Preliminary Ecological Appraisal

Wingerworth, Chesterfield

July 2013

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Non-technical summary

Absolute Ecology LLP was commissioned to undertake a Preliminary Ecological Appraisal of land off Derby Road, Wingerworth Chesterfield, Derbyshire. The Preliminary Ecological Appraisal was undertaken on 5th July 2013 by an experienced and licensed ecologist who is a full member of the Chartered Institute of Ecology & Environmental Management (CIEEM).

The site comprises a large arable field with field margins of between 0.5 m and 2 m wide, semi-improved grassland, hedgerow/scrub boundaries and young to mature trees.

There is no statutory designated site located near to the site.

The effect of any development of the site has been considered and the key constraints identified. It has been concluded that further surveys are necessary in order to assess the full impact on certain species and for the key ecological constraints to be further identified or discounted.

There was evidence of badger activity on the site boundary, indicating that this species is present in the locality. Although no setts were found, badger activity can change over a short space of time, so a full badger survey is recommended prior to any planning application. This can be undertaken at any time of year.

One mature oak tree was assessed to have moderate potential for roosting bats and it is recommended that a dusk emergence/dawn re-entry survey is undertaken between May and August. If a bat roost is found to be present, a European Protected Species licence may be required if the tree/roost is to be affected by the works. The hedgerows may provide commuting routes for bats; therefore, transect surveys between May and September are recommended.

Nesting birds may be present in hedgerows, scrub and grassland during the bird breeding season (March to August inclusive). If vegetation or building removal is planned during these months, a prior check for nesting birds should be undertaken by an ecologist. Any active nests that are found must not be moved until fledglings have dispersed.

The grassy field margins, hedgerows and scrub represent suitable habitat for common reptiles such as slow-worm. It is recommended that a reptile survey is undertaken (April, May and September are the best months for the survey) in advance of any planning application, to confirm the presence or absence of reptiles. If reptiles are found, mitigation measures to capture and remove individuals would need to be undertaken prior to works affecting the habitat.

There is two ponds within 500 m of the site which may have the potential to support great crested newts. As the site contains habitat that may be used by this species during their terrestrial phase, It is recommended that if access permission can be arranged, these ponds

are assessed for suitability for great crested newts, and if found suitable great crested newt surveys of the ponds are to be carried out in advance of any planning application. Great crested newt pond surveys can only be carried out between mid-March and mid-June. If great crested newts are found, a European Protected Species licence from Natural England may be required prior to any work on site.

There is a Local wildlife site adjacent to the south and south-west boundary (Sutcliffe and Hanging Banks Woods).

Contents

1.0 Introduction

Background

1.1 Absolute Ecology LLP was commissioned to undertake a Preliminary Ecological Appraisal of a site known as land off Derby Road, Wingerworth, Chesterfield, Derbyshire.

1.2 The Preliminary Ecological Appraisal was undertaken on 5th July 2013 by Matthew James Haydock has been involved in many projects including designing and undertaking ecological habitat surveys and site nature conservation evaluations; writing and implementing site management plans; acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures; protected species surveys under Natural England licence for survey and development; undertaking ecological impact assessment, appropriate assessment. Matthew has a National Diploma in ecology and Landscape studies and holds higher National Diploma in Environmental Management and whom is a full member of the Chartered Institute of Ecology & Environmental Management (CIEEM).

1.3 The site will be subjected to a proposed housing development

1.4 Unless the client indicates to the contrary, information on the species found to be present on the site will be passed to the county biological records centre to update records held for the area.

Site Description

1.5 The site comprises a large arable field with species-poor gappy hedgerow and fencing boundaries. The residential estates of Wingerworth lie immediately to the north and the remaining landscape comprises mixed agricultural fields, woodland and a pond.

Figure 1: Location map – aerial photograph of site (red boundary line)

2.0 Methodology

Desk Study

2.1 In order to compile background information on the site and immediate surroundings, the Derbyshire Biological Records Centre (DBRC) was contacted.

2.2 Information requested was as follows:

- Records of protected species within 2 km of the site.
- Records of rare or notable species within 2 km of the site.
- Non-statutory site designations on or within 2 km of the site.

2.3 Additionally, MAGIC (Multi-Agency Geographic Information for the Countryside, 2010) was used to establish whether any of the following are present:

- Statutory site designations on or within 2km of the site.
- Statutory sites designated for bats within 5 km of the site.

