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Ecological Surveys • Habitat Management • Training • Legal Services

PRELIMINARY ECOLOGICAL APPRAISAL

LAND AT CREASE DRIVE, CROWLAND, LINCOLNSHIRE, PE6 0BS

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0.0 Executive Summary

0.1 Rationale

Greenwillows Associates Ltd was commissioned to conduct a preliminary ecological appraisal of a parcel of land at Crease Drive, Crowland, Lincolnshire, PE6 0BS (NGR:TF 2376 0965). The aim of the ecological appraisal was to provide *inter alia*, a scoping assessment of the likely impacts a proposed scheme might have upon notable and/or protected species and habitats and where such features might be affected to identify the need for any follow up detailed/specialist surveys and/or mitigation to ameliorate the potential impacts.

The construction proposals relate to the development of an industrial site into residential housing; detailed plans of the proposals are not yet finalised.

0.2 Essential Evidence and Conclusions

Nesting birds

There is potential for nesting birds to be present within the scrub patches located throughout the site and within the buildings onsite. There is also potential for nesting birds to be present within the trees bordering the site, although these are scheduled to be retained within any new development.

If nests are disturbed during incubation and rearing phases then mortality of chicks could occur. Outside of the nesting season there will be a minor negative impact for a low number of birds due to loss of potential nesting habitat.

Bats

The buildings present within the site are assessed as having negligible potential to support roosting bats. From the preliminary appraisal from the ground it does not appear that any of the trees within or on the boundary of the site are likely to support roosting bats. Some trees located on the northern boundary were noted to have some overlapping limbs; this process can form crevices suitable for roosting bats although none suitable were seen during the survey. However, due to the number of trees present, a close inspection of each tree present was not possible during this preliminary ecological appraisal.

The site, particularly the tree-lined boundaries, is likely used by foraging and commuting bats.

The boundary trees are scheduled to be retained and so no impact is anticipated on any potential roosting features not identified in the preliminary site appraisal; an increase in lighting of the site could have a negative impact on the suitability of the site for commuting/foraging bats.

Reptiles

The habitat to the east of the site offers suitable habitat to support reptiles such as lizards, grass snakes and slow worms. The boundary bunds, open areas of gravel and bare earth offer potential basking areas, and the tall ruderal and scrub vegetation, rubble

piles (including in bund), brash piles and compost heap offer suitable resting/shelter habitat.

There is the potential of causing death/injury to reptiles if present during site clearance. Post-construction there may be a loss of habitat for this species group.

Badger

The site offers some suitable habitat for sett creation and suitable habitat for foraging and commuting badgers. However, no evidence of badger activity was noted during the survey.

If badgers do forage/commute through the site at the time of construction, then there is a risk of them becoming trapped in any open trenches/pits created during the course of the works. Any installation of new boundary fencing could restrict foraging and commuting ranges.

Hedgehog

The site is generally suitable for foraging and commuting hedgehogs and the brash piles also offer suitable resting/shelter/hibernation habitat for this species.

0.3 Recommendations

Best Practice

Any works close to trees should be undertaken in accordance with the British Standard BS 5837: 2012 and National Joint Utilities Group Guidelines (NJUG 4).

Site Specific

Nesting birds

It is recommended that the operational set-up should ideally avoid the bird-breeding season (late February to August inclusive) to avoid damage to nesting species. If this is not practicable then a nesting bird survey should be undertaken by an experienced ecologist prior to site clearance commencement to identify whether active nests are present. If any are found they should be clearly marked and avoided until after the young have fledged and left the nest.

It is recommended that the new site plans include a provision of alternative nesting habitats in the form of nest boxes (see Appendix Four) and that woody vegetation should be retained as much as possible.

Bats

Care should be taken to avoid any unnecessary bright lights - both in regards to temporary security lighting during the construction phase and any long-term lighting plans for the site.

Any potential new lighting impacts associated with the proposed development should be minimised by the use of lights with little to no UV content, warm white light sources, and directional downlights - illuminating below the horizontal plane which avoid light trespass into the environment. The use of light directional accessories such as baffles, hoods and

louvres can assist with this. Particular attention should be made to avoid lighting the boundary tree lines of the site.

Lighting types to be avoided include any blue-white light sources, metal halide and mercury lamps, and any form of uplighting, which lights above the horizontal plane, illuminating trees and foraging habitat.

If plans change and trees from the boundary of the site are to be removed - then a closer inspection of trees to be removed may be necessary to ensure no roosting features were missed during the preliminary appraisal.

There is scope to enhance the site for bats through the inclusion of bat roost habitat (see Appendix Four for examples).

Reptiles

It is recommended to undertake a seven-day presence/absence survey for reptiles in the active reptile season (ideally in April or September). Further recommendations will depend on the outcome of this survey.

Badger

It is recommended to cover any trenches/pits created during the works nightly to prevent any badgers from becoming trapped. Alternatively, a ramp should be installed in these features to allow badgers to escape.

Hedgehog

It is recommended that the brush piles be cleared by hand to prevent accidental killing/injuring of hedgehogs. Clearance should not take place on frosty days.

The ramps installed for badgers will also aid hedgehogs in escaping trenches if they cannot be covered nightly. Any new boundary fencing installed should make provisions for foraging hedgehogs to be able to pass freely through the site (see Appendix Four).

1.0 Introduction and Terms of Reference

1.1 This report was commissioned to provide *inter alia*:

- A scoping assessment of the likely impacts the proposed scheme might have upon notable and/or protected species and habitats and where such features might be affected to identify the need for any follow up detailed/specialist surveys.
- Recommendations to avoid potential adverse impacts upon notable and/or protected species and habitats identified as potential receptors within the construction footprint or the relevant zones of influence associated with each receptor.
- An informative document for use by the Local Planning Authority as part of the planning process.

1.2 Based on the JNCC (2010) guidelines an Extended Phase 1 Habitat Survey was undertaken by means of a walkover of the site and its immediate environs, including the licensable impact zone relative to the individual species.

1.3 The survey was based on plans provided by the client and aerial photographs.

1.4 This report outlines the methodology employed to undertake the survey, results obtained and a discussion of the implications arising there from.

2.0 Site Location

The site is situated at Crease Drive, Crowland, Lincolnshire, PE6 0BS (NGR:TF 2376 0965).

