

ECOLOGICAL MITIGATION AND ENHANCEMENT STRATEGY

Land at Arundel, Angmering



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REPORT

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1 INTRODUCTION

1.1 Purpose and scope of this report

1.1.1 RPS was commissioned by Redrow Homes to prepare an Ecology Mitigation and Enhancement Strategy (EMES) for a reserved matters application (ref. A/207/21/PL) at 'Land at Arundel', Angmering, Littlehampton, BN16 4ET.

1.1.2 This report supports the submission of a reserved matters application following the approval of application A/207/21/PL. A range of ecology surveys were undertaken across the site by CSA Environmental between 2017 to 2019.

1.1.3 The report specifically sets out updated survey work undertaken by RPS during 2021 and the mitigation measures that will be employed to avoid construction-phase impacts on retained habitats and species and safeguard the biodiversity interests. The report also details the ecological enhancements that will be provided as part of the development.

A range of ecology surveys were undertaken across the site by CSA Environmental between 2017 to 2019, including:

1.1.4

- Ecological Impact Assessment (CSA Environmental, 2019);
- Ecological Mitigation and Enhancement Strategy (CSA Environmental, 2019) a number of Phase 2 protected species were completed in support of the Ecological Mitigation and Enhancement Strategy.;
- Preliminary Ecological Appraisal (CSA Environmental, 2017/2018);
- Preliminary Roost Assessment (CSA Environmental, 2017);
- Phase 2 bat surveys (emergence/re-entry and activity surveys) (CSA Environmental, 2017/2018);
- Phase 2 hazel dormouse *Muscardinus avellanarius* surveys (CSA Environmental, 2017/2018);
- Phase 2 badger *Meles meles* surveys (CSA Environmental, 2018);
- Phase 2 reptile surveys (CSA Environmental, 2018); and
- Phase 2 great crested newt *Triturus cristatus* surveys (CSA Environmental, 2018).

1.1.5 In addition, update surveys were completed by RPS in 2021 including.

- Ecological Site Walkover (RPS, 2021).
- Phase 2 Protected Species Survey (RPS, 2021) which included update surveys for the following.
 - Dormouse surveys;
 - Bat emergence re/entry surveys Buildings B3 and B4;
 - Great crested newt Environmental DNA (EDNA) surveys; and
 - Badger surveys.

1.1.6 The site has been subject to a range of ecological studies during the planning process (CSA Environmental, 2017/2018 and RPS, 2021). These identified the site as supporting a number of foraging and commuting bats, roosting bats in Building B3 and Building B4, hazel dormice within the hedgerows, common and widespread reptiles, and an outlier badger sett within woodland.

1.1.7 Condition 23 in the Outline Planning Permission for the site (reference A/122/19/OUT) states that;

'Prior to the commencement of construction and demolition works a Schedule of Works shall be submitted to the Local Planning Authority for approval and will be based on the recommendations within the supporting Ecological Mitigation and Enhancement Strategy. All approved details shall then be implemented in full and in accordance with the agreed timings and details.

The Schedule of Works shall include but not be restricted to:

- *Timings for clearance of trees or scrub to avoid impacts on breeding birds;*
- *Grassland areas managed to benefit reptiles;*
- *Details of compensatory and additional tree planting;*
- *Details of compensatory boundary habitat planting and wildflower meadow planting;*
- *Details and locations of bat, bird, dormouse and invertebrate boxes, and log piles provided on the site;*
- *Measures to minimise the disturbance of badgers including details of a 20 metre buffer to the badger sett;*
- *Post development habitat management and dormouse population monitoring will include maintaining hedgerows and planting for the foreseeable future.*

Should the detailed layout of the site require the removal of further trees which have the potential to support bats, a climbed tree inspection survey will be required.

Reason: This condition is necessary to ensure the protection of wildlife and supporting habitat and secure opportunities for the enhancement of the nature conservation value of the site in line with national guidance and Policy ENV DM4, Policy ENV DM5 and Policy ENV SP1 of the Arun Local Plan. It is considered necessary for this to be a pre-commencement condition because of the need to ensure measures are in place to protect wildlife and habitats on site prior to any disturbance.'

1.1.8 This report sets out how potential impacts from the development, construction and operation will be addressed and provides details of ecological enhancement measures which will be delivered in line with the mitigation hierarchy set out in the British Standards BS 42020:2013, as per the steps below;

- Avoidance – Avoiding adverse effects through good design;
- Mitigation – Where impacts are unavoidable, mitigation should be employed to minimise adverse effects;
- Compensation – Where residual effect remain after mitigation, it may be necessary to provide compensation to offset any harm; and
- Enhancement – Maximise opportunities to deliver biodiversity benefits, which can be delivered alongside the above to resolve potential adverse effects.

1.1.9 This report therefore provides details of the ecological protection and mitigation and measures to be included as mitigation for the development, and to mitigate the impacts to the above receptors. It is split into sections detailing protection and mitigation measures for the various protected species.

1.2 Legislation and Policy

1.2.1 Relevant legislation, policy guidance and both Local and National Biodiversity Action Plans (BAPs) are referred to throughout this report where appropriate. Their context and application are explained in the relevant sections of this report.

1.2.2 The relevant articles of legislation are:

- The National Planning Policy Framework (NPPF, 2021);
- ODPM Circular 06/2005 (retained as Technical Guidance on NPPF 2021);
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;

- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Countryside and Rights of Way Act 2000;
- The Hedgerow Regulations 1997;
- The Natural Environment and Rural Communities Act 2006; and
- National / Local Biodiversity Action Plan for Arun.

1.2.3 A summary of legislation relevant to protected or other species identified as potential constraints in this report is provided in Appendix A.

1.3 Site Description

- 1.3.1 The application site is located on the northern edge of Angmering village, with recreational / amenity grassland to the immediate south. The site is accessed off Arundel Road.
- 1.3.2 The site is 9.1 hectares and at the time of survey was mixed use, comprising agricultural, industrial, and residential (Building B1). This residential building is approved for demolition as part of the outline application. Two oak trees within the western boundary are protected by a Tree Preservation Order (TPO).
- 1.3.3 Habitats on the site includes 16 existing buildings, hardstanding, semi-improved grassland, native hedgerow, scrub amenity grassland and one pond.
- 1.3.4 The site is immediately bound by Arundel Road to the east, existing sports pitches to the south, arable farmland to the west and broadleaved woodland to the north.
- 1.3.5 The wider landscape beyond this, to the north, west and east continues to be largely rural in nature with the A27 approximately 200 m north. Whilst to the south, lies existing sports pitches and a residential housing. The town of Angmering is to the south.
- 1.3.6 The main ecological constraints within the site as per previous surveys (CSA Environmental, 2017/2018 and RPS, 2021) are roosting bats, commuting/foraging bats, hazel dormouse, badgers, nesting birds and common and widespread reptiles.
- 1.3.7 In line with national and local planning policy, this strategy aims to minimise adverse effects on protected habitat and species during the construction and operation phases of the development. To meet this aim, the objectives have been set out for each protected species overleaf.

2 ECOLOGY RECEPTORS

- 2.1.1 In 2018, a Preliminary Ecological Appraisal (PEA) and following Phase 2 Surveys were carried out for reptiles, great crested newt (GCN), badger, bats and hazel dormouse. A Mitigation and Enhancement Strategy was produced by CSA Environmental in 2019 (CSA Environmental, 2019).
- 2.1.2 RPS conducted a site walk-over on the 7th July 2021 to assess if there had been any changes in conditions of existing habitats onsite since the previous surveys (CSA, 2018). Updating Phase 2 surveys were also undertaken for GCN, badger, bats and hazel dormice. The condition and size of reptile habitat had not altered; therefore, it was concluded that the population size reported of common reptile species was unlikely to have increased or decreased significantly. The key features within the site were broadly similar to those found in 2018 (refer to Figure 1) and comprised:
- Semi-improved grassland covering the central fields;
 - Tall ruderal vegetation and longer semi-improved grassland along the field boundaries;
 - Intact hedgerows and scattered mature trees;
 - Dense scrub in the northeast corner of the site; and
 - Agricultural, industrial, and residential (New Place Bungalow) buildings.

2.2 Reptiles

- 2.2.1 A small population of common lizard *Zootoca vivipara* was previously identified on site in 2018 (CSA Environmental). The ruderal field margins, dense areas of scrub bordered by grassland and hedgerows provide suitable habitat with the potential to support common and widespread reptiles. Habitats onsite also connect to suitable reptile habitat within the wider landscape offsite, providing wider ecological connectivity. Common reptile species include common lizard, slow worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*.

2.3 Nesting Birds

- 2.3.1 The scattered trees, scrub and hedgerows on site offer suitable nesting opportunities for a range of common bird species.

