



**Meadow Larkins, Larkins Lane, Headington,
Oxford OX3 9DW**

Preliminary Ecological Appraisal

September 2020

on behalf of Adrian James Architects Limited

Disclaimer


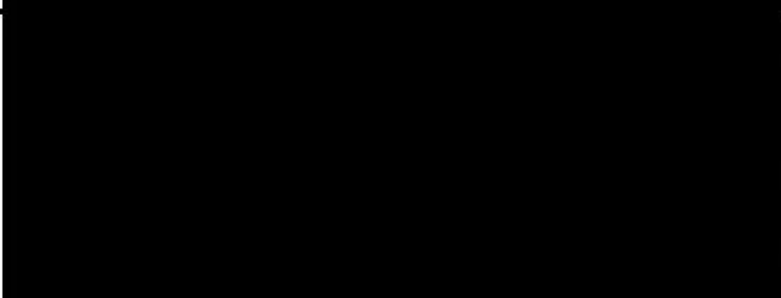
This report is issued to the client for their sole use and for the intended purpose as stated in the agreement between the client and Windrush Ecology Ltd. This report may not be relied upon by any other party without the express written consent of Windrush Ecology Ltd.

Windrush Ecology has exercised due care in preparing this report. It has not independently verified information provided by others, and no warranty is made in relation to the content of this report and Windrush Ecology Ltd assumes no liability for any loss resulting from errors, omissions or misinterpretation made by others.

Any recommendation, opinion or finding stated in this report is based on the circumstances and facts as they existed at the time that Windrush Ecology Ltd performed the work. The content of this report has been provided in accordance with the provisions of the CIEEM Code of Conduct.

Nothing in this report constitutes legal opinion.

Client	Adrian James Architects Limited
Job name	Meadow Larkins, Larkins Lane, Headington, Oxford OX3 9DW
Survey date	27 th April 2020
Report date	8 th September 2020
Report title	Preliminary Ecological Appraisal
Reference	W3602_rep_Meadow Larkins, Headington_08-09-20

	Signed	Name	Position	Date
Prepared by		Oliver Bevan <i>MEnvSci</i>	Assistant Ecologist	21/07/2020
Reviewed by		Edward Bodsworth <i>MA (Cantab)</i> <i>PhD MCIEEM</i>	Director	08/09/2020

Report Contents

1	Executive Summary	1
2	Introduction	3
2.1	Site Description & Context	3
2.2	Proposals	3
2.3	Aims of Study	3
2.4	Bat Ecology	3
3	Methodology.....	4
3.1	Desk Study	4
3.2	Field Surveys.....	5
3.2.1	Extended Phase 1 Habitat Survey.....	5
3.2.2	Bat Activity Surveys	6
3.3	Internal Building Inspection.....	7
3.4	Biodiversity Impact Calculator.....	8
3.5	Limitations	8
4	Results & Evaluation.....	8
4.1	Ecological Context.....	8
4.1.1	Sites of Nature Conservation Importance.....	8
4.1.2	Species Records.....	10
4.2	Habitats	11
4.2.1	Overview	11
4.2.2	Buildings	11
4.2.3	Amenity Grassland (Lawn)	12
4.2.4	Garden Orchard.....	12
4.2.5	Shrubs & Ornamental Planting	13
4.2.6	Boundaries.....	13
4.2.7	Hard-standing	13
4.3	Species	13
4.3.1	Plants	13
4.3.2	Invertebrates.....	13
4.3.3	Amphibians	13
4.3.4	Reptiles	14
4.3.5	Birds.....	14
4.3.6	Bats.....	14
4.3.7	Other Mammals	15
4.3.8	Other Species	15
4.4	Relevant Legislation & Policy Guidance	15
4.4.1	Reptiles	15
4.4.2	Nesting Birds.....	16
4.4.3	Bats.....	16
4.4.4	The Natural Environment and Rural Communities Act 2006.....	17
4.4.5	National Planning Policy Framework (NPPF).....	17
5	Impact Assessment.....	19
5.1	Sites of Nature Conservation Importance	19
5.2	Habitats	19
5.3	Species	20
5.3.1	Reptiles	20
5.3.2	Birds.....	20
5.3.3	Bats.....	20
5.3.4	Other Mammals	21
5.3.5	Other Species	21
6	Recommendations	21
6.1	Further Surveys	21

6.1.1	Bat Survey	21
6.1.2	Reptile Survey.....	21
6.2	Habitats	21
6.3	Species	22
6.3.1	Reptiles	22
6.3.2	Bats	22
6.3.3	Birds.....	23
6.3.4	Hedgehogs & Other Mammals	23
7	Biodiversity Impact Assessment	24
7.1	Habitat Status Before Development.....	24
7.2	Habitat Status After Development.....	24
7.3	Calculation.....	24
8	References.....	24
9	Appendix 1. Photographs	26
10	Appendix 2. Site Location Plans	29
11	Appendix 3. Habitat Plan	30
12	Appendix 4. Proposal Plans	31
13	Appendix 5. Species for Landscape and Ornamental Planting.....	32
14	Appendix 6. Data Search Results.....	34
15	Appendix 7. Biodiversity Impact Assessment Calculation	35

1 Executive Summary

Site Details	Meadow Larkins, referred to as the 'site' for the purposes of this report, is a detached dwelling located to the east of Larkins Lane, within the suburb of Headington, Oxford OX3 9DW. The approximate Ordnance Survey grid reference of the site is SP 546 076.
Proposals	There is a proposal to extend and upgrade the existing dwelling.
Methodology	<p>An extended Phase 1 Habitat Survey was undertaken on 28th April 2020 by Oliver Bevan <i>MEnvSci</i>.</p> <p>This was followed by two bat activity surveys, one at dusk and one at dawn in July 2020.</p>
Evaluation	<ul style="list-style-type: none"> • The site comprises a detached dwelling and garden, with areas of amenity grassland and ornamental planting as well as an orchard and ruin. The garden boundaries are comprised of wooden fences, hedges and areas of stone wall. • None of the habitats on site are considered to meet the criteria for habitats of 'principal importance' under Section 41 of the NERC Act 2006. • The garden orchard area is considered to be the feature of highest ecological value within the site. • No bats or evidence of bats were found during the survey of the site. • Bat potential within trees is limited to two mature trees assessed as having 'low' potential to offer shelter to bats (Collins, 2016). • The dwelling is assessed as having 'moderate' potential to offer shelter to bats (Collins, 2016). • The ruin is assessed as having 'low' potential to offer shelter to bats (Collins, 2016). No bats or evidence of bats were found during the survey of the ruin. • Bat activity surveys of both buildings did not to identify a bat roost in either building. • Trees, hedges and shrubs are considered suitable for nesting birds. • The site offers limited habitat for reptiles within the grassland of the garden orchard.

<p>Impact Assessment</p>	<ul style="list-style-type: none"> • The proposals may result in the loss of amenity grassland, hard-standing, garden vegetation and a portion of garden orchard. • It is considered unlikely that the proposals will result in an overall loss of biodiversity if measures are put in place to enhance the ecological value of the site, such as native planting. • Removal of woody vegetation during the bird nesting period may result in disturbance, destruction of nests and killing and injury of young and eggs. • Works within the site could result in the killing and injury of common lizards and slow worms within terrestrial habitats. Works may also result in a loss of habitat for these species
<p>Recommendations</p>	<p>It is recommended that trees are retained and protected where possible.</p> <p>A mitigation strategy for reptiles is also recommended.</p> <p>Recommendations for habitat compensation and enhancement are made through planting of native ground flora and shrubs, deadwood pile creation/enhancement, stone refugia creation and the creation of a wildlife pond.</p> <p>Recommendations are made with regard to species-specific enhancement such as bat boxes, bird boxes and lighting.</p> <p>A Biodiversity Impact Assessment calculation was undertaken displaying that the current proposals can result in a net-gain in biodiversity if certain on-site enhancement measures are employed.</p>

2 Introduction

2.1 Site Description & Context

Meadow Larkins, referred to as the 'site' for the purposes of this report, is a detached dwelling located to the east of Larkins Lane, within the suburb of Headington, Oxford OX3 9DW. The approximate Ordnance Survey grid reference of the site is SP 546 076.

The site comprises a detached converted barn of stone and brick construction. The roof has machine made clay tiles throughout. The dwelling is set within a managed garden dominated by ornamental planting and amenity grassland (lawn). Within the eastern portion of the property is a garden orchard whilst to the south-west is a ruined stone building. The property is bounded by garden hedges, stone walls, fences and trees.

To the north, south and west of the site are the dwellings and gardens associated with the suburb of Headington, whilst to the east lies an area of pasture (improved grassland). The wider landscape is largely urban, comprising dwellings, gardens and commercial properties. However, pasture, hedgerows and a small number of isolated copses are also present to the north and east of the site.

2.2 Proposals

There is a proposal to extend and upgrade the existing dwelling.

2.3 Aims of Study

The aims of this study are to describe and evaluate the habitats present within the site and to assess the potential for the site to support protected and notable species. The report discusses the potential impacts of the proposed development on the ecology of the site, on valued habitats and on protected/notable species. The study also makes recommendations for appropriate mitigation measures and habitat enhancement with regard to habitats and species.

The study also undertakes two bat activity (dusk/dawn) surveys of the buildings to confirm the presence, or likely absence, of roosting bats.

