M5 Junction 10 Improvements Scheme

Environmental Statement

Appendix 7.3 Bat Survey

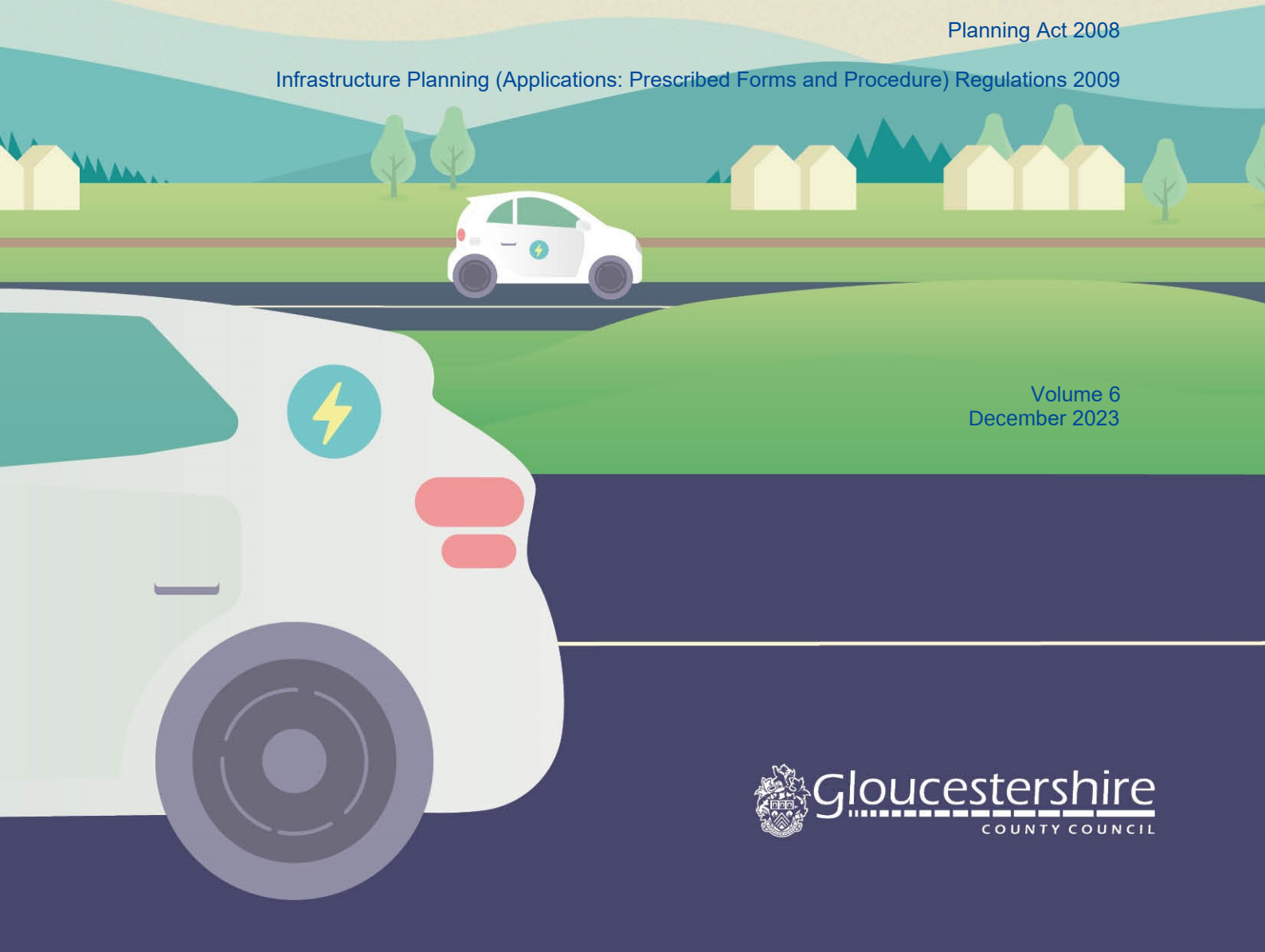
Part 1 of 2

TR010063 – APP 6.15

Regulation 5 (2) (a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M5 Junction 10 Improvements Scheme

Development Consent Order 202[x]

6.15 Environmental Statement:

Appendix 7.3 Bat Survey – Part 1 of 2

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010063
Application Document Reference	TR010063/APP/6.15
Author:	M5 Junction 10 Improvements Scheme Project Team

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Rev 0	December 2023	DCO Application

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1 Introduction

1.1 Terms of Reference

1.1.1 Atkins, member of the SNC-Lavalin group, was commissioned by Gloucestershire County Council (GCC) to undertake a suite of bat surveys to inform the Environmental Statement (ES) for the M5 Junction 10 Improvements Scheme (hereafter referred to as 'the Scheme').

1.1.2 The purpose of the bat surveys was to assess the use of the habitats within the Scheme by bats for the purposes of commuting, foraging and roosting; provide recommendations to enable compliance with legislation and policy; and, where appropriate, identify the need for avoidance, mitigation, compensation, or enhancement measures.

1.1.3 This Technical Appendix summarises the results of the bat surveys, including the methods used, results of the desk study and field surveys, and provides an evaluation of the nature conservation value of bats within the survey area.

1.1.4 This report provides factual information to support the ES, which will accompany the planning application for the Scheme.

1.2 Legislation and Policy

1.2.1 Relevant legislation in relation to bats is provided in Table 1-1 below.

Table 1-1 - Summary of Relevant Legislation

Species	Legislation	Offences	Licensing procedures and guidance
Bats European protected species (EPS)	Conservation of Habitats and Species Regulations 2017 (as amended) Reg 43	Deliberately[1] capture, injure or kill a bat; deliberate disturbance[2] of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of a bat roost is considered to apply regardless of whether bats are present]	Licences issued for development by Natural England. Guidance documents: • Natural England Standing Advice for protected species 2022; • European Protected Species: Mitigation Licensing- How to get a licence (Natural England 2013); • Bat Mitigation Guidelines (English Nature 2004)

1 Deliberate capture or killing is taken to include "accepting the possibility" of such capture or killing.

2 Deliberate disturbance of animals includes 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) in the case of animals of hibernating or migratory species, to hibernate or migrate; or b) to significantly affect the local distribution or abundance of the species to which they belong.

Species	Legislation	Offences	Licensing procedures and guidance
			• Bat Workers Manual (JNCC 2004)
	Wildlife and Countryside Act 1981 (as amended) Schedule 5, Section 9.	Intentionally kill, injure or take a bat; intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection or disturb[3] a bat in such a place.	Licence from Natural England is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.

3 Lower levels of disturbance not covered by the Conservation of Habitats and Species Regulations 2017 (as amended) remain an offence under the Wildlife and Countryside Act 1981 (as amended) although a defence is available where such actions are the incidental result of a lawful activity that could not reasonably be avoided.

2 Methodology

2.1.1 Unless otherwise stated, the term 'Scheme Boundary' refers to the Order limits, excluding areas of the Order limits that extend approximately 2 km north and 2 km south of the Scheme alignment, along the M5. In these locations, the Scheme Boundary is the Scheme alignment.

2.1.2 Within the areas of the Order limits that extend north and south of the Scheme alignment, the only works proposed are the installation of signs in discrete locations, which will require vegetation clearance of up to approximately 20 m^2 plus some minor trimming back of vegetation up to a distance of 180 m in front of the sign to ensure visibility. These signage locations can be micro sited to avoid/minimise ecological impacts. These small-scale works are consistent with routine highway maintenance works. The results of desk study and field surveys here would not have any bearing on the impact assessment for the Scheme, and these areas have been excluded from assessments to inform the ES. Pre-construction surveys of the discrete signage locations and working with the contractor to micro site locations where appropriate to avoid or minimise ecological impacts is the approach that will be taken, and is considered to be proportionate.

2.2 Study Areas

2.2.1 The extent to which the study area for bats extends beyond the Scheme Boundary was determined by the potential significant effects on ecological features, i.e. the Zone of Influence (ZoI). These were based on guidance where available (references provided where applicable), but in most cases were determined by professional judgement and taking guidance from Interim Advice Note 116/08[4]. The study areas for bats are discussed in the following paragraphs.

Desk Study

2.2.2 A desk-based data gathering exercise was undertaken in July 2022 by contacting Gloucestershire Centre for Environmental Records (GCER) to obtain recent (within 10 years) records of bat species within 2 km of the Scheme[5].

2.2.3 The MAGIC website[6] was reviewed to identify all:

- European Sites[7] where bats are one of the qualifying features within 30 km of the Scheme Boundary.
- Granted bat mitigation licences[8] within 2 km of the Scheme.

2.2.4 Additionally, bat roosts within 2 km of the Scheme Boundary that were identified as part of the survey work (preliminary bat roost assessment (PBRA), emergence / re-entry surveys, aerial tree surveys and radio tracking), but which are now outside of the study area as detailed under 'Preliminary Bat Roost Assessment of Structures and Trees' below, are provided.

[4] Highways England (October 2008) Interim Advice Note 116/08: Nature Conservation Advice In Relation To Bats..
[5] Using the minimum distance of 2 km was considered to be sufficient due to the vast number of surveys and methods being completed within the Study Area, providing detailed information of the bat species and assemblages present.
[6] Magic Map Application (defra.gov.uk) [Accessed August 2022]
[7] As defined in Regulation 8 of the Habitats Regulations 2017, these include: Sites of Community Importance (SCIs), Special Protection Areas (SPAs), potential SPAs (pSPAs), Special Areas of Conservation (SACs), candidate SACs (cSACs) and possible SACs (pSACs). Ramsar sites, proposed Ramsar sites and sites compensating for damage to a European Site are also considered to be European Sites in accordance with UK Government policy (Ministry of Housing, Communities and Local Government (July 2021) National Planning Policy Framework). Following the changes made to the Conservation of Habitats and Species Regulations 2017 (as amended) by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, SACs and SPAs in the UK no longer form part of the EU's Natura 2000 ecological network and now form part of a UK national site network. In this document they are still referred to as European Sites.
[8] Licences granted by Natural England to permit activities that might otherwise cause a breach of the Conservation of Habitats and Species Regulations 2017, with respect to species protected by that legislation.

Preliminary Bat Roost Assessment (PBRA) of Structures and Trees

2.2.5 Research on impacts of the effect of noise on bats[9] suggests that, to avoid noise impacts on bat species, noise levels (construction and operational levels) should attenuate back to approximately background levels (baseline noise levels). The noise assessment presented in Chapter 6 – Noise and Vibration (application document TR010063 – APP 6.4) showed that, with the exception of 1 Withybridge Lane[10], all of the baseline noise levels were 65.1 dB or higher. Therefore, the study area for the PBRA of structures and trees considered all land within and surrounding the Scheme which may be subjected to noise levels greater than 65 dB during construction. Noise levels during operation will be slightly higher than baseline in some areas, as shown by the noise modelling for the Scheme.

2.2.6 The construction assessment presented in Chapter 6 – Noise and Vibration (application document TR010063 – APP 6.4) details the estimated dB levels of activities associated with the construction of the Scheme. It was anticipated that the highest noise level impact would be 80 dB and this was the figure used to calculate the ZoI for bat roost surveys.

2.2.7 Table 2-1 shows indicative noise decay with distance from the source. These reductions were used to estimate distances at which the construction and demolition activities would be below the baseline noise levels recorded. Table 2-1 suggests that noise levels are likely to be 65 dB or lower (back to baseline noise levels along the majority of the Scheme) at a receiver, a distance of 40 m from earthworks and construction activities or 60 m from demolition activities.

2.2.8 It should be noted that the distances presented in Table 2-1 are considered to be conservative estimates, as they do not account for the fact that a bat roost itself (i.e. the tree or structure) and surrounding landform / structures or vegetation would also provide additional barriers to noise.

Table 2-1 - Approximate Construction Noise Level at Various Distances[11]

Construction Activity		Construction Activity Noise Level dB LAeq,T[12] at Receiver									
		10 m	20 m	30 m	40 m	50 m	60 m	70 m	80 m	90 m	100 m
Demolition	Demolition works and topsoil stripping	80	74	71	68	66	65	63	62	61	60
Earthworks	All other construction activities	77	71	67	65	63	61	60	59	58	57
Construction		76	70	66	63	62	60	59	57	56	56

2.2.9 As all demolition works are proposed to take place more than 20 m within the Scheme Boundary, it is considered that a 40 m study area around the Scheme Boundary is sufficient[13] to adequately address all potential impacts on roosting bats from the construction and operational activities[14]. The study area is shown on the figures in

[9] The California Department of Transportation. 2016. Technical Guidance for the Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Bats. July. (Contract 43A0306.) Sacramento, CA. Prepared by ICF International, Sacramento, CA, and West Ecosystems Analysis, Inc., Davis, CA. Available at: http://iene.se/wp-content/uploads/Effects-of-Traffic-Noise-and-Road-Construction-Noise-on-Bats.pdf

[10] This is within the land that will be between the M5 and the new Link Road, and surveys for bat roosts extend well beyond 100 m within this area, therefore it was considered acceptable to retract this datum point from the assessed noise levels. Noise levels at this location were 57.4 dB.

[11] Data taken from the Noise and Vibration chapter (application document TR010063 – APP 6.4).
Red text show the distance from the construction activity before the level of disturbance is ≤ 65 dB.

[12] Equivalent continuous sound levels over time

[13] A 40m buffer along the A4019 and adjacent to the M5 Junction 10 where baseline noise levels have been recorded as 74.5 dB or greater is considered to be conservative.

[14] Other potential impacts from the Scheme on bats, including dust pollution, light spill and vibration are unlikely to exceed 40 m from the Scheme Boundary

Appendix G. The exceptions to the 40 m buffer around the Scheme Boundary are as follows:

- The study area did not extend east beyond Hayden Road (located west of the dualled section of the A4019 carriageway). This was because there are streetlights already in this location which will have already had significant impacts on bat activity, and works are restricted to the carriageway and are unlikely to have a greater noise impact than rush hour traffic.
- The study area did not extend along the A4019 by Homecroft Drive past the first row of houses, as impacts in this area were considered to be minimal (as the first row of houses is likely to form a buffer for any indirect noise or lighting impacts).
- The study area did not extend 40 m from the Scheme Boundary at three locations within the eastern quadrant. These areas were incorporated into the Scheme Boundary at a later date to provide mitigation for dormice and badgers. Works here will be limited to hedgerow enhancement and creation of an artificial badger sett, which would have negligible negative disturbance impacts to bats. In addition, the study area did not extend 40 m from the Scheme Boundary at a further two locations, one of which is within the southern quadrant and one in the western quadrant. These areas were incorporated into the Scheme Boundary at a later date as additional right to flood/drain areas, which require an agreement with the landowner to be in place. No physical works will be undertaken here.
- The study area extended more than 40 m from the Scheme boundary to include the entire area between the Link Road and the M5 motorway in order that the potential risk of fragmentation could be fully assessed.

Limitations of the PBRA of Structures and Trees Study Area

2.2.10 Following preliminary calculations in 2021 it was assumed that the highest noise level impact would be 80 dB and this figure was used to calculate the ZoI for bat roost surveys. However, final calculations in summer 2022 predicted the highest dB level during construction to be 83.1 dB, a difference of 3.1 dB. Therefore, it would require a slightly larger ZoI (larger than 40 m from the Scheme Boundary) to return the noise levels back to baseline levels of 65.1 dB. This was not considered to be a significant limitation as the baseline noise levels along the A4019 (which is where the majority of the bat noise receptors are located) were between 74.5 and 80.4 dB, which is 9.4 dB higher than the 65.1 dB baseline used to calculate the ZoI for bat roost surveys.

2.2.11 Adjacent to the proposed Link Road, baseline noise levels of between 55 dB to 60 dB are predicted as no data was collected directly adjacent to this location (Chapter 6 – Noise and Vibration (application document TR010063 – APP 6.4)). Therefore, in order to achieve a return to baseline noise levels the ZoI for bat roost surveys would be required to be extended to 100 m+ along the east of the Link Road at this location[15]. A buffer of 100 m would include an additional 19 potential bat roost receptors, comprising seven[16] structures and 12 trees[17]. These structures and trees are accustomed to periodic agricultural machinery in the adjacent fields, including combine harvesters which have been estimated to generate noise between 76 dB and 90 dB[18], which is equivalent to the noise levels predicted as a result of the construction works. Furthermore, the noise will be attenuated further by the landscape (i.e. due to hedgerows and trees) reducing the noise levels further. It is therefore considered on balance that it is not proportionate to extend the ZoI further in this location, given that the risk of disturbance is considered to be low

[15] This includes the eastern aspect of the Link Road only needing to be extended to 100 m+, as west of the Link Road is already included within the study area due to the potential risk of fragmentation from the Link Road and the M5 motorway
[16] One considered to have negligible bat roost suitability (see section 2.3 for suitability descriptions), two with low bat roost suitability, two with moderate suitability for roosting bats and two surveyed structures.
[17] Seven low, three moderate and two high bat roosting suitability
[18] Sümer, S., Say, S., Ege, F. and Sabanci, A., 2006. Noise exposed of the operators of combine harvesters with and without a cab. Applied Ergonomics, 37(6), pp.749-756.

and precautionary roost mitigation has already been included. Therefore, the 40 m study area for bat roost surveys remains appropriate.

Bat Activity Surveys (Transects and Static Detectors)

2.2.12 The study area extended up to 250 m from the Scheme Boundary for assessment of habitat and suitability to support bats. This included all habitat features that may be impacted in the Scheme, allowed for changes in the design and provided understanding of bat usage of habitats adjacent to the Scheme.

Crossing Point Surveys

2.2.13 Locations identified for crossing point surveys were selected based on habitats likely to be used by bats as features to commute/forage along, which would be impacted by the Scheme. These included:

- Hedgerows that would be intersected by the Scheme.
- Roads with parallel/perpendicular hedgerows where the Scheme will result in the addition of lighting at these locations.
- At the River Chelt where a new road bridge is proposed.

2.2.14 A proportion of these features were taken forward to survey, focusing on the highest quality habitats, i.e. intact hedgerows with the highest botanical diversity (see limitation below).

2.2.15 Hedgerows that were not included within the crossing point surveys (including hedgerow with trees 37, hedgerow 176, hedgerow 160 and hedgerow 132, which would all be intersected by the Link Road) were surveyed by other methods including transects or statics as they were identified to be sub-optimal bat commuting habitats and it was therefore not considered proportionate to complete crossing point surveys. As a precaution, and in order to maintain connectivity as far as possible, mitigation has been incorporated at these, and all confirmed crossing point locations.

Advanced Licence Bat Survey Techniques (ALBST)

2.2.16 The study area for ALBST extended 2 km from the Scheme Boundary. Where it was considered necessary, some survey teams attempted to track bats outside of this study area when bats were not in range of the transmitters. For example, radio-tracking in an attempt to locate bats up to 5 km from the Scheme Boundary was carried out in some circumstances (when bats could not be located).

2.3 Field Surveys

PBRA / Ground Level Tree Assessments (GLTA)

2.3.1 Preliminary Bat Roost Assessment (PBRAs) and Ground Level Tree Assessments (GLTAs) were undertaken in line with the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists[19] (hereafter referred to as the BCT Guidelines).

2.3.2 PBRA surveys were undertaken during daylight hours and involved the identification of suitable bat roosting features within a structure (building, bridge or culvert) or tree, and then looking for further evidence of use by bats. Surveys were aided by the use of high-powered torches, endoscopes and binoculars (where appropriate). The use of torches or endoscopes was only completed by appropriately licensed bat ecologists. Photographs were taken of each suitable feature, and any evidence of bats was recorded.

2.3.3 A large proportion of PBRAs undertaken of structures as part of this Scheme involved an external assessment only, due to the potential presence of asbestos, as well as the risk

[19] Collins, J. (ed) (2016) Bat Surveys for professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

of transmission of Covid-19. Where internal surveys were not undertaken this is detailed in Appendix A.

2.3.4 Where internal inspections were possible, they identified evidence and roosting features within the property focussing on any roof voids or basements. The surveyor ensured that they made notes of any bats or evidence of bats including bat droppings or staining. The internal inspection allowed for an accurate assessment of the structure's hibernation suitability. However, where structures were very open with minimal asbestos risk, such as Dutch barns, these were fully surveyed as part of the initial PBRA survey. Structures and trees were assigned an overall bat roost suitability: negligible, low, moderate, high or confirmed, as per the BCT Guidelines.

2.3.5 Where areas of woodland were found (defined in this context as groups of more than 20 trees and referred to as 'tree groups' within this report), these were assessed for bat roosting suitability as a whole, whereby the highest bat roosting suitability for any individual tree within the woodland was assigned to the whole group, this was considered to be a proportionate approach to ensure efficient assessments based on a worst-case scenario.

2.3.6 If bat droppings were found within any tree or structure, they were collected (if possible), and sent for DNA testing (see 2.3.12 to 2.3.15).

2.3.7 Where no land parcel access was provided, an aerial photography assessment was undertaken, combined with an assessment from public rights of way, to complete an assessment of the number of structures and trees and their bat roost suitability.

PBRA / GLTA Limitations

2.3.8 Surveys for roost assessments were undertaken between May 2019 and May 2022. This is not considered to be a significant limitation as it is sufficient to characterise value of the bat roost resource. However, for the purposes of a European Protected Species (EPS) licence to be granted from Natural England, some degree of re-survey will be necessary, which will be agreed with Natural England.

2.3.9 The majority of the surveys undertaken did not include internal assessments of structures, due to the Covid-19 pandemic (in order to minimise the risk of disease transmission to bats and / or residents when entering shared internal spaces) and due to the difficulty in completing asbestos surveys prior to the internal survey of any structure (a pre-requisite to be able to complete an internal survey based on health and safety requirements). This could have reduced the surveyors' ability to accurately identify/ characterise bat roosts. At these sites, a conservative approach to assigning bat roost suitability was adopted when assessing structures or trees. Combined, with bat emergence/re-entry surveys, and professional judgement, it is considered that this was not a significant limitation.

2.3.10 All surveys were carried out from ground level and therefore a close view of any roof or bridge could only be carried out with binoculars from ground level. On this basis, where a full assessment could not be completed, then a precautionary approach was adopted with regards to roost characterisation. Therefore, this was not considered to be a significant limitation.

2.3.11 On an individual structure basis, Appendix A.2 states further limitations. None of these limitations were considered to be significant, or they were considered within the results section, or the survey was repeated where possible.

DNA Surveys

2.3.12 Where bat droppings were found within any tree or structure, a sample of the droppings was collected (if possible) as quickly as feasible, to avoid disturbance of roosting bats by the survey team, placed in a sealed pot and labelled. Photographs of the droppings and their general distribution were taken prior to collection, and the location noted on the survey proforma or annotated on a plan. If more than one species of bat was suspected, droppings of different shape and size were collected separately and details included in the survey proforma and sample label.

2.3.13 Surveyors aimed to collect at least six droppings per sample (i.e. for each species and location). Up to three droppings were then extracted and sent to Swift Ecology Limited for DNA analysis within two weeks of being collected, and multiple species analysis was undertaken to identify all bat species' DNA present.

2.3.14 The remaining droppings were stored in a cool, dry location for a minimum of 12 months, in the event that the droppings sent for analysis did not provide conclusive results.

DNA Survey Limitations

2.3.15 In some instances, where only a single dropping was found, this was not submitted for DNA analysis (this was the case at BU_357, BU_747, BU_757, BU_761, BU_762, BU_763 and BU_765). Where roosts are proposed to be demolished, or where the roosts may be subject to disturbance, attempts will be made to collect more droppings for DNA analysis (if species identification cannot be made by other methods) prior to a Natural England licence application being submitted (which will be necessary before construction works proceed on site). In the meantime, assessments of roost characterisation have been conducted using surveyor professional judgement and bat sound analysis to determine species identification.

Structure Hibernation Surveys

2.3.16 Only structures meeting the below criteria were subject to bat hibernation surveys:

- High hibernation suitability recorded during the PBRA and where hibernating bats were assessed likely to be present (i.e. a stone wall cavity of a barn).
- Confirmed evidence of bats was recorded.
- Where the loft could not be fully inspected (i.e. inaccessible loft areas where hibernation was considered likely in these areas).

2.3.17 Structures assessed to have negligible bat hibernation suitability, where no evidence of bats had previously been recorded (during the PBRA and emergence/re-entry surveys), were not subject to bat hibernation surveys, as this was considered to be a disproportionate level of additional survey effort.

2.3.18 Where bat hibernation surveys were conducted, this included a minimum of one visit[20] between December and February. Hibernation surveys only extended into March where the weather remained suitably cold (considered to be a minimum night-time temperature of 5°C or below[21]).

2.3.19 For structures, bat hibernation surveys comprised a full spectrum static bat recorder being left within the structure (or in the case of culverts, left outside, with microphone pointing inside, with a wooden back shield to reduce the risk of picking up bat calls outside of the culvert). On each occasion the detector was left for a minimum of two weeks with an EasyLog USB - Lascar temperature and humidity data logger (taking hourly readings). The location of each static bat detector and humidity/ temperature recorder was mapped.

2.3.20 At the existing A4019 bridge over the M5there were expansion joints on both sides of the bridge that were surveyed by a licensed ecologist with an endoscope twice during the hibernation period.

Structure Hibernation Survey Limitations

2.3.21 Due to the Covid-19 pandemic, internal surveys of the structures were significantly reduced. In some situations, the static bat detector and data loggers were given to residents to be placed in roof voids, with instructions, to gain relevant hibernation data in the absence of internal inspections. In other cases, the internal inspection was undertaken at a later date, where access permitted, and up-to-date asbestos surveys had been

[20] Two visits were undertaken where access permitted additional surveys.
[21] Based on the BCT guidelines which suggests it is advisable for surveys to be carried out when the weather is the coldest.

completed. As the data were still able to be gathered and analysed, this was not considered to be a significant limitation.

Emergence / Re-entry Surveys of Structures

2.3.22 Following PBRA, structures with low to high / confirmed suitability for roosting bats were subject to emergence / re-entry surveys. These surveys included one survey for low suitability, two surveys for moderate suitability and three surveys for high / confirmed suitability, in line with the BCT Guidelines, during the bat active season (May to September).

2.3.23 Emergence surveys began approximately 15 minutes before sunset and continued until two hours after sunset (or one and a half hours if bat activity was low, or late emerging species were considered unlikely to be present). Re-entry surveys commenced two hours before sunrise and continued until 15 minutes after sunrise. If there was still bat activity 15 minutes after sunrise, the survey continued until 15 minutes after the last bat activity.