3.0 Legislation and Policy

3.1 Statutory Legislation

The Conservation of Habitats and Species Regulations 2010, or the 'Habitat Regulations 2010', transposes European Directives into English and Welsh legislation. Under these regulations, wild animals of a European Protected Species and their breeding sites or resting places are protected. It is an offence to deliberately capture, injure or kill any such wild animal and in the case of great crested newts, deliberately take or destroy their eggs. It is also an offence to deliberately damage or destroy a breeding site or resting place of any such wild animal.

Wild animals of a European Protected Species are also protected from disturbance. Disturbance of such wild animals includes in particular any disturbance which is likely:

(a) To impair their ability -

- *to survive, to breed or reproduce, or to rear or nurture their young; or*
- *in the case of animals of a hibernating or migratory species, to hibernate or migrate; or*

(b) To affect significantly the local distribution or abundance of the species to which they belong.

The Wildlife and Countryside Act 1981 (as amended) adds further protection to wildlife in England and Wales under Part 1. It is unlawful to intentionally kill, injure or take any wild bird or take, damage or destroy the nest of any wild bird whilst the nest is in use or being built. If the bird is included on the Schedule 1 list, it is additionally an offence to intentionally disturb its nest during the breeding season.

Certain species of animal are protected under the Wildlife and Countryside Act 1981 (as amended) by being included in Schedule 5 in respect of certain offences under Section 9. Such offences include:

9(1) Intentional killing, injuring or taking of a Schedule 5 animal;

9(4a) Damage to, destruction of, obstruction of access to any structure or place used by a Schedule 5 animal for shelter or protection;

9(4b) Disturbance of a Schedule 5 animal occupying such a structure or place.

Badgers are primarily protected by The Protection of Badgers Act 1992, under which it is a criminal offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so and to intentionally or recklessly interfere with a sett.

Under the Hedgerow Regulations 1997 it is an offence to remove most hedgerows without permission from the Local Planning Authority. Permission for the removal of hedgerows may be refused if the Local Planning Authority determines any hedgerow to be 'Important' under criteria listed in Part II of Schedule 1 of the Regulations.

3.2 Planning Policy

The National Planning Policy Framework relating to biodiversity (NPPF) is both guidance for local planning authorities on the content of their Local Plans and material consideration in determining planning applications. The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. However, the government circular 06/05: 'Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System', which accompanied PPS9 remains valid.

The NPPF places much emphasis on sustainable development and the need for the planning system to perform a number of roles including 'improving biodiversity' by protection of designated sites, priority habitats and priority species, ancient woodland and veteran trees.

The NPPF places more emphasis on ecological networks and their creation and states that the planning system should:

- Avoid, mitigate and compensate for significant harm to biodiversity and protect Sites of Special Scientific Interest and irreplaceable habitats such as ancient woodland.
- Provide a net gain for biodiversity wherever possible and contribute to the Government's commitment to halt the loss of biodiversity.

3.3 Notable Species and Habitats

3.3.1 The UK Biodiversity Action Plan (UK BAP) was drafted for 'Priority' species and habitats in which specific conservation targets were set and are regularly reviewed. UK BAP features do not receive any legal protection *per se* but have biodiversity value within a national context. The UK BAP also serves as a framework for local biodiversity conservation efforts. UK BAP priority species and habitats were those that were identified as being the most threatened and requiring conservation action under the UK BAP. The original lists of UK BAP priority species and habitats were created between 1995 and 1999, and were subsequently updated in 2007, following a 2-year review of UK BAP processes and priorities, which included a review of the UK priority species and habitats lists. As a result of new drivers and requirements, the 'UK Post-2010 Biodiversity Framework', published in July 2012, has now succeeded the UK BAP. The UK BAP lists of priority species and habitats remain, however, important and valuable reference sources. Notably, they have been used to help draw up statutory lists of priorities in England and BAP species and habitats are still referred to at a local level (JNCC 2013).

3.3.2 The Natural Environment and Rural Communities (NERC) Act 2006: Section 41 of The Natural Environment and Rural Communities (NERC) Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act.

3.3.3 The Section 41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

4.0 Methodology

4.1 Desktop Study

A search of the Multi-Agency Geographic Information for the Countryside website was undertaken with regards to the presence of statutory nature conservation sites. In addition a high level screening review of the National Biodiversity Network website was undertaken for an indication of the potential likely presence of protected species within 2km of the survey site. A data search was also undertaken of records held by Greater Lincolnshire Nature Partnership within 2km of the target site of all designated sites (statutory and non-statutory) and protected species covered by the following legislation: Wildlife & Countryside Act 1981 Schedules 1,5 & 8; Protection of Badgers Act 1992; The Conservation of Habitats & Species Regulations 2010 Schedules 2,4&5; Habitats Directive Annexes 2,4&5; Birds Directive Annex 1; UKBAP species (both local and national); NERC Act 2006 Section 41 species; Nationally Notable, Scarce & Rare species.

4.2 Field Surveys

Extended Phase 1 Habitat Survey

A walkover of the site was undertaken on 29th February 2016 by Emma Parnwell and Claire Parnwell based on the JNCC (2010) Phase 1 Habitat Survey Guidelines.

The Phase 1 Survey was extended to include a search for signs of protected, principal importance and biodiversity priority action plan species and an assessment of the habitats present for their likelihood to support such species (see Annex One). Target notes (TN) are shown on a habitat map in Appendix Two.

Building Inspection

A building inspection bat survey (including an examination of the internal structures, roof spaces and external spaces of all the buildings on site) was also undertaken on 29th February 2016. The survey was carried out to assess the current usage of the building by bats and to advise on the impact on bats and legal obligations prior to building work being carried out.

The building bat inspection was carried out by Emma Parnwell, a level two class licensed bat surveyor and Claire Parnwell, a trained bat worker. The building survey involved a thorough internal and external search of all suitable cavities, holes and crevices, all suitable areas and floors were inspected for the following signs:

- Bat droppings;
- Stains around roosting places and entrance points;

- Urine marks;
- Prey remains;
- Areas devoid of cobwebs;
- Live or dead bats;
- Suitable cracks and crevices for bats to enter.

Equipment used for the building survey included various sized torches, extending mirror, endoscope, close-focusing binoculars and ladders.

4.3 Constraints

There were no constraints to the survey.

5.0 Results

5.1 Background Data

5.1.1 Statutory and Non-Statutory Nature Conservation Sites

There are five Local Wildlife Sites (LWS) found within 2km of the application site. There is no anticipated impact on any of these.

Table One: Local Wildlife Sites Within the Zone of Influence.

