REDROW HOMES

ECOLOGYSOLUTIONS

Part of the ES Group

GREAT WILSEY PARK, HAVERHILL: INFRASTRUCTURE RESERVED MATTERS APPLICATION

Biodiversity Monitoring Strategy

Pursuant to Condition 45 of DC/15/2151/OUT

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ecology solutions for planners and developers

CONTENTS

PLANS

1. INTRODUCTION

1.1. Ecology Solutions was commissioned by Redrow Homes in October 2018 to prepare materials to address the requirements of planning conditions for the development at Great Wilsey Park as shown on Plans ECO1 and ECO2 (reference: DC/15/2151/OUT).

1.2. Condition 45 requires that a Biodiversity Monitoring Strategy be submitted and approved prior to commencement of development. The condition states:

Within any phase or reserved matters application, no development shall take place (including demolition, archaeological investigation, ground works and vegetation clearance), until a biodiversity monitoring strategy for that phase has been submitted to, and approved in writing by, the local planning authority. The purpose of the strategy shall be to monitor existing and new habitats on the site including hedges, attenuation ponds and adjacent areas, and protected and priority species mitigation including skylark, hazel dormice, reptiles and badgers. The content of the Strategy shall include the following:

a) Aims and objectives of monitoring to match the stated purpose.
b) Identification of adequate baseline conditions prior to the start of development as appropriate.
c) Appropriate success criteria, thresholds, triggers and targets against which the effectiveness of the various conservation measures being monitored can be judged.
d) Methods for data gathering and analysis.
e) Location of monitoring.
f) Timing and duration of monitoring.
g) Responsible persons and lines of communication.
h) Review, and where appropriate, publication of results and outcomes.

A report describing the results of monitoring shall be submitted to the local planning authority at intervals identified in the strategy. The report shall also set out (where the results from monitoring show that conservation aims and objectives are not being met) how contingencies and/or remedial action will be identified, agreed with the local planning authority, and then implemented so that the development still delivers the fully functioning biodiversity objectives of the originally approved scheme. The monitoring strategy will be implemented in accordance with the approved details.

Reason: Monitoring is required at the appropriate time to ensure that that the proposed development delivers the fully functioning biodiversity outcomes set out in the Environmental Statement.

1.3. This document forms part of a Reserved Matters Application (RMA) for the Infrastructure of the Redrow scheme (which includes extensive landscaping and green infrastructure).

1.4. The stated purpose of the strategy is *"to monitor existing and new habitats on the site including hedges, attenuation ponds and adjacent areas, and protected and priority species mitigation including skylark, hazel dormice, reptiles and badgers".* This has been interpreted to extend to all existing and proposed habitats, and protected and priority species for which mitigation and enhancement measures are proposed. While the names features and species are referenced, the monitoring strategy is not limited to them.

2. WOODLAND AND SCRUB

2.1. Monitoring Objectives

To assess effectiveness of habitat establishment and management.

To use the findings to guide remedial action where appropriate.

2.2. Baseline Conditions

Great Field Plantation

2.2.1. Overall, while Great Field Plantation does offer opportunities to wildlife, it is of limited intrinsic nature conservation interest. The understorey is virtually absent and the field layer is very impoverished, with little light penetrating to the woodland floor. The aims of management will therefore be to facilitate a gradual conversion to a more naturalistic woodland with greater structural diversity, focusing on native species as opposed to introduced conifers.

Conversion of Even-aged Plantation to Uneven-aged System

2.2.2. The principal advantage of the phased removal of conifers and the introduction of native broadleaves is that disruption to wildlife is minimised. A phased approach is therefore favoured over a clear-fell approach, which would have an adverse effect on protected and notable species, and is in any case unacceptable from a landscape and visual standpoint.

2.2.3. Three glades will be established in the woodland by felling conifer species. New understorey planting will be undertaken using native species. Existing broadleaved species will be encouraged to grow to maturity.

2.2.4. Felled timber will be cut into logs and set into 'loggeries' and more informal log piles to encourage saproxylic invertebrates. Felled trees will not be shredded or mulched.

2.2.5. New planting will exclusively be locally native species e.g. Oak *Quercus robur*; Hazel *Corylus avellana*, Hornbeam *Carpinus betulus*, Field Maple *Acer campestre*, Holly *Ilex aquifolium*, Guelder Rose *Viburnum opulus*, Hawthorn *Crataegus monogyna*, Spindle *Euonymus europaeus*, Honeysuckle *Lonicera periclymenum*, Dog Rose *Rosa canina*, Silver Birch *Betula pendula*, Cherry *Prunus avium*, Bird Cherry *Prunus padus*, Crab Apple *Malus sylvestris* and Rowan S*orbus aucuparia*. The aim will be to encourage strong growth of these species to canopy and understorey layer as appropriate.

Coppicing

2.2.6. Existing Hazel stools will be coppiced on a 15-year rotation to encourage greater structural diversity, and layered to produce new coppice stools and expand the understorey. Cut wood will be used to diversify the habitat through establishment of wood piles.

Ground Flora

2.2.7. Though the intention will be to encourage natural regeneration, if this proves difficult consideration will be given to the introduction of plug-planted locally native species.

Public Use and Recreation

2.2.8. Public use of the woodland will be monitored and management operations adapted where necessary. Generally it is envisaged that fencing will be avoided. Where it is necessary to dissuade the public from accessing certain areas (for example around the Badger setts and where new planting has been undertaken) this will be by means of dead hedging or planting thorny species. If fencing must be used it will be suitable for the area, e.g. natural woven Willow or Hazel hurdles.

Southern Plantation

2.2.9. The woodland in the south of the site is currently a mixed plantation, with a good proportion of native species, though largely even-aged. Long term management will encourage growth of native species and diversification of the habitat. Non-native conifers will be selectively felled to introduce habitat diversity, with timber retained as for Great Field Plantation.

2.2.10. An appropriate coppicing regime will be introduced on a 15-year rotation to encourage a vigorous understorey.

2.2.11. Bat and Dormouse 'hop-overs' will be established using trees approximately 6m in height at edges of new accesses.

Stour Brook Tributary

2.2.12. Generally the woodland along the watercourse is more semi-natural than that of the plantations, with mature broadleaved trees and a good understorey and field layer. At this stage it is considered that minimal intervention is necessary. Enhancements will focus on the provision of dead wood piles for habitat diversification.

2.3. Success Criteria and Targets

1. All new woodland and scrub established and sustainable.
2. Established 15-year Hazel coppice cycle.
3. Great Field Plantation to have 30% understorey cover in five years.
4. Observable woodland ground flora within two years.
5. Public access to Great Field Plantation established and effectively managed.
6. Where required, dead hedges and fencing established and maintained.
7. Replacement of all conifers in Southern Plantation within five years.

8. Dead wood piles established and undisturbed.
9. Observed use of new and existing features by wildlife.

2.4. Methods for Data Gathering and Analysis

2.4.1. Existing and newly established habitats will be subject to an annual walkover survey. The success or otherwise of habitat establishment and management will be noted. Areas where hedgerows or individual trees or shrubs have failed to establish successfully or where management is not proving effective will be recorded.