2.3.24 All surveys were carried out in accordance with the weather conditions described in the BCT Guidelines[22] (where this was not possible limitations were detailed within the analysis / roost characterisation where applicable). Figures were drawn of all roost surveys, detailing each surveyor location, the location of any infra-red camera positions (and static detectors, if utilised without a surveyor), and any emergence / re-entry points. Flight lines were noted within the survey proforma for any important commuting or foraging habitats, and for any emergence or re-entry observed, with attention noted to the time of observation to allow for call analysis to identify the species.

2.3.25 Surveyors were strategically positioned around the structure to allow for visibility of all features suitable for roosting bats. Visual observations of bats were supported by ultrasonic bat detectors, using full spectrum handheld detectors.

2.3.26 All recording equipment used recorded in full-spectrum (unless stated within the survey specific limitations, i.e. 2021 crossing point surveys). Recording devices for emergence surveys included:

- Batlogger (M and M2).
- Echo Meter Touch 2 (EMT 2).
- Echo Meter Touch 3 (EMT 3).
- Anabat Walkabout (Walkabout).
- Anabat Scout (Scout).
- Anabat Swift (Swift).
- Song Meter SM4BAT – FS (SM4) used with a BatBox Duet (Duet)[23].
- Peersonic RPA3.

2.3.27 The use of infra-red cameras was used where assessed necessary, specifically where bats with low amplitude echolocation calls are likely to be present (e.g. brown long-eared bats), and for all culverts.

Emergence / Re-entry Structure Surveys Limitations

2.3.28 Emergence / re-entry surveys for the roost characterisations have been undertaken since 2019, therefore, some of the surveys have not been undertaken within the last 12 months. This was not considered to be a significant limitation as it was sufficient to characterise the value of each roost. However, for the purposes of an EPS licence to be granted from Natural England, some degree of re-survey will be necessary, which will be agreed with Natural England.

2.3.29 The bat detectors used for the emergence / re-entry surveys varied between surveys. In line with the BCT guidelines ideally the same detector should be used for all surveys. This

[22] This was taken to be temperatures of at least 10^0C at dusk for an emergence survey or dawn for a re-entry survey, avoiding rain, and wind levels estimated to be 4 or lower on the Beaufort scale.
[23] This was not assessed to be a limitation as bat calls were recorded using the full spectrum SM4 via this method.

is not considered to be a significant limitation as the purpose of the surveys was to observe emerging bats which all of the detectors were able to do. On some occasions equipment failure occurred, but this was not considered to be a significant limitation as surveyors were still able to view the structure, and any roosting bats were confirmed via another surveyor's detector data.

2.3.30 Any discrepancies in temperatures and the subjectivity of surveyors recording wind speed and cloud cover (detailed above) is not considered to be a significant limitation as all surveys were conducted within the range of appropriate survey parameters as set out in the BCT Guidelines and where the lead bat surveyor assessed there were limitations to the survey, these were specifically noted on the proformas and considered in the analysis.

2.3.31 For a proportion of surveys, weather condition data was not recorded. All surveys were only carried out if the weather forecast was assessed as being suitable for that evening / survey the following morning as detailed within the BCT Guidelines. Additionally, surveyors recorded weather limitations during the course of their surveys, and therefore the this is not assessed as being a significant limitation.

2.3.32 The table in Appendix A details limitations encountered at individual structures. None of these limitations were considered to be significant.

Tree Surveys (Aerial Tree Climbs and Emergence / Re-entry Surveys)

2.3.33 Trees within the study area that were assessed during the GLTA as having moderate, high or confirmed roosting suitability were subjected to an aerial tree climb and / or emergence / re-entry surveys during the bat active season (May to September).

2.3.34 Aerial tree-climbing surveys were carried out during daylight hours, using tree climbing equipment, ladders, endoscope and torches (as necessary). Evidence of bats was recorded in the field using a survey proforma and all evidence was marked on a location map. Following the aerial tree-climbing assessment, the bat roosting suitability of the tree was updated (where necessary). Photographs that were taken of features/ evidence were referenced appropriately, and any changes to the GLTA map annotated (such as a change in the roosting suitability, updated location for a feature or a new feature identified).

2.3.35 Aerial tree climbs were completed in lieu of emergence/ re-entry surveys. In such cases, trees with moderate suitability were climbed two times in the active season to search for evidence of roosting bats, and trees with high suitability were climbed three times.

2.3.36 Any features which could not be fully accessed, such as those which could not be fully inspected with an endoscope or trees that were identified as unsafe to climb, were surveyed by emergence/ re-entry surveys. Where bat roosts were identified during tree climbing and the number / species of bat(s) could not be confirmed, then a bat emergence survey was carried out for roost characterisation and bat call analysis.

2.3.37 Emergence / re-entry surveys were complimented by the use of infra-red night vision cameras in all instances for tree surveys, and ultrasonic bat detectors.

2.3.38 All recording equipment used recorded in full-spectrum (unless stated within the survey specific limitations, i.e. 2021 crossing point surveys). Recording devices for emergence surveys included:

- Batlogger (M and M2).
- Echo Meter Touch 2 (EMT 2).
- Echo Meter Touch 3 (EMT 3).
- Anabat Walkabout (Walkabout).
- Anabat Scout (Scout).
- Anabat Swift (Swift).

- Song Meter SM4BAT – FS (SM4) used with a BatBox Duet (Duet)[24].
- Peersonic RPA3.

2.3.39 All infra red detectors used Canon XA11 or XA40.

2.3.40 In some instances infra-red cameras and static bat detectors were used instead of surveyors, due to the high number of surveys that were required across the Scheme; this included:

- Tree 42.
- Tree 55.
- Tree 57 (3 surveys).
- Tree 60 (2 surveys).
- Tree 86 (3 surveys).
- Tree 89 (2 surveys).
- Tree 132 (3 surveys).
- Tree 156 (2 surveys).
- Tree 235A (3 surveys).
- Tree 237 (3 surveys).
- Tree 645 (3 surveys).

2.3.41 The surveyors that supervised the use of this technique were all considered capable (using Atkins Competency Framework[25]) to lead these surveys, and the data were also analysed (i.e. watching the footage in real time and then with reduced speed as required and checking against the time stamp of the analysed bat calls) by the same capable surveyors.

Tree Surveys (Aerial Tree Climbs and Emergence / Re-entry Surveys) Limitations

2.3.42 The use of infra-red cameras and static bat detectors in replacement of surveyors does not follow the current BCT Guidelines, which state that 'while such equipment is very useful as a complementary technique, it should not be used to replace surveyors to any significant degree; the majority of any site should be observed by surveyors'. However, the more recent Thermal Imaging: Bat Survey Guidelines[26] (produced in association with the BCT) endorses the use of thermal imaging cameras as a replacement for one or more surveyors providing the right equipment is deployed correctly by suitably trained personnel. It is acknowledged that this relates specifically to thermal imaging cameras, rather than infra-red cameras, but the principal of replacing surveyors with cameras is endorsed. The even more recent Interim Guidance for Night Vision Aids (NVA)27 does not explicitly state that infrared or thermal imaging cameras can replace surveyors, stating that this depends on each individual scenario and the equipment used, and that the forthcoming BCT Guidelines will provide more detail on this, but it does acknowledge that the forthcoming BCT Guidelines will shift the emphasis to using NVAs as a standard protocol. It is considered that this methodology is at least as reliable, if not more so, than surveyors, and this was reinforced during the data analysis stage, undertaken by capable surveyors. The approach taken is therefore not considered to be a limitation, particularly given the trends towards use of cameras. Natural England confirmed in a letter sent via email on 16/04/2021 that they were in agreement with the approach taken. (Tree Surveys (Aerial Tree Climb Hibernation Surveys)

2.3.43 Only trees assessed as having high suitability for hibernation from the GLTA (i.e. large cavity providing a stable temperature) or with confirmed evidence of bats, were subject to hibernation surveys.

[24] This was not assessed to be a limitation as bat calls were recorded using the full spectrum SM4 via this method.
[25] https://atkins-corporate.production.investis.com/~/media/Files/A/Atkins-Corporate/group/services-documents/ecology_competencies_criteria_and_process_2019.pdf [Accessed August 2022]
26 Fawcett Williams (2021) Thermal Imaging: Bat Survey Guidelines in association with the Bat Conservation Trust
[27] Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys. Bat Conservation Trust, May 2022

2.3.44 Trees with a 'low' or 'moderate' suitability from the GLTA, or where no evidence of bats had previously been recorded (during the GLTA and emergence / aerial tree climb surveys), were not subject to specific hibernation surveys, as this was not assessed to be proportionate.

2.3.45 The hibernation survey was completed in accordance with the tree climbing protocols in the BCT Guidelines. It comprised one aerial tree climb by a licensed bat surveyor using an endoscope, and was completed between December and February within the core hibernation season. Any evidence of bats was recorded in the field using a survey proforma; all evidence was marked on a location map.

2.3.46 Any trees which could not be fully accessed, such as those which could not be fully inspected with an endoscope, or trees identified as unsafe to climb, were identified and it was considered that a hibernation survey was only partially completed. Acknowledgement of this was considered when proposing compensation and making assumptions of roosts (see section 2.6) and was therefore not considered to be a significant limitation.

Activity Surveys

Transects

2.3.47 The study area was assessed to be of moderate suitability for foraging and commuting bats (using criteria listed in Table 4.1 in the BCT Guidelines). Habitats with potential to support foraging/ commuting bats (e.g. woodland, hedgerows and river corridors), were identified through aerial mapping and site surveys. Ten transects (with pre-defined point counts) were identified; these focused on areas most likely to be used by commuting/ foraging bats (approximately one transect for every 40 hectares of suitable habitat within the study area).

2.3.48 The original survey scope included ten transects that were surveyed during 2019 and 2020. Transects were repeated in 2021 as update surveys (see Sections 2.3.52 and 2.3.53). Three transects, Transect 1 (T1), T3 and T6, were removed from the scope following design changes in early 2021, as the locations were no longer assessed as being within the ZoI of the Scheme. In 2021, following the completion of lighting design, two additional transects were included along the A4019 (T11 and T12). Therefore, nine transects are considered for the assessment.

Table 2-2 - Transects within the 2019 / 2020 / 2021 Survey Scope

Transect	Survey Scope												
	2019/20						2021						
	Jun	Jul	Aug	Sep	Oct	May	Apr	May	Jun	Jul	Aug	Sept	Oct
T1	Removed from the survey scope due to being outside of the ZoI												
T2	✓	✓	✓	✓	✓	✓	✓	×	×	×	×	×	×
T3	Removed from the survey scope due to being outside of the ZoI												
T4	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	×	×
T5	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	×	×
T6	Removed from the survey scope due to being outside of the ZoI												
T7	✓	✓	✓	✓	✓	✓	✓	×	✓	×	×	×	×
T8	✓	✓	✓	✓	✓	✓	×	✓	×	×	×	×	×
T9	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	×	×
T10	✓	×	✓	✓	✓	✓	×	×	×	×	×	✓	×
T11	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓
T12	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓

2.3.49 In line with the BCT Guidelines each transect was surveyed once monthly throughout the survey season from April to October. Each transect commenced at dusk and lasted at least three hours, to account for late-emerging bat species. As per the BCT Guidelines, one survey per transect per year comprised a combined dusk and dawn survey (August 2019 and August 2021); the dawn transects began two hours before sunrise and finished at sunrise.

2.3.50 Transect routes were selected to encompass a range of habitats, but the route was also influenced by access throughout the survey season. Along each walked activity transect route there were designated point counts, referred to as points, representing different habitats or features with high bat suitability along the survey route. Each pre-defined point was stopped at for three minutes to allow surveyors to observe and count bats. Each point was visited at least twice during each survey following BCT Guidelines. The starting location for each transect changed, or the transect route was reversed, with each repeated survey to reduce temporal bias.

2.3.51 Surveyors completed a transect proforma detailing observations of bat flight paths to note foraging or commuting habitats, with particular attention paid to the time to allow for the identification of the species from the analysis of bat calls.

2.3.52 The majority of the transect and static data used to inform the assessment was collected between 2019 and 2020, with the exception of T11 and T12. In 2021 update surveys were undertaken of transects completed in 2019 and 2020. Three transect routes (T4, T5 and T9) were surveyed once per survey season (following the methodology for low suitability habitat as detailed in the BCT Guidelines) and four transects (T2, T7, T8 and T10) were surveyed once or twice each in 2021. 27 static bat detector locations were surveyed between May and October 2021. Where transects were only surveyed once or twice within the year, this was due to access limitations.

2.3.53 Each transect route and the habitats that were present are described below. The locations of these transects can be found in Appendix G.

Table 2-3 - Transect Location Descriptions

Transect	Description
T2	T2 was designed to run approximately parallel to the M5, located to the west of the motorway; surveyors followed the perimeter field margins of four arable fields. The northernmost two fields of this transect were bordered by the River Chelt as it exits the M5 River Chelt culvert.
T4	T4 was located west of the M5, north-west of the M5 Junction 10. The survey encompassed five fields (comprising arable and pasture) bordered by hedgerows. Barn Farm was directly adjacent to this route. This transect also incorporated a long hedgerow bordered access track running parallel to the M5.
T5	T5 was located south of the A4019, where the Link Road is proposed. The surveyors walked five pasture fields, bordered by both intact and defunct hedgerows. At the south of the transect route was the River Chelt, with intermittent vegetation along its banks.
T7	T7 was located just north of where the new Link Road will join the B4634. It comprised five pasture fields, including a small orchard on a gently sloping hill to the east. The route was located to the north of a large complex of farm structures and to the east of Withybridge Lane.
T8	T8 was located between T5 and T7, and was located to the south of the River Chelt. It comprised five fields including arable, orchard and pasture, located to the south of a small complex of farm and residential structures. Hedgerows were located throughout.
T9	T9 was located at the southwest of the M5 Junction 10 in the western quadrant. It comprised a series of four large arable fields, bordered by hedgerows and trees and with the River Chelt running along the south.
T10	T10 was located at the north-west of the junction. It included sections along Stanboro Lane, which was bordered by a hedgerow and woodland, and also included survey of three fields (arable and pasture) that surround a large complex of farm, residential and industrial structures. There were pockets of woodland located at the north, east and within the centre of the transect route.
T11	T11 was located south of the A4019. The route covered pasture fields from the A4019 Junction 10 layby to the fire station which are bordered by hedgerows, and adjacent to residential and farm properties along Moat Lane.
T12	T12 was located north of the A4019. The route predominantly followed pavements that are adjacent to the A4019, extending between the southbound exit slip road of M5 Junction 10 and the Hayden Road junction; a hedgerow is located along the length of this route. The route also included two arable fields bordered by hedgerows. This transect is lit in proximity of the fire station and in the residential areas closer to Hayden Road.

Transect Equipment

2.3.54 Anabat Walkabout bat detectors were used for surveys undertaken in 2019 and 2020. From June 2021 onwards, the bat detectors used were Batlogger M2s for all bat transect surveys to improve GPS location recording. This is not considered to be a limitation.

Transect Mapping

2.3.55 For the purposes of mapping, only species recorded at the stopping points were included, with bats recorded between stopping points excluded.

2.3.56 Bats were counted whereby a gap of 30 seconds between calls was considered to be a new individual. Where continuous foraging was recorded then only one bat has been counted.

Static Bat Detector Surveys

2.3.57 Static bat detectors were deployed across the Scheme to support the bat transect surveys; these are summarised in Table 2-4, and their locations can be seen in in Appendix G. Static bat detectors were deployed along the transect routes, with additional detectors deployed in areas of particular impact (e.g. National Highways land, where junction works are proposed) or areas inaccessible for transects (e.g. in the southern quadrant of the study area, south-east of the junction).

2.3.58 The static bat detectors deployed across the site included Anabat Swifts deployed along hedgerows. All detectors were set to record in automatic mode, not manual, to reduce the likelihood f under recording bats. The minimum frequency was set to 13kHz and the maximum frequency was set to 200 kHz. The minimum event of 3 ms, and a trigger window of 2 seconds, was used to maximise the number of bat passes recorded, compared to noise files.

2.3.59 The detectors were deployed primarily within areas of hedgerow and woodland, and other dominant habitat types which may be directly or indirectly affected (fragmented) by the Scheme. The detectors were securely hidden within vegetation (between 0.5 m and 1.5 m above ground) with microphones positioned to allow for unrestricted recording. Each static detector was photographed in-situ and its grid reference recorded as eastings, northings. In areas of high public footfall, locks were used.

2.3.60 The static deployment locations were selected to help determine the use of the landscape by bats, therefore features such as hedgerows or watercourses that were likely to be used by commuting bats were preferentially selected.

Table 2-4 - Transects and Associated Static Detectors and Crossing Points

Transect	Static Location Reference	Crossing Point locations (Details Provided Below)	Area of Impact due to the Scheme that the Surveys were assessing
T2	3	CP1	Junction improvements
	4		
T4	7	N/A	
	8		
T9	15	CP9 covers T9 and 10 as this crossing point was intended to identify where bats cross the A4019, west of the junction	
	16		
T10	17		
	18		
N/A	45		
	45b		
Southern quadrant, directly south-east of the junction	21	N/A	
	35		
National Highways land	22	N/A	
	23		
	41		
	41b		
	42		
	42b		
T5	9	CP3	Link Road
	10		
T7	11	CP5	
	12		
T8	14	CP4	
	36		
N/A	40		
	44		
T11	39	CP2, CP6, CP7 and CP8 cover T11 and T12; these crossing points were intended to identify locations that bats cross the A4019, between the two transects	A4019 improvements
	43		
T12	39b		
	43b		

Transect	Static Location Reference	Crossing Point locations (Details Provided Below)	Area of Impact due to the Scheme that the Surveys were assessing
Other Static bat detectors	33 34 37		

2.3.61 The static bat detectors were deployed for a minimum of five consecutive nights. After the recording was complete, surveyors analysed the local weather conditions from local weather stations to determine the number of the survey dates where there were optimal weather conditions. This was considered to be avoiding rain and 'strong winds' (i.e. when the wind was estimated to be 4 or lower on the Beaufort scale). Where weather was not optimal on consecutive nights, then nights with suitable weather were chosen for analysis, over consecutive nights. If there were not five full nights of suitable weather, then the most favourable survey night's data were retained, and this limitation was presented in the survey details. Static detector surveys were repeated each month to allow for comparisons.

Static Analysis

2.3.62 Following the call analysis (see Section 2.4) of each static, taking into account the five nights with the most suitable weather, the data were collated. The data were then put into bar graphs to compare the number of bat passes recorded, which was determined by the bats recorded within each file at each static location, and the species assemblage at each location, these bar graphs can be found in the results section.

2.3.63 The data were also then analysed by converting them into a bat activity index (number of bat passes per night) below to provide comparable indices to show which statics recorded more activity than other statics for all species, and per species.

Paired Statics

2.3.64 Statics 39 and 39b and 43 and 43b were paired over the A4019, and statics 41 and 41b and 42 and 42b were paired beneath the M5 Junction 10 bridge, to determine if bats were commuting across the feature. Bat calls of the same species within 30 seconds of each other were considered to be the same bat commuting.

2.3.65 If the same bat species was recorded again within 30 seconds this was only considered a single recording on the basis that the bat could be foraging between the static detectors.

2.3.66 Nyctaloid bats were not considered when pairing the bat species on the basis that they frequently fly above the features being surveyed and are therefore not within the commuting height considered.

2.3.67 Due to limitations with the bat detectors (as detailed below in the limitations for equipment and call analysis) there is the risk that bats commuting may not have been recorded. Bats recorded on both detectors may also not have been commuting but may have been individuals at each bat detector location, and therefore the results should be considered as indicative of likely commuting species.

Bat Activity Index (BAI)

2.3.68 Once the transects and statics were complete, the data was analysed utilising bat activity index (BAI). This methodology recorded each individual bat as a single record (based on surveyor judgement in the field for transects and each pass within each file for statics).

2.3.69 For transects to calculate the BAI, each species was assigned to the point count where it was recorded. All bat records that were between point counts were omitted from this analysis, but considered within the overall evaluation. This data was imported into a spreadsheet to display each species and the number of records of that species throughout the whole of the surveys.

2.3.70 Although each point count was visited for three minutes when surveyors reached the location, the individual point counts were visited a different number of times depending on the direction that surveyors walked the route, or the length of the transect, both impacting the number of times the point count could be visited in the survey time available. This method therefore allows a comparable figure to be produced.

2.3.71 The BAI was calculated[28] by dividing the total number of bat occurrences at that point count by the total number of minutes that surveyors recorded at each point count across all of the surveys[29]. This number was multiplied by 60 to give a BAI for transects that showed the number of bat passes per hour.

2.3.72 For statics, each bat pass recorded was assumed to be a different bat. The number of nights of deployment was calculated to account for where there was nights of successful recording . The BAI was calculated by dividing the total number of bat occurrences at that static location by the total number of nights deployed to give a BAI for statics that showed the number of bat passes per hour.

2.3.73 The resultant numbers can be applied to consider bat passes at static or point count locations as a whole, or to consider individual species to allow comparison that take into account the length of time for which data was recorded.

2.3.74 When comparing the BAI between quadrants, the mean BAI was taken accounting for all transects or statics within the quadrant.

Activity Surveys (Transect and Static Surveys) Limitations

2.3.75 The specific limitations associated with a particular transect were all determined to not be significant, and are provided in Appendix C.

2.3.76 The majority of transect and static survey data was collected between April and October across three years (between June and October 2019, in May 2020 and April 2021). This was as a result of when the project started, and the effects of Covid-19 (this is not applicable to T11 and T12, or statics 39 to 45b which were surveyed entirely in 2021). Although this will have resulted in some degree in variation recorded due to yearly fluctuations, this is not considered to be a significant limitation.

2.3.77 The transect routes remained as similar as possible throughout the surveys to provide comparable data; however, some alterations were necessary due to health and safety and land access issues, as detailed within Appendix C. This is not considered a significant limitation as although there is a reduction in collected data on some hedgerows and habitats, the amalgamation of all survey types will have collected sufficient data to inform the impacts and mitigation required.

2.3.78 No transects were possible within the Southern Quadrant of the study area, directly south of Withybridge Gardens, as access would have required the unsafe crossing of a main road at night, and cows were present in the field adjacent to Butler's Court property. However, two statics were deployed directly adjacent to the M5 motorway throughout 2019 it is therefore possible that flight paths on hedgerows without statics deployed (including H110, H107 and H107a) were not recorded. However, this is not assessed as being a significant limitation as this location is proposed to be enhanced for bats within the scheme through the creation of a flood compensation area, assumptions on hedgerow usage have been made based on the statics deployed in this area and the hedgerows will be retained through the design.

2.3.79 Any discrepancies in temperatures and the subjectivity of surveyors recording wind speed and cloud cover (detailed above) is not considered to be a significant limitation as all surveys were conducted within the range of appropriate survey parameters as set out in

[28] Adapted from Cook et al 2008. Survey Guidance for Assessing bat Activity at Proposed On-Shore Wind Farms.
[29] This did not include any update surveys where these were undertaken, as the update surveys were reduced in scope when compared to the previous surveys.

the BCT Guidelines and where the lead bat surveyor assessed there were limitations to the survey, these were specifically noted on the proformas and considered in the analysis.

2.3.80 For a proportion of surveys, weather condition data was not recorded. All surveys were only carried out if the weather forecast was assessed as being suitable for that evening / survey the following morning as detailed within the BCT Guidelines. Additionally, surveyors recorded weather limitations during the course of their surveys, and therefore this is not assessed as being a significant limitation.

2.3.81 There were a number of occasions where the equipment failed and resulted in data not being fully collected. Similarly, unsuitable weather and lack of access prevented data being collected. Given the amount of data obtained across the deployments and different survey methods was considered that this was not a significant limitation.

2.3.82 Although ideally recording equipment would remain the same for all surveys (i.e. one detector brand across all of the transect surveys) as there may be small differences in detector microphone sensitivity, this was not assessed as being a significant limitation as the primary purpose of the surveys was to detect bat species and assemblages within the different locations of the study area which both detectors are able to achieve.

BAI Limitations

2.3.83 For Transect 12 in April 2021 the surveyors did not make a note of how many times each of the point counts were visited (i.e. if no bats were recorded at the point count, no reference to that point count on the survey form was made). Therefore, for this one survey, an assumed number of times the point count was visited was calculated by using the mean number based on the six other surveys that were undertaken at this location. This was not considered to be a significant limitation as this is unlikely to have significantly adjusted the numbers for these locations. This is however considered in the results as the highest BAI score (for total number of bat passes) was within Transect 12.

Crossing Point Surveys

2.3.84 In 2020, across the Scheme, five potential bat crossing point locations (CP1 – CP5) were identified, where bats were considered likely to be using linear features which may be impacted by the Scheme. Due to Scheme changes in 2021, detailing the proposed widening and lighting of the A4019, four additional potential crossing point locations (CP6 – CP9) were identified. The locations of the potential crossing points are shown in Appendix G, and are as follows:

- CP1 – Located at the River Chelt culvert beneath the M5 to record bats that passed through the culvert and over the top of the motorway.
- CP2 – Located at the junction of Withybridge Lane and the A4019 to record bats that crossed the A4019.
- CP3 – Located on a hedgerow to the south of the A4019 to record bats that use this feature, which will be severed by the Link Road.
- CP4 – Located on the River Chelt where the Link Road will cross this watercourse.
- CP5 – Located at the Link Road junction with the B4634 to record bats that crossed the B4634.
- CP6 and CP7 – Located along the A4019 close to the fire station where hedgerows are perpendicular to the A4019 on both sides, to determine if bats were crossing the road at these points.
- CP8 – Located along the A4019 east of the junction where the M5 slip road meets the A4019, to determine if bats were crossing the A4019 at this point.
- CP9 – Located along the A4019 west of the junction, to determine if bats were crossing the A4019 at this point.

2.3.85 The Crossing Point Survey Guidelines[30] that were followed for the planning of these surveys, were designed for the survey of new linear schemes, assessing where bats commuted along linear features, such as hedgerows, before the implementation of a scheme. These data are used to assess bats that will be '*at risk of collision*' as a result of the scheme; therefore, for surveys following this methodology, bats that cross < 5 m (unsafe crossing height) were recorded. Potential collision risk for bats is applicable for CP3 as the new Link Road will intersect a linear feature at this location.