2.4 Bat Ecology

Bats are the only mammals to have developed the ability of true flight. At present, over 1,100 species of bat are recognised worldwide, making bats the second largest mammal group after rodents. As well as flight, bats have evolved a system of navigation and orientation using echolocation which has allowed many species to become nocturnal. There are 18 species of bat that occur within the British Isles, of which 17 are known to breed here. More species occur in the south and west of the country, with species numbers declining towards the north and into Scotland.

All bat species in the UK are nocturnal and feed exclusively on insects (they are insectivorous) which they catch in flight during their night-time activity, using echolocation to locate and home-in on their prey. Bats will roost during the daytime and seek out dark, enclosed and undisturbed places in which to do so, often using a variety of roosting sites within their home range. Different roost sites are used for different purposes (such as mating, giving birth and hibernation) and at different periods of a bat's life cycle.

During the summer, female bats will gather together in a maternity or breeding roost. In the UK, this starts to occur towards the end of May and the females will seek out a warm and undisturbed site in which to give birth. Because maternity roosts require a particular set of environmental attributes (such as location, temperature, orientation and size), breeding bats tend to return to roost and breed in the same locations year after year. Given that bats live a relatively long time (anywhere from 10-20 years),

and only give birth to one pup a year, maternity colonies are crucial to the reproduction and survival of the local population and can be very sensitive to environmental change.

Relatively little is known about hibernation roosts, as tracking and locating hibernating bats is very difficult. However, many species (particularly those within the genera *Myotis* and *Rhinolophus*) have been found within underground sites such as caves, mines and cellars, where the temperature remains constant and low throughout the winter allowing the bats to remain in a state of torpor. The spring and autumn are periods of transition and bats can use a number of different locations on a temporary basis, often moving between roosts as environmental conditions change and temperatures fluctuate. In the autumn, bats will mate and it has been shown that male and female bats will gather at particular locations (such as a building, cave or tree) to meet, socialise and mate.

Bats choose to roost in a number of different locations, depending on the species, their activity pattern and the period of their lifecycle. Certain species, such as the pipistrelles, favour crevices and small cavities for roosting and will use features such as cracks, crevices and small rot holes in the boughs and trunks of trees and within certain features of buildings such as boxed eaves, gaps under roof tiles, hanging tiles and soffit boards. Other species favour large, uncluttered roof spaces and lofts within buildings where they can hang up on the underside of the roof and use the interior space for flying prior to emergence. Hollow trees, cellars, caves, barns, churches and cavity walls can also all be used for roosting, given suitable access. Certain species, such as the noctule, favour roosting sites within trees whilst others tend to favour buildings. Roost sites may be used by only a very small number of bats, such as solitary males, or may offer shelter to tens or hundreds of bats within maternity and hibernation roost sites.

The suitability of roosting sites is also highly influenced by the location or context of a tree, building or cave. Roost sites are most often favoured when they are within close proximity to foraging habitats and where those habitats are connected to one another within the landscape by features such as hedgerows, woodlands, rivers or sunken lanes along which bats disperse and 'commute' from place to place. Suitable foraging habitats are any places where insect prey is diverse and abundant such as woodlands, ponds, lakes, rivers, scrub, hedgerows and unimproved grassland or pasture. Thus, the ecological context of a site is very important for determining if bats may be present within a roost and the potential for a roost to be present tends to be much higher within rural or village locations.

3 Methodology

3.1 Desk Study

The Thames Valley Environmental Records Centre (TVERC) was contacted in April 2020 to gather records that it holds for protected and notable species, and non-statutory sites of nature conservation importance from within a 1km radius of the site.

The Multi-Agency Geographic Information for the Countryside (www.magic.gov.uk) website was searched for information regarding internationally protected sites (e.g. Special Areas of Conservation) within 5km of the survey area and statutory sites of nature conservation importance (e.g. Sites of Special Scientific Interest) within a 1km radius of the site. Other Internet resources interrogated as part of the desk study include:

- Bing Maps - www.bing.com/maps
- Google Earth - www.earth.google.co.uk
- Google maps - www.google.co.uk/maps

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and the Oxfordshire Biodiversity Action Plan (BAP) were also consulted to gather information pertaining to priority habitats and species for conservation action at the national and local level.

Aerial photography interpretation is used to place the site into an ecological context and to provide information on the nature of the habitats beyond the site boundary. The information gathered is used to put the site into an ecological context and to provide a baseline to the habitat assessment.

3.2 Field Surveys

3.2.1 Extended Phase 1 Habitat Survey

An extended Phase 1 Habitat Survey was undertaken on 28th April 2020 by Oliver Bevan *MEnvSci*. A walkover of the site was conducted, and a description of the habitats present was prepared using standard Phase 1 Habitat Survey methodology (JNCC, 2010).

Target notes were also prepared on features of particular ecological interest and an assessment was made of the site’s potential to support protected and notable species (such as species listed under Section 41 of the NERC Act 2006).

3.2.1.1 Weather Conditions

The initial Phase 1 Habitat Survey was conducted on 28th April 2020. The weather on the day was cool (8°C) and wet, with heavy rain (100% cloud cover) and minimal breeze (Beaufort Scale 1).

3.2.1.2 Assessment for Roosting Bats

Trees and the dwelling were assessed for their potential to offer shelter to roosting bats in accordance with best practice guidelines published by the Bat Conservation Trust (Collins, 2016). The trees were assessed from ground level (using binoculars) as either having high, moderate, low or negligible potential to shelter roosting bats according to the criteria shown in Table 1.

Table 1. Criteria for the assessment of buildings and trees for roosting bats (Collins, 2016)

Potential	Features
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation significance.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Potential roost features (PRFs) in trees that may be used by bats include (Collins, 2016):

- woodpecker holes;
- rot holes;
- hazard beams;
- other vertical or horizontal cracks and splits (such as frost cracks) in stems or branches;
- partially detached bark;

- knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;
- man-made holes (e.g. cavities that have developed from flush cuts) or cavities created by branches tearing out from parent stems;
- cankers (caused by localised bark death) in which cavities have developed;
- other hollows or cavities, including butt-rots;
- double leaders forming compression forks with included bark and potential cavities;
- gaps between overlapping stems or branches;
- partially detached ivy with stem diameters in excess of 50mm; and bat, bird or dormouse boxes

The study also takes into account the structure and ecological context of the dwelling, including the following factors which may increase the likelihood of roosting bats being present:

- Age of the building (pre-20th Century or early 20th Century construction)
- Nature of construction; traditional brick, stone or timber construction
- Large and complicated roof void with unobstructed flying spaces
- Large (>20 cm) roof timbers with mortice/tenon joints, cracks and holes
- Entrances and gaps for bats to fly and crawl through
- Poorly maintained fabric providing ready access points for bats into roofs, walls; but at the same time not being too draughty and cool.
- Roof warmed by the sun, south-facing roofs in particular
- Weatherboarding and/or hanging tiles with gaps
- Undisturbed roof voids
- Buildings and built structures in proximity to each other providing a variety of roosting opportunities throughout the year
- Buildings or built structures close to good foraging habitat, in particular mature trees, parkland, woodland or wetland, especially in a rural setting.

3.2.2 Bat Activity Surveys

Bat activity surveys of the dwelling and ruin at Meadow Larkins, were undertaken to establish presence/absence of roosting bats and to characterise any roosts identified. These surveys were commissioned following the results of the initial assessment for roosting bats. The bat activity surveys were undertaken in accordance with best practice guidelines (Collins, 2016).

Surveyors were positioned around each structure to provide adequate visual coverage of potential roost features/emergence points (Figure 1). Notes were made on any emergences or re-entries, as well as incidental bat foraging and commuting behaviour.

All surveyors were equipped with Echometer Touch bat detectors to record and analyse bat calls in real time; Bat Box Duet and Magenta bat detectors were also used on occasion.