2.4.2. The walkover survey will be the responsibility of the management company, with input from the project ecologist and landscape architect as necessary. The project ecologist will advise on

2.4.3. Species monitoring to be undertaken as set out in the following sections will establish to what extent existing and new attenuation features are being used by wildlife.

2.5. Location of Monitoring

2.5.1. Monitoring will take place across the retained and newly established woodland and scrub within the site.

2.6. Timing and Duration

2.6.1. A walkover survey of all habitats will be undertaken on an annual basis by the management company. This will be an ongoing commitment that will extend beyond the lifetime of this strategy.

2.7. Contingencies and Remedial Action

2.7.1. Any habitats failing to establish will be subject to attention by the management company.

2.7.2. Watering will be required during periods of drought to ensure satisfactory establishment. Watering will be undertaken as required to maintain healthy plant growth.

2.7.3. Dead or diseased plants will be removed and replaced with the same species during the next growing season (i.e. October to March inclusive).

2.7.4. All remedial action will be the responsibility of the management company.

3. HEDGEROWS AND TREES

3.1. Monitoring Objectives

To assess effectiveness of habitat establishment and management.

To use the findings to guide remedial action where appropriate.

3.2. Baseline Conditions

3.2.1. The existing hedgerow network is a key green infrastructure asset and is to be retained and enhanced wherever possible.

3.2.2. Unless otherwise stated on the Hedgerow Removal Plan 5055-L-112 rev C accompanying the outline application, new gaps established will generally be a maximum of 12m to allow for Dormouse dispersal. Gaps in existing hedgerows will be reinforced with native species.

3.2.3. Hedgerows will continue to be managed, with the aim to ensure continued good structure. Hedgerows will be cut on rotation, so that not all are cut in any one year. This will encourage greater availability of winter forage for birds. Hedgerows will be laid on rotation to encourage greater structural diversity.

3.2.4. A scheme of new tree and shrub planting is to be undertaken throughout the green infrastructure as shown on the landscape proposals.

3.2.5. Existing trees outwith woodlands will be retained and safeguarded.

3.3. Success Criteria and Targets

1. All new hedgerows established and sustainable.
2. All existing hedgerows successfully laid in rotation and sustainable.
3. All new trees and shrubs established.
4. Observed use of new and existing features by wildlife.

3.4. Methods for Data Gathering and Analysis

3.4.1. Existing and newly established habitats will be subject to an annual walkover survey. The success or otherwise of habitat establishment and management will be noted. Areas where hedgerows or individual trees or shrubs have failed to establish successfully or where management is not proving effective will be recorded.

3.4.2. The walkover survey will be the responsibility of the management company, with input from the project ecologist and landscape architect as necessary.

3.4.3. Species monitoring to be undertaken as set out in the following sections will establish to what extent existing and new attenuation features are being used by wildlife.

3.5. Location of Monitoring

3.5.1. Monitoring will take place across the retained and newly established hedgerows, trees and shrubs within the site.

3.6. Timing and Duration

3.6.1. A walkover survey of all habitats will be undertaken on an annual basis by the management company. This will be an ongoing commitment that will extend beyond the lifetime of this strategy.

3.7. Contingencies and Remedial Action

3.7.1. Any habitats failing to establish will be subject to attention by the management company.

3.7.2. Watering will be required during periods of drought to ensure satisfactory establishment. Watering will be undertaken as required to maintain healthy plant growth.

3.7.3. Dead or diseased plants will be removed and replaced with the same species during the next growing season (i.e. October to March inclusive).

3.7.4. All remedial action will be the responsibility of the management company.

4. GRASSLAND

4.1. Monitoring Objectives

To assess effectiveness of habitat establishment.

To use the findings to guide remedial action where appropriate.

4.2. Baseline Conditions

4.2.1. The existing field margins are recognised to be of relatively higher botanical interest. These are to be retained and subject to ongoing management to maximise their botanical interest.

4.2.2. New areas of wildflower grassland are to be established throughout the Green Spine and Linear Park. These areas are currently principally intensive arable and improved grassland respectively. In conjunction with the drainage strategy, areas of dry and wet grassland will be established.

4.3. Success Criteria and Targets

1. All new grassland areas established and sustainable.
2. Botanical interest of existing field margins retained.
3. Observed use of new and existing features by wildlife.

4.4. Methods for Data Gathering and Analysis

4.4.1. Existing and newly established habitats will be subject to an annual walkover survey. The success or otherwise of habitat establishment and management will be noted. Areas where the habitats have failed to establish successfully or where management is not proving effective will be recorded.

4.4.2. The walkover survey will be the responsibility of the management company, with input from the project ecologist and landscape architect as necessary.

4.4.3. Species monitoring to be undertaken as set out in the following sections will establish to what extent existing and new attenuation features are being used by wildlife.

4.5. Location of Monitoring

4.5.1. Monitoring will take place across the retained and newly established grassland areas within the site.

4.6. Timing and Duration

4.6.1. A walkover survey of all habitats will be undertaken on an annual basis by the management company. This will be an ongoing commitment that will extend beyond the lifetime of this strategy.

4.7. Contingencies and Remedial Action

4.7.1. Any habitats failing to establish will be subject to attention by the management company.

4.7.2. Watering will be required during periods of drought to ensure satisfactory establishment. Watering will be undertaken as required to maintain healthy plant growth.

4.7.3. Dead or diseased plants will be removed and replaced with the same species immediately after identification.

4.7.4. All remedial action will be the responsibility of the management company.

5. ATTENUATION FEATURES

5.1. Monitoring Objectives

To assess effectiveness of habitat establishment.

To use the findings to guide remedial action where appropriate.

5.2. Baseline Conditions

5.2.1. The attenuation features of the site as proposed comprise a combination of existing drainage ditches and new attenuation basins. The existing drainage ditches are largely dry most of the time, and are associated with hedgerows and consequently generally overshaded.

5.2.2. For the most part the new and enhanced existing features will not be permanently wet, but some areas will be designed to retain water. The design of the attenuation basins throughout the linear park include small ponds designed to hold water, and a variety of shallow scrapes and channels, as well as embayments and spits. This diversity of slopes and banks offering varying water depths and retention will create a variety of micro-habitats for wildlife.

5.2.3. This will diversify the habitats present. Locally native aquatic and emergent species will be planted to encourage early naturalisation. Swales to be planted with appropriate mix of native species.

5.2.4. Newly established basins will be seeded with native damp grassland and tussocky grassland species mixes and managed appropriately.

5.2.5. Wetter areas will be planted with marginal species.

5.3. Success Criteria and Targets

1. Damp and dry grassland established and sustainable.
2. Marginal vegetation established and sustainable.
3. Observed use of new and existing features by wildlife.

5.4. Methods for Data Gathering and Analysis

5.4.1. Existing and newly established habitats will be subject to an annual walkover survey. The success or otherwise of habitat establishment and management will be noted. Areas where the habitats have failed to establish successfully or where management is not proving effective will be recorded.

5.4.2. The walkover survey will be the responsibility of the management company, with input from the project ecologist and landscape architect as necessary.

5.4.3. Species monitoring to be undertaken as set out in the following sections will establish to what extent existing and new attenuation features are being used by wildlife.

5.5. Location of Monitoring

5.5.1. Monitoring will take place across the retained and newly established attenuation features within the site.

5.6. Timing and Duration

5.6.1. A walkover survey of all habitats will be undertaken on an annual basis by the management company. This will be an ongoing commitment that will extend beyond the lifetime of this strategy.