2.3.86 The methodology was adapted for CP2 and CP5 to CP9 (all located where there is already a break in the linear features from a road). At these locations the method was adapted to determine if the bats will be affected by the change in the existing road layout (i.e. the dualling of the A4019) and the increased lighting at these locations. This method still identified bats that cross < 5 m (unsafe crossing height), however these are locations where bats are already deemed at risk from vehicles. Although this was not the primary purpose of this methodology (i.e. not usually used at locations where roads are present), it is considered that this will help determine impacts on bats as a result of the Scheme in these locations.

2.3.87 For CP4, as this was the proposed location of the Link Road bridge over the River Chelt, the unsafe crossing height was considered to be between 3 m and 8 m, as below 3 m bats will still be able to pass under the new road bridge safely and above 8 m bats would be above the traffic on the road bridge and avoid the risk of collision (see Figure 2-1).

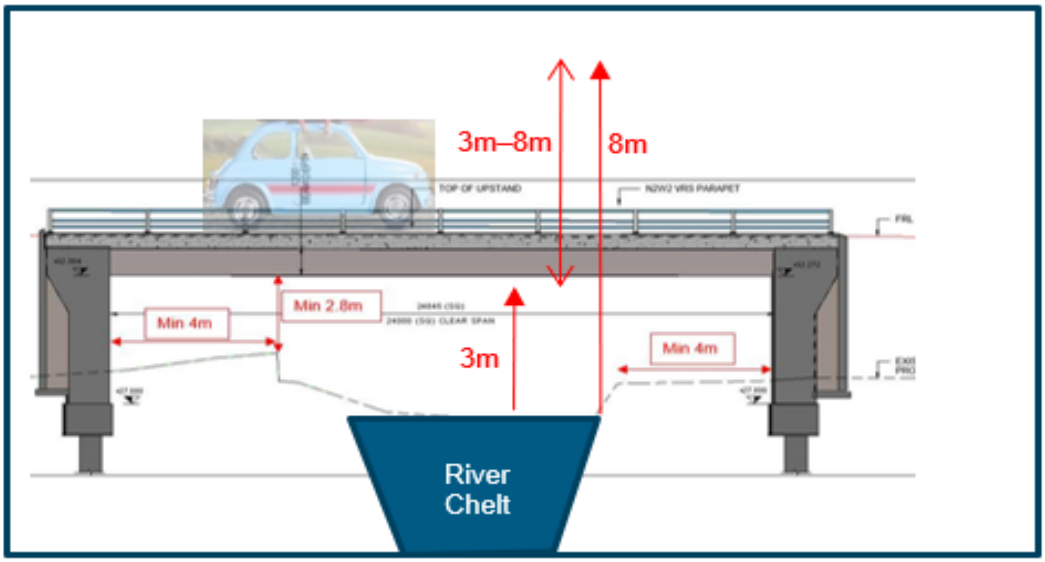

Figure 2-1 – Figure to Show the Safe and Unsafe Crossing Height at CP4

2.3.88 The Crossing Point Survey Guidelines state a requirement for a minimum of six 60-minute dusk or dawn surveys, of which at least three should be dusk surveys. After *Myotis* and horseshoe bats were recorded during crossing point surveys 1 and 2, the duration of the surveys was extended to 90 minutes for surveys 3 to 6, to ensure these species were recorded.

2.3.89 Surveyors completed a crossing point survey proforma, detailing observations of bat flight paths in relation to the identified crossing point, as per the Crossing Point Survey Guidelines. Information recorded by the surveyors included:

- Bat species.
- Time of recording.
- Where the bat was recorded and direction of travel.

[30] Appendix G. Local effects of transport infrastructure & mitigation: Best practice survey protocol and data analysis (2015) Anna Berthinussen & John Altringham School of Biology, University of Leeds, Leeds LS2 9JT

- Distance from the identified feature[31] (i.e. distance from a hedgerow).
- Bat height above ground level, rather than the height above each feature, for consistency.

2.3.90 Maps were annotated with survey results, showing the locations of observed flight lines in addition to the completed proformas where appropriate.

2.3.91 Visual observations of bats in 2020 were supported by full spectrum ultrasonic bat detectors (Anabat walkabouts); however, no camera was used as a visual aid. In 2021, zero-crossing bat detectors were used[32] with at least one thermal imaging camera to enable bats to be detected.

2.3.92 Crossing Point Survey Guidelines recommend '*each crossing bat is recorded as a separate observation regardless of whether the same bat has crossed the road more than once*'. Additionally, bats that travelled > 5 m (excluding CP4) over the top of any feature (defined as a 'safe crossing height') and bats that were heard and not seen, were all recorded. However, they were not included in the number of bat passes that defined whether the location was a confirmed crossing point or not, using the criteria set out below.

2.3.93 As per the method presented in the Crossing Point Survey Guidelines, after the first two surveys, the results were subject to an initial assessment. During the initial assessment, this survey method states that if more than 10 bats are seen to be using a crossing point feature < 5 m (or between one and five bats, in the case of rare species, depending upon rarity), a full suite of six bat crossing point surveys should be conducted. However, the Crossing Point Survey Guidelines provides no guidance on how to define what constitutes as 'rare', or how to calculate how many of each rare bat must be present to signify the location is a confirmed crossing point. Therefore, Atkins produced Table 2-5**,** a points-based system to determine if the feature at a location is a confirmed crossing point. Where any one crossing point achieved a Crossing Point Score of ten points or more during surveys, then the full suite of six surveys were completed to confirm the location as a confirmed crossing point. The points within this table were calculated based on rarity of bat species within England (Wray et al., 2010)[33].

2.3.94 NB: Where bats were seen by surveyors commuting or foraging along a feature that was not the feature of interest, i.e. not crossing the road itself these recordings were incidental and although recorded, they were omitted from the Crossing Point Score.

Table 2-5 - Methodology to Determine if the Feature at a Location is a Confirmed Crossing Point

Bat Species (Using the Crossing Point < 5 m)	Crossing Point Score
Common pipistrelle	1 point per crossing
Soprano pipistrelle	
Long-eared	
Myotis (excluding greater mouse-eared or Bechstein's if these can be distinguished)	3 points per crossing
Lesser horseshoe	
Leisler's	
Noctule	
Nathusius' pipistrelle	

[31] Where bats are recorded as using a feature, this was considered to be with 3 m of the habitat or feature
[32] Which records lower quality data than a full spectrum ultrasonic detector.
[33] Wray et al., Valuing Bats in Ecological Impact Assessment (CIEEM (2010) In Practice Number 70)

Bat Species (Using the Crossing Point < 5 m)	Crossing Point Score
Serotine	
Greater horseshoe	10 points per crossing
Greater mouse-eared	
Barbastelle	
Bechstein's	

2.3.95 A total of six crossing point surveys were undertaken at five locations (CP1 – CP5) across the 2020 survey season (May to September). In 2021, as per the Crossing Point Survey Guidelines, these surveys were repeated. CP1 – CP5 were all surveyed the full six times in 2020 and 2021.

2.3.96 In addition, due to the Scheme changes detailed above, four additional potential crossing point locations (CP6 – CP9) were subject to surveys in 2021. CP6/7 and CP9 were only subject to the initial two surveys as they did not meet a Crossing Point Score of ten points or more to define them as confirmed crossing points (as detailed above).

Crossing Point Survey Limitations

Survey Length

2.3.97 The first two surveys in 2020 were one hour in duration, as per the Crossing Point Survey Guidelines. This was then extended by 30 minutes from the third survey onwards, due to late emerging species being confirmed as present within the study area of the Scheme. This was not considered to be a significant limitation as these were surveyed again in 2021 and the survey length was 1 hour and 30 minutes for all surveys.

2.3.98 In addition to this, the 5th survey of the six surveys in 2020 for CP1 (17/09/2020) finished six minutes early. This was not considered to be a significant limitation, as the survey had been extended to 90 minutes (from 60 minutes), therefore it is unlikely that a significant number of bat passes will have been missed. However, this was considered within the evaluation regarding whether this location would be determined to be a confirmed crossing point or not.

Height Measurement

2.3.99 The surveyors did not have a pole on site to help measure the height that each bat was crossing. This was considered to be a limitation, as it allows differences between surveyor's judgement on the height that bats were flying, which could affect the results. In response to this limitation, surveyors agreed local features (i.e. hedgerows or structures) on site that were the differing heights, to be able to capture bat heights as effectively as possible.

Crossing Point Analysis

2.3.100 The analysis of the survey data for 2020 and 2021 is the same within this report.

2.3.101 Initially the analysis for CP1-CP5, after the first two surveys counted how many bats had been heard or seen at each location, regardless of whether the bat was recorded using the defined crossing point feature or how high the bat flew.

2.3.102 This methodology was refined in 2021, re-analysing the 2020 data at the same time as 2021 data from CP1-CP9 to only focus on bats that were using the identified crossing point feature (i.e. the road or hedgerow) to commute / forage along during the initial analysis. This was not considered to be a limitation as the initial approach was more precautionary.

Survey Teams and Timings

2.3.103 As detailed within the Crossing Point Survey Guidelines, the same team of surveyors should conduct the repeat surveys (including each year) to eliminate any variation due to observer bias, if possible. Due to the volume of survey work, this was not feasible. Therefore, there is a chance that an element of surveyor bias was inherent to the collected data, due to the change in surveyors. A well-defined survey method was produced and suitably experienced staff (rated against a competency criteria) were used with the objective of achieving a consistent approach to surveys and data collection, to reduce the effect of survey bias. As such, this was not considered to be a significant limitation.

2.3.104 The Crossing Point Survey Guidelines suggest that crossing point surveys are best carried out between June and August inclusive. May and September are considered to be acceptable (but less optimal as bat activity may be lower than in other months and behaviour may not be typical of mid-summer). As shown in Table 2-6, some of the surveys at CP1-CP5 in 2020 were undertaken outside of the optimal survey period. This was not considered to be a significant limitation as it was still within the acceptable survey period.

Table 2-6 - Crossing Point Survey dates

Survey number	CP1		CP2		CP3		CP4		CP5		CP6	CP8	CP9
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2021	2021	2021
1	02/06/2020	07/06/2021	04/06/2020	09/06/2021	15/06/2020	01/06/2021	08/06/2020	08/06/2021	10/06/2020	02/06/2021	03/06/2021	10/06/2021	16/06/2021
	Dusk	Dawn	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk
2	22/06/2020	21/06/2021	16/07/2020	22/06/2021	01/07/2020	14/06/2021	06/07/2020	23/06/2021	24/06/2020	17/06/2021	16/06/2021	09/07/2021	01/07/2021
	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dusk	Dawn	Dawn	Dawn
3	01/09/2020	14/07/2021	10/08/2020	08/07/2021	26/08/2020	28/06/2021	20/08/2020	07/07/2021	17/08/2020	01/07/2021		23/07/2021	
	Dusk	Dawn	Dusk	Dawn	Dusk	Dusk	Dusk	Dawn	Dusk	Dusk		Dawn	
4	07/09/2020	20/07/2021	24/08/2020	22/07/2021	10/09/2020	13/07/2021	27/08/2020	21/07/2021	08/09/2020	16/07/2021		03/08/2021	
	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn		Dusk	
5	17/09/2020	03/08/2021	09/09/2020	05/08/2021	16/09/2020	10/08/2021	03/09/2020	04/08/2021	21/09/2020	20/08/2021		12/08/2021	
	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn		Dawn	
6	28/09/2020	17/08/2021	15/09/2020	19/08/2021	24/09/2020	13/08/2021	14/09/2020	18/08/2021	28/09/2020	31/08/2021		23/08/2021	
	Dusk	Dusk	Dusk	Dusk	Dusk	Dawn	Dusk	Dusk	Dusk	Dawn		Dusk	

Green cells are optimal, red are outside of the optimal period.

2.3.105 The Crossing Point Survey Guidelines are designed to compare pre and post construction data. Therefore, the methodology specifies that annual repeats of surveys should be carried out at the same time of year at each site to avoid seasonal changes in bat activity (including completing dusk / dawns during the same time period). However, as the surveys in 2020 were undertaken partially outside of the optimal survey period, this was corrected for the 2021 surveys to follow the Crossing Point Survey Guidelines. Furthermore, in 2020, all of the surveys were completed from dusk onwards, as it was during the start of the Covid-19 pandemic and due to health and safety concerns, no hotels were being used. This meant that dawn surveys were impossible due to safety concerns of surveyors driving with fatigue. This was corrected in 2021. This is not

considered to be a limitation as direct comparisons between 2020 and 2021 are not currently needed. The 2021 dataset can be used as baseline data against which any post-construction data can be compared.

2.3.106 The following survey limitations were recorded with regard to rain:

- For CP3, on Survey 6/6 in 2020 (24/09/2020), the survey finished early (after 79 minutes, instead of 90 minutes) due to rain.
- For CP5, on Survey 6/6 in 2020 (28/09/2020), there was light rain throughout the survey.

2.3.107 The weather conditions for these surveys were not optimal, as the BCT Guidelines (not the Crossing Point Survey Guidelines) suggest bats may not be as active during periods of rain. However, bats were recorded during these surveys, and furthermore numerous other surveys were undertaken at these locations. This is only considered to be a minor limitation, nonetheless, it has been considered when analysing the results.

Recording Devices

2.3.108 For the 2020 surveys, no infra-red or thermal cameras, or night scopes were used as surveyor aids. This is not specifically required within the Crossing Point Survey Guidelines, ,with the exception of culverts, where the Crossing Point Survey Guidelines state 'infra-red lights should be set up to illuminate the underpass entrance and as much of the interior as possible.' CP1 is the only culvert, and although a night scope was not used in 2020, this was rectified for the 2021 surveys where the night scope was set up on a tripod with the whole of the culvert entrance in view. Therefore, this is not considered to be a significant limitation.

2.3.109 For the 2021 surveys, zero-crossing bat detectors were used rather than full spectrum detectors. Zero crossing bat detectors have some limitations to their functionality, since they record ultrasound frequencies and process the call data in such a way that the amplitude information is lost, and some bats may go un-detected or may not be identifiable to species level. To address this, at least one thermal imaging camera was used on all surveys, to increase the likelihood of observing bats during the survey. Any bats that were confirmed to cross the road, were checked against the second surveyor's data to confirm species, therefore no significant limitation was noted.

2.3.110 Additionally, the following malfunctions were encountered during operation of bat detectors:

- For CP1, on Survey 2/6 in 2020 (22/06/2020), the detector froze on several occasions.
- For CP2, on the survey 4/6 in 2020 (24/08/2020), the detector failed to record for one of the surveyors for a short period.
- For CP5, on Survey 1/6 in 2020 (10/06/2020), the detector failed to record for one of the surveyors.
- For CP5, on survey 2/6 in 2020 (24/06/2020), the detector failed to record for one of the surveyors.
- For CP5, on Survey 5/6 in 2020 (21/09/2020), the detector failed to record for one of the surveyors.
- For CP1, on survey 1/6 in 2021 (20/08/2021), the detector failed to record for one of the surveyors.

2.3.111 In all instances where a detector malfunctioned this will have prevented species identification at that surveyor position, although they would still be able to observe bats in flight. However, given the proximity of surveyors to each other there was at least one more surveyor that was recording in a similar location at all these locations (i.e. the other side of the crossing point) and any bats crossing the identified crossing point features were able to be identified. Therefore, this was not considered to be a significant limitation.

Surveyor positions

2.3.112 At CP2 and CP5, during the initial four surveys in 2021 and all of the 2020 surveys, surveyors were located away from the road side, due to health and safety concerns of collision risks with traffic. This meant the surveyors' field of view was limited and some bats that crossed the road may have been missed. Therefore, this has been considered when analysing the results of these crossing points. Following a review of health and safety risks, with the inclusion of additional reflective clothing and surveyor locations being changed, surveyors were able to work road side. This allowed the surveyors (and the camera) to have a better view of the road and increase the likelihood of observing bats during the survey.

2.3.113 For the first survey of CP2 in 2020, two survey positions were monitored during the survey. Following review of survey coverage for this location the possibility of some bats being undetected was identified. Therefore, four surveyors were deployed to increase the likelihood of observing bats during the survey. However, this is not considered to be a significant limitation, as only one of the twelve surveys completed at this location over the two-year period was undertaken with two surveyors, with remaining surveys utilising four surveyors.

2.3.114 Complete coverage of the Feature B hedgerow of CP3 was not possible, as cows were present in the field to the east of this hedgerow. Therefore, bats to the east of Feature B would likely have been missed. This was considered to be a significant limitation to the results that were gathered for CP3 and has been considered within the analysis of the results.

2.3.115 No access south of the River Chelt was provided for surveys of CP4, which may have resulted in bats to the south of the northern hedgerow being missed, as can be seen in Figure 2-2. This was considered to be a significant survey limitation. However, based on the static and transect bat data that has been gathered over 2020 and 2021, this is known to be an important commuting route for bats, and this was considered within the analysis of the results.

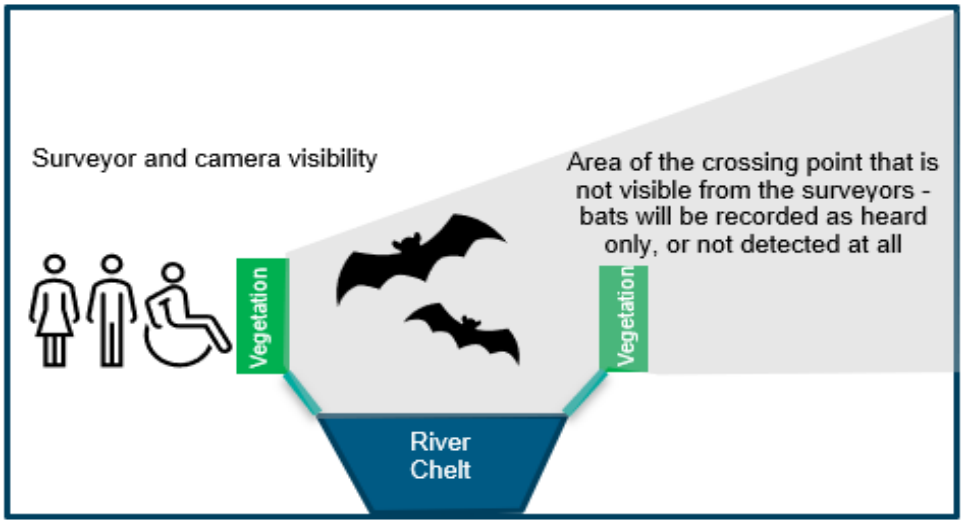

Figure 2-2 – Figure to Show the Limitations to Surveyor Location at CP4

2.3.116 CP9 was proposed for survey to identify if, and where, bats cross the A4019, west of M5 J10. There was no obvious feature that bats would use to cross the road in this location due to the hedgerows / vegetation located along the whole length of the A4019. Although surveyors were positioned so that they could view as large an area as possible, it was not possible to ensure complete coverage of this area and it is possible that bats could cross the A4019 without being picked up by this survey method; this was considered to be a significant limitation.

Advanced Licence Bat Survey Techniques (ALBST)

2.3.117 Use of ALBST was considered necessary, due to the Scheme being of '*landscape scale affecting rare bat species'* (BCT Guidelines), and as all the Annex II bat species (barbastelle, Bechstein's[34], lesser and greater horseshoe bat) had been recorded within the study area (during bat activity surveys including static and transect surveys).

2.3.118 ALBST were proposed for the months of May and July 2021, as recommended in the BCT Guidelines. The objectives were to improve understanding of how these rarer bats used the landscape, in order to appropriately mitigate any impacts.

Target Bat Species

2.3.119 The following bat species were targeted during ALBST surveys:

- Primary: Bechstein's due to being an Annex II bat species and not easily identified through other survey techniques as *Myotis* bat calls are not easily distinguishable and hence it was deemed necessary to gain additional information on Bechstein's use of the landscape.
- Secondary: Barbastelle, greater horseshoe and lesser horseshoe due to being Annex II bat species, noting that bat calls of these species are easily identified and consequently data can be gathered from other survey techniques.
- Incidental species: Natterer's, Brandt's, whiskered, Alcathoe, Daubenton's and brown long-eared bats (only tagged if the target and secondary species were proving difficult to trap or track) are all species that are difficult to differentiate by other survey techniques due to similar or quiet echolocation, and they are likely to be impacted by the Scheme.

Trapping Locations

2.3.120 During a site scoping visit in April 2021, following an assessment of aerial photography, eight trapping locations were identified (Locations 1-8) where trapping could be completed, as described below and shown in Appendix G. The habitats present were sub-optimal for Bechstein's (when compared to optimal habitats outlined in BCT guidelines), but because of lack of alternative locations, the surveys proceeded. Trapping was possible at seven locations, due to a lack of access at Location 1.

Location 1

2.3.121 Located close to a barbastelle roost (Tree 496), in proximity of a small pocket of woodland parallel to the M5. No access was possible at this location for the surveys.

Location 2

2.3.122 The M5 culvert over the River Chelt – accessed from the east of the culvert. Two harp traps were placed next to each other at this location in May 2021, with the objective of trapping bats when passing through the culvert. No mist nets were used at this location.

[34] A tree (Tree 172 as referred to in Section 3.1.2), located 110 m from the south eastern extent of the Scheme Boundary, recorded a single Bechstein's bat within it on three occasions (27/07/2020, 17/08/2020, 01/09/2020). The tree had been surveyed as it was originally within the study area for ground level tree assessment (GLTA) surveys, until Scheme changes meant that this tree was no longer within the updated study area.

Figure 2-3 – Bat Trapping Location 2, River Chelt M5 Culvert

Location 3

2.3.123 The Withybridge Lane bridge over the River Chelt. A single harp trap was placed at this location in May 2021 and fabric was hung either side of the harp trap to prevent bats flying around the harp trap, with the objective of trapping bats when passing through the culvert. No mist nets were used at this location.

Figure 2-4 – Bat Trapping Location 3, River Chelt M5 Culvert

Location 4

2.3.124 A small orchard parallel to Withybridge Lane. Mist nets and harp traps were used in this location in May 2021.

Location 5

2.3.125 A tree line running parallel to the A4019, 150 m to the south (along CP3). Mist nets and harp traps were used in this location (and the field to the south) in May 2021 adjacent to hedgerows and in gaps in the hedgerow where footpaths crossed.

Figure 2-5 – Bat Trapping Location 5, Footpath Through Hedgerows where the Harp Trap was Located

Location 6

2.3.126 A Bechstein's roost (from desk study data) within a young orchard. Endoscopes were used to check every tree for evidence of bats. No harp traps or mist nets were used at this location. A hand net was to be used if any target bats were recorded in any tree.

Location 7

2.3.127 A small footbridge over the River Chelt. Similar to Location 3. A harp trap was positioned over the water in May 2021. In addition, a mist net was used above the bridge with the objective of capturing bats that were following the watercourse and flying over the footbridge.

Location 8

2.3.128 A hedgerow and tree line running parallel to the River Chelt, approximately 100 m north. A harp trap was used with the objective of catching bats as they crossed this feature.

Trapping Methodology and Equipment

2.3.129 Not all locations were trapped at the same time; the trapping locations were chosen in the 24 hours preceding the survey, taking into consideration weather conditions and trapping success during previous nights. Based on surveyor experience, surveying the same location on multiple nights was avoided as bats have been found to avoid locations where traps are in place on subsequent nights.

2.3.130 Five nights of trapping and tagging across the Scheme were completed in May 2021 (over a period of seven days to allow for a contingency of bad weather). The general methodology for trapping and tagging followed the BCT Guidelines. Trapping was not carried out during adverse weather conditions, such as when temperatures fell consistently to below 8°C at any point during the night or during heavy rain or moderate to strong wind. No July trapping session was carried out as originally planned, as discussed in paragraph 2.3.155.

2.3.131 Mist nets and harp traps were checked at regular intervals (i.e. mist nets every 5-10 minutes, harp traps every 15-20 minutes). A central location for processing bats was set

up each night when trapping locations were not in one location. Surveyors remained in radio contact throughout.

2.3.132 Equipment used included mist nets and harp traps (comprising a mixture of two and three banks) with acoustic lures (Sussex Autobat and Avisoft models). A peak total count of five mist nets were used on any night and a peak total count of five harp traps were available on any night (over two teams). Equipment that was used for each night is provided in Appendix E. A hand net was available should a Bechstein's bat have been recorded at Location 1 or 6.

Tagging Methodology and Equipment

2.3.133 When target bats were caught, radio tags were attached by a suitably experienced surveyor (see competencies below).

2.3.134 The maximum number of bats that could be caught was agreed within the project-specific licence issued by Natural England (licence reference 2021-52728-SCI-SCI_, as shown in Table 2-7 so that the correct number and species of bats was tagged.

Table 2-7 - Pre-determined Maximum Bats Tagged

Species (in order of importance, based on the info in paragraph 2.3.119)	Number of Bats to be Tagged
Bechstein's	5
Barbastelle	5
Lesser horseshoe	4
Greater horseshoe	2
Natterer's	2
Brandt's	1
Whiskered	1
Daubenton's	2
Brown long-eared	2
Total number of bats	6 (maximum)

2.3.135 Radio-tags used for this survey were the smallest / lightest models available (as suitable for the bats proposed to be tagged) and never exceed 5% of the bat's total body weight (based on BCT Guidelines). Only bats in good physical condition and without any injuries were tagged. For the May trapping period, nine larger tags (PicoPip Ag190, available from Lotek) were available (generally suitable for Bechstein's, barbastelle, greater horseshoe, brown long-eared, Daubenton's and Natterer's) and three smaller tags (Pip Ag317, available from Lotek) were available (suitable for lesser horseshoe bats and small *Myotis,* i.e. whiskered / Brant's / Alcathoe).

Manual Radio Tracking Methodology and Equipment

2.3.136 Manual tracking followed the BCT Guidelines, with up to four teams per night during the May trapping session, to ensure that all bats were tracked successfully (as detailed in Appendix E). This included up to four teams for up to ten nights (over a 13-night period to allow contingency for bad weather and fatigue management of staff).

2.3.137 The radio tracking teams met at dusk (21:00 on 22/05/2021, getting slightly later each day) and they tracked the bats until dawn where practicable. Biotrack Sika receivers were used with one handheld antenna (with connecting cable) per team to get a fix on each bat's location.

2.3.138 In some cases, surveyors began earlier to find roosts prior to dusk emergence if necessary. Tracking was carried out using antenna to triangulate the locations of bats with tags. Surveyor positions primarily remained static, but on some occasions moved around the landscape by car when bats could not be found (i.e. out of the antenna's receiving radius), stopping at various locations to check for signals from the tagged bats. Stopping locations were determined on an ad-hoc basis where safe to do so. Surveyors made records of each bat's bearing, where practicable. Radio tracking survey teams remained in radio contact with each other / the lead surveyor via UHF radio at all times.

