Ashfield Land Management and Gazeley GLP Northampton s.à.r.l

Annex E: Bat Survey Report (Part 1 - Main SRFI Site)

Rail Central

Project No. 855950

FEBRUARY 2018

RSK GENERAL NOTES

Project No.: 855950

Title: Rail Central Bat Survey Report (Main SRFI site)

Client: Ashfield Land Management and Gazeley GLP Northampton s.à.r.l

Date: 8 February 2018

Office: Coventry

Status: Final

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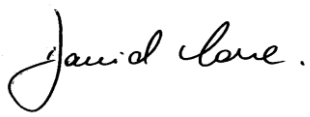
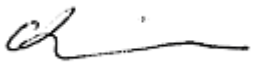
Signature		**Signature**	
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EXECUTIVE SUMMARY

1. This report presents the results of assessments of trees and buildings for bats. The surveys were undertaken in connection with proposals to develop a rail freight interchange at land to the south of Milton Malsor in Northamptonshire. Surveys included initial building assessments, tree assessments (both ground level (GLTA's) and climbing surveys), emergence and re-entry surveys; transect surveys and static bat detector surveys carried out throughout 2016/17.
2. The site comprises agricultural land divided into fields used for both arable and livestock farming. The fields are divided by hedgerows with a large number of standard trees. There are a number of buildings and building groups on the site.
3. The initial building assessments found buildings to have suitable features for roosting bats. . During subsequent emergence and re-entry surveys all of the bat roosts identified within the buildings are day roosts used by individual Common Pipistrelle bats. There are no maternity roosts present, the day roosts as individual roosts are not important on their own but collectively may be important at a site level.
4. Ground Level Tree Assessments were carried out on trees. Trees with moderate or high roosting potential were subject to aerial surveys and emergence and re-entry surveys. No evidence of bats was found in any of the trees on site. Emergence/ re-entry surveys on trees were completed in 2016 and 2017.
5. Transect surveys for bats were carried out to understand how bats were using the site for foraging and commuting. A total of four transects were devised that encompassed all of the land within the boundary of the site, with the fourth transect being along the canal where it bordered the site. The canal transects were only undertaken on two occasions and they were designed to provide some off site data on bat species present close to the site.
6. The transect data revealed that there were very few bats foraging and commuting across the site. The species recorded included Common Pipistrelle, Soprano Pipistrelle, Pipistrelle spp., Noctule, Serotine, Brown Long-eared, and Myotid spp. bats. The transects along the canal revealed that there was a similar assemblage of species but with a much greater number of bats using the canal for commuting and foraging.
7. The combined survey results have revealed that the site has a moderate assemblage of bat species and that bats are present in small numbers. Bats have been found during the transect surveys to use the whole of the site, but with a particular concentration of foraging and commuting behaviour associated with Farm Lane in the east of the site.
8. The proposed works will result in the removal of all roosting features within buildings apart from that within the BG1 – Field Barns. It is suggested that these barns are renovated to include new roosting opportunities for a range of bat species. Much of the commuting and foraging habitat within the southern two thirds of the site will be lost to the

development and it will be important to retain corridors of suitable habitat along the western boundary and along the eastern boundary allowing bats to commute off the site. It is important that these areas are retained and enhanced with additional hedgerow and tree planting.

9. The retained areas in the north of the site should be augmented with additional tree and hedgerow planting to enhance the invertebrate biomass of the site providing enhanced feeding and commuting opportunities for bats.

10. Lighting of the site has been considered and a dark corridor along the western boundary between the development site and the A43 is part of the proposals for the site. Proposals should include consideration of lighting including street lighting of the new access road to include cowls and deflectors to direct light away from the dark corridor. Use should be made of lighting that is triggered by human movement through the proposed pedestrian tunnel so that this remains in darkness allowing bats to use it instead of being forced to attempt to cross the new access road.

11. A European Protected Species Licence (EPSL) will be required for the demolition of those buildings with bats roosts. A licence application will need to be made to Natural England for a Letter of Comfort to be issued prior to submission of the application as part of the Nationally Significant Infrastructure Project (NSIP) process. A full licence application will need to be made once consent for the NSIP has been granted but before works affecting bats is carried out, and depending on the timing of the works may require additional surveys to be carried out before that application is made.

1 INTRODUCTION

1.1 Purpose of this Report

This report presents the results of the preliminary roost assessments of buildings, and ground level trees assessments (GLTAs) for bats. It also presents the results of the subsequent emergence and re-entry, transect, and static bat detector surveys undertaken monthly across the site and adjacent canal.

These surveys were undertaken on land south of Milton Malsor, Northamptonshire (Central Ordnance Survey grid reference SP 7354 0969) to accompany an application to the Ministry of Transport as part of an Nationally Significant Infrastructure Project (NSIP) application for a rail freight interchange. The proposed works include the demolition of existing buildings, removal of trees, and the construction of new buildings and rail infrastructure.

Figure E1 shows the site location and an aerial photograph of the site and *Figure E2* shows the site layout.

Naming conventions for buildings throughout the site are displayed as BG (building group), followed by the name and building number. This also applies to individual buildings for consistency. All buildings are identified in this way throughout the report for ease of identification.

1.2 Survey Objectives

Table E1.1 – Objectives of Surveys

Survey objective	Comments
Determine presence / absence of bats	To determine the presence or absence of bats within the buildings and trees on the site particularly those buildings and trees likely to be demolished or removed to facilitate the development.
Determine bat usage of site (e.g. maternity, hibernation, night roosts in various structures (specify)).	To determine if any bats were present within buildings or trees and establish the status of that use.
Identify foraging, commuting or swarming sites	To identify important commuting routes and foraging areas used by bats. To establish how continued use of any important commuting routes or foraging could be maintained post development.

1.3 Background to the Activity/Development

The *c* 250 ha site consists mostly of arable land and livestock fields used for agriculture. Set within this landscape are a number of groups and individual buildings.

The land was identified as being suitable for a rail freight terminal due to its central location within the country and its proximity to both the West Coast Mainline and the Northampton Loop Railway which follow the southern and eastern boundaries of the site. Additionally there is good road infrastructure locally, with the A34 following the western boundary which in turn links to the M1 motorway at Junction 15.

Surveys were undertaken to investigate the use of the site by bats, including for commuting and foraging and for roosting within the buildings and trees. This was to not only inform the EIA but to also enable early identification of where European Protected Species Mitigation licences would be required where buildings and trees had to be removed and to identify where mitigation and compensation could be included within the development plans.

1.4 Full Details of the Proposed Works at the Site

It is proposed to carry out the following works at the site:

1. Demolish existing buildings:
    a. BG2 – Lodge Farm;
    b. BG3 – The Nursery;
    c. BG4 – Manor Farm;
    d. BG7 – Former Petrol Station; and
    e. BG10 – Rathvilly Farm.
2. Remove trees from the development footprint.
3. Construction of warehousing involving loss of fields, trees and hedgerows.
4. Construction of rail infrastructure involving loss of fields, trees and hedgerows.
5. Lighting of proposed development footprint.
6. Development of both on-site and off-site mitigation and compensation.

1.5 Habitat Description

1.5.1 Brief Site Description

The site is *c* 250 hectares in size and is comprised primarily of agricultural fields. The majority of the land cover is of arable fields with a few fields consisting of semi-improved grassland used for livestock grazing. There is a large area of semi-improved and unimproved grassland in the southwest of the site. Most of these fields are divided by poor quality hedge lines many with large standard trees. There is an area of trees that are subject to a Tree Preservation Order (TPO) in the northern part of the site with other standard trees throughout the site.

There is a small stream that runs approximately north to south across the site. Throughout the site there are groups of buildings as well as individual buildings (*Figure E4 – Phase 1 Maps 1 – 4*).

1.5.2 Description of Offsite Areas

The site is located south of the village of Milton Malsor, which consists of buildings and recreation areas. It is also north of the village of Blisworth and is buffered by the Grand Union Canal and the East Coast mainline railway. To the west the site is immediately bordered by the A43 road which runs north to south, and by the Grand Union Canal which also runs north to south and then west to east at the south west corner.

To the east of the site it is bordered by the Northampton Loop railway, and the M1 motorway runs north west to south east approximately 2 km north of the site.

There is limited woodland within the landscape surrounding the site with the nearest woodland being approximately 700 m east of the site beyond the Northampton Loop. There are other small areas of woodland to the east and within 2 km of the site and these are linked by hedgerows that surround fields.

This landscape is generally poor for bats with a number of barriers that may deter bats, with the most significant corridor that bats use being the Grand Union Canal to the west of the site.

1.6 Structure of this Report

The remainder of this report is structured as follows:

- *Section 2* describes the survey methods;
- *Section 3* presents results of the surveys;
- *Section 4* presents the evaluation/interpretation of the results of the surveys;
- *Section 5* describes the proposed mitigation and compensation;
- *Section 6* presents the references

Appendix A provides the survey details

Appendix B provides the photographic plates

Appendix C provides the relevant legislation

Appendix D provides the discretionary advice service letter; and

Appendix E provides the figures

2 SURVEY METHODS

2.1 Introduction

The whole site was subject to a number of survey strategies so that all activity by bats including roosting, commuting and foraging was recorded. The surveys were designed using the methods outlined in the Bat Surveys for Professional Ecologists. Collins, J. (ed.) (2016)

2.2 Surveys

The following surveys were carried out at the site:

- Initial bat assessments of buildings;
- Dusk emergence and Dawn re-entry surveys of buildings;
- Initial ground level assessments of trees;
- Tree climbing surveys of trees; and
- Emergence surveys of trees
- Static Bat Detector Surveys

Details of the weather conditions for the surveys and the equipment used are shown in the Appendices.

The surveyors employed on the various surveys and their expertise is shown in Table in the Appendices.

2.3 Desk Study

A desk study was undertaken using aerial photography and maps of the site and the surrounding area to establish potential commuting, foraging and roosting locations that may be used by bats. This information was used to determine the requirements for initial bat surveys of buildings and trees and to identify potentially important commuting routes for bats that would require transect and static detector surveys.

Bat records are held by the Northamptonshire Bat Group and not the local records centre. Therefore a request was made to them for all bat records within 5 km of the centre of the site. These records aid in determining what level of survey is required for the site.

2.4 Visual Inspection of Buildings

Ecologists from RSK inspected all buildings where access was agreed internally and externally using the methods described below.

The building was assessed for its suitability to support roosting bats using primarily a 1,000,000-candle power torch but also binoculars, ladders and an endoscope where necessary. The buildings were assessed for their bat roost potential according to the following factors that influence the likelihood of bat roosting.

- Surrounding habitat: whether there are potential flight-lines and bat foraging areas nearby.
- Construction detail: the type and construction of architectural features such as drainage pipes or naturally occurring voids within the buildings.
- Building condition: whether there were suitable gaps within the external construction of the buildings that may give access to internal voids.
- Internal conditions: bats favour sheltered locations with a store temperature regime, protection from the elements and little wind/light/rain penetration.
- Potential bat-access points: whether there is flight and crawl access.
- Potential roosting locations: descriptions of all bat-accessible voids, cracks and crevices.

A description of each building was recorded on survey sheets, and digital photographs of them were taken as a record. The buildings were categorised into a standard scheme as described in *Table E1.2* below.

An examination of each building was made for bats and evidence of bats, both internally and externally where access was made. Features inspected (if present) included:

- roof slopes and the ridge;
- wall, window and door surfaces;
- window and door frames;
- wall bases;
- wall ledges and wall tops;
- cracks, crevices and sheltered voids;
- the floors and stored items; and
- external features such as soffits and lead flashing.

Evidence of roosting bats includes droppings, urine stains, staining from fur-oils, scratch marks, wear marks, feeding remains, dead bats, odour, squeaking and chattering, and in some cases the absence of cobwebs.

Bat droppings provide evidence that bats use a structure and can help to identify roosting locations where piles accumulate beneath roosting sites or entrance points. The location, size, shape, texture and colour of the droppings can be used to aid species identification. All droppings found were compared to a reference collection of droppings from known species. The number and condition (age) of droppings can indicate the size of the roost and when it was last used.

2.5 Ground Level Tree Assessment (GLTA)

All trees on the site were assessed from ground level using binoculars for features on the tree that may support roosting bats. These features can include ivy cover, splits, and cavities within the trunk of the tree or its limbs. Each tree is then given a grading which is based on the guidance in the Bat Surveys for Professional Ecologists as shown in *Table E1.2*.

2.5.1 Classification Criteria for Building and Ground Level Tree Assessment

Table E1.2 Classification criteria for building and ground level tree assessment

Category (Potential to support roosting bats)	Description
Negligible potential	Negligible habitat features on site likely to be used by roosting bats.
Low Potential	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions. And/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate potential	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High Potential	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Confirmed roost	Bats or evidence of bats recorded within the building during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

2.6 Aerial Surveys

Aerial surveys can take the form of an inspection of potential roost features identified during the GLTA from a ladder or using rope access methods. These features are closely inspected using torches, mirrors and endoscopes to search for evidence of bats including droppings, staining from sebaceous oil and scratch marks. In some cases it is not possible to fully inspect a feature using these methods *i.e.* depth of a cavity or due to the tree being using by another sensitive species *i.e.* Barn Owls (*Tyto alba*). Where evidence of bats is found or a full survey of the tree is not possible then additional dusk emergence or dawn re-entry surveys may be required.

2.7 Dusk Emergence and Dawn Re-entry Surveys

Dusk emergence and dawn re-entry surveys were carried out on buildings or trees where there are suitable features for bats. Surveyors are positioned so that all suitable features can be observed by the surveyors. Surveyors observe the features for bats, either emerging during a dusk survey or re-entering during a dawn survey. All surveyors are equipped with a bat detector which records the echolocation of bats. These calls are recorded to either a stereo solid state recorder or to SD cards within the

detectors. Where there is ambiguity over the species of bat these calls are analysed using sound analysis software. These can include BatSound, Kaleidoscope and BatExplorer.

2.8 Transect Surveys

Surveyors equipped with bat detectors walked pre-determined routes around the site. The routes were planned to include all features that may be used by bats for commuting and/or foraging *e.g.* hedge rows, woodland, water features, etc. Surveyors were equipped with bat detectors to record all bat activity. Surveyors started each survey at dusk and walked between pre-determined points recording all activity. They recorded the time, location, flight style (if the bat was visible), field identification of the bat species, and what the bat was doing (*i.e.* commuting, foraging or song flighting). Some detectors use inbuilt GPS to locate the position of the bat and these GPS readings can be exported to a map. Features that may be significant for bat activity are identified and static recording is undertaken at these points. The surveyors walk the route until complete with the survey lasting between two and three hours.

Transect surveys were planned according to guidance from Bat Survey Guidelines (Collins, 2016). This site was divided into three transect routes that included all suitable features that bats could use for commuting and foraging. Each transect was approximately 3.5 km in length. The site was considered to have moderate potential for bats to be using the site for foraging and commuting. Therefore each of the transect routes were walked once a month during each month of the bat active season between April and October 2016. All transects are shown on *Figures E7 – 12*.

2.9 Static Bat Detector Surveys

Key areas of habitat for bats were identified during the desk study (*Section 2.3.*) and static bat detectors were deployed for three nights to record all bat passes in these areas. This survey method attempts to captures species which are not picked up during other surveys particularly bats that may enter the area from off-site, so that a comprehensive species list for the site can be compiled. The data also gives an indication of the importance of the site for bats. All data recorded is then analysed to identify the species using Kaleidoscope sound analysis program.

Each detector was deployed during each month of the bat active season (May to September.)

2.10 Sound Analysis

Echolocation calls were identified down to species wherever possible; however, depending on the type of bat encountered and call recorded it is not always possible to reliably identify all bats beyond their genus. In particular, because of the similarities of their frequency modulated calls, Myotis bat species cannot reliably be separated.

Therefore, in this region of England, a 'Myotis bat' call is most likely to comprise either: Natterer's Bat (*M. nattereri*), Daubenton's Bat (*M. daubentonii*), Whiskered Bat (*M. mystacinus*) or Brandt's Bat (*M. brandtii*) but could also be Bechstein's Bat (*M. bechsteinii*).

Note that it can also be difficult to separate some calls of *Plecotus* bats (in Northamptonshire most likely to be the Brown Long-Eared Bat, *Plecotus auritus*, rather than the Grey Long-Eared Bat, *P. austriacus*) as well as separating some Plecotus calls from Myotis bats. It can also be difficult to distinguish between the two bats in the *Nyctalus* genus, Noctule (*N. noctula*) and Leisler's bat (*N. leisleri*), and occasionally alongside Serotine (*Eptesicus serotinus*). Some calls of Common Pipistrelle (*Pipistrellus pipistrellus*) also overlap with either Nathusius' Pipistrelle (*P. nathusii*) or Soprano Pipistrelle (*P.pygmaeus*). Analysis of cryptic calls can also be more difficult with faint or poor quality recordings.

Lastly, there are a number of variables that affect the detect ability of a bat, ranging from its biology and ecology, to the environmental conditions and condition of the equipment, and so there are limitations in drawing certain conclusions about bat activity on a site from the use of bat detectors / sound analysis alone.

2.11 Evaluation

In order to provide a means of evaluating the bat assemblages using the site in 2017, in both a wider context and in the context of previous assessments, the monitoring results have been evaluated against adapted criteria from Wray *et al*. (2010). This method has also been used in the absence of any other recognised approach.