Name	Status	Easting	Northing	Distance from site (km)
Crowland Wash Lake	LWS	523304	310593	0.9
New River	LWS	526045	315231	0.53
River Welland	LWS	525341	315069	1.21
Crowland Ponds	LWS	522917	311218	1.37
Newborough Drain	LWS	522179	308427	1.68

5.1.2 Notable Species (Protected Species, Species of Principal Importance and Priority Biodiversity Action Plan Species).

There are 16 records of water voles within 2km of the target site. The oldest record dates from 1977 and the most recent is from 2012. The closest water vole record is located approximately 520m from the target development site.

There are 4 records of reptiles within 2km of the site. These are recorded as grass snake (*Natrix natrix*), slow-worm (*Anguis fragilis*) or common lizard (*Zootoca vivipara*)- the oldest record is from 1989 and the most recent is from 2011. The closest reptile record to the target development site is one of a slow worm recorded approximately 370m from the site.

Other protected species were recorded within a 2km radius of the site but these were not felt to be relevant to the application site taking into account the habitat within the site and the location of the records.

There were no records in the databases consulted, of protected species within or immediately adjacent to, the target site. However, absence of records does not necessarily mean absence of species.

5.2 Habitats

5.2.1 *Vegetation*

5.2.1.1 Scrub

There are patches of dense bramble and hawthorn scrub scattered around the eastern area of the site. There is a section of very dense bramble scrub located in the north-western corner of the site- within this area are also a small number of ornamental shrubs including berberis sp.

5.2.1.2 Ephemeral Weeds

Throughout the site are scattered ephemeral weeds. At the western end of the site where the concrete hard standing is located, these weeds are sparse and sporadic. To the east of the site in the area of the previously demolished building these weeds are denser and in larger patches. Species noted include cow parsley, herb Robert, bristly ox tongue, groundsel, black medick, weld, water figwort, spear thistle, broad-leaved dock, red dead nettle, cocksfoot, cleavers, teasel, mullein, buddleia, woundwort, rosebay willowherb, cut-leaved cranesbill and ragwort.

5.2.1.3 Tall Ruderal

In the south-eastern corner of the site is dense tall ruderal vegetation dominated by nettles.

5.2.1.4 Tree Lined Boundaries

On the northern and southern boundaries of the site are closely planted tree lines dominated by field maple with hawthorn, bramble, and elder.

5.2.1.5 Amenity Grassland

5.2.1.6 Damp Flush

In the north-eastern corner of the site is an area dominated by tall common reed, with some reed canary grass, suggesting a damper area of ground, although no standing water was present at the time of surveying. This is located close to a ditch that was dry at the time of surveying but may hold some water in times of heavy rainfall.

5.2.2 *Miscellaneous*

5.2.2.1 Hard Standing

The majority of the western side of the site consists of solid concrete hard standing in good condition. To the east of the site there is a large area of relatively compacted rubble that is the remains of a previously demolished building.

5.2.2.2 Bund

The north and south boundary of the site consists of a bund constructed of spoil and rubble. This is now covered coarsely in the same ephemeral weed/scrub vegetation noted above.

5.2.2.3 Buildings

There is one large industrial structure that is currently divided into three adjoining units. See Table Two for more details.

5.2.2.4 Compost Heap/Brash Heaps

At the very eastern end of the site is a brash/compost heap of rotted plant material (TN2). Scattered through the eastern end of the site are large piles of brash, formed of cut wood (TN3).

5.2.3 *Neighbouring habitat*

The site is set on the outskirts of the village of Crowland in Lincolnshire. To the west the site is bordered by Crease Drove and to the south the site is bordered by arable fields. To the north and east the site is bordered by residential dwellings and associated gardens.

5.3 Protected Species

5.3.1 *Birds*

There is potential for nesting birds to be present within the woody vegetation surrounding the site as well as the scattered scrub located in the eastern section of the site. Three remnant birds' nests were noted in the northern and southern tree lined boundaries. There is also some potential for nesting birds to be present within the buildings present.

White droppings and a low number of small pellets were found below ledges present on the eastern elevation of Structure 1 (TN1). These are assessed as likely being evidence of a feeding perch of a little owl; whilst it is possible they are evidence of a barn owl feeding perch, this is considered less likely due to the small size of all pellets found. For either species it is assessed that the ledge is used by the owl as a feeding perch and is not evidence of nesting behaviour due to the small amount of evidence found, and the very open and exposed nature of the ledge that they were found beneath.

5.3.2 Bats

5.3.2.1 Buildings

Table Two: Results of building inspection

Building	Description	Comments	Bat Roost Potential H = high, M = medium, L = low, N = negligible
Structure 1 -Unit 1	Northern section of industrial unit- separated internally into offices, cupboard, toilets and open factory areas. Still used daily as bottling factory. Brick walls and metal roof with metal girders. Small loft hatch above office shows small void directly beneath metal roof.	Badly insulated, lack of roosting features, regularly used, no evidence of bat activity.	N
Structure 1 -Unit 2	Central section of industrial unit. Used for storage of furniture for nearby shop- accessed approximately 1-2 times a week. Brick and metal walls, metal shutters.	Badly insulated, lack of roosting features, no evidence of bat activity.	N
Structure 1 -Unit 3	Southern section of industrial unit. Empty since Sept 2015- previously used as shop/storage. Flat roof extension on western side of building- has two loft hatches presumably into very small void of flat roofed building. Both hatches are sealed shut and inaccessible - but no apparent access into this area as bitumen felt roof is tightly affixed to roof. Eastern area of building is similar to Unit 1 and Unit 2: metal roof and giders, brick and metal walls. Extractor fan.	Draughty, lack of roosting features, no evidence of bat activity.	N

5.3.2.2 Trees

From the ground it does not appear that any of the trees within or on the boundary of the site are likely to support roosting bats. Some trees located on the northern boundary were noted to have some overlapping limbs, the process of this can form crevices suitable for roosting bats although none suitable were seen during the survey. However, due to the number of trees present, a close inspection of each tree present was not possible during this preliminary ecological appraisal.

5.3.2.3 General Site

The site, particularly the tree-lined boundaries, is likely used by foraging and commuting bats.

5.3.3 *Badgers*

The site offers some suitable habitat for sett creation and suitable habitat for foraging and commuting badgers. However, no evidence of badger activity was noted during the survey.

5.3.6 *Great crested newts*

There are no suitable water bodies within the zone of influence with the potential to support great crested newts.

