ECOLOGICAL MANAGEMENT PLAN

COLTSLOW FARM, STANLEY MOSS LANE
STOCKTON BROOK, STOKE-ON-TRENT

AUGUST 2018

Commissioned By
David Tatton Architect

On Behalf of
Humphries Builders

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The results of the survey and assessment work undertaken by Eyebright Ecology are representative at the time of surveying. Every endeavour has been made to identify the presence of protected species on site, where this falls within the agreed scope of works.

The flora and fauna detailed within this report are those noted during the field survey and from anecdotal evidence. It should not be viewed as a complete list of flora and fauna species that may frequent or exist on site at other times of the year.

Up to date standard methodologies have been used, which are accepted by Natural England and other statutory conservation bodies. No responsibility will be accepted where these methodologies fail to identify all species on site.

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1. INTRODUCTION

1.1 Background & Objectives

Eyebright Ecology Ltd. was commissioned by David Tatton Architect on behalf of Humphries Builders Ltd., to prepare an Ecological Management Plan for a proposed housing development at the former Endon Riding School, Coltslow Farm, Stanley Moss Lane, Stockton Brook, Stoke-on-Trent, ST9 9LH (SJ926522).

Proposed Works and Planning Condition

The site has outline planning permission for a development of 8 detached houses (SMD/2017/0470). An Ecological Management Plan is required under Condition 15 of the reserved matters:

"Condition 15: Development shall not begin (including any works or demolition and site clearance) until such time that an Ecological Management Plan (EcMP) including a timetable for implementation, has been submitted to and approved in writing by the local planning authority. The approved EcMP shall be implemented in full in accordance with the approved timetable. The EcMP shall include, but is not restricted to:

- Hours during which works of construction (including works of demolition and site clearance) can take place;
- All aspects of habitat creation and ongoing management, including avoidance, mitigation and compensation measures to address potential impacts on legally protected species;
- A scheme for the erection of 'wildlife fencing' around the proposed development boundary during the construction period;
- A scheme to manage appropriately Indian[1] [sic] Balsam during pre-construction, construction and post-construction periods in order to prevent it's spread;
- No plastic sheeting or mesh shall be used on any scaffolding erection during the construction period, in order to prevent potential snaring and entanglement of volant bats in the surrounding landscape;
- Best practice with regard to mammals shall be followed for the duration of works, with any footings/holes to be covered at night, or a suitable method of escape provided;
- The provision of a buffer zone of at least 10 metres in width alongside the adjacent watercourse, in order to reduce potential impacts on aquatic/riparian species including otter and water vole. No waste material or contaminates shall be deposited within the buffer zone. No heavy machinery is to be used within the buffer zone. Any works that may affect the buffer zone / river corridor should be carried out under ecological supervision. If any evidence of otter or water vole is found during works, then all works shall cease, and a suitably qualified ecologist shall be consulted to advise on how best to proceed;

[1] Indian balsam is an alternative name for Himalayan balsam which is hereon used in this report; both refer to *Impatiens glandulifera*.

- Details of methods to be employed during all construction works, including earthworks, to limit silt mobilisation into and pollution of nearby water channels, and storm water run-off, in accordance with the Environment Agency guidelines: EA PPG5;
- Measures to be employed during construction (including works of demolition and site clearance) for any on-site storage of chemical and/or fuel storage; for on-site re-fuelling of machinery and vehicles; and for dealing with fuel spillage incidents;
- Measures to minimise dust emissions during the construction process (including works of demolition and site clearance)."

Aims of Ecological Management Plan

This Ecological Management Plan (EcMP) aims to collate all of the existing and updated ecological surveys and recommendations, and provide a detailed scheme of mitigation and management measures to be followed pre, during and post-construction, to ensure compliance with the planning condition, and to protect and enhance the existing ecology on site. The EcMP has taken into consideration baseline ecological surveys undertaken between July 2013 and September 2014 which are detailed in the following reports:

- Absolute Ecology (2013). Preliminary Ecological Appraisal Endon Riding School.
- Charnia Ecology (2014). Preliminary Roost Assessment – Bat and Bird Transect Survey Report.
- Charnia Ecology (2014). Reptile Survey Report.
- Charnia Ecology (2014). Water Vole and Otter Survey Report.
- Charnia Ecology (2014). Badger Survey Report.

In addition, updated surveys for badgers, bats, nesting birds, water voles and otters have been undertaken between April and July 2018, which have identified additional requirements for mitigation and management during works. These requirements are detailed in the forthcoming sections. The 2018 survey data is detailed in Appendix 3 & 4.

2.0 RELEVANT POLICY & LEGISLATION

2.1 Habitat Regulations

The Conservation of Habitats and Species Regulations 2010 make it an offence to deliberately capture, kill or disturb any wild animal listed in Schedule 2. It is also an offence to damage or destroy a breeding site or resting place of such an animal, even if the animal is not present at the time. In UK, these European Protected Species include (in addition to other animals and plants not relevant to this site):

- All species of bats

Special Areas of Conservation (SAC) sites are also designated under the Habitats Directive, due to the presence of habitats and/or species which are important for conservation at a European level.

2.2 Wildlife & Countryside Act

The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive), making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection;
- Pick or uproot any wild plant listed under Schedule 8 of the Act.
- Plant or otherwise cause to grow in the wild any invasive plant listed under Schedule 9 of the Act. Himalayan ('Indian') balsam *Impatiens glandulifera* is listed under Schedule 9.

Species potentially relevant to this site which are listed under Schedule 5 include common reptiles (adder, grass snake, slow worm and common lizard) which are partially protected against killing or injuring and bats which have full protection.

Sites of Special Scientific Interest (SSSI) are also designated under this Act.

2.3 Protection of Badgers Act

The Protection of Badgers Act 1992 makes it illegal to kill, injure or take a badger or to intentionally or recklessly interfere with a badger sett. Sett interference includes disturbing badgers whilst they are occupying a sett or obstructing access to it.

2.4 Hedgerow Regulations

The Hedgerow Regulations 1997 (as amended) makes it illegal to remove or destroy 'important' hedgerows without Local Planning Authority permission (either through planning or a Hedgerow Removal Notice). Hedgerows that are at least 20 metres long, more than 30 years old and contain certain botanical species need to be assessed for 'importance' using a number of criteria set out in the Regulations.

2.5 Natural Environment & Rural Communities (NERC) Act

The NERC Act 2006 places a duty on authorities to have due regard for biodiversity and nature conservation during the course of their operations.

2.6 National Planning Policy Framework (NPPF)

The NPPF 2012 replaces Planning Policy Statements (e.g. PPS9) and sets out current government policy on biodiversity and nature conservation. Planners are required to set criteria based policies against which proposals for development which may affect legally protected species will be judged. The NPPF promotes sustainable development by ensuring that developments take account of the role and value of biodiversity with emphasis on maintaining ecological networks at a landscape level.

2.7 Biodiversity and Biodiversity Action Plans

Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services is the current government strategy for maintaining and increasing biodiversity in UK. As a response to this, Local Biodiversity Action Plans set targets which aim to conserve priority species and habitats relevant to each county.

3.0 BASELINE SURVEY DATA

3.1 Ecological Baseline

Table 1: Survey Findings to Date

Species	Date and Type of Survey	Summary of Findings
Bats	Preliminary Ecological Appraisal in 2013[2] and Bat and Bird Survey in 2014[3].	There was a complex of wooden buildings previously used for horses which were assessed to be of negligible to low potential; there were two brick built, tiled houses which were assessed to be of moderate potential. There were several mature trees identified to have moderate to high bat roosting potential. The stone bridge was assessed to have moderate potential for roosting bats. Bat emergence, dawn and transect surveys in 2014 found no bats roosting in buildings or trees on site.
	Updated bat surveys in 2018 (Appendix 3)	Updated building inspections, dusk and dawn surveys were undertaken between May and August 2018, which identified the following bat roosts: Building 2 (House) – Individual non-breeding summer roost for common pipistrelle. Building 3 (Indoor Arena) – Occasional non-breeding summer roost for individual brown long-eared bats and small numbers of non-breeding common pipistrelle bats.
Badgers	Badger Survey in 2014[4].	A partially active outlier sett was found in the stream bank, 22 m north of the corner of the paddock. The sett was found to be used by badger and fox periodically.

[2] Absolute Ecology (2013). Preliminary Ecological Appraisal - Endon Riding School.

[3] Charnia Ecology (2014). Preliminary Roost Assessment – Bat and Bird Transect Survey Report.

[4] Charnia Ecology (2014). Badger Survey Report.