2.4 Badgers

- 2.4.1 No new evidence of badger was found during the 2021 survey (RPS). However, as the existing badger sett was identified as an outlier in June 2021, it is likely to be occasionally used and not fully active throughout the year.
- 2.4.2 The site contains suitable habitat for foraging and commuting badger and the site boundary is open to allow badgers access onto site from the adjacent surrounding habitat and wider area.

2.5 Hazel Dormouse

- 2.5.1 Dormice have been found onsite during surveys conducted in 2018 (CSA Environmental) and 2021 (RPS). Whilst evidence of dormice was found predominantly in the northern and eastern boundary hedges in the most recent surveys, these are connected to further hedgerows, on site scrub and the woodland off site to the north. Therefore, it is appropriate to assume dormice could be present in all suitable connecting habitat on site and within the wider area off site, and not restricted to hedgerows.
- 2.5.2 Habitats onsite with potential to support dormice included all hedgerows, scrub and the northern boundary tree line.

2.6 Bats

- 2.6.1 Buildings B3 and B4 were assessed for their suitability to support bat roosts during the surveys by CSA in 2018 and updated in the 2021 site walk-over by RPS. Each building was re-assessed from the outside and, where possible, the inside for evidence of bat roosts (droppings etc.) or any new features that could support roosts (slipped tiles, cavities in brick work etc.). Figure 1 shows the location of the buildings.
- 2.6.2 Previous bat emergence/re-entry surveys in 2018 by CSA Environmental, recorded bat roosts in Buildings B3 and B4 in 2018, with one roost present on each building; a single common pipistrelle *Pipistrellus pipistrellus* was seen emerging from under a ridge tile on Building B3 and a soprano pipistrelle *Pipistrellus pygmaeus* seen emerging from a gap in brickwork in Building B4.
- 2.6.3 Although no bats were recorded during the re-survey of these buildings in 2021 it is likely that bats will still utilise these roosts in the future. The roosts recorded were for crevice dwelling species and are categorised as summer day roosts for one or a few occupants and are not likely to support large numbers of individual bats per roost. In the active period, pipistrelle species are known to utilise several day roosts opportunistically, and bats are a highly mobile species that can start to roost in locations that are suitable even if they have not done so historically.
- 2.6.4 **An application for a Natural England Low Impact Class licence for bats will be required for historical roosts recorded in Buildings B3 and B4.**
- 2.6.5 Building B1, B2 and B14 have high, moderate, and low potential to support roosting bats respectively. The recommended updating Preliminary Roost Assessment (PRA) surveys were not completed this season due to there being no safe access available for RPS surveyors to survey the buildings.
- 2.6.6 It is therefore recommended that internal and external inspections are completed as soon as access is available. It is also recommended that these buildings are left intact until it is established if they have roosting potential, and if any evidence of use of bats is present; work commencing on these buildings or within the vicinity of these buildings will not commence until these surveys have been completed. If any other buildings are found to have evidence of bat presence following internal inspections, these will also require emergence/re-entry surveys.
- 2.6.7 This inspection should be carried out prior to the application for any mitigation licence pertaining to bats, as the presence of roosts could potentially alter the baseline requirements for the licence.
- 2.6.8 Habitats present onsite, in particular scrub, all hedgerows and the tree line along the northern boundary, support foraging and commuting bats. Under the current development proposals, no trees considered to hold potential roosting opportunities for bats will be removed or directly impacted.

3 POTENTIAL IMPACTS IN THE ABSENCE OF MITIGATION

3.1 Overview

- 3.1.1 Habitats onsite were in the same or similar condition as noted in the previous Ecological Mitigation and Enhancement Strategy (CSA Environmental, 2019). The potential impacts of both the construction and operational phase were assessed within the Ecological Impact Assessment (CSA/3467/07). A summary of those potential impacts is provided below.

3.2 Construction Phase

- 3.2.1 The construction phase for the whole site will comprise the following:

- Cessation of arable cultivation;
- Demolition of existing buildings;
- Limited removal of hedgerows;
- Removal of scrub in northeast corner of the site;
- Removal of small garden pond P1;
- Clearance of semi-improved grassland, amenity grassland, tall ruderal/ colonising ground vegetation;
- Construction of residential dwellings, associated gardens, parking, access infrastructure;
- The creation of formal amenity playing fields including new tree and hedgerow planting;
- Planting of the buffer strip, including thicket, woodland belt planting and wildflower seeding;
- Construction of a Sustainable Urban Drainage System (SUDS) including an attenuation basin set within the POS to the north- west of the developed area; and
- Strengthening of boundary vegetation with new native species planting as part of the 5 m buffer zone.

- 3.2.2 The construction related to the commercial units is within outline planning and therefore not detailed above.

Potential Impacts

- 3.2.3 In the absence of mitigation, the construction phase has the potential to result in the following impacts:

- Pollution through dust, run-off, and artificial lighting, which could negatively impact retained habitats, the woodland to the north of the site, and other habitats downstream of the site;
- Loss of all arable habitat onsite, which may provide a foraging resource for a range of invertebrates, mammals and birds;
- Loss of three species-rich hedgerows (H1, H4 and H9), a species-poor hedgerow (H7), and a small number of trees;
- Loss of semi-improved grassland, tall ruderal, and scrub habitat to construct new dwellings, resulting in a temporary loss of habitat for foraging bats, badgers, and nesting birds and terrestrial habitat for reptiles and amphibians (until proposed planting matures);
- Loss of small amount of aquatic habitat through removal of pond P1.
- Demolition of onsite buildings, which includes the loss of two buildings with confirmed bat roosts (B3 and B4).

- Risk of killing/ injury to bats, dormice, badgers (and other mammals), nesting birds, reptiles and amphibians during vegetation clearance and proposed construction.

3.3 Operational Phase

3.3.1 As per the previous EMES report (CSA Environmental, 2019), the operational phase will comprise the following:

- Occupation of new residential dwellings;
- Increase in human activity, including use of vehicles and presence of domestic pets;
- Increased artificial lighting and anthropogenic noise;
- Management of retained and newly created habitats.

3.3.2 In the absence of mitigation, the operational phase has the potential to result in the following impacts:

- Increase in ambient lighting, and subsequently decrease in suitability of habitats for bats and other light-sensitive species;
- Increased risk to wildlife from killing/ injury through traffic collisions, becoming trapped drains and predation from domestic cats; and
- Increased disturbance through recreational use of on site habitats, which may deter some species from breeding successfully on site.

3.3.3 In the absence of mitigation, the proposed development could have an adverse impact on bats, through roost loss/ disruption of foraging habitat. However, this effect is predicted to be limited to a site level given the small number of minor confirmed roosts and focus of bat activity within retained habitats to the north and west.

3.4 Reptiles

3.4.1 Without suitable mitigation and working methods, the proposed development could have adverse impact of the population status of present reptile species as well as having the potential to injure, harm or kill individuals.

3.5 Nesting Birds

3.5.1 Without mitigation in place, the timing of works has the potential to cause harm, injury or even death to nesting birds and their young. Disturbance to birds is most likely to occur during the construction phase during habitat removal, or during the operational phase during any habitat management.

3.6 Badgers

3.6.1 An outlier badger sett was located on site, along the western boundary. The construction phase and layout of the operational phase could cause soil compaction and damage to the badger sett. If found to be active, the related works could cause harm, injury or death to badgers within the outlier sett. Precautionary pre-works check, and the protection of a buffer zone will be implemented if the sett is found to be active that will ensure no injury or disturbance will come to badger.

3.6.2 In the absence of mitigation, further construction activities could cause harm, injury or death to commuting and foraging badgers on site. Precautionary measures to ensure safe working methods have been provided to protect commuting and foraging badgers.

3.7 Hazel Dormouse

- 3.7.1 The proposed development will result in the loss of c. 0.4ha of scrub and hedgerows (c. 335 m in total length) of Local importance to dormice to allow creation of the primary site access and provide room for development. This will result in a permanent loss of suitable nesting and foraging habitat (more than compensated for by new planting), and temporary reduction in habitat connectivity until new planting matures.
- 3.7.2 There is the potential for direct impacts to this species during the construction phase, as vegetation clearance activities may result in an offence whereby dormice are injured, killed or disturbed and/or their breeding or resting places are damaged or destroyed. During the operational phase dormice may be at greater risk of predation due to domestic cats, and traffic collision.
- 3.7.3 Overall, in the absence of mitigation, the proposed development could have the potential for adverse impacts on dormice significant at the local level.
- 3.7.4 Under the Development Framework Plan, the proposed development will result in the loss of c. 0.4ha of scrub and hedgerow (c. 335 m in total length) to allow creation of the primary site access and provide room for development. In the absence of mitigation this could result in direct impacts to and habitat loss for dormice.