2.3.139 Surveying equipment per team included:

- High powered torches / head torches (including a back-up).
- Survey pack (comprising of tablet for recording data digitally, compass, back up-paper survey sheets and pen).
- Biotrack Sika receiver and one handheld antenna (with connecting cable).

Data Processing

2.3.140 The location points of each tracked bat were estimated through use of LOAS software[35], using the Maximum Likelihood Estimator (MLE).

2.3.141 The MLE described by Lenth (1981)[36] uses an iterative algorithm that calculates the minimum angular error between the observed set of the bearings and the signal's estimated location. Therefore, it provides the most likely estimate for a location given a set of bearings. MLE was used in favour of other methods as the data is primarily 'clean', and the very few outliers were omitted manually.

2.3.142 Some records have been omitted from the analysis in this report as they are assumed to be incorrect based on the time and distance a bat would have been required to travel. Two levels of 'cleaning' the data has occurred for the data gathered on this project:

- The raw data were 'cleaned' as described above and any data points that were more than 2 km from the study area were removed.
- During the analysis stage, the data were further scrutinised and any additional data points that have been assumed to be incorrect are shown; however, the evaluation for each bat identifies these data points as likely errors. These data points are shown on figures in Appendix G however they are only shown as data points and are not linked with the other timestamped data to show that they have been removed from further analysis. These spurious data points have been omitted from further analysis within this report.

Surveyor Competence

2.3.143 The catching of bats via harp traps and mist nets, required to tag target bat species, was led by a surveyor who was suitably licensed to compete this work (holding a Natural England level 3 and level 4 bat survey class licence). The lead surveyor was assisted by two / three people at all times, with a minimum of one of those assistants being a level 2 licensed bat worker. All works were completed under project licence 2021-52728-SCI-SCI, granted by Natural England.

2.3.144 Any bat caught during this process was tagged by a suitably experienced surveyor who was named on the above-mentioned project licence.

2.3.145 The tracking of bats was led by a surveyor who was suitably experienced in radio-telemetry. This surveyor led up to three other teams (four teams in total on any one night) of two people, where at least one member of the team was experienced in radio-telemetry. Bats were tracked across the Scheme and the wider area.

[35] Further information is available at http://ecostats.com/LOAS (accessed November 2021)
[36] Russell V. Lenth (1981) On Finding the Source of a Signal, Technometrics, 23:2, 149-154, DOI: 10.1080/00401706.1981.10486257

2.3.146 All staff that led surveys (or led teams with regards to tracking) were assessed Capable for bat surveys on the Atkins Competency Framework and held appropriate Natural England survey licences (where applicable).

Survey Limitations

Refused Land Access

2.3.147 In the week leading up to the ALBST all land access was refused to Location 1 where bat trapping had been proposed, due to the known presence of a barbastelle roost. Therefore, this location was not trapped. This was not considered to be a significant limitation to the trapping method for barbastelle, a secondary target species for trapping, as other trapping locations had been identified. Additionally, there was no recent evidence to suggest that there was an active roost in the feature that is understood to be an historic barbastelle bat roost following a re-survey in April 2021 (the hole being densely covered in cobwebs).

Sub-Optimal Trapping Locations

2.3.148 During a site scoping visit in April 2021, following an assessment of aerial photography, eight locations were identified for trapping. All trapping locations were assessed to be sub-optimal for the primary target bat species, Bechstein's. This was due to the general homogenous habitat of the landscape providing limited 'ideal' locations to record the target species, which are primarily recorded in and close to mature dense deciduous woodland habitat (BCT Guidelines).

2.3.149 This limitation was acknowledged, but given that a Bechstein's bat roost had been recorded 110 m from the south-eastern edge of the Scheme Boundary, it was assessed that surveys would be required to discover more about this species, to inform necessary mitigation. Furthermore, the ALBST did not focus on Bechstein's only, but included other Annex II species (secondary target species) and incidental species.

Weather Conditions for Trapping

2.3.150 The first night of trapping was completed when temperatures were assessed to be suitable (i.e. dusk temperatures over 10°C as per BCT Guidelines (dusk temperature was 16°C)). However, due to the low amount / absence of cloud cover, the temperature dropped considerably and only one soprano pipistrelle bat was recorded (and subsequently caught). The bat was processed (for species, sex and breeding status), however it was assessed to be too cold to process for a weight. Therefore, it was warmed by one of the surveyors and released as soon as was safe to do so. The weather on the subsequent two nights was unsuitable for trapping (with even lower temperatures and high winds). This was not considered to be a significant limitation as four more trapping nights occurred in suitable weather conditions and bats were recorded regularly on those nights.

Tags for Tracking

2.3.151 With any tracking equipment there is potential for malfunction. The tag on Bat 4 could not be tracked after the bat was released and it is considered that this was either because the bat travelled out of the antenna range, or more likely, the tag malfunctioned. This was not considered to be a significant limitation as four other bats were successfully tracked.

Manual Tracking Limitations

2.3.152 Manual tracking of bats and regularly recording precise locations is a challenging task, particularly factoring in land access limitations. Triangulated points have a radius of error for each plotted point, this is generally estimated to be 20 m within the ranges worked with. For this project, this also includes roost locations as these were triangulated due to land access restrictions.

2.3.153 Therefore, there are some periods where there are gaps in the data, where there was no fix on the bat's location. As a result, determining precisely where bats crossed the roads,

specifically the A4019 (a key aim of the surveys) was not possible on most occasions. Based on the limited data (with large time periods not covered by the records) this has meant that determining exactly where bats crossed the roads, specifically the A4019, was difficult, as described within the analysis of this report. However, it was possible to demonstrate that bats were crossing the A4019 and M5 motorway within the Scheme.

2.3.154 Additionally in the first 12 hours of radio tracking, bats will often not behave in their usual manner due to the disturbance of being tagged (i.e. will visit locations not within their home range). On this basis the initial movements of the bats after being tagged were considered with caution, therefore this was not considered to be a significant limitation of this methodology.

Cancelled July Survey Session

2.3.155 Originally it had been proposed that ALBST sessions would be carried out in May and July 2021, in line with the BCT Guidelines. The July session was cancelled in late June 2021 due to a number of reasons (this was communicated to Natural England via email on the 27/07/2021):

- No bats of the target species (Bechstein's) were trapped in May. This was likely due to the habitats within the study area being sub-optimal for trapping this species, so this would still be a limitation in July. The Bechstein's roost at the south of the Scheme had not had a confirmed bat present in over a year, therefore, this species may no longer be in the proximity of the Scheme (i.e. the most optimal locations for trapping are all outside of the study area for trapping).
- Land access was restricted in May and was deteriorating leading up to the July surveys (Locations 2 and 3 were retracted after the May 2021 trapping took place).

2.4 Call Analysis

2.4.1 For activity surveys, call analysis was completed using Auto ID software (Kaleidoscope Pro or Anabat Insight with confidence set to at least 70%[37]). Where auto ID software was not available, files were processed through the basic software version; however, additional spot-checks were completed during the QA process. The data received was processed following the methodology set out below.

[37] The program is at least 70% confident that outputs are bats.

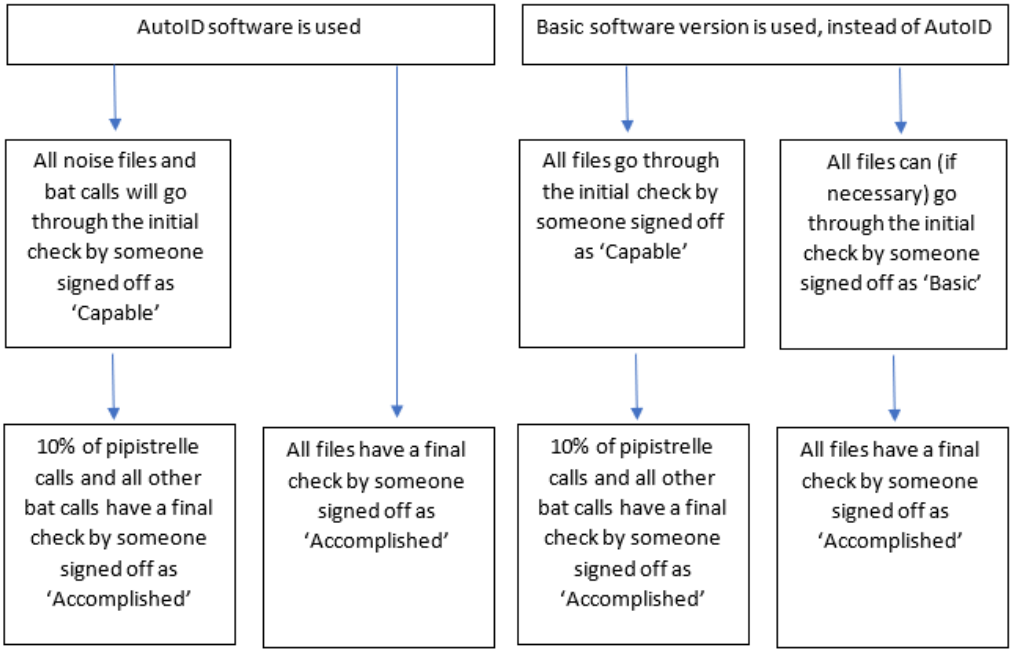

Figure 2-6 – Flow Diagram of Call Analysis QA[38]

2.4.2 All calls and sound files, including files auto-ID'd as noise, were then checked by an appropriately experienced ecologist and subjected to the QA process[39].

2.4.3 Identification of multiple species, and multiple bats within each sound file, was completed. In these instances, the number of bats and the species within each sound file was recorded. Results have been presented as 'bat passes' within this report, rather than number of bats (i.e. if a single bat passed the same detector ten times in one night, this would be recorded as 10 bat passes at this location).

2.4.4 Where possible, bats were identified to species level; however, for some species this was not possible due to overlapping call characteristics, for example the *Myotis* bats. The following terms are used throughout this report:

- Pipistrelle – refers to the UK's three resident species within the pipistrelle genus, the common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle. These species were identified to species level during analysis where possible. However, through the bat auto-ID process, it was not possible to identify which species of pipistrelle was present when the peak frequency was between 49 and 51 kHz or 41kHz. In this situation the bat call was identified as 'pipistrelle'. This was not considered to be a significant limitation as where bat roosts were present DNA testing was conducted to confirm the pipistrelle species. For transects and static surveys, all three pipistrelle species are known to frequent the study area, and it was assessed that any mitigation/ compensation for these species would be similar, therefore grouping these bats as 'pipistrelle' was not considered a limitation.
- *Myotis* – refers to species from the *Myotis* genus. There are seven species from this genus occurring in the UK which display similar call characteristics: Natterer's bat, whiskered bat, Brandt's bat, Daubenton's bat, Bechstein's and Alcathoe bat. Bechstein's bats are Annex II 'rare' bat species (which are known to be roosting just outside of the study area based on desk study data and records obtained during transect and static bat surveys).

[38] 'Accomplished' and 'Capable' bat surveyors are based on Atkins criteria to assess surveyor's competence
[39] Using Russ, J (2012) British Bat Calls: A Guide to Species Identification. Pelagic Publishing.

- For the purpose of this report, all long-eared bats are referred to as brown long-eared bats. This is because although bat calls of brown long-eared and grey long-eared bats are indistinguishable, there are no known records of grey long-eared bats within the study area and all DNA results obtained confirmed the presence of brown long-eared bats only. Due to their quiet echolocation long-eared bats have been recorded infrequently and this has been considered when assessing impacts.
- Similarly, within the bat auto-ID process, noctules, Leisler's and serotines have been labelled as Nyctaloids (big bats). A surveyor assessed to be accomplished has checked a percentage of all the data and it has been confirmed that all three of these species frequent the study area. This was not considered to be a significant limitation as where bat roosts were present DNA assessment of droppings has been used to confirm the bat species. Furthermore, the mitigation for Nyctaloids is similar and hence this is not considered to be a significant limitation.

2.4.5 During the 2019 static deployment, the Anabat Swift detectors recorded large volumes of data including over 64 GB of data in less than a five day deployment. This was largely due to the number of noise files being recorded due to the static detector settings, which were the factory default settings of an Anabat Swift (subsequently, settings were changed to reduce the number of noise files recorded). These files were run through Kaleidoscope Pro auto-identification software and 100% of files identified as bat calls were checked manually, with 10% of all noise files checked. Where more than 10% of noise files checked were found to contain bat calls, then an additional 10% of files was checked. This sampling method was used to estimate the likely percentages of noise files that contained bat calls. It was estimated that 83% of noise files analysed would have been noise, 9% of these files would have been Myotis species, 7% would have been pipistrelle species and fewer than 3% of these calls would have been other bat species including lesser horseshoe, barbastelle, Nyctaloids and brown long-eared bats.

2.5 Evaluation methodology

2.5.1 The valuation of bat roosts, commuting and foraging habitat has been informed by guidance on valuing bats in ecological impact assessment by Wray *et al*[40]. The guidance provides a framework for assigning roosts, commuting and foraging habitat to geographic importance categories that are consistent with the values defined in LA 108[41]. The evaluation is based on the information gathered from the desk study and field surveys, using a combination of professional judgement and accepted criteria[42] (e.g., diversity, rarity, and naturalness).

2.6 Addressing Roost Survey Data Gaps

2.6.1 Despite every attempt to gather as much survey data as possible, some gaps remain in the bat roost survey data and it has been necessary to predict the bat roosts present within these structures and trees, using existing survey data and taking a reasonably precautionary approach.

2.6.2 Initially, the known occupancy rates of bat roosts was established. This was based on the results of fully completed surveys. Using the known occupancy rates, the predicted occupancy rates of bats in the unsurveyed structures and partially surveyed structures were determined. The process of establishing known and predicted occupancy rates involved the bat roost suitability of all structures being assessed as negligible, low, moderate or high in line with the BCT guidelines.

[40]Wray et al., Valuing Bats in Ecological Impact Assessment (CIEEM (2010) In Practice Number 70))
[41] Highways England. March 2020. LA 108 Biodiversity. Available from: https://www.standardsforhighways.co.uk/dmrb/search?discipline=SUSTAINABILITY_AND_ENVIRONMENT [Accessed October 2020]
[42] Set out in Ratcliffe, D.A. (1977). *A Nature Conservation Review*. Cambridge University Press.

2.6.3 These categories were applied for horseshoe bats, other void dwelling bats and crevice dwelling bats. This generally used the following criteria:

- Horseshoe Bats - Bats that require at least a letter box sized access point into a void. This generally excludes residential properties as access points of this size are very unlikely.
- Void Dwelling Bats (Excluding Horseshoe Bats) - Bats that require a generally undisturbed void to fly / light sample within (i.e. long-eared bats or Natterer's bats that are known to light sample). This category of bats does not require a fly through access point like horseshoes, and instead can utilise the void via crevice features.
- Crevice Dwelling Bats - Bats that require a crevice feature to roost, and do not need a void.

2.6.4 If the structure was deemed unlikely to have potential roost features (PRF) for one of these bat groups, then it was assessed as 'negligible'.

2.6.5 The same process for assigning negligible/low/moderate/high suitability was used for all structures (surveyed, unsurveyed and partially surveyed) to ensure that the methodology is consistent and transferable. Therefore, it has been necessary to undertake this as a predominantly desk based assessment (despite detailed information about the structures existing for those that have been fully surveyed) using aerial imagery and Google street view. In addition, information provided by the client about a structure, for example if the client had identified a structure as derelict or provided detailed structural reports for culverts, then this information was also taken into consideration. Alongside this assessment, the location of the structure and surrounding habitat was considered.

2.6.6 Hibernation suitability was assessed by the likelihood of the structure to have traditional hibernation opportunities which are considered to be caves / basement habitats. Acknowledgement however was made to small numbers of bats that may utilise non-traditional hibernation habitats present on residential buildings.

2.6.7 The known occupancy rates of bat roosts was established where surveys have been fully completed, this was calculated for each roost type and suitability. The occupancy rate was then applied to the same roost type and suitability of all unsurveyed and partially surveyed structures and trees to calculate the predicted occupancy rate for unsurveyed structures and trees.

2.6.8 Further details of the methodology can be found within Appendix F.

2.6.9 The emerging 2023 survey work, which is not reported here, is confirming that a precautionary approach has been taken, and the predicted roosts and impacts presented here are likely to be an over-estimation.

3 Results

3.1 Desk Study

3.1.1 This section provides a summary of the results of the desk study for bats. These are shown on in Appendix G.

Statutory Designated Sites

Table 3-1 - Statutory Designated Sites for Bats within 30 km of the Scheme Boundary

Site Name	Designation	Approximate Location of Designated Site	Features of Interest (including Qualifying Features of Internationally Designated Sites	Importance Level
Wye Valley and Forest of Dean Bat Sites	SAC	24 km south west	Lesser and greater horseshoe bats	International Importance

Record Centre Records

Table 3-2 - Bat Records provided by GCER within 2km of the Scheme Boundary

Species	Number of records	Closest record (approximate distance)	Record Type
Bechstein's	7	600 m south west of M5 (all except one record was at Fidler's Green)	Other than one casual sighting, all from Fiddler's Green (records of tree roosts and bats caught, and radio tracked)
Brown long eared	1	240 m east of the eastern end of the Scheme	One dead bat recorded
Common pipistrelle	4	500 m north west of the western end of the Scheme	3 casual records and one care record
Soprano pipistrelle	2	700 m east of the eastern end of the Scheme	One casual record and one bat care record
Pipistrelle species	1	1.8 km east of the eastern end of the Scheme	One casual record
Daubenton's	3	700 m east of the eastern end of the Scheme	One detector record, one bat caught in a mist net and one roost
Lesser horseshoe	4	420 m north of the northern end of the M5 within the Scheme	One casual record, two roosts and one juvenile record (1.7 km north of the Scheme close to the motorway) (assuming a maternity colony is somewhere close this record)

Species	Number of records	Closest record (approximate distance)	Record Type
Noctule	2	1.2 km east of the eastern end of the Scheme	Bat detector records.
Unidentified records	5	180 m south of the eastern end of the Scheme	Baby bat was the closest record, and the other records were two casual records, one record of droppings and a volunteer bat record with no further details.

Bat EPS Licences

Table 3-3 - EPS licences for Bats within 2 km of the Scheme Boundary

EPS Licence Reference	Details of EPS including Species	Approximate Distance and Direction from the Scheme Boundary
2015-8404-EPS-MIT	To allow the destruction of a resting place dating between 18/06/2015 and 17/06/2025 for brown long-eared and lesser horseshoes	170 m east of the Scheme Boundary
2017-28135-EPS-MIT	To allow the destruction of a resting place dating between 29/03/2017 and 31/03/2022 for common pipistrelle, lesser horseshoe and soprano pipistrelle	500 m west of the Scheme Boundary
2019-41747-EPS-MIT	To allow impacts between 10/09/2019 and 01/10/2024 to roosts for common pipistrelle, soprano pipistrelle and brown long-eared	1.45 km east of the Scheme Boundary

Additional Bat Roosts

3.1.2 The bat surveys for the Scheme included surveys of trees which are now beyond the study area for roosting bats (they are between 40 m and 100 m from the Scheme Boundary), but within the desk study area. These are included in Table 3-4. All records are from between 2019 and 2022.

Table 3-4 - Details of Bat Roosts Recorded Within 100m of the Scheme but Beyond the ZoI

Structure/tree reference	Central OS grid ref	Species	Number of bats	Roost type(s)
BU_1050	SO 91668 25026	Lesser horseshoe	1	Unknown
BU_379	SO 90685 23994	*Myotis*	1	Possible day roost
BU_567	SO 91523 24830	Pipistrelle	2	Possible day roost
BU_574	SO 91538 24848	Lesser horseshoe and *Myotis*	Likely individual bats	Unknown
BU_595a	SO 91743 24938	Unknown	1	Day roost
BU_642	SO 91791 24942	Natterer's	Likely individual bats	Unknown

Structure/tree reference	Central OS grid ref	Species	Number of bats	Roost type(s)
BU_993	SO 9090 2630	Common pipistrelle	1	Day roost
Tree 172	SO 90746 24070	Bechstein's	1	Day roost

3.2 Bat Roost Survey Results

Confirmed bat roosts

3.2.1 There were 329 structures, 353 individual trees and 105 tree groups identified within the study area[43]. 151 structures were surveyed in full, 72 structures were partially surveyed and 106 structures had no surveys. 319 trees and all 105 tree groups were surveyed in full, 22 trees were partially surveyed and 12 trees had no surveys.

3.2.2 As per Table 3-5, 106 structures were not surveyed due to access restrictions to (see section 3.2.10), and 70 structures had negligible bat suitability after a PBRA. Any buildings assessed to have negligible suitability were not subject to any further bat surveys. The remaining structures were all subject to further bat surveys. Similarly, 149 trees were assessed to have negligible suitability after a GLTA and were not subject to further surveys. Of the 105 tree groups, all of them were negligible or low suitability and were not subject to any further surveys.

Table 3-5 - Summary of Roost Surveys

Suitability	Quadrant	Structure references	Number of trees
Negligible (70 structures, 149 individual trees, 77 tree groups)	N	6 structures	11 individual trees 7 tree groups
	S	49 structures	103 individual trees 25 tree groups
	E	15 structures	30 individual trees 27 tree groups
	W	0 structures	5 individual trees 18 tree groups
Low (64 structures, 116 individual trees, 28 tree groups)	N	2 Structures BU_1002, BU_1011	27 individual trees
	S	47 Structures BU_1007, BU_1008, BU_1012, BU_1012b, BU_1025, BU_1041b, BU_1043, BU_1045, BU_1045a, BU_1045b, BU_1046, BU_1092, BU_1092a, BU_20, BU_366, BU_565, BU_569, BU_573, BU_600, BU_630, BU_654, BU_659, BU_663, BU_711, BU_718, BU_750, BU_752a, BU_758, BU_768, BU_768a, BU_770, BU_772,	70 individual trees 15 tree groups

[43] Note, numbers presented in this section do not exactly match numbers presented in Appendix F, as Appendix F excludes those structures/trees between the M5 and the Link Road.

Suitability	Quadrant	Structure references	Number of trees
		BU_800, BU_826, BU_827, BU_839, BU_858, BU_859, BU_862a, BU_890, BU_893, BU_909, BU_926, BU_964, BU_978, BU_985, BU_995	
	E	14 Structures BU_969, BU_970, BU_982, BU_722, BU_652, BU_716, BU_595, BU_641c, BU_736, BU_728, BU_732, BU_646, BU_969a, BU_1477	16 individual trees 12 tree groups
	W	1 Structure BU_1514	3 individual trees 1 tree group
Moderate (26 structures, 51 individual trees)	N	4 Structures BU_1027, BU_968, BU_971, BU_1096 (leading to eastern quadrant)	9 individual trees 664, 663, 499, 646, 512, 515, 516, 487, 490
	S	15 Structures BU_1005, BU_1006, BU_1041, BU_1047, BU_356, BU_362, BU_667, BU_755, BU_797, BU_824, BU_841, BU_966, BU_983, BU_988, BU_988a	41 individual trees 34, 42, 60, 61, 65, 66, 90, 97, 123, 124, 125, 156, 201, 200, 202, 203, 204, 211, 229, 240, 247, 248, 252, 253, 521, 522, 596, 635, 636, 637, 656, 665, 675, 677, 678, 683, 685, 686, 687, 688, 690
	E	7 Structures BU_1044, BU_1528, BU_629, BU_54, BU_641, BU_662, BU_803	1 individual tree 281
	W	0	0
High (12 structures, 18 individual trees)	N	1 Structure BU_1098 (leading to eastern quadrant)	4 individual trees 645, 648, 649, 660
	S	6 structures BU_1033, BU_1408, BU_1522 (leading to western quadrant), BU_360, BU_367 and BU_645.	11 individual trees 216, 237, 235A, 241, 230, 132, 106, 86, 72, 57, 49
	E	5 structures BU_577, BU_578, BU_660, BU_701 and BU_1527 (leading to southern quadrant)	2 individual trees 273, 257
	W	0	1 individual tree 569
Confirmed (50 structures,	N	7 Structures BU_1034, BU_1039, BU_963, BU_972, BU_981, BU_990, BU_992	1 individual tree 496

Suitability	Quadrant	Structure references	Number of trees
7 trees)	S	31 Structures BU_1030, BU_1042, BU_370, BU_376, BU_378, BU_614, BU_653, BU_834, BU_987, BU_11, BU_357, BU_364, BU_668, BU_747, BU_751, BU_752, BU_753, BU_757, BU_761, BU_762, BU_763, BU_765, BU_766, BU_771, BU_850, BU_853, BU_854, BU_855, BU_857, BU_862 and BU_965	4 individual trees 86, 101, 627, 675
	E	12 Structures BU_507, BU_610, BU_611, BU_694, BU_709, BU_723, BU_735, BU_819, BU_638, BU_661, BU_705 and BU_737	0
	W	0	2 individual trees 576, 578
Former Bat Roost (1 structure)	N	1 Structure BU_1034a	0
Unknown (106 structures, 12 individual trees)	All	106	12 individual trees Trees 725 – 736
Total		**329**	**353 individual trees** **105 tree groups**

3.2.3 Throughout the survey area there were 57 structures and trees with confirmed bat roosts, plus one former bat roost. Fifty bat roosts were within structures (including hibernation roosts) and seven bat roosts were within trees, and the former bat roost was within a structure, as detailed within Table 3-6. Full survey results of these structures and trees are provided in Appendix A (structures) and Appendix B (trees) and the survey results are shown on in Appendix G.

3.2.4 Table 3-6 also includes the results of DNA surveys, where appropriate. The locations that the samples were collected can be seen on the individual structure survey results in Appendix A.

3.2.5 The majority of the bat roosts were used by 'common' bat species (i.e. brown long-eared, common pipistrelle and soprano pipistrelle) based on Wray et al., (2010)[44]. There were also 'rarer' bats as defined in Wray et al., (2010) including two whiskered bat roosts[45] (one in the northern quadrant and also one in Butler's Court within the southern quadrant), ten Natterer's[46] roosts (two trees in the southern quadrant, seven structures within Butler's Court in the southern quadrant, one structure (BU_723) in the eastern quadrant[47]), five

[44] Wray et al., Valuing Bats in Ecological Impact Assessment (CIEEM (2010) In Practice Number 70)
[45] BU_857 and BU_992
[46] BU_723, BU_752, BU_761, BU_763, BU_766, BU_853, BU_854, BU_857, Tree 86 and Tree 101
[47] This is a confirmed *Myotis* species record, and Natterer's is the assumed species based on the call characteristics as no DNA survey has been possible.

noctule roosts[48] (two tree roosts in the western quadrant, two tree roosts in the southern quadrant and one structure in the eastern quadrant), and ten lesser horseshoe roosts[49] (three in Butler's Court within the southern quadrant, and the remaining seven were all located to the east of the study area, five in the eastern quadrant and two in the southern quadrant)

3.2.6 One 'rarest' species as defined in Wray et al., (2010) roost was recorded, a barbastelle tree roost in the northern quadrant[50].