Habitat Survey

2.4 The site was visited on 4th July 2013 and was surveyed in accordance with the Joint Nature Conservation Committee (JNCC) Phase I Habitat Survey methodology (JNCC, 2007). This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential that might warrant further study.

2.5 The observable higher plant species in each habitat type within the site, and their abundance, were recorded using the DAFOR scale:

D Dominant

A Abundant

F Frequent

O Occasional

R Rare

Fauna

2.6 Habitats present on the site were searched for obvious signs of faunal activity, e.g. presence of badger setts, mammal tracks or herpetofauna under refugia. Any buildings and mature trees on site were visually examined from the ground to identify features with the potential to support roosting bats.

Valuation of Ecological Features

2.7 The value of areas of habitat and plant communities has been measured against published criteria where available. Biodiversity Action Plans (BAPs) have been searched to identify whether

action has been taken to protect all areas of a particular habitat and to identify current factors causing loss and decline of particular habitats. The presence of injurious and legally controlled weeds has also been taken into account.

2.8 When assigning a level of value to a species, its distribution and status (including a consideration of trends based on available historic records) has been taken into account. Other factors influencing the value of a species are legal protection, rarity and Species Action Plans (SAPs). Guidance, where it is available, for the identification of populations of sufficient size for them to be considered of national or international importance has also been taken into account.

Nomenclature

2.9 The English name only of flora and fauna species is given in the main text of this report; however, scientific names are used for invertebrates where no English name is available. Vascular plants and charophytes follow the nomenclature of The Botanical Society for the British Isles (BSBI) 2007 database (BSBI, 2011), with all other flora and fauna following the Nameserver facility of the National Biodiversity Network Species Dictionary (http://www.nhm.ac.uk/nbn/), which is managed by the Natural History Museum.

3.0 Legislation

3.1 The United Kingdom Biodiversity Action Plan (BAP) 1994 sets out a strategy for implementing the Convention on Biological Diversity, which was signed by the United Kingdom at the Rio de Janeiro Earth Summit in 1992. The published report contains action plans for the United Kingdom's most threatened species and habitat plans for the most vulnerable areas.

3.2 The Local BAP sets out the county's part in the UK biodiversity planning process, in the form of local habitat and species action plans. Local BAPs are intended to focus resources, to conserve and enhance biodiversity, by taking account of national and local priorities.

3.3 Schedule 1 Part 1 of The Wildlife and Countryside Act 1981 (and amendments) lists birds protected by special penalties at all times. It prohibits intentional killing/injuring, taking, possessing, disturbing and selling (including parts and derivatives, eggs, nests, etc. as applicable) as well as damaging, destroying or disturbing nests in current use or dependent young, etc.

3.4 Schedule 5 of The Wildlife and Countryside Act 1981 (and amendments) prohibits deliberate killing, injuring, taking, possessing, disturbing and selling (including parts and derivatives) as well as damaging, destroying or obstructing any structure or place of refuge of listed fauna, such as dormouse, otter and bat species.

3.5 The Conservation of Habitats and Species Regulations 2010 consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994, in respect of England and Wales. It is illegal to kill, disturb, destroy eggs, breeding sites or resting places, to pick, collect, take cuttings, uproot or destroy in the wild as well as keep, transport, sell/exchange and offer for sale/exchange species listed.

3.6 The Countryside and Rights of Way Act 2000 increases the protection given by The Wildlife and Countryside Act 1981 (and amendments). The offence to intentionally damage any structure or place that a wild animal listed in Schedule 5 of the Act uses for shelter or protection or deliberately disturbing any such animal while in such a structure or place is extended so that the offence also covers reckless damage or disturbance. The CRoW Act also places a duty on Ministers and Government Departments to have regard for the purpose of conserving biological diversity in accordance with the Convention on Biological Diversity.

3.7 The Protection of Badgers Act 1992 makes it illegal to wilfully kill, injure or take any badger, or attempt to do so and it is an offence to intentionally or recklessly damage, destroy or obstruct access to any part of a badger sett.

3.8 The Natural Environment and Rural Communities Act 2006, as well as creating Natural England, gives all public authorities the duty to have regard for conserving biodiversity within the commission of their duties. This includes a duty to restore and enhance as well as maintain biodiversity. The act also strengthens protection for Sites of Special Scientific Interest (SSSI) and makes authorities liable for allowing damage to such sites or their features.