3.8 Bats

- 3.8.1 Under the current development proposals, no trees considered to hold potential roosting opportunities for bats will be lost. However, two buildings confirmed to support low numbers of common and soprano pipistrelle bats (B3 & B4) will be demolished. Three further buildings (B1, B2 and B14) with potential to support roosting bats will be subject to further inspection and surveys and may also result in loss of roosting features suitable for bats.
- 3.8.2 During the construction phase, foraging and commuting habitat will be lost in the east and north-east of the site as hedgerows, scrub, trees, grassland and the pond are removed. This will reduce habitat connectivity from Steyne Wood to the north, through the site to the woodland across Arundel Road to the east.
- 3.8.3 However, significant amounts of buffer planting along the edge of Steyne Wood will be planted, and the majority of the site boundaries, strengthening commuting routes. In addition, new meadow planting and a Suds basin will provide a variety of foraging habitats.
- 3.8.4 During the operational phase, ambient light levels could be increased due to artificial street lighting, although it should be noted that significant floodlighting is currently in place within the industrial park.
- 3.8.5 In the absence of mitigation, the proposed development could have an adverse impact on bats, through roost loss/ disruption of foraging habitat. However, this effect is predicted to be limited to the site level given the small number of minor confirmed roosts and focus of bat activity within retained habitats to the north and west.

4 PROTECTION, MITIGATION AND COMPENSATION MEASURES

4.1 Habitats

- 4.1.1 Best practice general environmental protection measures will be employed throughout construction to minimise potential risks and to react to any incidents that could result in environmental damage.

Retention and Protection

- 4.1.2 All construction will strictly adhere to a Construction Environmental Management Plan (CEMP). The CEMP will minimise the impact to on site habitats from the construction phase, including but not limited to disturbance, noise, dust and run-off.
- 4.1.3 Retained habitat at the boundaries of the site will also be subject to protection through the installation and maintenance of fencing to prevent indirect damage or disturbance, in line with BS 5837:2012 trees in relation to design, demolition and construction - Recommendations (BSI, 2012).
- 4.1.4 The layout has been designed to protect retained individual trees and their root systems. All site materials will be stored outside of the Root Protection Areas (RPAs) of all retained trees/ hedgerows. No construction activities related to the development will be carried out within Root Protection Areas.
- 4.1.5 These measures will be detailed within a Tree Protection Plan, to be agreed with Arun District Council as part of detailed planning consent. The habitat buffers will help to further reduce potential impacts to retained vegetation.
- 4.1.6 The lighting scheme during the construction and operational phase will avoid unnecessary spill of light onto retained habitats and the 5 m buffer will be utilised as a dark corridor, this will benefit habitats and is detailed in full below in Section 4.6 as part of the sensitive lighting scheme pertaining to bats.

Habitat Creation

- 4.1.7 The majority of retained habitat will comprise of hedgerows and scattered trees and a retained 5 m buffer strip will be implemented along northern, western, and southern boundaries of the site. The 5 m green buffer strip contains approximately 0.17 ha of existing and retained hedgerow, the additional area of c.0.4 ha will include woodland belt planting and thicket planting.
- 4.1.8 The area around the Suds pond (not including the basin) of 0.2 ha will be seeded with wildflower mix. Within the residential scheme, native trees will be planted with scope for additional planting in the Landscape and Ecology Management Plan (LEAP).
- 4.1.9 A total of 1369 m of existing hedgerow on site will be retained. The remaining 335 m of hedgerow will be removed as part of the proposed development. It is recommended that 250 m of hedgerow be planted along the northern border of the proposed amenity fields in the south half of the proposed development, to compensate for the loss of intact native hedgerow. The newly planted hedgerow will comprise of native fruiting and flowering species and include enough species to be classified as native species rich; the newly planted hedgerow species composition will include at least six of the following species:
- Hawthorn (*Crataegus monogyna*);
 - Blackthorn (*Prunus spinosa*);
 - Guelder rose (*Viburnum opulus*);
 - Spindle (*Euonymus europaea*);
 - Crab apple (*Malus sylvestris*);

- Holly (*Ilex europaeus*);
- Hazel (*Coryllus avellana*);
- Field maple (*Acer campestre*); and
- Buckthorn (*Rhamnus cathartica*).

4.2 Reptiles

- 4.2.1 Due to the presence of common and widespread reptile species onsite and within habitat immediately adjacent the site with suitable reptile habitat present, the clearance of habitats will be timed to avoid the most sensitive period for reptiles during their hibernation period (November to March inclusive) and a phased approach to vegetation removal will be implemented to naturally encourage reptiles from the site and to avoid causing injury to any reptiles onsite.
- 4.2.2 Although a protected species licence is not required for sites supporting the common and widespread reptile species, in order to comply with legislation habitat manipulation methods are recommended in order to avoid killing and injury. These methods involve reducing the suitability of the habitat for reptiles and therefore encouraging them to move out of the area to adjacent suitable habitat.
- 4.2.3 As only a small number of reptiles are present within habitats to be lost, and habitat to be retained includes suitable habitat for reptile species, a full translocation exercise is not considered warranted in this instance. Instead, habitat manipulation and displacement into retained habitat is considered appropriate and proportionate mitigation to minimise the risk of harming individuals. Where suitable reptile habitat will be lost, the following approach will be taken to minimise the risk of killing / injury of individuals:
- Habitat manipulation will be used to displace reptiles into the retained habitat, including hedgerows and grassland along the northern boundary;
 - Vegetation clearance will be carried out under an ecological watching brief and during warm, dry weather conditions to ensure reptiles have the best chance of dispersing away from harm. Vegetation removal is provided above; and
 - Retained habitat will be enhanced through creation of log piles and hibernacula to raise its carrying capacity, and ensure that the denser population can be supported, details of these are provided below in Section 5.

Timing and Working Methods

- 4.2.4 Any potential hibernacula or refugia encountered should be carefully dismantled by hand during the active period (with and ECoW present. Suitable hibernation habitat (bases of hedgerows and scrub base/below ground) and refugia such as log piles, rubble and tree stumps will not be removed during the winter. During the reptile active period (March – October) any hibernacula will be dismantled by hand with an Ecologist Clerk of Works (ECoW) present to perform hand searches prior to and during the dismantling, with any animals found moved to adjacent suitable habitat.
- 4.2.5 If the cutting of vegetation is required during the reptile active period, a cut to 30 cm above ground level (no lower) would be required at least 24 hours prior to works to encourage animals to leave the area. It would be strimmed directionally, towards retained habitat (i.e. site boundary hedgerows) to encourage any reptiles present to move out of the way of the cut, towards retained habitat.
- 4.2.6 A second cut to ground-level (<75 mm) would be undertaken under the supervision of an ECoW at least 24 hours later to provide time for animals to move away from the works area. All cut material would be raked off and removed from the site.
- 4.2.7 Following strimming, a destructive search of all suitable reptile habitat would take place to establish a bare ground working area. The topsoil would be progressively stripped under the supervision of

the ECoW. Any potential hibernacula or refugia would be carefully excavated using a wide-toothed digger bucket that would gently lift the features under the guidance of an appropriately experienced ECoW, who would be present to capture any reptiles disturbed by the process and relocate them to suitable retained habitat around the boundaries of the site. The removal of topsoil during the destructive search must be conducted outside of the hibernation period in suitable weather conditions (continuous temperature overnight of >5°C).

- 4.2.8 Where required, any sections of species-poor hedgerow or any areas of bramble or scrub will be removed between September and February outside of the bird nesting season, or subject to inspection by an ecologist in advance of cutting back to confirm the presence/absence of active bird nests.
- 4.2.9 Following the destructive search, the land will be maintained as unsuitable for recolonisation by reptiles prior to the start of construction in these areas.
- 4.2.10 Vegetation clearance would be undertaken at a time of the year when animals are active (i.e. between March to October, depending on local weather conditions) and during suitable weather conditions for them to be mobile (i.e. reasonably warm with no rain). This method may require consideration to nesting birds within the core nesting season (March – August inclusive). Areas to be cut during the bird nesting season and reptile active period will be searched by an ECoW before any cutting commences.
- 4.2.11 Any reptiles that are caught during the clearance process can be moved into safe, suitable adjacent habitat away from the works area.

Habitat Creation, Mitigation and Compensation

- 4.2.12 The proposed development will result in a loss of habitat suitable for reptiles, as c. 0.4ha of scrub and hedgerows, c. 0.2ha of tall ruderal vegetation and c.1.8ha of grassland of limited suitability for reptiles will be removed. This will be mitigated for through new planting, including seeding of c.0.2ha native species- rich wildflower meadow around the Suds pond, c. 0.4ha of new native thicket / woodland belt planting within the retained 5 m buffer strip, additional planting along the southern boundary and the creation of hibernacula and log piles within the 5 m buffer strip.