5.7. Contingencies and Remedial Action

5.7.1. Any habitats failing to establish will be subject to attention by the management company.

5.7.2. Watering will be required during periods of drought to ensure satisfactory establishment. Watering will be undertaken as required to maintain healthy plant growth.

5.7.3. Dead or diseased plants will be removed and replaced with the same species immediately after identification.

5.7.4. All remedial action will be the responsibility of the management company.

6. BADGERS

6.1. Monitoring Objectives

To assess changes in Badger activity following establishment of new landscaping, infrastructure and public access, to guide remedial action where appropriate.

6.2. Baseline Conditions

6.2.1. Evidence of Badgers was identified at Sett S1 – which lies within a small group of trees in the north of the site – obtained through the use of camera traps and monitoring sticks in July 2019, although activity appeared to be low.

6.2.2. Sett S2 at the eastern edge of Great Field Plantation displayed no evidence of activity at the end of 2018. Evidence was recorded in May 2019, with a latrine and fresh bedding present within the vicinity of the sett. Surveys undertaken in September and October 2019 showed no recent activity at the sett.

6.2.3. Some evidence of Badger activity has been recorded on the boundary with the woodland off-site to the northwest, but there are currently no active setts in this location.

6.3. Success Criteria and Targets

1. Existing levels of Badger activity maintained.
2. No public interference at Badger setts or damage to proximal vegetation.
3. Recorded increase in Badger activity, defined as increased use of existing sett establishment of new setts.
4. Zero road traffic accidents involving Badgers.

6.4. Methods for Data Gathering and Analysis

6.4.1. Monitoring visits will be undertaken on a six-monthly basis, with the initial visit following completion of landscaping works associated with the Infrastructure RMA. Areas of known activity, such as Great Field Plantation, will be focused on, but all new and existing habitats will be assessed.

6.4.2. Surveys will note the presence of existing and new setts, including signs of use such as fresh spoil, bedding, hairs, etc. Badger latrines will be noted and mapped.

6.4.3. Responses to changes in habitat will be monitored. In particular, any apparent effects of public access to the woodland will be assessed.

6.4.4. The status and health of new planting in the vicinity of Badger setts will be checked, and any damage or disturbance noted.

6.4.5. Regard will be had to evidence of road traffic accidents, particularly in locations where new roads cross the infrastructure landscaping.

6.5. Location of Monitoring

6.5.1. Monitoring will focus on known centres of Badger activity as noted in the baseline conditions, but all new and retained habitats will be walked to take account of new activity.

6.6. Timing and Duration

6.6.1. Monitoring surveys will take place on a six-monthly basis for five years, with the initial visit following completion of landscaping works associated with the Infrastructure RMA. Surveys will be undertaken during favourable weather conditions, and can reasonably be undertaken at any time of year.

6.7. Contingencies and Remedial Action

6.7.1. Any damage to or disturbance of existing and / or new vegetation in the vicinity of the existing or newly excavated Badger setts will be made good by the management company as soon as reasonably possible after discovery. This will likely involve replacement planting. Consideration will be given to using signage if the problem persists.

7. BATS

7.1. Monitoring Objectives

To assess changes in bat activity following establishment of new landscaping, infrastructure and public access.

To monitor status of known existing bat roosts.

To monitor use of new bat boxes.

To use the findings to guide remedial action where appropriate.

7.2. Baseline Conditions

7.2.1. Bat activity surveys completed in October 2018 and April to October 2019 across the Redrow site recorded a generally low level of activity. Areas shown to be of greater interest for bats are Great Field Plantation and Hedgerow H4, crossing the south of the site. Species recorded during the activity surveys include Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Nathusius' Pipistrelle *Pipistrellus nathusii*, Noctule Bat *Nyctalus noctula*, Leisler's Bat *Nyctalus leisleri*, Serotine Bat *Eptesicus serotinus*, Brown Long-eared Bat *Plecotus auritus*, *Myotis* sp. and Barbastelle *Barbastella barbastellus*. The results of the activity surveys completed by to inform the ES in 2014 and 2015 across the wider site recorded a similar assemblage.

7.2.2. Several trees with potential roost features were identified by in 2014, three of which were found to contain roosts. A single Pipistrelle species hibernation roost was identified within tree T28. Trees T44 and T49 were identified as having bat roosts but the species were not identified from eDNA testing. Nocturnal surveys concluded that T49 was used as a roost by Soprano Pipistrelle.

7.2.3. An emergence survey of the bat roost trees mentioned above was completed in September 2019. No emergence was observed but early registrations for Common Pipistrelle and Soprano Pipistrelle recorded by trees T28 and T49 would suggest that roosts for these species are present close by.

7.2.4. The 2018/19 dataset, combined with the information from the outline ES, provides a robust baseline from which to assess the effectiveness of mitigation and enhancement measures. As far as possible, future monitoring surveys will replicate the approach taken for the 2018/19 work.

7.3. Success Criteria and Targets

1. Existing bat species diversity maintained.
2. No significant decline in bat activity levels.
3. Recorded use of dark corridors.

4. Recorded use of bat hop-overs.
5. Continued use of known existing roosts.
6. Recorded use of new bat boxes.

7.4. Methods for Data Gathering and Analysis

7.4.1. A series of transect surveys, static detector deployments and bat roost surveys will be undertaken, following the established procedures of the outline ES and the updated surveys being undertaken by Ecology Solutions in 2018 / 2019.

7.4.2. Field surveys will be undertaken with regard to best practice guidelines issued by Natural England (2004[1]), the Joint Nature Conservation Committee (2004[2]) and the Bat Conservation Trust (2016[3]).

7.4.3. Monthly surveys will be completed from April to October in odd years during the operation of this strategy, i.e. Years 1, 3 and 5 following completion of the landscaping works and ecological enhancements associated with the Infrastructure RMA.

Activity Transects

7.4.4. Activity surveys will be undertaken across a set route which covers the majority of the site. This will include the designated dark corridors as defined in the *Lighting Strategy for Bats* produced under Condition 44 and, as far as possible, replicate the transect routes for Ecology Solutions' updated surveys in 2018/19 (see Plan ECO3).

7.4.5. A series of point counts will be included in the transects. Point counts will include but not be limited to the location of new bat hop-overs in the landscape. The locations of these are shown on the landscape drawings produced by Exterior Architecture (as referenced in the Ecological Implementation Strategy and Landscape and Ecological Management Plan) and shown on the plan accompanying the *Lighting Strategy for Bats*.

7.4.6. The transects will commence at sunset and continue for two to three hours in order to maximise the encounter rate of bats i.e. both early and late emerging species. The echolocation calls of bats will be recorded on iPads paired with Echo Meter Touch 2 Pro bat detectors and analysed using Kaleidoscope software (or equivalent equipment and software).

7.4.7. The surveyors will observe the behaviour of any bat recorded, i.e. foraging or commuting, together with noting the species present and number of bats present at that location.

