult to find in heavily vegetated ponds with small newt populations, or those with no accessible vegetation. The search should be conducted with care not to damage the eggs or the aquatic and marginal vegetation. Normally, it is necessary to 'unwrap' eggs to confirm identification, and there is some evidence that exposed eggs may be more prone to predation and UV radiation impacts. It is therefore recommended that large areas of vegetation are not systematically unwrapped (to conduct egg counts); once great crested newt eggs have been reliably identified, the search can be terminated. This is not a problem as the method does not give any meaningful quantitative information on population size. In large ponds, it may be useful to conduct egg searching in different sections of the pond margin to establish favoured breeding areas. Artificial 'egg strips' may be successful at detecting newt presence, and are especially valuable in sparsely vegetated ponds (though even in well-vegetated ponds, newts sometimes prefer them). Egg-strips may be constructed from plastic bin-liners cut into 1-2cm wide strips, attached to a stake or rock and submerged near the pond margin. The risk of interference should be considered (do not use them if there is a high risk), and egg-strips should be removed after hatching. When egg searching it can be instructive to make a note of the developmental stage of newt eggs and the presence of previously used leaves (folds without eggs are often evident in late season); see 5.6.7 Timing of surveys.

5.6.3 Torch survey

This method involves searching for great crested newts at night by shining a torch in the pond. In clear ponds this can be a simple and very effective way of detecting newts, but in heavily weeded or turbid ponds this method is limited. Bright light may cause great crested newts to seek the cover of vegetation, possibly affecting survey results and disrupting their breeding activity. Nonetheless, it is often indicated as a useful method. Powerful torches should be used, with 50,000 candlepower as a recommended minimum. Some surveyors use 1,000,000 candlepower torches, which may increase the chance of detecting newts and may reveal a higher proportion of the newts present, though increased disturbance also occurs. The margins of the pond are often the best areas to search for newts. It is recommended that the entire margin of the pond is walked once, slowly checking for great crested newts (though some areas of the margin may need to be omitted if access if difficult). Torch survey results are subject to high variation due to weather conditions, and so should only be carried out under the following conditions: night-time air temperature >5°C, no/little wind, no rain.

5.6.4 Netting

Using a long-handled dip-net, great crested newts can be captured by sampling the area around the pond edge. Netting can be conducted by day or night, but better results may be obtained at night when adult newts are more likely to be in open water. A perimeter walk, as with torch surveys, is recommended, and there should be at least 15 minutes of netting per 50m of shoreline. Studies indicate that netting is much less effective at detecting adult great crested newt presence than bottle-trapping, torch survey or egg search, but it is nonetheless useful in augmenting these techniques. In

addition, netting is often useful for finding larvae during late summer (though care is needed to avoid damage to gills). Results from netting are normally only useful for indicating presence/absence; using netting to give an indication of population size is not usually recommended.

5.6.5 Pitfall trapping

Newts can be captured on land using pitfall traps sunk into the ground, flush with a drift fence (see Figure 4: Fence and pitfall trap design). Pitfall traps are commonly used in conjunction with a ring fence, ie a length of drift fence that encircles the breeding pond. This is a good method of sampling immigration and emigration. Drift fences with pitfall traps can also be used to sample newts in areas away from the breeding pond, though this often requires considerable time. The sampling efficiency of drift fence systems can be greatly influenced by their design and installation. Traps should be installed at 5-10m intervals (or less for very intensive surveys). Capture rates are highly dependent on timing and weather conditions, particularly in summer when great crested newt terrestrial movements are normally highly correlated with rainfall. There are a number of practical concerns relating to the welfare of great crested newts and other species when using pitfall traps (see 8.6.2 Pitfall traps).

5.6.6 Refuge search

Great crested newts may rest under refuges such as logs, bark, rocks, and debris (discarded furniture, etc). Placing further refuges such as carpet tiles and plywood boards on a site for the purpose of survey may be advised to increase the chances of newts finding a refuge. However, lifting and searching underneath such refuges appears to be a very inefficient method, and is best used as an additional technique. It should certainly not be relied upon as the sole survey method. There is some evidence that placing refuges along drift fences can be somewhat more effective, but they should be used together with, not instead of, pitfall traps.

5.6.7 Timing of surveys

The table below gives the most effective (*) and alternative, less effective (+) times for survey methods. (L) indicates the method may be used for detection of larvae. A blank indicates that the survey method is highly unlikely to detect newts. Note that these times are based on typical lowland central England activity, and that activity is generally progressively earlier towards the south-west and later towards the north-east. Local weather conditions and altitude may also influence timing. When conducting egg searches it is useful to note the developmental stage of any eggs present (see Green [2001]), and the presence of previously folded leaves without eggs. If many of the latter are found, it indicates that the main adult and egg survey season has passed in that pond. If a high proportion of eggs are still at an early developmental stage, this indicates that the timing of the survey is appropriate. Note that ponds even within the same site can vary considerably in the speed with which great crested newt embryos will develop, especially if there are variations in the degree of shading. These considerations are particularly pertinent when conducting population size class estimates during the margins of the acceptable time window (see below).

Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bottle		+	*	*	*	+	+	*(L)	+(L)			
Egg			+	*	*	*	+					
Torch		+	*	*	*	+	+	+(L)	+(L)			
Net		+	*	*	*	+	+	*(L)	+(L)			
Pitfall		+	*	*	*	+	+	+	*	+		
Refuge			+	*	*	*	*	*	*	+		

5.7 Survey standards

It is for the person planning the survey to decide what level of effort is required, according to the objective of the survey and local conditions. However, this section gives guidelines on reasonable minimum standards for survey methods and effort. Deviation from these guidelines should be justified by a supporting statement, giving reasons for the use of a different set of methods, or level of effort. Obviously, for presence/absence surveys, in many cases newts will be detected in much less time than the number of visits indicated here (sometimes within a few minutes of a site visit commencing), and there may be no need to undertake the full effort indicated if the objective is purely to determine presence.

5.7.1 Presence/absence survey

5.7.1.1 Ponds
Method: three methods (preferably torch survey, bottle-trapping and egg search) per visit
Effort: 4 visits in suitable weather conditions
Timing: mid-March to mid-June, with at least two of these visits during mid-April to mid-May

5.7.1.2 Terrestrial habitat
Method: Pitfall-trapping with drift fence (preferably plus refuges)
Effort: 60 trapping nights (NB this means 60 nights with suitable weather conditions – see 8.4.2.2 Pitfall trapping)
Timing: March - October

5.7.2 Population size class assessment

5.7.2.1 Ponds
Method: torch survey and bottle-trapping
Effort: 6 visits in suitable weather conditions
Timing: mid-March to mid-June, with at least 3 of these visits during mid-April to mid-May

5.7.2.2 Terrestrial habitat
Determining population size class by sampling in terrestrial habitat distant from the pond is fraught with practical and interpretative difficulties, and is therefore not recommended.

5.8 Interpreting and evaluating survey results

5.8.1 Low numbers and absence

'Presence/absence' surveys may determine presence but in fact it is virtually impossible to demonstrate absence. The guidance here is designed to suggest a reasonable level of effort that, at the majority of ponds, will detect the presence of newts. However, where survey conditions are difficult, or where very small populations are involved, it can be exceedingly difficult to detect great crested newts. It is feasible, for example, that using the above methodology at a site with a very small population, 4 visits could be carried out with no great crested newts detected, but a fifth visit might find them. Note that even if great crested newts are indicated to be absent from a given pond in one year, it is feasible that in future years they may colonise, depending on the surrounding populations and connectivity.

Small numbers of adult great crested newts found during a pond survey may indicate that there is (1) a small population centred on the pond, (2) a recent colonisation, (3) a declining population, (4) several, recent low-recruitment years, and/or (5) foraging, and possibly not breeding, occurring in that pond. Similarly, small numbers of immature or adult newts might be encountered on land, say 700m from a pond, but it would be unwise to assume from this that the pond supports only a small population (see 5.7.2.2 Terrestrial habitat); this finding would simply indicate that the sampled area is used by newts. Note also that ponds that are dry the summer of survey (hence no larvae present) may be wet in other years, and hence could still be used by great crested newts.

It is for the consultant to decide on the level of effort to employ according to site conditions; the fundamental issue is that the survey should be able to provide English Nature, the Local Planning Authority and DEFRA with an assessment of the effects of development.

5.8.2 Terrestrial habitat use

Although it can be difficult to assess how much habitat is used by newts (because of the practical problems of detecting newts away from the pond), a precautionary interpretation should adopted. That is, just because no newts are detected in a given area, it should not be assumed that newts will not use it. It would be futile to attempt to comprehensively assess terrestrial habitat use through survey unless several years of intensive studies were undertaken. Some indication can be gained by ring-fencing ponds and determining the direction of immigration and emigration, and by placing traps at points around the terrestrial habitat. However, there is ample evidence that newts often disperse a considerable distance from ponds, so it is for the surveyor to assess likely habitat use based on the available information. Even habitats which do not provide much food or cover, such as playing fields or car parks, may be traversed, so loss of these habitats may have impacts on dispersal. As a general guide, suitable habitats within 250m of a breeding pond are likely to be used most frequently.

5.8.3 Population size class assessment

5.8.3.1 Rapid assessment of population size class

It is very difficult to establish the true size of a population of great crested newts, due to a range of factors, notably the variable sampling efficiency attained even by the best methods, and the complex (meta)population dynamics involved. There have been various attempts at developing multipliers to convert survey results into population size, but these are regularly shown to be unreliable. At the few sites where reliable population estimates or complete censuses are available to compare with survey data, they indicate that surveys may reveal from around 2% to 30% of the population. On this basis, a torch count of 10 may indicate a minimum of 33 newts, but a maximum of 500; clearly this is not very useful. Moreover, recent evidence from mitigation schemes has indicated even greater variation. Until further detailed research is done in this area, such multipliers are not to be recommended. Density based methods are useful for certain types of surveys, but used on their own for mitigation planning they are unlikely to give the most appropriate interpretation (for instance because populations in large ponds are likely to be to undervalued, and vice versa). Survey reports for development projects should use the interpretation shown below as a minimum; further interpretations using density, mark-recapture, multiplier or other methods may be presented in addition if the surveyor feels this would be useful.

For mitigation schemes, it is not normally necessary to determine the actual population size (for which, see 5.8.3.2), though a maximum capture figure may need to be given in DEFRA licence

applications; for the latter, it is recommended to use maximum estimates in order to avoid the need for subsequent licence amendments. However, an approximate indication of population size class is very useful. Hence, the methods given here are meant to give an indication of whether the population is small, medium or large in terms of the number of newts present in the breeding pond. This should be based on a spring survey of adult numbers, as egg, larval and juvenile counts can give a misleading indication of overall population size without complex interpretation. It is essential to note that the size of a population is not the same as its importance, as although size is a major factor there are other points to consider (see 5.8.5 Site status assessment).

Examining the results of the survey, the maximum adult count per pond per night gained through torch survey or bottle-trapping should be quoted as the main figure (raw data should also be presented). For sites where there is reasonable certainty that there is regular interchange of animals between ponds (typically, within 250m and with an absence of barriers to dispersal), counts can be summed across ponds (but note that this should only be done for counts obtained on the same visit). Survey results should then be expressed as peak counts per pond and a total site count, if appropriate.

Populations can then be classed as:

- '**small**' for maximum counts up to 10,
- '**medium**' for maximum counts between 11 and 100
- '**large**' for maximum counts over 100.

This categorisation may appear crude, but examination of a wide range of survey results reveals considerable variation, and mitigation schemes using other interpretation methods have frequently met with problems. If six or more counts are conducted, then some indication can be gained as to where the population lies within these broad categories. For example, counts of 57, 83, 89, 92, 92 and 95 would indicate a population at the upper end of the medium size class. It is important to bear in mind that these figures relate to counts and not to population estimates.

5.8.3.2 Assessment of actual population size
Should a determination of the actual population size be required, two methods are suggested:

(i) ring-fencing
Method: pitfall traps set against a drift fence, encircling the pond
Effort: 100 days minimum
Timing: early-February to late-May

(ii) mark-recapture
Method: bottle-trapping and netting
Effort: 20 visits minimum
Timing: early-February to late-May

Note that both of these methods require careful interpretation. Mark-recapture (which normally involves recording belly patterns photographically) in particular requires a considerable amount of statistical expertise. Ring-fencing can provide interesting information on age structure and migration patterns, which may aid the assessment of impacts and the development of mitigation plans. Full methods are available in more detailed texts (see 11. Further reading). Note that even when ring-fencing or mark-recapture is used to provide population estimates, the simpler population size class

assessment outlined above should also be quoted in mitigation plans (there are no standard methods for scoring and comparing population sizes).

5.8.4 Factors influencing survey results

The main factors which can affect counts are:

- weather (though most of the significant problems are during low temperatures, high winds or rain, and this should be excluded using the above recommendations)
- turbidity and high density of aquatic vegetation: can reduce the proportion of newts seen or captured
- disturbance: may reduce newt activity or catchability
- torch power: high power torches may render a higher proportion of newts visible
- surveyor experience: more accomplished surveyors may see more newts than novices
- drift fence/pitfall trap efficiency: well designed and installed systems may catch more newts

If any of these points impinge significantly on a given survey, they should be mentioned and any implications explained. At present there are no reliable correction factors to apply to raw survey data in order to compensate for such effects.

5.8.5 Site status assessment

The following aspects should be considered when interpreting survey results to assess overall site importance:

- Quantitative: the number and size of populations
- Qualitative: nature of the habitats and the population – how typical or unusual are they? Does breeding occur on site?
- Functional: how does the site contribute to the connectivity or fragmentation of populations in the area (are newts on the site part of a wider metapopulation?)
- Contextual: the local significance of the population, and its relation to wider great crested newt status.

5.9 Sub-optimal surveys

In some circumstances, for example where the presence of newts is discovered only after a development project has commenced, it may be necessary to conduct surveys in sub-optimal conditions, ie outside the recommended times given above. The table above can be referred to in order to provide the 'next best' option (indicated by +), and ideally additional effort should be employed. Assessing population size outside the guidelines given above is not recommended, but the presence of newts can often still be detected throughout summer, eg by netting for larvae. Note that surveys outside the optimum times can be unreliable, and that surveying between mid-October and mid-February is unlikely to reveal any useful information at all. Negative results gained outside the optimal times given above should not normally be interpreted as an absence of great crested newts.

Where the nature of the proposed development is such that detailed survey information is required in order to assess impacts and produce mitigation plans, licence applications may be refused on the basis of insufficient survey. Similarly, Local Planning Authorities may refuse or defer planning applications on the basis of insufficient information. It is therefore in the interest of developers to ensure that surveys are undertaken at as early a stage as possible.

6. Predicting the impact of development

6.1 Introduction

In order to determine what legal implications the proposed development will have, it is important to examine the survey information, and compare this with the plans for development. This task is made easier by good survey information and detailed maps, showing pre-development and post-development site layout and habitats. Sometimes called impact assessment, this is a critical phase of mitigation planning, since the type and extent of mitigation required will depend on the likely impacts on populations. Impact assessments can also help in considering alternative sites or alternative site layouts. For certain types of project, listed in Schedules 1 and 2 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, impact assessments are mandatory. Even when a statutory impact assessment is not required, Local Planning Authorities do have powers (eg under the Town and Country Planning (Applications) Regulations 1988) to direct developers to provide any information they may reasonably require to enable them to determine the application. The High Court recently ruled (R. v. Cornwall County Council ex parte Jill Hardy, 22 September 2000) that for EIA developments, where there are grounds that protected species may occur, environmental information (primarily survey results) needs to be provided to the Local Planning Authority before determination, and that initial surveys to determine the presence of protected species should not be conditioned. It seems likely that these principles apply more widely to non-EIA developments as well, since the guidance in PPG9 regarding protected species being a material consideration is difficult, if not impossible, to implement where no survey information exists. Ideally, an impact assessment should inform the drawing up of detailed development plans, so that impacts can be avoided where possible. It is therefore important that this stage is undertaken as early as possible following survey. Guidance on structure for setting out impacts is given in 10. Presenting mitigation plans.