4.3 Nesting Birds

- 4.3.1 The majority of suitable foraging, dispersal and nesting habitat for birds will be retained within the 5 m buffer strip of retained hedgerows and retained trees will be protected during construction. Habitat loss will be mitigated for through replacement planting (detailed above), with scope for additional planting in residential parcels.
- 4.3.2 All active bird nests will be protected during site clearance and construction activities during the construction and operational phase of the proposals. Protective fencing will be installed between the boundary hedgerows and the construction areas to protect any nests from damage.
- 4.3.3 During the main bird nesting season (March 1st to August 31st inclusive) clearance or pruning of any vegetation with the potential to support nesting birds, such as scrub, hedgerows, trees, buildings, long grass and tall ruderal vegetation, will be subject to pre-clearance nesting bird checks by an ECoW no more than 48hrs prior to removal.
- 4.3.4 Nests and the activity of adults indicating the presence of a nest would be searched for in the area of clearance. Where the vegetation is too dense to confirm the absence of a nest, the ECoW will direct the site staff to carefully cut back the vegetation in stages to enable a comprehensive inspection.
- 4.3.5 Where checks by the ECoW have confirmed the absence of nests, the vegetation would be cut down to ground level within 24 hours. Should an active nest be encountered, the nest must be left undisturbed. The ECoW will define an exclusion zone around active nests, using line marker paint

and / or barrier tape. No works will be permitted within the exclusion zone until the ECoW confirms the nest is no longer in use.

4.4 Badgers

- 4.4.1 A pre-work check of the outlier sett that is located on the site boundary, will be required within 2 months before the start of any proposed works. The check will be conducted by a suitably experienced ECoW.
- 4.4.2 If the sett is deemed to be active, then a buffer of 20 m will be required to be maintained. No construction works, storage, site traffic or soil compaction is permitted within this buffer zone. The buffer zone will be enforced and demarcated by heras fencing. The badger sett is located along the boundary of the site, should a 20 m buffer be required around the sett, it will be incorporated within the proposed green buffer and wider landscaping.
- 4.4.3 If the layout for the scheme is altered or the sett is required to be closed (as it is found to be active), it will require closure under a Natural England licence depending on the proximity of construction work and likelihood of disturbance from the works footprint. If closure is required, the monitoring data will be sufficient for a Natural England disturbance licence application for sett closure.
- 4.4.4 The following measures will be implemented to ensure that no badgers are harmed during the construction phase:
- Heras fencing to be erected around all construction works to exclude foraging badgers from the works areas;
 - Any excavated or natural holes, trenches or pits dug during construction will be fenced off and all holes will either have a mammal ramp provided (sturdy ramp or wide plank of wood) or be fully covered overnight to avoid individuals becoming trapped inside;
 - In the event that badgers are found to be trapped or injured within the site no attempt should be made to approach the badger and the RSPCA should be contacted immediately.
 - Any chemicals to be securely stored at night in a locked container;
 - In order to avoid attracting badgers to the works area any food waste must be disposed of in appropriate bins or removed from site at the end of each day;
 - Due to the inquisitive nature of badgers any litter, tools and machinery that could potentially harm badgers should be kept away from badgers with appropriate overnight storage; and
 - Avoid presenting new digging opportunities for badgers, e.g., by leaving stockpiled soil on the edge of the development for prolonged periods.

4.5 Hazel Dormouse

- 4.5.1 Dormice have been recorded on site, suitable habitat which supports dormice will be impacted by the proposed development. Therefore, an EPSML application for hazel dormouse will be required prior to the commencement of any works related to the proposed development.
- 4.5.2 Requirements for a future licence application are detailed below, including recommended measures to avoid disturbance during and post construction and habitat management (in Section 6).

Licence Requirements

- 4.5.3 The proposed development scheme includes the provision of compensatory habitat for dormice, including the provision of c. 0.4 ha of new native thicket and woodland belt planting and the provision of 20 dormouse nest boxes on retained boundary vegetation. The installation of these boxes will be advised by a suitably qualified and licensed ecologist and the indicative location for boxes is shown on Figure 1.

- 4.5.4 The EPSML application will include the proposed works and measures relating to the suitable dormouse habitat. No works will be undertaken until a licence has been granted by Natural England. Licence applications will be written and submitted on receipt of planning permission. Timings of all licensable activities will be programmed to minimise disturbance impacts. The works will be undertaken at times of year in order to minimise the disturbance to dormice that could be disturbed by the works.

Working Methods & Timings

- 4.5.5 The proposed vegetation clearance is considered to be limited in its extent to sections of scrub and 335 m of hedgerow (~25% of the total hedges on site) and mitigation through displacement of any residential animals is the most appropriate option. This is deemed more suitable than a full translocation method. To clear the scrub in the north-east corner and centre of the site and relevant hedgerows, the below working methods will be followed to persuade any dormice present to re-locate into retained habitat and avoid potential killing, injury and disturbance of any dormice.
- 4.5.6 Works will be subject to seasonal constraints and will adopt the recommended standard two-stage clearance methodology as recommended within the Mitigation and Compensation Methods Section of the Dormouse Conservation Handbook.

Stage 1

- A toolbox talk will be provided to contractors by the licensed ecologist.
- Removal of surface vegetation to no lower than 30 cm above ground level between November to February inclusive (typically accepted as the core dormouse hibernation period). This cut height is recommended to avoid impacts to dormice which may be hibernating at ground level within habitats to be removed.
- Clearance will be carried out in a set direction, moving progressively towards retained habitat, to encourage dormice to disperse into it. If retained habitat is present on both sides of the habitat to be cleared (i.e. the hedgerow and scrub in north-east corner), clearance will begin in the centre and work outwards in both directions. If retained habitat is present in only one direction, clearance will begin at the furthest point from the retained habitat and work towards it.
- Habitat removal works will be undertaken sensitively using hand-held tools, under a close watching brief provided by a suitably qualified ecologist, to minimise any potential impacts to hibernating animals. Should any dormouse nests be found during these works they will carefully be removed and placed within areas of habitat to be protected during the construction phase. On emergence from hibernation dormice will be able to disperse into retained habitat.
- All material and arisings from the vegetation clearance will be carefully removed from the cleared areas so as not to provide additional nest building habitat for dormice in summer months.
- Any existing piles of vegetation or logs within the habitat clearance will be left and dismantled by hand between May and September, outside of the hibernation period (to avoid potential impacts to hibernating animals) by a suitably qualified and licensed ecologist.
- If vegetation is cleared during winter months, care will be taken to protect hibernating dormice on the ground by utilising a single drag- line route, along which vegetation is removed. This route may be checked for dormice and/or cleared of vegetation beforehand, if necessary.

Stage 2

- A toolbox talk will be provided to contractors by the licensed ecologist.
- A second stage of clearance will take place after the end of May to remove any remaining vegetation, to ensure no food source suitable for dormice (e.g. bramble flowers and fruit) re-establishes within the development area. The ECoW will check over the remaining habitat

before the vegetation removal and hand search during the clearance to ensure no trapped reptiles or dormice within the remaining vegetation.

- Vegetation will be cleared under an ecological watching brief (ECoW present) and in stages, first to a height of 10 cm and then gradually cleared to ground level to allow any reptiles which may be present to disperse. As with stage 1, the stage 2 clearance will be carried out in a set direction, moving progressively towards retained habitat, to encourage dormice to disperse into it.
- Any potential hibernation features left during the first stage of clearance will be dismantled by hand. The first stage of clearance will also have ensured that impacts to nesting birds are avoided which would otherwise be likely at this time of year. This stage of work will also be subject to an ecological watching brief.

4.5.7 The following measures will also be adhered to:

- Vehicular access to the site will follow existing tracks and avoid any unnecessary movement over on-site vegetation where possible.
- A single route to and from the clearance area for all vehicles and machinery will be designated and used at all times. As clearance will be carried out in the winter during Stage 1, it may be required for track matting to be applied to the site route to avoid on site traffic hazards due to site conditions.

Construction and Operational Phase

4.5.8 The measures provided for retained and enhanced habitats during the construction and operational phases detailed for bats in Section 4.6 are applicable also for hazel dormouse.

Habitat Retention and Creation

4.5.9 The majority of hedgerows will be retained in the proposed development, maintaining habitat connectivity along the northern, western and southern boundaries.

4.5.10 Retained boundary vegetation will be buffered by a 5 m strip that includes thicket planting and woodland belt planting (totalling c.0.4ha). A new 250 m of species rich hedgerow planting is also recommended along the northern boundary of the proposed amenity fields. Additional planting will be included along the southern boundary.

4.5.11 Planting specifications will be provided at the detailed planning stage. However, to ensure good habitat provision will include native species of benefit to dormice, such as hazel *Corylus avellana* and black thorn *Prunus spinosa*, which provide suitable food resources and a dense shrubby understorey.

4.5.12 Twenty dormouse nest boxes will be installed on retained mature trees along the site boundaries, to provide additional nesting opportunities. These will be positioned at a height of at least 1.5 m above ground level, far from public areas to minimise the risk of disturbance. Indicative locations for these boxes have been provided on the Ecological Mitigation and Enhancement Strategy Plan (Figure 1).