5.3.7 *Reptiles*

The habitat to the east of the site offers suitable habitat to support reptiles such as lizards, grass snakes and slow worms. The boundary bunds, open areas of gravel and bare earth offer potential basking areas, and the tall ruderal and scrub vegetation, rubble piles (including in bund), brash piles and compost heap offer suitable resting/shelter habitat.

5.3.8 *Water voles*

There is no suitable habitat for this species within the zone of influence. During the desktop study, it appeared there was a ditch to the south of the site, but during the site survey this was found to have been filled in. During the site visit a heavily overgrown, dry ditch was noted to be present running parallel to the northern boundary of the site but this is not assessed as suitable to support water voles.

5.3.9 *Hedgehogs*

The site is generally suitable for foraging and commuting hedgehogs and the brash piles also offer suitable resting/shelter/hibernation habitat for this species.

6.0 Impact Assessment

The assessment of the impacts on valued ecological resources within the Zone of Influence (ZoI) of the Scheme has been based on the Institute of Ecology and Environmental Management (IEEM) guidelines. This process includes:

- Identifying those ecological features likely to be affected;
- Evaluating them to identify the important ones (i.e. those which, if their level of value reduced, national or local policies (or in some cases legislation) would be triggered); and
- Characterising the nature of the individual and combined impacts on each important feature, to determine their longevity, reversibility and consequences for the feature in terms of ecological structure and function.

6.1 Identifying the Zone of Influence (ZoI)

For most species the potential ecological impacts of the proposal are confined to the construction area and the immediately adjacent land. For great crested newts any

breeding colonies within 250 metres of the construction activities could also be potentially affected.

6.2 Evaluation

6.2.1 *Valuing Ecological Features and Resources*

The IEEM Guidelines acknowledge that ecological evaluation is a complex and subjective process but provides key considerations to take into account when applying professional judgement to assign values to ecological features and resources. These include consideration of geographic frame of reference; legal protection, site designations and features; biodiversity value; large populations or important assemblages of species; potential value, secondary or supporting value; social/community value and economic value.

Focusing on assessments of biodiversity value, there are various characteristics that can be used to identify ecological resources or features that are likely to be important in terms of biodiversity. These include:

- Rare or uncommon species in the local, national or international context;
- Endemic or locally distinct sub-populations of a species;
- Species on the edge of their distribution;
- Notably large populations of animals or concentration of animals considered uncommon or threatened in a wider context;
- Species-rich assemblages of plants or animals;
- Ecosystems and their component parts which provide the habitats required by the above species, populations and/or assemblages;
- Plant communities (and associated animals) considered typical of valued natural/semi-natural vegetation types;
- Habitat diversity, connectivity and/or synergistic associations.

This assessment also measures the contribution to nature conservation interest from non-statutory sites of nature conservation interest and the presence of habitats and species which although not specially protected are considered to be of local, regional or national conservation importance.

This latter category includes identification of flora and fauna that are listed as Species of Principal Importance under the Natural Environmental and Rural Communities Act 2006 (NERC), priorities under the UK Biodiversity Action Plan (UK BAP) and Local Biodiversity Action Plans (LBAP) and Red Data Book Species.

In this report all ecological resources or features are assigned to a value relating to their legal status and/or any other ecological interest within the immediate ZoI only.

Table Three: Valuation of Species and Habitats

Level of Importance	Examples
International importance	Special Areas of Conservation; Special Protection Areas; Ramsar sites; European Protected Species.
National importance	Sites of Special Scientific Interest (SSSI); National BAP Priority Species/Habitats; Species listed within Wildlife and Countryside Act 1981.
Regional/County importance	Local Nature Reserves; County Wildlife Sites (CWS); Ancient woodlands; Areas of priority Biodiversity Action Plan (BAP) habitat. Species/Habitat of Principal Importance (NERC).* (S/HPI)
Local (parish) importance	Undesignated sites of some local biodiversity and earth heritage interest.
Negligible importance	Would usually be applied to areas of built development, active mineral extraction, or intensive agricultural land.

*S/HPI NERC list also include some species/habitats protected under European and/or domestic legislation and therefore may be valued at a higher level.

6.2.2 Prediction and Evaluation of Effects

This assessment has considered both immediate on site impacts as well as those which may occur in adjacent areas of ecological value. Resultant effects can be permanent or temporary, direct or indirect, and cumulative.

6.2.3 Significance of Potential Impacts

The significance of an adverse effect (or a beneficial result) is determined by the magnitude of the impact and the value and sensitivity of the nature conservation resources affected. There is no definitive method for assessing the significance of adverse impacts on nature conservation receptors/features. Nevertheless, a high significance would generally be ascribed to large impacts on receptors/features of high nature conservation value and low significance would generally be ascribed to small impacts on receptors/features of low nature conservation value. The criteria used for assessing the significance of adverse and beneficial impacts are set out below in Table Four. These significance criteria are used for guidance, and professional judgement is required in their application to take account of the particular circumstances of a project.

The following factors are considered in determining whether ecological impacts are significant:

- Extent;
- Magnitude;
- Duration;
- Reversibility;
- Timing;
- Cumulative effects.

Table Four: Significance Criteria

Significance Category	Criteria
Substantial Adverse	Loss of, permanent damage to, or adverse effect on, integrity of any part of a site of international or national importance; Loss of a substantial part or key feature of a site of county importance; Loss of favourable conservation status (FCS) of a legally protected species; Loss of or damage to a population of nationally rare or scarce species.
Moderate Adverse	Temporary disturbance to a site of international or national importance, but no permanent damage; Loss of, or permanent damage to, any part of a site of county importance; Loss of a key feature of local importance; A substantial reduction in the numbers of legally protected species such that there is no loss of FCS but the population is significantly more vulnerable; Reduction in the amount of habitat available for a nationally rare or scarce species, or species that is notable at a regional or county level.
Minor Adverse	Temporary disturbance to a site of county value, but no permanent damage; Loss of, or permanent damage to, a feature with some ecological value in a local context but that has no nature conservation designation; A minor impact on legally protected species but no significant habitat loss or reduction in FCS; A minor impact on populations of nationally rare or scarce species or species that is notable at a regional or county level.
Negligible	No impacts on sites of international, national or county importance; Temporary disturbance or damage to a small part of a feature of local importance; Loss of or damage to land of negligible nature conservation value; No reduction in the population of legally protected, nationally rare, nationally scarce or notable (regional/county level) species on the site or its immediate vicinity.
Neutral	No impacts either adverse or beneficial.
Minor Beneficial	A small but clear and measurable gain in

	general wildlife interest, e.g. small-scale new habitats of wildlife value created where none existed before, or where the new habitats exceed in area the habitats lost.
Moderate Beneficial	Larger scale new habitats (e.g. net gains over 1ha in area) created leading to significant measurable gains in relation to the objectives of Biodiversity Action Plans.
Substantial Beneficial	Major gains in new habitats (net gains of at least 10ha) of high value for biodiversity being those habitats, or habitats supporting viable species populations, of national or international importance cited in Annexes I and II of the Habitats Directive or Annex I of the Birds Directive.