Species	Date and Type of Survey	Summary of Findings
	Updated badger survey April 2018 (Appendix 3)	During an updated badger survey in April 2018, a new badger outlier sett was found in the stream bank, with well used pathways along the stream bank and in the paddock. The entrance to the badger sett is approximately 35 m away from the proposed construction zone.
Otter and Water Voles	Water Vole & Otter Survey Report in 2014[5]	An otter and water vole survey was carried out along the stream corridor in 2014. No evidence of otter and water vole was found.
	Updated otter & water vole surveys 2018 (Appendix 3)	No evidence of water vole was found in April or August 2018. An old otter spraint was found in August 2018. No other signs of otters were found.
Birds	Nesting Bird Survey (2014).	A nesting bird and barn owl survey was carried out in 2014 by Charnia Ecology as part of the Bat and Bird Transect. No evidence of barn owl was found. A population of house martins (c. 15 pairs) was found to nest under the eaves on the residential house on site.
	Updated nesting bird survey 2018 (Appendix 3)	No evidence of barn owl was found in 2018. House martins continue to nest on Building 1 (House), and a tawny owl *roost* was found in Building 3 (Riding School). At least two pairs of swallows nesting in the wooden stables (Building 6).
Reptiles	Reptile survey in 2014[6]	No reptiles were found during reptile surveys undertaken in 2014. Updated reptile surveys not considered necessary given the limited amount of potential reptile habitat within the construction zone. Reptile exclusion fencing is sufficient to minimise risk of any reptiles entering the area of works.
Himalayan balsam	Preliminary ecological appraisal in 2013[1]	Himalayan balsam was confirmed to be present along the banks of the stream.

[5] Charnia Ecology (2014). Water vole and otter survey report.
[6] Charnia Ecology (2014) Reptile Survey Report

4.0 IMPACT ASSESSMENT

4.1 Impacts & Summary of Mitigation Measures

Table 2: Potential Impacts on Species During and Post Construction and Mitigation, Compensation and Enhancement Recommendations

Species	Potential Impacts During Construction	Potential Impacts Post-Construction	Summary of Proposed Mitigation, Compensation and Enhancement
Bats	Demolition of Buildings 2 and 3 (House and Riding School) will destroy bat roosts and could harm or injure bats. Use of mesh or sheeting on scaffolding could trap or ensnare bats foraging and commuting through the site.	Increase in lighting which may deter some species of bat Minor loss of foraging habitat (mature tree, small amount of vegetation).	EPS Mitigation Licence required prior to demolition of Buildings 2 and 3 which support roosts for individual non-breeding brown long-eared and common pipistrelle bats. Mitigation to include sensitive timing of demolition (Oct to Apr), supervised soft-strip of areas that may be used by roosting bats (tiles etc.), and provision of 4 tree bat boxes (Schwegler 2F x 2, 2FN x 2) and 4 permanent bat boxes in walls of new builds. Any scaffolding during demolition or construction to avoid the use of mesh or plastic sheeting. Sensitive lighting scheme to avoid illuminating the existing stream corridor, retained trees and hedgerows and adjacent grassland fields.
Badgers	Potential damage to a badger sett and disturbance or harm to badgers if any works including tracking of heavy machinery within	Potential for badgers to forage in the new gardens (particularly those adjacent to the stream banks where there are well used badger paths).	A 30 metre zone to be fenced off with clear signage and heras fencing, around the new outlier badger sett in the stream bank, to ensure no heavy machinery or ground works damage the tunnels or

Species	Potential Impacts During Construction	Potential Impacts Post-Construction	Summary of Proposed Mitigation, Compensation and Enhancement
	30 metres of the badger sett. Potential for badgers to become trapped in excavations or pipework during construction.		disturb any badgers present. Site Induction for all site workers to include a tool box talk on badgers. If works are subsequently found to be required within this zone, a Natural England licence may need to be applied for, to temporarily close the sett depending on the nature of the work. **Sett closure can only be undertaken between July and November.** During construction all excavations should be covered at night or have a means of escape (ramp). Ends of open pipes to be covered. Permanent badger resistant fencing along northern boundary of site (adjacent to stream corridor) and western boundary to be installed prior to start of construction to reduce risk of badgers entering the construction site, and to deter badgers from entering new gardens in future.
Otter and Water Vole	Potential noise, vibration, and other disturbance of otter and water voles during construction if present. Potential for damage to water vole or otter habitat during work to	Potential increase in lighting of stream corridor. Potential increase in human-related disturbance in future (including people, cats etc).	Precautionary check by an ecologist for otter and water voles immediately prior to any works on the watercourse or it's banks (e.g. drainage, Himalayan balsam removal etc.) If otter or water vole are found to be present during works, a licence may be required from Natural

Species	Potential Impacts During Construction	Potential Impacts Post-Construction	Summary of Proposed Mitigation, Compensation and Enhancement
	install rain water drain. Potential for pollution or silt / sediment to run into watercourse from construction site. Potential for noise and dust pollution during construction.		England prior to any works that could disturb individuals or damage habitat. Site works to be undertaken during daylight hours; no floodlighting or security lighting (unless motion sensitive and timed) to be used at night on site. Sensitive lighting plan to ensure the stream corridor remains dark in future. Fuel storage during construction to be located away from the stream corridor with measures in place for accidental spillages. Protective systems in place to prevent pollution or sediment loaded water to run off development site into stream. Protective measures in place to prevent noise and dust affecting the stream corridor.
Birds	Damage or destruction of active bird's nests during building and vegetation removal.	Loss of nesting habitat for 15+ pairs of house martins and 2 + pairs of swallows. Loss of bird nesting and roosting habitat for other species (buildings, tree). Potential increase in predation by cats.	Building demolition and tree felling should ideally be undertaken between October and February, or be subject to an ecologist pre-check for active bird's nests. Any active nests will need to be left until fledglings have left the nest. Prior to demolition commencing, installation of 6 bird boxes by ecologist on suitable retained trees (Schwegler or Vivara Woodstone, 32mm hole x 4,

Species	Potential Impacts During Construction	Potential Impacts Post-Construction	Summary of Proposed Mitigation, Compensation and Enhancement
			open fronted x 2) at least 2 m high and out of reach of cats. Prior to demolition commencing, installation of 1 tawny owl nest box on a suitable retained tree. Installation of artificial house martin and swallow nest cups (Schwegler or Vivara woodstone) underneath external eaves of new houses. There should be a minimum of two house martin cups per plot, sited appropriately i.e. sheltered from prevailing winds, and not above doors or windows. Installation of 4 artificial swallow nest cups under overhanging eaves or within new buildings where possible / appropriate.
Reptiles	No reptiles found in surveys, but grass snakes could occasionally commute along stream corridor. There is a small risk that grass snakes could enter the construction zone and be harmed by construction activities. Potential for pollution or silt / sediment to run into watercourse from construction site.	Impacts post-construction likely to be minimal.	Temporary plastic fencing to be attached to the bottom of the badger mesh fencing along the northern and western boundary to deter any grass snakes from entering the construction site from the stream corridor. Protective systems in place to prevent pollution or silt loaded water to run off development site into stream.

Species	Potential Impacts During Construction	Potential Impacts Post-Construction	Summary of Proposed Mitigation, Compensation and Enhancement
Himalayan Balsam	Vegetation removal or damage along stream banks (for example during construction of rainwater outlet) could cause spread of Himalayan balsam if undertaken when plants are in seed.	Impacts post-construction likely to be minimal but without regular management, Himalayan balsam is likely to continue to spread along the stream banks.	Avoid any vegetation removal or disturbance of stream banks in late July – November when the plants may be in seed. If this is unavoidable, clear working area by hand pulling plants in June to early July and leaving to dry on ground or burning on site. Pesticides must not be used due to the adjacent watercourse. Strimmers may only be used under supervision of ecologist due to presence of badger sett in the streambank (strimmers can be used up to 10 m away from any active sett). An annual management programme to minimise reoccurrence of Himalayan balsam along the stream bank adjacent to the site, by annual pulling in June – early July before plants set seed. This will commence in 2019 or at the start of construction under advice / supervision of ecologist and will continue throughout construction, and for at least 10 years post-construction.

5.0 DETAILED MITIGATION AND MANAGEMENT MEASURES

The following sections give details of mitigation and management measures which should be implemented before, during and after construction. This is summarised in Section 6 with appropriate timings. An overview of mitigation pre, during and post-construction is shown in Appendix 1, Figures 1 – 3, with fencing specifications shown in Figure 4.