7.4.8. Surveys will be conducted when the night-time temperature are above 10°C. The insectivorous diet of bats means there is little or no food available

[1] Mitchell-Jones, A. J. (2004). *Bat Mitigation Guidelines*. English Nature, Peterborough.
[2] Mitchell-Jones, A.J. & McLeish, A.P. (Eds.) (2004). *Bat Workers' Manual*. 3rd edition. Joint Nature Conservation Committee, Peterborough.
[3] Collins, J. (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd Edition. The Bat Conservation Trust, London.

when temperature falls below this level and consequently levels of activity are low and may not accurately reflect the value of the site for bats. The weather conditions for the surveys will be recorded and any limitations noted.

Static Detector Deployments

7.4.9. Static bat detectors (SM4 or equivalent) will be deployed in the locations shown on Plan ECO3, i.e. the locations in which detectors have been deployed for Ecology Solutions' updated surveys in 2018/19, as far as is reasonable possible given security considerations. This will allow for more or less direct comparison between activity levels from before and after completion of landscaping works. Detectors will be deployed for a minimum of five nights per month between April and October inclusive. Accumulated data will be analysed using Kaleidoscope (or equivalent).

Emergence Surveys

7.4.10. Emergence surveys of existing known bat roosts (the trees noted above) will be undertaken on three occasions during the period from May to August / September inclusive. Trees will be observed from fifteen minutes before sunset until two hours after sunset. Surveyors will use SM4 detectors to record data, which will again be analysed using Kaleidoscope or equivalent. Records of bats emerging will be compared to the baseline data.

7.4.11. Where considered appropriate or useful, and where safe to do so, bat workers holding the necessary tree climbing qualifications will assess use of particular features.

Bat Boxes

7.4.12. Bat boxes will be checked by a licensed bat worker using a ladder in August annually for five years. Species and numbers present will be recorded. Where droppings are present these will be sent for DNA analysis if necessary. Each box will be numbered to allow accurate recording of data and comparison between years. A further check will be undertaken in March each year to ensure the box remains in situ.

7.5. Location of Monitoring

7.5.1. Monitoring will take place across the retained and newly created habitats within the site, focusing on the dark corridors as set out above.

7.6. Timing and Duration

7.6.1. Monitoring surveys will be completed monthly from April to October in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA.

7.6.2. Bat boxes will be checked in August annually for signs of occupation by bats. A further check will be undertaken in March annually to see that the box remains in situ. These checks will be undertaken for the lifetime of this strategy (five years).

7.7. Contingencies and Remedial Action

7.7.1. Bat species diversity and activity levels will be monitored as set out above, with a particular focus on the dark corridors. Should significant changes be observed, such as loss of species or declines in activity, steps will be taken where possible to address potential contributing factors. The lighting strategy is considered to be robust, but if unexpected adverse effects are being experienced lighting units will be investigated and repaired, modified or replaced if necessary.

7.7.2. Dispersal through bat hop-overs will be monitored. Should these not prove effective then remedial steps will be taken where possible. This may involve modification or replacement of lighting columns in the vicinity, new planting and / or replacement of existing planting.

7.7.3. Any damage to the vegetation comprising a bat-hop will be made good through replacement planting in the next planting season (i.e. October to March).

7.7.4. Similarly, any damage to vegetation in dark corridors will be made good during the next planting season.

7.7.5. Any damage or lighting columns, or malfunctions that affect the light spill, particularly where these are located close to foraging areas or dispersal routes, will be made good by the appointed contractor as soon as reasonably practicable.

7.7.6. It is accepted and understood that bats will move on to new roosting opportunities, and so if existing roosts are not found to be occupied in every year this should not necessarily be taken as evidence of an adverse effect. Nonetheless, if no occupation is observed in consecutive years, possible reasons for this will be considered and appropriate measures taken.

7.7.7. If bat boxes are found to be damaged they will be replaced as soon as reasonably practicable.

7.7.8. It is understood that bat boxes can take time to be found and used. If bat boxes are found to have no signs of use in the Year 2 check they will be relocated to a suitable tree under the supervision of a licensed bat worker.

8. OTTERS AND WATER VOLES

8.1. Monitoring Objectives

To monitor any use of the site by Otters.

To monitor any use of the site by Water Voles.

8.2. Baseline Conditions

8.2.1. No evidence of use by Otters or Water Voles has been recorded in the existing waterbodies across the Redrow site and the wider site, but this species is known to be present in the River Stour, and the Stour Brook south of the site.

8.3. Success Criteria and Targets

1. Recorded use of the site by Otters.
2. Recorded use of the site by Water Voles.

8.3.1. It is noted that no specific measures for Otters and Water Voles were defined the outline ES, simply that maintaining open watercourses could encourage their colonisation in time.

8.4. Methods for Data Gathering and Analysis

8.4.1. Otter surveys will be undertaken in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA. Surveys for Otters can be undertaken at any time of year, but generally this work will be undertaken in concert with that for Water Voles (see below). A suitably qualified ecologist will survey watercourses to identify field signs:

- Spraint – Irregular, sometimes short, rounded segments containing fish bones, scales or crayfish parts;
- Footprints of otters in soft substrates along the watercourse typically 8cm wide and 10cm long;
- Holts and couches on the banks of the watercourse; and
- Slides on the banks of the watercourse.

8.4.2. Surveys for Water Voles will be undertaken in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA, with surveys carried out from mid-April to the end of June and July to September inclusive.

8.4.3. As Water Voles are rarely seen, the surveys will be based around the identification of characteristic signs. The surveys will follow guidance by Natural England and consist of a close examination of all watercourses, waterbodies and banks up to two metres from the water's edge.

8.4.4. The following signs will be sought:

- Faeces - 8-12 mm long and 4-5 mm wide with blunt ends;
- Latrines - Water Voles will deposit the majority of their droppings at points of their territory boundary;
- Feeding Stations – Water Voles often bring pieces of cut vegetation to favoured feeding stations close to the water's edge;
- Burrows - Typically 4-8 cm in diameter and found in the river / ditch bank;
- Footprints of Water Vole in soft substrates along the ditches; and
- Water Voles that may be observed directly.

8.4.5. The condition of newly established and existing habitats will be monitored. Water levels in the Stour Brook tributary will be noted during survey work.

8.5. Location of Monitoring

8.5.1. Monitoring will take place across the retained and newly established waterbodies, watercourses and associated habitats across the site.

8.6. Timing and Duration

8.6.1. Monitoring surveys for Otters and Water Voles will be undertaken in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA. Surveys for Water Voles will be carried out from mid-April to the end of June and July to September inclusive, with checks for Otters carried out at the same time.

8.7. Contingencies and Remedial Action

8.7.1. Otters and Water Voles are currently not present within the site. Any signs of their presence would be viewed as a significant benefit of the scheme.

8.7.2. New planting will be replaced if damaged or failing, in the next available planting season.

8.7.3. In the unlikely event that water level of the Stour Brook are seen to have changed significantly from previously observed levels, a civil engineer will be instructed to determine the cause and to take such remedial action as necessary to return the levels to their former position. This would be to ensure that the opportunity for colonisation by these species remains available.

9. DORMICE

9.1. Monitoring Objectives

To monitor any use of the site by Dormice.

To monitor use of new Dormouse nest boxes.

To use the findings to guide remedial action where appropriate.

9.2. Baseline Conditions

9.2.1. A Dormouse nest was recorded in a survey tube along Hedgerow H13, west of Great Field Plantation during a survey undertaken in April 2019. No other evidence of Dormice has been recorded within the Redrow site. A partial Dormouse nest was recorded in the south-east of the wider site in 2015 during surveys to inform the outline ES.