4.5.13 A site visit will be undertaken, by the project ecologist, to confirm that the mitigation proposed is undertaken to the agreed specification.

Sensitive Lighting Scheme

4.5.14 In line with policy ENV SPI, to maintain habitat suitability for dormice, light spill onto suitable habitat will be minimised through design of a sensitive lighting scheme, to be detailed at the Reserved Matters planning stage. The scheme will aim to achieve a maximum light-spill of 1 lux onto the

woodland edge to the north and retained boundary vegetation, following the same principles as that set out in section 4.6 for bats.

- 4.5.15 In the first instance, lighting columns to be erected alongside mature trees and hedgerows will be aligned and the height carefully considered so as to minimise light spill onto these habitat corridors. Luminaires will be selected with spectral specifications which minimise impacts to nocturnal fauna. Directional light sources and shielding, including anti-glare shields, louvres and cowls, will be used as a last resort to minimise light spill.
- 4.5.16 Where light spill onto retained or created habitats cannot be avoided additional mitigation measures, such as restricting the time periods when lighting is turned on, should be applied to ensure that retained habitats do not become fragmented by light disturbance.

4.6 Bats

Licence Requirements

- 4.6.1 As roosting bats are present in Buildings B3 and B4, demolition of these buildings will take place under a European Protected Species (EPS) licence. Given the low conservation status to of the roosts identified and the single or low occupancy use of the roosts available, EPS licencing can be achieved with an EPS mitigation licence for bats, or an application for a Low Impact Bat Class licence.
- 4.6.2 The inspection of three additional buildings (Buildings B1, B2 and B14) may alter the baseline requirements for the Low Impact Class Licence. However, whichever licensing approach is chosen, the following mitigation and compensation measures will be implemented as part of the scheme and secured by EPS licence as appropriate.
- 4.6.3 Application for the licence will be made once full (Reserved Matters) planning consent has been obtained and all relevant conditions have been discharged. The application will be made following additional surveys conducted on Building B1, B2 and B14.

Working Methods

- 4.6.4 To minimise the risk of killing or injury of roosting bats during the demolition of Buildings B3 and B4, the following working methods will be used (and detailed within the mitigation licence application for Natural England):
- A toolbox talk will be given to the site manager and contractors involved prior to the start of works to inform them of the procedures to be taken pertaining to the impacted buildings and bats. This be delivered by the named ecologist or an accredited agent listed on the licence;
 - As mitigation for the loss of bat roosts 10 bat boxes (Schwegler 2FN or similar; four as mitigation and six as enhancement) will be installed on retained mature trees along the site boundaries (indicative locations shown on Figure 1);
 - The mitigation boxes will be installed before demolition commences, so that in the event a bat is found during demolition, it can be moved to a bat box. The remaining boxes will be installed during the construction period;
 - Immediately prior to demolition, a bat licensed ecologist will complete a final internal inspection and detailed external inspection of Buildings B3 and B4;
 - A licensed bat ecologist will supervise the soft strip of key areas of Buildings B3 and B4 which could conceal bats, focusing on the areas where bat evidence has previously been observed (i.e. lifted ridge tiles of Building B3 and hole in brickwork of Building B4); and
 - A licensed bat ecologist will check any crevices suitable for bats that are exposed as part of these works, using an endoscope and a high-powered torch, as necessary. This approach will minimise the potential for disturbance, killing or injury of bats.
- 4.6.5 If bats are found, the bat licensed ecologist will secure any individuals by hand and place them in a breathable holding bag for immediate relocation to one of the bat boxes on site. Care will be taken to move the bat quickly and with minimal handling and the box will be monitored to ensure the bat does not exit during the day. The soft stripping of the building will not re-commence until the bat licensed ecologist has completed the box monitoring and resumed to supervise the works.
- 4.6.6 Once the relevant roof areas and features have been stripped under supervision, the remainder of the demolition will then continue without the supervision of an ecologist. In the unlikely event that any bat is found during any of the subsequent demolition work, contractors must immediately stop work on that building and contact RPS ecologists, or the named ecologist on the mitigation licence, for advice.

Timing of Works

- 4.6.7 Under Natural England guidelines, given the low conservation value of the roosts involved there is no requirement to restrict the timing of works. However, as the roosts present are summer roosts, it is recommended that to minimise the risk of killing, injuring or disturbing roosting bats, demolition works be undertaken in winter.

Construction Phase

- 4.6.8 During the construction phase, foraging and commuting habitat will be lost in the east and north-east of the Site as hedgerows, scrub, trees, grassland and the on site pond are removed. This will reduce habitat connectivity from Steyne Wood to the north, through the site to the woodland across Arundel Road to the east.
- 4.6.9 However, the 5 m buffer around the retained boundaries, surrounding the Suds basin, along the edge of Steyne Wood and planting in the southern boundary hedgerow will include highly suitable and targeted buffer planting, strengthening commuting routes. In addition, new meadow planting and the Suds basin will provide foraging habitats.

Operational Phase

- 4.6.10 During the operational phase, ambient light levels could be increased due to artificial street lighting, although it should be noted that significant floodlighting is currently in place within the industrial park. The 5 m buffer strip will be retained as a dark corridor and the lighting scheme will incorporate features to ensure the protection of retained and newly created habitats, further details for the operational phase are listed below.

Habitat Retention and Creation

- 4.6.11 The majority of habitat currently utilised by bats for foraging and commuting will be retained, with significant a 5 m buffer from the new development being created and maintained as a dark and ecology corridor with thicket and woodland belt planting totalling 0.4 ha. The new 0.2 ha of wildflower meadow seeding around the proposed Suds basin will also be of value to bats due to the invertebrate prey they will support. The new planting will strengthen habitat connectivity around the site and provide additional habitat around the new roosts to be created.
- 4.6.12 The light spill onto habitat used by commuting and foraging bats will be minimised through design of a sensitive lighting scheme, detailed below.

New Roost Creation

- 4.6.13 To mitigate for the loss of roost locations, four replacement bat boxes (Schwegler 2FN or 2FN-DFP, suitable for pipistrelle species) will be installed in pairs on retained mature trees as close to each roost to be lost as possible. The bat boxes will be mounted on south-east to south-west aspects, close to suitable foraging habitat, away from possible access by domestic cats (e.g. window ledges, fences), and positioned at a height of between 3 m to 6 m. Indicative locations for these boxes have been provided on the Ecological Mitigation and Enhancement Strategy Plan (Figure 1).

Lighting Scheme

- 4.6.14 In order to protect the context of the boundary hedgerows and trees, the lighting scheme for the final development will adopt the following parameters set out in the guidelines published by the Institute of Lighting Engineers (ILP, 2018). This will maintain habitat suitability for bats, the sensitive lighting scheme will be implemented throughout the construction phase and operational phase as follows unless a different standard is required by Mid Sussex District Council or Highways Authority for adoptable roads.
- 4.6.15 Lighting will be installed where it is strictly needed for safety, and as low as guidelines permit.

- 4.6.16 The design will avoid the backlighting of boundary habitats and upward light spill through appropriate lighting specifications, the positioning of columns and angling of lighting units. Where possible LED lamps in the warm white spectrum (2700K to 3000K) will be used.
- 4.6.17 If essential lighting is needed near trees for safety, the lighting units will be positioned to avoid light spill on the tree and ensure that the trunks remain completely unlit.
- 4.6.18 The establishment of dark corridors on the 5 m buffer strip along boundaries of the completed development will maintain their ecological integrity as wildlife corridors and avoid any decline in their value for faunal species including foraging bats and nesting birds.
- 4.6.19 The measures provided below are in concurrence with the Bat Conservation Trust and the Institution of Lighting Professionals Guidance Note on Artificial lighting and Bats (2018).

Construction Phase:

- Illumination of retained boundary vegetation and mature trees will be avoided, wherever practicable, during low light conditions;
- On site lighting during construction will not be left on overnight, where possible;
- In instances where illumination is necessary the intensity and duration will be kept to a minimum; and
- Down lighting will be used where possible.

Operational Phase

- Lighting throughout the Site will be kept to a minimum and installed on motion sensors or timers where practicable;
- Direct and indirect illumination of the boundary vegetation and mature trees will be avoided where possible;
- Down lighting will be used throughout to minimise light spill and sky glow;
- Lighting to be installed on the Site will conform with the following spectral specifications, in accordance with BCT (2018);
- LED luminaires used where possible;
- No metal halide fluorescent sources;
- Minimal emission of ultra-violet light;
- Warm white spectrum (ideally <2700Kelvin where possible) with peak higher than 550nm;
- Luminaires with 0%upward light ratio and good optical control;
- Careful consideration of column heights to minimise light spill;
- Bollard / low level downward directional luminaires where required; and
- As a last resort, accessories such as baffles, hoods or louvres to minimise light spill.