4.0 Results

Desk Study

4.1 There is no statutory designated site within 2 km of the site.

4.2 There are 10 Local Wildlife sites within 2 km of the site:

- Birdholme Nature Reserve
- Hardwick Wood & Redcarr Hill
- Wingerworth Lido
- Nether Speighthill Wood
- Cowlishaw Wood
- Carr Plantation
- Sutcliffe and Hanging Banks Woods
- Birdholme Marsh
- Hasland Railway Margins
- Bottom Road Wood

4.3 There is one Local Wildlife Site adjacent to the site:

- Sutcliffe and Hanging Banks Woods

4.4 DBRC provided the following records for protected and notable species within 1 km of the site boundary:

Plants – 160 records

Mammals – water vole (79 records), common pipistrelle (15 records), noctule (11 records), brown long-eared bat (5 records), hedgehog (1 record), harvest mouse (2 records).

Birds – 4524 records

Insect – 583 records

Amphibian – great crested newts (26 records), toads (12 records).

Reptile – 36 records

Habitats

4.5 The following habitats or vegetation types were identified on the site during the course of the habitat survey:

- Arable
- Semi-improved grassland
- Defunct species-poor hedgerow
- Individual trees
- Tall ruderal herbs
- Continuous bracken

Arable

4.6 The fields have small margins which range from 0.5 m to 2 m in width. These grassy margins are included under semi-improved grassland below.

Plate 1: Arable fields

Semi-improved grassland

4.7 The field margin grasses include cocksfoot (*Dactylis glomerata*) and perennial ryegrass (*Lolium perenne*). Herbs are few but include cleavers (*Galium aparine*), cow parsley (*Anthriscus sylvestris*), dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*) and dandelion (*Taraxacum officinale*). The widest strips of grassland (up to 2 m) are present along the east boundaries. The remainder of the field margins are limited to approximately 0.5 m.

Plate 2: Semi-improved grassland margins

Defunct Species-poor hedgerow

4.8 The hedgerows forming the field and site boundaries contain blackthorn (*Prunus spinosa*) with hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*) and conifer. The hedgerow was found to have large gaps, with residential garden fencing dominating much of the site boundary.

Plate 3: Species-poor hawthorn hedgerow along Derby Road

Individual Trees

4.9 There are several young to mature trees around the site boundaries, including hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), sycamore (*Acer pseudoplatanus*) and oak **(***Quercus robur*).

Plate 4: Showing individual trees on site

Scattered Scrub

4.10 The site boundary margins consist of a scattering and small thickets of scrub dominated by bramble.

Tall ruderal herbs

4.11 There are areas dominated by tall ruderal herbs, including cow parsley (*Anthriscus sylvestris*), hogweed (*Heracleum sphondylium*), broadleaved dock (*Rumex obtusifolius*), common nettle (*Epilobium angustifolium*) and creeping thistle (*Cirsium arvense*).

Continuous bracken

4.12 Along the southern boundary is continuous bracken *Pteridium aquilinum*.

Fauna

Bats

4.13 DBRC provided records of bat species within 2 km of the site. There is one oak tree within the site with cracks and holes which were assessed to have moderate potential value for roosting bats.

Plate 3: Splits in the mature oak

4.14 The site contains a limited amount of potential bat foraging habitat in the form of hedgerows and field margins. The hedgerows may be used as commuting routes, which bats habitually fly along to access foraging areas and roost sites. The woodland corridor to the east is likely to be valuable to foraging bats, and the houses to the north may provide potential roost sites.

Badgers

4.15 DBRC provided records of badger within 2 km of the site. There was evidence of badger on site in the form of tracks.

Dormice

4.16 There are no records of dormice occurring within 2 km of the site. The potential for the site to support dormice is low due to there being no woodland on site.

Water voles and otters

4.17 DBRC provides records of water voles within 2 Km. No water bodies or water courses are present within the site. Although records do occur, no evidence was identified to suggest that this species has been on site.

Birds

4.18 DBRC provides records of birds within 2 Km. During the survey, the following bird species were recorded on site: robin (*Erithacus rubecula*), carrion crow (*Corvus corone*), magpie (*Pica pica*), wren (*Troglodytes troglodytes*) and blackbird (*Turdus merula*). Common bird species are likely to use the hedgerows for nesting and foraging.