For this method, where bats (species and likely number of) are found using certain habitats (to roost, commute or forage) their population is assigned a relative ecological value. This value is partly based upon how well used a habitat is and partly upon how rare the bat species is. The number of roosts nearby

In this method of assessment British bat species are subdivided into groups, dependent upon how common they are: common, rarer and rarest as shown in *Table E1.3*. These were further subdivided based upon the location of the site surveyed (i.e. in England).

Table E1.3: Categorising Bats by Distribution and Rarity in England.

Rarity in England:	Bat Species:
Rarest (population estimated to be under 10,000)	Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) Bechstein's Bat (*Myotis Bechsteinii*) Alcathoe Bat (*Myotis Alcathoe*) Greater Mouse-Eared Bat (*Myotis myotis*) Barbastelle Bat (*Barbastella barbastellus*) Grey Long-Eared Bat (*Plecotus austriacus*)

Rarity in England:	Bat Species:
Rarer (population estimated to be 10,000 to 100,000)	Lesser Horseshoe Bat (*Rhinolophus hipposideros*) Whiskered Bat (*Myotis mystacinus*) Brandt's Bat (*Myotis brandtii*) Daubenton's Bat (*Myotis daubentonii*) Natterer's Bat (*Myotis nattereri*) Leisler's Bat (*Nyctalus leisleri*) Noctule (*Nyctalus noctula*) Nathusius' Pipistrelle (*Pipistrellus nathusii*) Serotine (*Eptesicus serotinus*)
Common (population estimated to be over 100,000)	Common Pipistrelle (*Pipistrellus pipistrellus*) Soprano Pipistrelle (*Pipistrellus pygmaeus*) Brown Long-Eared Bat (*Plecotus auritus*)

To calculate the score (shown in brackets in the tables below) for commuting routes or foraging areas according to Wray *et al.,* (2010), the numerical values in *Table E1.5* (commuting) are each added together to give a total for each species recorded on the site, and the same is then also done for *Table E1.6* (foraging). The highest value obtained for a species across both tables is then used in the assessment. This value is applied to the overall scoring system shown in *Table E1.7* to give an assessment of the importance of the site to foraging and commuting bats within a geographic frame of reference.

Table E1.4: Valuing Bat Roosts

Geographic frame of reference	Roost Types
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well used swarming sites Maternity sites (rarer/rarest species) Hibernation sites (rarest species Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting SSSI guidelines
International	SAC sites

Having categorised bat species by rarity and distribution above (*Table E1.2*) different roost types can be assigned to a geographic frame of reference based on the rarity of the species concerned. *Table 1.4* shows the valuations for different roost types, for bats in each rarity category. As an example, maternity sites of common species would be valued at County level, whereas maternity sites of the rarest species would be valued at National level.

Table E1.5: Valuing Commuting Routes.

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Unvegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number / Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
		Large number of roosts or close to a SSSI (5)	Well grown and well connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table E1.6: Valuing Foraging Areas.

Species	Likely No. of Bats	Roosts / Potential Roosts Nearby	Foraging Habitat Characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches less intensive arable and/or small towns and villages (3)
		Large number of roosts or close to a SSSI (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Table E1.7: Scoring System for Valuing Sites for Commuting and Foraging Bats.

Geographic Frame of Reference	Score
International	>50
National	41-50
Regional	31-40

Geographic Frame of Reference	Score
County	21-30
District, local or parish	11-20
Not important	1-10

2.11.1 Constraints for all surveys

The following constraints were identified during the course of the surveys at the site.

Initial bat surveys were all carried out as planned with no constraints.

Transect surveys were all carried out except for the April surveys which were abandoned due to unsuitable weather conditions with temperatures well below those acceptable for such surveys. One survey was conducted where light precipitation was encountered towards the end of the survey but was insufficient to abandon the survey.

Static bat detectors suffered multiple failures primarily due to microphone failure.

Dusk emergence and dawn re-entry surveys were all carried out. There were occasional periods of light precipitation insufficient to abandon the surveys except for one survey at Rathvilly when the survey was stopped early. The majority of these surveys were carried out during weather conditions that were suitable.

3 SURVEY RESULTS

3.1 Desk Study

Records within 5 km of the site were sought from the Northants Bat Group and these identified records of eight species of bat within that radius. The species identified were Pipistrelle spp., *Pipistrellus pipistrellus* (Common Pipistrelle), *Pipistrellus pygmaeus* (Soprano Pipistrelle), *Plecotus auritus* (Brown long-eared), *Myotis daubentonni* (Daubentons), *Myotis nattereri (*Natterer's), *Myotis mystachinus/brandti* (Whiskered/Brandts), *Barbastella barbastellus (Barbastelle)*, and *Nyctalus noctula* (Noctule) bats. Of the records supplied, six were within the site boundary including Pipistrelle spp., Brown Long-eared and Natterers bat roosts within a barn on the site and a single Daubentons record on the western edge of the site (*Figure E3* shows the bat records).

3.1.1 Building Descriptions

All buildings within the red line boundary and that were considered for surveys are shown in *Figure E5 Maps 1 – 5*.

Table E1.8 Building Descriptions

Building Group No and Name	Building No and Type	Building Description
BG1 – Field Barns	Barn 1	This is a two storey brick barn with a slate tiled pitched roof. The roof is in poor condition. Barn owls have used this building as a breeding site and there is significant evidence of this species within the barn.
	Barn 2	Barn 2 is a single storey extension to the first barn attached at its southern end, with a poorly-sealed pitched corrugated metal roof laid over timber sarking. The barn is extremely dilapidated.
	Barn 3	This is a single storey brick stable block with a pitched corrugated metal roof laid over timber sarking.

BG2 – Lodge Farm	Building 1	This is a two storey brick and stone built house with a slate tiled pitched roof. The roof has two voids that are connected. The building is in generally good condition.
	Building 2	This is a brick and stone built barn and stable block that is attached to Building 1 at its east end. The barn has a pitched tiled roof and the stable block element has a pitched metal roof.
	Building 3	A range of farm buildings that are interconnected and consist of modern barn type structures that are open on at least one side.
	Building 4	A range of farm buildings that are interconnected and consist of modern barn type structures that are open on at least one side.
BG4 – Manor Farm	Building 1	A detached bungalow and detached double garage. The Bungalow is constructed of brick with a pitched tiled roof. The detached double garage is of breeze block construction with stone cladding and a pitched tiled roof.
	Building 2	A large timber stable block with a tiled pitched roof. The building is new.
	Building 3	A series of industrial units constructed of breeze blocks for the lower half of the walls and corrugated metal upper walls and roof. The gently pitched roof on each unit is of a single skin construction.
	Building 4	A series of large modern warehouse buildings constructed of congregated metal throughout the walls and roof.
	Building 5	A row of single story industrial units constructed with a variety of materials including brick, breeze blocks, corrugated metal and wooden cladding. The majority of the units have a flat roof apart from one building which has a steeply pitched roof constructed of corrugated metal.
BG6 – Arm Farm	Building 1	A collection of 19th Century stone barns, much-extended with brick-built additions, all featuring pitched tiled roofs

BG7 – Petrol Station	Building 1	A former petrol station building that is constructed of brick with a flat metal roof. The building has been heavily vandalised and there is evidence that fires may have damaged the internal structure of the building.
BG10 – Rathvilly Farm	Building 1.	A single detached farmhouse of modern construction with a pitched tiled roof. The internal roof void is trussed and is lined internally with F1 Bitumastic Felt that is in good condition preventing any access to the void. The roof is in good condition with no broken or missing tiles. There are two lifted tiles on the rear elevation of the house and a small area of missing mortar at the ridge that could allow bats to enter the interior of the roof. There are no soffits and the edge of the roof is sealed to the walls preventing any access.
	Building 2	A detached garage constructed of brick with a pitched roof. The roof void has been lined with boards and is used for storage.
	Building 3	A detached former poultry unit constructed of timber around a metal frame. Now used for the storage of machinery.
	Building 4	A detached metal construction ware house

Table E1.8 shows details of all buildings within the site to which surveyors have had access. Surveyors have not had access to a number of building groups. These are listed below in *Table E1.9* along with the reason they were not surveyed.

Table E1.9 –Buildings Not Surveyed

Building Group	Reason for No Survey
BG3 – The Nursery	No access was permitted by the owners but access will be forthcoming in 2017
BG5 – Canal Building	This building was originally within the red line boundary of the site and has since been taken out. Therefore no survey completed
BG8 – Devron House	This building was originally within the red line boundary for the site but has since

	been taken out therefore no survey of the buildings within the site have been undertaken. However anecdotal information has suggested the presence of a possible maternity roost of bats
BG9 – House and Industrial Units on Northampton Road	This group of buildings was originally within the red line boundary of the site and has since been removed.

3.1.2 Visual Inspections of Buildings

Table E1.10– Visual Inspection Results

Date	Species Observed	Roost Type	Structure Reference	Roost Location	Potential Access Points	Dimensions of existing roosts
19.04.2016	None	None Identified	BG1 – Field Barns – Building 1	None Found	Through holes in building structure allowing free flight	N/A

Notes and Observations: A field barn constructed of brick and is two storeys in height. The building has a pitched roof covered with slate tiles. The roof is in a generally poor condition with a large area of missing tiles on the west side allowing ingress of the weather. There are holes in the walls and there are missing windows and doors that allow flight access into the interior of the building. There are wooden barge boards on the gables allowing potential access beneath and onto the walls plates of the building. This building has extensive opportunities for roosting bats including large maternity colonies. No evidence of bats was found during the internal inspection. See *Photo Plates 1 - 9 , Appendix B.*

This building is classified as having **a CONFIRMED** bat roost as shown in *Table E1.2.*

None	None Identified	BG1 – Field Barns – Building 2	None Found	Beneath roof covering throughout structure and within holes and crevices within the walls	N/A

Notes and Observations: This barn is a brick built barn and is of a single storey. It is an extension to Building 1. The building has a pitched roof with a corrugated metal roof laid over timber sarking. This building is in a very poor condition with a large hole in the east wall. There are many locations that could potentially be used by bats although not suitable as a maternity roost. No evidence of bats was found during the internal inspection. See *Photo Plates 1 - 9, Appendix B*.

This building is classified as having **a CONFIRMED** bat roost as shown in *Table E1.2*.

1	None	None Found	BG1 – Field Barns – Building 3	None found	Access through east side where there is no wall	N/A

Notes and Observations: A single storey brick stable block with a pitched corrugated metal roof laid over timber sarking. There is potential for roosting at the roof apex although this would be for individual bats rather than groups. The building is generally very dilapidated with extensive weather ingress reducing the overall potential of the building as a potential roost. See *Photo Plates 1 – 9, Appendix B*

This building is classified as having MODERATE potential as a bat roost as shown in *Table E1.2*.

10.03.2016	None	Day	BG2- Lodge Farm – Building 1	Within Roof Void	Beneath roof tiles throughout structure and through gaps between this building and Building 2 within roof void.	Approximately 20 m x 10 m x 3 m

Notes and Observations: This farmhouse is 'L' shaped and constructed of brick and stone. The building has one wing along an east/west axis with the second wing along a North/South axis The brick section is a newer extension to the farmhouse. The building has a pitched roof covered with slate tiles that have some missing and/or slipped tiles on all elevations that bats could use to get beneath the tiles to access the interior of the roof void or the space between the tiles and sarking. There is a gable end that faces south at one end of the building (See Plate 1). The walls of the house are in generally good condition with no holes or cavities that could be used by bats. The roof which is 'L' shaped is split into two voids. The roof is open allowing any bats using the void free uninterrupted flight.

The two loft voids are separated by an internal stone wall that was the original west facing flank wall of the farmhouse before the extension was added. There is a gap over the top of the wall allowing bats to pass between the two voids. The void at the west end of the house could not be accessed for inspection as there was no separate loft hatch.

A full inspection of the main internal void was made including the lifting of fibreglass insulation on the floor. Two very old droppings from bats were found but these were in such poor condition they were not collected for DNA analysis and it was not possible to identify the species from the dropping shape or size. No further evidence of bats or bat use was found within this void. See *Photo Plates 10 – 17, Appendix B*

This building is classified as having **HIGH** potential as a bat roost as shown in *Table E1.2* and requires additional emergence and dawn re-entry surveys

10.03.2016	None	Day	BG2 Lodge Farm – Building 2	None Found	Through gap in wall. Through open doors	Approx 15m x 10m x 6m

Notes and Observations: This building is constructed from stone with a pitched roof and flat roof. The building consists of 3 elements 1) The main barn, 2) Stable Block and 3) Covered animal pens.

1) The barn is an extension of B2-Building 1 above. It lies on an East/West axis. The barn is constructed from a combination of brick and stone with a pitched slated roof with a gable end at its east end. The upper part of the gable is exposed but it is well pointed with no potential access. The lower section of the east wall has numerous areas of missing mortar leading to internal cavities offering potential roosting. Within the south elevation there are double cart doors with the doors remaining open during the spring and summer months. The interior of the barn is open to the roof throughout with exposed wooden sarking beneath the roof slates. There is a mezzanine level at the east end of the barn. The internal walls have gaps within the mortar leading to cavities within the walls providing potential roosting opportunities. There is also a gap at the top of the west wall internally that leads into the roof void of B2-Building 1. The barn is used generally as a workshop and for storage of smaller pieces of farm machinery so is a relatively disturbed area. Two very old bat droppings were adhering to an internal wall of the

barn. It was not possible to determine the species and the droppings were too deteriorated to be suitable for DNA.

2) The stable block is single storey and constructed of stone with a pitched new metal roof. There are no gaps suitable for bats externally. The south facing gable wall at the end of the stable block has a large hole within it potentially allowing bats to fly directly into the interior. The interior is split into stalls with dividing walls. Many of these walls are topped with chicken wire that prevents bats from flying through the building. The roof internally is open to the ridge and is lined with timber sarking potentially allowing bats to roost along the ridge line. A thorough search of this structure revealed no evidence of any use by bats.
3) This area that extends from the rear of the main barn and encompasses the end of the stable block. It is a ramshackle series of additions supported by both timber and steel uprights. The roof is a mixture of coverings including corrugated asbestos sheets, metal roofing sheets and clear corrugated plastic sheets. The area is used for sheep during the lambing season. The whole area is generally open with no suitable roosting opportunities. The internal temperature is generally very variable with a breezes blowing through when the wind is blowing.

   See Photo Plates 10 – 17, Appendix B

This building is classified as having overall a **HIGH** potential as a bat roost as shown in Table *E1.2.*

10.03.2016	None	None Identified	BG2 – Lodge Farm – Building 3	None Found	None Found

Notes and Observations: This is a range of farm buildings that are all linked and consist of cattle sheds and barns. They are all open to the elements allowing the wind and rain to penetrate. There are no sheltered crevices suitable for bats. *Photo Plates 10 – 17, Appendix B*

This building is classified as having overall a **NEGLIGIBLE** potential as a bat roost as shown in Table E*1.2.*

10.03.2016	None	None Identified	BG2 – Lodge Farm– Building 4	None Found	None Found

Notes and Observations: This is a range of farm buildings including a dutch barn and animal sheds that are all linked. These structures are used for the storage of hay and straw and for animal housing. They are all open to the elements allowing the wind and rain to penetrate. There are no sheltered crevices suitable for bats. *Photo Plates 10 - 17, Appendix B*.

This building is classified as having overall a **NEGLIGIBLE** potential as a bat roost as shown in Table E1.2.

15.04.2016	None	Day	BG4 – Manor Farm – Building 1	Potential bat access is through the roof where there are missing tiles, and beneath the soffits	The roof void and along the wall plates of the building.

Notes and Observations: This comprises of a detached bungalow and detached garage treated as a single building. The bungalow is constructed of brick with a pitched tiled roof. The roof covering has missing tiles providing potential access to the roof void. There are also gaps beneath the lead flashing around the chimney. The building has soffits that are in generally good condition but with gaps between the wall and the boxes that could give access to the wall plate and the roof void. The roof void is a modern trussed roof. A search of the roof void found two old droppings on the floor of the loft. The insulation on the floor of the loft was lifted and no further droppings were found.

The detached garage is constructed of breeze block that has stone cladding on its exterior. The roof is pitched and covered with tiles. The interior is extant to the ridge with no potential for bats.

Photo Plates 18 – 26, Appendix B.

The Bungalow is classified as having overall a **HIGH** potential as a bat roost as shown in Table E1.2.

None	None Identified	BG4 – Manor Farm – Building 2	Potential bat access beneath soffits and beneath roof tiles.	N/a

Notes and Observations: This is a large timber stable block with a tiled pitched roof. The building is new and is generally well sealed. There is timber sarking beneath the roof tiles that has some holes within it. There are some ill fitting roof tiles that provide gaps for bats.

Photo Plates 18 – 26, Appendix B.

This building is classified as having overall a MODERATE potential as a bat roost as shown in Table E*1.2*.

None	None Identified	BG4 – Manor Farm – Building 3	N/A	N/A

Notes and Observations: A series of interconnected modern industrial units constructed with lower walls of breeze block and corrugated metal walls. The roof is gently pitched and covered with single skin corrugated metal sheets. These buildings are of open construction internally with no sheltered crevices. The building has the benefit of clear skylights making the interior too light for bats to roost in the open areas.

Photo Plates 18 – 26, Appendix B.

This building is classified as having overall NEGLIGIBLE potential as a bat roost as shown in Table E*1.2.*

None	None Identified	BG4 – Manor Farm – Building 4	N/A	N/A

Notes and Observations: A series of interconnected modern industrial units constructed with sheet metal walls and roofs. There are no potential access points and no potential roosting locations for bats externally or internally.