It is important to consider impacts both at the site level and in a wider perspective. The latter element relates to the assessment of the overall importance of the site (see 5.8.5 Site status assessment). The development 'context' of the site should also form part of the impact assessment. For example, if the site will soon become isolated from the wider countryside by a subsequent spate of development activity around it, the potential consequences for the target population(s) need to be considered. The effects of development on the hydrology of a general area may also be an issue, as may changes to long-standing habitat management regimes.

6.2 Major types of impact and their effects on populations

6.2.1 Pre- and mid-development impacts

There are a number of operations which can affect great crested newts prior to the start of development proper. These include general site clearance, topsoiling, regrading and drainage works, which can seriously degrade habitats or kill newts. Archaeological excavations can also damage sites, and conversely they can sometimes create new waterbodies which may be colonised by great crested newts. During construction work itself, there are a range of activities which will destroy habitats and kill newts. Again, some work may actually create temporary habitats, such as rubble piles, which newts may attempt to use if still on site.

6.2.2 Long-term impacts: Habitat loss

Perhaps the most common and most obvious impact of development, the loss of habitat can have several important effects on great crested newt populations. Pond loss is often seen as the most damaging impact on great crested newt populations, but the loss of terrestrial habitat can also have serious consequences. Great crested newts live on land for the majority of their lives, and so loss of terrestrial areas, particularly those close to the breeding pond, can be very damaging. The main effect of habitat loss is reduction in population size, through reduced breeding and recruitment (if the pond is lost), reduced foraging opportunities, reduced refuge opportunities leading to exposure to predators or harsh conditions, and unsuccessful hibernation. Populations may go extinct where there is a major loss of habitat. Such a loss in viability is also linked to fragmentation (see 6.2.4 Fragmentation and isolation). Small scale losses of terrestrial habitat, especially over 250m from the breeding pond, will probably have little effect on populations but some mitigation may be required.

Consideration should be given to the effects on other important species groups, particularly other amphibians which may be an important food source for great crested newts. Even if great crested newts are found in only one pond of several due to be lost, mitigation may only be effective if all ponds are 'replaced' as prey species may otherwise suffer; in addition, great crested newts may not use every pond each year, so a precautionary approach should be adopted.

6.2.3 Long-term impacts: Habitat modification

Certain types of development may not actually replace newt habitat with built land, but result in modified habitat which is less suitable for great crested newts. This can be exacerbated by a change in habitat management regime. For instance, converting an area of rough grassland into typical gardens, a sports pitch or a children's play area would probably have a negative impact on the population. 'Tidying up' of semi-natural habitats for recreational or aesthetic reasons can also have similar effects.

6.2.4 Long-term impacts: Fragmentation and isolation

Fragmentation occurs when development imposes barriers to dispersal, resulting in disrupted movement across a site, for example between breeding ponds and hibernation areas. Reduced dispersal between populations can also lead to populations becoming isolated, increasing the risk of extinction and genetic impoverishment. Fragmentation can be caused by physical obstructions which great crested newts cannot negotiate, such as built land (buildings, walls, etc), fast-flowing streams, or extreme landforms. 'Softer' barriers comprise habitats across which dispersal is limited, because of its intrinsic unsuitability or increased risk of mortality, for example large areas of hard standing and high traffic-volume roads, respectively.

Note that development can lead to fragmentation effects on populations outside the development area, as well as the population occurring on the site in question. This is largely due to the metapopulation structure which great crested newt populations often form. The loss of dispersal possibilities from one pond may affect newt populations some distance away. Another important point is that fragmentation effects can be severe even when there is only a very small loss of occupied great crested newt habitat.

6.2.5 Miscellaneous impacts

Some types of development may lead to other impacts such as: water table alteration (on and off site), increased siltation, increased shading, increased chemical input or run-off, or reduced prey availability (eg through the loss of common frog or smooth newt populations). It is for the developer and

consultant to examine what the likely effects of the development will be, and how these may impact on the great crested newt population.

6.2.6 Post-development interference impacts

Great crested newt populations are fairly robust to modest disturbance, but certain types of interference can be very damaging. The possible increase in the risk of interference needs to be assessed when considering how the development will impact on the population in the medium to long term. Fish are often introduced to breeding ponds close to residential developments, or those otherwise subject to high public pressure. It is recognised that many types of fish, including goldfish and sticklebacks, can lead to population declines and extinction in great crested newts. Once introduced, fish can be very difficult to remove completely. Similarly, there is a much higher risk of the introduction of damaging invasive plants, like *Crassula helmsii*, when the pond is frequently visited by people. Severe disturbance, such as dumping of rubbish or setting of fires, can damage newt sites.

6.3 Temporal and spatial considerations

Some developments entail impacts which affect great crested newts for only a short period of time. For example, pipeline installation frequently involves disturbance only for a period of weeks, following which there is reinstatement. Many operations affecting the land will vary in their capacity to kill or injure newts according to when they are conducted, so the timing of development activities needs to be carefully considered.

As discussed above (5.4 Survey area) the possible impacts outside the development site itself need to be investigated. Impacts on areas used for migration and dispersal between ponds should be considered. For phased developments (including some 'design and build' schemes), the potential impact of the entire development needs to be considered. Looking at impacts on a piecemeal basis could prove problematic.

6.4 Poor data situations and 'last-minute' discoveries

It is difficult to predict impacts accurately when no or few data are available. Local Planning Authorities may refuse or defer planning permission in such cases. Where attempts have been made to predict impacts based on poor data, mitigation plans will be assessed in the light of the information contained in this section and the previous section on surveys; should the impact assessment not adequately address these points it is unlikely that the proposals will be viewed favourably. A recommendation for further survey is likely in such circumstances. One exception would be where other evidence strongly indicates that the area to be affected by development is of very low importance, and the impacts will be negligible; in this case, a lower standard of survey might be acceptable (though of course detailed survey is always preferable).

In the case where great crested newts are discovered after planning permission has been granted, or after development has commenced, works that would be likely to lead to a breach in the law should cease, and a survey undertaken (note that species protection applies even when planning consent has been granted). Mitigation plans should be developed, recognising that in some cases the potential for mitigation will be reduced. Where a sound survey has been undertaken prior to the development and this failed to detect newts, it is understandable that a developer might feel frustrated at having to delay works or incur significant extra costs. In such circumstances – effectively where the presence of great crested newts could not reasonably be predicted – mitigation plans might be scaled down from the normal expectations. However, where there was no prior survey, or the survey was undertaken to a

poor design, it seems likely that the developer would have insufficient grounds for a defence should prohibited activities be undertaken subsequent to the discovery of newts; hence, normal mitigation procedures would probably apply. This might mean that a development needs to be delayed for several months in order to undertake adequate surveys, exclude newts and create receptor habitat. Cases like this are legally complex and each should be considered on its own merits; DEFRA should be contacted for advice on the best way to proceed.

6.5 Summarising the scale of site level impacts

The table below gives a simple classification of the scales of impact for the most commonly encountered development effects. In general, the greater the predicted impact, the greater the level of mitigation will be required. When viewing this table, there are a number of important caveats to consider:

- The scale of impact here refers to impact at the site level; it does not consider the consequences of the development effects in a wider context (for which, see 5.8.5 Site status assessment and 7.2 Key principles of mitigation).
- The assessment here relates to impacts on great crested newt habitats in terms of likely damage to population viability, and should not be confused with an assessment of the risk of killing or injuring individual newts. So, for example, even though temporary ground excavation at 30m distance from a great crested newt pond would qualify here as a low impact in population terms, there might be a high risk to individual newts, depending on timing and methods.
- Individual site characteristics will often mean deviation from this classification is required. The distance figures here are meant to indicate that, all else being equal, impacts closer to ponds are generally more severe than distant ones. However, the figures are indicative and cannot be applied rigidly without reference to site survey. For instance, it might be found that at a given site an area of broad-leaved woodland at 300m from the breeding pond is being used preferentially over closer, lower quality habitats; destruction of such areas would lead to a higher impact level being applied.
- Development effects will be cumulative to some degree, so that a number of low impact effects may combine to increase the overall impact. However, as there is so much variation in the level of impact, and as the ways in which development effects interact to influence populations is complex, a simple additive relationship cannot be derived. In other words, it would be inappropriate to conclude that, for example, two low impact effects always combine to give a medium impact. A judgement on the combined impact should be derived by assessment and reasoning on a case specific basis.
- "Low" impact as stated here does not mean no impact. Generally some mitigation will still be required. However, there will be cases where a given development effect will have no (or negligible) effect on the population or on individual newts, and will not therefore require mitigation.

Table summarising the scale of main impacts at the site level.

Habitat feature	Development effect	Scale of impact		
		Low	Medium	High
Breeding pond	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance	✓		
	Post-development interference			✓
Other pond used by great crested newts	Destruction		✓	
	Isolation caused by fragmentation		✓	
	Partial destruction; modification	✓		
	Temporary disturbance	✓		
	Post-development interference	✓		
Immediate terrestrial habitat (approx <50m from breeding pond)	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction		✓	
	Modified management, resurfacing, etc		✓	
	Temporary disturbance	✓		
	Post-development interference		✓	
	Temporary destruction, then reinstatement	✓		
Intermediate terrestrial habitat (approx 50–250m from breeding pond)	Destruction		✓	
	Isolation caused by fragmentation		✓	
	Partial destruction	✓		
	Modified management, resurfacing, etc	✓		
	Temporary disturbance	✓		
	Post-development interference	✓		
	Temporary destruction, then reinstatement	✓		
Distant terrestrial habitat (approx >250m from breeding pond)	Destruction	✓		
	Isolation caused by fragmentation	✓		
	Partial destruction	✓		
	Modified management, resurfacing, etc	✓		
	Temporary disturbance	✓		
	Post-development interference	✓		
	Temporary destruction, then reinstatement	✓		

7. Planning mitigation and compensation

7.1 Why mitigate?

This section is aimed to assist consultants and developers decide *what* mitigation is required, whilst 8. Mitigation and compensation methods gives guidance on *how* to undertake it.

The aim of mitigation should be to seek to achieve one of the following outcomes, in decreasing order of preference. Each of these scenarios should be designed to satisfy Regulation 44(3)(b) (see 2.2 Exceptions and licensing):

- no negative impact on great crested newt populations
- where only a minor impact is predicted, compensation by small-scale relocation and exclusion of newts, combined with habitat creation, enhancement or restoration (all occurring on-site or in the immediate surrounding area, ie *in situ* mitigation)
- where a major impact is unavoidable, and it is not possible to compensate through on-site mitigation, translocation of newts away from the site, to an area that provides equivalent or better habitats. To achieve this, new habitats, including ponds, will invariably need to be created, enhanced or restored prior to translocation.

The potential impacts of the development should be considered at the outset, so that plans can ideally be modified in order to achieve the first outcome listed above (no impact). This could entail the use of alternative sites, or the repositioning of structures to avoid impacts. Note that DEFRA licences to destroy habitats, capture newts etc can only be obtained where there is no satisfactory alternative to that course of action.

Another category of works would be where no impact on great crested newt populations is predicted through the survey and impact assessment, but the developer wishes to contribute to conservation by creating or enhancing nearby habitats, thus having a positive impact. However, this would not be classed as mitigation, as there is no impact to compensate for. Such works may require an English Nature conservation licence, depending on exactly what was proposed, but note that most routine enhancement and management works are not licensable if conducted in the appropriate manner. English Nature can advise further on this.

7.2 Key principles of mitigation

The term 'mitigation' is frequently used to refer to all works required to comply with the legislation when developing land occupied by protected species (indeed, these guidelines use the term mitigation in this broad sense). Strictly speaking, there are two elements to this process:

- Mitigation - which, in the strict sense, refers to practices which reduce or remove damage (eg by changing the layout of a scheme, or by capturing newts to avoid killing)
- Compensation – which refers to works which offset the damage caused by the development (eg by the creation of new habitat and subsequent establishment of a population).

Both of these elements need to be considered, with the overall aim being to ensure that there will be no detriment to the conservation status of great crested newts. In practice, this means maintaining and

preferably enhancing populations affected by development. The following points should be considered when planning mitigation:

The level of mitigation required depends on the size and type of impact, and the importance of the population affected.

Plans should be based on sound survey, site assessment and impact assessment. The plan should take each predicted impact and address how it can be avoided, lessened and/or compensated for.

Mitigation should aim to address the characteristics picked up by the site assessment, as follows:

- Quantitative characteristics: There should be no net loss of sites, and in fact where significant impacts are predicted there will be an expectation that compensation will provide an enhanced habitat (in terms of quality or area) compared with that to be lost. For example, should an impact assessment indicate that 5 ponds supporting good populations are to be lost, the mitigation plan might involve the creation of around 10 new ponds of equivalent characteristics. The reasoning behind this concept is that the acceptability of newly created areas by great crested newt populations is not entirely predictable; creation of new habitats should therefore go as far as possible to ensure that the new area will be of high value for newts. Generally there should also be no net loss in the summed surface area of ponds for the site. Note that, considering the wider status of ponds in England, there will normally be a requirement for no net loss of quality or number of ponds resulting from development, regardless of their great crested newt status, and that ponds not used for breeding may still be of value to newt populations (see 6.2.2 Long-term impacts: Habitat loss).
- Qualitative characteristics: the plans should aim to retain or replace unusual habitats. For example, it would be unacceptable to create typical field ponds as mitigation for heathland pools to be lost.
- Functional characteristics: compensation should remedy any loss of connectivity brought about through development. Works should aim to ensure that any new populations function in a similar way to those being lost.
- Contextual (range) characteristics: mitigation should take into account the local significance of the population. For instance, schemes which involve translocations from low status areas to high status areas would entail a major loss in the donor area, and would therefore be unacceptable.

Selecting and preparing an appropriate receptor site (or sites) may require considerable time and effort. The success of the scheme will depend to a great extent on this decision. For high impact schemes, additional land may need to be purchased, and hence the costs of compensation can be considerable.

The long-term security of the population should be assured. Mitigation should aim to ensure that the population will be free from further disturbance, and is subject to adequate management, maintenance and monitoring. Any proposals should be confirmed, ideally by a legal agreement or planning obligation, and not left as open-ended options.

Mitigation plans will be open to public scrutiny. English Nature and DEFRA will make plans available to third parties on request wherever possible, because they are part of a decision-making process for a statutory function (licensing) and because freedom of information legislation requires this. If

submitted as part of a planning application, they will also be held on file by Local Planning Authorities, and therefore be available for viewing.

Mitigation plans should address the impacts of all phases in phased developments. Individual phases will normally be mitigated for individually, but there should be an overall plan which takes the impacts for the entire scheme into consideration. Licences for habitat creation or restoration as mitigation must be licensed along with the accompanying capture, exclusion or translocation; it is not acceptable to undertake post hoc mitigation for example via an English Nature conservation licence.

Precautionary mitigation, ie going ahead with mitigation before a proper survey has been undertaken, is not normally acceptable. Only in certain limited cases, notably where there is good evidence to indicate that the site is of very low importance and there will be negligible impacts, will it be acceptable to submit mitigation plans based on little or no survey (see section 6.4 Poor data situations and 'last-minute' discoveries).

Mitigation can be complex and costly. Great crested newt habitats are often complex, having developed over long time periods, and they should not be viewed as simple systems which are easily moved or recreated without difficulty. Migration patterns, demographics, breeding and foraging may be disrupted through mitigation, particularly where translocation is involved. Newly created habitats, even where they are larger in extent than the original, are not always qualitatively as good as old ones, and there is an intrinsic value in established habitats that should not be under-rated. Effective compensation may require land purchase and complex planning and legal arrangements, such as s106 agreements, restrictive covenants and adoption as publicly owned land.