5.1 Pre-Construction

Bats

Buildings 1, 4, 5, 6 and Tree 1 (See Figure 5, Appendix 4 for building layout) did not appear to support roosting bats, and work can proceed on these buildings / tree without any further actions.

The roosts present within Buildings 2 (House) and 3 (Indoor Arena) are protected even when bats are not present. A European Protected Species (EPS) licence will be required from Natural England prior to any works to the buildings. The licence sets out the mitigation which describes in detail how the works would be undertaken to avoid harming bats and to replace the roost sites present. The EPS licence application process takes at least 30 working days from submission. The applicant is responsible for the mitigation being undertaken as agreed; a licensed Ecologist is also named on the application to guide and to advise the developer / contractors during the works.

Planning permission must be granted before an EPS licence can be applied for. The licence cannot be applied for in advance of 12 weeks before works are due to commence. If there is any delay which results in survey data being at least 18 months old when applying for the licence, Natural England will require updated surveys to be completed. An updated site visit / building inspection by the Ecologist is also required within the 3 months prior to the licence application being submitted.

Bat Mitigation

The following mitigation measures are likely to be required by Natural England to gain a successful licence application:

- Demolition of Buildings 2 and 3 should commence between October and April when bats are least likely to be present.
- Bats should be provided with suitable alternative roosts prior to works commencing; four bat boxes (e.g. Schwegler 2F x 2, 2FN x 2) to be installed on nearby trees (e.g. along the stream corridor).
- Prior to full mechanical demolition, the roof and any possible roost areas in Buildings 2 and 3 should be soft-stripped by hand, under supervision of a licensed bat worker to transfer any bats found to the bat boxes.
- Permanent replacement roosting opportunities suitable for brown long-eared bats and pipistrelle bats should be provided.

- Four self-contained bat boxes to be integrated into external walls of new builds (e.g. Habibat, Schwegler or Ibstock). These should be at least 3 m in height, ideally face south or west and not be illuminated by outdoor lighting.

- Any lighting planned for the development should be minimal and will need to be approved by Natural England. Brown long-eared bats are particularly sensitive to artificial lighting. Security lighting will need to avoid illuminating the roosts and any other lighting will need to be limited and of sensitive design (e.g. low voltage, downward pointing, timed motion sensors).

Badgers

A 30 m zone will be fenced off using robust fencing such as heras fencing around the badger sett, with clear signage to ensure that no machinery will be used within this zone.

If at any stage it appears likely that machinery will need to be used within the 30 m zone, a licence will be applied for from Natural England to temporarily close the sett before any works within the zone. A licence may take up to 30 working days to be processed by Natural England. Sett closure can only be undertaken between July and November and would involve installation of a one-way badger gate and monitoring every 3 days until the works have been completed.

Permanent badger-resistant fencing will be installed around the north and west boundaries of the site where it is most likely that they could enter the construction zone and gardens in future.

Specification of badger fencing is shown in Figure 4 (Appendix 1) but in summary, it will be constructed of welded mesh (25 mm x 50 mm, gauge 2.5mm) or galvanised chain link (50 mm x 50 mm, gauge 2.5 mm). The mesh or chain-link can be attached to the bottom of a close board wooden fence, or on a post and rail system. The fence will extend 1000 mm above ground level (unless attached to a close board wooden fence, in which case it can be less), with 300 mm being sunk underground, and a 300 mm horizontal return (facing out of the site) to reduce the risk of badgers digging underneath the fencing.

Otters & Water Voles

No water voles currently appear to be present on the watercourse. Otters appear to occasionally commute along the watercourse.

The badger fencing which will be installed prior to construction starting around the northern and western boundary is likely to deter any otters that may commute along the stream corridor, from entering the construction zone or gardens in future.

Birds

Demolition of buildings and felling of the ash tree should ideally be scheduled between October and February to avoid the main bird breeding season. If this is not possible, an ecologist should undertake a nesting bird survey of each building within a day or two before works are due to commence. If any ‘active’ bird’s nests are found (which includes nests being built, nests containing eggs (or adults likely to be incubating eggs), chicks or fledglings), demolition of the building will wait until fledglings have left the nest.

The ecologist will install (or supervise installation of) 6 bird boxes on suitable retained trees (Schwegler or Vivara Woodstone, 32mm hole x 4, open fronted x 2), at least 3 m high and out of reach of cats.

The ecologist will install (or supervise installation of) a tawny owl nest box on a suitable retained tree, at least 3 m high and out of reach of cats.

Installing these bird boxes prior to demolition commencing will provide birds with alternative nest and roost sites during works and into the future.

Reptiles

As there is minimal potential reptile habitat within the construction zone, an updated reptile survey prior to construction is not considered necessary.

However, as a precaution, a strip of temporary polythene reptile fencing (1200 mm tall, UV stabilised) will be attached to wooden stakes following the outer edge of the badger exclusion fencing, to prevent reptiles such as grass snakes, which may commute along the stream corridor, from entering the construction zone.

The plastic sheeting will be taut, sunk to a depth of 200 mm, with a 100 mm horizontal return below ground and around 900 mm above ground and a top overhang lip. Wood screws or clout nails with washers will secure the plastic in regular places to wooden stakes.

The plastic sheeting will be carefully removed and recycled at the end of the construction period.

Himalayan balsam

A management programme for Himalayan balsam will commence in June / early July 2018 and will continue annually during construction. Following a check / advice by the ecologist, individual balsam plants will be hand pulled in June / early July when they are in flower but before they set seed. The plants will be pulled out and left to dry in place and/or burnt on site. If strimmers are used, it must be under direct supervision of the ecologist since they must not be used within 10 m of the active badger sett, or any areas which may be used by nesting birds, and should only target areas dominated by Himalayan balsam to avoid other native plants being removed.

5.2 During Construction

General construction principles

A summary of mitigation required during construction and the ecological responsibilities of site workers during construction (including appropriate contact numbers should protected species be found during works, or in the event of accidental spillages etc.) will be included in the Site Induction for all site workers to read and understand.

Construction works on site will only be undertaken within the hours of daylight to avoid noise and vibration at night, and to avoid the need to use artificial lighting, which could be detrimental to

nocturnal wildlife such as bats, badgers and otters. Any security lighting required overnight will be on a motion-sensitive timer and will be set up to ensure the stream corridor is not illuminated if set off.

There will be an Ecologist Clerk of Works (ECoW) who will be on hand as a point of contact throughout the construction phase, to undertake supervision during any vegetation clearance and fence installation, and to conduct regular visits to site to ensure the mitigation measures are in place, and to provide advice where necessary.

Protection of watercourse

The watercourse and it's banks (the 'stream corridor') are sensitive habitats, which will be protected by a 'buffer zone' of 10 metres. No work will be undertaken within the buffer zone (including vegetation removal, installation of rainwater drains etc.) without advice from the ECoW and ecological checks / supervision where necessary. All effort will be taken to ensure that no pollution, sediment or other run-off from construction reaches the watercourse or banks. The Environment Agency Pollution Prevention Guidance (EA PPG5) referred to in the Planning Condition has now been withdrawn, but pollution avoidance measures are detailed on the government website (https://www.gov.uk/guidance/pollution-prevention-for-businesses#storing-materials-products-and-waste). As a minimum, pollution avoidance measures on the site will include:

- Storage of all fuel, concrete and other potentially polluting materials to be kept in sealed containers in a secured location on the south side of the site, furthest away from the watercourse. A spill kit will be available for accidental spillages.

- Refuelling of machinery to be undertaken in a set area on the south side of the site, furthest away from the watercourse, and with the use of drip trays.

- Excess water from excavations or other run-off must not be pumped or drained into the watercourse from the site. Any such contaminated water must be collected and treated (e.g. in settlement tanks) or recycled.

- No construction materials, rubble or chemicals to be dumped in the buffer zone or watercourse.

- Workers to keep a tidy site, with all waste materials and rubbish to be kept in covered bins or skips, to avoid plastic and other rubbish from blowing into the watercourse or beyond.

- Building materials on site (sand, aggregate, soil or hardcore) to be kept covered, to avoid being blown or washed away.

- During dry periods, spraying of dusty areas on site with water to ensure minimal dust-borne particles which could settle in the watercourse (ensuring the resulting contaminated water is collected and does not run into or get pumped into the watercourse).

- A temporary swale to be created on the inside of the badger fence (along the northern boundary) at the start of construction to help prevent surface run off from the construction site towards the watercourse.

- A speed bump to be installed along the top of the access road to the farm to help divert any surface run-off from heavy rains and the construction site into the surrounding areas rather than water running down the steep hill into the watercourse.