Reptiles

4.19 DBRC did not provide any records of reptiles within 2 km of site. The grassed field margins with thickets of scrub and hedgerows can be found in various locations around the development boundary. It is considered that the site field margins provide potential habitat for common and widespread reptiles such as common lizard (*Zootoca vivipara*), slow-worm (*Anguilis fragilis*) and grass snake (*Natrix natrix*).

Amphibians

4.20 DBRC provided records of amphibian species, including great crested newts, within 2 km of the site. Pond 1 lies at approximately 470 m west of the site. Due to access restrictions, the pond was not accessed during the Phase I survey. This pond is approximately 25 m x 36 m, and a second pond 460 m west of the site is approximately 6 m x 6 m.

4.21 The site contains terrestrial habitat that may be used by great crested newts if they are present in the area. Newts may use hedgerows, field margins and scrub for foraging and shelter during their terrestrial phase.

Invertebrates

4.22 DBRC did not provide any records of protected or notable invertebrate species. The habitats on site are generally common and do not provide much potential for rare invertebrate species, although they are expected to support a number of more common species.

5.0 Development Constraints and Recommendations

5.1 The site is the subject of a possible planning application for a residential development. Ecological constraints and recommendations with regard to any development are discussed below.

Designated Sites

5.2 There is no designated statutory site within 1 km of the site.

Habitats

5.3 Botanically, the site itself does not appear to have any rare species and it is not particularly diverse.

Potential Impact of Works

5.4 If residential development is undertaken in the future, potential impacts are likely to include the following.

Badgers

5.5 Although there were no badger setts observed on site, badger activity can change over a short space of time. If any new setts are created on site prior to works, tunnels could be affected by ground works and vegetation removal, and badgers could be harmed.

Bats

5.6 One mature oak tree within the boundary has features (cracked limbs) which were assessed to have moderate bat roost potential. Development may affect trees through direct loss as well as compacting and ground works.

5.7 Hedgerows may also be used as commuting routes by bats. Removal or severance of hedgerows may impact bats if they represent important commuting routes.

Birds

5.8 There may be impacts on nesting birds if vegetation removal is undertaken during the breeding season.

Reptiles

5.9 The site contains habitat (field margins of grass and scrubland, and the base of hedgerows) which has the potential to be used by common reptiles such as common lizard (*Zootoca vivipara*), slow-worm (*Anguilis fragilis*) and grass snake (*Natrix natrix*). If reptiles are present in this habitat, they may be harmed during vegetation removal or ground works.

Great crested newt

5.10 A single pond is present within 500 m of the site which may support breeding great crested newts. The site contains habitat (field margins of grass and scrub, and the base of hedgerows) which

has the potential to be used by great crested newts during their terrestrial phase. If the species is present, vegetation removal and ground works would cause loss of terrestrial habitat and may harm this species.

Recommendations

5.11 The following are general recommendations that are likely to be a minimum requirement for any future development of the site. To prevent potential delays, it would be prudent to undertake the recommended surveys well in advance of any master-planning and certainly before any planning application is made.

5.12 The hedgerow boundary is species poor and gappy though this should be retained were possible as these type of habitats or of importance to much of the wildlife within the local area. Where existing hedgerows are gappy, these should be maintained and augmented by planting native species. Hedgelaying can increase vigour and longevity of hedgerows, this is a costly management technique and may not be appropriate in highly visible amenity areas. The sensitive use of hand tools can often achieve the same results as hedgelaying. Flailing of hedgerows by tractor driven machinery is a more cost effective option; however, this can affect both fruiting and flowering of hedges and may affect the long-term vigour of the hedgerow it is highly recommended that the species rich hedgerow is to be retained.

5.13 Any landscaping relating to the proposed development should also take into consideration bats and other wildlife, and it is recommended that only native tree and shrub species are planted. In particular, no plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 should be planted during the landscaping of this development. For further details of Schedule 9 plants, visit the Defra website: www.defra.gov.uk/wildlife-pets/non-native.