7.3 Main components of mitigation

Mitigation for great crested newts normally comprises the following elements:

- Habitat creation, restoration or enhancement – to provide receptor areas for displaced newts, in compensation for areas to be lost or damaged
- Avoidance of disturbance, killing or injury – taking all reasonable steps to ensure works do not harm individuals, by altering working methods or timing to avoid newts; capture and removal; exclusion to prevent newts entering development areas
- Long-term habitat management and maintenance – to ensure the population will persist
- Post-development population monitoring – to assess the success of the scheme and to inform management or remedial operations.

8. Mitigation and compensation methods

8.1 Introduction

This section gives advice on the methods commonly used for mitigation and compensation, paying particular attention to effort and timing. Note that these are not the only methods which could be used, but they are known to be generally effective in appropriate circumstances. They should be applicable to the majority of development schemes. As sites vary in their individual characteristics, and developments differ in their impacts, the information presented is generic rather than prescriptive; consultants may make a case for different techniques and levels of effort on a site by site basis.

8.2 Receptor site selection

8.2.1 Existing great crested newt status

Potential receptor sites should be surveyed for the presence of great crested newts. For most situations, the receptor site should not support great crested newts for clear reasons, but be capable of doing so given habitat restoration, enhancement or creation.

It is normally unacceptable for receptor sites to support a pre-existing great crested newt population unless:

- an *in situ* scheme is planned, where newts are moved or excluded within the same site; or
- only small numbers of newts are to be translocated, such that it is unlikely that they would form a viable population if introduced on their own (a guideline threshold of 20 adults, plus associated immature stages, can be used). In cases like this involving the movement of only a part of a population (or one that has seriously declined or fragmented), it may be better to introduce the newts to an existing population, but only in conjunction with suitable habitat enhancement to increase carrying capacity (eg creation of new ponds, or bringing adjacent areas into more favourable management).

It is sometimes argued that, having sampled a site and found relatively low numbers of newts, further individuals may be added because the population is below carrying capacity. However, in the context of mitigation this approach is flawed. Populations naturally fluctuate and periodically reach the carrying capacity; adding further individuals does not alter the carrying capacity, but will affect the dynamics of the receptor site population. Given that habitat at the donor site is being destroyed, there will be an overall loss of newt conservation status unless additional work is undertaken to increase the carrying capacity of the receptor site. Hence, adding great crested newts to existing populations should always be accompanied by habitat enhancement.

8.2.2 Location, ownership, status and access

Receptor sites should be as close to the donor site as possible, ideally adjacent to it. However, this is of course dependent on the other criteria being met. It is generally recommended that great crested newt populations are not translocated outside the administrative area of the donor site, and that they should remain within the same Natural Area (see English Nature's publications or website for information on Natural Areas). This approach facilitates Local Planning Authorities in assessing the status of the great crested newt resource within their area of operation, whilst ensuring that ecologically relevant boundaries are also observed (ie if populations are translocated, there is parity of habitat and landscape type). It may sometimes be necessary to acquire sites, or gain management agreements for land outside

the developer's ownership. The site should be free of development threats in the future, and the Local Planning Authority should be consulted to ensure that the site would not be damaged in future (ideally this should be indicated in the Local Plan/UDP). Translocation into SSSIs would not normally be acceptable unless there are no other suitable habitats in the general area, appropriate enhancement is made, and the release of the animals is consistent with the conservation objectives for the site. It is generally preferable that mitigation sites have no or minimal public access, since there are many problems associated with interference (see 6.2.6 Post-development interference impacts). Ponds can be screened off with fencing and or hedging (preferably including hawthorn or blackthorn to discourage access). Lockable gates may be required to allow monitoring and management access, or to allow controlled entry by school groups etc. Where there is a strong case for open public access to mitigation sites, there should be a significant remedial element in the aftercare plans for the site so that any interference impacts can be promptly addressed.

8.2.3 Habitats

The receptor site should include, or be capable of including, broadly the same habitats as are due to be lost. This is especially important where unusual habitats are to be lost. Generally, if ponds are to be lost, then new ponds need to be created in mitigation, and the same goes for terrestrial habitat; for instance, it would normally be unacceptable to mitigate for the loss of large areas of terrestrial habitat simply by digging new ponds, unless there is no alternative and this approach is appropriate in the circumstances. Even partial loss of terrestrial habitats can impact on populations, especially where this occurs close to the breeding pond, and so compensation for terrestrial habitats is an important issue to address. Note also that the receptor site habitats may also need to adequately accommodate other species as part of the mitigation, eg other amphibian species.

8.2.4 Size and boundaries

There needs to be adequate area to allow for at least an equivalent population as that existing at the donor site. Hence, receptor sites should be of equivalent size to the habitat due to be lost. Smaller sites may be allowable if it can be clearly demonstrated that the receptor site will be of a higher habitat quality. It is not appropriate to set the size of a receptor site solely on the basis of the theoretical minimum area calculated to support a viable great crested newt population; similarly, calculations based on the number of newts an area could theoretically support are often questionable (due to difficulties in accurately assessing population size, and the carrying capacity of a given habitat). The area selected needs to be informed by good land survey data from the site assessment. Note also that other characteristics such as connectivity and habitat quality may be of similar importance to the size of the receptor site.

Generally, receptor sites should not be entirely enclosed by permanent fencing, as this will limit dispersal and is an extra maintenance consideration. Lengths of fencing can, however, be used to prevent access to especially hazardous areas (see 8.3.3 Integration with roads and other hard landscapes). It should be noted that it will not always be possible in mitigation schemes to prevent newts gaining access to areas of potential harm, and a balance has to be made between permanently confining animals in safe areas and setting up more integrated receptor sites that allow freer movement. In general, where there are significant hazards, exclosures are preferable to enclosures.

8.2.5 Arrangements for habitat management, maintenance and monitoring

It will normally be necessary to make arrangements for ongoing habitat management, maintenance (eg fence repairs) and monitoring after the development is completed (see section 8.5 for details on methods), so the implications of this should be considered when reviewing potential receptor sites.

8.3 Habitat creation, restoration and enhancement

8.3.1 Aquatic habitats

As with other types of compensation, the first aim should be to replace qualitatively what is being lost. As great crested newts live in a variety of habitats, a prescription for the ideal pond will not be given here. It would not be in the interests of great crested newt conservation for all mitigation to follow the same pond design, as this would result in an overall loss of habitat diversity. Site assessment should include a habitat description, and this can be followed to create equivalent new habitats in mitigation. However, where the donor site is thought to be seriously declining in quality, mitigation can attempt to correct this. For example, the loss of a heavily shaded pond with indications of a declining population may be replaced in mitigation by creating a more open pond. Likewise, where great crested newts breed in highly artificial waterbodies from which it is unlikely they can exit (eg concrete lagoons, fire ponds or disused swimming pools), then mitigation should replace these with more suitable ponds. As general guidance, great crested newts prefer ponds with the following characteristics:

- Surface area between 100 and 300m^2
- Depth may vary; both deep (up to around 4m) and shallow ponds may be used
- Occasional drying out is not a problem, even if this means a total loss of that year's larvae; the pond should hold water throughout at least one summer in every 3 years
- Substantial cover of submerged and marginal vegetation
- Open areas to facilitate courtship behaviour
- Good populations of invertebrates and other amphibians, for prey
- Ponds in clusters, rather than in isolation
- Absence of shading on the south side
- Absence of fish
- Absence or low density of waterfowl

Note that the above generalises across the species' range and habitat associations, and that some other types of breeding site, (eg wide ditches), may also support good populations.

Where ponds are created in areas that may attract children, it is sensible to use a sloping profile with no sump. This avoids any sudden changes in depth, which are thought by safety experts to be an additional hazard to children should they get into the pond. Note that from a great crested newt conservation perspective, it is often advisable to prevent or constrain access to mitigation ponds (see 6.2.6 Post-development interference impacts)

The construction of new ponds or improvements to existing ponds should take place well in advance of a translocation (6 months minimum before newts will use the pond, ideally 1-2 years) to enable the establishment of plant and invertebrate populations. Some ponds may need to be deepened or made shallower once the water level is established. It is often better to create several smaller ponds rather than one very large one, as this gives scope to provide varied pond types, and less chance of fish

introduction and persistence. However, very small ponds may require more management in the medium to long term. Deeper ponds are less likely to silt up or become dominated by vegetation, but the likelihood of deliberate introduction of fish is a greater potential problem for the long-term survival of the population. This risks should be weighed up on a site by site basis.

New ponds should preferably be within 250m of each other, with no barriers to dispersal, and may be sited a similar distance from any existing ponds to speed up the natural dispersal and colonisation of the flora and fauna on which great crested newt populations depend. Where receptor sites are to support other amphibian species that are to be affected by development (this is a common occurrence), attention will have to be paid to their needs too. Ponds that are unsuitable for breeding by great crested newts every year may nevertheless be important for the maintenance of the population (see 6.2.2 Long-term impacts: Habitat loss).

The spoil arising from digging new ponds can be left on site as un-compacted mounds or banks. If mixed with other materials such as clean rubble, this can provide a good newt shelter/hibernation site, with cracks, fissures and, in time, small mammal burrows and tussocky vegetation.

Ponds should be created so as to support a wide range of invertebrates, with a quantity of native marginal, floating and submerged vegetation (of local provenance), with some areas of open water. If ponds are being destroyed on the development site, transfer of water and vegetation may be appropriate. Introducing artificial egg-laying substrates to newly created ponds is not recommended as a habitat enhancement technique, as it does nothing to promote development of the pond ecosystem that newt larvae require for growth and development. When introducing aquatic plants to a new pond, great care should be taken not to inadvertently introduce fragments of aggressively colonising alien plant species such as New Zealand pygmyweed *Crassula helmsii*, water fern *Azolla filiculoides*, least duckweed *Lemna minuta* and floating pennywort *Hydrocotyle ranunculoides*.

The siting of new ponds is important: high levels of human or animal disturbance, agricultural or road run-off, and significant shading from surrounding trees should be avoided. Light grazing can sometimes prevent trees and dense emergents invading and shading the pond (though note that if reptiles are present, grazing may need to be controlled or avoided).

Pond creation is preferable to pond restoration for mitigation schemes. Only in limited cases will restoration be acceptable, for example smaller impact schemes, or areas where there is an existing pond of low quality for great crested newts (and which does not currently support them), but which appears to have potential for supporting a population. The translocation of newts into a pond which already supports the species should be avoided unless there are very low numbers involved (see 8.2 Receptor site selection), and this should be accompanied by some enhancement of the pond and surrounding habitat. An assessment of the impact of introducing great crested newts to the pond should also be undertaken to ensure that no existing interests will be significantly damaged.

In considering the above points, note that inappropriate pond restoration or management can damage existing habitats of high conservation value. For instance, the rare mud snail *Lymnaea glabra* and the protected lesser silver water beetle *Hydrochara caraboides* inhabit shallow, grassy ponds, and silted up ponds may support rare bog mat habitats. Likewise, the temptation to create new ponds in 'lows' or damp, herb-rich areas may damage existing interests. Pond management or creation proposals should

therefore be developed by an experienced pond ecologist, rather than a general environmental consultant or a landscape architect with little knowledge in this field.

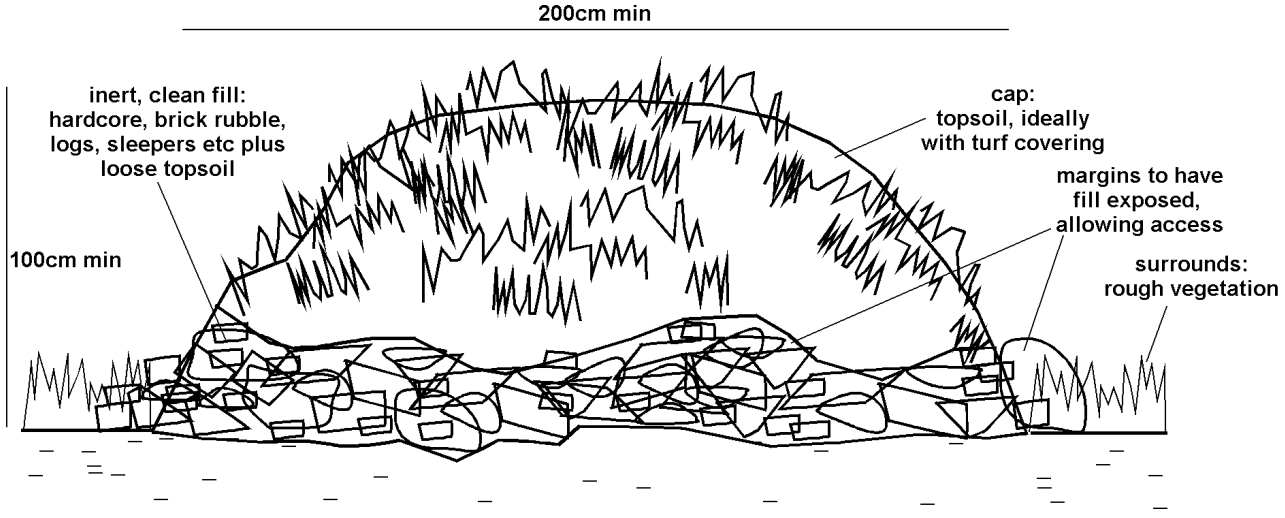
8.3.2 Terrestrial habitats

The area up to around 500m surrounding a mitigation pond should be considered as potential newt habitat, depending on the site layout. Scrub, woodland, hedgerows, banks and ditches, leaf litter, rough grassland, bare ground with fissures, disturbed ground, and pasture are frequently encountered great crested newt habitats which might be created, restored or enhanced as part of mitigation. Again, the aim should be to replace what has been lost and where possible enhance it.

Large piles of rubble, rock, log piles and earth banks (with plenty of mammal burrows and ground fissures present) make good hibernation and refuge sites. These features may be located in sheltered areas which are neither too dry nor prone to winter flooding or freezing (eg in frost hollows). On free-draining soils, these may be located below ground level by excavating a pit or trench, then infilling with a mixture of topsoil and rubble, sleepers, logs, etc. Some of the largest great crested newt populations in Britain occur within old brickworks sites, which usually provide a good range of these type of habitats. For ideas on the design and construction of suitable hibernacula, see Figure 3: Suggested hibernaculum design. Smaller refuges for daytime shelter may also be provided, though on sites which will be heavily used by the public these may not be appropriate unless they are well secured. Great crested newts are known to spend a considerable proportion of their terrestrial phase either underground or just above ground under refuge sites, so it is important that this aspect is addressed in mitigation plans.

Figure 3: Suggested hibernaculum design

This design mimics artificial and natural conditions in which great crested newts have frequently been found over-wintering. Dimensions should not be below 2m length x 1m width x 1m height. The illustrated design would be suitable for locating on an impermeable substrate. On free-draining substrates, the design is largely similar but the bulk of the fill is sited in an excavated depression in the ground. Hibernacula should ideally be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line.



Translocation of newts into terrestrial habitats should be delayed where time is required for maturation from the point of creation or restoration; this may be a year or more depending on soils, vegetation

type and weather conditions. Newts should not be moved in to areas before significant habitat modification takes place.

Though great crested newts may use gardens, studies indicate that they are generally of lower value for this species. It is difficult to ensure consistent habitat management in gardens of new properties, and given the vagaries of home ownership and potential for extensions, etc, it is generally not acceptable to rely on gardens as compensation for terrestrial habitat lost to development. The same applies to garden ponds. Only in limited circumstances where there is legal provision (eg through restrictive covenants) for the retention and management of great crested newt habitat would gardens be considered suitable in mitigation.