- A pollution incident response plan to be created for the site works (https://www.gov.uk/guidance/prevent-groundwater-pollution-from-solvents#prepare-for-emergencies-create-a-pollution-incident-response-plan). In the unlikely event that a pollution event occurs which could affect the watercourse or buffer zone, ECoW to be informed immediately, and the issue reported to the Environment Agency Incident Hotline on 0800 807060.

Bats

The EPS licence will dictate the precise mitigation and work schedule that will need to be followed for bats, as agreed with Natural England. The proposed mitigation is outlined above, in Section 5.1.

As it is likely that bats will forage and commute through the site and along the stream corridor between dusk and dawn, there will be no mesh or plastic sheeting used around scaffolding, to avoid the risk of bats getting entangled or trapped in the construction area.

There will be no permanent lighting left on overnight on the site, and any necessary security lighting will be on a motion-sensitive timer and be set up to ensure the stream corridor and trees remain dark at all times.

Badgers

During construction, the main potential hazard for badgers (and other wildlife) are excavations or pipes which are left open at night on site. Excavations will be covered at night or where this is not practical, a ramp (e.g. plank of wood) will be put into the trench to allow badgers and other wildlife to escape. Open pipes must be capped or fenced overnight to deter badgers or other animals from entering. These measures will be written into the Site Induction to ensure all contractors are aware of their responsibilities.

Regular checks of fencing (30 m exclusion fencing around badger sett and permanent badger exclusion fencing) will be undertaken by the ECoW throughout works. Any repairs required will be undertaken by the developer immediately.

Any work which is required within the 10 m buffer zone along the stream banks (e.g. Himalayan balsam removal, installation of rainwater drain) will be checked for new badger setts and supervised by the ECoW.

Otter & Water Vole

The ECoW will undertake a check for signs of otter and water vole immediately before any work which may affect the watercourse and banks, including vegetation / Himalayan balsam removal and installation of rainwater drainage outlet.

If any evidence of otters or water voles are found during these checks or at any other time during works, a licence may be required from Natural England.

General construction principles as outlined above will be followed, to minimise potential impacts of pollution, noise and lighting on otters and water voles.

Birds

The ECoW will undertake checks for nesting birds during construction, if any vegetation or building removal is required within the bird breeding season which runs from March to September inclusive. Any active nests found will remain undisturbed and monitored in a protective 5 m zone until fledglings have left the nest.

Reptiles

The ECoW will undertake regular checks of the reptile fencing during the construction phase. Any repairs required will be undertaken by the developer immediately.

Himalayan balsam

A management programme for Himalayan balsam will commence in June / early July 2019 and will continue annually during construction. Following a check / advice by the ECoW, individual balsam plants will be hand pulled in June / early July when they are in flower but before they set seed. The plants will be pulled out and left to dry in place and/or burnt on site. If strimmers are used, it must be under direct supervision of the ECoW since they must not be used within 10 m of the active badger sett, or any areas which may be used by nesting birds, and should only target areas dominated by Himalayan balsam to avoid other native plants being removed.

5.3 Post Construction

Bats

The EPS licence will dictate the precise mitigation that will need to be followed for bats, as agreed by Natural England. The proposed mitigation is outlined above, in Section 5.1.

A sensitive lighting plan will ensure the stream corridor, trees and surrounding hedgerows are not illuminated by light spill from the development in future.

Badgers

The badger sett and well used pathways along the stream corridor will continue to be available for use by badgers.

Sensitive lighting plan will help ensure these areas remain a dark, undisturbed area for badgers to continue to use.

Otters and Water voles

A sensitive lighting plan will help ensure the stream corridor remains dark, undisturbed area should otters and water voles use the habitats in future.

Birds

The site will support 16 artificial house martin nest cups (Schwegler or Vivara woodstone) underneath external eaves of new houses. There will be a minimum of two cups per plot, sited appropriately i.e. sheltered from prevailing winds, and not above doors or windows.

There will also be at least 4 swallow nest cups (e.g. Schwegler) underneath external eaves of new houses.

Himalayan balsam

An annual management programme for Himalayan balsam will continue after construction for at least 10 years. Following appropriate protected species checks by an Ecologist, individual balsam plants will be hand pulled in June / early July when they are in flower but before they set seed. The plants will be pulled out and left to dry in place. If strimmers are used, it must be under direct supervision of an Ecologist since they must not be used within 10 m of any active badger sett, or any areas which may be used by nesting birds, and should only target areas dominated by Himalayan balsam to avoid other native plants being removed.

6.0 SUMMARY OF MITIGATION & TIMING

The following table provides an overview of the mitigation detailed in the previous section, and the appropriate timing of implementation.

Table 3: Mitigation & Management Measures Before, During and Post-construction.

Species	Mitigation & Management Measures	Before Construction	During Construction	Post Construction
Bats	EPS Licence Application to Natural England for Buildings 2 and 3.			
	Following mitigation agreed under licence, including timing, supervised soft-strip, provision of new roosts in buildings and on trees.			
	4 x Bat Boxes installed on trees in suitable locations under direction of Ecologist.			
	Ensuring the stream corridor, paddock and trees adjacent to the site remain dark at night			
	Avoiding use of plastic mesh or sheeting on scaffolding			
Badger	Protective heras fencing marking 30 m zone with signage to ensure no machinery goes within 30 m of sett	Fencing erected before construction.	Fencing to stay in place until end of construction.	
	Permanent badger exclusion fencing installed around north and western site boundary			
	Covering excavations / installing ramps in trenches; covering open pipework to minimise potential for trapping badgers			
	Badger sett check of stream bank before any work such as Himalayan balsam removal or construction of rainwater outlet.			
	Ensuring the stream corridor, paddock and trees adjacent to the site remain dark at night			
Otter & Water Vole	Otter & Water vole check before any work such as Himalayan balsam removal or construction of rainwater outlet.			
	Ensuring the stream corridor, paddock and trees adjacent to the site remain dark at night			
Birds	Building and vegetation clearance outside of bird breeding season wherever possible. Where the above is not possible, an ecologist			

Species	Mitigation & Management Measures	Before Construction	During Construction	Post Construction
	check for nests prior to demolition of buildings or vegetation removal / tree felling.			
	6 x Bird Boxes and 1 x tawny owl box installed on trees under direction of Ecologist.			
	16 x House martin nesting cups and 4 x Swallow nesting cups installed on new builds			
Reptiles	Temporary reptile exclusion fencing installed at same time (in same location) as permanent badger exclusion fencing. To be removed at end of construction.	Fence installed prior to construction	Fence removed at end of construction	
Himalayan Balsam	Annual removal of Himalayan balsam along the stream banks adjacent to site. Hand pulling in June / early July. No pesticides. Strimmers only under supervision of ecologist and not within 10 m of any active badger setts.	**2019**		**10 years +**