Photo Plates 18 – 26, Appendix B.

This building is classified as having overall NEGLIGIBLE potential as a bat roost as shown in Table E*1.2.*

None	None Identified	BG4 – Manor Farm – Building 5	Potential access points include under barge boards and above doors	N/A

Notes and Observations: A row of single story industrial units constructed with a variety of materials including brick, breeze blocks, corrugated metal and wooden

cladding. The majority of the units have a flat roof apart from one building which has a steeply pitched roof constructed of corrugated metal. All units are generally well sealed and appeared dry inside however gaps above doors and under barge boards were present which could provide access routes for bats. Some of the units could not be accessed internally due to locked doors.

Photo Plates 18 – 26, Appendix B.

This building is classified as having overall LOW potential as a bat roost as shown in Table E*1.2* .

19.04.2016	None	None Identified	BG6 – Arm Farm – Building 1	Through holes in walls, beneath roof tiles etc	N/A

Notes and Observations: A collection of interlinked 19th Century stone barns, much-extended with brick-built additions, all featuring pitched tiled roofs. All buildings are dilapidated with missing tiles and holes in brickwork throughout. Doorways are either open or with poorly-fitting wooden doors, and as such there are an abundance of entrances and shelters for `any bat species.

Photo Plates 27 – 29, Appendix B.

This building is classified as having overall NEGLIGIBLE potential as a bat roost as shown in Table E*1.2.*

10.03.2016	None	None	BG7-Building 1	None Found	None Found

Notes and Observations: This building is a service station that is accessed off of the A43. It consists of access roads, hard standing, and a covered canopy area with petrol pumps and a retail shop. The structures are derelict and have been subject of vandalism. The canopy is constructed of metal panels with a flat metal roof with no potential access to any voids. The retail shop is constructed around a steel frame with panel walls and windows and has a pitched roof. There has been damage to the front of the shop allowing the weather to penetrate the interior. There are no gaps or crevices suitable for bats within the interior. There are no potential access points to the interior of the small cavity within the roof. *Photo Plates 29 – 31, Appendix B.*

This building is classified as having overall a **NEGLIGIBLE** potential as a bat roost as shown in Table E*1 .2.*

13.04.2017	**None**	**None**	**BG10 – Building 1**	**Beneath lifted tiles and beneath missing mortar at ridge**	**None Found**

Notes and Observations: This building is a detached farmhouse constructed over two storeys with a pitched and tiled roof. There are two lifted tiles on the rear elevation of the house and an area of missing mortar at the ridge. There are no gaps around the roofline with this being sealed to the walls. The roof interior is cluttered with modern roof trusses and is used for storage. No droppings either recent or historical were found anywhere within the void.

Photo Plates 32 – 33, Appendix B.

This building is classified as having overall a **MODERATE** potential as a bat roost as shown in *Table E1.2.*

13.04.2017	**None**	**None**	**BG10 – Building 2**	**Beneath gaps under roof slates.**	**None Found**

Notes and Observations: This building is a detached garage building constructed from brick. There is a pitched slate roof and there are uneven slates with gaps beneath on both elevations of the roof. Internally the garage roof is extant to the ridge but is lined hardboard sheets that are totally sealed. There is F1 Bitumastic felt between the slates and the hardboard. Bats could enter beneath the tiles and roost between the tiles and the felting.

Photo Plates 34 - 35, Appendix B.

This building is classified as having overall a **MODERATE** potential as a bat roost as shown in *Table E1.2.*

13.04.2017	**None**	**None**	**BG10 – Building 3**	**Through open doors and damaged windows**	**Within the large open void that is the interior of the building. No roosts were found but many small crevices were noted throughout the building.**

Notes and Observations: This building is a detached semi derelict former poultry shed. This is a large single storey building with a shallow pitched roof. The roof is constructed from corrugated panels and the undersides are coated with a spray on insulation material. The whole building is built around a steel frame. The walls are wooden panels with windows in all elevations. T windows are in considerable disrepair with many broken or open. At the east end of the building are large double doors that are permanently open. Internally the building is extremely dirty with large areas coated with a thick layer of dust. There are many crevices between the internal metal roof beams (that form part of the metal frame). The interior is used for the storage of farm machinery. A search of the building found a single dropping that was degraded but was Pipistrelle species in appearance.

Photo Plates 36 – 38, Appendix B.

This building is classified as having overall a **HIGH** potential as a bat roost as shown in *Table E1.2.*

13.04.2017	**None**	**None**	**BG10 – Building 4**	**None**	**None**

Notes and Observations: This is a detached warehouse building constructed of metal panels over a steel frame. There are gaps over the roller doors at the front of the building. The eaves of the building have gaps between the walls and the overhanging roof covering but these do not allow direct flight into the buildings interior, bats would have to perch to gain entry and the smooth metal surfaces prevent this. Internally all surfaces are metal and there are no suitable cavities for roosting bats.

Photo Plate 39, Appendix B.

This building is classified as having overall a **NEGLIGIBLE** potential as a bat roost as shown in *Table E1 .2*

Initial bat assessments were not carried out on BG3, BG8, and BG9 as no access was agreed with the landowners. All other buildings that were assessed for their potential to support roosting bats as having moderate or high potential for bats were subject of additional dusk and dawn surveys as shown in *Sections 3.1.3.* and *3.1.4*.

3.1.3 Dusk Survey Results – Buildings

Table E1.11 - Dusk Survey Results for Building Groups

Date	Start and end times	Species	Roost type	Structure reference	Roost location	Access points	Dimensions of existing roosts or explanation of where the roost is	Notes/Observations
17/05/2016	Sunset: 21:02 Start: 20:36 Finish: 22:32	Common Pipistrelle	Day	BG1 Field Barns - Building 1	Unknown but likely to be between timber cladding or under the barge boards	Northern end of building, above barn door.	Unknown but likely to be in crevice between timber cladding or under the barge boards.	At 2124 a single Common pipistrelle emerged from a small gap beneath the barge boards at the northern end of the building. The bat was identified at site and the species was confirmed through sound analysis. Additional bats of the same species were seen foraging around the buildings and adjacent vegetation, but no further bats were recorded emerging from the buildings.
06/06/2016	Sunset: 21:27 Start: 21:15 Finish: 23:00	Common Pipistrelle	Day	BG1- Field Barns Building 1	Unknown but likely to be between timber cladding or under the barge boards unknown	-Northern end of building, above barn door. -East side of building 1, large hole in brickwork.	Unknown but likely to be in crevice between timber cladding or under the barge boards.	At 2151 a single Common pipistrelle emerged from a small gap beneath the barge boards at the northern end of the building. At 2210 a second Common pipistrelle emerged from a large hole in the wall of the east side of building 1. The bats were identified at site and the species confirmed through sound analysis. Additional bats of the same species were seen foraging around the buildings and adjacent vegetation, but no further bats were recorded emerging from the buildings.

23/05/2016	Sunset: 21:11 Start: 20:55 Finish: 2234	P45	*Building 1-Day Roost* *Building 2 – Day Roost*	BG2 – Lodge Farm Building 1 & 2	Various opportunities within barn	Beneath soffits, missing roof tiles throughout, gaps around windows/doors	Various	Notes/observations: at 2128 two surveyors recorded a single Common pipistrelle emerging, one from within the eastern end of Building 1 and the other from the roof of Building 2. At 2142 a separate surveyor recorded two Common pipistrelles emerging from the north side of the roof of Building 1, behind the barge boards. One bat returned to this roost at 2149 and a significant level of activity was noted. On the south side of the same building a Common pipistrelle was seen returning to a roost within the roof, accessed by a gap created by loose tiles. The bats were identified at site and the species confirmed through sound analysis. Common pipistrelles were recorded foraging and commuting in all locations around the complex of buildings at Lodge Farm .
09/06/2016	Sunset: 21:30 Start: 2115 Finish: 2323	None	None found	N/A	None found	N/A	N/A	Pipistrelle, Noctule, and Myotis species were recorded commuting and foraging at various locations around the building complex, however no bats were seen to emerge during this survey.
24/05/2016	Sunset: 21:12 Start: 20:55 Finish: 2225	None	*None found*	BG4 – Manor Farm – Building 1	None found	N/A	N/A	Notes/observations: Common Pipistrelle bats were noted commuting and foraging in the vicinity of the building; however no bats were seen to emerge.
21/06/2016	Sunset: 21:35 Start: 2115 Finish: 2300	None	None found		None found	N/A	N/A	Notes/observations: Common Pipistrelles were seen commuting and foraging close to the building, however none were seen to emerge.
20/06/2016	Sunset:	Unknown	Day	BG4 –	Roof space	Drilled hole on	Within wall	Notes/observations: At 2206 a bat was

	21:35 Start: 2115 Finish: 2250		Roost	Manor Farm – Building 5	within 'gate house' of stables	inside of archway	possibly within cavity	seen to emerge from a small drilled hole beneath the gateway to the stables at the eastern end. It was not possible to identify the species due to the recording being too faint. A small number of Common pipistrelles were observed commuting near to the building; however no further bats were seen emerging from the building.
13/06/2016	Sunset: 21:32 Start: 2115 Finish: 2245	None	None found	BG4 – Manor Farm – Building 5	None found	N/A	N/A	Myotis and Common and Soprano Pipistrelle bats were noted commuting and foraging in the vicinity of the building; however no bats were seen to emerge.
19/05/2016	Sunset: 21:05 Start: 2050 Finish: 22:00	None	*None found*	BG6 – Arm Farm	None found	N/A	N/A	Common Pipistrelles and Noctules were recorded foraging and commuting close to the buildings but no bats were seen to emerge.
08/06/2016	Sunset: 21:29 Start: 21:10 Finish: 2242	Common Pipistrelle	Day	Building 1	Unknown	Missing timber cladding above large barn door	Roost location unknown	At 2142 a single Common Pipistrelle emerged from a gap above the barn door of Building 1. A second of the same species bat emerged at 2152. Common Pipistrelles were recorded foraging around the buildings.
07/06/2018	Sunset: 21:28 Start: 21:10 Finish: 22:00	Common Pipistrelle	Day	BG10 – Building 3	Inside Building – Unknown Location	Through broken window	Roost :Location within building unknown	At 2148 a single Common Pipistrelle emerged through a broken window of the building. No other bats emerged. There was drizzle at the start of the survey and the bat was noted flying within the building before sunset.
26/06/2018	Sunset: 21:36 Start: 21:20 Finish: 23:05	None	None Found	Buildings 1 and 2	None Found	N/A	N/A	Common Pipistrelles were recorded flying through the site but no bats emerged from the buildings.

25/07/2018	Sunset: 21:11 Start: 20:55 Finish: 22:45	Common Pipistrelle	Day	Building 3	Inside Building – Unknown Location	Through open doors	Roost :Location within building unknown	A single Common Pipistrelle bat emerged through the open doors of the building at 21:31. No other bats emerged

3.1.4 Dawn Survey Results – Buildings

Table E1.12 - Dawn Survey Results for Building Group 1

Date	Start and end times	Species	Roost type (to be consistent with the above listed types)	Structure reference (consistent with relevant figures and other text)	Roost location	Access points	Dimensions of existing roosts or explanation of where the roost is	Notes/Observations
07/07/2016	Start: 0252 Finish: 0500	None	N/A	BG1 – Field Barns Building 1 - 2	N/A	N/A	N/A	No bats observed returning to roost during survey. Common pipistrelle bats seen commuting and foraging around the buildings and adjacent vegetation.
11/08/2016	Start: Finish:	Common Pipistrelle	Day	BG1 – Field Barns - Building 1 - 2	Northern end of building, above barn door		Small gap beneath barge boards	At 0240 a single Common pipistrelle was seen returning to a small gap beneath the barge boards at the northern end of the building. Another bat of the same species returned to the same location at 0527. The bats were identified at site and the species confirmed through sound analysis. Further common Pipistrelles were seen foraging and commuting around the buildings and adjacent vegetation, and Noctules were observed commuting overhead.

10/08/2016	Start: 0339 Finish: 0609	None	*None found*	N/A	None found	N/A	N/A	A single Brown long-eared bat was seen foraging around a tree close to the southern gable end of Building 1 but this was the only activity recorded during the survey and no bats were seen entering the building to roost.
16/08/2016	Start: 0400 Finish: 0555	None	*None found*	N/A	None found	N/A	N/A	Common Pipistrelles were seen commuting close to the building; however none were seen to re-enter .
16/08/2016	Start: 0400 Finish: 0555	None	None found	BG2 – Manor Farm – Building 2	None found	N/A	N/A	Common Pipistrelles were seen commuting close to the building; however none were seen to enter.
12/08/2016	Start: 0330 Finish: 0550	None	None found	BG6 – Arm Farm – Buildings 1 - 3	None found	N/A	N/A	Common Pipistrelles were recorded foraging around the buildings and Noctules were seen commuting overhead but no bats were seen to enter.
01/08/2017	Dawn: 05:28 Start: 0400 Finish: 0545	None	None Found	BG10- Buildings 1 and 2	None Found	N/A	N/A	Occasional Common Pipistrelle bats were recorded flying through the site but no bats entered either building.
02/08/2017	Dawn: 05:30 Start: 0400 Finish: 0545	Day	Common Pipistrelle	Day	Inside Building – Unknown Location	Through open doors	Roost :Location within building unknown	A single Common Pipistrelle was seen flying constantly backwards and forwards outside of the open doors of the building entering the building and flying back out. This was constant from 0516. The bat finally entered the building and did not emerge again at 05:35. The bat was followed into the building but had already entered its roost which was not located.

15/08/2017	Dawn: 05:51 Start: 04:15 Finish: 0605	Day	Common Pipistrelle	Day	Inside Building – Unknown Location	Through open doors	Roost :Location within building unknown	A single Common Pipistrelle was seen flying constantly backwards and forwards outside of the open doors of the building entering the building and flying back out. This was constant from 0533. The bat finally entered the building and did not emerge again at 05:46. The bat was followed into the building but had already entered its roost which was not located.

3.1.5 Static Bat Detector Surveys

Static bat detectors were deployed across the site on a monthly basis. There were a number of failures of equipment resulting in no survey data being available for those detectors. However data that was obtained showed that the only triggers were by two species of bat; Common Pipistrelle and Noctule bats. The number of triggers in any one night on any detector was no more than 11 triggers, with many showing triggers in single figures only.

The results of these surveys are in line with the results of the transect surveys showing that very few bats are using the site overall. The main concentration of activity being in the east and south-east of the site and associated with Farm Lane.

3.2 Transect Survey Results

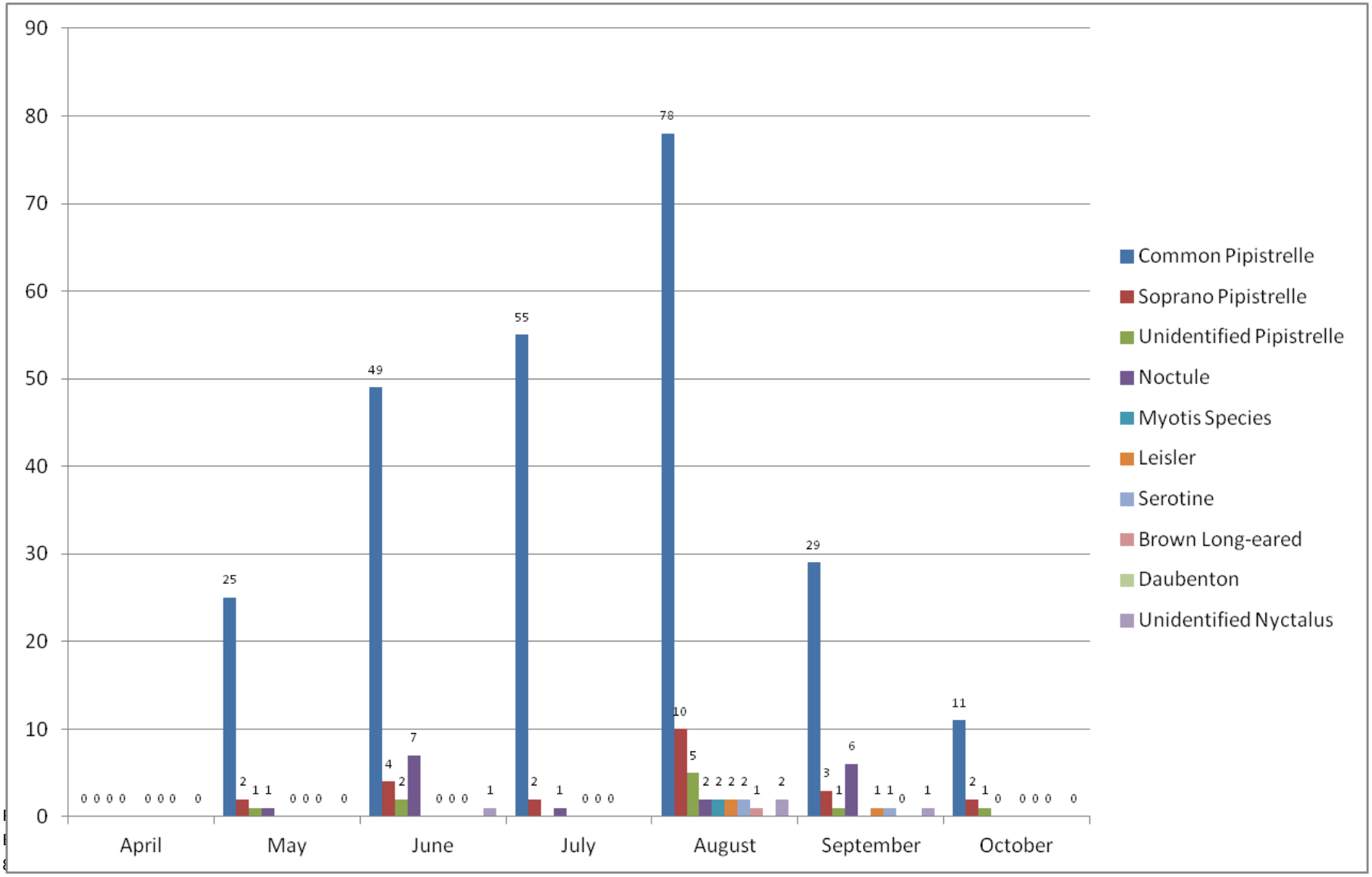
A total of three transects were walked across the whole of the site monthly, the results are shown in the Table below as a cumulative result.