5.14 Standing trees should be retained where possible, and any new planting should contain native species of trees.

Table 3: List of native tree species

	Species	**Planting Time**
Native Tree Species	Ash (*Fraxinus excelsior)*	January/February
	Aspen (*Populus tremula)*	January/February
	Field maple (*Acer campestre*)	January/February
	Bird Cherry (*Prunus padus*)	January/February
	English Elm(*Ulmus minor* var *vulgaris*)	January/February
	Oak (*Quercus robur*)	January/February

5.15 Smaller scale plantings that will be included within the landscape planting design should endeavour to resemble niche habitats. For example, native ferns and other plants that thrive in low light (e.g. Ivy, Holly, and a variety of grasses and mosses) can be used. Species should be chosen according to moisture and sunlight availability, but also with regard to their wildlife value. Many grasses will offer cover and breeding places for invertebrates as well as food for some birds. More open but sheltered areas within the development site are particularly suitable for colourful plants that thrive in full sun. These can function as bee and butterfly gardens, supplying

a rich source of nectar from spring to autumn. Shrubs such as Buddleia, Broom *Cytisus scoparius*, Lavender *Lavendula* sp. and Gorse *Ulex europaeus*, and herbs such as Willowherb *Epiloobium* sp., Michaelmas Daisy *Aster* sp., Soapwort, Mullein *Verbascum* sp. and Thyme *Thymus vulgaris* all enjoy a sunny position and provide significant nectaring resources for invertebrates.

5.16 The use of climbing plants to enhance the design and aesthetic elements is generally an accepted practice. The process of allowing and encouraging plants to grow on and up walls allows the natural environment to be extended within the site. From an ecological perspective, green walls will provide resting and feeding places for birds, invertebrates and small mammals. Climbers provide nesting habitats for birds such as Wrens, Blackbirds, Song Thrushes and House Sparrows. Species such as Cotoneaster, Ivy, Climbing Roses and Honeysuckles are all important fruit resources for birds. Equally, climbing plants such as Virginia Creeper and Ivy form important habitats for invertebrates. Although native species are more likely to attract wildlife, some exotic species are also effective in this respect. Within the site grounds it may be more productive to use a combination of native and exotic species to maximise the range of annual and perennial, deciduous and evergreen foliage, and flowering, climbing and creeping species. This latter plant type provides a selection of plants suitable for green walls. The aspect of a climbing plant on a wall can have significant ancillary effects, such as insulation and moisture retention. For example, north-facing walls are more suitable for supporting native herbs and a wider range of plants. This is due to the higher moisture regime. Further structural benefits of the space between the wall and the climbing plants include pockets to collect leaf litter and provision of nesting sites, as well as baffles to trap rising warm air.

5.17 Where existing hedgerows are gappy, these should be maintained and augmented by planting native species. Hedgelaying can increase the vigour and longevity of hedgerows, but is a costly management technique and may not be appropriate in highly visible amenity areas. The sensitive use of hand tools can often achieve the same results as hedgelaying. Flailing of hedgerows by tractor-driven machinery is a more cost effective option; however, this can affect both fruiting and flowering of hedges and may affect the long-term vigour of the hedgerow.

Table 4: List of species for two types of hedgerow deemed suitable for these areas, which can be planted for conservation or to provide a thorn-less barrier.

	Species	**Planting Time**
Conservation Hedgerow	Hawthorn (*Corylus avellana*)	January/February
	Blackthorn (*Prunus spinosa*)	January/February
	Field maple (*Acer campestre*)	January/February
	Spindle (*Euonymus europaeus*)	January/February
	Hazel (*Corylus avellana*)	January/February
	Dog rose (*Rosa canina* agg.)	January/February
	Wayfaring tree (*Viburnun lantana*)	January/February
	Oak (*Quercus robur*)	January/February
Thorn-less Hedgerow	Field maple (*Acer campestre*)	January/February
	Common dogwood (*Cornus sanguinea*)	January/February
	Guelder rose (*Viburnum opulus*)	January/February
	Wild privet (*Ligustrum vulgare*)	January/February
	Hornbeam (*Carpinus betulus)*	January/February

Badger

5.18 Although there was limited badger activity on the site at the time of the survey, there was evidence that badgers are present in the area. As activity patterns of this species can change over a short space of time, it is recommended that a full badger survey is undertaken prior to any planning application.

Bats

5.19 A further survey should be undertaken on the tree with moderate bat roost potential. It is recommended that at least two dusk emergence and/or dawn re-entry surveys are undertaken on this tree during the breeding season (May to August inclusive). If a bat roost is found to be present, a European Protected Species (EPS) licence would be required prior to any works affecting the tree.