7.0 REFERENCES

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APPENDIX 1: MITIGATION AND MANAGEMENT PLANS

Figure 1: Pre-construction Mitigation Measures

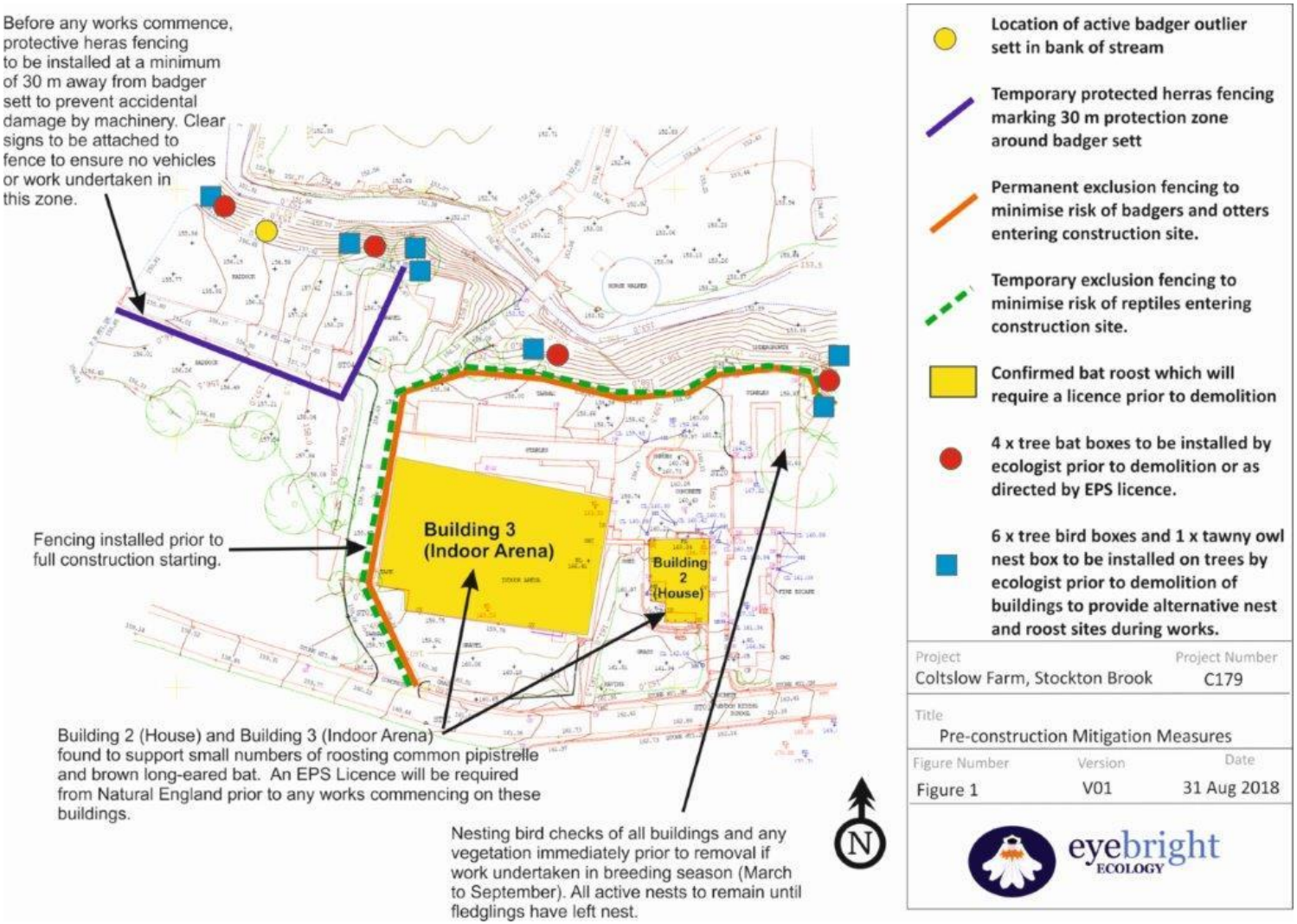


Figure 2: Mitigation Measures During Construction

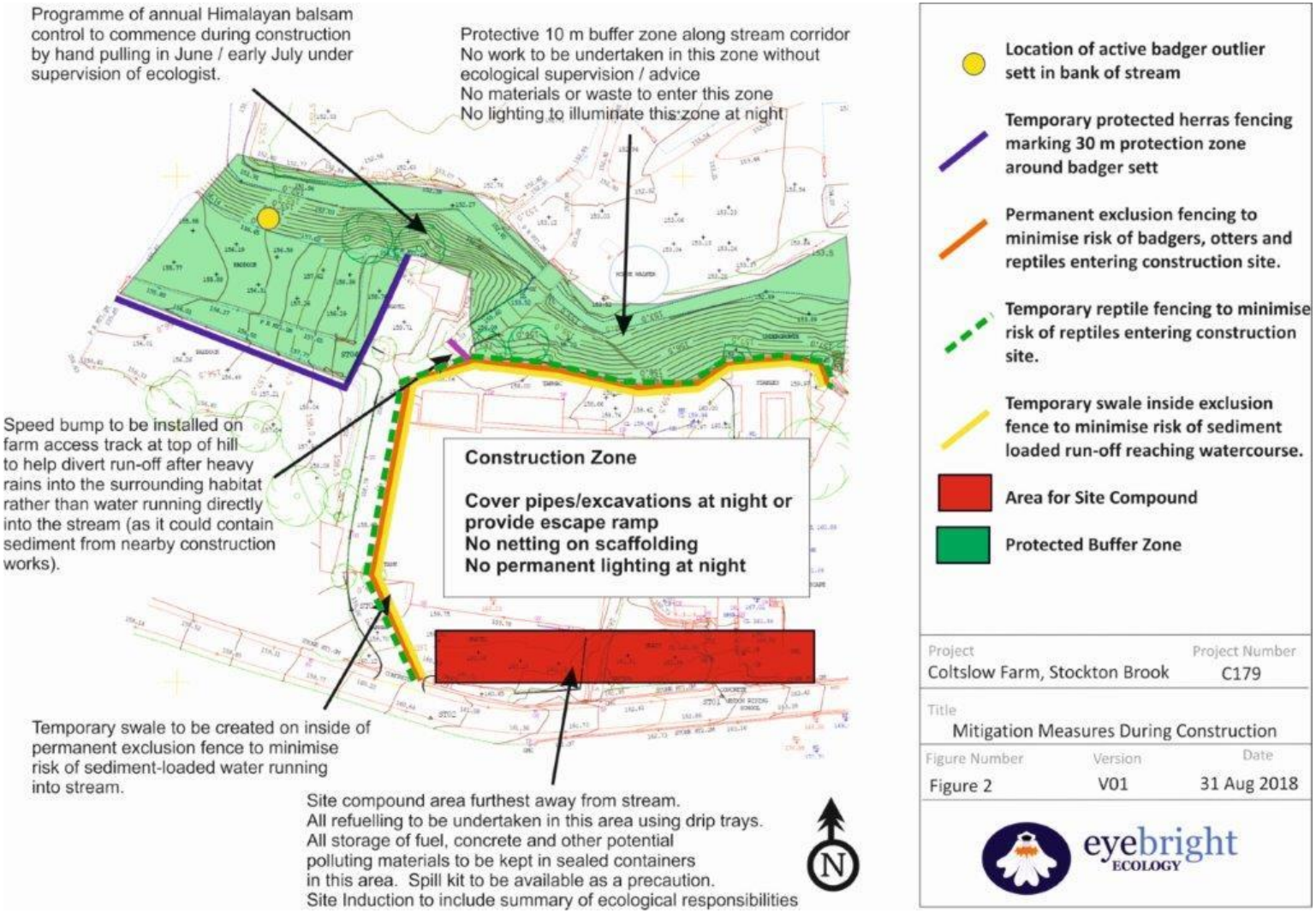


Figure 3: Post-Construction Mitigation & Management

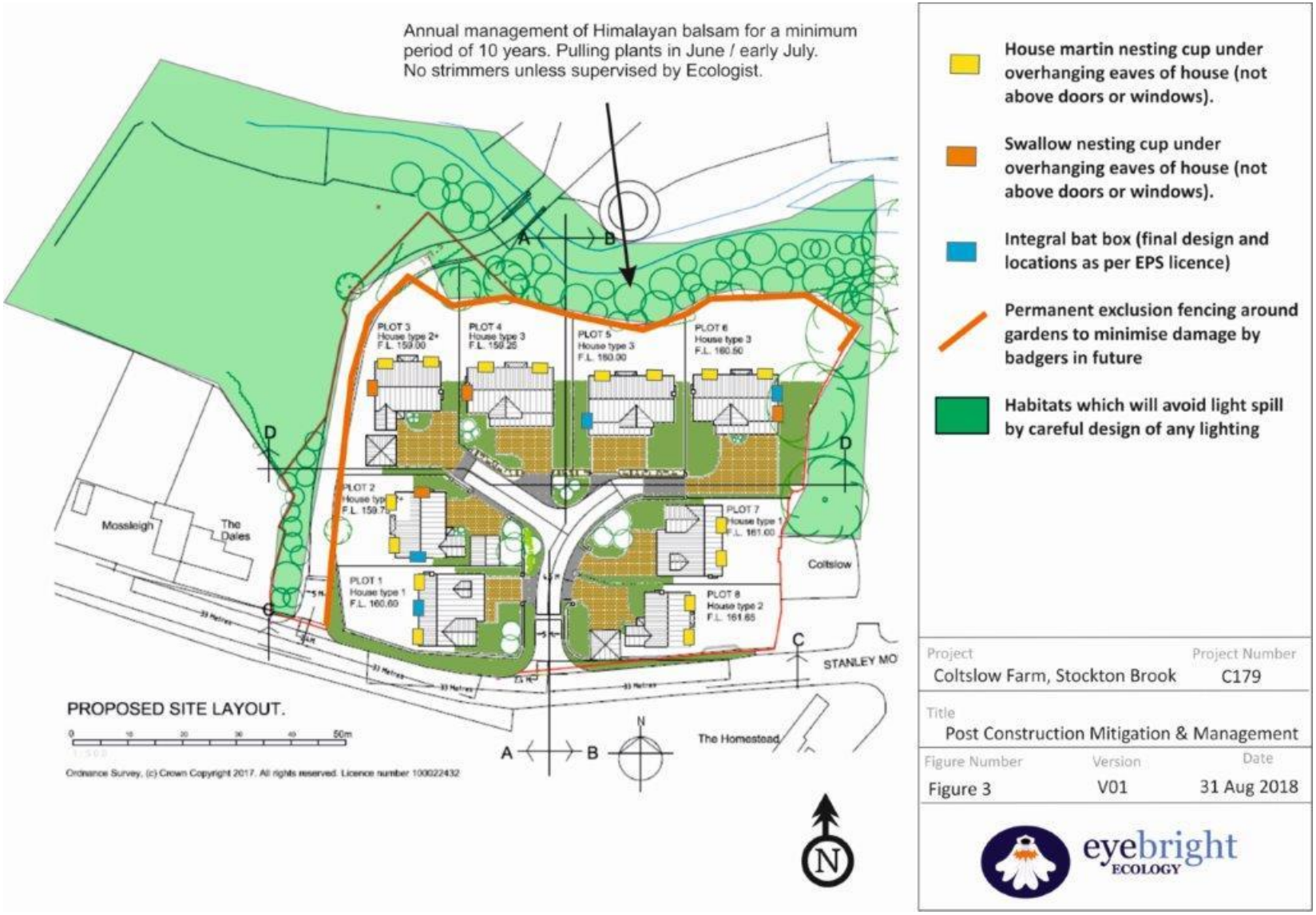
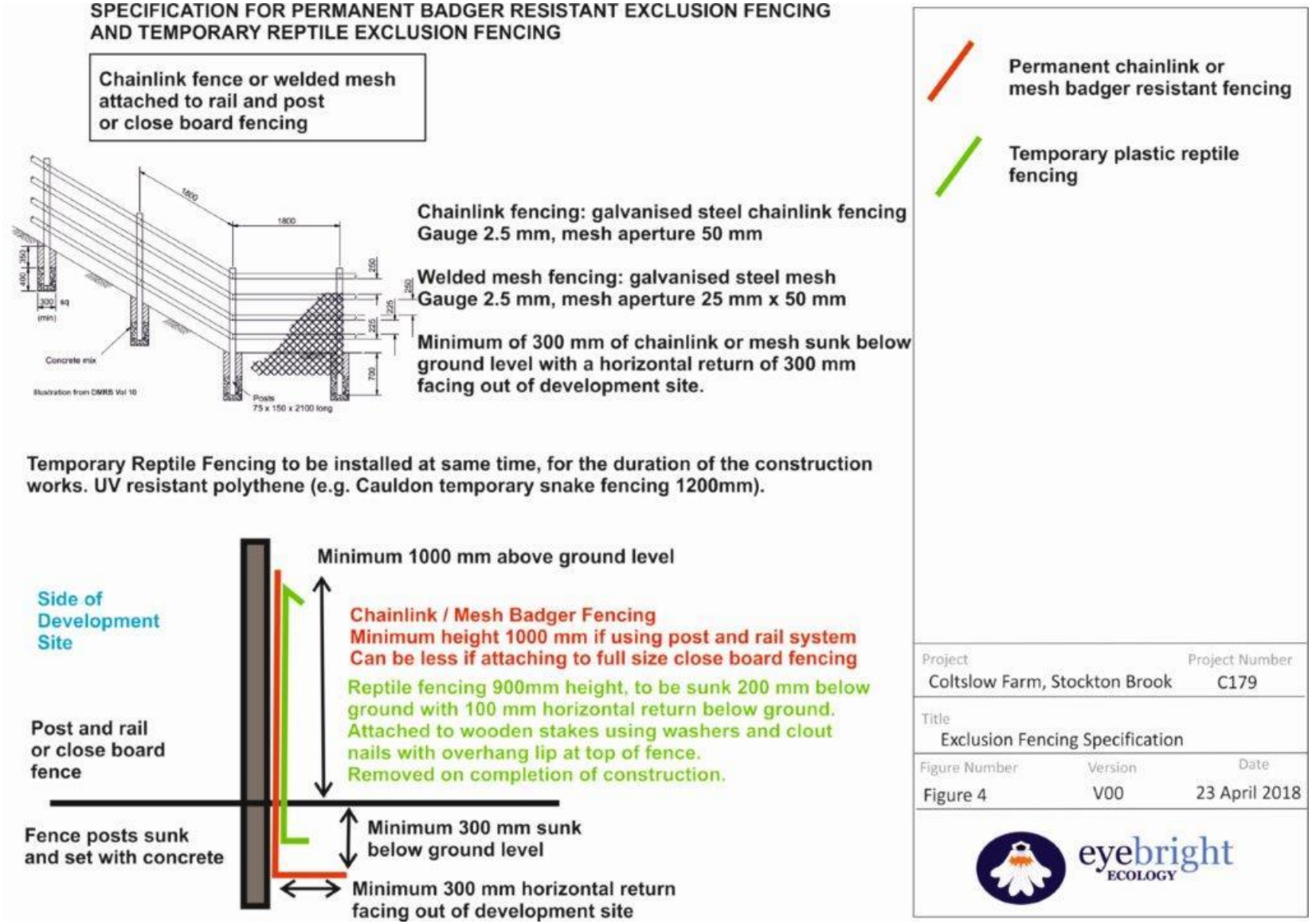


Figure 4: Exclusion Fencing Specification



APPENDIX 2: UPDATED SURVEY RESULTS 2018

Badger

Methodology

A badger survey was undertaken on 4 April 2018. A walkover of the site and surrounds was undertaken, checking for setts, well-worn pathways, latrines, feeding signs, footprints and hairs. The survey was undertaken by Eleanor Weir MCIEEM, an experienced ecologist who has worked as a professional consultant for 16 years.

Results

A new outlier badger sett was recorded, with two entrances and a large amount of fresh spoil, on the southern bank of the stream. The spoil was fresh and contained numerous badger hairs. There were a number of paths into the field above and along the stream bank. None of the paths appeared to go in the direction of the proposed construction zone.

The outlier badger sett recorded along the stream bank in the 2014 badger survey (Charnia Ecology, 2014) now appeared to be disused, as the entrance was mostly blocked with leaves and soil. There were no paths, fresh spoil or other signs of recent occupation.

Recommendations

The new badger sett identified in 2018 is closer to the site than the now disused outlier sett identified by Charnia Ecology. Measurements were taken on site and the entrance is around 35 m from the nearest part of the 'construction zone'.

There must be no work involving heavy machinery within 30 m of the sett, including tracking over by large vehicles, as this can cause tunnels to collapse. Light machinery must stay at least 20 m away from the sett, and electric hand tools can only be used up to 10 m from the sett. Heras fencing must be put into place to mark a 30 m protection zone around the sett during construction, to ensure no machinery goes within this area. If this is not possible, a licence from Natural England would be required to temporarily close the sett. Sett closure can only be carried out under licence between 1 July and 30 November.