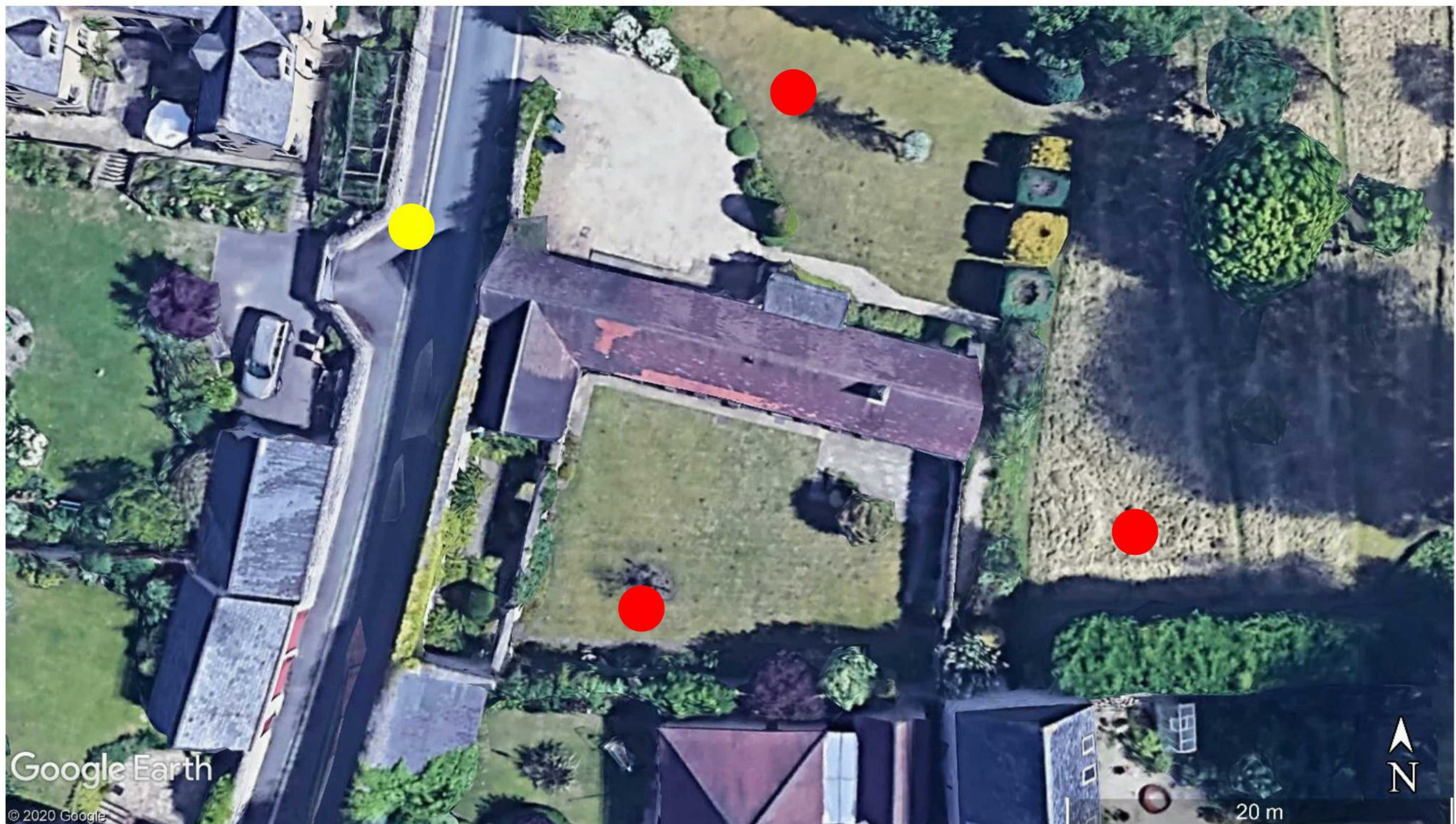


Figure 1. Aerial photograph showing the location of surveyors (indicated by the red and yellow circles) during the dusk and dawn watches of the buildings at Meadow Larkins, Headington. Red circles indicate locations for both the dusk and dawn watch whilst yellow indicates the dusk survey only.

Please refer to Table 2 for dates, timing, weather conditions and personnel present during each bat activity survey.

Table 2. Timing and weather conditions during bat activity surveys at Meadow Larkins in 2020.

Building	Date	Timing	Sunrise/ Sunset	Conditions	Personnel
Dwelling & Ruin	02/07/2020	21:12- 23:00	21:26	90% cloud cover, Beaufort Scale = 2, spitting prior to survey (no rain during), 17°C down to 16°C	Tracy Gray <i>BSc GradCIEEM</i> Oliver Bevan <i>MEnvSci</i> Jan-Piet Stuursma Angela Mills
Dwelling	21/07/2020	03:30- 05:06	05:13	0% cloud cover, Beaufort Scale = 0, dry, 10°C down to 9°C	Tracy Gray <i>BSc GradCIEEM</i> Oliver Bevan <i>MEnvSci</i> Robbie Birkett <i>MSci</i>

3.3 Internal Building Inspection

An internal building inspection of Meadow Larkins was undertaken in conjunction with the first bat activity survey on 2nd July 2020. The inspection was undertaken by Oliver Bevan *MEnvSci*.

A detailed internal survey of the building was undertaken using a 1 million candle-power torch in order to look for bats and/or evidence of bats such as bat droppings. Notes were made on the location and species of individual bats seen, and the relative freshness, shape and size of bat droppings, along with locations and quantity.

3.4 Biodiversity Impact Calculator

A Biodiversity Impact Assessment is included within the report (Biodiversity Metric 2.0 (JP029) created by Natural England) to calculate the impact of the proposed development upon the natural and local environment as well as guiding the approach for achieving a net gain for biodiversity as a result of the proposals.

3.5 Limitations

Whilst it is considered that a thorough habitat survey has been undertaken, and robust data and conclusions have been delivered within the assessment, the study provides only a snapshot of the species present at the time of the surveys and should be considered with this in mind.

4 Results & Evaluation

4.1 Ecological Context

The site is located towards the northern edge of the suburb of Headington, within the largely suburban landscape of Oxford. Immediate surrounding land use comprises dwellings, gardens and commercial buildings as well as pasture and isolated copses.

4.1.1 Sites of Nature Conservation Importance

There are two statutory sites of national nature conservation importance within a 1km radius of the site; Magdalen Quarry Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR).

There is one statutory site of international nature conservation importance within a 5km radius of the site; Oxford Meadows Special Area of Conservation (SAC).

There is one non-statutory site of nature conservation importance within a 1km radius of the site; Bayswater Brook. Please see Figure 2.

4.1.1.1 Statutory Sites

Magdalen Quarry SSSI & LNR

Magdalen Quarry SSSI is located approximately 730m south-east of the site. This area is primarily designated for its geology. However, it is also designated as a Local Nature Reserve due to the presence of native vegetation with predominantly urban surroundings.

Oxford Meadows SAC

The Oxford Meadows SAC is designated for its international importance to biodiversity; the edge of the SAC is approximately 4.3 km to the west of the site. The Oxford Meadows SAC comprises a series of lowland hay meadows within the Thames Valley centre of their distribution. The SAC includes vegetation communities that are perhaps unique in the world in reflecting the influence of long-term grazing and hay-cutting on lowland hay meadows. The meadows are of particular botanical interest and importance. Oxford Meadows is also designated as a SAC because Port Meadow is the larger of only two known sites in the UK for creeping marshwort *Apium repens*.

4.1.1.2 Non-statutory Sites

Bayswater Brook OCWS

The Bayswater Brook is located approximately 670m to the north-east of the site and lies on the boundary of Oxford City. The stream supports a population of water voles with the most records from 2009 just beyond the western end of the site.

The site has willow pollards with good bat potential and includes both standing and fallen dead wood.

Meadow Larkins, Headington Designated Sites Map



- LNR
- Oxfordshire Local Geological Site
- Oxford City Wildlife Site
- SSSI

Map produced by Thames Valley Environmental Records Centre in 2020

Figure 2. Sites of nature conservation importance within a 1km radius of the site

4.1.2 Species Records

The following sections summarise the protected/notable species records provided by the Thames Valley Environmental Records Centre for the 1km search radius around the site.

4.1.2.1 Plants

The TVERC holds a number of plant records from within a 1km radius of the site; with records dating from 1987 to 2019. The following species have been recorded since 1990; bluebell *Hyacinthoides non-scripta*, bog pimpernel *Anagallis tenella*, carline thistle *Carlina vulgaris*, chicory *Cichorium intybus*, common rock-rose *Helianthemum nummularium*, cornfield knotgrass *Polygonum rurivagum*, field scabious *Knautia arvensis*, field woundwort *Stachys arvensis*, fritillary *Fritillaria meleagris*, hoary plantain *Plantago media*, long-stalked yellow-sedge *Carex viridula* subsp. *brachyrrhyncha*, marsh helleborine *Epipactis palustris*, marsh pennywort *Hydrocotyle vulgaris*, marsh valerian *Valeriana dioica*, pale willowherb *Epilobium roseum*, parsley water-dropwort *Oenanthe lachenalii*.

4.1.2.2 Invertebrates

The TVERC holds records of a variety of invertebrate taxa from a 1km radius of the site. These records date from 1983 to 2018. Records since 1990 include *Dolichovespula (Dolichovespula) media* and the sharp-collared furrow bee *Lasioglossum (Evylaeus) malachurum*.

Beetle species recorded since 1990 are limited to records of *Ischnomera cyanea* and stag beetle *Lucanus cervus*.

Molluscs recorded since 1990 are limited to the large black slug *Arion (Arion) ater*.

A variety of moth species have been recorded since 1990. Moth species recorded include blood-vein *Timandra comae*, buff ermine *Spilosoma lutea*, cinnabar *Tyria jacobaeae*, and large nutmeg *Apamea anceps*.

The closest invertebrate record to Meadow Larkins is a record of stag beetle approximately 230m to the south.

4.1.2.3 Amphibians

The TVERC holds records of common frog *Rana temporaria*, great crested newt *Triturus cristatus*, and smooth newt *Lissotriton vulgaris* from within a 1km radius of the site. The most pertinent record is a record of great crested newt from a pond approximately 330m north-west of the site.

4.1.2.4 Reptiles

Reptile records held by the TVERC are limited to a single record of grass snake approximately 750m south-east of the site.

4.1.2.5 Birds

The TVERC holds a number of records of bird species dating from 1996 to 2019. Birds recorded from a 1km radius of the site include song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, kingfisher *Alcedo atthis*, lesser spotted woodpecker *Dendrocopos minor*, swift *Apus apus*, house sparrow *Passer domesticus*, spotted flycatcher *Muscicapa striata*, starling *Sturnus vulgaris* and red kite *Milvus milvus*.

4.1.2.6 Bats

The TVERC holds a small number of bat records which include common pipistrelle *Pipistrellus pipistrellus*, noctule *Nyctalus noctula* and soprano pipistrelle *Pipistrellus pygmaeus*. Bat records date from 2007 to 2019.

4.1.2.8 Other Species

Other species recorded include a record of the fungus Satan's bolete *Rubroboletus satanas* from a location approximately 750m north-west of the site.