5.20 The habitats for foraging bats are limited within the development area of the site (the development footprint is on the semi-improved grassland field margins. Loss of grassland is unlikely to significantly impact local bat populations, given the abundance of similar habitat within the area and taking into account that any new residential development will also include gardens which can be used by foraging bats. However, if any of the hedgerows are to be severed or removed, or likely to be affected by an increase in light spill, there may be significant impacts on commuting routes, particularly if there are roosts in existing houses and woodland nearby.

5.21 If there is due to be any major loss or major severance of hedgerows, it is recommended that bat transects are undertaken to check whether any important commuting routes are present. Following Good Practice Guidelines for a small site of medium habitat quality, up to three activity transects should be undertaken within the peak activity season (May to August).

Birds

5.22 Nesting birds may be present in the hedgerows and trees during the bird breeding season (March to August inclusive). If vegetation removal is planned during these months, a prior check for nesting birds should be undertaken by an ecologist. Any active nests that are found must not be moved until fledglings have dispersed.

5.23 It would be of conservation benefit to install a variety of nesting boxes for different bird species on retained trees within the hedgerows and retained trees, to replace nesting sites.

Reptiles

5.24 A reptile survey of the field margins should be carried out prior to development. Reptile surveys can be carried out between April and September (April, May and September being the optimal survey months). Standard survey methodology involves installing artificial refugia (0.5 m squares of roofing felt) throughout the habitat, which are used by basking reptiles if they are present. Seven checks of the refugia are carried out to confirm presence or absence.

5.25 If reptiles are present, mitigation will involve protecting individuals from harm during the development. Depending on the size of population present and area of habitat loss, this may require catching and translocating reptiles to a suitable receptor site prior to groundworks and/or destructive searches during groundworks.

Great crested newt

5.26 It is recommended that if access permission can be arranged, the ponds are assessed for suitability for great crested newts, and if found suitable a great crested newt survey of the ponds is recommended to be carried out well in advance of any development. Four repeat surveys of the pond should be undertaken between mid-March and mid-June, with at least two of these in mid-April and mid-May. If great crested newts are found to be present, a further two surveys are required to estimate population size. Standard survey methodology involves three different methods, preferably torchlight counts, bottle trapping and an egg search.

5.27 If great crested newts are found to be present, a European Protected Species (EPS) licence from Natural England may be required to allow the development to proceed. The EPS licence sets out a Method Statement including appropriate mitigation to ensure that individual newts are not harmed and to mitigate for any loss of habitat. The EPS licence application process can take up to ten weeks.

Local Wildlife Site

5.28 In order to minimise the indirect impact on Sutcliffe and Hanging Banks Woods, it is recommended that a 3 m buffer zone with supporting vegetation and trees is established along the site boundary and that this is managed appropriately in the longer term.

5.29 As the new housing development will increase the human population within the local area and Sutcliffe and Hanging Banks Woods are directly opposite the proposed development, it would be of benefit if discussions between the land owner and the developers took place to enable a mitigation strategy to be developed for Sutcliffe and Hanging Banks Woods that contribute to the facilities of the site, as this will provide compensation for the increased human activity due to the proposed development.

5.30 A lighting design around the new development, specifically on the northern boundary facing Sutcliffe and Hanging Banks Woods, should be considered at an early stage. Light spill can affect the foraging and commuting strategy of many species and thus should be avoided on nearby trees and hedgerows/shrubs and should not exceed 200 lumens (150 watts). Any security lighting should be on a timer setting and faced downwards to prevent spillage onto nearby habitats. The height of any lighting columns around the development should not exceed 8 m to further reduce any ecological impact of light pollution. Low-pressure sodium lamps (SOX) fitted with hoods are recommended to direct light below the horizontal plane to minimize upward light spill.

5.31 It is not envisaged that the works will have any impact on the sensitive habitats adjacent to the Application Site, although best-practice measures should be implemented during the construction phase:

• Suitable and appropriate measures or precautions should be taken to avoid any issues relating to fuel spillage. This could involve the use of spill kits (absorbent materials) on site.

• Good site practice should be employed to ensure that concrete is not released into the river and that all chemical and fuels on site are stored within a locked, sealed, bunded container. The refuelling of vehicles should occur in one location and a drip tray should always be used.