Bats

Methodology

An updated building inspection was undertaken on 8 May 2018 by Eleanor Weir MCIEEM (Bat licence number (2015-12689-CLS-CLS) and Carl Capewell GradCIEEM (Bat Licence: 2017-29923-CLS-CLS).

A powerful torch (Clulite, one million candlepower), and binoculars were used to search for evidence of bats which includes droppings, urine splashes, feeding remains, staining and individual bats. Potential roost sites and access points were also recorded.

Where no evidence of bats was found during the inspection, an assessment of the building for potential suitability for roosting bats was made, based on the criteria in the table below, which is taken from current Good Practise Survey Guidelines (Collins, 2016).

Table 4: Assessment of Bat Roosting Potential

Potential Suitability for Roosting Bats	**Roosting Habitat**
Negligible	No habitat features (such as crevices, suitable roosting surfaces, access points) present within the structure or tree; where minimal features exist, they may be assessed to be very unlikely to be used by bats due to other factors such as lighting, isolation, poor surrounding habitat etc.
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, the potential roost sites do not provide enough space/shelter/protection/appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be used for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by roosting bats on a regular basis but is unlikely to support a roost with high conservation status (e.g. maternity / hibernation roost).
High	A structure or tree that with one or more potential roost sites that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Constraints: Building 2 could not be accessed on the upper floor due to a locked door.

Subsequent dusk emergence and dawn re-entry surveys were undertaken on site, to identify any roosting bats on site. The following surveys were undertaken:

Dawn survey, 20th May 2018: House, Flats and Ash tree (2 surveyors)

Dawn survey, 8th July 2018: House, Riding School, Ash tree (2 surveyors)

Dusk survey, 21st July 2018: Riding School (2 surveyors)

Dusk survey, 1st August 2018: House (2 surveyors)

The dusk surveys commenced 15 minutes before sunset and continued for 1.75 hours. The dawn survey commenced 1.5 hours before sunrise and continued until 15 minutes after sunrise.