8.3.3 Integration with roads and other hard landscapes

Great crested newt mitigation often occurs as a result of residential or commercial developments, and this may result in receptor sites in close proximity to roads, car parks, hard standing, buildings, etc. Some of these habitats may be traversable by newts, while others will certainly impose barriers. Studies in recent years have shown that some drainage systems can result in high mortality. A particular problem arises with upright kerbs and gully pots which effectively mimic a drift fence and pitfall trap system. For mitigation plans, information from the survey and development plans should allow an assessment of likely problems.

Where new great crested newt habitats are to be created, such additional mortality should be avoidable through careful design. Newts can be prevented from coming into contact with "traps" such as gully pots by designing drainage schemes which omit sumps. For a range of environmental reasons, there is an increasing move towards Sustainable Urban Drainage Schemes (SUDS) which aim to control and treat drainage at source, rather than convey it to other areas. These schemes typically involve a range of features, such as porous surfaces, swales (grassy ditches), buffer strips, and filter beds. Such schemes can create amphibian habitats, whilst avoiding gully pots and other "trap"-type drains. In order for such drainage schemes to be used, it is crucial to alert developers to their benefits at the early stages of design. References for information on this area are given in 11. Further reading; a good general introduction is given in SEPA's *Ponds, pools and lochans* (2000), including some useful suggestions for enhancing the conservation value of SUDS. Currently, there appears to be reluctance amongst some bodies to promote such approaches, and to adopt roads associated with SUDS. This is often viewed as an unfortunate situation given the wide environmental benefits of SUDS. Where significant newt mortality is indicated, the avoidance of the installation of gully pots by implementing SUDS should be thoroughly explored by developers and consultants, in liaison with local authorities, well in advance of commencing the scheme. Engineers who have not worked on such schemes before can be directed to a range of publications explaining the technical merits of SUDS. Recent experience has demonstrated that SUDS approaches can be adopted even when there is little space available within the development.

Where the use of gully pots etc is genuinely unavoidable, it may be appropriate to exclude newts from the area using permanent amphibian fencing. The most frequently used fencing is commercially produced (see 8.4.2.1 Exclusion fencing and drift fencing), heavy duty plastic with a curved design, though purpose-built walls may also be acceptable. The relative impacts of exclusion and drain mortality need to weighed up on a case by case basis – it is not always desirable to permanently exclude newts from newly created developments. A way of reducing the likelihood of newts getting trapped is to use sloping (battered or dropped) kerbs either side of (and ideally adjacent to) the gully

pot, or to eliminate kerbs altogether. Again, these options need to be discussed as early as possible with developers, emphasising the importance for protected species. There is currently no 'amphibian friendly' design of gully pot. Though exclusion using netting over grates, and assisted exit through the provision of 'ladders' may sometimes reduce mortality, these are temporary, maintenance-heavy fixes which are not to be recommended for new developments. In any case, there is little evidence that they are very effective at preventing amphibian mortality (particularly of juveniles). Such modifications may not be allowed by local highways authorities, and normally interfere with the purpose of the drainage systems through increased blockages or problems during cleaning. Rather than dealing with the problem of getting newts out of drains, the aim should be to stop them reaching drains in the first place.

The potential for newts to cross roads successfully depends largely on traffic volume and the presence of any barriers, such as kerbs. Small roads and tracks with low vehicle numbers appear to present no major problems for newts, whilst larger, busier ones can limit dispersal and result in high mortality. Mitigation ponds should be located away from such roads, but where this is unavoidable and problems are likely to occur, permanent amphibian fencing should be used. If this is likely to prevent dispersal to suitable habitat on the other side of the road, tunnels or culverts can be incorporated. At present, there is little evidence on the use of tunnels by great crested newts, though some anecdotal reports have indicated that newts use them. Tunnels should only be used where there is no alternative to maintaining dispersal routes, and monitoring of tunnel use should be put in place to allow assessment of this technique. Tunnels can only be effective where there is a well-planned fencing system to channel newts in, and they will require regular maintenance.

8.3.4 Other considerations

It is not unusual for sites to have other protected species present (eg badgers, bats, reptiles, water voles, nesting birds, the lesser silver water beetle). Where these animals may be present, it is wise to undertake a comprehensive protected species survey prior to planning permission being applied for. Where great crested newt habitat creation, restoration or enhancement is planned, involving hard landscaping such as earth moving, pond construction, tree felling or the erection of fences, other protected species may be overlooked. It is not acceptable for habitat creation, proposed as mitigation, to be sited where it would cause significant damage to existing features of value such as botanically diverse old pasture or marshland.

It should also be noted that habitat creation or enhancement does not override protected species legislation, and due care must be exercised in order to avoid damage to such species and their habitats during potentially disturbing works. This may mean taking measures to avoid killing, excluding them from areas prior to such works taking place, or re-designing the scheme to accommodate their interests.

8.4 Avoidance of disturbance, killing and injury

8.4.1 General points

Most forms of development will involve some works which pose a danger to individual newts. Mitigation should address this by reducing the chance of killing or injury, normally through the removal of newts from the area subject to disturbance, to a receptor site. Capture of newts can occur throughout the active season (February-October), but the efficiency varies greatly according to timing and methods. Capture of adult newts on land is most effective using a ring fence with pitfall traps

during the breeding migration, catching newts as they move towards the pond in spring. However, note that some adults may not migrate to a given pond every year. Newts can also be caught from ponds using netting, bottle-trapping and draining down. On land away from the pond, newts are most effectively caught by installing lengths of drift fences with pitfall traps and refuges. Hand searching, including the dismantling of refuges such as debris piles, can also be used. 'Destructive searching' involves the careful, controlled stripping of areas likely to harbour newts, but should be used only once the other methods have been exhausted.

It is normally unacceptable to attempt to capture newts once they have started to hibernate, which occurs when night temperatures drop towards freezing point, typically shortly before the first frosts, around mid-late October. This is largely because it is very difficult to find and capture animals once they have started to find refuges for winter; there is a risk that areas may be searched and declared free of newts when in fact the animals are still present in inaccessible underground crevices or in refuges. Searching destructively in winter, especially without a prior capture effort, is also more likely to result in mortality. In addition, from a welfare point of view it is most unwise to capture and relocate animals which have begun their winter dormancy.

The decision as to where to relocate newts to will depend on the site layout and on season. Newts should always be released in a sheltered area close to a suitable refuge (or in a pond), in weather conditions conducive to activity. Release as soon as possible after capture is preferable, and special care should be taken when releasing newts terrestrially during the day. Night releases are better but newts should not be unduly held in captivity, hence newts caught in pitfall traps that are checked in the morning will need to be released in suitable ground cover. As a general rule, newts captured on land should not be released into water and vice versa, as this may disturb their physiology (an exception being pitfall-trapped newts intercepted at ring fences during immigration to a breeding pond). Careful judgement, and ideally pre-survey, is required when intercepting newts during the breeding migration, so that they can be released in suitable ponds.

Once newts have been removed from the area to be disturbed, they will normally need to be excluded from re-entering it, so fencing is required. Various types of fencing are in use, including temporary, 'permanent' and one-way varieties. These should be selected according to the task required.

If an area proposed for development is found through survey to support newts but there is no pond present, effort must be put into removing newts from the area prior to damaging activities commencing. It is not normally acceptable simply to put up a fence to prevent newts moving into that area from the pond, nor is it acceptable to rely solely on 'passive clearance' methods, such as one-way fencing. Both of these approaches are likely to leave newts on the development site. There are very few cases where the sole mitigation measure will be fencing, since the loss of habitat is inevitable if newts are known to be in the general area; removal of newts plus compensation for the lost habitat will be required.

8.4.2 Capture and exclusion methods

8.4.2.1 Exclusion fencing and drift fencing

Great crested newts can be guided into pitfall traps (see below) by the use of drift fencing. Likewise, they can be prevented from (re-)entering an area using exclusion fencing. Both of these are temporary fences. The designs for general purpose exclusion and drift fencing are similar, although it is often

more important that exclusion fencing is well specified, correctly installed and subject to on-going maintenance. Failure to do this could lead to it letting newts through unhindered (though note that it is very difficult to guarantee that exclusion fencing is 100% effective). It should be as 'newt-proof' as reasonably possible over the entire period of works. If great crested newts are allowed to escape back onto a site, development works will normally need to cease and a re-trapping programme implemented after consultation the licensing authority; this can incur considerable delays. 'One-way' fencing may be used to allow newts to cross into a safe area, whilst preventing dispersal back into a development site. Note that there is currently little evidence that such fencing is very effective at allowing one-way passage, but it may still be used as a precautionary measure so long as other methods of active capture are in place.

There are a number of designs for amphibian exclusion fencing. The design of the fencing should be fit for the purpose, durable and repairable should damage occur. A recommended specification sheet for temporary fences is shown in Figure 4. A guide to the most important aspects of temporary exclusion fence installation is given below. The requirements for drift fencing follow the same pattern but are not so rigorous.

- Fencing installation should be instructed by, and if necessary carried out under the supervision of, an appropriately experienced amphibian worker.
- Engaging the services of an experienced amphibian fencing contractor, who can fine-tune construction methods to cope with the different problems associated with different soil types, is strongly recommended. Experience has shown that, despite the apparently simple construction methods involved, general fencing contractors with experience limited to the erection of 'conventional' stock barriers may not be appropriate.
- The proposed fence-line should first be searched and cleared of amphibians if it is likely that they are present. If clearance of the fence-line is required, vegetation can be cut back, taking care to avoid damage to any resting amphibians.
- The fencing layout should avoid gaps through which newts could pass, thus avoiding capture. Stiles can be constructed where a fence crosses a footpath. In exceptional circumstances, in the case of pipelines for instance, it may be necessary to allow farm access, etc across barrier fencing. Where this is necessary, the gap should be as small as possible and each end of the barrier fencing should be turned back at 45° to the fence for a few metres to deflect amphibians away from the gap. Heavy duty plastic flaps which are able to deform under vehicles and then spring back can be installed in the ground across gateways, flush with fencing either side.
- The fence should be installed to the correct height and depth and with an adequate 'under-lap' to prevent newts from passing underneath.
- The backfill should be placed turf downwards in the trench (to suppress re-growth of grass) and well compacted to eliminate any lumps or gaps. Backfill must not remain un-compacted overnight, and all fence trenches must be filled the same day as they have been dug, as amphibians may seek shelter within any un-compacted soil or turf.
- Exclusion fencing should have a overhang or 'top curl' to prevent newts from climbing over the fence.
- The fencing membrane should be of a type that will not break down or become brittle under exposure to the elements, notably UV light. '1000 gauge' transparent polythene sheeting works well in many situations, as do woven polypropylene and black polythene DPC. Ensure that the sheet width is sufficient to permit the forming of the 'under-lap' and 'top-curl' (1m is sufficient for most fences). The blue plastic often used in the building industry is not recommended

because it can become brittle quickly and usually requires replacement after only a few months. Replacing large sections of fencing will cause an unnecessary disturbance to the newts and should be avoided whenever possible.

- The fencing membrane should be as taut as possible without noticeable creases or folds which could allow newts to climb the fence. The use of too heavy a gauge of plastic may make it difficult to remove the creases and folds, and this could be a problem on uneven ground.
- The fence should ideally be secured to the supporting posts by pads and nails or staples (not battens, which may allow newts to scale the fence).
- Fence posts should be positioned on the outside of any receptor area fence, and in the case of drift fencing, on the side of the fence that is least likely to encounter newts.
- One-way fencing should be sloped at an angle of between 45° and 40°. This may allow amphibians to climb over into the receptor area, but prevent them from escaping back into the clearance area.
- Any joins in the membrane must be 'curl-joined' and well secured to a post with pads and nails. This jointing method should continue underground as well as above. Adhesive taped joins are not normally acceptable for long-term repairs to important parts of the fence, as they are not durable.
- A record of fence inspection and damage repair work should be kept by the licence holder as evidence that the newt-proof barrier has been properly maintained.
- Newts may seek refuge in the shrinkage cracks that will occur between the fence and the backfill; therefore special care needs to be exercised when removing fencing. Should any fencing need replacement (including any that has to be replaced due to faulty installation), or during the final fence removal process, then all backfill should be removed carefully by hand under the supervision of the licence holder or an agent, if it is thought likely that newts are present. This will minimise the risk of damaging or killing any amphibians that may be sheltering in the back-fill along the fence line.
- It is sometimes necessary to control the vegetation along the fence-line to prevent the fence becoming overgrown, which helps the newts to breach the fence. This is best achieved by the careful application of an approved herbicide which is licensed for aquatic use (such as Round-up Biactive) to a narrow strip (50cm) on whichever side(s) of the fence newts are being prevented from climbing. Cutting the vegetation using a strimmer may be undertaken but care should be exercised to prevent damage to newts or to the fence.
- In areas where barrier fencing is adjacent to a construction site, or within areas open to public access, the developer will generally be required to erect a security fence to prevent damage occurring to the amphibian fencing. Chain-link or 'Heras' fencing are often used for this purpose.
- In areas where vandalism is likely, regular monitoring of fencing may be required.

When the aim is to exclude great crested newts from an area in the long-term (eg a busy road, see 8.3.3 Integration with roads and other hard landscapes), 'permanent amphibian fencing' may be used. The most frequently cited commercial supplier of purpose-made permanent amphibian fencing in England is ACO Wildlife (Hitchin Rd, Shefford, Beds SG1 5TE; tel 01462 816666; web www.acowildlife.co.uk); the manufacturer's installation specifications need to be followed carefully. Other types of permanent barrier could be custom-made by engineers to take account of specific site characteristics.

8.4.2.2 Pitfall trapping (in conjunction with drift fencing)
It is possible to capture newts by this method throughout most of the frost-free months of the year, though capture is highly dependent on (a) weather conditions, and (b) location of drift fencing. Reduced capture rates should therefore not necessarily be interpreted as indicating an absence of newts. Pitfall trapping during the start and the end of the season may be unwise if frosts are likely to occur, as this may harm trapped animals. Welfare guidelines are given later in section 8.6. Ring-fencing and other intensive trapping programmes can cause considerable disturbance to the newt population (and to other wildlife) and should only be undertaken where there is a genuine need to do so.

Drift fencing should be installed in sufficient quantity to provide an adequate coverage across the site. It would be normal for traps to be installed at a higher density in areas of more favourable newt habitat, such as around breeding ponds and rough grassland. Newts may cross areas of short grass or bare ground, and these areas should not be ignored when designing the fencing layout, especially when in close proximity to breeding ponds.