Following the characterisation of effects, an assessment of the ecological significance of an effect is made. The Guidelines promote a transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological terms, in relation to the integrity of the defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, which relates to the level at which it has been valued. The decision about whether an effect is significant or not, is independent of the value of the ecological feature; the value of any feature that will be significantly affected is then used to determine the implications, in terms of legislation, policy and/or development control.

The Guidelines advise that it is important to consider the likelihood of a predicted impact, along with the degree of confidence in the assessment of the effect on ecological structure and function. The decision on confidence levels is based on professional judgement; the scale of confidence levels used for this report is as follows:

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

The concepts of 'ecological integrity' and 'conservation status' should also be considered when evaluating a feature of ecological interest. The Guidelines refer to 'integrity', 'the coherence of the ecological structure and function, across a site's whole area, that enables it to sustain that habitat, complex of habitats and/or the levels of populations of species for which it was classified'. The term 'conservation status' relates to the viability, rarity and condition of habitats and species. It is defined in the Guidelines to ensure that it can be 'applied to sites, habitats or species within any defined geographical area. If an effect is found not be significant at the highest geographical level at which the resource or feature has been valued, it may be significant at a lower geographical level'.

The Guidelines also state that: 'Significant effects on features of ecological importance should be mitigated (or compensated for) in accordance with guidance derived from policies applied at the scale relevant to the value of the feature or resource' and that: 'Any significant effects remaining after mitigation (the residual effects), together with an assessment of the likelihood of success in the mitigation, are the factors to be considered against legislation, policy and development control in determining the application.

6.2.4 Potential Impacts and Proposed Mitigation

Based on the results outlined in section five, Table Five provides a summary of the species and habitats that are known to be present or potentially likely to be significantly affected by the proposed construction. Table Six summarises the likely ecological impacts on these potential receptors (if present) and the recommended mitigation to minimise the likely impacts. Species not likely to be significantly affected are not included in this in depth evaluation but are referred to in the general summary in Table Seven.

Table Five

Potential Receptor
Nesting birds
Reptiles

Table Six: Potential Impacts and Proposed Mitigation

Habitat/Species	Nesting birds
Factors on which its integrity or conservation status depends	There are a variety of bird species that utilise hedgerows, trees and scrub for nesting and as a food resource.
Ecological Value Policy and legal framework	Assemblage valued at County Level. All are protected under the Wildlife and Countryside Act 1981 from killing and injuring and damage/destruction to their active nests and eggs.
Proposed Activity	The construction proposals relate to the development of an industrial site into residential housing; detailed plans of the proposals are not yet finalised.
Biophysical change	Removal of scrub and demolition of buildings.
Relevance to receptor in terms of ecosystem structure and function	There is potential for nesting birds to be present within the scrub patches located throughout the site and within the buildings onsite. There is also potential for nesting birds to be present within the trees bordering the site, although these are scheduled to be retained within any new development.
Characterisation of unmitigated impact on the feature	If nests are disturbed during incubation and rearing phases then mortality of chicks could occur. Outside of the nesting season there will be a minor negative impact for a low number of birds due to loss of potential nesting habitat.
Duration	For site clearance and post-construction.
Reversibility	Any damage to active nests would be permanent and should be avoided.
Ecologically significant: At what scale?	Minor adverse at the local scale.
Impact on integrity or conservation status	Negligible.
Confidence in this assessment Rationale	Probable. There are opportunities for nesting birds throughout the site. There is a high risk of impacting on nesting viability if any clearance of vegetation or demolition of buildings is undertaken during the nesting season.
Mitigation, Compensation and Enhancement.	It is recommended that the operational set-up should ideally avoid the bird-breeding season (late February to August inclusive) to avoid damage to nesting species. If this is not practicable then a nesting bird survey should be undertaken by an experienced ecologist prior to site clearance commencement to identify whether active nests are present. If any are found they should be clearly marked and avoided until after the young have fledged and left the nest. It is recommended that the new site plans include a provision of alternative nesting habitats in the form of nest boxes (see Appendix Four) and that woody vegetation should be retained as much as possible.
Residual Impact	With bird box enhancements the residual impact is assessed as neutral.

Habitat/Species	Reptiles
Factors on which its integrity or conservation status depends	This group of species prefers rank, rough, tussocky, tall, ruderal vegetation, scrub, ponds and ditches, but they also inhabit hedgerows, woodland margins, farmland and meadows.
Ecological Value Policy and legal framework	Valued at National level. Protected from reckless/intentional killing and injury under Schedule 5 Wildlife and Countryside Act 1981 (as amended).
Proposed Activity	The construction proposals relate to the development of an industrial site into residential housing; detailed plans of the proposals are not yet finalised.
Biophysical change	Clearance of site and development of site into residential housing.
Relevance to receptor in terms of ecosystem structure and function	The habitat to the east of the site offers suitable habitat to support reptiles such as lizards, grass snakes and slow worms. The boundary bunds, open areas of gravel and bare earth offer potential basking areas, and the tall ruderal and scrub vegetation, rubble piles (including in bund), brash piles and compost heap offer suitable resting/shelter habitat.
Characterisation of unmitigated impact on the feature	There is the potential of causing death/injury to reptiles if present during site clearance. Post-construction there may be a loss of habitat for this species group.
Duration	Unable to determine without further surveys.
Reversibility	Unable to determine without further surveys.
Ecologically significant: At what scale?	Unable to determine without further surveys.
Impact on integrity or conservation status	Unable to determine without further surveys.
Confidence in this assessment Rationale	Unable to determine without further surveys.
Mitigation, Compensation and Enhancement.	It is recommended to undertake a seven-day presence/absence survey for reptiles in the active reptile season (ideally in April or September). Further recommendations will depend on the outcome of this survey.
Residual Impact	Unable to determine without further surveys.