The surveyors used an Elekon Batlogger M, Batbox Griffin and an Anabat Walkabout, in order to record and identify any bats heard. Bat calls were analysed where necessary using BatSound 4.2 and Bat Explorer. Surveyors focused on identifying any bats emerging or returning to the buildings or tree, although general bat activity on site (foraging, commuting) was also recorded.

Surveys were led by experienced and licensed ecologists; Eleanor Weir, Carl Capewell, Dave Allen (Bat Licence 2018-36197-CLS-CLS) with assistant ecologist Hayley Worsdale.

A static Wildlife Acoustics SM3 recorder was installed inside the riding school, and set to automatically record bat calls between dusk and dawn between 21st July and 28th July.

Results

Table 5: Building Inspection Results

Building Number	**Description**	**Potential features and Evidence of Bats or Nesting Birds**	**Potential for Roosting Bats**
1 (Flats/ Dormitory Annexe)	Two storey (rooms built into roof) – no roof space. Lean-to extension on one side which was lined with bitumen felt. External stone walls, rendered in places, well pointed.	Tiles well-fitting with few gaps seen. No bat droppings found. No bird nests seen.	**Low** potential for bats.
2 (House)	Large two storey house, brick built with render and stone cladding and clay tile roof. Loft space mostly converted into loft room with wooden boarded ceiling. A small part was unconverted, bitumen underfelt could be seen.	Occasional gap under tiles, most appeared well fitting. No bat droppings found. Numerous house martin nests beneath eaves.	**Moderate** potential for bats.
3 (Indoor Arena)	Large open building with corrugated asbestos roof and top half of walls – bottom part of walls were concrete block. Metal ridge and rafters. Single storey extension on one side with a small (1.5 m high) partial 'roof space' above the storage rooms.	Large opening above main doorway. Small gaps at top of walls along north side. Scattered bat droppings around viewing platform. Tawny owl evidence – pellets, feathers, droppings. No evidence of a nest site, or signs of any barn owls. Old bird's nests (blackbird etc).	**Low** potential for bats.

4 (Double stable block)	Single storey double stable block, with wood walls and corrugated asbestos / felt single pitch roofs. Most have half open stable doors. Many very damp and draughty.	Few roosting crevices found. No bat droppings found. Several old swallow's nests.	**Negligible** potential for bats.
5 (Metal stable)	Two storey stables, corrugated metal roof and upper walls, rendered lower walls.	Could not access upper floor as door locked. No bat droppings found. No bird evidence found.	**Negligible** potential for bats.
6 (Wooden stables)	Single storey wooden walls and felt pitched roofs.	Few roosting crevices found. No bat droppings found. Two active swallow's nests, several old swallow's nests.	**Negligible** potential for bats.
Ash tree (Tree 1)	A large ash tree on the east boundary, with the lower trunk being within the stables.	Some signs of rot on higher branches, some knot holes – none appear to extend deeply.	**Low** potential for bats

Dusk and dawn survey summary

Full data is shown in Appendix 4 and 5, but a summary of the relevant results are as follows.

The dawn survey on 20 May 2018 of Building 1 (Flats), 2 (House) and Tree 1 (ash tree), found no bat activity around Building 2 or Tree 1. Both surveyors observed a common pipistrelle 'swarming' around the roof of the house (Building 2) around 45 minutes before sunrise. The bat appeared to disappear near to the ridge, and was presumed to have entered a roost as it was not seen to fly away from the building.

The dawn survey of 8 July 2018 of Building 2 (House), 3 (Riding School) and Tree 1 (ash tree) found a common pipistrelle circling around the chimney at around 40 minutes before sunrise. Again, the bat was not seen to fly away, and is presumed to have entered a roost somewhere near the chimney, possibly under a ridge tile. The height and angle of the roof made precise observation difficult.

A long-eared bat was observed to fly into the Indoor Arena (Building 3) at 45 minutes before sunrise. It was not seen to fly out again, and it is presumed it returned to roost inside the building.

A dusk survey of Building 3 (Riding School) on 21st July 2018 found up to 3 common pipistrelle bats appeared to emerge from the building between 21 and 35 minutes after sunset, and were then seen to forage in and out of the barn. A long-eared bat was seen to emerge out of the open doorway at 44 minutes after sunset, which is typical emergence time for this species.

The static bat detector recording inside the riding school between 21st July and 28th July, also recorded a long-eared bat inside the building on 21st July 2018 at around 44 minutes after sunset. There was a long-eared recorded at 00:56 on 22nd July 2018 but no further recordings of long-eared were present. Pipistrelle bats were also recorded on most nights, with pipistrelles being recorded between 5 and 28 minutes after sunset. The recorder picked up *Myotis* bats on most nights, but mostly later on in the night which could relate to bats foraging inside or close to the roof of the building later throughout the night.

The dusk survey on 1 August 2018 of Building 1 (House) found one common pipistrelle appeared to emerge from the roof at 15 minutes after sunset. It flew from the direction of the roof, but the point of emergence was not confirmed.

Bat Roost Summary

Table 6: Roost summary and conservation value

Building Number	Roost Assessment	Conservation Significance
1 (Flats/ Dormitory Annexe)	No roost identified.	Negligible
2 (House)	Non-breeding summer roost for individual common pipistrelle bats.	Low
3 (Indoor Arena)	Occasional non-breeding summer roost for individual brown long-eared bat. Non-breeding summer roost for individual (1 – 3) common pipistrelle bats.	Low
4 (Double stable block)	No roost identified	Negligible
5 (Metal stable)	No roost identified	Negligible
6 (Wooden stables)	No roost identified	Negligible
Tree 1 (Ash)	No roost identified	Negligible

Licensing & Mitigation

Buildings 1, 4, 5, 6 and the ash tree did not appear to support roosting bats, and work can proceed on these buildings / tree without any further actions.

The roosts present within Buildings 2 and 3 are protected even when bats are not present. A European Protected Species (EPS) licence will be required from Natural England prior to any works to the buildings. The licence sets out the mitigation which describes in detail how the works would be

undertaken to avoid harming bats and to replace the roost sites present. The EPS licence application process takes at least 30 working days from submission. The applicant is responsible for the mitigation being undertaken as agreed; a licensed Ecologist is also named on the application to guide and to advise the developer/contractors during the works.

Planning permission must be granted before an EPS licence can be applied for. The licence cannot be applied for in advance of 12 weeks before works are due to commence. If there is any delay which results in survey data being at least 18 months old when applying for the licence, Natural England will require updated surveys to be completed. An updated walkover survey / building inspection is also required within the 3 months prior to the licence application being submitted.

Bat Mitigation

The following mitigation measures are likely to be required by Natural England to gain a successful licence application:

- Demolition of Buildings 2 and 3 should commence between October and April when bats are least likely to be present.
- Bats should be provided with suitable alternative roosts prior to works commencing; it is recommended that four bat boxes (e.g. Schwegler 2F x 2, 2FN x 2) are installed on nearby retained trees (e.g. along the stream corridor).
- Prior to full mechanical demolition, the roof and any potential roost areas should be soft-stripped or dismantled by hand, under supervision of a licensed bat worker to transfer any bats found to the tree bat boxes.
- Permanent replacement roosting opportunities suitable for brown long-eared bats and pipistrelle bats should be provided.
    - Four self-contained bat boxes integrated into external walls of new builds (e.g. Habibat, Schwegler or Ibstock). These should be at least 3 m in height, ideally face south or west and not be illuminated by outdoor lighting.
- Any lighting planned for the development should be minimal and will need to be approved by Natural England. Brown long-eared bats are particularly sensitive to artificial lighting. Security lighting will need to avoid illuminating the roosts and any other lighting will need to be limited and of sensitive design (e.g. low wattage, downward pointing, timed motion sensors).

Otter & Water Vole

Methodology

The water vole survey involved a search along the banks of the watercourse for burrow entrances and characteristic droppings and latrine sites, feeding signs, footprints, feeding ‘lawns’ and individual animals.

As per current survey guidelines (Dean et al, 2016) two repeat surveys were undertaken at least two months apart, on 8 May 2018 and 1 August 2018. Weather conditions during the surveys were dry and sunny, and they were undertaken after several days without any heavy rain which can wash away evidence.

A search for signs of otters was also undertaken, including potential holt sites, 'spraint', feeding remains, footprints, slides and couches.