3.2.7 The majority of the roosts were day, night, transitional, mating and feeding roosts, however there was one Natterer's maternity roost[51], one brown long-eared hibernation roost[52], three pipistrelle (common or soprano) maternity roosts[53] and one common pipistrelle hibernation roost[54].

[48] BU_610, Tree 576, Tree 578, Tree 627 and Tree 675
[49] BU_507, BU_611, BU_694, BU_709, BU_819, BU_11, BU_668, BU_747, BU_752 and BU_757
[50] Tree 496
[51] BU_752
[52] BU_378
[53] BU_1030, BU_987, BU_854
[54] BU_638

Table 3-6 - Confirmed Roosts Summary

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
BU_1030	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. Two common pipistrelle bats emerged from apex in late August 2020. One unknown bat species (not echolocating) emerged from the soffit gap at the back of the building in mid-September 2021. A third emergence and hibernation survey not completed.	No Outstanding: • internal • hibernation • one emergence / re-entry survey (during early summer period)	Common pipistrelle – maternity[56] / day roost *(assumed, with limitations)*	Demolished
BU_1034	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. A peak total count of two common pipistrelle bats were recorded roosting. Additionally a peak total count of three common pipistrelle bats showed swarming behaviour as well as three soprano pipistrelle bats also showing swarming behaviour in September. No hibernation survey possible.	No Outstanding: • internal • hibernation[57]	Common pipistrelle – day / mating roost; and Soprano pipistrelle – mating roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_1039	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. One possible emergence of a non-echolocating bat in mid-September 2021, which was assumed to be roosting. No hibernation survey possible.	No Outstanding: • internal • hibernation	Common pipistrelle – day roost	Demolished
BU_1042	No evidence recorded during PBRA and it was originally assigned moderate suitability; however no internal survey possible. A single soprano pipistrelle was recorded emerging in August 2020. No bats were recorded emerging in July 2021.	No Outstanding: • internal	Soprano pipistrelle – day roost	Demolished

[55] All survey data limitations (i.e. when surveys such as internal assessments, hibernation or emergence / re-entry surveys remain outstanding), have been considered within the survey methodology limitations section, see Appendix A. Where additional assumptions are being made within the roost characterisation based on lack of survey data, i.e. if all three emergence / re-entry surveys were completed outside of the maternity period, then these assumptions are stated within the table and the roost characterisation has taken account of these limitations.
[56] In the absence of further emergence / re-entry survey data during the early summer period, this has been assumed on a 'precautionary basis to be a maternity roost, as this structure is to be demolished and was considered to have a high potential that a maternity colony may be present.
[57] Surveys were conducted from mid-August to September; therefore the maternity period was surveyed.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	A final emergence and hibernation survey was not completed.	• hibernation • one emergence/re-entry survey		
BU_370	Only an external assessment was carried out before all access was refused (where the structure was defined as high bat roosting suitability). However, during the PBRA the tenant made an un-verified comment about seeing a bat leave the structure. Therefore during the PBRA the structure was assigned as high suitability. No hibernation survey was possible due to access.	No Outstanding: • internal • hibernation • one emergence/re-entry survey	Bat – unknown roost (assumed, with limitations)	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_376	During the PBRA, the structure was assigned as high suitability. A single common pipistrelle bat emerged during the mid-July 2019 emergence survey. In June 2021 three common pipistrelle bats emerged in total from two locations. No bats were seen to emerge in mid-September 2020. No hibernation activity. DNA was collected on window below soffit on eastern gable end, below a gap between soffit box and wall (3 m in height) on 12/01/2022. It was confirmed to be common pipistrelle.	Yes	Common pipistrelle – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_507	During the PBRA, the structure was assigned as high suitability. A concentration of lesser horseshoe droppings were collected on 28/10/2020 (confirmed by DNA) from in the middle room of the extension, which was accessed via an open door. One soprano pipistrelle returned to roost on the east side of the porch under the tiles in June 2021 and again in April 2022. No bat activity was recorded in the hibernation period.	Yes	Soprano pipistrelle – day roost; and Lesser horseshoe – day/ feeding roost	Demolished
BU_610	During the PBRA, the structure was assigned as high suitability. In June 2021 a noctule bat emerged 39 minutes after sunset from the base of the chimney on the same night that a common pipistrelle also emerged from a gap under a tile. No emergences in mid-July 2021 and only a single common pipistrelle emergence in early August 2021.	Yes	Common pipistrelle – day roost; and Noctule – day roost	Demolished

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	No bat activity was recorded in the hibernation period.			
BU_611	During the PBRA, the structure was assigned as high suitability. A concentration of lesser horseshoe droppings were collected on 28/10/2020 (confirmed by DNA) from in the extension, which can be accessed via an open door. Droppings of lesser horseshoe were also collected within the loft space of the property on 16/02/2022. No bats emerged from this property during surveys in June to August 2021. No bat activity was recorded in the hibernation period.	Yes	Lesser horseshoe – day/ feeding roost	Demolished
BU_614	PBRA recorded no evidence of bats, the structure was assigned as high suitability. During the single emergence survey in April 2022 a single soprano pipistrelle bat emerged from the western gable end.	No Outstanding: • hibernation • two emergence/re-entry surveys	Soprano pipistrelle – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_638	PBRA recorded no evidence of bats, the structure was assigned as high suitability. During May and August 2021 no roosting was recorded. In early July 2021 two common pipistrelle bats were recorded emerging. In September 2021, an incidental sighting (while surveying BU_735) of a common pipistrelle bat was seen to re-enter the structure during a re-entry survey. During the hibernation survey, common pipistrelles were recorded within the roof void towards the end of February, and again in late March. At the time of recording the common pipistrelles the temperature within the roof void was 17°C after a cooler period suggesting that the bats had likely come out of torpor. In the absence of further information, it has been assumed that the common pipistrelle(s) were hibernating somewhere within the structure.	Yes	Common pipistrelle – day roost / hibernation roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_653	PBRA recorded no evidence of bats, the structure was assigned as low suitability.	Yes	Common pipistrelle – day roost; or	Demolished

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	During the first survey in June 2021 a non-echolocating bat, believed to be a pipistrelle species based on visual characteristics, emerged from the soffit box on the north west aspect of the property. No bats emerged from the structure in August and September 2021 surveys. No bat activity was recorded in the hibernation period.		Soprano pipistrelle – day roost	
BU_694	PBRA found evidence of lesser horseshoe and brown long-eared (confirmed by DNA) from concentrations of droppings found in the main loft space on 16/02/2022. During the PBRA, the structure was assigned as high suitability. During emergence surveys in June and August 2021 and July 2022 no evidence of roosting bats was recorded. No bat activity was recorded in the hibernation period.	Yes	Lesser horseshoe – day / night roosts; and Brown long-eared – day roost	Demolished
BU_709	PBRA recorded a concentration of lesser horseshoe droppings (confirmed by DNA) in the extension which can be accessed via an open door, collected on 28/10/2020. The structure was assigned as high suitability. During two emergence surveys in June and August 2021 no evidence of roosting bats was recorded. In July 2022 a non-echolocating bat (assumed to be a lesser horseshoe) bat was seen entering the outhouse doorway and emerging a few minutes later from the same doorway. No bat activity was recorded in the hibernation period.	Yes	Lesser horseshoe – day / feeding roost	Demolished
BU_723	The structure was assigned as low suitability. Based on the droppings recorded throughout the barn the structure is considered likely to be a feeding or night roost for bats (no DNA analysis completed). During the August 2021 survey four common pipistrelle bats appeared to drop from inside roof of barn and flew around inside. Additionally, a *Myotis* was assumed to be roosting in the barn based on its behaviour, assumed mostly likely to be a Natterer's bat based on call data analysis. During the mid-September 2021 survey a further common pipistrelle bat emerged from an unknown location. No hibernation suitability.	Yes	Common pipistrelle – day roost; and *Myotis* (assumed to be Natterer's) – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
BU_735	PBRA recorded no evidence of bats, the structure was assigned as high suitability. Two common pipistrelle bats were recorded roosting in September 2021 re-entry survey. Emergence surveys in May and July 2021 saw no emergences.	No Outstanding: • hibernation	Common pipistrelle – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_819	PBRA recorded a concentration of lesser horseshoe droppings (confirmed by DNA) in the extension which can be accessed via an open door, collected on 28/10/2020. The structure was assigned as high suitability. Two common pipistrelle bats were recorded roosting in August 2021 re-entry survey. Two emergence surveys in July 2021 saw no emergences.	No Outstanding: • hibernation	Lesser horseshoe - transitional roost; and Common pipistrelle – day roost	Demolished
BU_963	PBRA recorded no evidence of bats, the structure was assigned as moderate suitability. In July 2019 and 2021, no bats emerged. In late August 2019 a single soprano pipistrelle was recorded roosting within the property.	No Outstanding: • hibernation	Soprano pipistrelle – day roost	Demolished
BU_972	PBRA recorded no evidence of bats, although there was no internal access. The structure was assigned as moderate suitability. In early September 2021 a non-echolocating bat was recorded emerging from behind fascia board, considered likely to be a pipistrelle. Two further bats (common pipistrelle) emerged from the south elevation and the window frame. In late September 2021 a single common pipistrelle bat emerged. In May 2022 no bats were seen to emerge. No hibernation suitability.	No Outstanding: • internal	Common pipistrelle – day roost[58]	Demolished
BU_965	PBRA and hibernation survey recorded no evidence of bats, although there was no internal access. The structure was assigned as moderate suitability.	No Outstanding:	Common pipistrelle – day roost; and Brown long-eared – day roost	Demolished

[58] Although the first bat was an unconfirmed pipistrelle as all other bats emerging were common pipistrelle it was considered on balance to be most likely to be a common pipistrelle.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	A single non-echolocating bat was seen to emerge in September 2020. It was assumed to be a common pipistrelle based on the time of emergence combined with the later bat record of a common pipistrelle roosting at this location. In July 2021 a single common pipistrelle bat was seen to emergence from the same location. An incidental sighting in May 2021 (while surveying BU_1005) of a brown long-eared bat emerging from this structure was also recorded.	• internal • one emergence/re-entry survey		
BU_981	PBRA recorded no evidence of bats, although there was no internal access The structure was assigned as high suitability. Six emerging common pipistrelle and soprano pipistrelle bats from four different locations on the structure in mid-June 2021, plus one non-echolocating bat assumed to be a pipistrelle. In July 2021 a common pipistrelle and a non-echolocating bat were recorded emerging. No hibernation bat activity recorded.	No Outstanding: • internal • one emergence/re-entry survey	Common pipistrelle – day roost; and Soprano pipistrelle – day roost	Demolished
BU_987	PBRA recorded no evidence of bats, although there was no internal access. The structure was assigned as low suitability. In early September 2020, a single soprano pipistrelle bat emerged from the apex of south gable end. Two soprano pipistrelle bats emerged from the same feature in late August 2021.	No Outstanding: • internal • hibernation • one emergence/re-entry survey (during early summer period)	Soprano pipistrelle – maternity[59] / day roost *(assumed, with limitations)*	Demolished
Tree 86	The tree was assigned as high suitability. No evidence was recorded during the PBRA, emergence or hibernation surveys.	Yes	Natterer's – day roost (assumed, with limitations)	Tree retained but potential for roost to be subject to temporary disturbance during construction.

[59] In the absence of further emergence / re-entry survey data during the early summer period, this has been assumed on a precautionary basis to be a maternity roost, as this structure is to be demolished and was considered to have a high potential that a maternity colony may be present.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	However, a male Natterer's bat was recorded to be likely[60] roosting in this tree on the 30/05/2021 for one night, during the radio tracking surveys.			
Tree 576	The tree was assigned as high suitability. During the summer tree inspections in 2020, this feature was inspected and found to have a single noctule bat present in mid-August and early September. No hibernation bat activity recorded.	Yes	Noctule – day roost	Tree retained but potential for roost to be subject to temporary disturbance during construction.
Tree 578	The tree was assigned as high suitability. During the summer tree inspections in 2020, this feature was inspected and in mid-August found to have a single noctule bat present. In early September this feature was found to have a small number (likely 3) noctule bats present. No hibernation bat activity recorded.	Yes	Noctule – day roost	Tree retained but potential for roost to be subject to temporary disturbance during construction.
Tree 496	The tree was assigned as moderate suitability. During the initial ground level inspections of this tree a single barbastelle was located at the end of October 2019. All subsequent inspections in 2020 showed no evidence of roosting bats.	Yes	Barbastelle – transitional roost	Felled
Tree 627	The tree was assigned as high suitability. No evidence of bats was recorded during the PBRA survey. During the tree climbing inspections this tree was originally assessed to have low suitability to support roosting bats due to a large open feature. During a transect in October 2019, a single noctule was observed emerging from the tree, so the suitability assessment of the tree was increased to confirmed, requiring three emergence / tree climb surveys during the activity period. In May 2022 no bats were recorded roosting. Two emergence / re-entry surveys are outstanding.	No Outstanding: • two emergence/re-entry surveys	Noctule – day roost	Within the ZoI, but no impacts anticipated

[60] The location of this roost is only assumed as triangulated points from radio tracking have a radius of error for each plotted point, this is generally estimated to be 20 m within the ranges worked with.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	No hibernation activity was recorded.			
BU_11	The structure was assigned as moderate suitability. Confirmed lesser horseshoe droppings recorded during the PBRA survey on 03/03/2022 with droppings found in the loft space at the northern gable end under the central beam of the garage. No bats recorded during the one emergence survey.	No Outstanding: • internal • hibernation • two emergence/re-entry surveys	Lesser horseshoe – day roost	Within the ZoI, but no impacts anticipated (retained and protected with noise barrier)
BU_357	Droppings recorded during the PBRA (no DNA analysis carried out) suggest the structure is likely to be a feeding or night roost. The structure was assigned as high suitability. No emergences were recorded during the two emergence surveys. No hibernation suitability.	No Outstanding: • one emergence/re-entry surveys • DNA analysis	Unknown species – Night/ feeding roost	Between the Link Road and the M5, potential for fragmentation
BU_364	The structure was assigned as moderate suitability. Soprano pipistrelle droppings scattered throughout open barn during the PBRA survey, which were collected on 22/08/2019. No bats seen to emerge from the structure during both emergence surveys; One emergence / re-entry survey is outstanding. No hibernation suitability.	No Outstanding: • one emergence/re-entry surveys	Soprano pipistrelle – Night/ feeding roost	Between the Link Road and the M5, potential for fragmentation
BU_378	During the PBRA, the structure was assigned as high suitability. Dropping were collected on 17/09/2019 (common pipistrelle, from DNA). No emergences were recorded during the surveys. A brown long-eared bat was using the structure for a hibernation roost based on droppings collected during the hibernation survey on 12/01/2022 from within the cold room and the workshop.	Yes	Common pipistrelle – Night/ feeding roost; and Brown long-eared hibernation roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_661	No evidence was recorded during the PBRA survey. The structure was assigned as high suitability No bats seen to emerge from the structure during both emergence surveys; one emergence / re-entry survey and a hibernation survey are outstanding.	No Outstanding: • internal • hibernation	Common pipistrelle – day roost; and Brown long-eared – day roost	Within the ZoI, but no impacts anticipated (retained and protected with acoustic barrier)

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	In May 2021, an incidental sighting (while surveying BU_735) of a brown long-eared bat was assumed to have emerged from BU_661. In June 2021, a further incidental sighting (while surveying BU_705) of a single pipistrelle bat was assumed to have emerged from BU_661.	• one emergence/re-entry survey		
BU_668	The structure was assigned as moderate suitability. Lesser horseshoe droppings recorded within the structure during PBRA on 16/02/2022. In May 2022, a single common pipistrelle and a lesser horseshoe bat were recorded emerging from the structure. Two emergence / re-entry surveys and a hibernation survey are outstanding.	No Outstanding: • hibernation • two emergence/re-entry surveys	Lesser horseshoe – day roost; and Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated (retained and protected with acoustic barrier)
BU_705	No evidence was recorded during the PBRA survey. The structure was assigned as low suitability No evidence of roosting was recorded in June and September 2021. In August 2021, while surveying BU_646, a common pipistrelle entered and roosted in the south-east corner of the shed. No hibernation suitability.	No Outstanding: • one emergence/re-entry survey	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated
BU_737	No evidence was recorded during the PBRA survey. The structure was assigned as moderate suitability In July and August 2021, a single common pipistrelle was recorded emerging. In September 2021 three common pipistrelle bats were recorded emerging from two locations.	No Outstanding: • hibernation	Common pipistrelle – day / transitional roost	Within the ZoI, but no impacts anticipated (retained and protected with an acoustic barrier)
BU_747	Bat droppings recorded on stored fire wood (no DNA analysis) during the PBRA inspection. The structure was assigned as high suitability. In September 2019, one lesser horseshoe bat emerged. No hibernation suitability. .	No Outstanding: • DNA analysis • two emergence/re-	Lesser horseshoe – transitional / day roost[61]	Between the Link Road and the M5, potential for fragmentation

[61] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
		entry surveys (one in early summer)		
BU_751	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. A maximum of four common pipistrelle bats emerged from the west elevation in late July 2019. During the same survey an assumed brown long-eared bat was seen returning to the roost but was not echolocating. In September 2020, a brown long-eared bat (no echolocation was picked up) emerged from wooden slats on the gable end.	No Outstanding: • internal • hibernation • one emergence/re-entry survey (in early summer)	Common pipistrelle – day roost; and Brown long-eared – day roost	Between the Link Road and the M5, potential for fragmentation
BU_752	Natterer's bat droppings were recorded during the PBRA survey with droppings collected on 18/07/2019 from the ground floor room and scattered underneath the roof. The structure was assigned as high suitability In mid-August 2019, a lesser horseshoe bat was seen through a window roosting before the survey began, then also recorded feeding and hanging on a perch. During the same survey a *Myotis* (likely to be Natterer's based on DNA and bat calls analysis) returned to the roost 5 minutes after sunset, and a *Myotis* (also assumed to be Natterer's) emerged 10 minutes after sunset, although the exact roost site was not observed. A further *Myotis* (also assumed to be a Natterer's) emerged 17 minutes after sunset, however, the location it came from could not be confirmed. In late September 2020 no bats were seen to emerge or re-enter the structure. In May 2021 radio tracking surveys tracked a Natterer's, female, adult bat in breeding condition (raised nipples) roosing within 20 m of this structure, therefore on a precautionary basis this structure is assumed to be a maternity / satellite roost for Natterer's.	No Outstanding: • hibernation • one emergence/re-entry survey (in early summer)	Natterer's –maternity / day / night roost; Brown long-eared – day roost; and Lesser horseshoe – day roost	Between the Link Road and the M5, potential for fragmentation
BU_753	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned high suitability. During the survey in mid-September a single bat that was not echolocating was seen to emerge from the property.	No Outstanding: • one emergence/re-	Soprano pipistrelle – day roost	Between the Link Road and the M5, potential for fragmentation

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	In late July a soprano pipistrelle bat was seen to emerge from the property, and it was concluded that the bat in the previous year may also have been a pipistrelle bat. No hibernation activity was recorded.	entry survey (in early summer)		
BU_757	Bat droppings were recorded during the PBRA survey (no DNA analysis). The structure was assigned as high suitability. In early September 2019, a lesser horseshoe bat was observed emerging from its roost. In late September 2020 at least four common pipistrelle bats emerged from the gable brick wall. A further incidental sighting was recorded in July 2019 when surveying BU_751, when a possible brown long-eared re-entry was recorded. One emergence / re-entry survey and a hibernation survey are outstanding.	No Outstanding: • hibernation • DNA analysis • one emergence/re-entry surveys (in early summer)	Common pipistrelle –mating roost; Brown long-eared – day roost; and Lesser horseshoe – day roost	Between the Link Road and the M5, potential for fragmentation
BU_761	A single dropping was found on caravan inside shed during PBRA (no DNA analysis completed). The structure was assigned as high suitability. A single emergence survey was conducted in late September 2020, A peak total count of two *Myotis* (from call analysis assessed to be Natterer's), were recorded emerging. During the same survey a brown long-eared bat was recorded within the barn. No hibernation suitability.	No Outstanding: • DNA analysis • two emergence/re-entry surveys (one in early summer)	Brown long-eared bat – night/ feeding roost; and *Myotis* (assumed to be Natterer's) – transitional roost.[62]	Between the Link Road and the M5, potential for fragmentation
BU_762	The structure was assigned as high suitability during the PBRA. Droppings recorded outside the structure (no DNA analysis has been carried out), no internal survey completed. In early September 2019 a common pipistrelle bat was seen to enter during a re-entry survey. Two common pipistrelle bats were recorded emerging (two different locations) in mid-September 2020.	No Outstanding: • Internal • hibernation • DNA analysis	Common pipistrelle – mating / transitional roost	Between the Link Road and the M5, potential for fragmentation

[62] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.
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Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
		• one emergence/re-entry survey (early summer)		
BU_763	A surveyor observed bat droppings in doorway at the beginning of survey on 09/09/2020 (no DNA survey undertaken). The structure was assigned as high suitability during the PBRA. In mid-August 2019, no bats were recorded emerging. In early September 2020, roosting pipistrelle species were recorded under the northern apex of the structure, 15 and 25 minutes after sunset, both assumed to be common pipistrelle (based on later emerging species and emergence times). During the same survey, *Myotis* (assumed based on call ID to be Natterer's) were seen to emerge (two in total, with one briefly re-entering). Additionally, an incidental sighting of an emerging common pipistrelle bat in late September (while surveyors were completing a survey of an adjacent structure) was observed.	No Outstanding: • Internal • Hibernation • DNA analysis • one emergence/re-entry survey (early summer)	Common pipistrelle – mating / transitional roost; and *Myotis* (assumed to be Natterer's) – transitional roost[63]	Between the Link Road and the M5, potential for fragmentation
BU_765	Small number of droppings recorded during PBRA; likely from brown long-eared and pipistrelle bats (no DNA analysis carried out) on cars at western end of structure. The structure was assigned as high suitability. A re-entry survey in mid-August and an emergence survey in mid-September were carried out with no bats recording roosting in the structure. No hibernation suitability. No internal survey possible due to a lack of access.	No Outstanding: • DNA analysis • one emergence/re-entry survey (early summer)	Unknown species (potentially brown long-eared or pipistrelle) – day roost	Between the Link Road and the M5, potential for fragmentation
BU_766	Scattered droppings (Natterer's, common pipistrelle and soprano pipistrelle from DNA analysis) and moth wing fragments (likely to be feeding remains) collected on 18/07/2019 during PBRA. The structure was assigned as high suitability. A single emergence survey was completed in early September and no emergences were recorded. Two emergence / re-entry surveys are outstanding	No Outstanding: • two emergence/re-entry surveys	Natterer's – Night/ feeding roost; Common pipistrelle – Night/ feeding roost; and Soprano pipistrelle – Night/ feeding roost	Between the Link Road and the M5, potential for fragmentation

[63] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	No hibernation suitability.	(one in early summer)	(all assumed[64] with limitations)	
BU_771	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. In late August, no roost was recorded. In mid-September one common pipistrelle emerged from the lower, left gable end. Additionally, an incidental sighting in September 2019 (while surveying BU_762) also recorded one common pipistrelle roosting.	No Outstanding: • internal • hibernation • two emergence/re-entry surveys (one in early summer)	Common pipistrelle – transitional roost	Between the Link Road and the M5, potential for fragmentation
BU_834	No evidence was recorded during the PBRA survey. The structure was assigned as high suitability. One common pipistrelle emerged from the east facing roof pitch in July 2021. No emergences were recorded in September 2020 or July 2021. No hibernation suitability. .	Yes	Common pipistrelle – day roost	Structure retained but potential for roost to be subject to temporary disturbance during construction.
BU_850	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. A single common pipistrelle emerged from the gable end in early September 2019.	No Outstanding: • internal • hibernation • two emergence/re-entry surveys (one in early summer)	Common pipistrelle – day roost	Between the Link Road and the M5, potential for fragmentation
BU_853	No evidence was recorded during the PBRA survey. During a survey in late June 2019, two *Myotis* (likely to be Natterer's from sound analysis) emerged from a lifted roof tile and the open front of the shed. A brown long-eared bat was seen to emerge from the barn	No Outstanding:	*Myotis* (assumed to be Natterer's) – Day roost; and Brown long-eared – Day roost	Between the Link Road and the M5, potential for fragmentation

[64] This structure was assessed to provide bat roosting opportunities for a low conservation status roost only (i.e. small numbers of bats only), and therefore despite no emergence / re-entry survey data during the early summer period, it has not been assumed on a precautionary basis to be a maternity roost.