Table E1.13 – Transect Survey Results – Cumulative by Month

	Date	Total Bat Passes	Common Pipistrelle	Soprano Pipistrelle	Unidentified Pipistrelle	Noctule	Myotis Species	Leisler	Serotine	Brown Long-eared	Daubenton	Unidentified Nyctalus	Weather Favourable for Bats?	Notes and Comments
Main Site	April	0	0	0	0	0	0	0	0	0	0	0	No	All three transects were abandoned during April due to poor weather conditions. Transect 1 was partially completed before the survey was abandoned due to sub-optimal weather conditions due to the temperature dropping below three degrees. No bats were recorded during this partial transect. Transects 2 and 3 were abandoned at the start due to very low temperatures
	May	29	25	2	1	1	0	0	0	0	0	0	Yes	The bats were spread throughout the site, but there were concentrations of activity along Farm Lane in the east of the site where Transects 1 and 2 shared a common boundary, and at the north-west edge of the site close to Milton Malsor within Transect 3 (*Figure E7*).
	June	63	49	4	2	7	0	0	0	0	0	1	Yes	The bats were spread throughout the site but there was a concentration of bats in the south-east of the site, with Common Pipistrelle bats being the most common bat. The highest level of activity was along Farm Lane and two hedgerows to the east and west of the lane (*Figure E8*).

	July	58	55	2		1	0	0	0	0	0		Yes	The bats were spread throughout the site with no concentrations in any specific part of the site. No bats were tracked back to any roosts.
	August	104	78	10	5	2	2	2	2	1		2	Yes	Bats were spread across the site, but there were concentrations of bat activity along Farm Lane and the hedgerows that run off of it, a small concentration of activity in the south east corner, and two small concentrations of activity in the west of the site. All other activity was individual bats along hedgerows or over the top of groups of trees.
	Septembe r	42	29	3	1	6	0	1	1	0	0	1	Yes	Bats were spread across the site, but there was a concentration of bat activity along the lower end of Farm Lane close to The Nursery, and also along a hedgerow to the west of Farm Lane.
	October	14	11	2	1	0	0	0	0	0	0	0	Yes	Most bats were recorded to the west of Northampton Road, with the largest concentration (bats) recorded at the rear of the industrial estate.
Canal	May and August		x	x		x				x	x		Yes	Both transects showed extensive use of the canal between and the Blisworth Arm where the canal runs parallel with the A43. The most common bat was Common Pipistrelle followed by Soprano Pipistrelle and Daubenton bats. No roosts were identified in either trees or buildings during these transects.

Chart E1.1 – Transect Surveys cumulative totals across the site on a monthly basis for all three transects



The transect results above show that the most commonly encountered bat during the transects was the Common Pipistrelle. All other bat species encountered were all in very small numbers. The totals for each month express totals for the entire site of bats encountered over all three of the transect routes. None of the monthly totals were large with the largest number of bats encountered being 104 bat passes of all species in August 2016.

All species present were in small numbers for such a large site showing that the site generally is of poor quality for bats in terms of foraging and commuting.

3.3 Trees

A total of 96 trees were assessed and all which were assessed as moderate or high potential were then subject to either aerial or ground level tree assessments. No evidence of bats was discovered in any of the trees during these assessments. There were some trees that when inspected had their grading reduced to either low or negligible potential meaning no further surveys on them was necessary as advised in the Bat Surveys for Professional Ecologists.

Those trees still considered suitable after detailed inspection, as having either moderate or high potential were then the subject of dusk emergence surveys or dawn re-entry surveys. All trees have had at least one dusk or dawn carried out with many having three of these surveys carried out.

Just a single Tree (No 40) has been found to have bats using it and that was a single Common Pipistrelle observed during a single emergence survey.

Table E1.14 – Results of Tree Inspections (GLTA and Climbing)

Tree ID*	Species	DBH (m)	PRF Description	Height (m)	Aspect	GLTA Grade	Date Climbed	Climbing Grade (highest grade feature)	Further Action	Survey Date	Completed
1	Qr	1.5	Hole in dead wood split (above birds nest).	7	W	Moderate	25/06/2016	Moderate	Emergence / Dawn	25.06.2016	No - one further emergence survey required
			Woodpecker hole, fissures and deadwood	12	N	Moderate		Moderate			
2	Fe	2.5	Small hole in trunk	2	W	Low	N/A	N/A	N/A	N/A	Yes
3	Qr	1.1	small hole of branch possibly leading to larger cavity	4	N	Moderate	24/05/2016	Low	Completed	N/A	Yes
4	Qr	2	Gap behind flaking bark along vertical wound	2-10	N	Moderate	24/05/2016	Moderate	Emergence / Dawn	02.06.2016	No - one further emergence survey required
			Holes around dead branch	7	W	Moderate		Moderate			
			Horizontal split in dead branch with holes	7	E	Moderate		Moderate			
			Hollow trunk	0.5+	S	Moderate		Moderate			
			Numerous other splits to investigate around dead branches on all aspects	2-10	Central	Moderate		Moderate			
5	Fe	1.5	Overlapping Ivy stems	2-4	All	Low	N/A	N/A	N/A	N/A	Yes
6	Sf	1.5	Overlapping Ivy stems	2-4	All	Low	N/A	N/A	N/A	N/A	Yes
7	Pyrus sp.	1	Woodpecker hole	5	W	Low	25/06/2016	Low	Climbing	N/A	Yes
8	Fe	1.5	Split in wound of partially dead branch	6	E	High	24/05/2016	High	Emergence	02.06.2016	No - one

			Woodpecker holes in dead branch (possible blue tit nest)	8	E	High		High	/ Dawn	and 26.06.2016	further emergence survey required
			Cavities in large possibly hollow branch	6	E (viewed from S)	High		High			
			Cavities up main trunk including point of tear	3-8	S and W	High		High			
9	Um	0.4	Small hole in trunk possibly leading to cavity	4	W	Moderate	24/05/2016	Low	N/A	N/A	Yes
10	Fe	2	Overlapping Ivy stems	2-4	All	Low	N/A	N/A	N/A	N/A	Yes
11	Fe	2	Rot hole leading to small cavity	1.5	W	Low	N/A	N/A	N/A	N/A	Yes
12	Fe	1.5	Cavity at base of branch	5	N	Moderate	24/05/2016	Moderate	Climbing	Two further climbing inspections on 24.05.2016 and 26.06.2016	Yes
			Large cavity in trunk (corvid nest)	2	SE	High		Moderate			
			Long crack in bark on trunk	2-4	NW	Low		Moderate			
13	Fe	1.2	Rot hole possibly leading to cavity	5	N	Moderate	24/05/2016	Low	Climbing	Two further climbing inspections on 24.05.2016 and 26.06.2016	Yes
			Woodpecker hole in dead branch (adjacent to feature above)	6	NW	Moderate		No brp			
			Cavity at the end of horizontal wound	7.5	SW	High		Moderate			
			Woodpecker hole in branch possibly leading to PRF above	8	SW	Moderate		Low			
			Two rot holes in same branch with possible cavities	4-6	SW	Low		Low			
			Cavity at base on branch (viewed from SW)	4	NW	Moderate		Low			
			Rot holes in vertical branch	8	N	Moderate		Low			
			Rot hole in trunk with staining	3	N	Moderate		No brp			

14	Fe	1.2	Numerous woodpecker holes	5-7	N	Moderate	N/A - Unsafe to climb	N/A	Emergence	14.06.2016 and 27.07.2016	Yes
15	Fe	0.9	Small gaps around snapped branch wound	4	S	Moderate		Low	Climbing	Two further climbing inspections on 07.06.2016 and 25.06.2016	Yes
			Hollow in wound	5	E	Moderate		Moderate			
			Two wounds on trunk	5	N	Moderate		Low			
16	Fe	1.1	Three holes in bark into dead wood below branch failure	10-12	W	Moderate	14/06/2016	Moderate	Emergence	14.06.2016	No - one further emergence survey required
			Two socket cavities	6	W	Moderate					
			Hole in bark	10	E	Moderate					
			Woodpecker hole	13	SE	Moderate					
17	Fe	1	Socket hole	14	W	Moderate	N/A	N/A	N/A (tree fallen down)	N/A	Yes
18	Qr	0.8	Branch Collar	10	W	Low	N/A	N/A	N/A	N/A	Yes
			Branch Collar, Ivy clad	9.5	W	Low					
19	Fe	1.1	Dense Ivy (possible other features obstructed)	All	All	Low	N/A	N/A	Inspected further and no other features were present	N/A	Yes
20(V)	Ah	2.5	Stem crack	1.5-3	N	High	20/05/2016	High	Climbing	Climbing inspection on 09.07.2016	No - one further climbing inspection required
			Cracks and cavity in desiccated branch	3	NE	Mod					
			Impact shatter	3.5	S	Mod					
			Stem crack	1	S	Mod					
			Cavity in part desiccated limb	5	W	High					
21(V)	Qr	2	rot around base of flush cut	3.5	NW	Low	01/06/2016	Low	N/A	N/A	Yes
			rot around base of flush cut	3.5	E	Low					
			Stress crack on central limb	5.5	N	Low					

22	Qr	1.2	Woodpecker hole	6.5	SW	High	20/05/2016	High	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Woodpecker hole in bottom of tear out	5.5	N	Mod					
			Impact shatter	6	N	Mod					
			Knot hole	4	N	High					
23(V)	Cm	0.4	Decaying Trunk and holes	1	Central	Low	N/A	N/A	N/A	N/A	Yes
24(V)	Qr	1.9	Impact Shatter	0-3.5	W	Mod	31/05/2016	High	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Impact shatter	5	S	Mod					
			Stress crack on limb	1-4	NE	High					
			Desiccated limb	3-4	N	High					
25	Qr	1.1	Stress Crack			Moderate	31/05/2016	Moderate	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Tear out			Moderate					
26(V)	Ms	0.4	Decaying Trunk	0.5	S	Low	N/A	N/A	N/A	N/A	Yes
27(V)	Ps	0.5	Flaking Bark	1	Central	Low	N/A	N/A	N/A	N/A	Yes
28	Fe	1.1	Knot Hole	4	NW	Moderate	31/05/2016	Moderate	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Knot Hole	4.5	N	Negligible					
			Knot Hole	9	W	negligible					
			Knot Hole	9	S	negligible					
			Knot Hole	6	N	negligible					
			Knot Hole	7	N	Low					
29	Fe	0.5	Butt Rot	0	SE	Moderate	01/06/2016	Moderate	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Rot Hole	2.5	SE	Moderate					
30	Qr	1.1	Tear out	7	NW	Moderate	01/06/2016	Moderate	Climbing	Climbing	No - one

			Tear out	7	S	negligible				inspection on 10.07.2016	further climbing inspection required
			Rot hole at the base of desiccated limb	3	E	Low					
31	Qr	0.8	Tear out	8	W	negligible	01/06/2016	Low	N/A	N/A	Yes
			Tear out	4.5	N	Low					
			Tear out	4	Central	Low					
32	Fe	0.7	Canker wounds	5.5	All	Moderate	02/06/2016	Moderate	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Woodpecker Hole	5.5	N	Moderate					
			Woodpecker Hole	4.5	N	Moderate					
33(V)	Fe	0.7	Knot hole	4	SW	negligible	02/06/2016	High	Emergence	Emergence survey on 28.06.2016	No - two further Emergence / dawn surveys
			Woodpecker Hole	8.5	SW	Low					
			Woodpecker Hole	12	E	High					
			Woodpecker Hole	12	E	High					
			Woodpecker Hole	8	E	negligible					
34	Fe	0.5	Knot Hole	4	E	negligible	02/06/2016	Low	N/A	N/A	Yes
			Split in limb	4.5	E	Low					
35	Fe	0.5	Woodpecker Hole	3.5	S	negligible	02/06/2016	Low	N/A	N/A	Yes
			Woodpecker Hole on limb	6	S	Low					
36	Fe	0.6	Knot hole	2	W	Negligible	02/06/2016	Moderate	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Woodpecker Hole	2.1	N	Low					
			Rot Hole at base of small limb	2.6	NW	Moderate					
			Stress Crack in limb	4.5	W	Low					
			Knot hole	4.3	E	negligible					
			Impact shatter on end of limb	4.5	S	Low					
			Knot hole	2.6	S	Moderate					
			knot hole	5	S	Low					
37	Fe	0.7	Tear out on Trunk	1-5	W	Moderate	02/06/2016	Moderate	Climbing	02.06.2016 (not an	No - one further
			Woodpecker hole	2.5	S	negligible					

			Woodpecker hole	3	E	negligible				additional survey but carried out in the bat active season).	climbing inspection required
			Tear out on Trunk	3.5	W	Moderate					
			Rot hole	3.5	E	Low					
38	Fe	0.5	Kanker wounds	3-top	All	low	02/06/2016	Low	N/A	N/A	Yes
39	Qr	1.1	Loose Bark	0-2	E	High	03/06/2016	High	Climbing	Climbing inspection on 10.07.2016	No - one further climbing inspection required
			Impact shatter	3	N	negligible					
			Split in desiccated limb	3	S	Low					
			Stress crack under limb	7	E	negligible					
			Stress crack in limb	12	SW	negligible					
			Stem crack on top of limb	10	S	High					
40	Fe	1.4	Large Ivy Clad, Branch collar	7	N	Low	30/06/2016	High	Climbing and one Emergence	30.06.2016 (not an additional survey but carried out in the bat active season).	Two emergence Surveys carried out
			Broken limb, loose bark, curled bark	11	N	Low-mod					
41	Ah	0.4	Small coppard, lots of flaking bark and rolled bark	0.5-2	All	low	N/A	N/A	N/A	N/A	N/A
42(V)	Qr	1	Cavity in lower trunk – Split into 2 chambers, extended up but narrowed significantly	1	E	Low	19/04/2016	Low	N/A	N/A	Yes
			Inspected knot hole@4/5m, could see back of hole (5cm deep)	4.5	N	Low		Low			
			Flaking bark on numerous deadwood although open to the elements.			Low		Low			
43	Fe	1.2	Knothole in upper stem	12	S	Low	N/A	N/A	N/A	N/A	Yes
			Knothole in main stem, entrance facing upward	4	E	Low					

44	Fe	1	Previously outside of red line boundary but as of March 2017 is now inside. Large knothole.	7	SW	Moderate	25.06.2017		Climbing	25.06.2016 (not an additional survey but carried out in the bat active season).	No - two further climbing inspections are required in 2017
45	Fe	1	Dense ivy cover, some fairly thick-stemmed, some die-back in upper crowns	8	All	Low	N/A	N/A	N/A	N/A	Yes
46	Fe	0.7	Central cavity	3-4	NE	High	06/09/2016	Moderate	Climbing	06.09.2016	No - two further climbing inspection required
47	Qr	1	Exposed heartwood, vertical fissures in main stem. Weak union of twin stems. Behind main stem – multiple vertical fissures – clean and smooth	2-6	E	Moderate	21/03/2016	High	Climbing	Climbing inspection on 07.06.2016	No - one further climbing inspection required
48	Fe	1	Poor condition tree. Numerous deadwood and cavities throughout canopy. Dense Ivy coverage	7	NW	Moderate	21/03/2016	Moderate	Emergence and Climbing	07/06/2016	No - two further climbing inspection / emergence required
			Large cavity in main stem obscured from ground level by ivy. Birds nest present in cavity	5		High		High			
			Cavities on dead wood. Can't access as not safe to climb	7-9	S	Moderate		Moderate			
			3 woodpecker holes	6	E	Moderate	07/06/2016	Moderate	Climbing		
			Rot hole in rotting limb	4	E	Moderate		Moderate			

49	Fe	1.2	Three woodpecker holes: - Lowest hole was c. 5 cm deep - middle hole extended up c. 15 cm, and down, cobwebs present - top hole only extended down	6	E	Moderate	09/03/2016	N/A	Emergence	Emergence Survey conducted on 28.06.2016	No - one further emergence survey required
			Two knot-holes: - west facing hole was small and not suitable - south facing hole on the main stem (c. 7 m from the ground) was superficial and filled with rainwater	4-7	W & S	Negligible					
50	Qr	1	north facing hole on trunk (c. 2 m from the ground) visible from the road, exposed and not suitable	2	N	Moderate	09/03/2016	Moderate	Emergence	Emergence Survey conducted on 25.06.2016	No - one further emergence survey required
			Rot hole present near the end of the primary branch extending over the field at a dog leg (c. 4 m from the ground). Hole extended c. 30 cm.	4		Moderate		Moderate			
			A hole about 8 m up on the main stem, the cavity opened into the stem and extended down.	8		Moderate		Moderate			
51	Qr/Fe	1.5	Fissure in dead branch	10	N	Low	Low	Low	N/A	N/A	Yes
			Socket hole in dead branch	10	N	Low					
52	Qr	1	Loose bark around the trunk of the tree		All	Low	N/A	N/A	N/A	N/A	Yes
			Dead limbs		All	Low					
53	Fe	1.2	Dieback in crown. Crown failed and has split and fallen off. There is a large cavity at the base		SW	Moderate	19/04/2016	Moderate	Emergence	Emergence survey on 27.06.2017 and 11.08.2016	Yes