6.0 References

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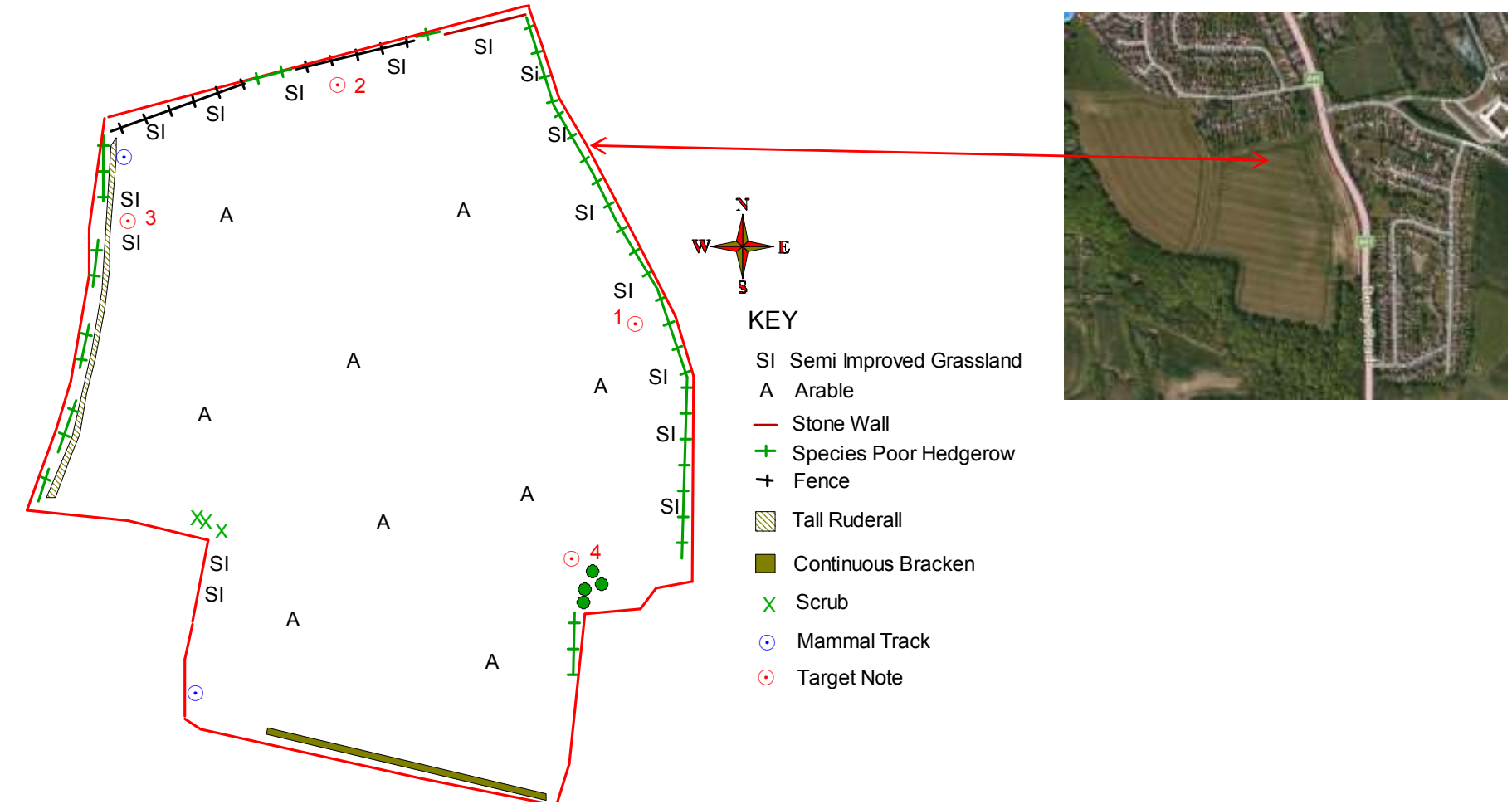
7.0 Plans

Phase I Habitat Map



APPENDIX 1: Target Notes

Table 3: Target Notes which are mapped on Figure 2

Number	Target Note
1	Wide field margins of 2 – 3 m semi-improved species-poor grassland with scattering of bramble. Potential habitat for reptiles.
2	Wide field margins of 1 – 2 m semi-improved grassland adjacent to hedgerow and scattering of bramble. Potential for reptiles and amphibians.
3	Wide field margins of 1 – 2 m semi-improved grassland adjacent to woodland with bracken and scattering of bramble. Potential for reptiles and amphibians.
4	Medium-sized mature oak tree (DBH ~1 m). Cracked limbs and small knot hole. Potential for bats.