4.2 Habitats

Photographs of the site are presented in Appendix 1. Appendix 2 illustrates the location of the site and provides an aerial photograph of the site within the surrounding landscape. A habitat map of the site is presented in Appendix 3.

4.2.1 Overview

The site comprises a detached dwelling and garden, with areas of amenity grassland and ornamental planting as well as a garden orchard and ruin. The garden boundaries are comprised of wooden fences, hedges and areas of stone wall.

4.2.2 Buildings

The property contains the dwelling of Meadow Larkins itself as well as an attached stone ruin. The ruin extends from the dwelling to the south and forms the southern portion of the western boundary.

Dwelling

The dwelling of Meadow Larkins is a detached building that appears to have incorporated the walls from a pre-existing stone barn. The dwelling occupies a single storey and is largely constructed of stone. However, there is also a section of wall constructed of painted brick to the south. The building has a cross-gabled roof constructed of machine-made clay tiles. A relatively small stone porch extends to the north of the building which has a flat roof covered by bitumen roofing felt.

There are two loft spaces within the dwelling. Only one of the loft spaces could be accessed during the internal building inspection on 2nd July 2020. This area of loft has a bitumen and mineral felt underlay and a simple timber frame. The space measures approximately 3m (L) x 3m (W) x 2m (H).

The external stone walls are in a good state of repair. However, a small relatively deep cavity was noted on the eastern wall. The roof tiles are largely close-fitting and intact, although a small number of gaps are present across all pitches where tiles have broken and lifted. Gaps are also present within the south-east facing valley where the tiles meet lead flashing. The southern pitch features tight-fitting wooden boxed eaves. The boxed eaves are in good condition and close-fitting, creating no gaps or crevices that could offer potential bat roosting locations. The northern pitch features wooden bargeboards at the eaves. A largely continuous gap is present along the wall where the bargeboard meets the wall.

Given the above discussion, the dwelling is assessed as having 'moderate' potential (Collins, 2016) to offer shelter to roosting bats. This is largely due gaps under tiles and at the eaves.

Ruin

The walls of a ruined building extend from the south-west of the dwelling. The western wall forms the southwest boundary of the site. The walls are constructed of stone and mortar of a similar style to the

dwelling. The interior of the ruin features planted ornamental beds (See Section 4.2.5). Climbing plants have colonised a large portion of the ruin walls. Noted plants include *Hydrangea petiolaris* and Virginia creeper *Parthenocissus quinquefolia*. The walls of the ruin are largely in a good state of repair. However, cavities were noted within the western wall. Gaps within the western wall are present on both faces particularly to the northern end.

Given the above discussion, the ruin is assessed as having 'low' potential (Collins, 2016) to offer shelter to roosting bats. This is largely due to gaps within the western wall of the ruin.

4.2.3 Amenity Grassland (Lawn)

Amenity grassland is the dominant habitat within the western portion of the site. This grassland is maintained at a short sward (<10cm) and shows obvious signs of improvement with a lush sward of coarse grasses. Herbaceous species present within the amenity lawn include common dandelion *Taraxacum officinale*, common daisy *Bellis perennis*, bristly oxtongue *Helminthotheca echioides*, borage *Borago officinalis*, cranesbill *Geranium* sp., herb-Robert *Geranium robertianum*, ragwort *Jacobaea vulgaris*, willowherb *Epilobium* sp., creeping thistle *Cirsium arvense* and red clover *Trifolium pratense*.

Trees planted within the amenity grassland include young ginkgo *Ginkgo biloba*, ornamental rowan *Sorbus* sp. and cypress trees *Cupressus* sp..

The amenity grassland is dominated by common and widespread species. The habitat is relatively homogeneous with regard to its structure and species composition, and is not considered to meet the criteria for a grassland 'habitat of principal importance' as listed within Section 41 of the NERC Act 2006. Given this, the habitat is considered to be of negligible/low ecological value.

4.2.4 Garden Orchard

The eastern portion of the site comprises a garden orchard. Trees within the orchard are all young individuals. Tree species noted include plum *Prunus domestica*, pear *Pyrus communis*, apple *Malus x domestica*, and black mulberry *Morus nigra*. The majority of the trees appear to be relatively young, and the garden orchard does not appear to be long-established.

Approximately 70m to the south-east of the site is a small pocket of 'Traditional Orchard', which is a habitat of principal importance and has been mapped on the Multi-Agency Geographic Information for the Countryside (MAGIC) website. However, the MAGIC website does not define the fruit trees within the site as 'Traditional Orchard'. Other trees towards the edge of the garden orchard area include mature poplar *Populus* sp., a mature common walnut *Juglans regia* and a row of Leyland cypress trees.

The trees sit within an area of tussocky grassland comprised of species adapted to moist, fertile grasslands such as meadow fox tail *Alopecurus pratensis* and rough meadow grass *Poa trivialis*. Due to an apparent lack of recent intensive management the grass had formed dense tussocks up to 50cm tall. Herbaceous species noted within the grassland include common vetch *Vicia sativa*, hybrid bluebell *Hyacinthoides* sp., cleavers *Galium aparine*, green alkanet *Pentaglottis sempervirens*, lords-and-ladies *Arum maculatum*, bramble *Rubus fruticosus*, stinging nettle *Urtica dioica*, creeping buttercup *Ranunculus repens*, sedges *Juncus* sp., cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium*, dandelion, wood avens *Geum urbanum* and ground ivy *Glechoma hederacea*.

To the south-east of the orchard are two piles of rubble which have been colonised by grasses from the orchard as well as buddleia *Buddleja* sp., heart-leaved bergenia *Bergenia crassifolia*, rose-of-Sharon *Hypericum calycinum*. There is also a small compost heap in the north-east corner of the orchard area.

Trees within the garden orchard are all young and planted in a uniform dense structure. The trees appear to have been planted within the last 30 years. They do not appear to be managed traditionally with no identified cutting for hay or grazing. The garden orchard area is not considered to meet the criteria of a 'Traditional Orchard', a habitat of principal importance under Section 41 of the NERC Act 2006. However, given the number of trees present and the sward structure of the grassland, the habitat is considered to be of high ecological value within the context of the site.

4.2.5 Shrubs & Ornamental Planting

Shrubs and ornamental planting are present within formal areas of the garden and within the ruin. Planted beds contain largely ornamental herbaceous species and shrubs. Noted plant species include red valerian *Centranthus ruber*, ornamental sedge *Juncus* sp., honesty *Lunaria annua*, ivy-leaved toadflax *Cymbalaria muralis*, welsh poppy *Meconopsis cambrica*, strawberry *Fragaria × ananassa*, stinging nettle, cleavers, lords-and-ladies and green alkanet. Trees and shrubs within these beds include rosemary *Rosmarinus officinalis*, *Hydrangea petiolaris*, Virginia creeper, fig *Ficus carica*, pink flowering hawthorn *Crataegus* sp., Leyland cypress and firethorn *Pyracantha* sp..

Planted beds do not qualify as any priority habitat as listed under Section 41 of the NERC Act 2006. The planted beds are considered to be of negligible/low ecological value.

4.2.6 Boundaries

The site is bounded by a mixture of stone walls, fencing and garden hedges. The western boundary is formed by freestanding stone walls and the walls of the ruin (See Section 4.2.2). To the north the site is bounded by a post and wire fence and a garden hedge of privet *Ligustrum* sp.. This northern boundary is shaded by overhanging hazel *Corylus avellana* from the adjacent property. The eastern boundary is marked by a post and rail fence overtopped with bramble. Beyond this is a pasture of improved grassland. The southern boundary is marked by free-standing stone walls as well as the walls of adjacent buildings and the ruin.

The boundaries are considered to be of low ecological value with value coming from the presence of native species and potential bat roosting opportunities within the walls of the ruin (See Section 4.2.2).

4.2.7 Hard-standing

Several areas of hard-standing are present on site. Namely, concrete paving within the ruin, a paved patio within the garden and a gravel driveway and parking area. Areas of hard-standing are considered to be of negligible ecological value.

4.3 Species

4.3.1 Plants

No rare or scarce plants were noted within the site, in particular no rare grassland flowering plants were observed within the garden or garden orchard.

4.3.2 Invertebrates

Habitats are likely to support an assemblage of common and widespread invertebrates. Invertebrate records for the area surrounding the site include the stag beetle. However, the garden habitats are considered to lack sufficient deadwood to support this species.

4.3.3 Amphibians

There are two ponds within a 500m radius of the site as shown by Ordnance Survey maps. These ponds are located adjacent to one another approximately 320m north-west of the site. There are records of the great crested newt from these ponds. Several barriers to amphibian dispersal, including

roads, dwelling and fences, are present between these ponds and the site. It is therefore considered highly unlikely that amphibians such as the great crested newt *Triturus cristatus* are able reach the site from these ponds. Amphibians are subsequently considered absent from the site.

4.3.4 Reptiles

The site offers a limited amount of potential habitat for common reptile species. Tussocky grassland within the garden orchard, a compost heap and rubble piles within the site offer limited potential habitat to slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*. Reptile records from a 1km radius of the site are limited to a single record of grass snake. However, due to the presence of suitable habitat within the site, the presence of an isolated reptile population within the site cannot be ruled out.

4.3.5 Birds

Bird species noted within the garden during the survey were limited to wood pigeon *Columba palumbus* and robin *Erithacus rubecula*. The shrubs and hedges of the garden offer potential nesting habitats to common and widespread species such as these. The site is not suitable for ground nesting species.