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	also. A survey in late July 2019 recorded no bats emerging. No hibernation suitability.	• one emergence/re-entry survey (early summer)		
BU_854	Scattered droppings (Natterer's, common pipistrelle and brown long-eared from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In late June 2019, A peak total count of nine common pipistrelle bats were observed emerging out of the main barn (maximum of three seen at one time. Additionally, two *Myotis* (assumed to be Natterer's from DNA analysis) emerged from the barn. In late July 2019, a single common pipistrelle was recorded returning to roost during a re-entry survey. In late May 2021, no bats were recorded emerging. A hibernation survey is outstanding.	No Outstanding: • hibernation	Common pipistrelle – maternity roost; Natterer's – day roost; and Brown long-eared – day roost	Between the Link Road and the M5, potential for fragmentation
BU_855	Scattered droppings (common pipistrelle from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In September 2019 no emergences were recorded. In May 2021 two common pipistrelle bats emerged. .	No Outstanding: • hibernation • one emergence/re-entry survey	Common pipistrelle – day roost	Between the Link Road and the M5, potential for fragmentation
BU_857	Scattered droppings (Natterer's, common pipistrelle and whiskered from DNA analysis) were collected on 18/07/2019 during the PBRA inspection. The structure was assigned as high suitability. In August and September no emergences were recorded. No hibernation suitability. .	No Outstanding: • one emergence/re-entry survey	Common pipistrelle – Night / feeding roost; Natterer's – Night / feeding roost; and Whiskered – Night / feeding roost	Between the Link Road and the M5, potential for fragmentation
BU_862	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as low suitability. On the 20th of July 2020 a peak total count of six common pipistrelle bats emerged from three locations. In late September 2020 and early August 2021, no bats emerged. No hibernation activity was recorded.	No Outstanding: • internal	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated (retained and protected with noise barrier, if necessary)

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
BU_990	No evidence was recorded during the PBRA survey, although no internal access was possible. The structure was assigned as high suitability. In late July 2019 a single bat emerged from the end of the barn, assumed to be common pipistrelle. In mid-August 2019 no bats were seen to enter the structure. In late July 2020, one common pipistrelle bat was seen to emerge from the northern gable. No hibernation suitability. .	No Outstanding: • internal	Common pipistrelle – day roost	Within the ZoI, but no impacts anticipated (retained and protected with acoustic barrier, if necessary)
BU_992	During the PBRA inspection whiskered bat droppings were collected on 31/07/2019 (confirmed by DNA analysis). The structure was assigned as high suitability. In July 2019four common pipistrelle bats were recorded emerging from two locations. In mid-August 2019 a single common pipistrelle bat emerged from the raised roof tiles nearest to the chimney stack. In July 2019, two common pipistrelle bats emerged. Additionally, in August 2019 when surveying BU_990 a common pipistrelle bat was recorded re-entering BU_992. No hibernation survey possible as there is no roof void based on the asbestos report.	No Outstanding: • internal	Common pipistrelle – day roost; Whiskered – transitional roost	Within the ZoI, but no impacts anticipated (retained and protected with acoustic barrier, if necessary)
Tree 101	The tree was assigned as moderate suitability. No evidence of bats was recorded during the GLTA survey. Three emergence / re-entry surveys are outstanding. During the ALBST in late May 2021 a male Natterer's bat was recorded roosting for the day (day roost) at this location. Due to the inaccuracy of radio tracking the exact location of this bat roost is unknown. As Tree 101 is a tree located within 20 m of this grid reference, on a precautionary basis it was assumed that Tree 101 is a Natterer's day roost. No hibernation activity was recorded.	No Outstanding: • three emergence/re-entry surveys	Natterer's – day roost	Within the ZoI, but no impacts anticipated (retained and protected with acoustic barrier, if necessary)
Tree 675	The tree was assigned as moderate suitability. No evidence of bats was recorded during the GLTA survey.	No	Noctule – day roost	Within the ZoI, but no impacts anticipated

Structure/ tree reference	Results (for full results see the relevant tables in Appendix A (structures) or B (trees)	Surveys complete?	Roost characterisation[55]	Likely Impact of Scheme
	In May 2022 a bat noctule bat was recorded from the direction of the tree. Due to the survey limitations (only access on one side of the tree was possible) it is assumed that the bat emerged from the tree. Two emergence / re-entry surveys are outstanding. No hibernation activity was recorded.	Outstanding: • two emergence/re-entry surveys		
BU_1034a	No evidence was recorded during the PBRA survey, although no internal access was possible. However, during the PBRA the owner made an un-verified comment about seeing dead bats within this structure on two occasions. Three emergence / re-entry surveys in 2021 and 2022 have been completed and no bats have been recorded roosting.	No Outstanding: • internal • hibernation	Former unknown species – unknown roost (assumed, with limitations)	Demolished

Predicted bat roosts

3.2.8 Following the methodology outlined in Section 2.6 and detailed in Appendix F, the predicted occupancy rates were calculated for the unsurveyed and partially surveyed structures.

3.2.9 Table 3-7 summarises the predicted bat roosts within unsurveyed / partially surveyed structures within each of the quadrants of the Scheme, where impacts as a result of the Scheme are anticipated. As explained in paragraph 2.6.9, the emerging 2023 survey work is confirming that a precautionary approach has been taken, and the predicted roosts and impacts presented here are likely to be an over-estimation.

Table 3-7 - The predicted roosts for all partially surveyed and unsurveyed structures where impacts are anticipated, split by quadrant and roost type.

Bat Category	Species Assemblage (and Rarity within England, as per Wray *et al.*, (2010))	PRF Suitability[65]	Northern Quadrant	Eastern Quadrant	Southern Quadrant	Western Quadrant	Totals	
Horseshoe bats	Lesser horseshoe (rarer)	Low / moderate	-	2	3	-	5	6
		High (maternity)	-	-	1	-	1	
Void dwelling / light sampling bats	Barbastelle (rarest) Natterer's, , serotine and Daubenton's (rarer) Brown long-eared (common)	Low / moderate	-	2	3	-	5	6
		High (maternity)	-	-	1	-	1	
Crevice dwelling bats	Barbastelle (rarest) Nathusius' pipistrelle, Natterer's, Daubenton's whiskered, Leisler's, noctule and serotine (rarer) Common and soprano pipistrelle (common)	Low / moderate	5	4	7	1	17	20
		High (maternity)	2	-	1	-	3	

[65] Where low or moderate suitability comprise features suitable for small numbers of bats, and high suitability comprises features suitable for maternity colonies.

Hibernation roost for larger numbers of bats	Any of the above	High	-	1	1	-	2	2
Hibernation roost for solitary bats	Any of the above	High	-	2	3	-	5	5
			7	11	20	1	-	-
			39					

3.2.10 For the predicted roosts, consideration has been given to the proportion of roosts of each species, based on common/rarer/rarest in Wray *et al.,* (2010), taking into account the known species assemblage and species abundance within the survey area. Regarding the 'rarest' bats (as defined by Wray et al.) recorded within the study area and Annex II species (Bechstein's, barbastelle, lesser horseshoe and greater horseshoe bat), the predicted roosts have taken into consideration the following:

- Greater horseshoe were recorded infrequently during the activity surveys. No roosts for greater horseshoe have been recorded, and greater horseshoe were never recorded less than 53 minutes after sunset, suggesting there are no roosts close by, as this species usually emerge 25 to 28 minutes after sunset66. Therefore, greater horseshoe are not considered to be roosting within the study area.
- One barbastelle roost was recorded within a tree in the study area, a transitional roost supporting a single bat in 2020, with all subsequent inspections showing no evidence of use by bats. Barbastelle were recorded infrequently during the activity surveys, and the habitat was considered sub-optimal for this species (a woodland specialist). Therefore, the presence of a high value (maternity) roost within unsurveyed/partially surveyed structures and trees is considered to be very unlikely, and only small numbers of roosts of individual/small numbers of barbastelle are predicted.
- One Bechstein's roost was recorded within a tree outside of the study area, a day roost supporting a single bat on three occasions in 2020. No Bechstein's were trapped during the ALBST and the habitat was considered sub-optimal for this species (see 2.3.120). Therefore, the presence of a high value (maternity) roost within unsurveyed/partially surveyed trees is considered to be very unlikely, and only small numbers of roosts of individual/small numbers of bats are predicted.

Table 3-8 - Bat Species Assumed to be Within the Predicted Bat Roosts (Structures)

Horseshoe Bats (6)		
Rarer	Lesser horseshoe	1 (potential maternity)
		5 (small numbers of bats)
Void Dwelling Bats (Excluding Horseshoes) (6)		
Rarest	Barbastelle	1 (small numbers of bats)
Rarer	Natterer's, serotine, Daubenton's	1 (potential maternity)[67] 1 (small numbers of bats)
Common	Brown long-eared	3 (small numbers of bats)
Crevice Dwelling Bats (20)		
Rarest	Barbastelle	1 (small numbers of bats)

[66] http://battreehabitatkey.co.uk/wp-content/uploads/2017/06/AEcol-REVIEW-OF-EMERGENCE-AND-RETURN-EMPIRICAL-DATA-2017-Ver.-4.pdf

[67] The species associated with the predicted void dwelling maternity roost is unknown, however as detailed in it is unlikely to be barbastelle. Of the remaining void dwelling species, the most regularly recorded bat roosts, as shown in Table 3-6, were for brown long-eared (11 roosts) a common species and Natterer's (10 roosts) a rarer bat species. On a precautionary basis, it has therefore been assumed that the predicted roost is of a 'rarer' bat species.

Rarer	Nathusius' pipistrelle, Natterer's, Daubenton's whiskered, Leisler's, noctule and serotine	1 (potential maternity)[68]
		6 (small numbers of bats)
Common	Common pipistrelle and soprano pipistrelle	2 (potential maternity)
		10 (small numbers of bats)
Hibernation Roosts (7)		
Rarest	Barbastelle	1 (solitary hibernating bat)[69]
Rarer	Lesser horseshoe, Natterer's, serotine, Nathusius' pipistrelle, Leisler's, Daubenton's, whiskered, Brandt's and / or noctule	1 (larger numbers of hibernating bats)[70]
		1 (solitary hibernating bat)[71]
Common	Common pipistrelle, soprano pipistrelle and/or brown long-eared	1 (larger numbers of hibernating bat)
		3 (solitary hibernating bat)

3.2.11 Of all the trees surveyed (344 individual trees and 105 tree groups) only 2% of trees had a confirmed bat roost within them. However, as tree roosts are frequently unoccupied (leading to risk of underestimating the roost resource) it has therefore been assumed on a precautionary basis that all trees where surveys are incomplete/unsurveyed trees have bat roosts present. Therefore, compensation has been included for the 11 partially surveyed trees that would be felled[72] and 23 unsurveyed / partially surveyed trees predicted to experience disturbance[73] as a result of the Scheme. As explained in paragraph 2.6.9, the emerging 2023 survey work is confirming that a precautionary approach has been taken, and the predicted roosts and impacts presented here are likely to be an over-estimation.

[68] The species associated with the predicted crevice dwelling maternity roost is unknown, however as detailed in it is unlikely to be barbastelle. Of the remaining crevice dwelling species, the most regularly recorded bat roosts, as shown in Table 3-6, were for common pipistrelle (32), soprano pipistrelle (12) both common species and Natterer's (10 roosts) a rarer bat species. On a precautionary basis, it has therefore been assumed that of the three maternity roosts, one is predicted to be for a 'rarer' bat species and two are considered to be for 'common' bat species.
[69] As detailed in 3.2.9, larger numbers of hibernating bats are unlikely to be barbastelle. However, as the only 'rarest' species that could be hibernating in the study area, on a precautionary basis one hibernation site for small numbers of bats is predicted to be for a 'rarest' bat species (barbastelle).
[70] The species within the two predicted hibernation sites with larger numbers of bats is unknown, however as detailed in , it is unlikely to be barbastelle. Of the remaining species, it is considered reasonable to assume that these comprise one with 'rarer' species and one with 'common' bat species.
[71] The species of the five predicted hibernation sites with small numbers of bats is unknown. One of these roosts is assumed to be a barbastelle hibernation site. Of the remaining four hibernation sites with small numbers of bats, it is reasonable to assume these comprise one with 'rarer' species and three with 'common' bat species.
[72] Tree references 101, 164, 237, 240, 241, 512, 596, 649, 685, 686 and 701
[73] Tree references 230, 635, 636, 637, 675, 677, 678, 682, 683, 687, 688, 690, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735 and 736

Table 3-9 - Bat Species Assumed to be Within the Predicted Bat Roosts (Trees)

Tree Roosts (34)		
Rarest	Barbastelle and Bechstein's	3 (small numbers of bats)[74]
Rarer	Natterer's, Daubenton's, whiskered, Brandt's, Nathusius' pipistrelle, Leisler's and / or noctule	5 (potential maternity)[75]
		5 (small numbers of bats)[76]
Common	Common pipistrelle and / or soprano pipistrelle	11 (potential maternity)
		10 (small numbers of bats)

3.3 Activity Surveys

Transect Surveys Overview

3.3.1 Across all transects, the most recorded species was common pipistrelles with a BAI of 6 common pipistrelle passes per hour. This was over double the next highest species recorded, *Myotis* (which comprised of all *Myotis* species) and soprano pipistrelle, both of which had a BAI of 2.3 passes per hour.

3.3.2 No greater horseshoe passes were recorded on any of the transect point counts, and comparatively low numbers of Nathusius pipistrelle (0.1 passes per hour) and barbastelle (0.2 passes per hour) were recorded.

3.3.3 A summary of results from each transect, accounting for each point count is presented in Figure 3-1. This does not include bats recorded between point counts, which have been considered separately. Full survey results, including the time record for each bat pass, are available on request.

3.3.4 The northern quadrant, comprising of T4 and T10, was found to have the lowest combined BAI of all the quadrants. Activity in the northern quadrant was concentrated around Stanboro Lane including the arable field to the west (point count 2) and along Stanboro Lane itself (within an area comprising farm buildings, pockets of woodland and hedgerow bordered pasture fields). The species assemblage around T10 was predominantly common and soprano pipistrelle, however T10 had high BAI for both Nyctaloid and *Myotis* species. T4 located west of the M5 and north of Stanboro Lane had the lowest total BAI of all transect locations.

3.3.5 The eastern quadrant, comprising of T12, was found to have the second highest mean BAI of all the quadrants. T12 also had the point count, PC7, with the highest total BAI of all point counts surveyed. PC7 had the highest BAI in the eastern quadrant for both pipistrelles and Nyctaloid bats. Along the T12 transect, north of the A4019, activity was highest around CP6 and 7 in the field east of Uckington. All other point count locations adjacent the A4019 were equally low and dominated by pipistrelle and Nyctaloid species.

[74] As detailed in □, larger numbers of bats are unlikely to be barbastelle or Bechstein's. However, on a precautionary basis three tree roosts are assumed to support small numbers of bats of these 'rarest' species.
[75] The species within the seventeen predicted maternity sites is unknown, however as detailed in 3.2.9, it is unlikely to be barbastelle. Of the remaining species, it is considered reasonable to assume that the maternity sites are comprised of five with 'rarer' species and 12 with 'common' bat species.
[76] The species of the five predicted tree roosts with small numbers of bats is unknown. As detailed in the row above (rarest) three of these tree roosts are assumed to be a barbastelle / Bechstein's tree roosts. Of the remaining 15 tree roosts, it is considered reasonable to assume that the predicted tree roosts with small numbers of bats are comprised of five with 'rarer' species and 10 with 'common' species.

PC6, located at CP6, had the only single record of a Nathusius' pipistrelle across all point count locations.

3.3.6 The southern quadrant, comprising of T2, T5, T7, T8 and T11, had the second lowest mean BAI of all quadrants. Of these transects the highest BAI was calculated on T11, with activity concentrated around Moat Lane (where a large waterbody is present). Activity was also high in the field adjacent to CP7, which had the highest BAI of lesser horseshoes across all point count locations. T2 had the second highest BAI of all transects, which activity particularly concentrated around the vegetation adjacent to the M5. Point counts within T2, T5 and T8 adjacent to the River Chelt recorded comparatively higher numbers of bat passes.

3.3.7 The western quadrant, comprising of T9, had the highest BAI of all quadrants. The BAI was highest at the three point counts on the hedgerows within the field (all away from the motorway and River Chelt). PC7, at the western most point along the A4019, recorded the highest total BAI of barbastelle across the whole site.

3.3.8 Considering the site as a whole, the highest activity levels were along T12 at the poplar tree line from CP7, around Moat Lane and along Stanboro Lane.

Static Surveys Overview

3.3.9 Considering all static locations common pipistrelle were the most frequently recorded species by a large margin, with a total BAI of 3096 passes per night across the site. The next most frequently recorded species were soprano pipistrelle, with a total of 743 passes per night and then *Myotis* species (comprising of all *Myotis* bats) at 685 passes per night.

3.3.10 Greater horseshoe and Nathusius' pipistrelle were recorded infrequently across the Site with a BAI of 1.3 and 1.8 passes per night respectively.

3.3.11 Figure 3-2 displays the BAI of all static locations, for all bat species recorded. It is clear from these graphs that common pipistrelles had the highest number of passes of all bat species. It is also clear that S3 and S15, adjacent to the River Chelt and the culvert beneath the M5 motorway, had the highest BAI of all locations.

3.3.12 Figure 3-3 displays the BAI of all static locations, but excludes common and soprano pipistrelles. It is clear from this figure that *Myotis* have the next highest BAI per night. However, when excluding common pipistrelle, S3 adjacent to the River Chelt just west of the M5 motorway remains the static with the highest number of passes. However, the second highest number of passes on a static can be found on S16, which was located to the southwest of the existing M5 Junction.

3.3.13 The northern quadrant, comprising of S7, S8, S17, S18, S41b and S45b, had the second lowest mean BAI of all quadrants averaging 113 bat passes per night. S7 and S8 near Barn Farm had the highest number of bat passes when considering all statics within the northern quadrant.

3.3.14 The eastern quadrant, comprising of S42b, S22, S33, S39b, S43b and S41b, had the lowest mean BAI of all quadrants with an average of 59 bat passes per night. S43b, adjacent to the poplar tree line east of Uckington, had the highest number of bat passes of all statics within the eastern quadrant. Whilst S22, within the woodland north of the A4019 adjacent to the southbound offslip, had the lowest number of bat calls, averaging fewer than 5 per night, of which 3.7 were noctules and are considered to be flying over the location rather than within the woodland.

3.3.15 The southern quadrant, comprising of S39, S41, S42, S21, S35, S3, S4, S40, S9, S10, S36, S14, S12, S11, had the second highest mean number of bat passes per night averaging 184 bat passes. S3, located immediately east of the M5 motorway culvert along the River Chelt, had the highest number of bat passes of all static locations, averaging 1014 per night. In comparison, S44 located on a fence line along the Link Road just south of the A4019, averaged 12 bat passes per night. S21 and S35, adjacent to the woodland parallel to the M5 motorway south of Withybridge gardens, had the 4th and 9th highest bat passes per night. S21 also had the highest bat passes of greater horseshoe across the whole Site.

3.3.16 The western quadrant, comprising of S45, S23, S16 and S15, and had the highest mean BAI of all quadrants, with an average of 235 bat passes per night. S15, located immediately west of the M5 motorway culvert along the River Chelt, had the second highest number of bat passes of all static locations averaging 527 per night. S45 and S16 had the 3rd and 5th highest bat passes of all statics suggesting bats were utilising the woodland verge south of the A4019. However, the static within the woodland in the northbound on-slip, S23, only averaged 3 bat passes per night.

Annex II BAI

3.3.17 The three easily identifiable Annex II bat species from bat call analysis have been considered separately to assess their usage of the site. This was not completed for Bechstein's due to the uncertainty in confirming the species through call analysis.

Lesser horseshoe

3.3.18 Lesser horseshoes were recorded sporadically across the site, with a hotspot on S39 south of the A4019 east of Uckington, with 10 bat passes per night, and S39b north of A4019 east of Uckington, with 4 lesser horseshoe passes per night. Lesser horseshoes had the highest BAI per hour at point count locations around T11 including south of the fire station, and along Moat Lane, and south of the River Chelt along the Link Road utilising hedgerows. Static locations S4, S7, S15 and S43b all recorded an average of 1 lesser horseshoe pass per night. The statics around the existing motorway junction recorded an average of 0.1 passes per night and therefore had the lowest lesser horseshoe activity comparatively across the whole site.

Greater horseshoe

3.3.19 Greater horseshoes were recorded infrequently across the site. Only six statics in total recorded passes of greater horseshoe, with the maximum count of 0.3 passes per night at static locations S43b, the poplar tree line east of Uckington, S21, and the woodland parallel to the motorway and south of Withybridge Gardens. Other locations that recorded greater horseshoe passes included S17, S18 and S43. It is therefore considered that greater horseshoe utilises the site infrequently for commuting only. No greater horseshoe passes were recorded on any transects.

Barbastelle

3.3.20 Barbastelle bats had the highest BAI at S43b at CP7, with 1.2 passes per night, followed by S40 south of the Link Road at CP5 with 0.9 passes per night. Barbastelles were recorded in low levels of less than 1 pass per night across the rest of the site, except for statics around the motorway junction including the slip road where no barbastelle passes were recorded. The transects recorded two hotspots of barbastelle activity which included on T8 adjacent to the River Chelt, with a BAI of 2.5 passes per hour and also on T9 adjacent to the south of the A4019, with a BAI of 2.2 passes per hour.

Annex II Site Usage

3.3.21 Considering the above paragraphs detailing Annex II usage across the site, it is considered for all of these species that the site is used infrequently and that it is unlikely that any large colonies are present in the vicinity of the Scheme.

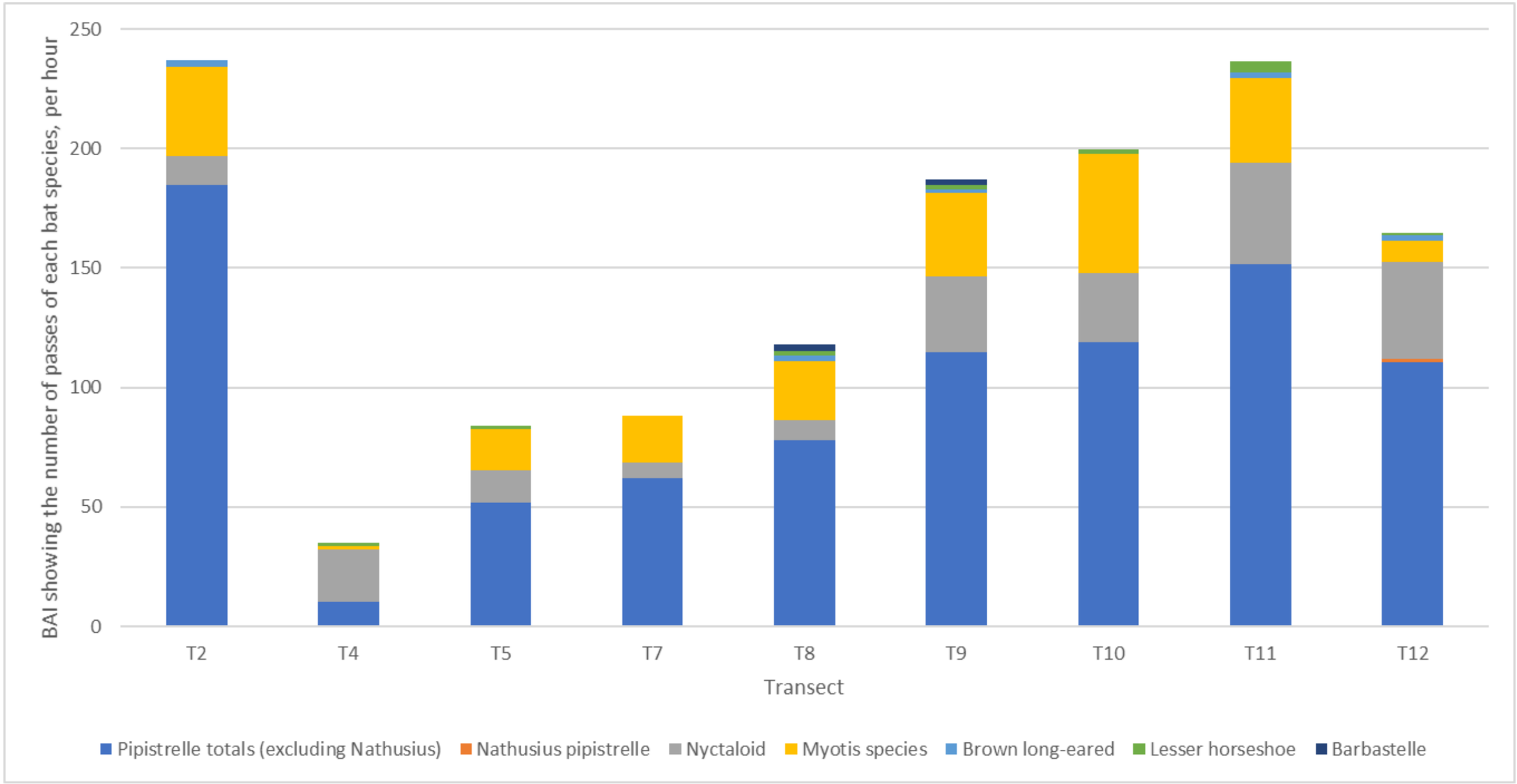


Figure 3-1 – A Bar Graph to Show the Species Assemblage of Bats, by BAI, for All Transects Within the ZoI

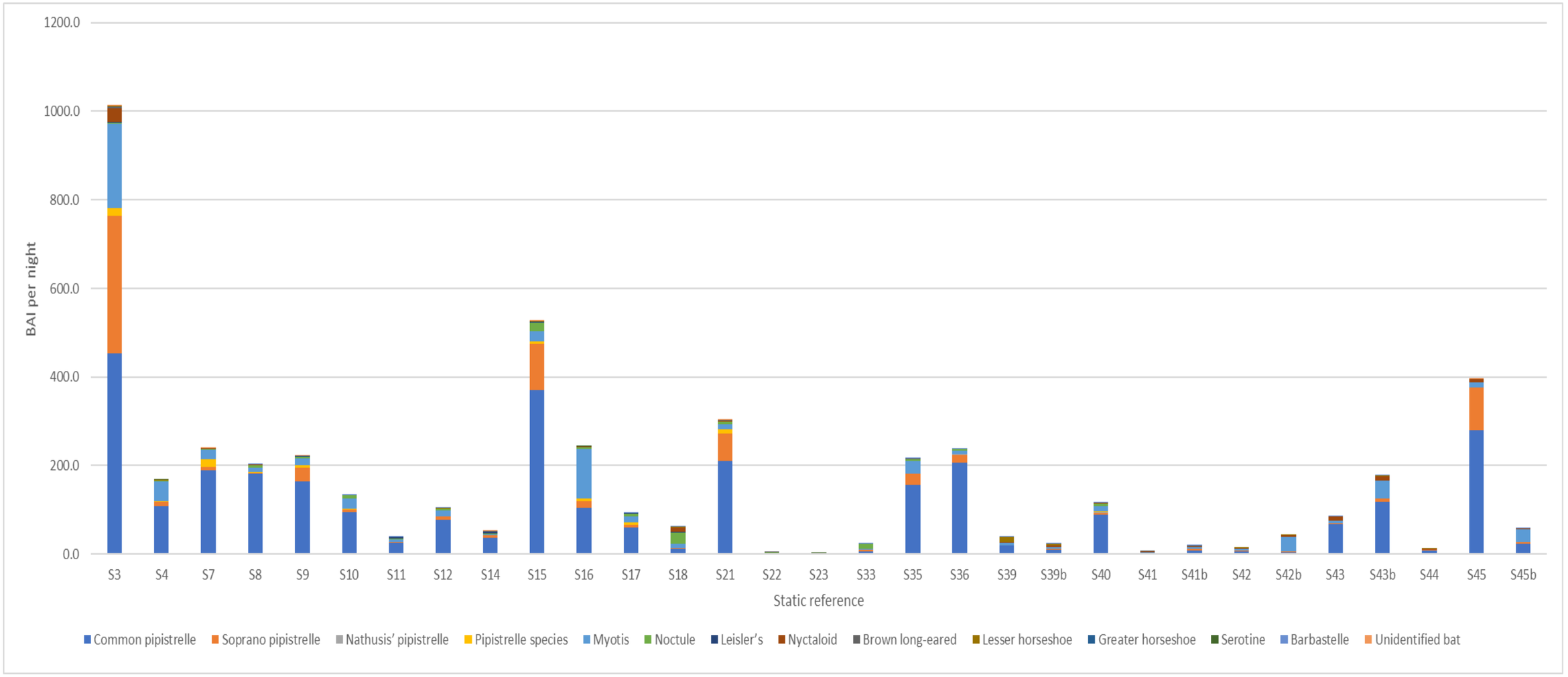


Figure 3-2 – BAI per night of each static location including all bat species recorded