54	Fe	1	Dieback in crown. Cavity in trunk – completely hollow, rotted heartwood.	4	W	Moderate	19/04/2016	High	Emergence	Emergence survey on 28.06.2017 and 10.08.2016	No - one further emergence survey required
			Limb that goes west has hole facing up. Extends 80cm, 10-15cm wide on entry to cavity no evidence using endoscope, could see back of hole	6	W	Moderate		High			
55	Qr	1	Curled bark (ram's-horns) on a limb extending west that appears to have suffered a tear-out of another limb. Open to the elements	3-4	W	High	19/04/2016	Low	Barn Owl nesting in tree during the climbing survey on 19.04.2016	Climbing survey on 19.04.2016	No - could consider emergence surveys if Barn Owls are not present
			Knot-hole at end of limb growing east. Splits into 2 chambers. No evidence found in either with endoscope	3-4	E	High		Moderate			
			Main trunk cavity can see to ground level when on ladder at 4m. Evidence of Barn Owl droppings on ledge within rotted heartwood, roughly 3m. White staining, small white feathers.	4	Central Stem	High		Moderate			
			Primary limb growing east at 4/5m, entrance of hole 10cm extending 80cm+ east. No evidence found using endoscope	4-5	E	High		Moderate			
56	Qr	1	Tear out	2	W	low	12/05/2016	Moderate	Climbing	12.05.2016 (not an additional survey but carried out in the bat active season).	No - one further climbing inspection required
			Tear out	5	S	Low					
			Tear out	5.2	S	Negligible					
			Cavity beneath desiccated limb	3.5	E	Moderate					
			gap base of desiccated limb	2.5	E	Negligible					
			Hazard beam	6	E	Moderate					
57	Qr	1	Tear out	4.5	NW	High	10/05/2016	Moderate	Climbing	Climbing survey on 25.06.2016	No - one further climbing inspection

											required
58	Qr	1	Flaking Bark	4	NW	low	10/05/2016	Low	N/A	N/A	N/A
59	Qr	1.1	Rot hole, loose bark underside of largest south facing dead branch	5	S	Low	10/05/2016	Low	Climbing	Climbing survey on 24.05.2016 and 25.06.2016	Yes
			Split dead branch	3.2	SE	Low		Low			
			Flaking bark on dead branch	4-5	S	Low		Low			
			Hole on elbow of large limb	3	S	Moderate		Moderate			
			Flaking bark	8-10	N	Low		Low			
60	Qr	1	Cavity	5	S	High	10/05/2016	High	Climbing	Climbing survey on 24.05.2016 and 25.06.2016	No - one further climbing inspection required
			long rip, bark roll	5-6	E	High					
			Cavity	7	W	High					
			Cavity at base of dead branch	3	NE	Moderate					
			Cavity, rotten wood	4	NW	Low					
			longitudinal split, dead branch	8	NW	Moderate					
			rot hole/woodpecker hole	8	NW	High					
61	Qr	1.1	Oak with co dominant, upper boughs both with rot holes facing East	7.1	E	High	12/05/2016	High	Climbing	Climbing survey on 12.05.2016 and 25.06.2016	No - one further climbing inspection required
				7	E	High					
			Slot in a rotten branch	6	S	High					
			Bark folds around limb	4	NE	Moderate					
62	Fe	0.5	Split in main trunk	0.3-2	N-S	Moderate	12/05/2016	Low	N/A	N/A	N/A
			Rot hole	3.5	SE	High		Low			
63	Qr	0.7	Hole on North side	2	N	Low	12/05/2016	Moderate	Climbing	12.05.2016 (not an additional survey but carried out in the bat active	No - one further climbing inspection required
			Rot hole in elbow of branch	5.5	SE	Low					

									season).	
64	Qr	1	Split in dead wood	4	E	Low	12/05/2016	Moderate	Climbing	12.05.2016 (not an additional survey but carried out in the bat active season).	No - one further climbing inspection required
			Rot/Woodpecker Hole	4	N	High					
65	Fe	0.5	Branch Cavity	3.5	NE	Low	N/A	N/A	N/A	N/A	Yes
			Branch Tear	8	S	Low					
66	Qr	1.2	Massive tear on trunk, fractured limbs, rolled bark	0-4	E+S	Moderate	14/06/2016	Moderate	Climbing	Initial Climbing inspection on 14.06.2016	No - Requires another climbing inspection
67	Fe	0.5	Stem Tear, Woodpecker hole	6.5	E	Moderate	14/06/2016	Moderate	Climbing	Initial Climbing inspection on 14.06.2016	No - Requires another climbing inspection
68	Fe	0.6	Branch Collar	3.2	NE	Low	N/A	N/A	N/A	N/A	Yes
			Branch Collar & Tear	2.1	NE	Low					
69	Fe	0.5	Branch Collar, Rot Hole, Ivy Clad	5	W	Low	N/A	N/A	N/A	N/A	Yes
70	Fe	0.5	Ivy covered	6	E	Low	N/A	Low	N/A	N/A	Yes
71	Fe	0.5	Branch tear, cavity	7	W	Low	N/A	Low	N/A	N/A	Yes
72	Fe	0.5	Heavy Ivy	0.8	All		14/06/2016	High	Climbing and one Emergence	Initial Climbing inspection on	No - Requires another climbing
			Branch Tear	5	E	Moderate					

										14.06.2016	inspection
73	Fe	0.7	Woodpecker Hole	5	NE	High	14/06/2016	Moderate	Climbing	Initial Climbing inspection on 14.06.2016	No - Requires another climbing inspection
			Trunk Cavity	4	NE	Moderate					
			Branch Collar	6	S	Low					
74	Qr	0.8	Knot hole	2	N	low	03/06/2016	Low	N/A	N/A	Yes
			Tear out/impact shatter	6.7	Centre	low					
			Knot hole	3	SW	negligible					
			Knot hole	6	E	negligible					
			Main Stem Fracture/Tear & loose bark	6-8	S	Moderate					
75	Qr	1	Stress Crack	8	N	Moderate	03/06/2016	Moderate	Climbing	Climbing inspection 06.09.2016	Climbed twice during bat active season
			Stress Crack	8-9	Central	negligible					
			at base of desiccated limb	7	S	negligible					
			Tear out	7-8	W	Moderate					
			Dead Limb, cavity at base	7	W	Moderate					
77	Fe	0.5	Multi stem ash trackside knot holes	6 + 7	N	High	N/A	N/A	Emergence	Emergence Survey on 28.07.2016	No - two further Emergence / dawn surveys
78	Fe	1	2x woodpecker holes	12	W	High	14/06/2016	High	Climbing	Climbing inspection 06.09.2016	Climbed twice during bat active season. High feature needs one final survey.
			crevices around large split branch	5-8	N	Moderate					
			Woodpecker Hole	10	E centre	High					
			Fissure Bark	9	E	Low					
			Loose Bark - Smashed limb	10	S	Moderate					
			Tear-Fissure Bark	0-3.5	N	Moderate					
			Tear-Fissure Bark	3.5-6	W-S	Moderate					
79	Qr	1.2	Dead Limb - Flaking bark and fissures	0-6	Central	Low	N/A	High	Emergence	Emergence	No - two

			Curled Bark	8	W	Mod - High	(Unsafe to climb)			Survey on 29.07.2016	further Emergence / dawn surveys or climbing surveys
80	Qr	0.9	Socket wound with narrow aperture at base, sap run staining below. Could see to back of feature	2.5	NW	Moderate	28/04/2016	Low	N/A	N/A	Yes
81	Qr	1	Open split on limb, no sheltered areas	3.5	S	Moderate	28/04/2016	Low	N/A	N/A	N/A
			Knot hole	3.5	S	Moderate		Low			
82	Qr	1.2	Open cavity on old pruning wound on main stem	3.5	S	Low	28/04/2016	Low	N/A	N/A	N/A
			Deadwood – Bark flaking at branch collar. Can see to bottom of feature, birds nest at bottom	4	N	Low		Low			
83(V)	Qr	1	Impact shatter	3.5	N	low	12/05/2016	High	Climbing	Climbing inspection on 12.05.2016 (not an additional survey but carried out in the bat active season).	No - Requires two further climbing inspections (High feature only)
			Impact shatter	5.5	E	low					
			Cavity in desiccated limb	5.5	S	High					
			Stress crack	5.5	E	Negligible					
			Knot hole	5.5	E	Negligible					
84	Fe	0.4	Tear out/knot hole on trunk	3.5	N	Low	N/A	Moderate	N/A	N/A	N/A
85	Fe	1.1	Large socket hole on main stem. Open feature, 20cm's deep and could see back of feature – birds nest forming	4	SE	Low-Moderate	28/04/2016	Low	Climbing	Climbing inspection on 07.06.2016	Yes

			Series of woodpecker (WP) holes on central leader. Top hole 9m down to roughly 7m. Internal wood rotted away could see light from other WP holes down to bottom of feature where a pool of water is collected.	9-7	N&E	Low		Low		and 06.09.2016	
			Rotted bacterial area on primary limb growing south 5m from main stem.	6	S	Negligible		Negligible			
			Feature at point of previous failed branch. Birds nest at bottom of feature, cavity 20cm deep	4	S	Moderate		Moderate			
			Knot hole on primary limb growing north. Could see to back of feature	4	N	Low		Low			
86	Ms	0.5	Rot Hole / frost crack leading to two long cavities. Tree situated in area of dense scrub.	1.5	E	Moderate	30.06.2016	Moderate	Ground Level Inspection	Inspected on 30.06.2016	Need one final ground level inspection
87	Fe	0.5	Tear Out	5	E	Moderate	30.06.2016	Low	N/A	N/A	N/A
88	Fe	0.5	Knot Hole	3.5	E	Low	30.06.2016	Negligible	N/A	N/A	N/A
			Knot Hole	5	N	Low		Low			
			Knot Hole	2	S	Low		Low			
			Tear out	3	S	Moderate		Low			
			Branch End	3	SE	Low		Negligible			
			Knot Hole	5	S	Moderate		Low			
			Knot Hole	5	S	Moderate		Low			
			Knot Hole	5	S	Low		Negligible			
			Knot Hole	6	N	Low		Negligible			
89	Qr	0.5	Tree located trackside. Assessed from East only, may be more PRFs on other aspects	3.5	S	Low		N/A	N/A	N/A	Need access to trackside to assess all areas

90	Qr	0.9	Mature, but healthy tree. Couple of small rot holes, superficial.	4	E	Low	19/04/2016	Low	N/A	N/A	N/A
			Cavity suitable for nesting birds, extends 15cm up	2.5	N	Low		Low			
91	Fe	0.8	Rot hole in trunk	0.1	S	Moderate	13/05/2016	Moderate	Climbing	Climbing inspection on 09.07.2016	Climbed twice during bat active season
92	Fe	0.9	Woodpecker and rot holes	5	S	Moderate	13/05/2016	Moderate	Climbing	Climbing inspection on 09.07.2016	Climbed twice during bat active season
93	Fe	0.4	Woodpecker Hole	3	S	Low	13/05/2016	Low	N/A	N/A	N/A
			Knot hole	3.05	S	negligible					
			Butt Rot	0	E	Low					
94	Fe	0.5	Woodpecker hole	4.8	SE	Moderate	13/05/2016	Moderate	Climbing	Climbing inspection on 09.07.2016	Climbed twice during bat active season
			Woodpecker hole	5.1	SE	Moderate					
95	Qr	1.3	Knot hole	4	S	Moderate	13/05/2016	High	Climbing	Climbing inspection on 13.05.2016 and 09.07.2016	Climbed twice during bat active season, required one final limbing inspection
			Stress Crack	4.5-5.5	S	High					
			Knot hole	5	S	Moderate					
			Knot hole on end of small limb	8.5	E	Moderate					
			Tear out	5	E	Low					
			Rot hole in flesh cut	4.5	N	Negligible					
			Woodpecker hole	7.5	NW	High					
96	Fe	0.7	Butt Rot	0	SW	Low	13/05/2016	Low	N/A	N/A	N/A
			Canker wounds	2.5-10	All	Low					

*** V indicates a Veteran Tree**

4 INTERPRETATION AND EVALUATION

4.1 Status of the Species at the site

Table E1.15 - Species Status

Species	Conservation Status Assessment		
	Local	County	Regional
Pipistrellus pipistrellus	This bat is frequent and common in the local area	This bat is frequent and common throughout Northamptonshire and is the most frequent species encountered	This bat is frequent and common throughout the Midlands and is the most frequent species encountered.
Pipistrellus pygmaeus (Soprano Pipistrelle)	This bat is frequent and common in the local area	This bat is frequent and common throughout Northamptonshire and is the second most frequent species encountered	This bat is frequent and common throughout the South East of England and is the second most frequent species encountered.
Plecotus auritus (Brown Long-eared)	This bat is frequent and common in the local area.	This bat is frequent and common throughout Northamptonshire and is the Third most frequent species encountered	This bat is frequent and common throughout the Midlands and is the second most frequent species encountered.
Myotis Nattereri	This is an uncommon species found in this area.	This is an uncommon species but is found throughout Northamptonshire.	This bat is found throughout the Midlands but it is relatively uncommon
Myotis daubentonni	Frequent throughout the local area.	This bat is found throughout Northamptonshire and is relatively common	This bat is found throughout the Midlands and is common.
Nyctalus noctula	Found throughout the local area in small numbers. Relatively uncommon	This bat is found throughout Northamptonshire. It is though relatively uncommon.	This bat is found throughout the Midlands but is relatively uncommon.
Myotis mystachinus/Myotis brandti	Found throughout the local area in small numbers. Relatively uncommon	This bat is found throughout Northamptonshire. It is though relatively uncommon. However this likely due to	This bat is found throughout the Midlands but is relatively uncommon. However this

		under recording	likely due to under recording
Barbastella barbastellus	Found occasionally in the local area, This bat has only been identified locally in the last couple of years and all from sound recordings with no roosts known. Relatively rare	This bat is recorded from Northamptonshire but in only small numbers. Relatively rare. It is likely that this is due to under recording	This bat is recorded throughout the Midlands but only in small numbers and is relatively rare. This is likely due to under recording.

4.2 Buildings

Building inspections and emergence surveys of the accessible building groups identified the following roosts

BG1 – Barn 1 and Barn 2. Both are used as day roosts by Common Pipistrelle bats in very small numbers. Historically these barns were also used as roosts by Brown Long-eared and Natterers bats which were identified within the desk survey within the results of the Data Search with the Northampton Bat Group.

The current condition of these barns with large holes in the roof, open doors and windows and partial collapses of some walls suggest that roosting opportunities have been reduced over the years, so that they are no longer capable of supporting maternity colonies due to variable conditions within the structures being unfavourable to the formation of larger roosts.

BG2 – Building 1 and Building 2. Building 1 has been found to support day roosts of Common Pipistrelle bats with small numbers of bats present. Historically building 2 has been used by bats and the two droppings found indicate that this has also been used by Pipistrelle spp. bats. Both of these buildings have been classified as confirmed day roosts used probably by lone males or non-breeding females.

It is highly likely that building 2 is still used by individual bats as two bat droppings were discovered during the initial assessment but to date not detected during surveys. It is probable that the use of this building is extremely infrequent.

BG4 - Building 1 and Building 5. Building 1 has historical use identified with the finding of two very old Pipistrelle spp. droppings within the roof void during the initial assessment. However no bats either emerging or entering were found during the dusk and dawn surveys.

Building 5 has been confirmed as a roost with Common Pipistrelle bats with very small numbers being detected as emerging. This roost has been classified as a day roost used probably by lone males or non-breeding females.

BG 6 – Arm Farm. Surveys of this collection of buildings were included as this area was originally within the development footprint. This has now been removed with no development proposed in this area. The surveys revealed that Arm Farm is used by individual Common Pipistrelle bats as a day roost.

BG10 – Rathvilly Farm. Surveys of all of the buildings found no evidence of use by bats in buildings 1, 2 and 4. Building 3 was found to have a single bat dropping deposited on a machine within the building. Emergence surveys have confirmed that building 3 – Poultry shed was being used by a single Common Pipistrelle bat. This bat was noted exiting and entering the building during the surveys at dusk and dawn. On one of the dusk surveys a single Common Pipistrelle was observed flying within the building before emergence. This was the only bat observed using this building and it is using it as a day roost throughout the season.

4.3 Buildings – not surveyed

BG3 – The nursery. This building group has not been surveyed but is close to BG2 – Manor Farm where day roosts have been identified, and transect surveys have identified consistent commuting and foraging by bats along Farm Lane and adjacent hedges. It is possible that a roost is present here and should be subject of at least an initial inspection prior to any development of the site, which includes the demolition of these buildings.