4.7 Other Species – Precautionary Measures

Amphibians

- 4.7.1 There is a small garden pond on site (Pond P1) and five within an appropriate distance that could support amphibians. The hedgerows, scrub and field margins provide suitable terrestrial habitat for amphibians. Survey results indicate GCN are likely absent from the site.
- 4.7.2 An attenuation basin will be created as part of a Suds system, which will include a permanent core. The banks will be seeded with species-rich wildflower mixes to provide suitable terrestrial habitat, and the wet core will be planted with native aquatic and marginal species to provide suitable aquatic habitat.

- 4.7.3 The proposed development scheme is considered to offer significant scope for the provision of compensatory habitat for amphibians (i.e. through new planting, of SuDS basin, log piles), and subject to sensitive working practices/ seasonality of vegetation works direct impacts could be avoided and the favourable conservation status of these species maintained.
- 4.7.4 The above methods for habitat clearance for reptiles will also be applicable to common amphibian species. In the unlikely event that GCNs are found on site during any works, works must halt until the procurement of a Natural England EPSML pertaining to GCN and advice of a licensed ecologist will be followed.

5 ECOLOGICAL ENHANCEMENT

5.1 Aims

- 5.1.1 As per the previous EMES (CSA Environmental, 2019), compensation and enhancement measures for protected species relevant to the construction and operation phases of development, are set out herein to address the following aims and objectives:
- Compensate /offset any residual impacts from development where this is not possible through impact avoidance and mitigation measures;
 - Undertake habitat creation which will be in line with national and local planning policy;
 - Provide habitat enhancement features of benefit to Section 41 species known to be present on site / locally;
 - Provide long-term benefits for wildlife during the operational phase through suitable habitat delivery and management; and
 - Ensure that habitat management practices ensure that the value of retained and newly created habitats are maximised through the implementation of a suitable Landscape and Ecology Management Plan (LEMP).

5.2 Habitats

- 5.2.1 The development will include a range of habitats of wildlife value, including boundary hedgerows, gardens, trees and landscaped grassland. The landscaping scheme will use native tree and hedgerow species. Night-scented flowering plants will be included to encourage foraging bats to use the site, post-development.

- 5.2.2 Although outside the control of Redrow Homes, once the properties are occupied, the residents will develop a range of garden types. Flowering plants will benefit invertebrate diversity and abundance and provide enhancement compared to the existing site. The popularity of wildlife friendly gardening should increase the proportion of new residents that incorporate features of value for wildlife.

Native Grassland Creation

- 5.2.3 As per the previous EMES (CSA Environmental, 2019), the proposed scheme will provide the scope for new wildflower meadow planting (c. 0.2ha) surrounding the attenuation basin/ Suds pond. The ecological value of retained areas of existing grassland and new species-rich native grassland seeding will be increased through the implementation of appropriate management to be secured through a LEMP.

Hedgerow and Buffer Strip Planting

- 5.2.4 The proposed scheme will include new tree planting with native species of known benefit to wildlife selected to maximise the biodiversity value, such as oak *Quercus robur*, hawthorn *Crataegus monogyna* and blackthorn.
- 5.2.5 New trees and thickets will be planted throughout the 5 m buffer strip, along with areas of longer grassland to create a mosaic effect throughout the buffer strip. This will benefit invertebrates, reptiles and amphibians in particular by creating open basking opportunities and refuge areas. Foraging resources will also be increased for dormice, bats and birds.
- 5.2.6 Within the proposed development, the use of native tree and hedgerow planting shall be incorporated into areas of more formal planting as appropriate. This will provide benefits in terms of habitat connectivity and ecological resources across the proposed development.

5.3 Reptiles

- 5.3.1 In addition to the mitigation planting and seeding of new habitat, enhancements for reptile species include the creation of five wood log piles from wood fallen or felled on site, with supplementary wood if required, and the creation of one hibernaculum.
- 5.3.2 The log piles will be stacked in existing grassland habitat, in unshaded position, preferably south facing. Log piles to be formed from native arisings following tree felling, or locally sourced native hardwood. The logs will be tied and pegged down with wire to ensure the structure is maintained and will be located within the 5 m buffer strip, see Figure 1 for indicative locations.
- 5.3.3 The one hibernaculum will be created under ecological specification to provide hibernation habitat for amphibians and reptiles. The design mimics artificial and natural conditions in which herptiles have been found over wintering. Dimensions should not be below 2m length x 1m width and 1m height. Hibernacula should be placed on free draining surfaces, with the fill located in an excavated depression in the ground above the flood line. Topsoil turf will be retained, and the depression will be filled in mixed spoil rubble, logs, sleepers, brick etc). The base will then be capped with the excavated soil and topped with the topsoil sod. A diagram for hibernacula construction can be seen in Appendix B.
- 5.3.4 Reptile enhancements will also provide opportunities for amphibians and saproxylic invertebrates and small mammals.

5.4 Nesting Birds

- 5.4.1 As per the previous EMES (CSA Environmental, 2019), the loss of nesting opportunities for bird species in the on-site buildings that will be demolished, will be compensated for and enhanced with the provision of a variety of artificial, purpose-built nest boxes. A total of 10 bird boxes will be installed into new buildings within the development (NHBS integrated starling box, terraced sparrow box, and swift box or equivalent; refer to Appendix B), to provide compensation for loss of nesting bird habitat.
- 5.4.2 An additional 10 wood Crete nest boxes (IMR Avianex nest box, or equivalent; see Appendix B) will be mounted on trees throughout along the site boundaries as ecological enhancements. These will be located in sheltered areas close to retained / new planting and away from new external light sources. All bird boxes will be located with a broadly north-facing aspect away from direct sunlight and prevailing winds, at a height of c.2-4 m above ground level and away from areas which could be accessible by predators (e.g. domestic cats). Details of will be provided within the LEMP, indicative locations on Figure 1.

5.5 Hazel Dormouse

- 5.5.1 In addition to the provision of dormouse nest boxes, the planting of additional native fruit or nut bearing tree and shrub planting within the proposed development will increase the availability of suitable habitat for dormice as the planting establishes and matures. The planting should be completed in areas connected to existing and retained hedgerow habitat with a screening buffer from any residential properties.
- 5.5.2 This will offer both increased habitat area but will also maintain and strengthen all existing habitat linkages, ensuring that all parts of the site remain accessible to the species.

5.6 Bats

- 5.6.1 In addition to the four Schwegler 2FN bat boxes for mitigation, an additional six Schwegler 2FN bat boxes (specifications in Appendix B) will also be mounted on mature trees along the retained site boundary. Boxes will be mounted at a height of at least three metres, with an unobstructed access point and on a southerly aspect where possible, facing away from the prevailing winds. Each bat

box will be installed flush with the tree or beneath a rendered surface in a location that will be unlit from artificial lighting.

- 5.6.2 Additional bat enhancements include 10 Habibat 001 bat bricks or Schwegler 1FR bat tubes (specifications in Appendix B) that will be incorporated into buildings at suitable locations provided by a licensed bat ecologist. These will be located in sheltered areas close to retained/ new planting and away from new external light sources.
- 5.6.3 Details of the locations and specifications of new bat roost enhancement features will be provided within the LEMP with indicative locations provided in Figure 1.
- 5.6.4 The landscaping proposals for the development will include native planting of fruit or nectar –bearing and night-scented plants, such as night-scented jasmine *Casdtum noctornum*, evening primrose *Oenothera* spp., or tuberose *Poluanthes tuberosa*. This additional planting will help attract night-flying insects and therefore providing a regular source of food for foraging bats.

5.7 Other Species

Invertebrates and Amphibians

- 5.7.1 The installation of three invertebrate boxes will be provided within the proposals as an enhancement and dead wood created through habitat management will be retained on site and used to create log or brash piles. Reptile enhancements of log piles and one hibernaculum will also provide ample foraging and nesting opportunity for amphibians and invertebrates. Locations will be detailed in the LEMP.

Hedgehog

- 5.7.2 The residential gardens will be potential habitat for hedgehogs, a species of principal importance with a rapidly declining UK population.
- 5.7.3 To ensure the majority of new residential gardens are accessible to hedgehogs, small 100x100 mm gaps will be created in the base of solid fence lines dividing gardens.
- 5.7.4 Adult hedgehogs typically require large home ranges and the proposed access gaps in the fences will ensure that individual hedgehogs can move throughout the site, significantly increasing the availability of food and shelter in the occupied residential development.
- 5.7.5 Additionally, the incorporation of five hedgehog houses will be placed at the base of retained hedgerows, within the 5 m new habitat buffer strip, along the northern boundary adjacent to woodland off site to the north. Indicative locations for the hedgehog houses are shown on Figure 1.

6 MANAGING AND MONITORING

6.1 Management

6.1.1 As per the previous EMES (CSA Environmental, 2019), basic prescriptions for habitat management of retained and newly created semi-natural habitats have been set out within this report as appropriate, for targeted protected species, where they are relevant to the required mitigation for the proposed development. Full management details will be provided alongside detailed development proposals in the CEMP and LEMP, that will include the following:

- Details of habitat types and areas to be provided;
- Planting and seeding specification;
- Details of management for both establishment of new habitats and ongoing management, with details of at least the first 10 years of management to be set out;
- A works schedule detailing annual management actions; and
- Details of management responsibilities and funding.