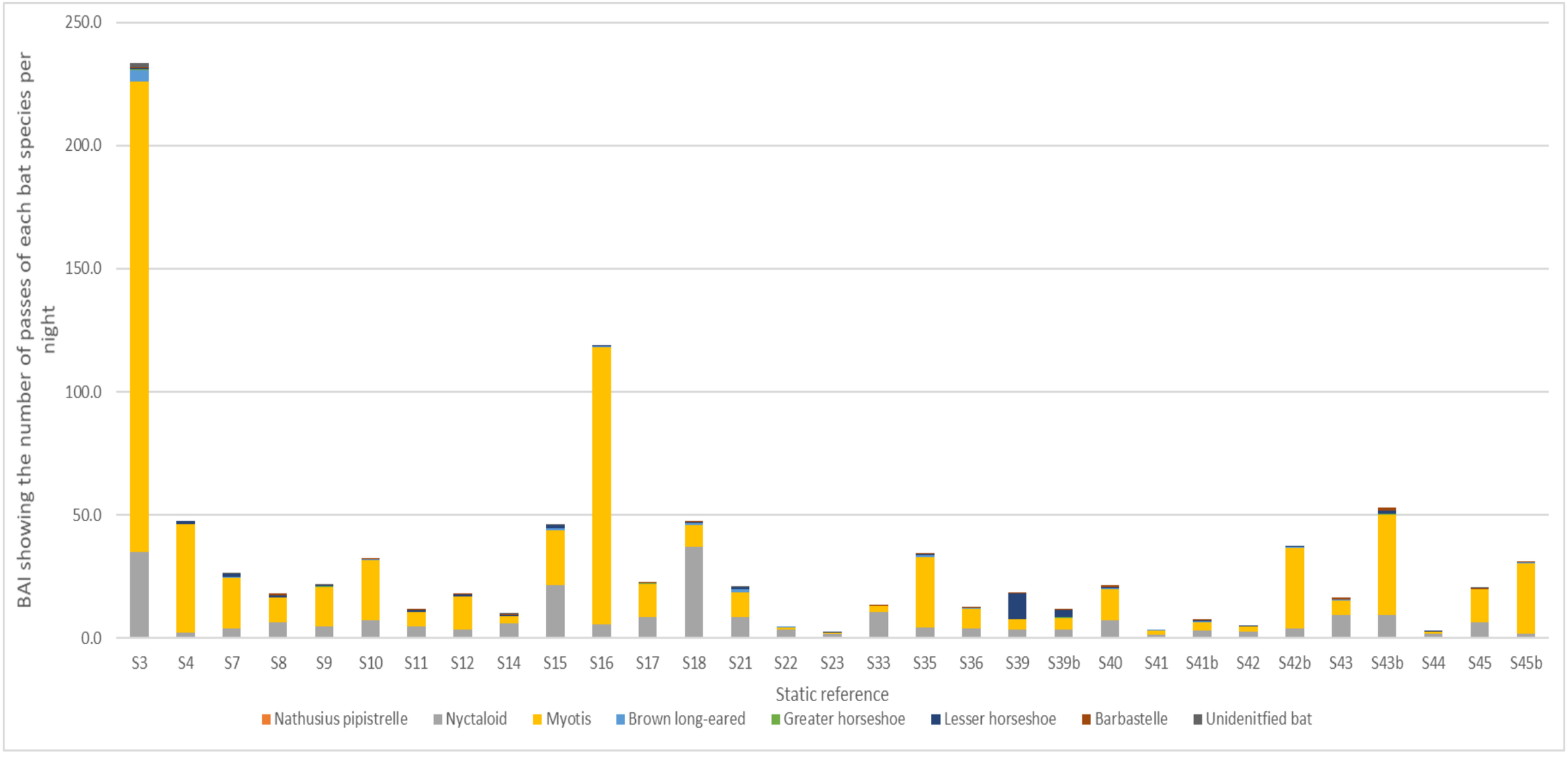


Figure 3-3 – The BAI of each static location considering all bat species, but excluding common and soprano pipistrelle

3.4 Crossing Point Surveys

Overview of All Crossing Points

3.4.1 Table 3-10 shows that crossing point locations 1, 4, 5 and 8 were assessed to be confirmed crossing points in 2020, 2021 or in both years. If the location was assessed to be a crossing point in any year, it has been classified as a confirmed crossing point on a precautionary basis.

3.4.2 In addition to the confirmed crossing points, due to the significant limitations identified with the survey methodologies (see 2.3.84 to 2.3.116), CP3 and CP9 are also assumed on a precautionary basis to be crossing points.

Table 3-10 - Showing which Crossing Points were Assessed to be Bat Crossing Points in which Year

Crossing Point	Confirmed crossing point in 2020	Confirmed crossing point in 2021	Assessed to be a confirmed crossing point
Crossing Point Location 1	✓	✗	✓
Crossing Point Location 2	✗	✗	✗
Crossing Point Location 3	✗	✗	✓[77]
Crossing Point Location 4	✓	✓	✓
Crossing Point Location 5	✗	✓	✓
Crossing Point Location 6/7		✗	✗
Crossing Point Location 8		✓	✓
Crossing Point Location 9		✗	✓

Green tick – confirmed crossing point, red cross – not a confirmed crossing point, orange tick – considered to be a crossing point on a precautionary basis.

3.4.3 Two of the crossing points, CP1 and CP5, were surveyed in both 2020 and 2021 but had different usage between the years which resulted in only being shown as a crossing point in one of the two years, but not both. This therefore shows there is variability in some locations in the usage of the site between years. For the purposes of the evaluation, these have been confirmed as a crossing point. However, the variability in the results pre-construction suggests that any crossing point results post-construction will be subject to the same variability and this should be considered within the results.

3.4.4 The following sections of the report identify the number of bats that have crossed at the different locations and determines why locations would be considered as a crossing point or not.

[77] Amber tick refers to a confirmed crossing point on a precautionary basis

Crossing Point 1 (CP1)

CP1 2020

3.4.5 All bats recorded for this crossing point (2020 and 2021) were travelling through the culvert. At least four bat species, or species groups, were recorded commuting through the culvert at CP1 (common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis* species and lesser horseshoe) (see Appendix D and Figure 3-4).

3.4.6 Survey 3 (01/09/2020) recorded the most bats, where 16 bats were recorded commuting through the culvert. Overall, soprano pipistrelle was the most common bat species recorded using the culvert to cross under the M5.

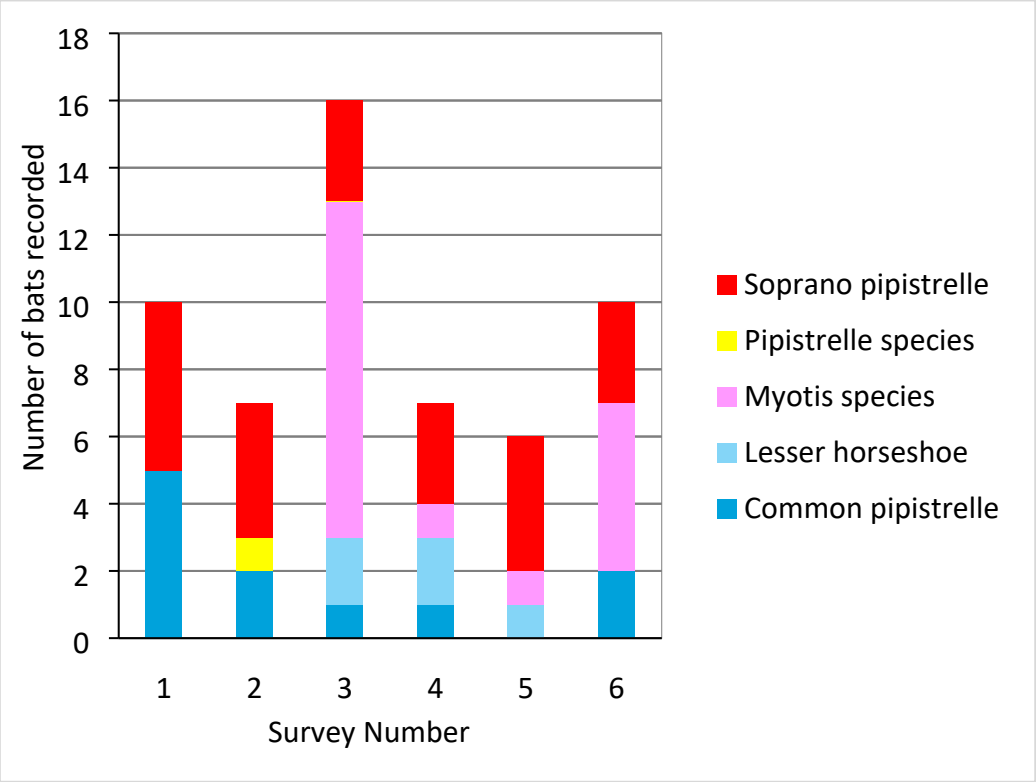


Figure 3-4 – Graph to Show CP1 Survey Data in 2020

CP1 2021

3.4.7 During the 2021 surveys, at least three bat species, or species groups, were recorded commuting through the culvert (common pipistrelle, soprano pipistrelle, pipistrelle species and *Myotis* species). This is one species fewer than the 2020 surveys, when lesser horseshoe were also recorded.

3.4.8 A peak total count of six bats were recorded during the surveys (maximum count was on Survey 1, 07/06/2021) (see Appendix D and Figure 3-5). Pipistrelle species were the most common bat species recorded using the culvert to cross under the M5.

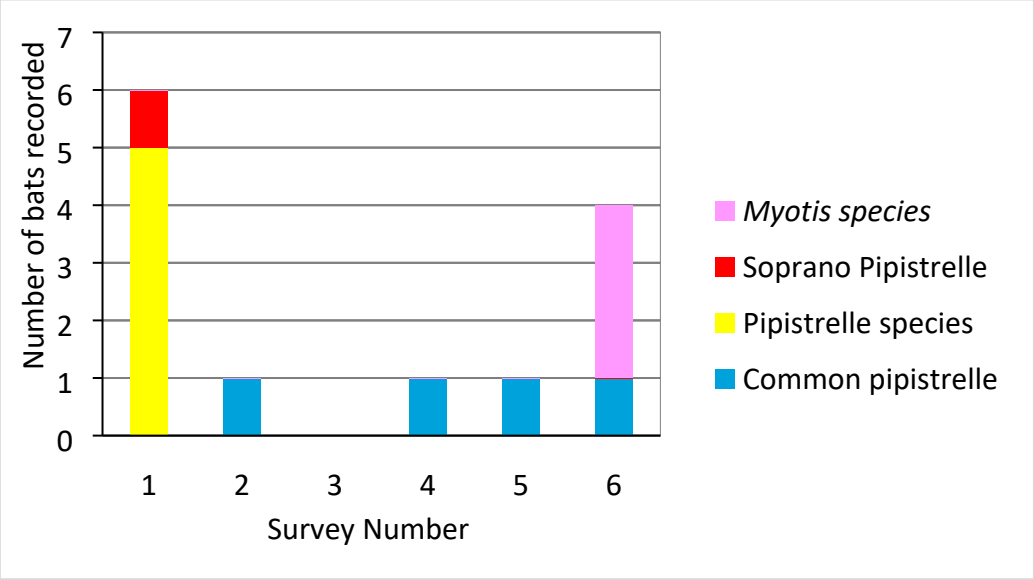


Figure 3-5 – Graph to Show CP1 Survey Data in 2021

Crossing Point 1 (CP1) Overview

3.4.9 Fewer bats were recorded using the culvert in 2021 compared to 2020 (a total of 57 bats recorded in 2020 and 13 bats recorded in 2021) as shown in Figure 3-6. Based on the Crossing Point Survey Guidelines, the M5 River Chelt culvert at CP1 was assessed to be a confirmed crossing point in 2020. However, using the same criteria, CP1 was assessed to not be a confirmed crossing point in 2021. This is because, using the criteria set out in the Crossing Point Survey Guidelines[78], this location only achieved seven points during the initial two surveys in 2021, rather than the ten points required to categorise this location as a confirmed crossing point.

3.4.10 There were five lesser horseshoe bat passes recorded in 2020, but this species was not recorded at CP1 in 2021. All of the lesser horseshoe bats using this crossing point (five in total) were recorded in September 2020 (the sub-optimal survey period for this survey methodology). The September survey was omitted from the 2021 survey, to ensure that all surveys were within the optimal survey period. This may suggest however that lesser horseshoe use this crossing point primarily in autumn as a route to transitional roosts.

[78] Appendix G. Local effects of transport infrastructure & mitigation: Best practice survey protocol and data analysis (2015) Anna Berthinussen & John Altringham School of Biology, University of Leeds, Leeds LS2 9JT

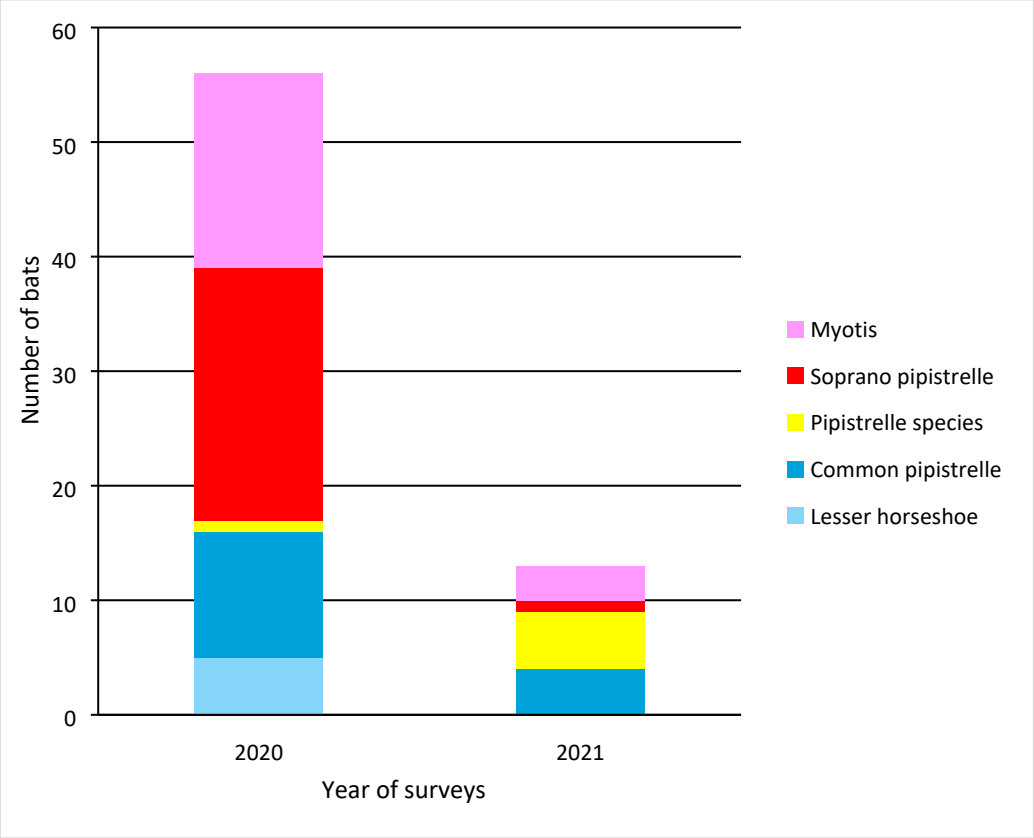


Figure 3-6 – Graph Comparing 2020 to 2021 Data for CP1

Crossing Point 2

CP2 2020

3.4.11 All bats recorded at this crossing point (2020 and 2021), were travelling below 5 m. Across the six surveys, three bat species (common and soprano pipistrelle bats and serotine) were recorded using this potential crossing point location (see Appendix D and Figure 3-7). Serotine were recorded in August only.

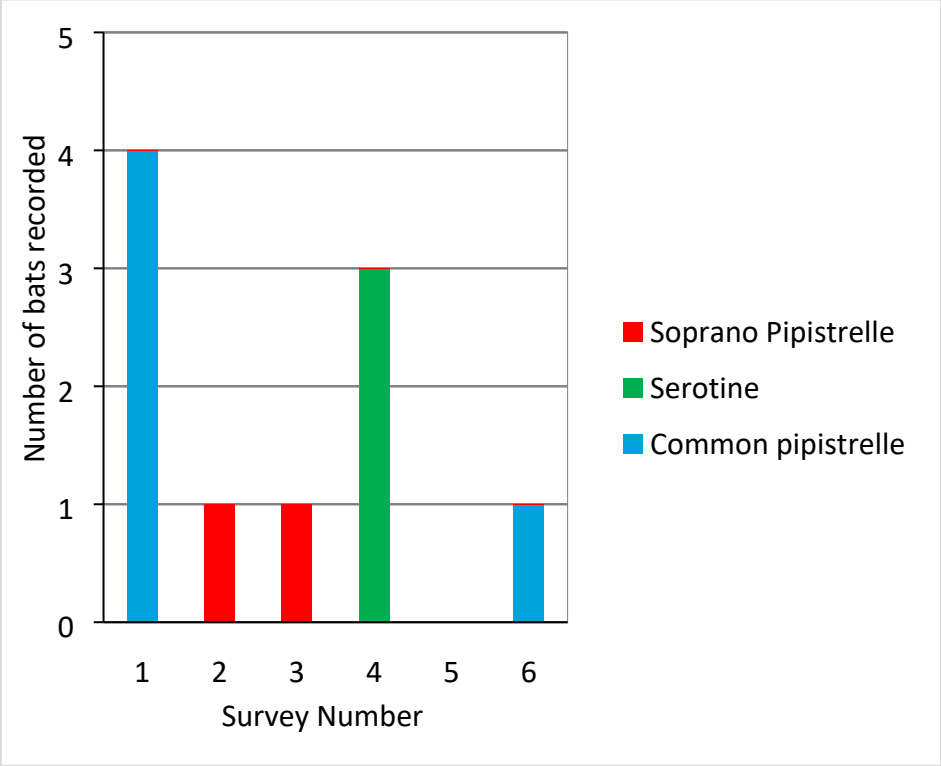


Figure 3-7 – Graph to Show CP2 Survey Data in 2020

CP2 2021

3.4.12 Over the six surveys, only one species (common pipistrelle) was recorded crossing the road <5 m. Noctule and common pipistrelle were also recorded to cross the road >5 m (see Appendix D and Figure 3-8) during the full six surveys. However, these bats were not counted towards the Crossing Point to determine if this location is a confirmed crossing point (as detailed within the survey methodology).

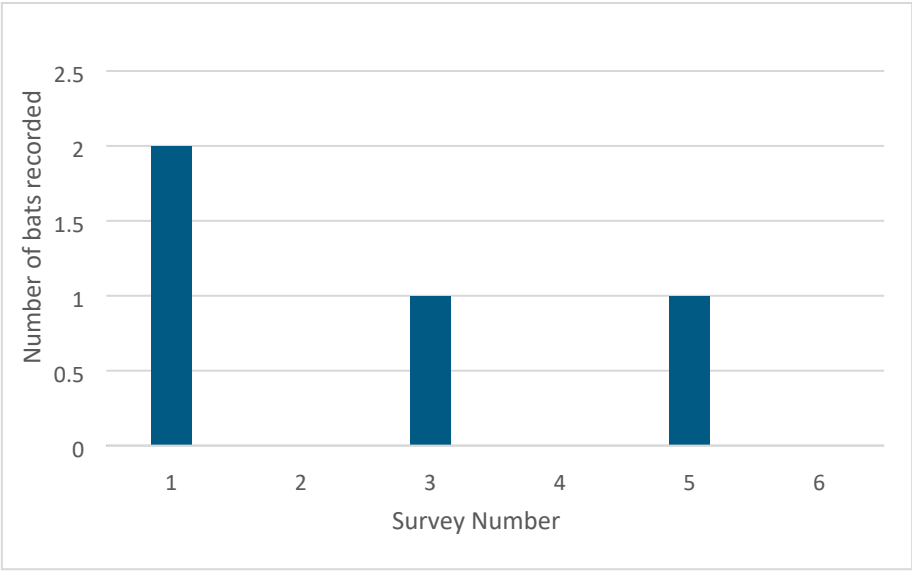


Figure 3-8 – Graph to Show CP2 Survey Data in 2021

CP2 Overview.

3.4.13 Fewer bats and species were recorded crossing the road at this location in 2021, with a total of 10 bats recorded in 2020 and four bats recorded in 2021, see Figure 3-9. In 2020,

the bats crossing the road included common pipistrelle, soprano pipistrelle and serotine. However, only common pipistrelle were recorded crossing the road in 2021.

3.4.14 CP2 was not assessed to be a confirmed crossing point in 2020 or 2021.

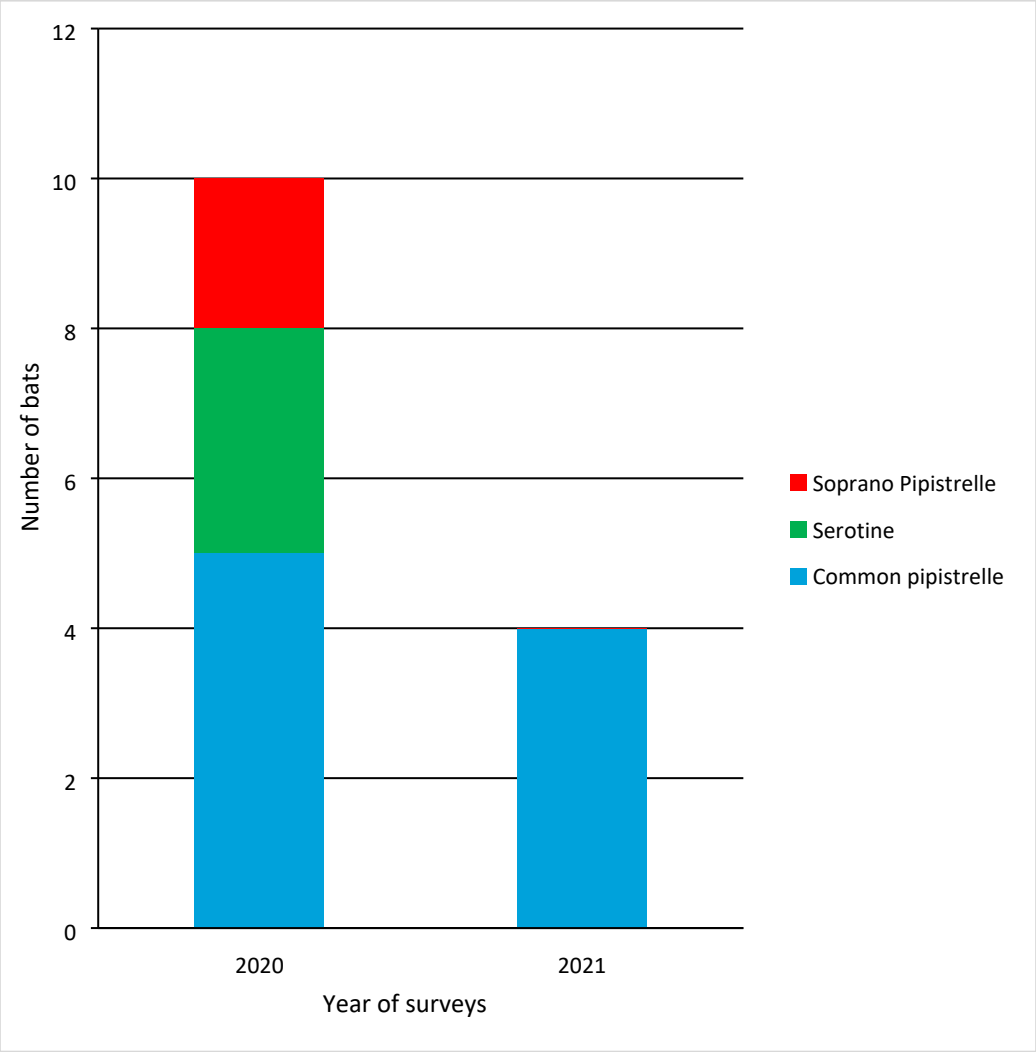


Figure 3-9 – Graph Comparing 2020 to 2021 Data for CP2

3.4.15 It should be noted that Features B and C (the hedgerows running parallel to the road) were not primary survey features of this location, as the objective of this survey was to assess whether bats cross the A4019 at this location. However, incidental data were collected by the surveyors on Features B and C also (see and Table 4-64). The data suggests that these were regularly used features.

Crossing Point 3

CP3 2020

3.4.16 At least three bat species or species groups were recorded using Feature B at CP3 in 2020 (common pipistrelle, soprano pipistrelle, noctule and an unidentified bat) (see Appendix D and Figure 3-10). A peak total count of six bats (16/09/2020, Survey 5) were recorded on any one survey.

3.4.17 Common pipistrelle was the most commonly recorded bat species, with eight passes over all surveys. Noctule was recorded once in September 2020 at <5 m. Noctule was recorded regularly >5 m, but these records were not counted towards the Crossing Point Score.