The following points should be noted regarding the installation and servicing of pitfall traps (see Figure 4: Fence and pitfall trap design):

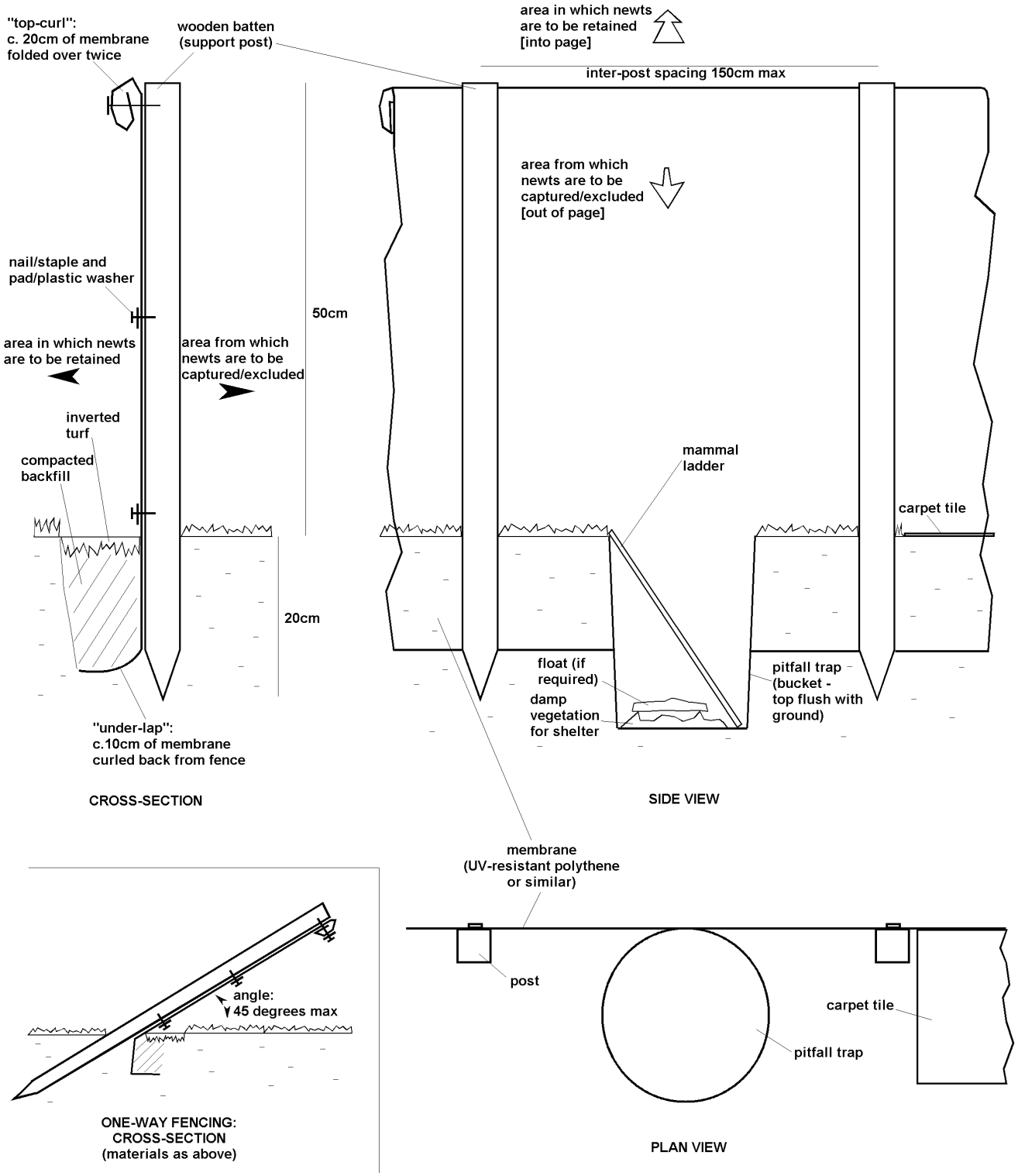
- Pitfall trap design: plastic buckets should lack a top lip, as this might allow newts to walk between the fence and the bucket without falling in. Opinions differ as to whether to use square or round buckets; square buckets may be slightly more effective at intercepting newts but the animals have been known to more easily scale the corners of square buckets and escape. If necessary, plastic tape can be used around the inner edge of the top of the bucket, forming a small overhang to prevent escapes.
- Pitfall traps will only work effectively if they are fitted flush to the barrier fence, with their tops just below ground level. Frequent checks should be made to ensure that the traps have not pulled away from the fence or their tops raised above the ground, especially after periods of heavy rainfall or dry weather. In very wet periods, especially in clay areas where the water table can rise rapidly, the 'empty' buckets are likely to pop out (and therefore become ineffective) unless some form of pegging-down is used. If remedial works are required the bucket-hole and backfill should be carefully searched for newts prior to the trap being re-seated. Drilling holes in traps may improve drainage on free-draining soils.
- Spacing of the pitfalls should generally be between 5 and 10 metres, though higher densities may result in higher capture rates and may be appropriate around key areas (eg breeding ponds, rubble piles).
- To increase the chances of capture, suitable refuges (eg carpet tiles) can be placed along the fence line at a similar density to the pitfall traps. These refuges should also be fitted flush up to the fence. It may take about two weeks for them to become 'bedded-down' enough to be attractive as refuges. Rubber-backed carpet off-cuts, about 50cm square, appear to be moderately effective in creating the desired humid conditions and are substantial enough not to be blown-away in the wind. When attempting to remove newts from very hard surfaces on which pitfall trapping is impractical, such refuges may be appropriate.
- Servicing of pitfall traps and refuges must be carried out on a daily basis before 11am. All captures should be recorded with notes on location, species, sex and life-stage, making it useful to number and label each trap and fence. This information (together with that from any other capture methods) should be compiled to form an accurate record of the capture data for

submission upon completion of the scheme or at any stage it might be requested to review project progress. The plotting of capture locations and numbers caught can be of great assistance when determining and justifying any shift in trapping effort.

- Any amphibians captured must be moved to the receptor area and released as soon as possible, using suitable, lidded containers with air-holes (plastic 3.3 pint 'maggot boxes', available from angling suppliers, are ideal).
- Torchlight searches along the fence-lines on warm, wet nights are an excellent way of improving newt capture rates.
- Hand searching areas of vegetation is usually an inefficient method of site clearance and, consequently, data from such searches should not be used as sole evidence that a site has been cleared.
- Pitfall trapping should be a continuous process, with traps open every day unless the weather indicates zero or very low capture rates. Full and consistent trapping effort should be employed in order to maximise captures and prevent unnecessary disruption being caused to amphibians by preventing access to breeding ponds or foraging habitat for any longer than is necessary.
- Cutting vegetation by hand, strimming, or mowing of vegetation may be acceptable as a technique to encourage newts to move into trapping areas, providing it is done to assist in the capture of the remaining animals after a suitable trapping operation has already been implemented. However, there is little evidence to show that this is very effective. Vegetation cutting is acceptable so long as newts are not endangered; generally there is virtually no likelihood of encountering newts exposed and above ground during the day, but it is recommended that to minimise chances of killing newts where vegetation is dense, cutting should be carried out during periods of hot, dry weather and to leave a sward height of around 15cm. Artificial watering of the ground in dry conditions has been suggested as a technique for raising capture rates in summer but again there are few data on its effectiveness; this may be tried as an additional technique.

Figure 4: Fence and pitfall trap design

Recommended design for exclusion fence (temporary amphibian fence), drift fence, and pitfall trap placement. This design can be used for a variety of capture and exclusion/retention purposes (see text and Figure 5: Common fencing and trapping patterns).



Effort, trap pattern and timing:

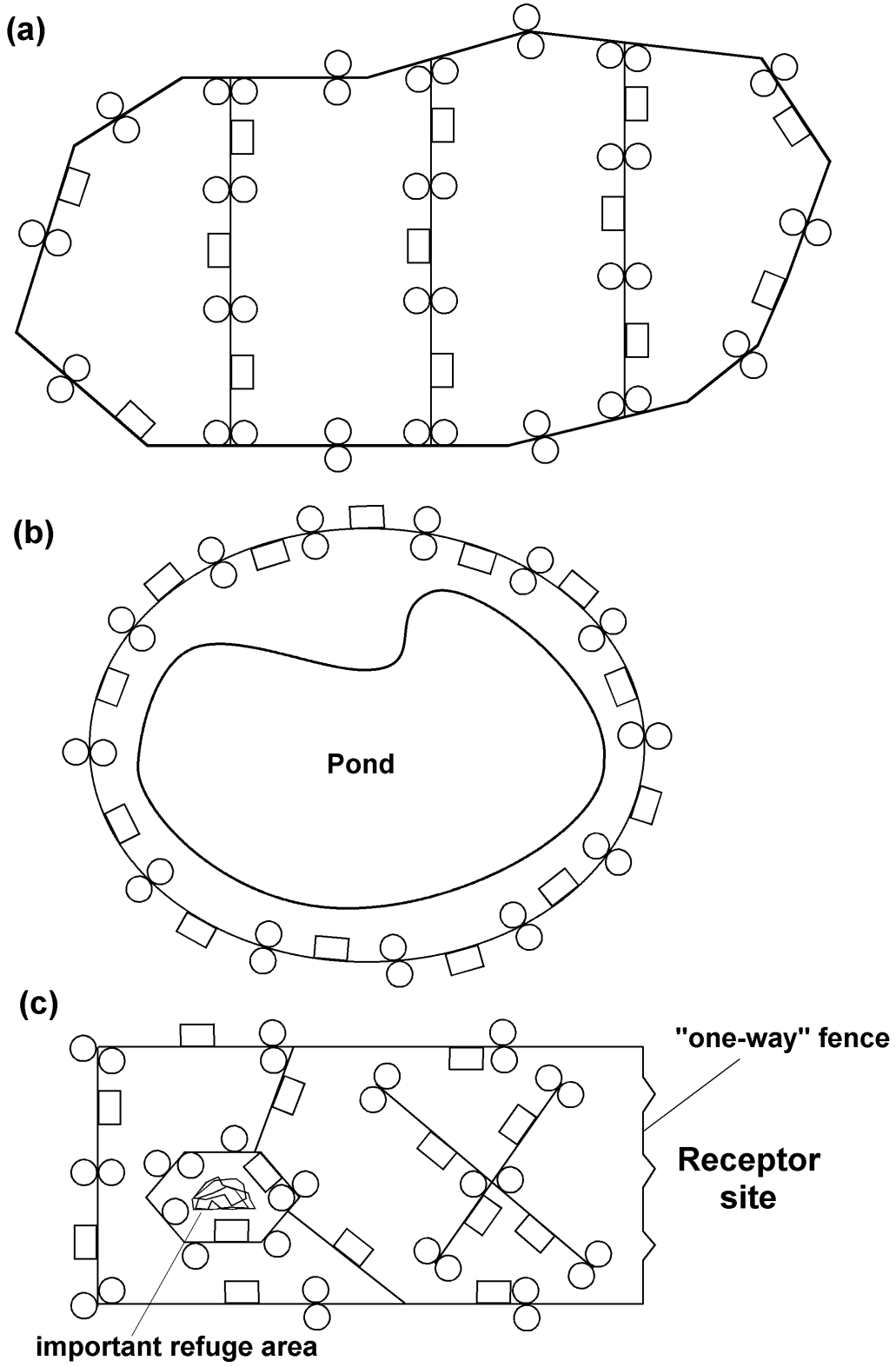
(a) *Breeding ponds*. To remove great crested newts from a site that includes a breeding pond, trapping should last from February to October inclusive, or until capture data clearly indicate that a site has been trapped successfully (see below). There should be, as a minimum, at least one spring migration (February to May inclusive), with breeding ponds ring-fenced (a notable exception being temporary, linear works - such as pipelines - which may be best undertaken outside the migration period to avoid separating newts and other amphibians from their breeding ponds). Pitfall traps should be located on both sides of the fence, as some newts may shelter within the enclosure (see Figure 5: Common fencing and trapping patterns). It will also be necessary to capture adult and immature newts away from the pond, even during the breeding season. Note that even if pitfall trapping on a ring-fence system is undertaken around the pond for an entire year, a significant percentage of the population will normally not be captured (great crested newts normally take two to four years to reach sexual maturity, and during this time they may not visit the pond). For this reason, to be confident of effectively capturing the majority of the population at large sites, ring-fencing over at least three years, combined with trapping effort away from the pond (see below) is advised. However, where considerable extra effort is expended, it may be possible to capture a significant proportion of the population in one year.

(b) *Terrestrial habitats*. Where areas of terrestrial habitat are to be affected by development, drift fencing and pitfall trapping often provide the best solution for removing newts. Fencing should enclose the development area to prevent immigration of newts. Where the receptor site is adjacent to the donor site, one-way fencing may be used at the perimeter. A common trap pattern is to install lines of drift fencing with pitfall traps within the development area so that it is divided into compartments. Within the compartments, further trapping can be undertaken along lines or crosses of drift fencing (compartmentalising is preferable to using fence lines or crosses alone, since it further restricts newt movement and allows areas to be successively 'cleared'; this is especially useful for large sites). The level of effort required will vary according to case details, but the following may be used as a guide:

Population size class assessment (see 5.8.3)	Minimum trap density (traps/ha)	Minimum no. of trapping nights
Small	50	30
Medium	80	60
Large	100	90

Note that a 'trapping night' is counted as one during which the weather and seasonal conditions indicate newt capture is likely. Such conditions are generally taken to be: night air temperature >5°C, with rain (or if no rain, there should have been some rain in the last few days, such that the ground is damp). Hence, a trapping period of 30 nights as indicated in the above table would mean 30 nights on which conditions were suitable. Intervening periods of cold or dry weather would mean that the actual period of capture, from start to end, would be more than 30 nights. Note that these figures are given as a guide, and should great crested newts still be trapped towards the end of the effort indicated here, further effort will often be required. As a guide, 5 trapping nights with no captures would indicate that suitable effort had been expended at most sites. Other methods of capture would normally also be employed to supplement pitfall trapping.

Figure 5: Common fencing and trapping patterns
Fences shown as lines, pitfall traps as small circles and carpet refuges as rectangles. (a) Capturing newts from a large area of terrestrial habitat due to be destroyed. The fencing compartmentalises the site facilitating phased clearance. Traps on the outside of the area capture newts that attempt to migrate into the area to be lost, a method useful in most schemes. (b) Ring-fencing a breeding pond. Note that traps are required on both sides of the fence. (c) Capturing newts from an area of terrestrial habitat due to be lost, where the receptor site is adjacent. The one-way fence is angled upwards towards the receptor site, to prevent newts returning. Intensive trapping is shown around a favoured refuge area.



8.3.2.3 Netting, bottle trapping, draining down and hand searching in ponds
To capture great crested newts from a pond, a combination of methods is normally required. A programme of pitfall trapping would normally be the first stage, as outlined above. Netting is relatively inefficient except in very small ponds or those with hard substrates and little vegetation (eg concrete ponds, lagoons or swimming pools, all of which are generally easier to catch from). Bottle-trapping appears to be more effective. A density of at least 1 trap per 2m of shoreline, with 90 trap nights (night-time air temperature >5°C) over mid-February to mid-June is recommended for removing breeding adults. Bottle-trapping can also be used in summer to trap larvae, but special care is required to minimise harm. Vegetation supporting great crested newt eggs should be moved too, though care should be taken if the donor pond supports fish or invasive exotic species (removing egg-laden leaves and careful washing in clean water may help).

Draining down of ponds can help to catch remaining newts. Screens with a fine (<1.5mm) mesh should be fitted to pumps used for draining down, to prevent any remaining newts (or other wildlife) from being drawn through the pump. Rather than drawing water directly from the pond, it may be possible to dig a narrow trench, connected to the pond, from which water can be drawn-off. A fine mesh screen would still need to be positioned across the mouth of the trench (two pond nets, used alternately as each becomes clogged with vegetation, work well); using this method it is easier to prevent amphibians, vegetation or silt being pulled into the pump. In some cases the use of a pump could be avoided completely if pond water can be trenched away by gravity to a nearby ditch. Newts can be caught by netting as draining takes place, and by hand searching through plants, debris and silt when the pond is dewatered. Care should be taken when working over areas of soft silt; a risk assessment is recommended. Ring fencing with pitfall traps can help capture newts escaping from the pond overnight during the process of draining. Having removed the newts from the pond, in many cases it is beneficial to transfer the pond vegetation, water and a quantity of silt to a newly prepared pond (though beware of transferring undesirable fauna and flora). This can help establish a more favourable pond ecosystem on receptor sites.

8.4.2.4 Hand searching and night searching on land
Some habitats may be searched by hand during the active season. This is useful for finding newts under refuges, but is a poor method when they are underground or amongst very dense vegetation. Newts can sometimes be found by torchlight, walking over land at night in good weather conditions (typically when the ground is wet, and often up against drift fences if used), but this is a very inefficient method. Both these methods are to be used only as additional techniques, alongside the others described here.