9.3. Success Criteria and Targets

1. Recorded use of the site by Dormice in nest tube surveys.
2. Recorded use of Dormouse boxes.
3. Establishment and maintenance of habitats to encourage Dormice.

9.3.1. It is noted that no specific measures for Otters and Water Voles were defined the outline ES, simply that maintaining open watercourses could encourage their colonisation in time.

9.4. Methods for Data Gathering and Analysis

9.4.1. Monitoring surveys for Dormice will be undertaken in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA.

9.4.2. The survey technique involves the installation and checking of nest tubes and nest boxes within all habitats considered to be species-rich or of potential value to Dormice. The Dormouse nest tubes / boxes utilised will be those approved as standard by the Mammal Society.

9.4.3. Nest tubes / boxes will be placed in accordance with the guidance provided by the Mammal Society and Natural England. Typically, tubes are placed within scrub, hedgerows and woodland approximately every 20 metres where suitable locations can be identified. Nest boxes are placed at lower densities but in similarly selected locations as for nest tubes. The nest tubes will be attached with wire ties underneath suitably sturdy horizontal branches and positioned approximately 1.5 metres above ground level on average.

9.4.4. The survey will be scored for effort according to the method developed from the South West Dormouse Project and carried through in the second edition

of *The Dormouse Conservation Handbook* (English Nature, 2006[4]). The system provides an overall score that reflects the chances of Dormice being discovered if present, and thus provides an indicator of the 'thoroughness' of a survey. This score is based on the number of tubes used and the number of months the tubes are in place.

9.4.5. The months of the year are weighted according to the likelihood of recording Dormice, as set out in Table 10.1 below.

Month	Weighting
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

Table 9.1. Monthly Score Weighting for Dormouse surveys.

9.4.6. Generally speaking, the index of effort is calculated based on the use of 50 nest tubes as a standard minimum.

9.4.7. A score of 20 (or above) is deemed a thorough survey and a score of 15 to 19 may be regarded as adequate where circumstances do not permit more time or more tubes (particularly if other survey methods have also given negative results).

9.4.8. Dormouse nest tubes will be collected following completion of each survey round. Nest boxes will remain in situ. The locations of nest boxes will be carefully considered to avoid interference by the public.

9.4.9. New and existing hedgerows, woodland and scrub will be checked and made good where necessary through new planting in the next planting season.

9.5. Location of Monitoring

9.5.1. Monitoring surveys will take place across suitable retained and newly created habitats within the site, i.e. hedgerows, woodland and scrub.

9.6. Timing and Duration

9.6.1. Monitoring surveys will take place in Years 1, 3 and 3 following completion of the landscaping works associated with the Infrastructure RMA. Surveys will be undertaken from May to September inclusive to meet the threshold index of probability score.

[4] English Nature (2006). *The Dormouse Conservation Handbook*. English Nature, Peterborough.

9.6.2. Nesting boxes will be checked annually in March by a suitably experienced ecologist for the first five years following installation, to ensure that they are still in situ and are not damaged.

9.7. Contingencies and Remedial Action

9.7.1. Dormice are currently not present within the site. Any signs of their presence would be viewed as a significant benefit of the scheme.

9.7.2. New planting will be replaced if damaged or failing, in the next available planting season.

9.7.3. If bat boxes are found to be damaged they will be replaced as soon as reasonably practicable. Regard will be had to possible interference from the public.

10. BIRDS

10.1. Condition 45 specifically cites Skylarks as a species to be monitored, though it extends coverage to protected and priority species. The strategy therefore extends to all bird species, albeit there will be a particular focus on Skylark and other priority species.

10.2. Monitoring Objectives

To monitor use of the site by Skylark.
To monitor use of the site by other priority species.
To monitor use of the site by bird species in general.
To monitor use of bird boxes, including Swift towers.
To use the findings to guide remedial action where appropriate.

10.3. Baseline Conditions

10.3.1. Four wintering bird surveys were completed by Ecology Solutions in November and December 2018, and in January and February 2019. A total of 47 species were recorded, including 17 species that are listed as NERC species of principal importance, Suffolk LBAP and / or on the UK Birds of Conservation Concern Red and Amber list, as set out below:

Song Thrush *Turdus philomelos*
Skylark *Alauda arvensis*
Yellowhammer *Emberiza citrinella*
Kestrel *Falco tinnunculus*
Linnet *Carduelis cannabina*
Redwing *Turdus iliacus*
Stock Dove *Columba oenas*
Black-headed Gull *Chroicocephalus ridibundus*
Bullfinch *Pyrrhula pyrrhula*
Dunnock *Prunella modularis*
Mistle Thrush *Turdus viscivorus*
Starling *Sturnus vulgaris*
House Sparrow *Passer domesticus*
Reed Bunting *Emberiza schoeniclus*
Fieldfare *Turdus pilaris*
Mallard *Anas platyrhynchos*
Lesser Black-backed Gull *Larus fuscus*

10.3.2. Four wintering bird surveys were undertaken between November 2014 and February 2015 to inform the outline ES, recording a similar complement of species.

10.3.3. Three breeding bird surveys were undertaken by Ecology Solutions in April, May and June 2019.

10.3.4. Fifty species were recorded within or immediately adjacent to the site, including 18 species that are listed as NERC species of principal importance and / or on the UK Birds of Conservation Concern Red and Amber list, as follows:

Song Thrush *Turdus philomelos*
Skylark *Alauda arvensis*
Yellowhammer *Emberiza citrinella*
Kestrel *Falco tinnunculus*
Linnet *Carduelis cannabina*
Dunnock *Prunella modularis*
Mistle Thrush *Turdus viscivorus*
Starling *Sturnus vulgaris*
House Sparrow *Passer domesticus*
Reed Bunting *Emberiza schoeniclus*

Herring Gull *Larus argentatus*
Stock Dove *Columba oenas*
Black-headed Gull *Chroicocephalus ridibundus*
Bullfinch *Pyrrhula pyrrhula*
Fieldfare *Turdus pilaris*
Willow Warbler *Phylloscopus trochilus*
Lesser Black-backed Gull *Larus fuscus*
Tawny Owl *Strix aluco*

10.3.5. Of these species, singing males of Dunnock, Linnet, Yellowhammer, Skylark, Stock Dove, Reed Bunting, Song Thrush and Willow Warbler were all recorded within the site and are therefore categorised as possible breeders. The three gull species that were recorded were observed flying over the site and do not use the site itself to a significant degree, and there is no suitable breeding habitat for these species.

10.3.6. The only bird species that has been confirmed to successfully breed on site are Great Tits *Parus major*, with two nest sites recorded within Great Field Plantation. A pair of Yellowhammers were also seen mating in Hedgerow H17 indicating attempted breeding of this species within this area of the site.

10.3.7. Families of Great Tit, Blue Tit *Cyanistes caeruleus*, Jackdaw *Corvus monedula*, Bullfinch, Magpie *Pica pica*, Goldfinch *Carduelis carduelis*, Whitethroat *Sylvia communis*, Blackbird *Turdus merula* and Long-tailed Tit *Aegithalos caudatus* were recorded on site during the survey completed in June.