The otter and water vole surveys were carried out by experienced ecologists.

Results

No evidence of water vole was found on either survey visit.

An old otter spraint was found on 1 August 2018, on a stone near to the bridge. No other evidence of otters was found. This suggests otters occasionally commute along this watercourse, but are unlikely to use it for any sustained periods of foraging, or to shelter.

Recommendations

The proposed mitigation and management measures are appropriate, even if otter occasionally commutes along the watercourse. The badger fencing will deter any otters from entering the construction zone at night. Measures to avoid any pollution reaching the watercourse will be implemented. No lighting should be used at night on the construction zone, and the watercourse should remain a dark corridor both during development and in future.

Birds

Methodology

During the building inspections for bats on 8 May 2018, a check for nesting birds including barn owl was undertaken. This included a search for 'active' nests (i.e. in use), old nest material, pellets, droppings, feeding remains, feathers and egg shells.

The bird survey was undertaken by Eleanor Weir (Barn owl licence CL29/00162) and Carl Capewell.

Constraints: Building 2 could not be accessed on the upper floor due to a locked door.

Results

Two active swallow's nests were noted in Building 6 (Stables), and old swallow's nests were present in Building 4 and 6 (Stables).

Active house martin nests were present in Building 2 (House).

Old blackbird nests noted in Building 3 (Riding School), and this building also supports a tawny owl roost.

Recommendations

No evidence of barn owl was found, and although Building 5 could not be inspected on the upper floor due to a locked door – no adult barn owls were noted flying in or out of this building during the bat surveys, indicating it is unlikely to support a nest site.

The site supports nesting swallows, house martins and blackbirds, as well as a roosting tawny owl.

It is recommended that replacement nest sites are provided for these species. Artificial house martin and swallow nests can be installed under overhanging eaves, although swallows ideally prefer to nest inside a building.

A tawny owl nest box should be installed on a tree adjacent to the watercourse.

A variety of other bird boxes should be installed on trees and/or new buildings.

APPENDIX 3: BAT SURVEY DATA

The following tables provide survey data of bat dusk and dawn surveys undertaken between May and August 2018. This information will be required to inform an EPS licence application.

Building Numbers and Locations are shown in Figure 4 below.

Table 7: Weather Conditions During Bat Activity Surveys

Date	Building / Tree	Survey Timing	Sunset / Sunrise Time	Start / End of Survey	Temp (°C)	Wind (Beaufort Scale)	Cloud cover	Rain
20.05.18	Building 1, 2, Tree 1	Dawn	05:03	Start	11	0	0%	Dry
				End	9	0	0%	Dry
08.07.18	Building 2, 3, Tree 1	Dawn	04:52	Start	16	1	0%	Dry
				End	13	1	0%	Dry
21.07.18	Building 2	Dusk	21:21	Start	17	1	70%	Dry
				End	15	1-2	50%	Dry
01.08.18	Building 2	Dusk	21:04	Start	20	2	95%	Dry
				End	18	1	80%	Dry

Table 8: Dawn Survey 20th May 2018

Sunrise Time: 05:03

Surveyor 1: On north side of Building 1 & 2, & checking Tree 1

Time	Species / Numbers	Behaviour	Notes
03:34	Common pipistrelle	Commuting	Brief / Faint
03:37	Common pipistrelle	Commuting	Brief
03:39	Common	Foraging	Heard not seen

	pipistrelle		
03:51	Common pipistrelle	Commuting	Brief
03:58	Noctule	Commuting	One pass
04:01	Common pipistrelle	Commuting	One pass
04:15	**Common pipistrelle**	**Returned to roost**	**'Swarming' around top of roof of Building 2, appeared to enter near ridge as disappeared and not seen flying away**

Surveyor 2: South side of Building 2 & East of Building 1

Time	**Species / Numbers**	**Behaviour**	**Notes**
03:31	Common pipistrelle	Foraging	Not seen
03:35	Common pipistrelle	Foraging	One pass
03:37	Common pipistrelle	Foraging	Brief
03:41	Common pipistrelle	Foraging	One pass
04:00	Common pipistrelle	Foraging	Not seen
04:05	**Common pipistrelle**	**Returned to roost?**	**Bat flew around chimney of Building 2 for some time before disappearing, not seen to fly away from house. Likely re-entry.**

Table 9: Dawn Survey 8th July 2018

Sunrise Time: 04:52

Surveyor 1: On north side of Building 2, Building 3, Checking Ash Tree

Time	**Species / Numbers**	**Behaviour**	**Notes**
03:21	Common pipistrelle	Foraging	Few passes
03:27	Common	Foraging	Passes over several minutes

	pipistrelle		
03:33	Common pipistrelle	Foraging	Heard not seen
03:38	Common pipistrelle	Foraging	Faint
03:40	Common pipistrelle	Foraging	Occasional passes until 03:56
03:57	Noctule	Commuting	Not seen
04:07	**Long-eared**	**Returned to roost**	**Quiet bat flew into Building 2 (Indoor Arena) through large gap above door. It flew around for a little while inside then disappeared, did not fly out again.**
04:11	Common pipistrelle	Commuting	Not seen

Surveyor 2: On south side of Building 1

Time	**Species / Numbers**	**Behaviour**	**Notes**
03:22	Common pipistrelle	Foraging	Brief, 2 passes
03:27	Common pipistrelle	Foraging	Brief
03:30	Common pipistrelle	Foraging	3 passes
03:32	Common pipistrelle	Foraging	Faint
03:41	Common pipistrelle	Foraging	2 passes
03:49	Common pipistrelle	Foraging	2 passes
03:56	Noctule	Foraging	1 pass, heard not seen
04:12	**Common pipistrelle**	**Returning to roost?**	**Bat seen flying around chimney, did not see enter but bat disappeared and was not seen to fly away. Likely re-entered roost.**

Table 10: Dusk Survey 21st July 2018

Sunset Time: 21:21

Surveyor 1: South and east sides of Building 3 Indoor Arena

Time	**Species / Numbers**	**Behaviour**	**Notes**
21:42	**Common pipistrelle**	**Emerged**	**Bat appeared to emerge from corner of building**
21:49	Common pipistrelle	Commuting	
21:49	Pipistrelle species	Commuting	Entered barn
21:53	Common pipistrelle	Foraging	In and out of barn, 1 – 2 bats
21:55	**Common pipistrelle**	**Emerged**	**2 bats flew out of barn**
21:56	Common pipistrelle	Foraging	For several minutes
22:08	Common pipistrelle	Foraging	Flying in and out of barn
22:11	Soprano pipistrelle	Commuting	
22:16	Common pipistrelle	Foraging	2 bats, heard not seen
22:26	Common pipistrelle	Commuting	Heard not seen
22:43	Myotis species	Commuting	Heard not seen
22:43	Common pipistrelle	Foraging	Occasional pass over several minutes

Surveyor 2: North and west sides of Building 3 Indoor Arena

Time	**Species / Numbers**	**Behaviour**	**Notes**
21:48	Soprano pipistrelle	Commuting	Faint, brief
21:57	Pipistrelle species	Commuting	Heard not seen, brief

22:00	**Long-eared bat**	**Emerged**	**Silent bat emerged out of doorway and across to stables. No recording but ties in with static recording of long-eared at this time.**
22:07	Long-eared	Foraging	
22:17	Common pipistrelle	Foraging	
22:24	Common pipistrelle	Foraging	
22:38	Long-eared	Foraging	Brief, faint
22:42	Common pipistrelle	Foraging	Heard not seen, brief.

Table 11: Dusk Survey 1st August 2018

Sunset Time: 21:04

Surveyor 1: South side of Building 2 House

Time	Species / Numbers	Behaviour	Notes
21:30	Common pipistrelle	Foraging	Heard not seen
21:36	Common pipistrelle	Commuting	
21:37	Common pipistrelle	Foraging	Around garden, several passes over 5 minutes
21:44	Common pipistrelle	Foraging	From north direction
21:53	Common pipistrelle	Foraging	Brief
22:12	Pip sp.	Foraging	

Surveyor 1: North side of Building 2 House

Time	Species / Numbers	Behaviour	Notes
21:17	**Common pipistrelle**	**Emerged?**	**Flew from direction of roof**

21:22	Common pipistrelle	Foraging	Very brief
21:24	Common pipistrelle	Foraging	
21:33	Soprano pipistrelle	Foraging	
21:38	Common pipistrelle	Foraging	Circling passes over 10 minutes
22:05	Common pipistrelle	Foraging	

Figure 5: Updated Bat Surveys 2018