BG8 – Devron House. These buildings are no longer within the development footprint for the site. However information from the owner at a public consultation has suggested that a roost may be present within the stable block. Access to the buildings to carry an Initial Bat Survey was refused. Therefore activity surveys were carried out around the boundary of Devron House on three occasions during the bat active season during 2017. This was carried out to establish if any bats were emerging from the site along the boundary line at or just after dusk to establish if a maternity roost of any species was present. During all of the surveys very small numbers of bats of common species were recorded flying over and around the site a and these were primarily Common Pipistrelle bats in very low numbers never exceeding 5 and occasional passes by Noctule bats. There were no large numbers of bats recorded during any of the surveys. It is possible to say from these surveys that no maternity roost was present within the grounds of Devron House during 2017. It is probable that individual bats of Common Species are roosting here as individual bats were noted flying over the boundary during the surveys. **BG9 – House and Industrial Units Northampton Road.** No surveys have been carried out here and the buildings have only moderate potential (as viewed from PRW). The buildings are outside of the development footprint and therefore there will be no direct impacts.

4.4 Overall Evaluation of Roosting Potential of Buildings

The buildings on site are clearly an important resource for bats. Those buildings identified during the surveys as containing roosts were all found to l contain day roosts for low numbers of Common Pipistrelle bats. However when assessed as a group their removal would have a significant impact on the bats using the site for roosting.

A total of 7 day roosts of low numbers of Common Pipistrelle bats have been found across the site. None of these buildings have been found to contain any more than two bats. But all appear to be in constant use as day roosts throughout the bat active season. It is likely that there will be a significant impact on bats particularly Common Pipistrelles at a local level. The works involving the demolition of the buildings would have no impact on bat populations at a Regional or National Level.

All buildings should be the subject of further surveys including internal and dusk/dawn surveys especially the Nursery building which to date has not been surveyed. These surveys will need to be carried out prior to work commencing and to inform a European Protected Species Licence which will be required for the site.

4.5 Interpretation of Tree Survey Results

All tree survey results have revealed no evidence of roosting bats in any trees during the GLTA and Tree climbing surveys. It should be noted that it is often difficult to identify bat use in trees because bats use individual trees infrequently and for short periods of time, and evidence of bats use such as droppings and urine staining break down and disappear very quickly. A single tree was found to be used by a single Common Pipistrelle bat on one occasion. It is possible that some trees on the site could be used by bats without ever being detected, so a precautionary approach to the removal of trees should be applied and additional surveys/inspections undertaken at the time of removal. Where possible, all trees that have potential roosting features should be retained where possible.

4.6 Interpretation of Commuting and Foraging Habitat

To date six species of bat have been identified from the transect and static bat detector surveys. The species identified are Common Pipistrelle, Soprano Pipistrelle, Brown Long-eared, Noctule, Serotine and Myotid spp. bats.

The results from the transect and static bat detector surveys show a range of bat species across the site that are reliant on hedgerows and tree lines for commuting between roosts. The hedgerows are also important foraging resources in their own right providing sheltered foraging. From surveys conducted on the buildings it appears that no significant populations are present with the majority of bats probably commuting into the site for foraging purposes from adjacent areas, particularly from the village of Milton Malsor.

The loss of hedgerows and trees particularly along the western boundary with the A43 and the Northampton Loop to the east may prevent bats from passing through the site to off-site areas including the Grand Union Canal to the west where significant numbers of bats were noted foraging and commuting.

4.7 Overall Appraisal

Wray *et al*. (2010) was used to appraise the value of the site for the value of bat roosts at the site,

Using Table E1.4, the only bat roosts on the SRFI site comprise of roosts of individual bats of common species (Common Pipistrelle) only in either buildings or a single tree. Using this criteria the site if of District, Local or Parish significance only.

For commuting and foraging bats. *Tables E1.16 and E1.17* show the scores for the commuting value of the site and the foraging value respectively.

One 'rare' bat species, the Barbastelle bat, was recorded using the site on one occassion. and so it is a reasonable assumption that the site is used only by individuals of this species on an infrequent basis. Otherwise, the monitoring indicated that either small or moderate numbers of bats or individuals of each species were using the site, In terms of commuting habitat for bats, the site was deemed to support '*Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes'*. For evaluating foraging habitat the site (and surrounding landscape) was also assessed as supporting '*Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes*.'

Table E1.16: Valuing commuting routes for each of the bat species recorded on the site during the bat activity monitoring.

Species	Rarity	(Likely) 'Number' of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features	Score
Common Pipistrelle	Common (2)	Small no. of bats (10) for all species	Moderate number / Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes(3)	17
Soprano Pipistrelle					17
Brown Long-Eared Bat*					17
Noctule	Rarer (5)				22

Myotis Spp		Individual bats (5)			22
Barbastelle	Rare (10)				22

Table E1.17: Valuing foraging areas for each of the bat species recorded on the site during the bat activity monitoring surveys.

Species	Rarity	(Likely) 'Number' of Bats	Roosts / Potential Roosts Nearby	Type and Complexity of Linear Features	Score
Common Pipistrelle	Common (2)	Small no. of bats (10) for all species	Moderate number / Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes(3)	19
Soprano Pipistrelle					19
Brown Long-Eared Bat*					22
Noctule	Rarer (5)				22
Myotis spp					22
Barbastelle	Rare (10)				27

Overall, the results tables above show a maximum score of 22 for the value of the commuting habitats on the site for bats, and a maximum score of 27 for the value of the foraging habitat.

Therefore, based on *Table E1.7*, these values indicate that the site is considered to be of '*County*' value for commuting and foraging bats.

In terms of species, according to Wray *et al*. (2010) the site is most important for assemblages of Common Pipistrelle, bats. However, it may also be important for Barbastelle bats as this species is only rarely recorded in the county. There could also be relatively regular undetected activity by Barbastelle Bats, which is a 'quiet' echolocating species.

Clearly the site is important at a local level for a range of species.

5 MITIGATION AND COMPENSATION

5.1 Roosts

It is known that seven buildings, all on the east side of the site, containing day roosts with small numbers of common species of bats will be impacted by the proposals. It is also possible that so far undiscovered roosts may be present in buildings yet to be surveyed.

A European Protected Species Mitigation Licence for the destruction of roosts in buildings scheduled for removal will be required.

It is important to note that a range of mitigation and compensation should be included for the plans for the site to provide alternative roosting opportunities for the bats using these buildings. The majority of these new roosting opportunities should be in place well in advance of the demolition of the existing roosts in order for the bats on site to discover the new roosting opportunities and to start using them.

The mitigation should include the renovation and repair of **BG1 – Barns 1 and 2**. These barns are currently in a poor state of repair but historically have had Common Pipistrelle, Brown Long-eared and Natterers bats roosting in them. The historic roosting has not been reflected in the current surveys with only Common Pipistrelle still present albeit in small numbers. This is probably the result of the barns falling into disrepair.

The renovation of these building could provide long-term roosting opportunities for a number of bat species. This should include crevice roosting around the edges of the roof of each of the buildings, crevice roosting within cavities designed into the walls of the buildings, and also roosting opportunities within the roof voids.

This would provide roosting opportunities for the three historically recorded species of bat and help provide an opportunity for these bats to potentially re-colonise the north of the site, along with mitigation to maintain commuting routes and foraging areas.

In addition, a bat box scheme should be initiated using retained trees. These bat boxes should be a range of boxes constructed from woodcrete or a similar material for longevity. They should include a range of box designs.

Trees that have potential roost features should where possible be retained so that bats can roost in the gaps and cavities. This would also require a tree management plan being drawn up so that trees can be actively managed for their potential for roosting bats.

5.2 Commuting Routes and Foraging areas

The development will remove a large number of hedgerows and standard trees from the existing site. As stated above it is important to retain standard trees where possible especially where they contain existing potential roost features.

Hedgerows which are currently used extensively by small numbers of bats across the site for foraging and commuting are to be removed to facilitate the proposed development. It is important that retained hedgerows are subject to suitable management but in the long term gappy hedges should be planted up with native hedgerow species including trees to provide suitable commuting links and sheltered foraging. There should be tree and hedge belts created along the west and east boundaries of the site to maintain commuting routes for bats travelling to offsite areas to the west and south of the proposed development areas, maintain access to these areas will be important for bats in the larger landscape outside of the site.

The area to the north of the development site should be retained but with rough grassland and scrub encouraged in some areas so as to maintain a high species diversity of insects. There should also be ponds created in this area also to increase insect diversity. The existing stream in the north of the site should be retained with additional planting to broaden its diversity.

5.3 Lighting

Additional lighting from the development is likely to affect the movement of bats. The proposed development site once operational will be in use 24 hours a day. Lighting used on the site should be directed and include such things as cowls and reflectors to direct light away from any sensitive areas particularly to the north, west and east sides of the site.

A draft lighting plan for the site has been drawn up and in this document there is the following statement:

'*To minimise disruption to bats, light sources utilised should employ lamps with minimal or zero ultra violet (UV) emission (insects are attracted to UV). Hence, it may be applicable to consider LED light sources (which have limited / zero UV content) rather than ceramic metal halide and other 'white light' discharge lamps. Recent BCT Interim guidance 2014 states that LED with a CCT of lower than 4200K should be used;*

A dark corridor should be provided along the length of the west boundary of the site between the warehousing units and the boundary of the site along the A43 and also along the east boundary between the warehousing and the Northampton Loop. This corridor will assist in bats being able to commute north to south past the site retaining access to foraging areas to the south.

There is a proposed access road from the A43 into the site that will cross the proposed dark corridor. This will be accessed from a new roundabout on the A43. Lighting here should be carefully designed to minimise affects of lighting on this dark corridor. There is a proposed public footpath that passes below the access route within a pedestrian tunnel. So as to maintain the dark corridor lighting within the tunnel should be pedestrian controlled lighting as has been designed into the Thames footpath at

Richmond, so that it is only triggered on the approach of pedestrians and is extinguished as the pedestrians pass the tunnel. This public footpath follows the east boundary but it is not proposed to light the footpath at this time therefore potentially maintaining the dark corridor.

It is proposed that lighting will be erected on buildings and other structures throughout the site. This lighting will be for health and safety purposes and security, in conjunction with CCTV cameras. Where possible lighting used for security away from areas where staff may require access, infrared illumination in conjunction with cameras sensitive to infrared should be used. This will create some dark areas throughout the site that may allow bats to forage around the warehouses particularly where there are proposals to create swales and ponds.

The mitigation and compensation for this site is based on the results from surveys that have been carried out and on the existing indicative plans for the development. Once all surveys of buildings and trees are complete these suggestions may change if additional roosts and/or more significant roosts or different species are identified.

6 REFERENCES

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

Lighting ES Chapter Issued by Hoare Lee Ltd

APPENDIC A – SURVEY DETAILS

Details of all weather conditions during all surveys and details of equipment used.

Table E1.18 - Initial Building Assessments

Date of Survey Visit	Structure Reference	Equipment Used	Weather -
19.04.2016	BG1 – Buildings 1 and 2	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 11ºC Precipitation: 1 Wind: None
10.03.2016	BG2 – Buildings 1 – 4	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 12ºC Precipitation: 2 Wind: None
15.04.2016	BG4 – Manor Farm – Buildings 1 – 5	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 10ºC Precipitation: 3 Wind: None
19.04.2016	BG6 – Arm Farm Buildings	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 11ºC Precipitation: 1 Wind: None
10.03.2016	BG7 - Garage	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 12ºC Precipitation: 2 Wind: None
13.04.2017	BG10 – Rathvilly Buildings 1 - 4	Hand Held Lamps, Endoscope, Mirrors and Ladders	Temp: 12ºC Precipitation: 2 Wind: None

Table E1.19 – Dusk and Dawn Surveys of Buildings

Survey Type	Date of each Survey	Structure Reference/Location	Equipment Used	Weather Temp - ºC Wind: Beaufort Clooud: Octas	Comments
Dusk	17/05/2016	BG1 – Field Barns – Building 1 and 2	BatBox Duet, BatLogger, Pettersson	Temp Start: 14°C Temp End: 13°C Precipitation: None Wind: 2 Cloud:4	
Dusk	06/06/2016	BG1 – Field Barns – Building 1 and 2	BatBox Duet, Pettersson	Temp Start: 17°C Temp End: 15°C Precipitation: None Wind: 2 Cloud: 7	Survey called off after 1hr20 due to rain
Dusk	23/05/2016	BG2 – Lodge Farm – Buildings 1-3	BatBox Duet Pettersson 240X	Temp Start: 12°C Temp End: 10°C Precipitation: None Wind: 2 Cloud: 0	
Dusk	09/06/2016	BG2 – Lodge Farm – Buildings 1-3	EM Touch, BatBox Duet, Pettersson 240X	Temp Start: 19°C Temp End: 17°C Precipitation: None Wind: 2 Cloud: 6	
Dusk	24/05/2016	BG4 – Manor Farm – Building 1	Batbox Duet	Temp Start: 12.5°C Temp End: 11°C	

				Precipitation: None Wind: 2 Cloud: 3	
Dusk	21/06/2016	BG4 – Manor Farm – Building 1	BatBox Duet	Temp Start: 16°C Temp End: 14°C Precipitation: None Wind: 1 Cloud: 5	
Dusk	20/06/2016	BG4 – Manor Farm – Building 2	Batbox Duet, Baton XD	Temp Start: 17°C Temp End: 15°C Precipitation: None Wind: 1 Cloud: 3	Building assessed as Low potential and therefore only one emergence survey undertaken
Dusk	13/06/2016	BG4 – Manor Farm – Building 5	BatBox Duet, Baton XD	Temp Start: 14°C Temp End: 12°C Precipitation: None Wind: 2 Cloud: 3	Building assessed as Low potential and therefore only one emergence survey and one dawn re-entry survey undertaken.
Dusk	19/05/2016	BG6 – Arm Farm – Building 1, 2 and 3	Batbox Duet	Temp Start: 12°C Temp End: 11.5°C Precipitation: None Wind: 3 Cloud: 2	
Dusk	08/06/2016	BG6 – Arm Farm – Building 1, 2 and 3	Batbox Duet	Temp Start: 14.5°C Temp End: 11 °C Precipitation: None Wind: 3	

				Cloud: 4	
Dawn	07/07/2016	BG1 – Field Barns – Building 1 and 2	BatBox Duet, BatLogger	Temp Start: 13°C Temp End: 11°C Precipitation: None Wind: 2/3 Cloud: 2	Replacement survey for 06/06/2016
Dawn	11/08/2016	BG1 – Field Barns – Building 1 and 2	BatBox Duet, BatLogger, Pettersson	Temp Start: 13°C Temp End: 14°C Precipitation: Very Light (5 mins) Wind: 2 Cloud: 3	
Dawn	10/08/2016	BG2 – Lodge Farm – Buildings 1-2	BatBox Duet, BatLogger	Temp Start: 11.5°C Temp End: 13°C Precipitation: None Wind: 1-2 Cloud: 2	
Dawn	16/08/2016	BG4 – Manor Farm – Building 1 and 2	BatBox Duet	Temp Start: 11°C Temp End: 11°C Precipitation: None Wind: 2 Cloud: 2	
Dawn	12/08/2016	BG6 – Arm Farm – Building 1, 2 and 3	Batbox Duet	Temp Start: 13°C Temp End: 15°C Precipitation: None Wind: 2 Cloud: 6	

Dusk	07/06/2017	BG10 – Rathvilly – Building 3	BatBBox Duet	Temp Start: 12ºC Temp End: 12ºC Precipitation: Light Drizzle throughout Wind: 5 Cloud: 3	There was steady drizzle throughout the survey. Therefore the survey was stopped at 22:10. Two surveyors remained and surveyed within the barn
Dusk	26/06/2017	BG10 – Rathvilly _Building 1 and 2	BatBox Duet	Temp Start: 18ºC Temp End: 15ºC Precipitation: Nil Wind: 3 Cloud: 8	
Dusk	25/07/2017	BG10 – Rathvilly – Building 3	BatBox Duet	Temp Start: 19ºC Temp End: 17ºC Precipitation: Nil Wind: 1 Cloud: 8	
Dusk	01/08/17	BG10 – Rathvilly – Buildings 1 and 2	BatBox Duet	Temp Start: 17ºC Temp End: 15ºC Precipitation: Nil Wind: 3 Cloud: 7	
Dawn	02/08/2017	BG10 – Rathvilly – Building 3	BatBox Duet and BatLogger	Temp Start: 13ºC Temp End: 12ºC Precipitation: Nil Wind: 2 Cloud: 2	
Dusk	15/08/2017	BG10 – Rathvilly – Building 3	BatBox Duet and BatLogger	Temp Start: 18ºC Temp End: 16ºC Precipitation: Nil Wind: 2	

Cloud: 5

Table E1.20 – Transect Surveys

Survey Time	Date of each survey visit	Start and end times and time of sunrise	Structure reference / location	Equipment used (include make of bat detectors and logging equipment)	Weather –	Comments
Dusk	29.04.2016	Start: 20:44 End: 22:10 Sunset: 20:44	Transect 1	EM Touch	Temp Start 6 °C Temp End 3 °C Wind 2 Precip: None	Survey started in sub optimal conditions and abandoned at 22:10 due to temperature dropping to 3 degrees. No bats were recorded
Dusk	11.05.2016	Start: 2040 End: 00:00 Sunset: 20:40	Transect 1	EM Touch	Temp Start 15.5°C Temp End 14.8 °C Wind 1 Precip: Light	Survey started dry with a few drops of rain mid way around the transect
Dusk	21.06.2016	Start: 21:29 End: 00:29 Sunset: 21:29	Transect 1	Elekon BatLogger M	Temp Start 15 °C Temp End 15 °C Wind: 0 -1 Precip: Light at end of transect.	Warm still night, dry throughout except at end when light rain started
Dusk	14.07.2016	Start: 21:13 End:23:39 Sunset:21:13	Transect 1	Bat Box Baton	Temp Start: 16 Temp End: 14 Wind: 1 Precip: None	
Dusk	15.08.2016	Start: 20:28 End: 23:00 Sunset: 20:28	Transect 1	Bat Box Baton	Temp Start: 18.2 Temp End: 16 Wind: 1 Precipitation: None	