Also of note, is the presence of an owl box on an adjacent dwelling which forms part of the southern boundary. No evidence of owls such as pellets or feathers was noted within the vicinity of the box. However, the interior of the box could not be inspected. Due to the urban context of the site it is considered unlikely that the box is be utilised by owl species such as the tawny owl *Strix aluco*.

4.3.6 Bats

As discussed earlier, the dwelling of Meadow Larkins is considered to have 'moderate' potential to offer shelter to roosting bats (Collins, 2016). This is due to the presence of potential roost features below tiles and within the roof fabric via gaps at the eaves. The ruin is assessed as having 'low' potential to offer shelter to roosting bats (Collins, 2016). This is due to the presence of a small number of gaps within the western wall. Subsequent bat activity surveys were conducted, the results of which are presented below (Section 4.3.6.1).

No bats or evidence of bats were found during the internal inspection of the loft space on 2nd July 2020.

Two trees within the site, namely the mature poplar and mature walnut, are assessed as having 'low' potential to offer shelter to roosting bats (Collins, 2016). This is due to the presence of a small number of knot holes and possible concealed features higher up the trees. All other trees are assessed as having 'negligible' potential to offer shelter to roosting bats.

4.3.6.1 Bat Activity Surveys

Bat activity surveys were used to establish the presence/absence of roosting bats and where a roost presence was confirmed, ascertain the specific features and characteristics of the identified roosts. The level of survey undertaken is in line with best practice guidelines (Collins, 2016).

No bats were seen to emerge from, or re-enter, the buildings; roosting bats are considered to be absent. Table 3 provides a summary of the results of the bat activity surveys at Meadow Larkins in July 2020.

Table 3. Bat Activity Surveys Results.

Building	Type & Date	Results	Roost Status
Dwelling & Ruin	Dusk 02/07/2020	No bats seen to emerge	Roosting bats absent from both the dwelling and the ruin
Dwelling	Dawn 21/07/2020	No bats seen to re-enter	

4.3.6.1.1 Summary

Roosting bats are considered to be absent from the two buildings.

4.3.6.1.1.1 Foraging & Commuting Behaviour

Bat foraging activity around the property was found to be relatively limited comprising small numbers of common species. Foraging was largely restricted to the orchard area of the garden and the open greenspace beyond.

No specific commuting corridors were identified during activity surveys.

Species recorded commuting/foraging within the site are limited to common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula* and brown long-eared bat *Plecotus auritus*.

4.3.6.2 Internal Building Inspection

Only one area of loft space could be accessed within the dwelling of Meadow Larkins on 2nd July 2020. No bats or evidence of bats such as fur staining, feeding remains or droppings, was found within the loft space. A second larger loft space is present within the dwelling which could not be accessed. It is considered that the bat activity surveys conducted avoid the need for internal survey of this space.

4.3.7 Other Mammals

There are records of European otter and water vole within 1km of the site. However, there are no aquatic habitats on or adjacent to the site; and these species are absent.

The site lacks suitable vegetation cover and grasses to facilitate the presence of harvest mouse. Harvest mice are considered absent.

4.3.8 Other Species

No evidence of any other protected species was found.

4.4 Relevant Legislation & Policy Guidance

4.4.1 Reptiles

All British species of reptile are protected by the Wildlife and Countryside Act 1981. Part of Section 9(1) and all of Section 9(5) apply. This means they are protected against intentional killing and injuring (but not taking).

Rarer species, including the smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*, are fully protected under the Act, which protects them from intentional disturbance and destruction of habitat.

4.4.2 Nesting Birds

Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. The nesting season for most species is between March and August inclusive.

4.4.3 Bats

As with many animal species within the UK, declines in the abundance and distribution of many bat species have been documented through recent decades. The reasons for these declines are various and complex but it is considered that the major factors are changes in landuse and agriculture, the loss of woodlands and hedgerows and the loss of suitable roosting sites.

Bats are particularly sensitive to human activity due to the fact that they roost within buildings, trees and underground structures such as mines, and the availability of suitable roost sites is considered to be a key factor in the conservation of bats within the UK. As a consequence, all species of bat and their roost sites are protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and under The Conservation of Habitats and Species Regulations 2017. Taken together, these make it an offence to:

- (a) Deliberately capture or intentionally take a bat
- (b) Deliberately or intentionally kill or injure a bat
- (c) To be in possession or control of any live or dead wild bat or any part of, or anything derived from a wild bat
- (d) Damage or destroy a breeding site or resting place of such an animal or intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection
- (e) Intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection
- (f) Deliberately disturb any bat, in particular any disturbance which is likely
 - to impair their ability;
 - (i) to survive, breed, reproduce or to rear or nurture their young; or
 - (ii) in the case of hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong

A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. It is important to note that since bats tend to re-use the same roost sites, current legal opinion is that a bat roost is protected whether or not the bats are present at the time.

Although the law provides strict protection to bats, it also allows this protection to be set aside (derogation) under The Conservation of Habitats and Species Regulations 2017 through the issuing of licences (referred to as European Protected Species Licences or EPSL). Where a lawful operation is required to be carried out but which is likely to result in one of the above offences, a licence may be obtained from Natural England (the statutory body in England with responsibility for nature conservation) to allow the operation to proceed. However, in accordance with the requirements of The Conservation of Habitats and Species Regulations 2017, a licence can only be issued where the following requirements are satisfied:

- The proposal is necessary ‘to preserve 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’;
- ‘There is no satisfactory alternative’;
- The proposals ‘will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range’.

These three criteria are often referred to as the ‘three tests’ of the Regulations. All three must be satisfied in order for a licence to be granted.

Certain bat species are listed on Annex II of The Conservation of Habitats and Species regulations 2017. Special Areas of Conservation (SAC) can be designated for such species.

4.4.4 *The Natural Environment and Rural Communities Act 2006*

Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 places a duty on the Secretary of State to publish, review and revise lists of living organisms and types of habitat in England that are of principal importance for the purpose of conserving English biodiversity.

It also requires the Secretary of State to take, and promote the taking of, steps to further the conservation of the listed organisms and habitats. This is important in the context of planning decisions as the National Planning Policy Framework affords planning policy protection to the habitats of species listed by virtue of Section 41.

There are no habitats listed within Section 41 of the NERC Act 2006 that are relevant to the site.

Species listed within Section 41 of the NERC Act 2006 that are relevant to the site, or considered to be potentially relevant, include:

- A number of common bird species, such as dunnock and song thrush
- Common reptile species such as the slow worm and common lizard
- Hedgehog (garden offers limited habitat)

4.4.5 *National Planning Policy Framework (NPPF)*

The revised National Planning Policy Framework was updated in February 2019 and sets out the government’s planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012, and revised in July 2018.

The NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by:

- Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

- Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:

- The need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
- The cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and
- Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 172), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.

To protect and enhance biodiversity and geodiversity, plans should:

- Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
- Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

- If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

- Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
- Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

The following should be given the same protection as habitats sites:

- ❖ Potential Special Protection Areas and possible Special Areas of Conservation;
- ❖ Listed or proposed Ramsar sites; and
- ❖ Sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

5 Impact Assessment

The impact assessment is based on the proposed layout as presented in Appendix 4. The proposals are for a two-storey extension to the dwelling as well as a renovation of the ruin.

5.1 Sites of Nature Conservation Importance

The proposed development will be limited to the areas within the site and there are no foreseeable impacts on sites of local nature conservation importance, including Bayswater Brook. These sites are located far enough away to avoid any direct or indirect impacts.

Sites of Special Scientific Interest within a 1km radius of the site are designated for their geological value. There are no predicted impacts upon these sites as a result of the proposed development.

It is considered that there will be no significant impacts on Oxford Meadows SAC. This is due to a number of reasons. Firstly, the SAC is located approximately 4.3km away, which is likely to remove any possibility of direct or indirect impacts during the construction phase.

Indirect impacts upon completion of the extension, such as increased visitor pressure on the SAC are also unlikely to occur. The SAC site is designated for its biodiverse hay meadows and the presence of creeping marshwort. It is considered unlikely that the extension of the house will increase the visitor pressure on the SAC. Given the above, it is considered that a Habitat Regulations Assessment (HRA) will not be required in this instance.

5.2 Habitats

It is understood that proposals are to upgrade and extend the existing dwelling with the construction of a new two storey extension and the refurbishment of the ruin as a usable building. The existing access

will be used. The proposals will likely result in the loss of some areas of ornamental planting and amenity grassland. A small portion of the garden orchard including four trees are also due to be lost with the construction of the two-storey extension. There is potential for the remaining garden orchard to lose ecological value if future management of the area changes.

Given the above, habitat loss is likely to be limited to amenity grassland, hard-standing, ornamental planting and garden orchard. Of these habitats, the orchard is considered to be of greatest ecological value. However, loss of a small portion of the orchard is not expected to result in any significant ecological impacts.

The NPPF (as revised February 2019) states that planning policies and decisions should contribute to and enhance the natural and local environment by minimising impacts to existing habitats and providing net gains for biodiversity. The proposals will result in the loss of an area of garden orchard. Given this, it is considered that some compensation is likely to be required, in order to result in no net loss of overall biodiversity. It is believed that this can be achieved on site as part of the proposals for the garden.

5.3 Species

5.3.1 Reptiles

Loss of tussocky grassland, compost heaps and rubble piles could result in the killing and injury of reptile species, such as common lizard and slow worm. Loss of these habitats could also reduce the potential habitat available for these reptiles, although the scale of habitat loss is unlikely to result in a significant impact on the overall status of the populations, if present.