6.1.2 The agreed LEMP shall be submitted, alongside EPS licence applications for bats and dormice as applicable and its implementation shall secure long term habitat provision and enhancement for these species.

Hedgerows

6.1.3 Management for hedgerows will be set out within the LEMP and agreed with Arun District Council at the detailed planning stage. Hedgerows will be sensitively managed for the benefit of wildlife, including dormice, bats badger and reptiles and shall take account of ecological constraints such as the bird nesting period (March to August inclusive), reptile active season (March to September inclusive). Cutting intervals will be lengthened to allow flowering and fruiting, and to maintain their value as dispersal routes.

6.1.4 Any tree, scrub and hedgerow management carried out during the bird breeding season (March to August inclusive) will be subject to pre-works inspections by a suitably qualified ecologist and any active nests protected.

6.1.5 Hedgerows will be subject to cutting back annually or bi-annually in October to maintain a dense structure to the base. The hedgerows will be cut with a bladed tractor mounted cutter (or equivalent) and will not be flailed.

6.1.6 Alternative sides of the hedgerow will be cut over winter (Dec-Feb) at 3 to 5 year intervals in order to maintain the availability of flowers and fruits and to prevent hedgerows becoming outgrown and defunct.

Scattered Trees

6.1.7 The retained mature trees have high biodiversity value in the context of the site, typically supporting a diverse assemblage of species. The trees will be allowed to continue to mature.

6.1.8 Deadwood features will be retained where there are no significant for the health and safety issues. Crown reduction or thinning would be a last resort measure where there are no other options to avoid unnecessarily impacts on species and biodiversity.

6.1.9 The status and health of the mature trees will be subject to periodic review. Should surgery become unavoidable due to tree health or stability; the tree would be subject to pre-works bat/nesting bird survey by a suitably qualified ecologist. Appropriate actions would be taken to ensure compliance

of the proposed with wildlife legislation and all surgery would be completed in accordance with BS:3998.

Grassland

- 6.1.10 Species rich native grassland areas and newly seeded wildflower grassland around the Suds pond will be managed as meadow habitat, with a single hay cut taken in August or September depending on the species mix allowing sufficient time for flowering and seeding.
- 6.1.11 Grass cutting and clearance of encroaching scrub will be in line with reptile mitigation measures as appropriate, to ensure that opportunities for reptiles and amphibians continue to be provided across the site in the long term.
- 6.1.12 The value of these areas of informal open space shall be maximised by the use of pesticides being avoided to ensure that healthy invertebrate (eg. worm/ mollusc) populations thrive which provide an important foraging resource for badgers, bats, birds, reptiles, amphibians and other small mammals.
- 6.1.13 The grassland around the Suds pond will be maintained with a dense and tussocky sward, and thicket planting adjacent will provide cover and foraging resources for reptiles. Appropriate management measures which seek to avoid adverse impacts to reptile species will be set out within the LEMP and be agreed at the detailed planning stage, but key principles are summarised below:
- Existing grassland and hedgerow bases will be retained where possible;
 - Following establishment, some areas of grassland will be left to grow long during the summer, with a hay cut taken in late summer to lower than 150mm;
 - Cutting within long grassland must occur during suitable weather conditions (warm and sunny, temperature at least 10°C) to minimise the risk of harming reptiles;
 - Low intervention scrub management will help to maintain open grassland areas for basking reptiles which will involve annual strimming back of encroaching scrub in late autumn;
 - Cuttings from habitat management will be raked up and used to create habitat/litter piles, which will provide refuge, foraging and egg laying resources for reptiles and other faunal species. These will be placed sporadically along the edge of the 5 m buffer and surrounding the western and northern edge of the Suds pond; and
 - Access routes and planting around the Suds pond will be sensitively designed with an aim to minimise disturbance from walkers and dogs and limit their access.

6.2 Monitoring

- 6.2.1 As per the previous EMES (CSA Environmental, 2019), a programme of monitoring shall be included within the LEMP to ensure that the success of mitigation and management can be measured, and measures will be amended as necessary to achieve the objectives set out within this report. The monitoring framework shall cover the following:
- Planting - success of new planting to inform replacement as necessary;
 - Habitat Assessment - to assess the biodiversity value of habitat delivered in relation to the pre-development baseline; and
 - Protected Species - species specific surveys as appropriate where specific mitigation and compensation measure have been provided to inform further mitigation action requirements and in line with any Natural England / EPS licencing requirements.
- 6.2.2 A monitoring report will be provided to the Local Planning Authority and species records sent to Sussex Biodiversity Records Centre (SxBRC) annually.

Hazel Dormouse

- 6.2.3 A site visit, by the project ecologist, will need to be undertaken to ensure that the mitigation proposed is undertaken to the agreed specification (e.g. installation of dormouse boxes in appropriate locations) and in line with the EPS licence.
- 6.2.4 Monitoring of the dormouse boxes is proposed to occurring years 1 and 3 post-development with monitoring checks undertaken in May, August and September each year. The results will be used to inform future appropriate and proportionate management if necessary and will be reported to Natural England, the local records centre (SxBRC) and any local recognised recording groups.
- 6.2.5 Liaison with any local recording groups (i.e. Sussex Mammal Group) will be beneficial to ensure that monitoring of the boxes is undertaken in the longer term past the initial period detailed in the LEMP and EPS licence application.
- 6.2.6 Confirmation that the measures outlined and secured by EPS licence have been completed will be provided in the form of a licence return to Natural England upon completion of the works, along with a short report to the Local Planning Authority.

Bats

- 6.2.7 A site visit, by the project ecologist, will need to be undertaken to ensure that the mitigation proposed is undertaken to the agreed specification (e.g. installation of bat boxes in appropriate locations) and in line with the EPS licence.
- 6.2.8 As the bat roosts to be lost in Buildings B3 and B4 are of low conservation significance, no formal post-development monitoring is required (BCT, 2016). However, under good practice guidelines, one formal check of the installed bat boxes will be undertaken by a licensed ecologist within year 1 or 2 (during the period May to August) following completion of the works to see whether they have been utilised by any bat species and if not, then whether any changes are required.
- 6.2.9 Confirmation that the measures outlined and secured by EPS licence have been completed will be provided in the form of a licence return to Natural England upon completion of the works, along with a short report to the Local Planning Authority.

7 IMPLEMENTATION

- 7.1.1 Redrow Homes will be responsible for the delivery and implementation of the mitigation and enhancement measures specified in this report.
- 7.1.2 Redrow Homes will instruct an ECoW to support with the implementation of measures requiring specialist supervision as defined in this report, and where applicable, the ECoW must be suitably qualified and/or licensed.
- 7.1.3 The site contractor team will document and photograph the implementation of the mitigation and enhancement measures in a simple log maintained during the construction of the site supported by photographs. The ECoW will provide Redrow Homes with details of all works undertaken under their supervision.

8 CONCLUSIONS

Habitats

- 8.1.1 Mitigation, compensation and enhancements provided have ensured that any loss of habitat will be mitigated for by replacement planting and management of new habitats will maximise their potential to support protected species.
- 8.1.2 Precautionary measures and methods of working are detailed for reptiles, breeding birds, badger, hazel dormouse and bats, including the application of EPS mitigation licences for hazel dormouse and bats. Licensed works along with all measures detailed in this report are provided with best practice guidance for working with protected species and will reduce the risk of harm, injury or death to the relevant protected species.
- 8.1.3 Enhancements provided will benefit the site and increase ecological opportunities for protected species. The inclusion of new habitat with specific management and the installation of nest boxes (for dormice, bats and birds) and refugia for reptiles and amphibians provides ample opportunities for protected species within the retained habitat on site.

Hazel Dormouse

- 8.1.4 The proposed mitigation approach is in line with requirements for loss of dormouse habitat as set out within the Dormouse Conservation Handbook) and is compliant with Natural England EPS licensing requirements. In addition, new habitat creation and provision of a sensitive lighting strategy shall ensure provision of breeding, foraging and commuting habitat for dormice.
- 8.1.5 Appropriate management of this habitat provision will be detailed within a LEMP, to include species population monitoring in line with Natural England EPS licensing requirements. These measures shall ensure that the local population status is maintained.

Bats

- 8.1.6 The proposed mitigation approach is in line with requirements for loss of roosts of low conservation status (as set out within the BCT Mitigation Guidelines) and is compliant with Natural England EPS licensing requirements. In addition, new habitat creation and provision of a sensitive lighting strategy shall ensure provision of foraging commuting habitat, retaining and enhancing opportunities for bats.
- 8.1.7 Appropriate management of this habitat will be detailed within a LEMP, to include species population monitoring in line with Natural England EPS licensing requirements. These measures will ensure that the favourable conservation status is maintained.