Dusk	06.09.2016	Start: 20:16 End: 22.25 Sunset: 20:16	Transect 1	BatBox Baton HD	Temp Start: 14.1 Temp End: 12.2 Wind: 2 Precip: None	
Dusk	05.10.2016	Start: 20:16 End: 22:15 Sunset: 20:16	Transect 1	BatBox Baton HD	Temp Start:11 Temp End: 9.2 Wind: 1 Precip: None	
Dusk	April 2016	N/A	Transect 2	N/A	Temp Start 3 ^{o}C	Survey not commenced due to sub optimal temperatures
Dusk	12.05.2016	Start: 2042 End: 23:33 Sunset: 20:42	Transect 2	EM Touch	Temp Start: 15.5^{o}C Temp End: 11.8 ^{o}C Wind: 1 - 3 Precip: None	
Dusk	22.06.2016	Start: 21:30 End: 00:23 Sunset: 21:30	Transect 2	EM Touch	Temp Start: 15.2 ^{o}C Temp End: 13.9 ^{o}C Wind: 1 Precip: None.	Warm still night, dry throughout with a light breeze
Dusk	14.07.2016	Start: End: Sunset:	Transect 2	BatBox Baton HD	Temp Start 14 ^{o}C Temp End: 11 ^{o}C Wind: 1 Precip: None	
Dusk	15.08.2016	Start: 20:28 End: 23:00 Sunset: 20.28	Transect 2	BatBox Baton HD	Temp Start: 18.2 ^{o}C Temp End: 16 ^{o}C Wind: 1 Precip: None	
Dusk	06.09.2016	Start: 19:39	Transect 2	BatBox Baton HD	Temp Start: 14.2	

		End: Sunset: 19:39			Temp End: 12.4 Wind: 2 Precip: None	
Dusk	05.10.2016	Start: 18.28 End: Sunset: 18.28	Transect 2	BatBox Baton HD	Temp Start:11 Temp End: 9.2 Wind: 1 Precip: None	
Dusk	.April.2016	N/A	Transect 3	N/A	Start Temp 3	Survey abandoned at start due to sub optimal temperature
Dusk	13.05.2016	Start: 20:50 End: 23:16 Sunset: 20:50	Transect 3	EM Touch	Start Temp: 15.1 End Temp: 14 3 Wind: 4 – 3 Precip: None	A breezy evening with a cold wind.
Dusk	23.06.2016	Start: 21:23 End: Sunset: 21:23	Transect 3	EM Touch	Start Temp: 15.4ºC End Temp: 13.7ºC Wind: 2 Precip: None	
Dusk	14.07.2016	Start: 21:13 End: Sunset: 21:13	Transect 3	BatBox Baton HD	Start Temp: 17.1ºC End Temp: 16.1ºC Wind: 1 - 2 Precip: None	
Dusk	15.08.2016	Start: End: Sunset:	Transect 3	BatBox Baton HD	Start Temp 18.2ºC End Temp 16ºC Wind 1 Precip None	
Dusk	06.09.2016	Start: 19:39	Transect 3	BatBox Baton HD	Start Temp 22ºC	Very warm muggy night.

		End: 23:00 Sunset: 19:39			End Temp 19ºC Wind 0 Precip None
Dusk	05.10.2016	Start: 18:28 End: Sunset: 18:28	Transect 3	BatBox Baton HD	Start Temp:13.1ºC End Temp: 11.2ºC Wind: 2 Precip None
Dawn	15.07.2016	Start: 02:45 Finish: 05.01 Sunrise: 05:02	Transect 1	BatBox Baton HD	Temp Start 7ºC Temp End 9ºC Wind 2 Precip None
Dawn	15.07.2016	Start: 02:45 Finish: 05:14 Sunrise: 05:02	Transect 2	BatBox Baton HD	Temp Start 7ºC Temp End 9ºC Wind 2 Precip None
Dawn	15.07.2016	Start: 02:45 Finish: 05:10 Sunrise: 05:02	Transect 3	BatBox Baton HD	Temp Start 7ºC Temp End 9ºC Wind 2 Precip None

Table E1.21 – Surveyor Details for Surveys

Surveyors Name	Surveyors Experience	Ground Level Tree Assessment	Aerial and Ladder Tree Surveys	Transect Surveys	Initial Bat Surveys	Dusk and Dawn Surveys
James Pattenden	Principal Ecologist Licence Number: 2015–10680 – CLS-CLS Level 2	Yes	Yes	Yes		Yes
Iain Hysom	Principal Ecologist Licence Number: 2015-15350-CLS-CLS					Yes
Jan Skuriat	Principal Ecologist Licence No: 2015-15428-CLS-CLS Natural England Class Registration C155287 License Level 3.	Yes		Yes	Yes	Yes
David Cove	Principal Ecologist Class Licence Registration 00727 Licence No 2015-14432-CLS-CLS License Level 3	Yes		Yes	Yes	Yes
Matt Cook	Senior Ecologist Licence Nos: 2015-10167-CLS-CLS / 2015-10176-CLS-CLS (level 3/4) + BLICL (RC167)		Yes	Yes		Yes
Tom Coyne	Senior Ecologist Licence No: 2018-33242-CLS-CLS. (Class 2)	Yes		Yes	Yes	Yes
Alice Clarke	An experienced ecologist currently training towards her bat licence. She has received extensive training for dusk and dawn surveys and has carried many such surveys			Yes	Yes	Yes

Ben Lappage	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys	Yes	Yes
Dean Lefeuvre	Ecologist Licence No: 2015-18649-CLS-CLS License Level 1	Yes	Yes
Charles Geary	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Joe Dyson	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys	Yes	Yes
Olivia Guindon	An experienced ecologist currently training towards her bat licence. She has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Sarah Kitchen	An experienced ecologist currently training towards her bat licence. She has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Peter Walker	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Lindsay Stronge	Ecologist Licence No: 2017-32403-CLS-CLS Class 2		Yes

Jade Brennan	An experienced ecologist currently training towards her bat licence. She has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Luke Burgess	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys		Yes
Alistair Krzyzosiak	An experienced ecologist currently training towards his bat licence. He has received extensive training for dusk and dawn surveys and has carried many such surveys	Yes	
Jess Breeze	Senior Ecologist Licence No: 2015-17895-CLS-CLS	Yes	

APPENDIX B – PHOTOGRAPHIC PLATES

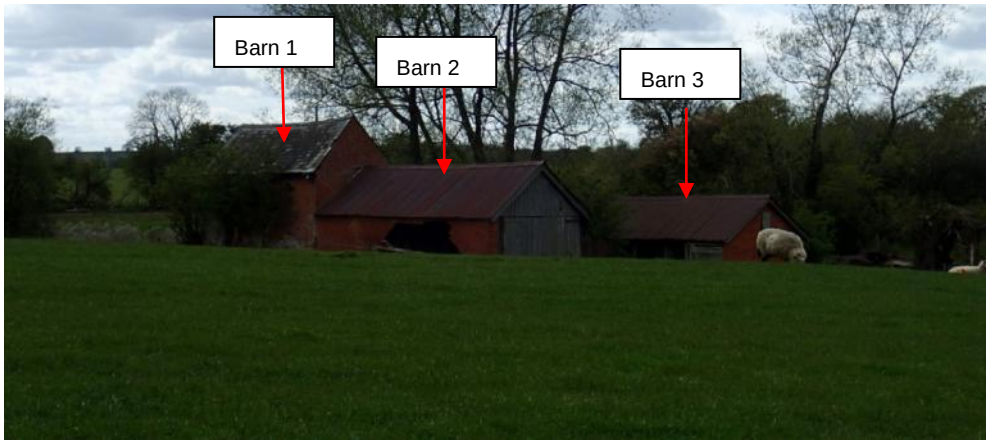
Plate No. and Description	Plate
Plate 1 – BG1 – Building 1, 2 and 3 showing all three buildings	
Plate 2 – BG1 – Barns 1 and 2 – external view showing hole into building through wall.	

Plate 3 – Barn 3 -- Single storey stable block.

Plate 4 – BG1 – Barn 1 – Internal view of roof also showing barn owl nesting area.

Plate 5 – BG1 – Barn 3 – Stable Block internal View.

Plate 6 – BG1 – Barn 1 – External View of Roof showing damage

Plate 7 – BG1 – Barn 1 – Gable end showing cavities

Plate 8 – BG1 – Barn 1 – Internal View of roof

Plate 9 – BG1 – Barn 2 – internal View

Plate 10 – BG2 – Building 1 south-east and south elevations

Plate 11 – BG2 – Building 2 – south Elevation

Plate 12 – BG2 – Building 2 East Elevation

Plate 13 – BG2 – Building 2 – Link between main barn and stable block

Plate 14 – BG2 – Building 2 – Internal View of barn wall showing extensive crevices.

Plate 15 – BG2 – Building 2 – Stable block end wall with large wall

Plate 16 – BG2 – Building 3 – Open Building

Plate 17 – BG2 – Buildings 3 and 4 – View of rows of open buildings

Plate 18 – BG4 – Building 1 – Farm House Rear Elevation

Plate 19 – BG4 – Building 1 – Main House – Side Elevation

Plate 20 – BG4 – Building 1 – Rear Elevation.

Plate 21 – BG4 – Building 1 – Detached Garage

Plate 21 – BG4 – Building 1 – Roof Interior showing modern trussed roof

Plate 22 – BG4 – Building 1 – Interior view of roof showing modern trussed roof.

Plate 23 – BG4 – Building 2 – Stable block

Plate 24 – BG4 – Building 2 – Rear Elevation

Plate 25 – BG4 – Building 3 – Industrial Building

Plate 26– BG4 – Building 4

Plate 27 – BG6 – Arm Farm – Front Elevation

Plate 28 – BG6 – Arm Farm – Rear Elevation

Plate 29 – BG6 – Arm Farm – Internal View

Plate 30 – BG7 – Garage – View showing main building and canopy

Plate 31 – Garage – View of rear of retail unit showing extensive damage to roof.

Plate 32 – BG10 Rathvilly – Building 1 Main House

Plate 33 – BG10 Rathvilly – Building 1 Main House Interior of roof

Plate 34 – BG10 Rathvilly – Building 2 Detached Garage

Plate 35 – BG10 Rathvilly – Building 2 Detached Garage Roof interior

Plate 36 – BG10 Rathvilly Building 3 – Semi derelict Poultry shed – Side elevation

Plate 36 – BG10 Rathvilly Building 3 – Semi derelict Poultry shed – End Elevation showing open doors

Plate 37 – BG10 Rathvilly Building 3 – Semi derelict Poultry shed – Internal view of shed showing insulation coating on underside of the roof

Plate 38 – BG10 Rathvilly Building 3 – Semi derelict Poultry shed – close up view of interior showing gaps between metal frame and roof.

Plate 39 - BG10 Rathvilly Building 4 – Detached metal warehouse building

APPENDIX C – RELEVANT LEGISLATION

General

This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation, but summarises the salient points.

Bats

All species of British bat are protected by *The Wildlife and Countryside Act 1981* (as amended), extended by the *Countryside and Rights of Way Act 2000*. This legislation makes it an offence to:

- intentionally kill, injure or take;
- possess or control;
- intentionally or recklessly damage, destroy or obstruct access to a breeding site or resting place; and
- intentionally or recklessly disturb whilst the animal occupies a breeding site or resting place.

Bats are also European Protected Species listed on *The Conservation of Species and Habitats Regulations 2010* (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill;
- deliberately disturb, including in particular any disturbance which is likely (a) to impair their ability - (i) to survive, to breed or reproduce, or to rear or nurture their young; or (ii) hibernate or migrate, where relevant; or (b) to affect significantly the local distribution or abundance of the species to which they belong;
- damage or destroy a breeding site or resting place; and
- possess, control, transport, sell, exchange, or offer for sale or exchange.

APPENDIX D – DISCRETIONARY ADVICE SERVICE LETTER

Date: 09 May 2017
Our ref: DAS/11554/202047
Your ref: Rail Central, Milton Malsor, Northamptonshire

Customer Services
Hornbeam House
Crewe Business Park
Electra Way
Crewe
Cheshire
CW1 6GJ

0300 060 3900

BY EMAIL ONLY

Dear Ms Epps

Discretionary Advice Service (Charged Advice)
DAS/11554/202047
Development proposal and location: Rail Central, Milton Malsor, Northamptonshire

Thank you for your consultation on the above.

This advice is being provided as part of Natural England's Discretionary Advice Service. RSK has asked Natural England to provide advice upon:

- Biological survey methodology for bats.
- Ecological mitigation plan for bats.

This advice is provided in accordance with the Quotation and Agreement dated 16 March 2017.

The following advice is based upon the information discussed with Ms Epps, Mr Cove, Mr Coyne and Dr Carter of RSK and Mr Digby of Ashfield Land Ltd., during the site meeting of 21 March 2017, and on the information within the following documents:

1. Rail Central – Extended Phase 1 Habitat Survey, RSK, 26 January 2017. (Draft.)
2. Rail Central Bat Survey Report, RSK, 16 January 2016. (Draft.)
3. Rail Central – Illustrative Colour Masterplan, October 2016. (Feasibility.)
4. Further information on tree bat roost survey results and lack of access for building survey (*NE questions/Rail Central Bat Trees/Bird Data*), sent via email by Ms Epps, RSK, 20 March 2017.
5. Further information on the ecology mitigation plan (map attached) (21/3/17 Rail Central Meeting Agenda), sent via email by Ms Epps, RSK, 20 March 2017.
6. Further information on tree bat roost survey results (excel file attached), sent via email by Mr Coyne, RSK, 4 April 2017.

For avoidance of doubt, the scope of Natural England's advice in this instance is limited to the bat interest only. However, I understand that RSK has sought Natural England's advice on other matters. Natural England would be able to conduct a document review and provide written advice on the ecological mitigation plan with respect to general vegetation and habitat impacts under the chargeable advice service. Please contact Miss Kayleigh Cheese, Lead Adviser – Land Use, West Anglia Area Team (kayleigh.cheese@naturalengland.org.uk) for more information.

Protected species – bats

The advice on this proposal, and the guidance contained within Natural England's standing advice relates to this case only and does not represent confirmation that a species licence (should one be sought) will be issued. Please see **Annex 1** for information regarding licensing for bats.

Bat surveys to date

Survey methods – general

Section 2.1 of the draft Bat Survey Report states that "The surveys were designed using the methods outlined in the Bat Surveys for Professional Ecologists" (Collins, 2016). Similar statements are made in the individual survey method sections. It is not clear from these statements whether the guidelines (Collins, 2016) were followed in all circumstances, and this should only be implied if this is the case. Non-compliance with the guidelines may be acceptable provided that this is acknowledged, where there is ecological justification and where any resulting constraints are addressed.

Desk study

A desk study has been undertaken covering 5km radius from the site, with records requested from Northants Bat Group. The date/s for the data search should be provided. Please clarify whether the 5km radius was applied from the site boundary (as is suggested by the 5km buffer shown on Figure 3) or from a central grid reference point (as is stated in section 2.2 of the draft Bat Survey Report), and if the latter, what grid reference was used. The desk study radius used should be justified and related to the scheme's Zone of Influence (Collins, 2016) – a 5km radius is likely to be appropriate in this case.

Section 3.2 of the Bat Survey Report lists the species present on the site in Table 2 and gives the conservation status of each. Please clarify whether the species listed in Table 2 are only those extracted from the data search (from records falling within the site boundary), or those from both the data search and those recorded by field surveys. A reference should be provided for the Conservation Status Assessment, and a framework such as the one presented by Wray et al. (2010) should be considered. Please note that there are some errors in bat species names in section 3.1 and 3.2 of the draft Bat Survey Report which should be corrected in the final version.

Daytime inspection surveys

Table 21 of the draft Bat Survey Report states that for each surveyed Building Group the survey result of the visual inspection (i.e. confirmed roost/bat roost potential) is given in Table 4, which is not the case. Please revise for the final version.

On page 31 of the draft Bat Survey Report it is stated that "those buildings that were assessed as having moderate or high potential for bats were subject of additional dusk and dawn surveys". Collins (2016) recommends that structures with low roost suitability be subject to at least one dusk emergence or dawn re-entry survey to give confidence in a negative result. If a different approach has been taken this should be discussed and ecologically justified.

Tree surveys

Tree roost assessment has been undertaken on an iterative basis, with ground level tree assessment informing further survey work. The dates of the ground level tree assessments have not been provided in the draft Bat Survey Report or in the further information sent via email (including the table within the attached excel file) on 4 April 2017, and this should be provided in the final version of the Bat Survey Report. Only 95 trees have been included in the table in the excel file although it is reported in the draft Bat Survey Report that 138 trees were assessed and in information sent via email on 20 March 2017 it is reported that 204 trees (and 13 tree groups) on site have been subject to a ground level roost assessment. The number of trees assessed should be clarified in the final version of the Bat Survey Report with at least some results reported for each tree or tree group assessed.