5.3.2 Birds

Without sensitive timing, or the adoption of careful work practices, removal of trees, shrubs or other woody vegetation could result in the destruction of active birds' nests and the killing/injury of eggs/young. There are no predicted impacts on ground-nesting species.

5.3.3 Bats

There are no other foreseeable impacts on roosting bats or trees that bats may use for roosting as a result of the proposals. Bat activity surveys of both the ruin and the dwelling did not reveal a roosting bat presence within either building.

As a result of this conclusion, works to the buildings of Meadow Larkins Elms Road are unlikely to result in any significant impacts on bats or the places that they use for breeding, shelter and/or protection (roosts) and no specific compensation measures are considered necessary (Mitchell-Jones 2004).

Since no significant impacts on bats are predicted under The Conservation of Habitats and Species Regulations 2017, a European Protected Species (bat) licence will not be required for the proposed works to proceed. Since there are no predicted impacts on bats or their habitats, it is not necessary to consider the 'three tests' of The Conservation of Habitats and Species Regulations 2017 in this instance.

There are no other foreseeable impacts on roosting bats or trees that bats may use for roosting as a result of the proposals. All trees identified as having bat roost potential (Collins, 2016) are to be retained.

External lighting could have an impact on bats by affecting their activity and behaviour. In that certain species of bat have been shown to be attracted to mercury vapour lamps which emit light over a very broad-spectrum including UV light to which insects are particularly sensitive.

Furthermore, insects can be attracted in large numbers to mercury lamps and so can bats of the genera *Nyctalus* and *Pipistrellus*, including noctules *N. noctula* and common pipistrelles *P. pipistrellus* (Rydell and Racey 1993). Lighting has shown to have an opposite effect on certain other species, such as the lesser horseshoe bat *Rhinolophus hipposideros*, which have been shown to avoid areas of artificial light (Stone *et al.* 2009). New external lighting could therefore affect the behaviour of bats within the locality of the site.

5.3.5 Other Species

There are no foreseeable impacts on other species.

6 Recommendations

6.1 Further Surveys

6.1.1 Bat Survey

No further bat surveys are recommended.

6.1.2 Reptile Survey

It is considered that the adoption of appropriate precautionary measures will avoid the need for reptile surveys.

6.2 Habitats

It is recommended that new areas of landscape or ornamental planting associated with new development are designed, planted and managed to maximise their value to wildlife. One key element of this would be the species used within the planting, which should comprise native species where possible, as well as ornamental plants of known value to wildlife. The key will be to provide a variety of flowers and fruits throughout the year in order to provide food for insects and birds, as well as providing potential nest sites through the planting of trees and shrubs.

Appendix 5 recommends a number of suitable species for landscape and garden planting schemes, including non-native species for more formal areas, although the species mix should by no means be limited to this list. Planting should aim to provide ground cover for animals such as hedgehogs and invertebrates, and so low-growing ground cover should be encouraged. Native species such as bugle, ivy and periwinkle could be used for this purpose, or ornamental species such as lady's mantle, elephant's ears or perennial geraniums may also be suitable for formal areas of ornamental planting. A diversity of structure should also be encouraged through the planting of small trees, with shrubs and herbaceous plants species established below.

It is recommended that trees and shrubs (excluding Cypress trees) are retained within the garden where practicable. It is understood that proposals include the loss of a portion of the garden orchard. It is recommended that the remaining area is managed as a meadow so as to improve its floral diversity and ecological value.

It is also recommended that the compost heap and rubble piles within the orchard are retained. Furthermore, existing wooden refuse, and woody debris generated through clearance can be incorporated into these features to enhance them.

6.3 Species

6.3.1 Reptiles

Measures should be put in place to avoid any potential killing or injury of reptiles. It is considered that this can be achieved through grassland management, to encourage any reptiles to move away from the area of the proposed extension.

It is recommended that the orchard area to be developed is mown/cleared to 5cm, avoiding disturbances to the ground. Subsequent cuts should be slowly reduced by 1cm at a time, until a short sward of 2-3cm is achieved. It is considered that these measures will encourage reptiles to move away from the proposed area of works.

The area should be cut regularly to maintain a close-mown sward, and it is recommended that the low sward height is maintained for at least two weeks prior to the commencement of works. This sward height should be maintained until works have been completed.

6.3.2 Bats

6.3.2.1 Lighting

It is recommended that external lighting should be avoided within the site, unless it is necessary for reasons of security and safety. In particular, light spillage around new bat roosting features and along boundaries should be avoided, so that a dark corridor is created around the peripheries of the site in order to facilitate the movement of bats, as well as other nocturnal wildlife.

Where external lighting is required, it should be kept at low level and a low intensity, with hoods and baffles used to direct the light to where it is required (Bat Conservation Trust 2018, Emery 2008). To minimise the impact on bats, the use of low pressured sodium lamps is recommended in preference to mercury or metal halide lamps which have a UV element that can affect the distribution of insects and attract bats to the area, affecting their natural behaviour (Bat Conservation Trust 2018).

The key principals for choosing a suitable type of lamp are:

- Avoid blue-white short wavelength lights: these have a significant negative impact on the insect prey of bats. Use alternatives such as warm-white (long wavelength) lights as this will reduce the impact on insects and therefore bats.
- Avoid lights with high UV content: (e.g. metal halide or mercury light sources) or reduce/completely remove the UV content of the light. Use UV filters or glass housings on lamps which filter out a lot of the UV content.

Selecting an appropriate lamp unit that is designed to be environmentally friendly will minimise light spill, but further controls can be imposed by installing directional accessories such as baffles, hoods and louvres on lamps to direct light away from ecologically sensitive areas.

LED (Light Emitting Diode) units are an effective way to direct the light into small target areas and are recommended for lighting the proposed parking and turning area. Composite LEDs can be switched off to reduce/direct the light beam to specific areas.

6.3.2.2 *Enhancement*

The erection, or integration, of bat boxes on new buildings is recommended as an enhancement measure, and to provide gain for biodiversity under the NPPF. Bat boxes can be erected on buildings or on trees, and the following boxes are recommended:

- Schwegler 1FF Bat Box
- Schwegler 2F Bat Box
- Traditional oak double-chambered bat box

6.3.3 *Birds*

It is recommended that any clearance of shrubs, trees or other woody vegetation is undertaken outside of the breeding bird period, avoiding March to August inclusive.

The erection of bird nesting boxes is recommended in order to provide suitable nest sites for species within the local area, as nest boxes can be excellent substitutes for the nesting potential of trees. Over 60 species are known to adopt nest boxes including blue tits, great tits, starlings, robins and sparrows.

The location and nature of the nest box depends on the species it is designed for; boxes for tits, sparrows or starlings should be fixed two to four metres up a tree or a wall; open-fronted boxes for robins and wrens need to be low down, below 2m, and well-hidden in vegetation. Unless there are trees or buildings which shade the box during the day, boxes should be faced between north and east, thus avoiding strong sunlight and the wettest winds. Boxes can either be integrated into new buildings or placed on the exterior of buildings and trees

Recommended integrated boxes are:

- Bird Brick Houses Standard Box or Starling Box
- Schwegler Brick Box Type 24

Other recommended boxes are:

- 1B Schwegler Nest Box
- 2H Schwegler Robin Box

6.3.4 *Hedgehogs & Other Mammals*

It is recommended that clearance of rubble piles and dense vegetation (if required) should be undertaken outside of the hedgehog hibernation period (avoiding November to February, inclusive) so as to avoid any possible impacts on hedgehogs that may be hibernating within the site.

It is also recommended that hedgehog passes are created within any new boundary fencing. Movement by hedgehogs between gardens should be allowed for through the provision of holes within garden fence panels. The holes should have minimum dimensions of 13cm x 13cm to allow movement by foraging hedgehogs within the proposed development.

Mammals passing through the site during the construction phase of development are at risk of injury and trapping due to inadvertent pitfall hazards. This is particularly the case when foundations are being excavated. It is therefore recommended that no ground works take place outside of daylight hours and at night any pits on site are appropriately covered over/fenced off, or that a ramp is put in place via which mammals can escape.

7 Biodiversity Impact Assessment

The outcome of the Biodiversity Impact Assessment calculation is provided below. The calculation is based on the prescriptions for ecological enhancement given above.

7.1 Habitat Status Before Development

The habitat types listed below are based on the habitat types listed within the biodiversity metric. Habitats present within the site prior to development are taken as:

- Developed land; sealed surface 0.02ha
- Orchard 0.11ha
- Vegetated garden 0.08ha
- Artificial unvegetated, unsealed surface 0.02ha
- Ornamental non native hedgerow 0.03km

7.2 Habitat Status After Development

The proposed development will result in the loss of vegetated garden and orchard in order to upgrade and extend the existing buildings including the creation of a new courtyard area. The calculation includes the proposed replacement of the cypress hedgerow with a native species rich hedgerow as well as the enhancement of the remaining orchard from fairly poor to fairly good. This enhancement could be achieved by managing the grassland of the orchard as a meadow. Habitats present within the site after the development will be:

- Developed Land; sealed surface (retained & created) 0.07ha
- Orchard (enhanced) 0.10ha
- Vegetated garden (retained) 0.05ha
- Artificial unvegetated, unsealed surface (retained & created) 0.03ha
- Native hedgerow, Species rich (created) 0.1km

7.3 Calculation

The result of the calculation is a change of **+0.13** habitat biodiversity units, a change of **+13.95%**. The creation of native species rich hedgerows resulted in an increase of **0.43** hedgerow biodiversity units a change of **+647.57%**. Overall, the proposals (including recommended orchard enhancement) are expected to result in a net gain in Biodiversity greater than 10%.