7.0 Conclusions and Recommendations

Table Seven

Potential Receptor	Conclusions	Recommendations
Nesting Birds	There is potential for nesting birds to be present within the scrub patches located throughout the site and within the buildings onsite. There is also potential for nesting birds to be present within the trees bordering the site, although these are scheduled to be retained within any new development. If nests are disturbed during incubation and rearing phases then mortality of chicks could occur. Outside of the nesting season there will be a minor negative impact for a low number of birds due to loss of potential nesting habitat.	It is recommended that the operational set-up should ideally avoid the bird-breeding season (late February to August inclusive) to avoid damage to nesting species. If this is not practicable then a nesting bird survey should be undertaken by an experienced ecologist prior to site clearance commencement to identify whether active nests are present. If any are found they should be clearly marked and avoided until after the young have fledged and left the nest. It is recommended that the new site plans include a provision of alternative nesting habitats in the form of nest boxes (see Appendix Four) and that woody vegetation should be retained as much as possible.
Bats	The buildings present within the site are assessed as having negligible potential to support roosting bats. From the preliminary appraisal from the ground it does not appear that any of the trees within or on the boundary of the site are likely to support roosting bats. Some trees located on the northern boundary were noted to have some overlapping limbs; this process can form crevices suitable for roosting bats although none suitable were seen during the survey. However, due to the number of trees present, a close inspection of each tree present was not possible during this preliminary ecological appraisal. The site, particularly the tree lined boundaries, is likely used by foraging and commuting bats. The boundary trees are scheduled to be retained and	Care should be taken to avoid any unnecessary bright lights- both in regards to temporary security lighting during the construction phase and any long-term lighting plans for the site: Any potential new lighting impacts associated with the proposed development should be minimised by the use of lights with little to no UV content, warm white light sources, and directional downlights - illuminating below the horizontal plane which avoid light trespass into the environment. The use of light directional accessories such as baffles, hoods and louvres can assist with this. Particular attention should be made to avoid lighting the boundary tree lines of the site. Lighting types to be avoided include any blue-white light sources, metal halide and mercury lamps, and any form of uplighting, which lights above the horizontal plane, illuminating

	so no impact is anticipated on any potential roosting features not identified in the preliminary site appraisal; an increase in lighting of the site could have a negative impact on the suitability of the site for commuting/foraging bats.	trees and foraging habitat. If plans change and trees from the boundary of the site are to be removed- then a closer inspection of trees to be removed may be necessary to ensure no roosting features were missed during the preliminary appraisal. There is scope to enhance the site for bats through the inclusion of bat roost habitat (see Appendix Four for examples).
Reptiles	The habitat to the east of the site offers suitable habitat to support reptiles such as lizards, grass snakes and slow worms. The boundary bunds, open areas of gravel and bare earth offer potential basking areas, and the tall ruderal and scrub vegetation, rubble piles (including in bund), brash piles and compost heap offer suitable resting/shelter habitat. There is the potential of causing death/injury to reptiles if present during site clearance. Post-construction there may be a loss of habitat for this species group.	It is recommended to undertake a seven-day presence/absence survey for reptiles in the active reptile season (ideally in April or September). Further recommendations will depend on the outcome of this survey.
Badgers	The site offers some suitable habitat for sett creation and suitable habitat for foraging and commuting badgers. However, no evidence of badger activity was noted during the survey. If badgers do forage/commute through the site at the time of construction, then there is a risk of them becoming trapped in any open trenches/pits created during the course of the works. Any installation of new boundary fencing could restrict foraging and commuting ranges.	It is recommended to cover any trenches/pits created during the works nightly to prevent any badgers from becoming trapped. Alternatively, a ramp should be installed in these features to allow badgers to escape.
Hedgehogs	The site is generally suitable for foraging and commuting hedgehogs and the brash piles also offer suitable resting/shelter/hibernation habitat for this species.	It is recommended that the brash piles are cleared by hand to prevent accidental killing/injuring of hedgehogs. Clearance should not take place on frosty days. The ramps installed for badgers will also aid hedgehogs in

		escaping trenches if they cannot be covered nightly. Any new boundary fencing installed should make provisions for foraging hedgehogs to be able to pass freely through the site (see Appendix Four).
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8.0 References

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9.0 Photographs



External Structure 1



Internal Structure 1 (Unit 1)



External Structure 1



Internal 1 (Unit 2)



External Structure 1 and area of demolished building



Example of boundary tree line



Rubble from demolished building (used in bund)



Compost/brush Heap



Damp flush



Area of dense scrub



Internal Structure 1



Elevation of Strucugre 1 where little owl pellets/droppings were found

10.0 Appendices

Appendix One-	Site Location
Appendix Two-	Habitat Map with Target Notes
Appendix Three -	Plant Species Referred to in the Report (English and Latin Names)
Appendix Four-	Examples of Potential Site Enhancements/Mitigation
Annex One-	Standard Survey Methodologies