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FIGURES

Figure 1 - Ecological Mitigation and Enhancement Plan

Document: \\sou-ih-fs-01\\EnvPlanningProjects\\Current Projects\\B ECO01659 Land at Arundel\\TechDrawings\\1659_012_05 (Ecological mitigation and enhancement strategy).mxd



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Legend

- Site boundary
- Existing buildings
- Retained vegetation
- Sensitive removal of vegetation
- SuDS basin
- Bat box (10)
- Bat tube (10)
- Bird box (20)
- Dormouse box (20)
- Hedgehog house (5)
- Hibernacula (1)
- Invertebrate box (3)
- Log pile (5)
- Proposed new native species hedge planting

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03/04	Updated layout	LW	FM	FEB 22
02	Updated layout	LW	FM	JAN 22
01	---	LW	FM	NOV 21
Rev	Description	By	CS	Date



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Client Redrow Homes Limited

Project Land at Arundel

Title Ecological Mitigation and Enhancement Plan

Status Information Drawn By LW PM/Checked By FM

Project Number ECO01659 Scale @ A3 1:1,500 Date Created 21/02/22

Figure Number 1 Rev 04

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APPENDICIES

Appendix A – Legislation

Appendix B – Specification of Proposed Wildlife Boxes and Hibernacula

GREAT CRESTED NEWTS

Great crested newts *Triturus cristatus* are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (and as amended), which affords the species protection under Section 9. The species is also listed on Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. In combination, this makes it an offence to:

- intentionally kill, injure or take (capture etc.) a great crested newt;
- possess a great crested newt; and
- intentionally or recklessly damage, destroy, obstruct access to any structure or place used by great crested newt for shelter or protection, or disturb any animal occupying such a structure or place; and sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative) or advertise for buying or selling such things.

Great crested newts are also listed on the UKBAP as a Priority Species and are listed as a species of principal importance for biodiversity in England & Wales under Section 41 of the Natural Environment & Rural Communities Act (2006).

REPTILES

All common UK reptile species (adder *Vipera berus*, grass snake *Natrix Helvetica*, common lizard *Zootoca vivipara* and slow worm *Anguis fragilis*) are protected through part of Section 9(1 and 5) of the Wildlife & Countryside Act 1981 (as amended). This prohibits:

- Intentional or reckless injuring or killing;
- Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild animal or any part of, or anything derived from, such an animal; or
- Publishing or causing to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of those things.

BIRDS

All birds, their nests and eggs are afforded protection under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. It is an offence to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- intentionally take or destroy the egg of any wild bird.

Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development even in circumstances where that development is fully authorised by consents such as a valid planning permission.

BATS

All British bat species are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. All British bats are also included on Schedule 2 of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 as European Protected Species. It is an offence to:

- intentionally or recklessly kill, injure or capture bats;
- deliberately or recklessly disturb bats (whether in a roost or not); and
- damage, destroy or obstruct access to bat roosts.

A roost is defined as 'any structure or place which [a bat] uses for shelter or protection'. As bats tend to reuse the same roosts, legal opinion is that a roost is protected whether or not bats are present at the time of survey.

A licence will therefore be required by those who carry out any operation that would otherwise result in offences being committed.

The following bat species are listed as being of principal importance for the conservation of biodiversity in England, (commonly referred to as UKBAP Priority species): barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus*, greater horseshoe *Rhinolophus ferrumequinum* and lesser horseshoe *Rhinolophus hipposideros*.

BADGER

Badgers are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from baiting and deliberate harm or injury. The act makes it an offence to:

- Wilfully kill, injure, take, possess, or cruelly ill-treat a badger, or attempt to do so; and
- Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.

A sett is defined as "any structure or place that displays signs indicating current use by a badger".

DORMOUSE

Hazel dormice *Muscardinus avellanarius* are fully protected under Schedule 2 of the Conservation of Habitats and Species (Amendment) EU Exit) Regulations 2019. The Regulations prohibit:

- Intentionally, recklessly, or deliberately kill, injure, or take a hazel dormouse;
- The deliberate disturbance of this species in such a way as to be significantly likely to affect:
- Their ability of to survive, hibernate, migrate, breed, or rear or nurture their young; or;
- The local distribution or abundance of hazel dormice;
- Damage or destruction of a breeding site or resting place (nest); and
- The possession or transport of hazel dormice or any other part of.

Hazel dormice are also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion in Schedule 5. Under the Act, they are protected from:

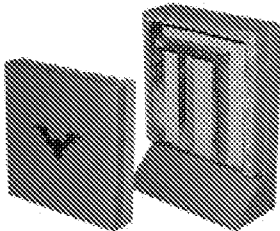
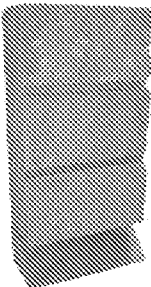
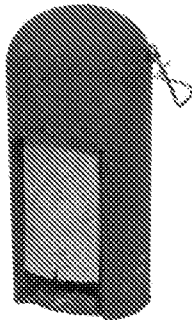
- Intentional or reckless disturbance (at any level);
- Obstruction of access to any place of shelter, breeding or rest; and
- Selling, bartering or exchange of these species, or parts of.

Offences can be deliberate, intentional, or reckless and penalties for any of the above include fines of up to £5k and imprisonment of up to 6 months, per animal affected.

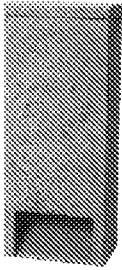
Hazel dormice are also listed on Section 41 of the NERC Act 2006 as a Species of Principal Importance; national objectives & targets include the maintenance of the geographical range and viability of existing Dormice populations to ensure that it remains in favourable conservation status.

Appendix B

Specification of Proposed Wildlife Boxes and Hibernacula

Product Image	Description	Type
Bats		
	<u>Ibstock Bat Box C</u> Suitable for crevice dwelling bat species, in particular for pipistrelle species. The internal design has several roosting zones. Designed to be unobtrusive to the aesthetic of proposed developments and maintenance free, due to the design of the bottom of the box.	Integrated directly into new buildings
	<u>Habibat 001 Box</u> Suitable for most bat species commonly found in the UK, this single chambered unit features an integrated V system to increase the surface for bats to roost against, whilst allowing them to move around. Designed to be unobtrusive to the aesthetic of proposed developments and maintenance free, due to the design of the bottom of the box.	Integrated directly into new buildings
	<u>Schwegler 2FN Bat Box</u> This box has two entrances - one at the front and one at the rear against the tree. Bats often creep into the rear entrance but leave by the front. It has a domed roof to allow the bats to form roosting clusters for warmth. This design has proved highly successful with noctule and Bechstein's bats. It is designed to be effective against small predators and excludes draughts and light. Due to the opening on the bottom, this bat box does not require cleaning.	Mounted on trees

1FR Schwegler Bat Tube



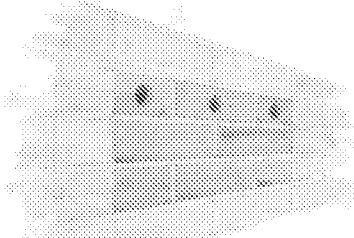
The 1FR Bat Tube is designed to be installed on the external walls of buildings, either flush or beneath a rendered surface. The design is discrete as only the entrance hole will be visible when incorporated. It can also be painted to match buildings with an air permeable paint if desired.

It has an integrated wooden panel onto which bats can cling and a ridged entrance slope which makes it easy for them to enter and leave the box safely. The design maintains excellent climatic conditions inside providing bats with a safe and stable environment in which to roost and it requires no maintenance due to the entrance design.

Integrated directly into new buildings or mounted on walls externally

Birds

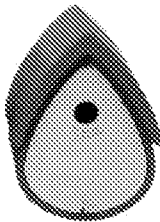
Terraced Sparrow Box



Made of insulating concrete and provides three internal nesting spaces, allowing three pairs to nest close to each other. This design of box is ideal for house sparrows which prefer to nest near to other pairs. The box is designed unobtrusive and aesthetically pleasing.

Integrated directly into new buildings

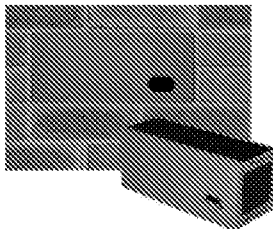
1MR Avianex Wall Nest Box



Made from woodcretePlus, the structure will not warp, rot or leak and mimics a natural hollow for birds.

Tree or wall mounted

lbstock Swift Eco Habitat



Made of brick and clay combination, it should be fitted be either on a side of the building that gets some shade during the day, or under an overhang or under the eaves, to give protection from heat, but not over windows or near to vents. Should not be placed on south facing wall. To be placed at least 5 m above the ground with clear adjacent airspace to allows swifts access.

Integrated directly into new buildings