It should be noted that the calculation is based on habitat (botanical) value alone and does not take into account the proposed ecological enhancement for species, such as bird boxes, bat boxes and log piles. It is considered that the installation of species-specific measures will provide further enhancement for biodiversity within the site.

Please refer to Appendix 7 (separate document) for full details of the calculation.

8 References

Bat Conservation Trust, 2018. *Bats and artificial lighting in the UK: Bats and the Built Environment series*. The Bat Conservation Trust, London.

CIEEM, 2016. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

Collins, J. 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London.

Emery, M., 2008. *Effect of Street Lighting on Bats*. Urbis Lighting Ltd., Anglia.

JNCC, 2010. *Handbook for Phase 1 Habitat Survey - a technique for environmental audit*. JNCC First published 1990; reprinted in 2010.

9 Appendix 1. Photographs



Photograph 1. The dwelling at Meadow Larkins, Headington, viewed from the south.



Photograph 2. The dwelling viewed from the north-west.



Photograph 3. 19 Gaps beneath weatherboarding on the northern face of the dwelling.



Photograph 4. Slipped tile on the eastern pitch of the dwelling.



Photograph 5. Gap in the mortar on the eastern face of the dwelling.



Photograph 6. The western ruin wall viewed from the south-west.



Photograph 7. The interior of the ruin.



Photograph 8. Gaps between stone blocks on the interior face of the western ruin wall.



Photograph 9. Amenity grassland within the western portion of the site.



Photograph 10. Garden orchard within the eastern portion of the site.



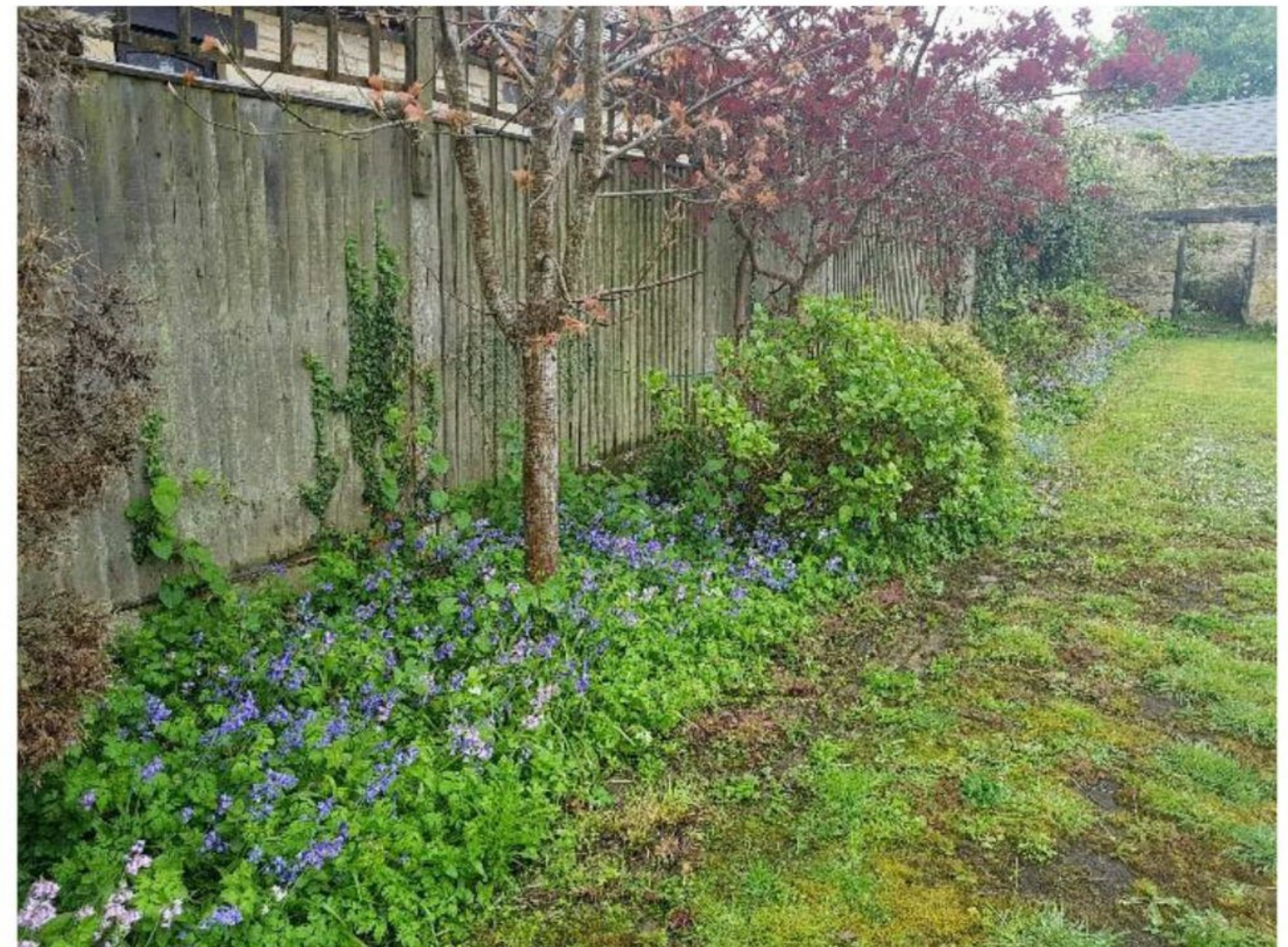
Photograph 11. Grassland present within the orchard area.



Photograph 12. Rubble piles within the south-eastern corner of the site.



Photograph 13. The eastern site boundary with pasture beyond.



Photograph 14. Ornamental planting within the south of the site.



Photograph 15. Ornamental planting within the north-west of the site.



Photograph 16. Boundary hedge and planted shrubs along the northern site boundary.

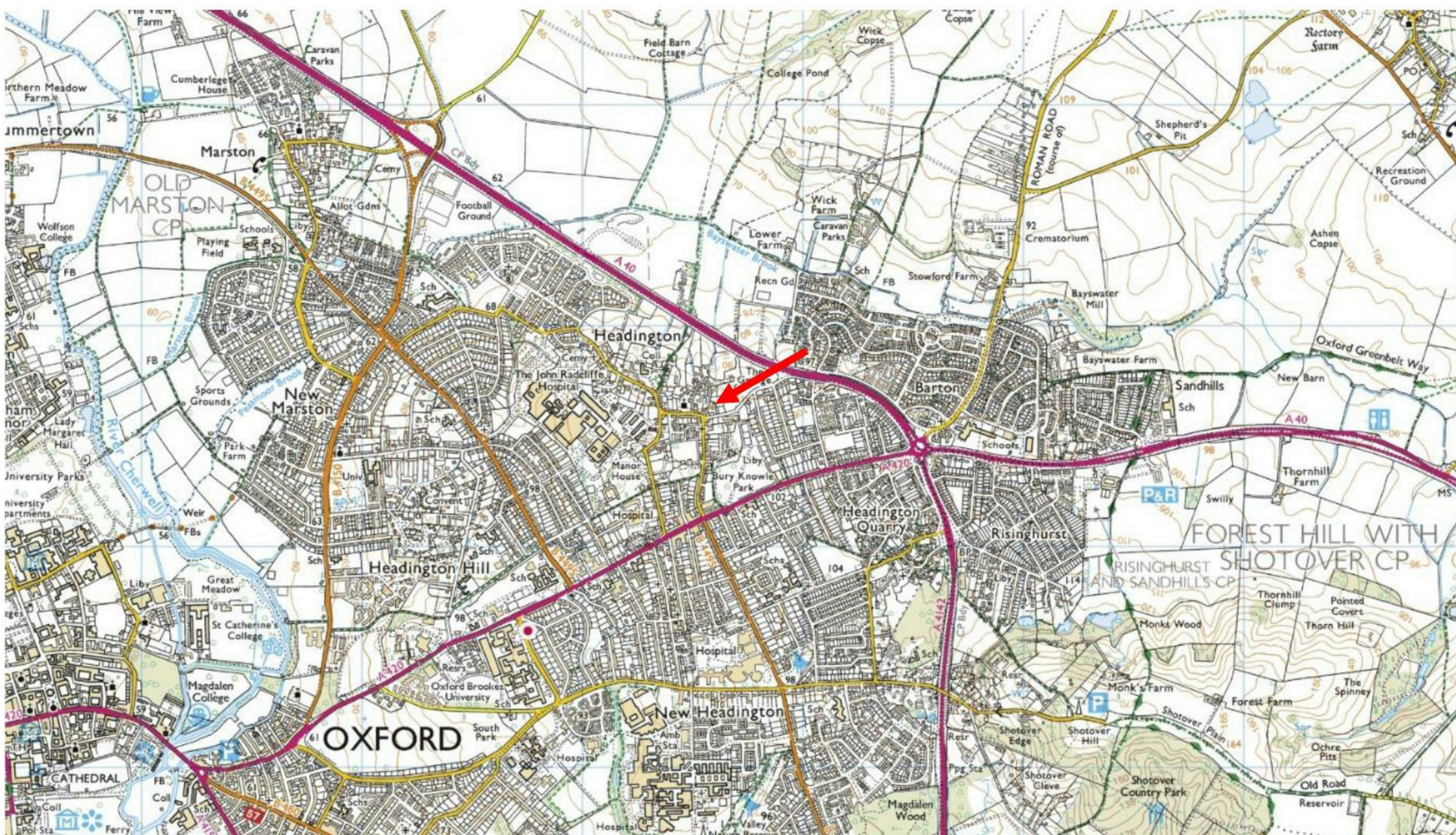


Photograph 17. Cypress trees along the southern site boundary.