10.3.8. Confirmed breeders immediately adjacent to the site include Rooks *Corvus frugilegus*, Blue Tits, Common Moorhen *Gallinula chloropus* and Starlings. There is a large Rookery of approximately 33 nests within the deciduous woodland

10.3.9. Information from the breeding bird surveys is that a maximum of three Skylarks were recorded singing during any one survey. It is therefore taken that three territories are being held during the breeding season.

10.4. Success Criteria and Targets

1. Maintain three Skylark breeding territories.
2. Increase Skylark breeding territories to five.
3. Maintain existing species complement in breeding and wintering periods.
4. Occupation of Swift towers by this species.
5. Occupation of other bird boxes.

10.5. Methods for Data Gathering and Analysis

Breeding Birds

10.5.1. Three breeding bird surveys will be undertaken during suitable weather conditions between April and June in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA.

10.5.2. As far as is practicable, transects will follow the same route as used for the breeding bird surveys (see Plan ECO4), to allow for direct comparison.

10.5.3. All birds seen or heard within the survey area will be identified and recorded, as will their behaviour. Binoculars and a telescope will be used when necessary.

Wintering Birds

10.5.4. Four monthly wintering bird surveys will be undertaken between November and February in Years 1, 3 and 5 (or equivalent) following completion of the landscaping works associated with the Infrastructure RMA. Again, the transect route will follow that used for the most recent surveys as far as practicable (see Plan ECO4).

10.5.5. The surveys will commence at or soon after sunrise and will be performed in suitable weather conditions. The transect route will be chosen so that the entire site is covered and all features likely to support wintering birds are surveyed.

10.6. Location of Monitoring

10.6.1. Monitoring will take place across the retained and newly created habitats within the site. Transect routes will closely follow those used for the most recent surveys.

10.7. Timing and Duration

10.7.1. Monitoring will take place in Years 1, 3 and 5 following completion of the landscaping associated with the Infrastructure RMA.

10.7.2. Bird boxes will be checked periodically (at least once a year in March) for the first five years following installation, by a suitably experienced ecologist to ensure that they are still in situ and are not damaged. Swift towers will be checked with binoculars in June.

10.8. Contingencies and Remedial Action

10.8.1. Any damage to new planting will be made good through replacement during the next planting season.

10.8.2. If bird boxes are found to be damaged they will be replaced as soon as reasonably practicable.

10.8.3. It is not expected that long term declines in Skylark numbers would be observed, but if so consideration will be given to fencing off particular areas of tussocky grassland to encourage greater use during the breeding season.

11. REPTILES

11.1. Monitoring Objectives

To assess changes in reptile population sizes and distribution.

To use the findings to guide remedial action where appropriate.

11.2. Baseline Conditions

11.2.1. A presence / absence survey for reptiles has been completed from April to June 2019. The results of the surveys show that low populations of Grass Snake and Common Lizard are present, with the main areas of interest being Hedgerow H4 and the southern edge of the new plantation in the south of the site. The field margins to the north of Great Field Plantation were also seen to support small numbers of Common Lizard. These results are similar to those of surveys undertaken to inform the outline ES in 2014. That work also identified Slow Worm in the wider survey area, though not within the Redrow site.

11.3. Success Criteria and Targets

1. Maintain presence of Grass Snake and Common Lizard within the site.
2. Increase populations of Grass Snake and Common Lizard.
3. Record Slow Worm within the site in sustainable numbers.

11.4. Methods for Data Gathering and Analysis

11.4.1. Specific surveys for reptiles will be carried out in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA. Work will be undertaken between April and September inclusive. The methodology that will be utilised is principally derived from guidance given in Froglife Advice Sheet 10[5], the *Herpetofauna Workers' Manual*[6] and the Herpetofauna Groups of Britain and Ireland's (HGBI) advisory note[7].

11.4.2. Areas of suitable habitat will be surveyed for the presence of reptiles using artificial refugia ("tins"), 0.5m x 0.5m roofing felt tins will be placed within areas of suitable reptile habitat within the site.

11.4.3. The tins provide shelter and heat up more quickly than the surroundings in the morning and can remain warmer than the surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask under and raise their body temperature which allows them to forage earlier and later in the day.

[5] Froglife (1999) *Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.
[6] Gent, T and Gibson, S. (2003). *Herpetofauna Workers' Manual*. JNCC, Peterborough.
[7] Herpetofauna Groups of Britain and Ireland (HGBI). (1998). *Evaluating Local Mitigation / Translocation Programmes: Maintaining Best Practice and Lawful Standards*.

11.4.4. To determine presence / absence the tins will be checked for reptile activity over seven visits at appropriate times of the day (avoiding the middle of the day when the ambient air temperature is at its highest) in accordance with Natural England and other guidance. Optimum weather conditions for reptile surveying are temperatures between 10°C and 17°C, intermittent or hazy sunshine and little or no wind.

11.4.5. The status of new and existing grassland habitats, and of newly established hibernacula, will be checked on an annual basis for the five years covered by this strategy.

11.5. Location of Monitoring

11.5.1. Monitoring will take place across the retained and newly created habitats within the site.

11.6. Timing and Duration

11.6.1. Monitoring surveys will be undertaken in Years 1, 3 and 5 following completion of the landscaping works associated with the Infrastructure RMA.

11.6.2. Hibernacula will be checked annually for the first five years following installation, by a suitably experienced ecologist to ensure that they are still in situ and are not damaged.

11.7. Contingencies and Remedial Action

11.7.1. Should tussocky grassland not establish appropriately the landscape contractor will address the matter through examining ground conditions and re-sowing as necessary.

11.7.2. Hibernacula will be replaced or repaired as soon as reasonably practicable if found to be damaged. If damage persists then consideration will be given to relocating the feature to a less obvious location – this will be at the discretion of the project ecologist and the management company.

12. AMPHIBIANS

12.1. Monitoring Objectives

To monitor any use of the site by Great Crested Newts.

To monitor use of the site by other amphibians.

12.2. Baseline Conditions

12.2.1. No Great Crested Newts *Triturus cristatus* were recorded during earlier survey work in 2015. Additionally, there are no records for Great Crested Newts in the local area. Common Toads *Bufo bufo* and Smooth Newts *Lissotriton vulgaris* were recorded during Great Crested Newt surveys completed in 2014 and 2015. Ponds within the site and those within 500m were subject to eDNA testing in 2019 where permission was granted. The results of the eDNA testing were returned as negative.

12.3. Success Criteria and Targets

1. Maintain presence of Common Toads and Smooth Newts within the site.
2. Record Great Crested Newts within the site in sustainable numbers.

12.4. Methods for Data Gathering and Analysis

12.4.1. A single evening presence / absence survey will be undertaken of existing and newly established ponds during the peak Great Crested Newt survey season from mid-April to mid-May. Given the absence of existing records from the locality and negative recent survey results it is considered unlikely that they will be recorded, but this survey would allow assessment of the distribution of Common Toad and Smooth Newt populations.

12.4.2. The survey would take the form of an evening visit to survey the ponds will high-powered torches and deploy bottle traps. The following morning the traps would be checked and an egg search undertaken. These are the standard methods following guidance in *Great Crested Newt Mitigation Guidelines* (English Nature, 2001)[8].