The tree assessment results table in the excel file sent on 4 April 2017 has the following column headings:

- Tree ID

- Species
- DBH(m)
- PRF description
- Height (m) (*of PRF*)
- Aspect (*of PRF*)
- GLTA grade
- Date climbed
- Climbing grade (highest grade feature)
- Further action
- Date of further survey
- Completed (*indicating whether survey work completed or not*)

According to good practice outlined in Collins (2016), the following details should be provided for ground level roost assessment of trees:

- Descriptions of trees surveyed (including reference number, species, diameter at breast height); (*already provided*)
- Descriptions of potential/actual roost features (including height above ground level and aspect); (*already provided*)
- Description of evidence of bats found; (*not applicable to date*)
- Trees not surveyed and reasons why; and
- All of the above marked onto a plan of the site;
- A set of cross-referenced photographs.

Please note in particular the recommendation for a plan and cross-referenced photographs. The plan should also indicate which of the trees are to be removed/impacted by the works. Further information sent via email on 20 March 2017 makes reference to a tree survey results map however this map has not been submitted to Natural England to date.

Trees assessed as having moderate or high potential were subject to further survey, as per best practice guidelines (Collins, 2016), initially in the form of aerial inspections using rope access and/or ladders, and in some cases also through nocturnal survey. It is stated in section 4.3 of the draft Bat Survey Report that "those trees still considered suitable after detailed inspection, as having either moderate or high potential were then the subject of dusk emergence surveys or dawn re-entry surveys. All trees have had at least one dusk or dawn carried out… " however this is not consistent with further information sent via email on 4 April 2017, in which it is reported that not all trees with moderate or high roost suitability have been subject to nocturnal survey. This should be clarified in the final version of the Bat Survey Report.

In the site meeting of 21 March 2017 and via further information sent via email on 4 April 2017, the roost presence/absence survey effort for trees was discussed, in particular the acceptability of using aerial inspection surveys as an alternative to nocturnal surveys. Natural England considers that it will be acceptable to use aerial inspection surveys instead of nocturnal surveys, where the following conditions can be met: (a) all potential roost features can be fully inspected, (b) aerial inspection surveys are undertaken within the appropriate season (e.g. May to September, with at least one or two surveys between May and August, as per Table 7.1 of Collins (2016)). Where these conditions can *strictly* be met, there should be no negative impact on roost detectability as aerial inspections can record evidence of roosts used in the past as well as those in use at the time of the survey, whereas nocturnal surveys can only detect roosts in use at the time of the survey. As noted in Collins (2016), nocturnal surveys are particularly important where it is not possible to inspect potential roost features fully, and where trees are not safe to climb or where potential roost features cannot be fully inspected, trees should be subject to nocturnal survey.

With reference to the survey effort outlined in Table 7.3 of Collins (2016), it would be acceptable for a tree with moderate roost suitability to be subject to: (a) two aerial inspection surveys, in May and August (as an example of timing, and provided that the potential roost features could be fully inspected), or (b) one aerial inspection in May and one nocturnal survey in August, or (c) two nocturnal surveys in May and August. Trees with high roost suitability should be subject to three

survey visits in total, comprising either aerial inspection or nocturnal surveys, or a mixture of the two methods.

A further query was discussed at the meeting on 21 March 2017 and via email on 4 April 2017, questioning the need for further tree surveys on the site given the '*low level of bat activity on site*'. Please note that the guidelines (Collins, 2016) do state that the number of surveys can be adjusted up or down if necessary by the ecologist, bearing in mind the site-specific circumstances, if this is fully justified. Natural England has not been provided with sufficient information or justification to recommend a reduction in survey effort for trees in this instance. It should be borne in mind that the guidelines in Collins (2016) do not refer to the survey effort required to have confidence in a negative result for tree surveys and so the standard recommended level of survey already risks missing bat roosts.

However, it should be noted that where nocturnal surveys can be replaced by aerial inspections, as outlined above, that some trees currently marked for further survey in the tree table in the excel file sent on 4 April 2017, have already met their survey requirements (with regards to the pre-application period).

Please note that whether using aerial inspection or nocturnal survey, or a mixture of the two methods, multiple survey visits should be spread out to sample as much of the recommended survey period as possible, with surveys spaced at least two weeks apart and preferably more (Collins, 2016). Therefore, where trees with for example moderate suitability have already been subject to two surveys between May and September but the visits were close together, a further survey (either aerial inspection or nocturnal survey) should be undertaken in 2017, at a different point within the active season.

Further, please note that the above advice refers only to presence/absence survey. Where a roost or roost evidence is observed, further roost characterisation survey suitable to support a mitigation licence application should be undertaken as required.

Please note that the above advice relates only to this site and not to any other sites.

It is recognised that survey work has not been completed, and therefore the survey results interpretation/evaluation is preliminary. Natural England is in agreement with the preliminary evaluation of the tree survey results provided in section 5.4 of the draft Bat Survey Report. Additional commentary on whether the tree survey results are as expected given the distribution of potential tree roosting habitat and foraging habitat on site would be useful.

Emergence/dawn re-entry surveys

Section 3.5.2 should refer to both dusk and pre-dawn/dawn surveys as Table 8 includes information on both. A separate table summarising the nocturnal survey effort per Building Group would be helpful in interpreting the results. Table 9 provides licence levels and numbers for each ecological surveyor which is welcomed. For those ecologists where only a licence level and number is listed, some additional information on experience and training would be useful. Please note that there are some errors in the table which should be corrected for the final report. Information has not been provided for all named surveyors for all survey types. Due to the large number of personnel involved, it may be most straightforward to name all surveyors in the relevant sections and provide a single table, perhaps in an appendix, with details of all personnel licences and experience.

It is recognised that survey work on buildings has not been completed, and therefore the survey results interpretation and evaluation is preliminary. Natural England is in agreement with the preliminary evaluation of roosting potential provided in section 5.3 of the draft Bat Survey Report.

Transect surveys

Weather conditions and personnel information is given in section 3.5.5 (Table 20). Some information is missing from the table which should be provided if possible in the final report.

The results of the transect surveys are provided in section 4.2 in a table format. It is not clear what numbers are being reported for the 'total' and for each species; please clarify whether the numbers refer to bat passes, bat sightings, or file counts, etc. More information in the 'notes and comments' column would be useful, for example in describing bat activity according to the habitats found along each transect, and in noting whether behaviour was dominated by foraging or commuting activity, and whether (and if so, where) bats were present shortly after sunset or shortly before sunrise, indicating potential roost emergence/return behaviour.

Collins (2016) recommends that the following information is reported from bat activity surveys:

- Tables of bats recorded/observed (including time, species, number of passes, behaviour observed) where low numbers, or this information summarised where higher numbers recorded;
- The above information summarised on an annotated plan or aerial photograph of the site.

Figures 7 to 12 display results as points for each month from May to October 2016. For these monthly results maps, it should be clarified what the points represent (i.e. one bat pass?). For the final version of the Bat Survey Report, Natural England recommends that the transect survey data are also summarised in one plan to show key commuting routes (and directions in particular at dusk/dawn) and foraging locations.

Natural England is in agreement with the preliminary interpretation and evaluation of commuting and foraging activity provided in section 5.5. of the draft Bat Survey Report. Please note that as well as commuting into the site to forage it is also possible that bats are commuting through the site, for example between roosts in Milton Malsor and Blisworth.

Static bat detector surveys

No information has been provided on the type/s of bat detector used for the static survey, or how they were deployed (i.e. whether they were placed above ground level, what settings were used, whether they failed during the deployment period). This information is required in the final version of the Bat Survey Report. Some further explanatory information on how the key areas for sampling were identified during the desk study would be useful.

The results of the static bat detector are referred to in section 5 (interpretation/evaluation of survey results) but are not given in section 4 (survey results). The results of the static bat detector survey should be clearly stated in the results section. Some quantification of the recorded activity should be provided, such as the number of files or calls recorded, as well as information on the timing of calls, and this should also be displayed graphically if possible to aid interpretation.

Impact assessment

The final paragraph of section 5.5 refers to a predicted impact – that of loss of hedgerows and trees preventing bats from moving through the site to off-site areas such as the Grand Union Canal. This discussion is dealing with an impact and ideally should not be mentioned in the interpretation/evaluation section. It is noted that the draft Bat Survey Report does not contain an impact assessment section, and no detailed impact assessment exercise has been completed. It is recognised that impacts are uncertain whilst the development plans are still being finalised. The final Bat Survey Report should include a detailed impact assessment, which should then be linked to the required mitigation, compensation and enhancement actions.

Further surveys

A property (Deveron House) outside the red-line boundary may contain a bat roost (possibly a maternity roost according to information supplied at a public consultation meeting by the owner) but no access permission is likely to be forthcoming to undertake either a daytime inspection survey or nocturnal surveys. It was discussed in the site meeting on 21 March 2017 that a different survey approach might be taken; activity surveys with static surveyors positioned around the boundary of Deveron House, which should identify if large numbers of bats are present and also identify the

species. Natural England confirms that this approach is acceptable, as long as it does not impinge on the landowner's decision not to grant access for survey.

The approach proposed above would potentially be acceptable for other structures where access is not permitted. Another option available would be use of new licensing policy 4. The new licensing policy may apply where: (i) the cost (e.g. of delays) associated with carrying out standard survey requirements would be disproportionate, (ii) the ecological impacts of the proposed development can be predicted with sufficient certainty and (iii) mitigation or compensation will ensure that the licensed activity does not detrimentally affect the conservation status of the local population of any European Protected Species. If you intend to use and rely on the new licensing policy, we would encourage you to seek further advice from Natural England.

Mitigation and compensation plan

As the impact of the development on bats is not yet fully understood, a detailed mitigation plan has not yet been prepared, and so it is not possible to fully assess the mitigation proposals. Preliminary recommendations are given below.

The final version of the Bat Survey Report should include a clear statement on whether and how the scheme design has been changed to avoid or minimise effects on bats, and on how the mitigation hierarchy has been applied. The mitigation, compensation and enhancement plan should relate clearly to the impact assessment exercise, which is yet to be completed. As plans are finalised, mitigation proposals should use the term 'will' rather than 'should'.

Roosts

It is noted that a range of mitigation and compensation will be included in plans for the site to replace roosting opportunities for bats using buildings. More information is required on the design and location of these replacement roost features in relation to the existing roosts. The final version of the Bat Survey Report should make clear whether particular measures (for example the bat box scheme) are intended as mitigation, compensation or enhancement measures.

The plan to renovate and repair BG1 (Barns 1 and 2) in order to provide roosting habitat for the range of species which was historically recorded in the buildings is welcomed. Commuting routes from the barns to likely foraging areas in the wider landscape should be maintained or re-created. In the final report or formal or draft mitigation licence application, it should be clear whether the renovation and repair work would be undertaken as compensation or enhancement. Should the work require the use of roof membranes Bitumen type 1F felt with a hessian matrix must be used.

Tree management plan

It is noted that the bat box scheme proposed would comprise woodcrete boxes for their longevity, however, bat boxes would essentially be a temporary measure. As such the proposal for a tree management plan is welcomed. The plan should include an aim to manage the production of new potential tree roost features over time.

Commuting routes and foraging areas

Further information is needed to demonstrate that bat populations will be able to move through the new development. Further information should be provided on maintaining, enhancing or recreating flight lines across the site. The intention to create tree and hedge belts along the west and east boundaries of the site to maintain commuting routes for bats travelling to offsite areas is welcomed. However, further information is needed on the provision of commuting routes elsewhere.

Lighting

More detail is needed on the lighting impacts of the scheme and on the proposed mitigation measures. The mitigation proposals, for example the 'dark corridor', should be shown in more detail

on the ecology mitigation plan. Proposals for 'pedestrian controlled lighting' where the proposed public footpath crosses the 'dark corridor' are welcomed. Proposals to use infrared illumination and infrared sensitive CCTV cameras in some locations of the operational site, instead of white light, are welcomed. Use of infrared illumination should be focused on the most valuable areas for commuting and foraging bats, if possible.

Letter of comfort

At the site meeting on 21 March 2017, information was requested on the 'Letter of comfort' process.

Some information is available at:
https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals

In Nationally Significant Infrastructure Project cases, Natural England will provide customers with early advice and opinion on their protected species proposals without a planning consent being in place. To do this Natural England conducts assessments based on full draft mitigation licence applications in advance of the formal submission to the Planning Inspectorate. If the licensing tests can in principle be satisfied Natural England will issue a 'Letter of comfort' which demonstrates that Natural England has considered the issues relating to protected species.

You should submit a draft licence application once you are confident that the proposals are sufficiently advanced and that the mitigation proposals take account of the final design. This should include:

- Application Form
- Method Statement
- Reasoned Statement

Within 30 working days, Natural England will either issue a 'Letter of comfort' stating that it is satisfied, in so far as it can make a judgement, that the proposals presented comply with the regulations or a letter (a Further Information Request) outlining why we believe the proposals do not meet licensing requirements.

The 'Letter of comfort' will draw attention to the fact that ecological conditions on the site may change over time and it is the customer's responsibility to maintain sufficiently up to date survey information which is then made available to Natural England (along with any resulting amendments to the draft licence application) and the Planning Inspectorate so that there is no delay in issuing the licence once the Development Control Order has been granted.

Once the Development Control Order has been granted, you would then submit the formal licence application to Natural England, either without any changes or with any necessary changes included for reassessment such as updated survey data or changes to timetable.

Natural England would then issue a licence, provided the proposals and the situation on site either:

- Remain the same and the Work Schedule is still Specific, Measurable, Achievable, Realistic and Time-limited) (SMART), or;
- Have been suitably adjusted to enable Natural England to confirm that the mitigation proposals remain adequate (e.g. timings in the Work Schedule may change), or;
- Take account of any further survey requirements resulting from a delay between the issue of the 'Letter of comfort' and the Development Control Order.

Please note that we would expect, where possible, a draft application to contain the same information, in the same format, as a final licence application. Without all the information, it is not possible to make a full assessment of the application. Surveys informing a draft or formal licence application will need to be up to date, from the current and/or previous optimal season, at the time of the draft or formal licence application submission.

Conclusion

The survey work undertaken to date, and further survey work to be completed in 2017, will form a good basis on which to predict impacts and design mitigation, compensation and enhancement, as appropriate.

Natural England welcomes further opportunities to engage on the mitigation and compensation plan and licensing requirements for bats, as proposals are finalised.

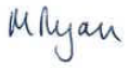
For clarification of any points in this letter, please contact Madeleine Ryan on 02082 257629.

This letter concludes Natural England's Advice within the Quotation and Agreement dated 16 March 2017.

☒ The advice provided in this letter has been through Natural England's Quality Assurance process

The advice provided within the Discretionary Advice Service is the professional advice of the Natural England adviser named below. It is the best advice that can be given based on the information provided so far. Its quality and detail is dependent upon the quality and depth of the information which has been provided. It does not constitute a statutory response or decision, which will be made by Natural England acting corporately in its role as statutory consultee to the competent authority after an application has been submitted. The advice given is therefore not binding in any way and is provided without prejudice to the consideration of any statutory consultation response or decision which may be made by Natural England in due course. The final judgement on any proposals by Natural England is reserved until an application is made and will be made on the information then available, including any modifications to the proposal made after receipt of discretionary advice. All pre-application advice is subject to review and revision in the light of changes in relevant considerations, including changes in relation to the facts, scientific knowledge/evidence, policy, guidance or law. Natural England will not accept any liability for the accuracy, adequacy or completeness of, nor will any express or implied warranty be given for, the advice. This exclusion does not extend to any fraudulent misrepresentation made by or on behalf of Natural England.

Yours sincerely,



Dr Madeleine Ryan MCIEEM
Wildlife Management – Lead Adviser
West Anglia Area Team | Eastern England

Cc commercialservices@naturalengland.org.uk

References

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

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Annex 1
European Protected Species

A licence is required in order to carry out any works that involve certain activities such as capturing the animals, disturbance, or damaging or destroying their resting or breeding places. Note that damage or destruction of a breeding site or resting place is an absolute offence and unless the offences can be avoided (e.g. by timing the works appropriately), it should be licensed. In the first instance it is for the developer to decide whether a species licence will be needed. The developer may need to engage specialist advice in making this decision. A licence may be needed to carry out mitigation work as well as for impacts directly connected with a development. Further information can be found in Natural England's 'How to get a licence' publication.

If the application requires planning permission, it is for the local planning authority to consider whether the permission would offend against Article 12(1) of the Habitats Directive, and if so, whether the application would be likely to receive a licence. This should be based on the advice Natural England provides at formal consultation on the likely impacts on favourable conservation status and Natural England's guidance on how the three tests (no alternative solutions, imperative reasons of overriding public interest and maintenance of favourable conservation status) are applied when considering licence applications.

Natural England's pre-submission Screening Service can screen application drafts prior to formal submission, whether or not the relevant planning permission is already in place. Screening will help applicants by making an assessment of whether the draft application is likely to meet licensing requirements, and, if necessary, provide specific guidance on how to address any shortfalls. The advice should help developers and ecological consultants to better manage the risks or costs they may face in having to wait until the formal submission stage after planning permission is secured, or in responding to requests for further information following an initial formal application.

The service will be available for new applications, resubmissions or modifications – depending on customer requirements. More information can be found on Natural England's website.

APPENDIX E – FIGURES

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