8.4.2.5 'Releasing' land for development
Once the capture programme has finished, the consultant should be in a position to make a statement that reasonable effort has been made to remove great crested newts from the development site, allowing earthworks to commence. Fencing and pitfall traps should be carefully removed under supervision of the licence holder, since great crested newts often take refuge in gaps between fences, traps and the ground, and these animals will need to be captured.

Infilling of great crested newt ponds should not normally take place until:
- capture records indicate reasonable effort has been expended to trap newts
- aquatic and marginal vegetation has been translocated to receptor ponds, if applicable
- any pond water required to inoculate new ponds has been taken

- pond water has been carefully drained away or pumped out
- the pond bed and surroundings have been reasonably searched for any uncaptured amphibians

The process should be supervised by the licence holder (or an accredited agent who has experience of pond draining operations) and concluded by infilling immediately the operations listed above have been completed. Great crested newt ponds may best be infilled over winter, as this may remove the need for involved capture efforts associated with draining down. In this instance, though, prior checks should be undertaken to ensure no newts remain in the pond or hibernate in the banks.

Land can be released for development provided that the works will not adversely affect any retained great crested newt habitat, for example by: interfering with migration; interfering with ongoing mitigation works; causing water-level changes in breeding ponds; allowing spoil or stock piles to be stored close to amphibian fencing; allowing insufficient working area for people and/or machinery used in mitigation.

8.4.2.6 Delays in development work
Construction work may be halted or postponed for various reasons beyond the control of the developer or the environmental consultant. Sometimes these can have a bearing on mitigation works. If fences have been erected, they should be maintained for the duration of the delays, as breaches might allow newts to recolonise areas from which they had previously been removed. Additional trapping may be required should vegetation bridge the fence, or should holes appear in it. If fencing is in place to confine great crested newts to small areas, this time should be minimised; removal of some fences and consequent amendments to the mitigation plan may be required. Licence variations may be required to accommodate modified method statements.

8.5 Post-development habitat management, site maintenance and population monitoring

8.5.1 Habitat management and site maintenance
The main issues which may need to be covered by post-development management are:

- Aquatic vegetation management in ponds
- Clearance of shading tree or scrub cover around pond margins
- Desilting and clearance of leaf-fall (infrequent, long-term)
- Mowing, cutting or grazing of grassland
- Woodland and scrub management, eg long rotation coppice

Maintenance should cover work to remedy any significant damage to the site. The following are examples of commonly encountered problems [with solutions in brackets] which should be covered by maintenance agreements:

- Introduction of fish [removal through draining, netting, electro-fishing, and/or chemical treatment; seek advice from English Nature on current recommended methods]
- Pond leakage caused by puncturing of liner, etc [pond repair and refilling]
- Dumping of rubbish on site [removal]
- Fires, acute pollution or other major damage [reinstatement as appropriate]
- Damage to fences [fence repair or replacement]

- Tunnel silting or blockage [jetting out or other cleaning methods]
- Damage to interpretation boards [repair or replace]

Timing and responsibilities should be clearly set out in a management and maintenance plan. For a typical scheme, the plan should be in place for at least 4 years following completion of the development, and ideally longer. For high impact developments, management may be required in perpetuity. The decision on timing will depend on the likely management needs, the importance of the population, and the impacts of development. There should be reasonable certainty that the population's management needs will be accommodated following completion of the main management plan period, through the routine land management practices. In some cases, responsibility for undertaking and paying for management may be passed to the new landowners after a period. The inclusion of receptor sites in green belt land is not enough on its own to guarantee future good management, nor are letters of intention from landowners (though these may be well-meaning, a more binding agreement is preferable).

There are a number of options for securing the finance for appropriate management and maintenance after development. A commuted sum (similar to that which is paid by developers to local authorities in order for them to adopt public open space, roads, footpaths, etc.) may be made available. The setting up of a trust fund, or agreements with local wildlife groups, may be an option. Local authorities may take on management if the receptor site is part of or linked to a Public Open Space. Whatever method for delivering management and maintenance, it should be ensured through a binding planning obligation, normally a Section 106 agreement.

The management and maintenance requirements should be decided on prior to finalising a mitigation plan. They can be incorporated into the plan itself, or for high impact schemes where a considerable amount of post-development management is required, a stand-alone management and maintenance plan can be written and appended to the mitigation plan (see 10. Presenting mitigation plans). In some circumstances, for instance where the receptor site is a nature reserve, the operations may need to be incorporated into a wider management plan which addresses other issues relating to the receptor site.

8.5.2 Population monitoring

A monitoring plan should be put in place to assess whether the great crested newt population has responded favourably to the mitigation, and to inform ongoing habitat management. If consistent methods are used pre- and post-development, it will be easier to compare population trends. The level of monitoring required depends on the population assessment and the impact of development. For some small schemes, no monitoring is required, while for developments which will result in significant impacts, a considerable monitoring commitment is required. The table below gives guidance on the minimum requirements.

Site status assessment/ population size class (see 5.8.3, 5.8.5)	Impact type and size (see 6. Predicting the impact of development)		
	Low	Medium	High
Small population/ low importance	None	Presence/absence; 2 years	Presence/absence; 4 years
Medium population/ medium importance	None	Pop size class assessment; 4 years	Pop size class assessment; 6 years
High population/ high importance	Pop size class assessment; 2 years	Pop size class assessment; 6 years	Pop size class assessment; 10 years

Table showing the methods, effort and timing for monitoring great crested newt populations. None = no monitoring required. Presence/absence = follow methods and effort set out in 5.7.1. Pop size class assessment = follow methods and effort set out in 5.7.2. X years = minimum number of years post-development for which monitoring should take place.

Note that it is important for certain qualitative checks to be made when undertaking monitoring, such as the presence (and use of) egg-laying plants, presence of late-stage larvae (July-August), and pond permanence. A commentary on such aspects should be included in monitoring reports. The table gives recommended minimum standards; for some high impact, large population schemes, statutory bodies may require additional monitoring, especially where active management will continue for longer.

Monitoring may be incorporated into (and used to inform the implementation of) the management and maintenance plan. It should clearly outline who is responsible for undertaken monitoring, when and by what methods. The results should be sent to DEFRA and English Nature through licence returns, to the English Nature Local Team, to the Local Planning Authority, and to local and national recording schemes as appropriate.

8.6 Welfare considerations for capture programmes

8.6.1 General

Capturing and trapping great crested newt is a skilled processes, controlled by both conservation and welfare legislation. Poor standards can lead to prosecution if newts are found to be unlawfully killed, injured or to have suffered unduly while in traps. Trapping should not take place in periods of extreme weather conditions where any newts taken may be at risk from extremely high or low temperatures or from drying out. When not in use, traps must be removed, or closed securely, as appropriate. Broken traps must be removed for safe disposal.

Where newt populations are to be surveyed for study (rather than being captured as part of a translocation programme), any animals taken must be released at the site of capture immediately following examination and should be handled as little as possible to obtain the survey data required. Day time release of night captives on land should be into thick ground cover. Traps must be robust and designed, wherever possible, to prevent harm to, or predation of, trapped animals.

A daily log of captures from each numbered trap should be kept for several reasons:

- to assist in site assessment, for example, which water bodies and terrestrial parts of the site are most or least used by newts
- as evidence that adequate survey effort has been employed to justify any conclusions reached
- to assist with reporting to the licensing authority (normally a condition of the licence)
- to refine the location and/or density of trap deployment to improve trapping efficiency.

For translocations any amphibians captured must be moved to the receptor area and released as soon as possible, using suitable, lidded containers with air-holes. These should be labelled with species type, source and destination, marked 'This side up' and (for terrestrial phase animals) have ample moist vegetation for padding. When putting amphibians into containers for transport, species must not be mixed, and animals must have suitable space (no 'stacking' should occur). When transporting larvae, care should be taken to separate large and small animals as cannibalism may occur.

8.6.2 Pitfall traps

If pitfall traps are used in areas where shrews occur, the traps must be designed to allow shrews to escape, or a separate shrew trapping licence is required from English Nature, which will have its own conditions that must be followed. Pitfall traps must be checked at least once in every 24 hours between 06.00 and 11.00 hours; preferably they should be checked more frequently.

Pitfall traps must be furnished with a sufficient quantity of suitable vegetation to act as an amphibian refuge. This material must be kept moist at all times and must be replenished as necessary. A mammal ladder, consisting of a twig not more than 1cm in diameter must be installed in each pitfall. Where buckets are liable to flooding, a floating raft such as tree bark must be added. . Care must be taken not to expose the animals to undue stress (eg through high temperatures) during the trapping and translocation process.

Newts should be released into the cover of a similar habitat to the one from which they have been captured (ie pond to pond, grassland to grassland, etc), normally on the opposite side of the fence to capture. However, note that for interception at the 'outside' of ring-fences around pond margins during immigration, release directly into the pond is more appropriate. When operating ring-fences and significant lengths of fence-lines for survey purposes, it is important to open traps each day that suitable weather conditions prevail in order to allow (assisted) newt movement across the barrier, otherwise migration patterns will be disrupted, and there is a risk of fragmenting the site.

8.6.3 Bottle traps

Submerged bottle traps containing an air bubble must not go unchecked for longer than 17 hours overnight, and should be checked between 0600 and 1100 hours. They must be held firmly in place to prevent tilting and loss of the air bubble. If used without an air bubble, they must not be left unattended longer than 12 hours in March-April, 10 hours in May, 8 hours in June, 7 hours in July-August and 8 hours in September-October. Marking the top of the canes used to secure bottle traps in place with high-visibility, fluorescent paint is recommended to make it easier to find all traps in poor light or heavily vegetated areas.

Traps should ideally be set at dusk, and checked and removed early the following morning. Bottle traps must not be set in full summer sunlight or at night during periods of very hot weather, as the temperature of water inside the trap may rise considerably and oxygen levels will be reduced. Larvae are especially prone to such risks, and it is advisable to switch to another method if such conditions prevail.

Any deaths of great crested newts must be immediately reported to the licensing authority. If more than one death occurs in a bottle trap or if newts are found unconscious and they then recover, then trapping must be suspended and advice sought from the licensing authority. Details of all casualties must be included in the report presented at the end of the licence period. Any unconscious newts

should be placed in damp moss in a cool, airy container; recovery may take a number of hours. The animals should then be released into damp ground cover adjacent to the pond from which they had been taken. Great crested newt larvae may be vulnerable to damage, predation or suffocation in bottle traps (normally found in peak numbers late June to October.) Trapping should be suspended if more than two larvae are found dead and advice sought from the licensing authority. Where the consultant considers that there is a reasonable chance of capturing other protected species (eg water shrews), steps should be taken to address appropriate licensing issues, to modify trapping methods, or to avoid trapping altogether, as necessary. Should water shrews be trapped inadvertently, the licensing authority should be informed and trapping halted; a note of the occurrence of this species should be sent to the Local Records Centre, as it is very under-recorded.

9. Model examples

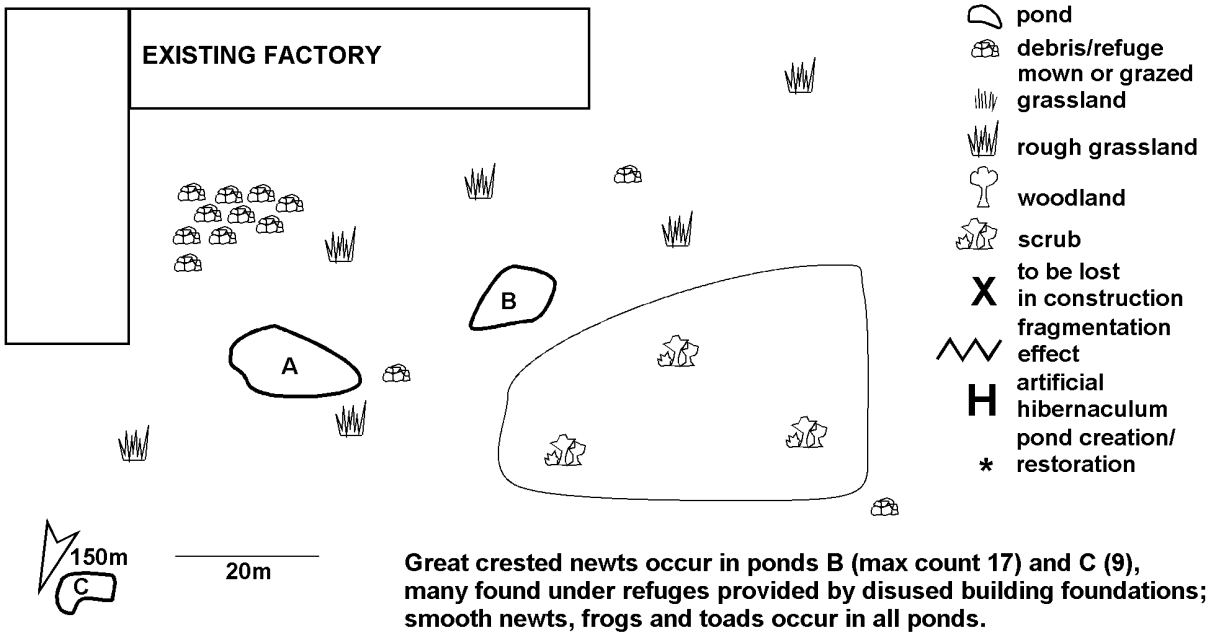
9.1 Introduction

These examples are given to illustrate the main aspects of capture, exclusion and habitat creation. For clarity, no details are given about the exact location of fencing and other methods used, nor on post-development management and monitoring. It is expected that actual mitigation plans will provide considerably more detail than is given here. These examples show a range of commonly encountered situations, varying from total site loss through to low impact. None of the examples relates to large impacts on sites of high importance, as such cases are likely to be so site specific that it might be misleading to provide very general guidance here.

Each example shows in stages an outline of the site and key survey information, predicted impacts, and finally the mitigation required. This approach distils the main information expected in mitigation plans, for which consultants and developers are recommended to follow the structure given in the next section (see 10. Presenting mitigation plans).