APPENDIX ONE

Site Location

Appendix One. Site location

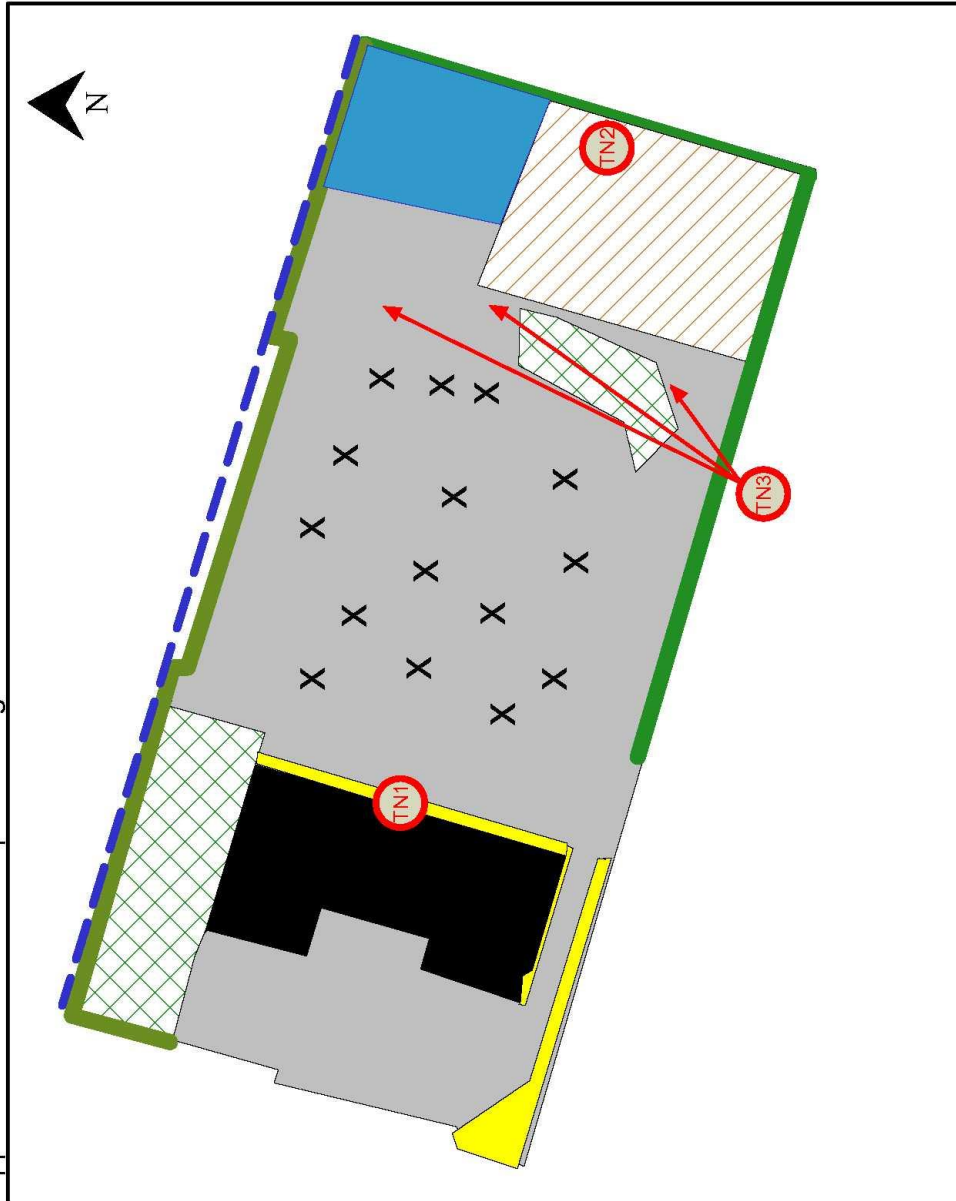


Aerial photograph taken from Google Earth©

APPENDIX TWO

Habitat Map with Target Notes

Appendix Two. Habitat map with Target Notes



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Identification of target notes/ numbers on habitat map	
Target Note	Feature
TN1	Feeding perch of owl (likely little owl)
TN2	Brash/compost heap of rotted plant material
TN3	Large piles of brash formed of cut wood

APPENDIX THREE

Plant species referred to in the report

Plant species referred to in the report (English and Latin Names)
Berberis sp. <i>Berberis sp.</i> Black medick <i>Medicago lupulina</i> Bramble <i>Rubus fruticosus agg</i> Bristly ox tongue <i>Helminthotheca echioides</i> Broad-leaved dock <i>Rumex obtusifolius</i> Buddleia <i>Buddleia davidii</i> Cleavers <i>Galium aparine</i> Cocksfoot <i>Dactylis glomerata</i> Common reed <i>Phragmites australis</i> Cow parsley <i>Anthriscus sylvestris</i> Cut-leaved cranesbill <i>Geranium dissectum</i> Elder <i>Sambucus nigra</i> Field maple <i>Acer campestre</i> Groundsel <i>Senecio vulgaris</i> Hawthorn <i>Crataegus monogyna</i> Herb Robert <i>Geranium robertianum</i> Mullein <i>Verbascum thapsus</i> Nettle <i>Urtica dioica</i> Ragwort <i>Senecio jacobaea</i> Red dead nettle <i>Lamium purpureum</i> Reed canary grass <i>Phalaris arundinacea</i> Rosebay willowherb <i>Chamerion angustifolium</i> Spear thistle <i>Cirsium vulgare</i> Teasel <i>Dipsacus sp.</i> Water figwort <i>Scrophularia auriculata</i> Weld <i>Reseda luteola</i> Woundwort <i>Stachys sylvatica</i>

APPENDIX FOUR

Examples of Potential Site Enhancements/Mitigation

Recommended Bird Box



Example of Schwegler 1B Nest Box two with 26 mm holes and two with 32mm holes to cater for a range of species should be provided and installed on posts at a height of 2 metres

Recommended Bat Boxes



Schwegler 1FF Module bat box. A minimum of three boxes should be placed in a south-to-south-westerly orientation and all lighting should be angled away to avoid direct illumination of the box. Branches should be cleared to provide an unrestricted flight path to and from the box.



Schwegler 1FW Bat Hibernation Box to be placed on north-facing aspect.

Other



Example of access provision for hedgehogs into site.

Bat Friendly Planting Suggestions	
Bedding Plants	
Nottingham catchfly	<i>Silene nutans</i>
Night-scented catchfly	<i>S. noctiflora</i>
Bladder campion	<i>S. vulgaris</i>
Night-scented stock	<i>Matthiola bicornis</i>
Sweet rocket	<i>Hesperis matronalis</i>
Evening primrose	<i>Oenothera biennis</i>
Tobacco plant	<i>Nicotiana affinis</i>
Cherry pie	<i>Heliotropum x hybridum</i>
Soapwort	<i>Saponaria officinalis</i>
Climbers	
European honeysuckle	<i>Lonicera caprifolium</i>
Italian honeysuckle	<i>L. etrusca superba</i>
Japanese honeysuckle	<i>L. japonica halliana</i>
Honeysuckle (native)	<i>L. periclymenum...</i>
White jasmine	<i>Jasminum officinale</i>
Dogrose	<i>Rosa canina</i>
Sweetbriar	<i>R. rubiginosa</i>
Fieldrose	<i>R. arvensis</i>
Ivy	<i>Hedera helix</i>
Bramble	- many species
Large trees, small trees and shrubs	
Oak	<i>Quercus robur & Q. petraea</i>
Ash	<i>Fraxinus excelsior</i>
Silver birch	<i>Betula pendula</i>
Field maple	<i>Acer campestre</i>
Hawthorn	<i>Crataegus monogyna</i>
Alder	<i>Alnus glutinosa</i>
Goat willow	<i>Salix caprea</i>
Guelder rose	<i>Viburnum opulus</i>
Hazel	<i>Coryllus avellana</i>
Blackthorn	<i>Prunus spinosa</i>
Elder	<i>Sambucus nigra</i>
Buddleia	<i> davidii</i>
Rock plants for walls	
Ivy-leaved toadflax	<i>Cymbalaria muralis</i>
Wall pennywort	<i>Umbilicus rupestris</i>
Stonecrop	<i>Sedum acre bertianum</i>

ANNEX ONE

Standard Survey Methodologies

A site walkover is undertaken to identify potential habitats suitable for protected species and/or evidence of field signs indicating presence of protected species and invasive plants.