10 Appendix 2. Site Location Plans

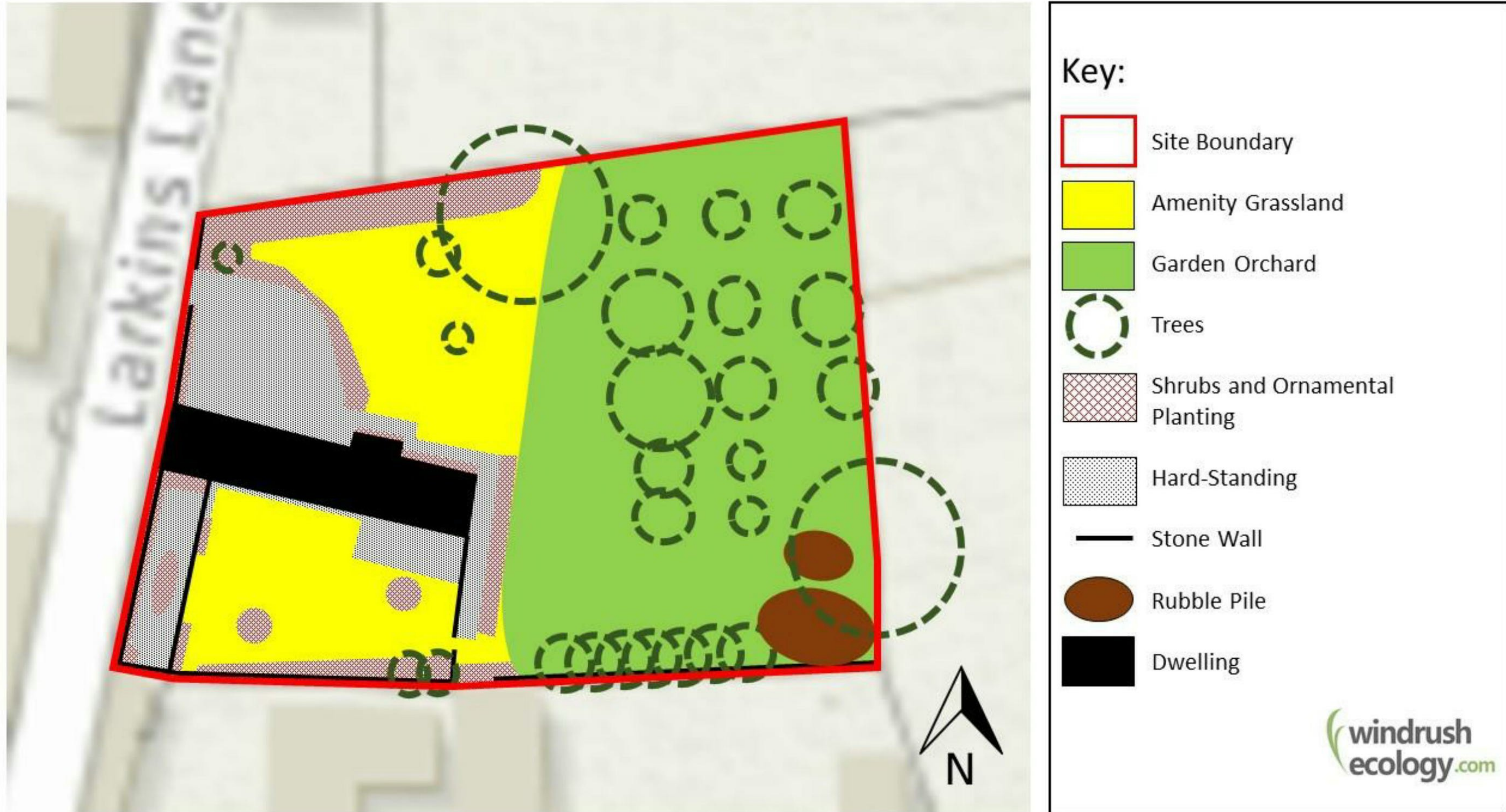


Aerial photograph showing the approximate location of Meadow Larkins, Headington, outlined in red.



Ordnance Survey map showing the approximate location of the site (indicated by the red arrow) within the local area.

11 Appendix 3. Habitat Plan



12 Appendix 4. Proposal Plans



13 Appendix 5. Species for Landscape and Ornamental Planting

Common Name	Botanical Name
Trees	
Field maple*	<i>Acer campestre</i>
Beech*	<i>Fagus sylvatica</i>
Hornbeam*	<i>Carpinus betulus</i>
Willow*	<i>Salix sp.</i>
Silver birch*	<i>Betula pendula</i>
Rowan*	<i>Sorbus aucuparia</i>
Whitebeam*	<i>Sorbus aria</i>
Alder*	<i>Alnus glutinosa</i>
Wild cherry*	<i>Prunus avium</i>
Flowering cherry	<i>Prunus sp.</i>
Flowering pear	<i>Pyrus calleryana</i>
Crab apple*	<i>Malus sylvestris</i>
Fruiting apple	<i>Malus sp.</i>
English oak*	<i>Quercus robur</i>
Elm*	<i>Ulmus sp.</i>
Small-leaved lime*	<i>Tilia cordata</i>
Shrubs	
Holly*	<i>Ilex aquifolium</i>
Hazel*	<i>Corylus avellana</i>
Wayfaring tree*	<i>Viburnum lantana</i>
Wild service tree*	<i>Sorbus torminalis</i>
Buckthorn*	<i>Rhamnus cathartica</i>
Guelder rose*	<i>Viburnum opulus</i>
Hawthorn*	<i>Crataegus monogyna</i>
Hebe	<i>Hebe sp.</i>
Rosemary	<i>Rosmarinus</i>
Ceanothus	<i>Ceanothus sp.</i>
Weigela	<i>Weigela sp.</i>
Dog rose	<i>Rosa canina</i>
Dogwood*	<i>Cornus sanguinea/alba</i>
Rose (single flowered varieties)	<i>Rosa sp.</i>
Wild privet*	<i>Ligustrum vulgare</i>
Garden privet	<i>Ligustrum ovalifolium</i>
Lilac	<i>Syringa vulgaris</i>
Escallonia	<i>Escallonia sp.</i>
Lavender	<i>Lavandula sp.</i>
Flowering currant	<i>Ribes sp.</i>
Honeysuckle*	<i>Lonicera periclymenum</i>
Mexican orange blossom	<i>Choisya sp.</i>
Spiraea	<i>Spiraea sp.</i>
Amelanchier	<i>Amelanchier lamarckii/canadensis</i>
Cotoneaster	<i>Cotoneaster sp.</i>
Yew*	<i>Taxus baccata</i>

Common Name	Botanical Name
Broom	<i>Cytisus sp.</i>
Rose of Sharon	<i>Hypericum calycinum</i>
Firethorn	<i>Pyracantha sp.</i>
Butterfly bush	<i>Buddleia davidii</i>
Clematis	<i>Clematis sp.</i>
Perennials	
Elephant's ears	<i>Bergenia cordifolia</i>
Sage	<i>Salvia sp.</i>
Lamb's ears	<i>Stachys byzantia</i>
Periwinkle*	<i>Vinca major & Vinca minor</i>
Ivy*	<i>Hedera helix</i>
Bugle*	<i>Ajuga reptans</i>
Lady's mantle	<i>Alchemilla mollis</i>
Geraniums	<i>Geranium sp.</i>
Globe thistle	<i>Echinops ritro</i>
Monk's hood	<i>Aconitum sp.</i>
Yarrow*	<i>Achillea millefolium</i>
Teasel*	<i>Dipsacus fullonum</i>
Oriental poppy	<i>Papaver orientalis</i>
Michaelmas daisy	<i>Aster sp.</i>
Bear's breeches	<i>Acanthus spinosus</i>
Montbretia	<i>Crocsmia sp.</i>
Purple coneflower	<i>Echinacea purpurea</i>
Ornamental onion	<i>Allium sp.</i>
Catmint	<i>Nepeta sp.</i>
Verbena	<i>Verbena sp., Verbena bonariensis</i>
Marjoram	<i>Origanum majorana</i>
Thyme	<i>Thymus sp.</i>
Crocus	<i>Crocus sp.</i>
Daffodil	<i>Narcissus sp.</i>
Snowdrop	<i>Galanthus nivalis</i>
Winter aconite	<i>Eranthis sp.</i>
Bluebell*	<i>Hyacinthoides non-scripta</i>
Primrose*	<i>Primula veris</i>
Forget-me-not*	<i>Myosotis sp.</i>
Grape hyacinth	<i>Muscari botryoides</i>
Hollyhock	<i>Althaea rosea</i>
Lenten rose	<i>Helleborus orientalis</i>
Foxglove*	<i>Digitalis purpurea</i>
Greater knapweed*	<i>Centaurea scabiosa</i>
Great mullein*	<i>Verbascum thapsus</i>
Toadflax*	<i>Linaria vulgaris</i>
Meadow crane's-bill*	<i>Geranium pratense</i>
*indicates native species	

14 Appendix 6. Data Search Results

Please refer to separate biodiversity report prepared by the Thames Valley Environmental Records Centre.

15 Appendix 7. Biodiversity Impact Assessment Calculation

Please refer to separate Excel document.