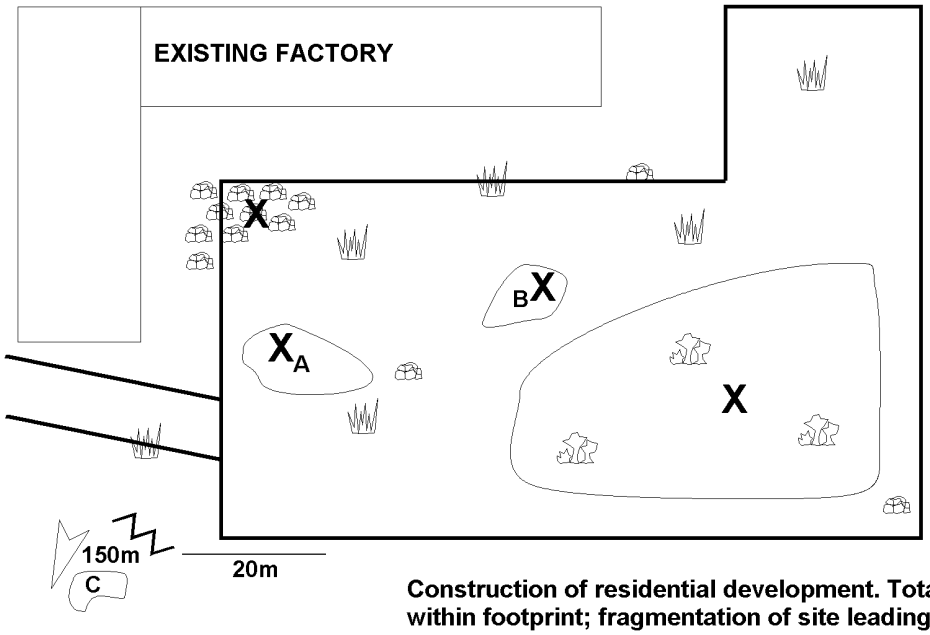
9.2 Example 1: total site loss

A. Site layout and newt status



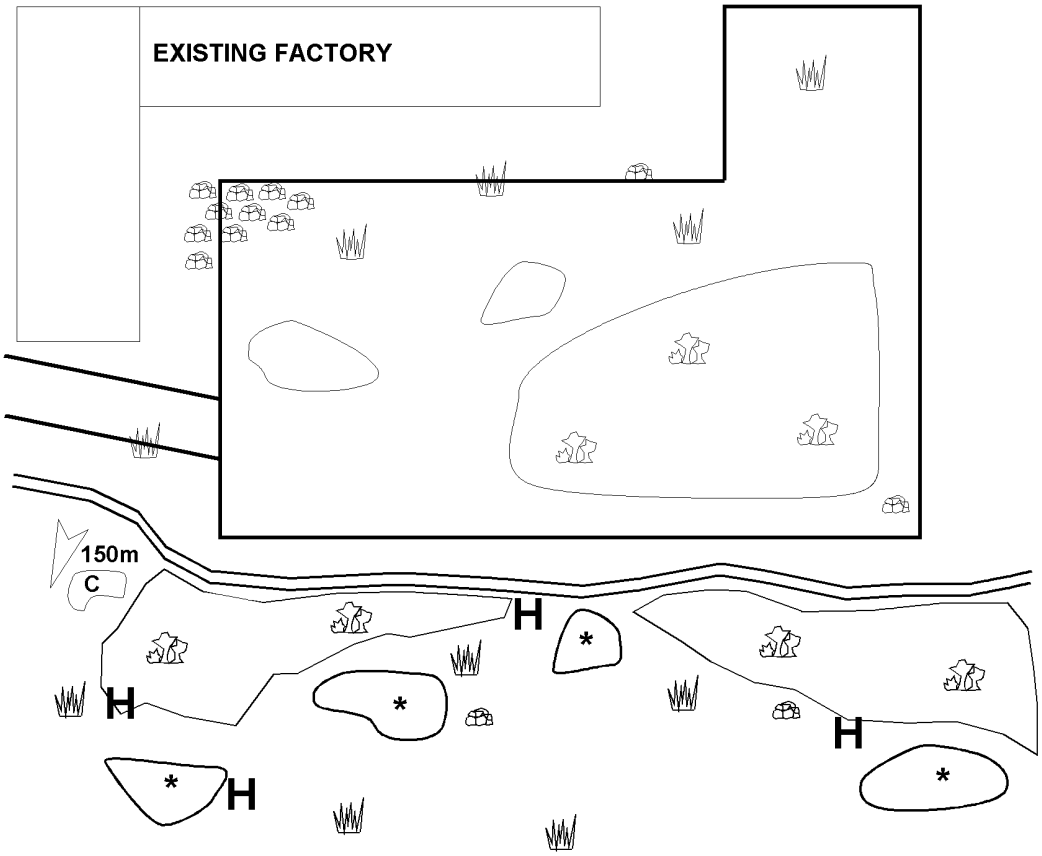
Great crested newts occur in ponds B (max count 17) and C (9), many found under refuges provided by disused building foundations; smooth newts, frogs and toads occur in all ponds.
Site assessment: low count in a local context; breeding occurs; habitats are not unusual for great crested newts in this area (rough grass, scrub on brownfield site); no other ponds within 500m; little disturbance as site is fenced; overall site importance is low.

B. Development proposals and predicted impacts



Construction of residential development. Total loss of habitats within footprint; fragmentation of site leading to isolation of pond C; likely increase in interference to pond C; likely changes to hydrology of pond C; possible increased mortality from proposed kerb/gully pot drainage system.

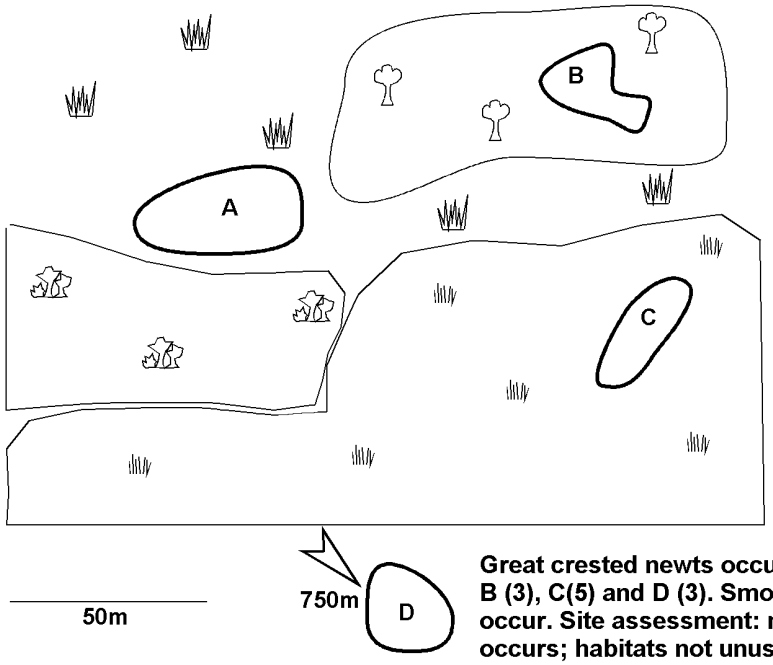
C. Mitigation



Capture/exclusion: ring-fence ponds A and B Feb - June; pitfall trap across development footprint Feb - June; additional searches and dismantling June - July; temporary exclusion around development. Pond infilling, site clearance in August.
Habitat creation/enhancement: (all on former arable land - ie previously of relatively low value for newts) creation of 4 new ponds, positioned to prevent isolation of pond C; scrub and grassland planting; bund creation along site boundary with secure fencing and screening; creation of hibernacula and refuges
Construction: development uses SUDS to avoid gully pots etc and prevent major changes in hydrology

9.3 Example 2: partial site loss

A. Site layout and newt status

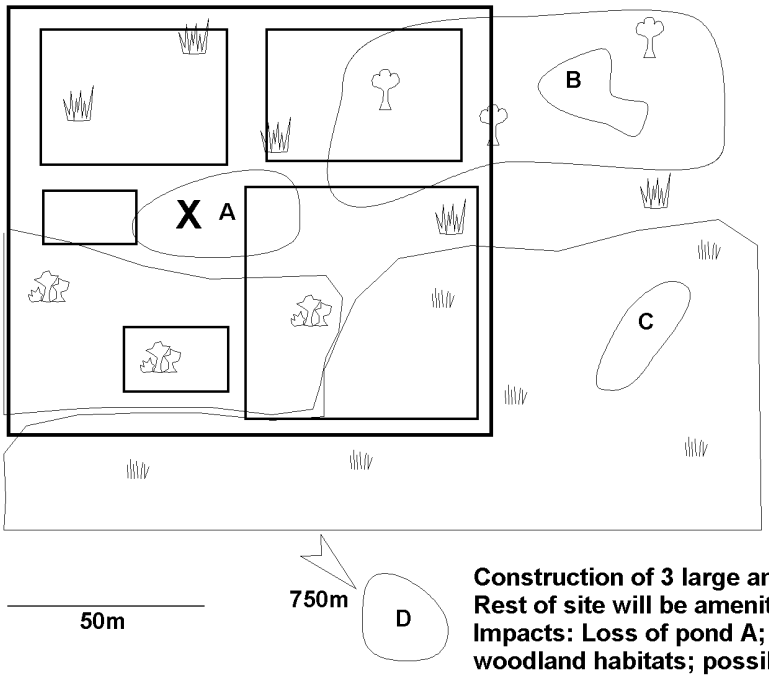


Key

- pond
- debris/refuge
- mown or grazed grassland
- rough grassland
- woodland
- scrub
- X to be lost in construction
- fragmentation effect
- H artificial hibernaculum
- * pond creation/ restoration

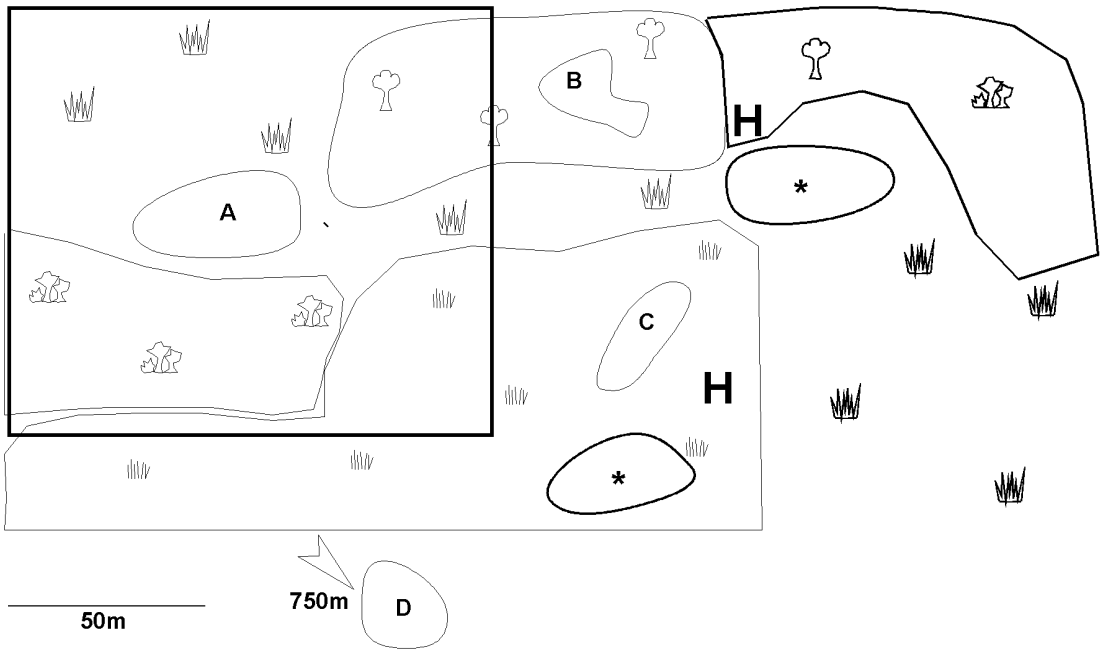
Great crested newts occur in ponds A (max count 36), B (3), C(5) and D (3). Smooth newts, frogs and toads also occur. Site assessment: medium sized population; breeding occurs; habitats not unusual in the local area; B is very shaded, C contains fish, D is isolated; no other linked ponds; site not of high local importance - at least 10 other sites with higher counts and site integrity within 10km.

B. Development proposals and predicted impacts



Construction of 3 large and 2 small industrial units. Rest of site will be amenity grassland or tarmac. Impacts: Loss of pond A; loss of grassland, scrub and woodland habitats; possible change in water quality and levels in B, C; increased mortality due to gully pot/kerb drainage system.

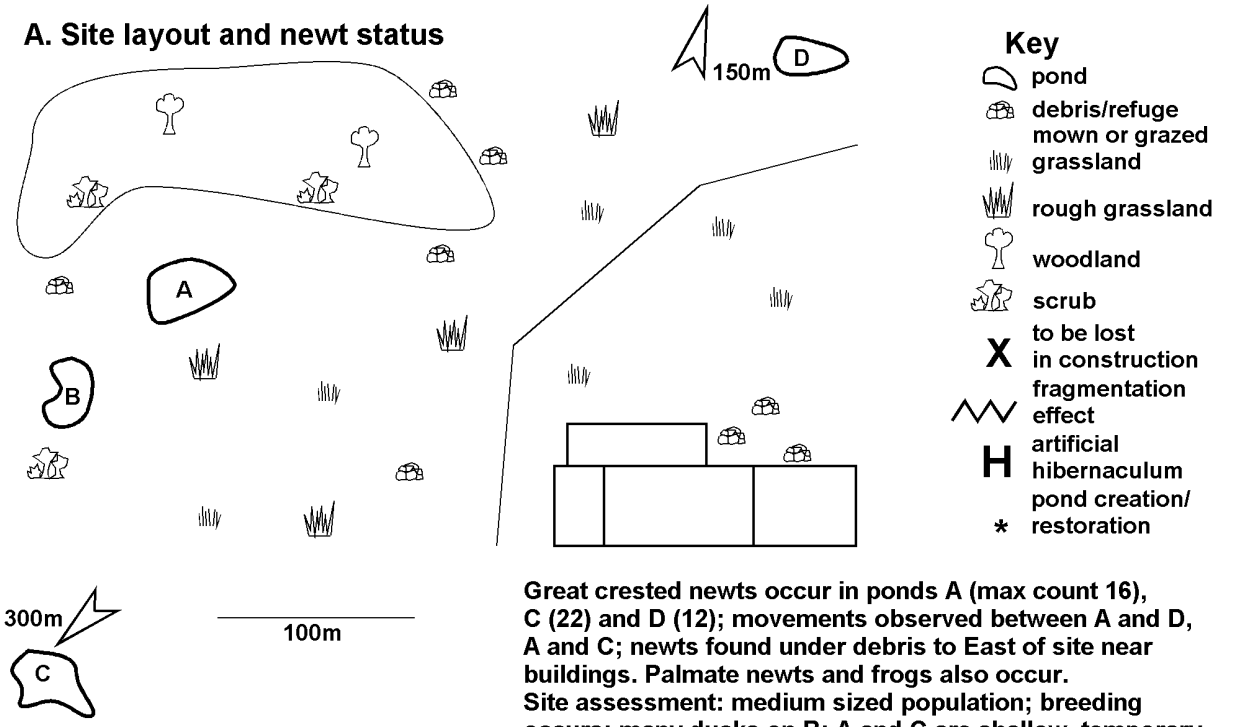
C. Mitigation



Capture/exclusion: Ring-fence and pitfall trap around pond A, Feb - June; pitfall trapping Feb - June across remaining development footprint along with exclusion fence.
Habitat creation/enhancement: 2 new ponds; woodland planting; enhancement of grassland management; construction of hibernacula.
Construction: uses SUDS (no kerbs, no gullies); hydrological tests ensure no water level/quality effects.