12.5. Location of Monitoring

12.5.1. Monitoring will take place across the retained and newly created waterbodies within the site.

12.6. Timing and Duration

12.6.1. Monitoring surveys will take place in Years 1, 3 and 5 following completion of the landscaping works and attenuation features associated with the Infrastructure RMA. The survey will be undertaken during the peak Great Crested Newt survey season of mid-April to mid-May.

[8] English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough,.

12.7. **Contingencies and Remedial Action**

12.7.1. Any problems identified with water levels in existing ponds will be discussed with the management company and steps taken where appropriate to maintain their status.

12.7.2. In general no further remedial actions for amphibians are likely to be necessary.

13. INVERTEBRATES

13.1. Monitoring Objectives

To check new invertebrate features for signs of use, damage or disturbance, and take remedial action as necessary.

13.2. Baseline Conditions

13.2.1. Given the habitats present, it is likely an assemblage of common invertebrate species utilises the site, though the intensive arable management of the majority of the land will limit variety. There is no evidence to suggest that any rare or notable species would currently be present.

13.3. Success Criteria and Targets

1. Maintain new invertebrate habitats.
2. Encouraging greater invertebrate diversity.

13.4. Methods for Data Gathering and Analysis

13.4.1. Specific invertebrate survey work is not proposed, rather the focus of monitoring will be on qualitative observations of new invertebrate nesting features, in terms of their use by invertebrates.

13.4.2. The status of new and existing grassland habitats, and of newly established hibernacula, will be checked on an annual basis for the five years covered by this strategy.

13.5. Location of Monitoring

13.5.1. Monitoring will take place across the retained and newly created habitats within the site.

13.6. Timing and Duration

13.6.1. New invertebrate nesting features will be monitored on at least an annual basis during other survey visits to the site.

13.6.2. Newly established and existing habitats will be monitored as previously described.

13.7. Contingencies and Remedial Action

13.7.1. Should new wildflower grassland not establish appropriately the landscape contractor will address the matter through examining ground conditions and re-sowing as necessary.

13.7.2. Nesting features will be replaced or repaired as soon as reasonably practicable if found to be damaged. If damage persists then consideration will be given to relocating the feature to a less obvious location – this will be at the discretion of the project ecologist and the management company.

14. RESPONSIBLE PERSONS AND COMMUNICATION

14.1. Redrow Homes has ultimate responsibility for implementation of this monitoring strategy. The individual currently leading for Redrow Homes is Richard Franks, Senior Engineering Manager, and the responsibility for implementation will be his or that of his appointed successor.

14.2. It is the responsibility of the appointed individual at Redrow Homes to instruct appropriate experienced ecologists and / or landscape contractors to check the status of the various existing and proposed habitats and features described in this report.

14.3. Clear channels between these parties and their associates on the ground will be in operation at all times, by email and telephone as appropriate.

14.4. Redrow and the landowner will establish a joint management company to manage and maintain the public landscape areas of Great Wilsey Park. The management company will be responsible for the ongoing maintenance of areas of soft landscaping within public open spaces, attenuation basins and Great Field Plantation.

15. REVIEW AND PUBLICATION OF RESULTS

15.1. An annual monitoring report will be produced for five years following completion of landscaping works associated with the Infrastructure RMA. This will be delivered in November of each year.

15.2. The report will set out the findings of the monitoring work, which will be judged against the success criteria. Details of any remedial work undertaken will be set out, together with any revised objectives for the following year.

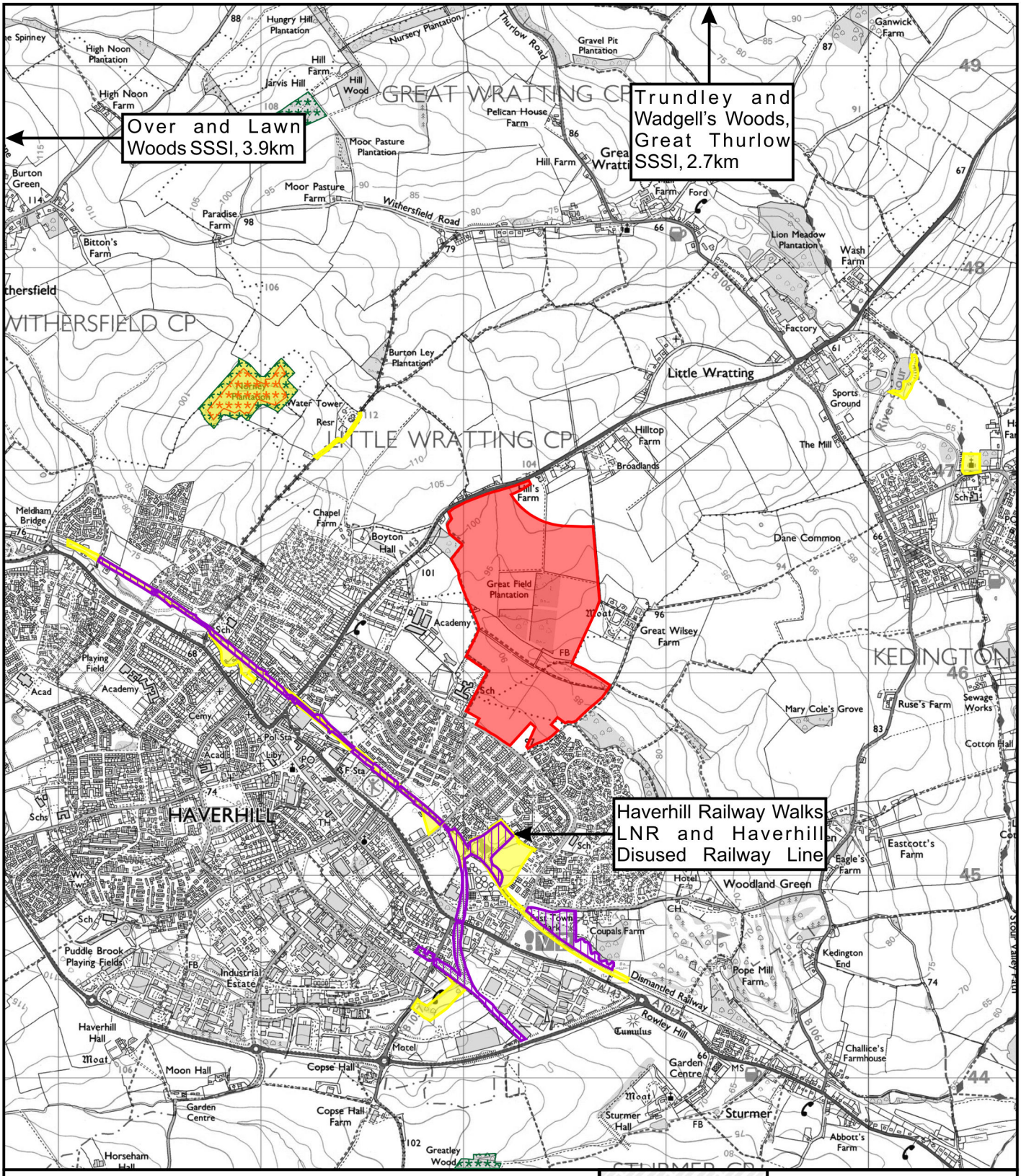
15.3. This Biodiversity Monitoring Strategy covers the first five years following completion of the landscaping and ecological enhancement works associated with the Infrastructure RMA. Following submission of the Year 5 monitoring report, further discussion will be held with the Local Planning Authority to determine the need for further monitoring work.