Species Specific Methodologies

Great Crested Newts: A habitat suitability assessment for newts is undertaken taking due note of the presence of water bodies within 250 metres of the site (based on English Nature (2001) now Natural England) guidelines and potentially suitable terrestrial resting and shelter habitat.

At certain times of the year and/or in some years but not others ponds may be seasonally dry but these are not necessarily ruled out as ephemeral ponds can be important 'stepping stones' from one pond to another and/or refuges from the ravages of fish populations that can build up in permanent ponds.

Ponds are assessed using a combination of professional judgment and applying the nationally accepted Habitat Suitability Index (HSI) for Great Crested Newts based on Oldham *et al* 2001 which uses nationally accepted formulae based on a number of factors which are assigned a score ranging from 0 to 1 with a score of <0.5 assessed as poor, 0.5 to 0.59 below average, 0.6 to 0.69 average, 0.7 to 0.79 good and >0.8 excellent.

If appropriate, follow-up pond surveys are undertaken in the spring to cover all ponds within 250 metres (or further where professional judgment dictates) of the construction footprint to determine presence/absence of this species. Night-torch surveys, egg searching, netting and funnel trapping are the main methods employed where practicable

Bats: A habitat suitability assessment for bats is undertaken by identifying buildings and trees likely to be affected by the proposed construction works.

The tree assessments involve looking for the following signs:

- Holes
- Fissures
- Broken Limbs
- Loose Bark
- Urine Staining
- Fur Rubbing
- Dense Ivy

A scoring system is applied to the buildings and trees using the following criteria.

- **Low/Negligible probability of bat interest.** Buildings in this category fall into two main types: Generally well maintained without cracks and crevices, no gaps between bargeboard or soffit and wall or without an attic space. Or those which contain some or all of the above features, but are both draughty and thick in cobwebs or contain strong odours such as solvents, diesel etc.

It must be borne in mind that a building from this latter group can become suitable for bats due to refurbishment. This often happens to houses once the attic space has been cleaned and under-felted prior to timber treatment.

No licence is required for development to a building classified as Low probability of bat interest. Trees with low bat interest are usually young trees without any deadwood or holes. Most conifers fall into this category as they are usually planted as a crop and are then felled prior to becoming old, although once maturity is attained as in a landscape tree, suitable bat roosts may develop.

- **Medium probability of bat interest.** The buildings in this category contain many sites suitable for roosting bats although no obvious signs were recorded during the survey. In exposed conditions on large buildings the signs of bat usage such as droppings and urine marks can be obliterated by heavy rain.

Occasionally a light scattering of droppings will be recorded in an attic or a semi-derelict building, which is considered by the surveyor unsuitable for use as a bat roost. The medium probability of bat interest category can be used based on the surveyor's experience.

Whilst no licence is required for development to a building classified as Medium probability of bat interest, it is often best practice to conduct sensitive roof stripping or architectural salvaging to minimise any possible disturbance.

Trees in this category will have holes, cracks and crevices and lose bark suitable for roosting bats but no obvious roost signs such as staining and droppings at entrances.

- **High probability of bat interest.** This group includes buildings with known roosts or signs of bat occupancy such as droppings and staining at a roost entrance. The description of high probability buildings will also contain an indication as to the time of the year when it will be occupied by bats i.e. Summer – nursery roost, Winter – hibernation.

A licence is normally required for development to a building classified as High probability of bat interest.

Trees within this category will contain all the obvious roost features such as holes, cracks and crevices and loose bark and will also contain staining and droppings at the roost entrance or have been identified as a roost via a visual sighting of an existing bat.

If appropriate, follow-up surveys are undertaken incorporating detailed inspections of the buildings/trees by a licensed bat worker and where necessary bat activity surveys are also undertaken to determine presence/absence of this group of species.

Reptiles: A habitat suitability assessment for reptiles is undertaken looking for, *inter alia*, areas of rough scrub, tussocky/rank grassland, areas of structural diversity offering short open areas of grassland and bare soil for basking with taller vegetation and habitat edges offering shelter and rapid escape routes, natural refugia such as brash piles and rubble heaps.

Where appropriate, follow-up surveys are undertaken utilizing artificial refugia to determine presence/absence of this species.

Badgers: Field signs are searched for including setts, runs, prints, dung pits, hairs and feeding signs.

Otters: Field signs are searched for including holts, prints, spraints, haul out points and feeding signs.

Water Voles: A habitat suitability assessment for water voles is undertaken within riparian habitat assessment factors including, *inter alia*, water levels and seasonal longevity of water table, seasonal flash floods, bank profiles and substrates, vegetation for cover and suitable food sources, over shading, and evidence of the presence of mink. Where appropriate, follow-up surveys are undertaken where field signs are searched for including burrows, prints, runs, droppings, latrines and feeding signs.

White-Clawed Native Crayfish: A habitat suitability assessment for crayfish is undertaken within riparian habitat assessment factors including, *inter alia*, water levels and quality and seasonal longevity of water table, water flow, underlying geology, bank and watercourse substrates, suitable submerged refugia and known presence of signal crayfish. Where

appropriate, follow-up surveys are undertaken to search for presence of this species by stone turning in the streambed, netting and searching for burrows in the stream banks. Humane trapping may also be employed.

Harvest Mice: A habitat suitability assessment for harvest mice is undertaken within rough grassland and tall ruderal vegetation. Harvest mice build breeding nests in dense vegetation by weaving a nest out of leaves which will be at the top of a tussock of grass or around half way up the stem of cereals. To search for these nests surveyors walk transects of the target habitat checking within tussocks of grass and on stems. All areas of suitable vegetation are checked.

Notable Flora and Invasive Weeds: A habitat suitability assessment for notable flora (rare and protected) is undertaken and species are recorded. Evidence of the presence of invasive weeds included within Schedule 9 of the Wildlife and Countryside Act 1981 as amended is searched for.