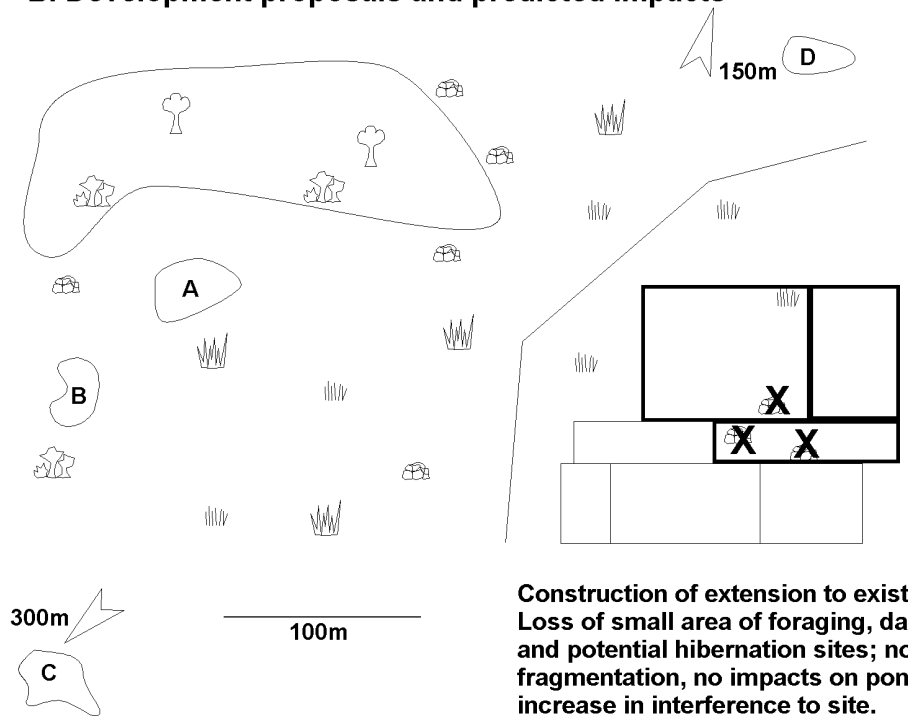
9.4 Example 3: marginal impact

A. Site layout and newt status



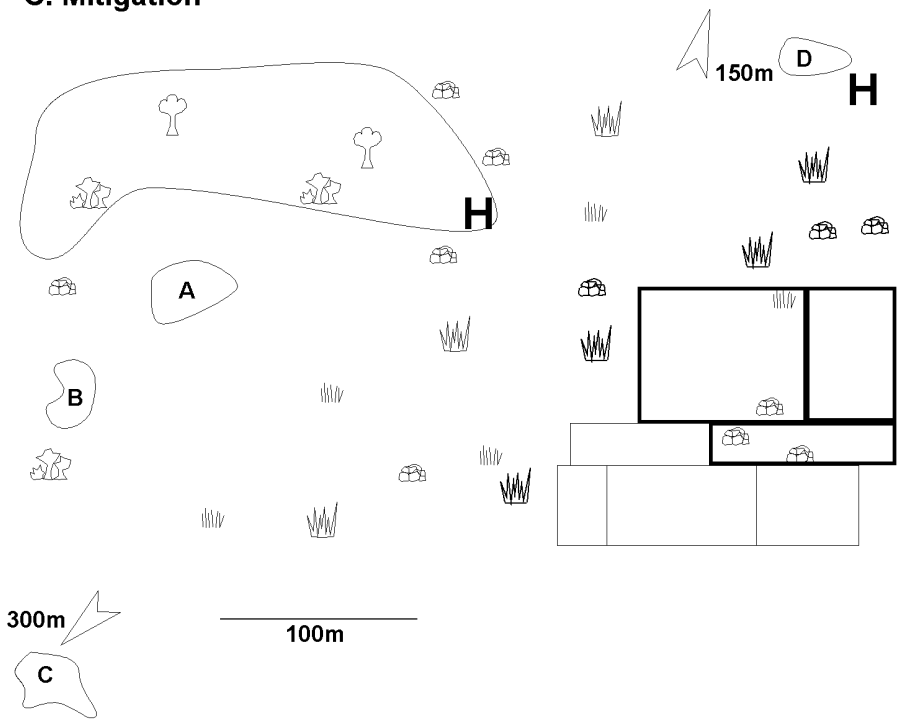
Great crested newts occur in ponds A (max count 16), C (22) and D (12); movements observed between A and D, A and C; newts found under debris to East of site near buildings. Palmate newts and frogs also occur.
Site assessment: medium sized population; breeding occurs; many ducks on B; A and C are shallow, temporary ponds; habitats are unusual in the local area (sandy soils and temporary ponds); site of medium-high local importance

B. Development proposals and predicted impacts



Construction of extension to existing buildings. Loss of small area of foraging, daytime shelter and potential hibernation sites; no significant fragmentation, no impacts on ponds, no increase in interference to site.

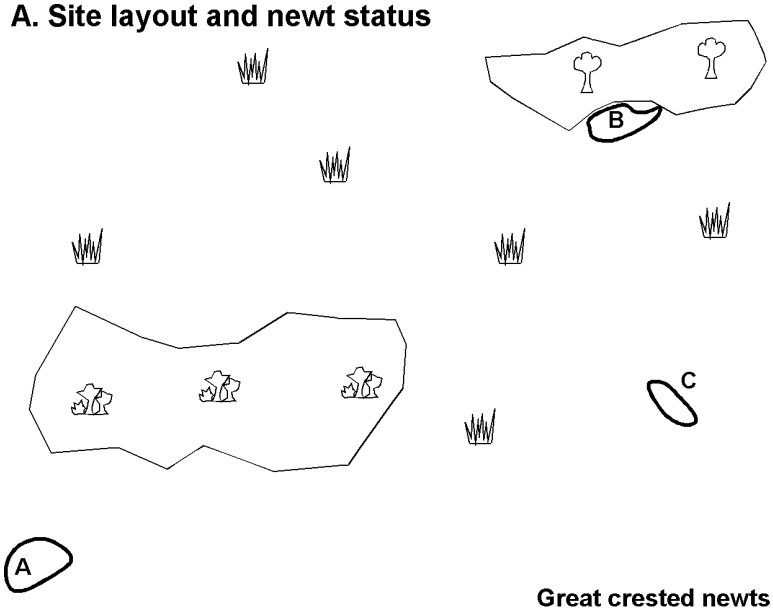
C. Mitigation



Capture/exclusion: pitfall trapping across development footprint for 30 trapping days plus hand dismantling of refuges; temporary exclusion fence.
Habitat creation/enhancement: new hibernacula; new refuges; enhanced grassland management around extension (modify mowing regime to produce better sward structure in previous amenity grassland area).

9.5 Example 4: temporary disturbance

A. Site layout and newt status

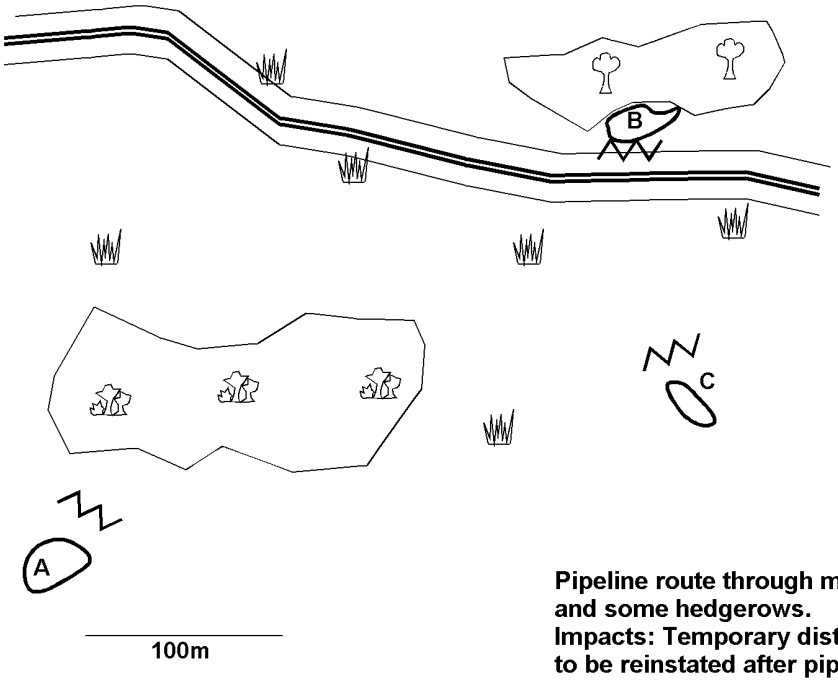


Key

- pond
- debris/refuge
- mown or grazed grassland
- rough grassland
- woodland
- scrub
- X — to be lost in construction
- fragmentation effect
- H — artificial hibernaculum
- * — pond creation/ restoration

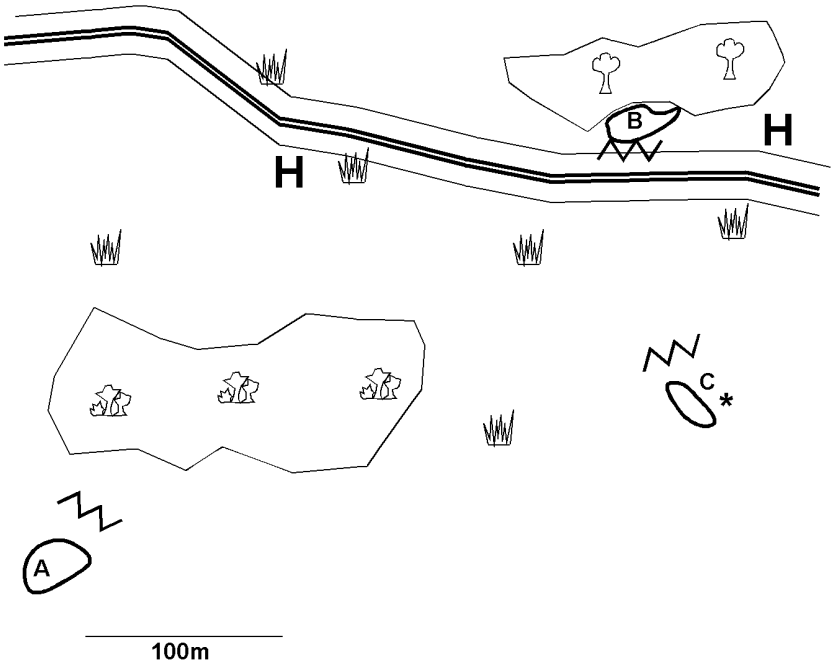
Great crested newts occur in ponds A (max count 15), B (23) and C (10). Smooth newts occur in A and B.
Site assessment: medium sized population, low counts for this local area; habitats are typical; ponds A and C are shaded, pond B recently restored. Overall site assessment low-medium importance.

B. Development proposals and predicted impacts



Pipeline route through mainly pasture, rough grassland and some hedgerows.
Impacts: Temporary disturbance only: ground to be reinstated after pipeline installation. Fragmentation of ponds, preventing migration. Only small long-term loss of terrestrial habitat (short lengths of hedgerow).

C. Mitigation



Capture/exclusion: fence off pipeline working width where within 250m of pond; pitfall traps and refuges used to remove newts from corridor (30 days); pitfall traps installed along outside 50m length in vicinity of ponds, in order to capture newts attempting to cross corridor (newts transferred to opposite side)
Habitat creation/enhancement: reduce shading around pond C; create hibernacula to compensate for short-term loss of hedgerow sections; plant new hedgerows to replace lost sections in long term

10. Presenting mitigation plans

Mitigation plans will often need to be understood, and commented on, by several organisations or individuals. As mitigation can be complex, it is important that the proposals are clear and allow the reader to quickly understand the key points. This will facilitate the processing of licence applications. The structure below proposes a structure with section headings which would be appropriate for most typical schemes. Comments on content are given in square brackets. Further details on the kind of information required are given in the appropriate section in these guidelines. Note that a mitigation plan based on this structure can form the basis of a Method Statement for use in a DEFRA licence. Colour photographs, maps and diagrams can be very useful, but bear in mind that several colour copies may be required since monochrome photocopies of colour images can make it very difficult to pick out detail. The front cover of the plan should show the author and revision history (the latter being useful for assessing how previous consultation comments have been incorporated).

10.1 Suggested mitigation plan structure

A Contents

B Introduction

- B1 Background to development [location, ownership, general landuse, type of and need for the proposed development, planning history, land allocation in Local Plan (or equivalent), etc]
- B2 Consideration of alternative solutions [eg consideration of other sites, or site layouts, and why they have been discounted]

C Survey and site assessment

- C1 Pre-existing information on great crested newts at survey site
- C2 Status of great crested newts in the local/regional area
- C3 Objective(s) of survey
- C4 Survey area
- C5 Habitat description [based on daytime visit(s); to include pond and terrestrial information]
- C6 Field survey
  - C6.1 Methods
  - C6.2 Timing
  - C6.3 Weather conditions
  - C6.4 Personnel
- C7 Results [to include raw data, any processed or aggregated data, and negative results as appropriate; record other amphibians observed]
- C8 Interpretation and evaluation
  - C8.1 Presence/absence
  - C8.2 Population size class assessment
  - C8.3 Site status assessment [combining quantitative, qualitative, functional and contextual factors]
  - C8.4 Constraints [factors influencing survey results]
- C9 Map(s) of survey area [with habitat description, marking ponds and any other features sampled; summary of survey results marked on map if appropriate. Map should show area within a radius of 500m of any breeding ponds on an Ordnance Survey (or similar) base-map]
- C10 Cross-referenced photographs of key habitat features [if appropriate]

D Impact assessment

- D1 Pre- and mid-development impacts
- D2 Long-term impacts [habitat loss, modification, fragmentation, etc]
- D3 Post-development interference impacts [disturbance, fish introduction, etc]
- D4 Other impacts
- D5 Summary of impacts at the site level
- D6 Summary of impacts in a wider context
- D7 Map(s) to show impacts [clear indication of which areas would be affected and how]

E Mitigation and compensation

- E1 Mitigation strategy [overview of how the impacts will be addressed in order to ensure no detriment to the maintenance of the population at a favourable conservation status]
- E2 Receptor site selection
  - E2.1 Existing great crested newt status [give survey data]
  - E2.2 Location, ownership and status
  - E2.3 Habitat description, size, boundaries
- E3 Habitat creation, restoration and/or enhancement [as appropriate]
  - E3.1 Aquatic habitats
  - E3.2 Terrestrial habitats
  - E3.3 Integration with roads and other hard landscapes
  - E3.4 Integration with other species/habitat requirements
- E4 Capture, exclusion and translocation
  - E4.1 Timing, effort, methods, layout of capture/exclusion methods, translocation
- E5 Post-development site safeguard
  - E5.1 Habitat management and maintenance [either set out details here, or if complex then give outline here and give details as an annexed stand-alone plan]
  - E5.2 Population monitoring
  - E5.3 Mechanism for ensuring delivery [eg section 106 agreement; include who will undertake the work, and reporting details]
- E6 Work schedule [phasing diagram to include all works associated within section E, and to indicate construction works timing]
- E7 Map to show location of receptor site in relation to development site
- E8 Map to show capture and exclusion works
- E9 Map to show habitat creation, restoration and/or enhancement
- E10 Map to show post development management [if appropriate]
- E11 Diagram to show capture/exclusion apparatus [only required if non-standard techniques are proposed]

F Summary

- F1 Summary of development and mitigation [NB to include overall consideration of the three main licensing criteria: effect on conservation status, purpose, and alternatives; see 2.2 Exceptions and licensing for details]

G References

H Annexes

- G1 Management and maintenance plan
- G2 Section 106 agreement / planning permission / other planning documents as appropriate
- G3 Pre-existing survey report(s)

11. Further reading

11.1 Literature on great crested newt ecology, conservation and mitigation

Arnold, HR (1995) Atlas of amphibians and reptiles in Britain. London: HMSO

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11.2 Web addresses for legislation texts

Conservation (Natural Habitats &c.) Regulations 1994:
http://www.hmso.gov.uk/si/si1994/Uksi_19942716_en_1.htm

Countryside and Rights of Way Act 2000:
http://www.legislation.hmso.gov.uk/acts/acts2000/20000037.htm

Habitats Directive:
http://europa.eu.int/eur-lex/en/lif/dat/1992/en_392L0043.html

Bern Convention:
http://www.nature.coe.int/english/cadres/bern.htm

(Note: There does not appear to be a full text of the Wildlife and Countryside Act 1981 on the internet.)

12. Document information

12.1 Production notes

This document is partly based on work done by Colin Hayes (Ecology-first) and Julian Whitehurst (The Sustainable Development Consultancy), under contract to English Nature North West Team. Additional comments provided by a range of people and organisations have improved its content. Cover photographs kindly provided by Julian Whitehurst. If you have comments on this document, or wish to make suggestions for future versions, please send them to Jim Foster at English Nature, Northminster House, Peterborough PE1 1UA, or e-mail: jim.foster@english-nature.org.uk . These guidelines will be updated periodically to take account of new findings and changes in policy and legislation, so please ensure you have the current version by checking with English Nature. The latest version is available as a hyperlinked PDF (Adobe® Acrobat®) file on English Nature's website, at www.english-nature.org.uk . Paper copies are available from English Nature's Enquiry Service (tel 01733 455101).

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