15.4. This is intended to be an iterative document. Objectives and success criteria will be reviewed annually and amended if required following discussion and agreement with the Local Planning Authority.

PLANS

PLAN ECO1

Site Location and Ecological Designations



KEY:

- SITE LOCATION
- LOCAL NATURE RESERVE (LNR)
- COUNTY WILDLIFE SITE (CWS)
- ANCIENT WOODLAND
- ANCIENT REPLANTED WOODLAND

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ECOLOGYSOLUTIONS
Part of the ES Group

Cokenach Estate
Barkway | Royston
Hertfordshire | SG8 8DL

+44(0)1763 848084
east@ecologysolutions.co.uk
ecologysolutions.co.uk

8110: GREAT WILSEY PARK, HAVERHILL

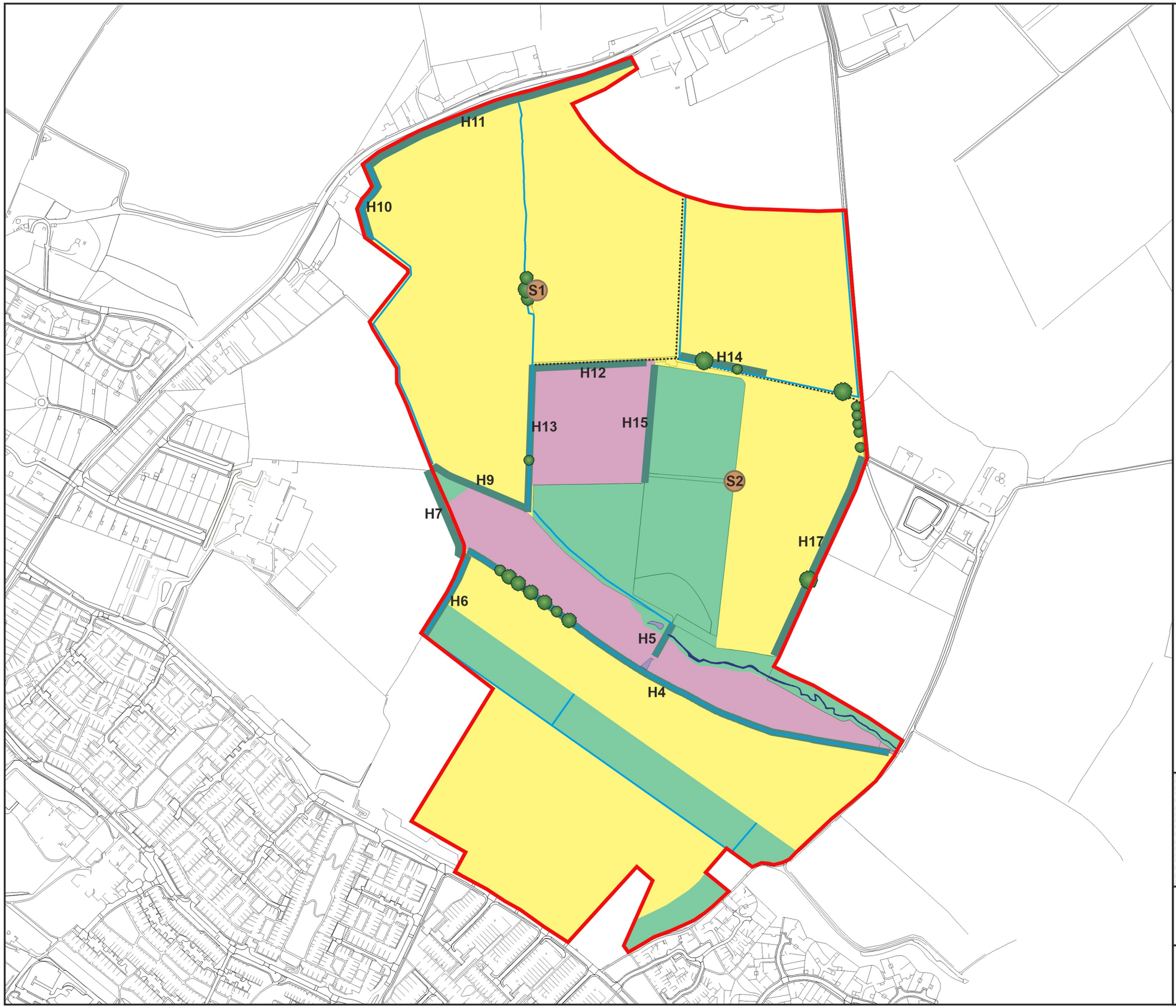
PLAN ECO1: SITE LOCATION AND ECOLOGICAL DESIGNATIONS

Rev: A

Jul 2019

PLAN ECO2

Ecological Features



KEY:

- SITE BOUNDARY
- ARABLE LAND
- WOODLAND
- IMPROVED GRASSLAND
- DITCH
- STOUR BROOK TRIBUTARY
- POND
- HEDGEROW
- TREE
- TRACK
- S1 BADGER SETT

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ECOLOGYSOLUTIONS
Part of the ES Group

Cokenach Estate
Barkway | Royston
Hertfordshire | SG8 8DL

+44(0)1763 848084
east@ecologysolutions.co.uk
ecologysolutions.co.uk

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PLAN ECO2:
ECOLOGICAL FEATURES

Rev: B

Dec 2019

PLAN ECO3

Approach to Bat Surveys

KEY:

- TRANSECT ROUTE
- CONFIRMED BAT ROOST
- BAT HOP-OVER
- BAT FORAGING ROUTES
- DARK CORRIDOR
- (1) STATIC DETECTOR

N

Based on Exterior Architecture Drawing No. ExA_1868_P_100 Illustrative Landscape Masterplan

ECOLOGYSOLUTIONS
Part of the ES Group

Cokenach Estate
Barkway | Royston
Hertfordshire | SG8 8DL

+44(0)1763 848084
east@ecologysolutions.co.uk
ecologysolutions.co.uk

8110: GREAT WILSEY PARK, HAVERHILL

PLAN ECO3:
APPROACH TO BAT SURVEYS

Rev: B

Dec 2019

PLAN ECO4

Approach to Bird Surveys

KEY:

TRANSECT ROUTE

N

Based on Exterior Architecture Drawing No. ExA_1868_P_100 Illustrative Landscape Masterplan

ECOLOGYSOLUTIONS
Part of the ES Group

Cokenach Estate
Barkway | Royston
Hertfordshire | SG8 8DL

+44(0)1763 848084
east@ecologysolutions.co.uk
ecologysolutions.co.uk

8110: GREAT WILSEY PARK, HAVERHILL

PLAN ECO4:
APPROACH TO BIRD SURVEYS

Rev: B

Dec 2019

ECOLOGYSOLUTIONS

Part of the ES Group

Ecology Solutions Limited | Cokenach Estate | Barkway | Royston | Hertfordshire | SG8 8DL

01763 848084 | east@ecologysolutions.co.uk | www.ecologysolutions.co.uk