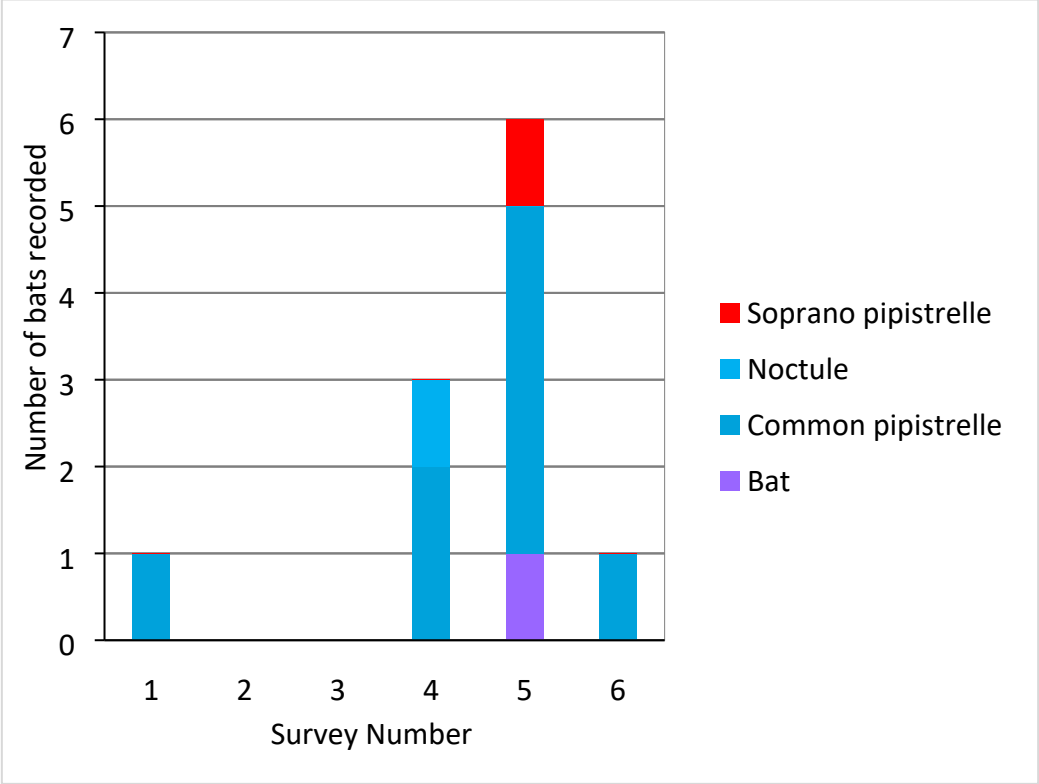


Figure 3-10 – Graph to Show CP3 Survey Data 2020

CP3 2021

3.4.18 At least three bat species or species groups were recorded using Feature B at CP3 over all the surveys (common pipistrelle, soprano pipistrelle and serotine). A peak total count of 12 bat passes (13/07/2021, Survey 4) were recorded on one survey (see Appendix D and Figure 3-11).

3.4.19 Common pipistrelle was the most commonly recorded bat species, with 16 passes in total over all the surveys. Noctule was not recorded, but serotine was recorded once using Feature B on 10/08/2021 (Survey 5).

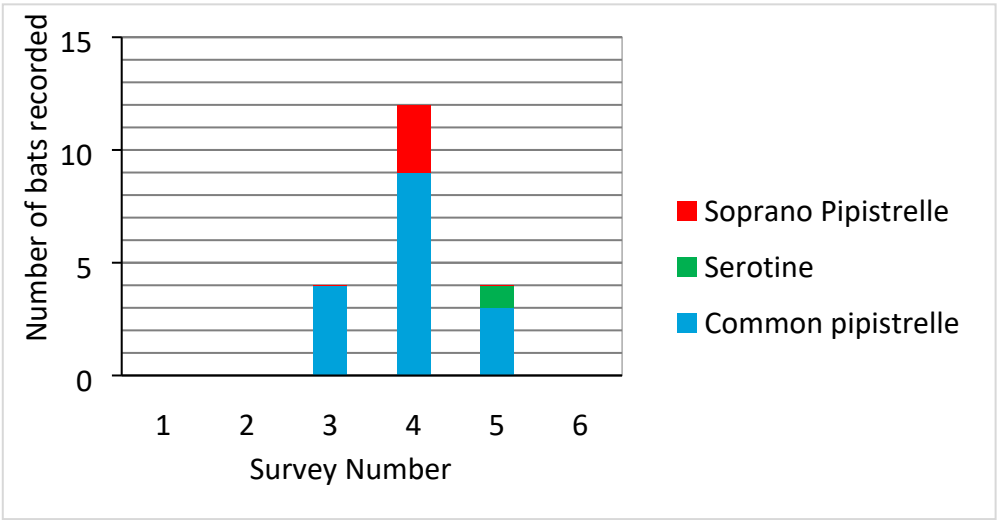


Figure 3-11 – Graph to Show CP3 Survey Data 2021

CP3 Overview

3.4.20 More bats were recorded crossing Feature B in 2021 (20 bat passes), with only 11 bat passes recorded in 2020, an increase of 80% in 2021. In 2020, the bats crossing Feature B included noctule; however, this species was not recorded in 2021. A single serotine was recorded on Survey 5 in 2021; however, this species was not recorded in 2020 (see Figure 3-12).

3.4.21 Based on the significant limitations with this survey location (see Appendix D), it is possible that this crossing point is used more frequently by bats than the data suggest. Therefore, on a precautionary basis, this location is considered to be a confirmed crossing point.

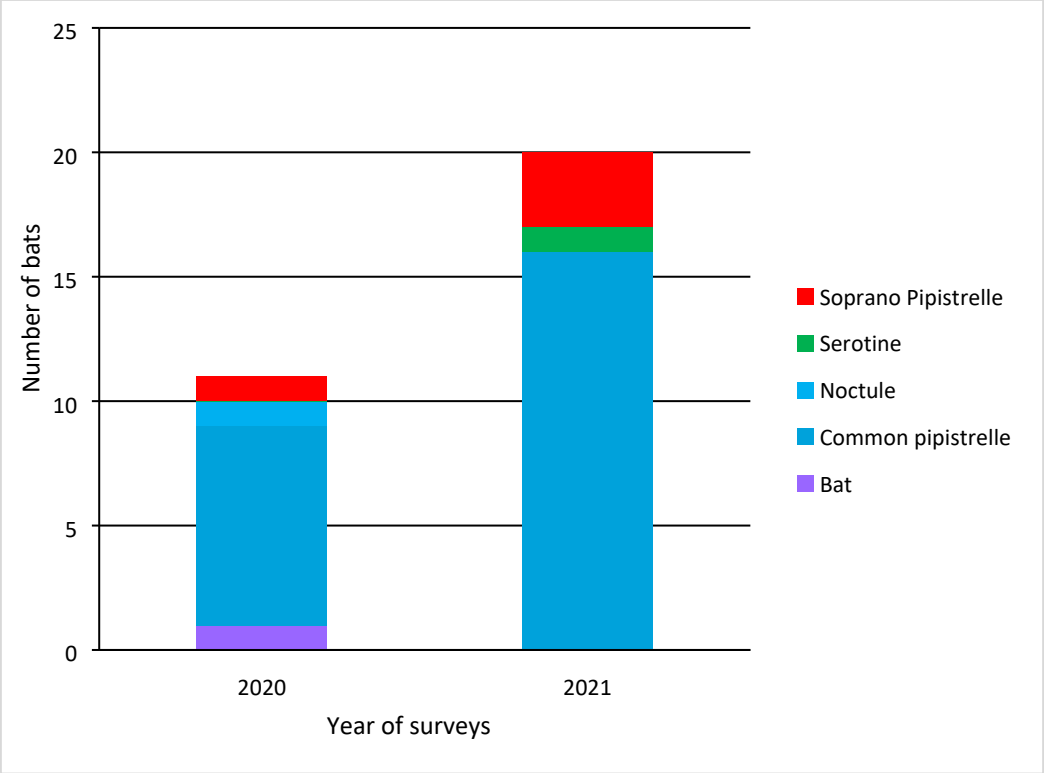


Figure 3-12 – Graph comparing 2020 to 2021 data for CP3

3.4.22 It should be noted that features A and C (hedgerows in the vicinity) were not primary survey points of this crossing point location and observations there were not counted towards the Crossing Point Score, as this survey focused on how bats were crossing Feature B (See Appendix D).

Crossing Point 4

CP4 2020

3.4.23 At least four bat species or species groups were recorded commuting along the River Chelt at CP4 (common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis*, noctule and unidentified bat). A minimum of 10 bat passes were recorded during each the of surveys (see Appendix D and Figure 3-13).

3.4.24 Common pipistrelle was the most commonly recorded bat species using the River Chelt (both at safe and unsafe heights). Noctule passes within the unsafe height range (3 m to 8 m) were recorded twice over the six surveys. A *Myotis* species crossing was recorded at an unsafe height in August 2020 (Survey 3).

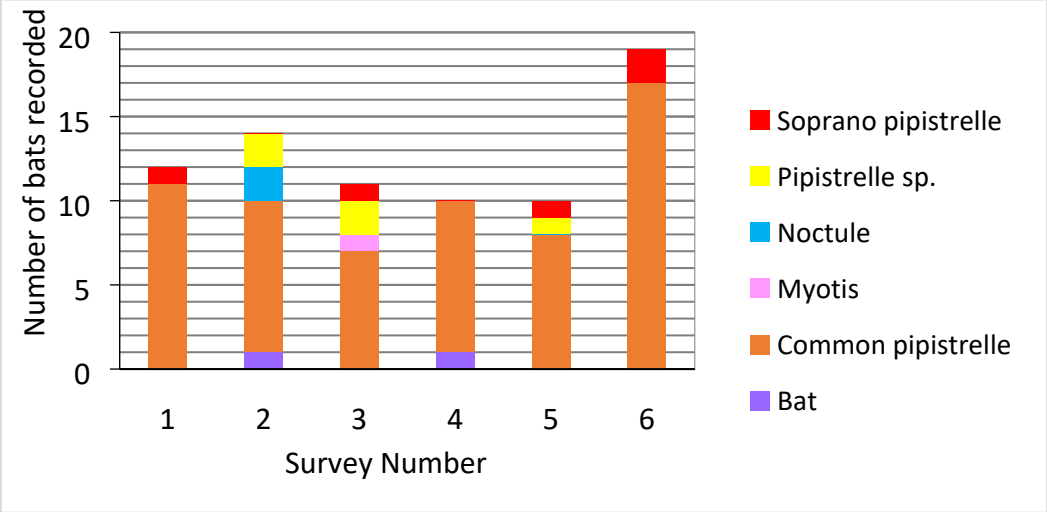


Figure 3-13 – Graph to Show CP4 Survey Data 2020

CP4 2021

3.4.25 During 2021 surveys, only one bat species was recorded commuting between 3 m and 8 m (CP4's unsafe crossing height) along the River Chelt at CP4 (common pipistrelle) (see Appendix D and Figure 3-14).

3.4.26 Common pipistrelle was the most commonly recorded bat species using the River Chelt at safe crossing heights, with over 300 bat passes recorded at safe heights (primarily under 3 m). These bats were recorded approximately in equal numbers travelling east and west along the crossing point, suggesting that this is likely to be used as a foraging site for this bat species (rather than all the bats travelling in one direction, i.e. as if they were emerging from a bat roost close to a foraging site). Noctule and *Myotis* species were also recorded using the River Chelt, at <3 m or >8 m.

3.4.27 Numbers of bat passes during 2021 (particularly in July) were high at this location; however, the majority of bats were flying at a safe height.

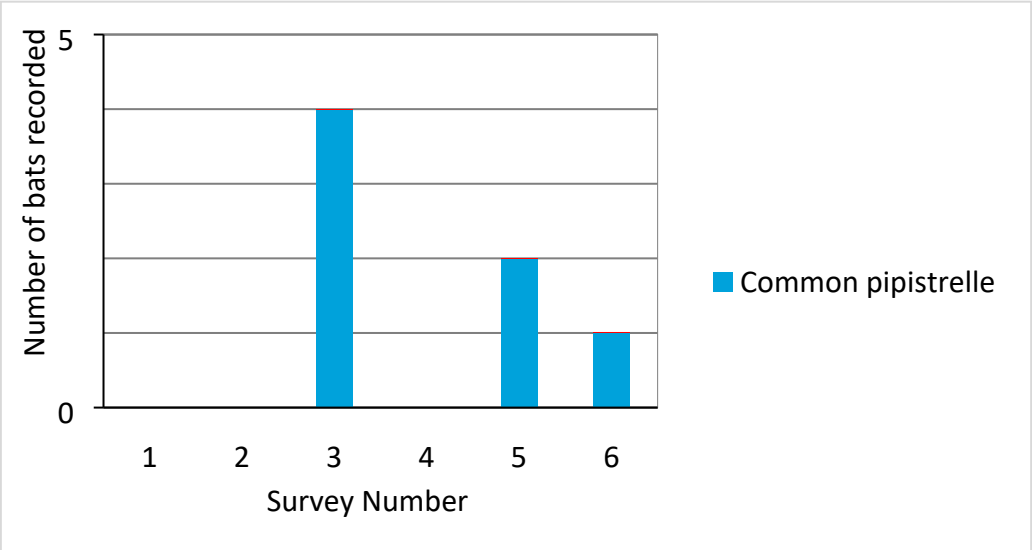


Figure 3-14 – Graph to Show CP4 Survey Data 2021

CP4 Overview

3.4.28 CP4 was determined to be a confirmed crossing point in 2020; however, in 2021, due to the number of bats flying at a safe height (below 3 m or higher than 8 m) this was not

assessed to be a crossing point in 2021. This has been assumed on a precautionary basis to be a crossing point, taking into account yearly fluctuations in bat activity.

3.4.29 More bats were recorded crossing at an unsafe height in 2020, with a total of 77 over the six surveys, compared to only 7 bat passes in 2021, see Figure 3-15.

3.4.30 Of those bats that crossed at a safe height in 2021 99% were common pipistrelle passes.

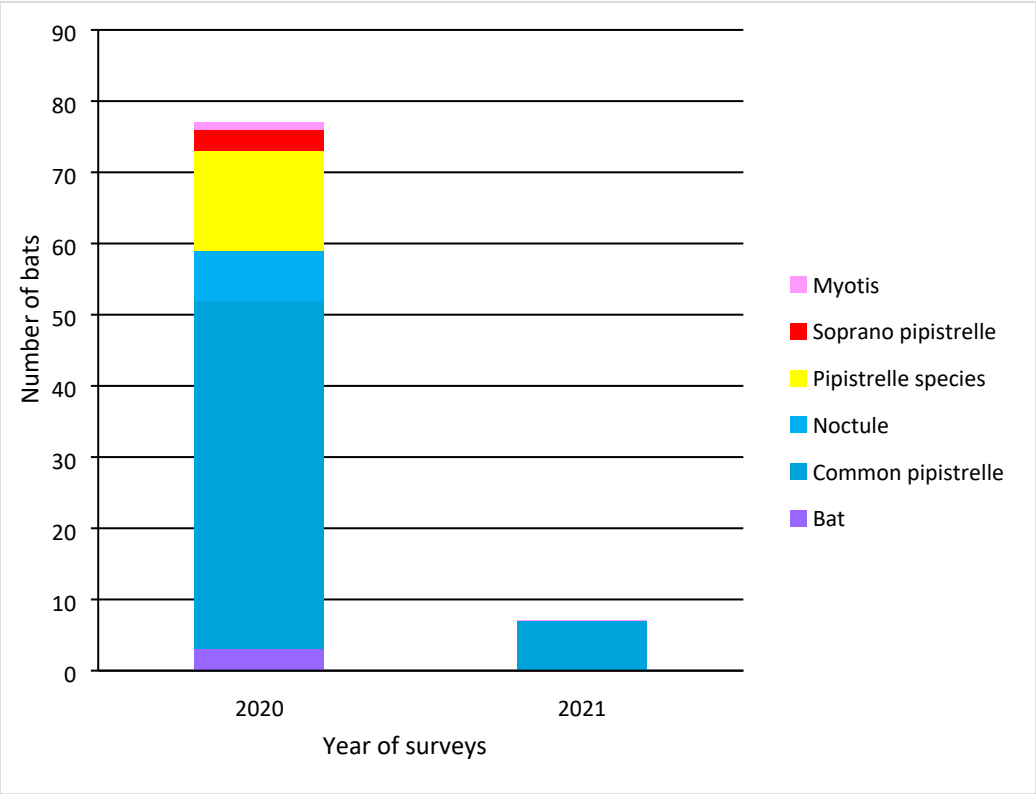


Figure 3-15 – Graph comparing 2020 to 2021 data for CP4

Crossing Point 5

CP5 2020

3.4.31 At least one bat species or species group was recorded commuting at this location (common pipistrelle, pipistrelle species and an unidentified bat). A peak total count of four bats were recorded crossing the road during each of the surveys <5 m (see Appendix D and Figure 3-16).

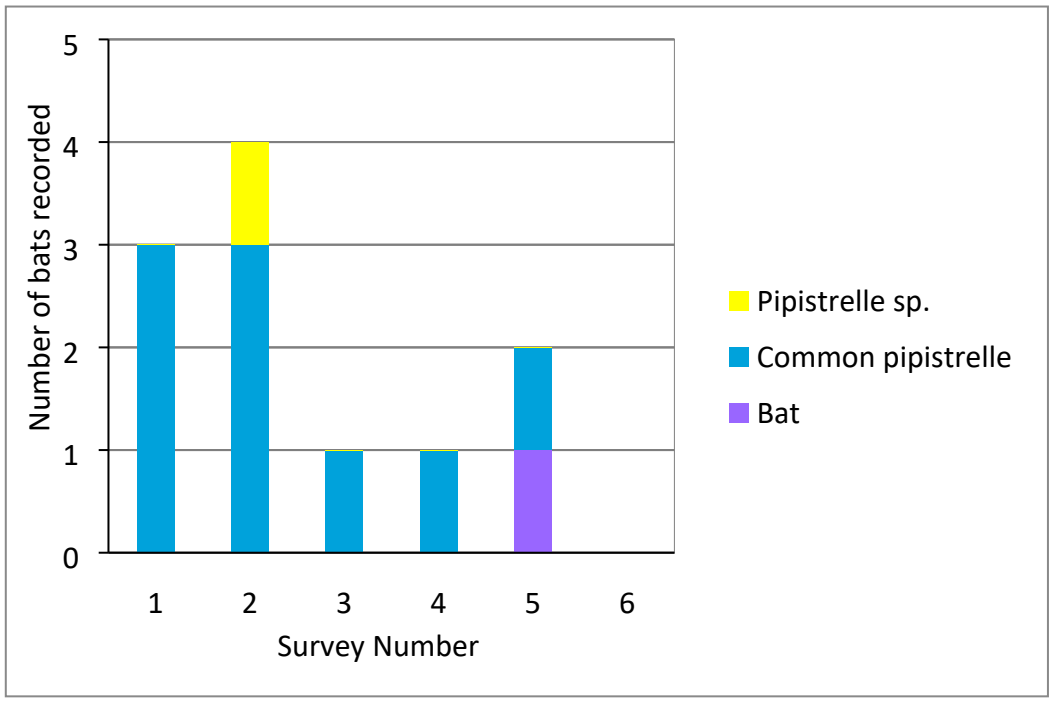


Figure 3-16 – Graph to Show CP5 Survey Data 2020

CP5 2021

3.4.32 In 2021, two bat species were recorded commuting across the road at CP5; common pipistrelle and *Myotis*. *Myotis* had not been recorded in 2020; however, they were recorded passing the road once on 02/06/2021 and 18 passes on 17/06/2021.

3.4.33 Common pipistrelle was the most commonly recorded bat species, recorded with a minimum of 17 passes during the first three surveys (02/07/2021, 17/06/2021 and 07/08/2021). There were eight passes on 16/07/2021 and no passes on either 20/09/2021 or 31/08/2021.

3.4.34 Bat activity at this location was skewed to early summer (June and July), with very little overall bat activity in the later summer month (August) as can be seen in Appendix D.

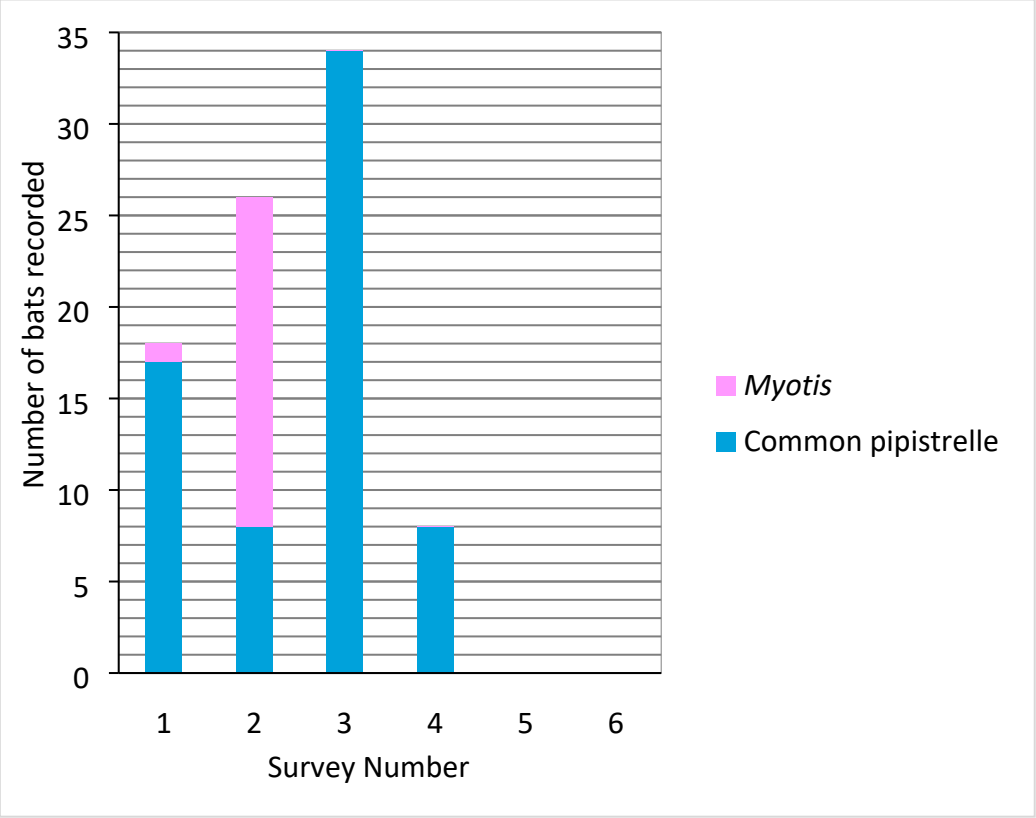


Figure 3-17 – Graph to Show CP5 Survey Data 2021

CP5 Overview

3.4.35 CP5 was determined to be a confirmed crossing point in 2021. However, the Crossing Point Score for this location did not meet the criteria set out in Table 2-5 in 2020.

3.4.36 More bats were recorded at this location in 2021, with a total of 86, compared to only 11 bat passes in 2020; an increase of 781% (see Figure 3-18). Bat activity at this location was skewed to early summer with very little overall bat activity in the later summer months in both 2020 and 2021.

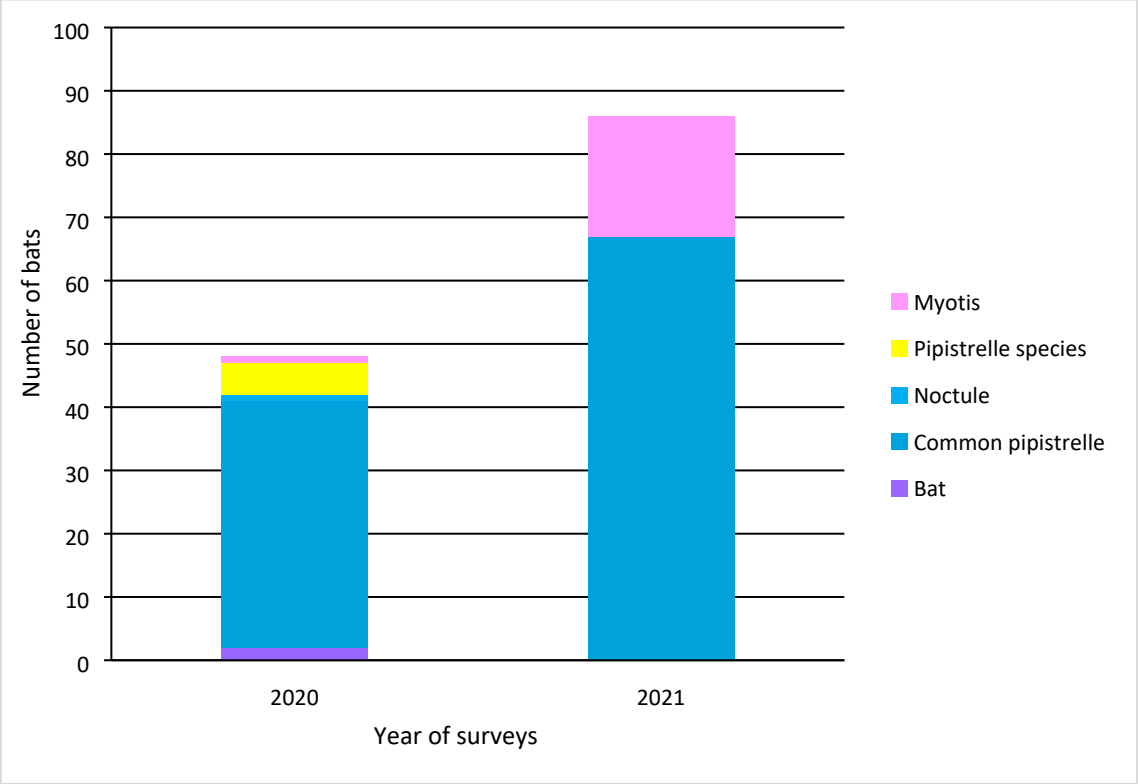


Figure 3-18 – Graph Comparing 2020 to 2021 data for CP5

Crossing Point 6/7 2021

3.4.37 CP6/7 was not considered to be a confirmed crossing point as this location did not meet the Crossing Point Score set out in Table 2-5. During the initial two surveys only two common pipistrelle bats were seen to cross the road at this location <5 m in height (both on Survey 1). Therefore, only the initial two surveys were completed.

Crossing Point 8 2021

3.4.38 CP8 was considered to be a confirmed crossing point, as it met the criteria set out in Table 2-5, achieving a Crossing Point Score of 14 points over the initial two surveys. Over the six surveys common pipistrelle, soprano pipistrelle, *Myotis* species and noctule bat passes were recorded, totalling four bat species recorded crossing the road at this location, see Figure 3-19.

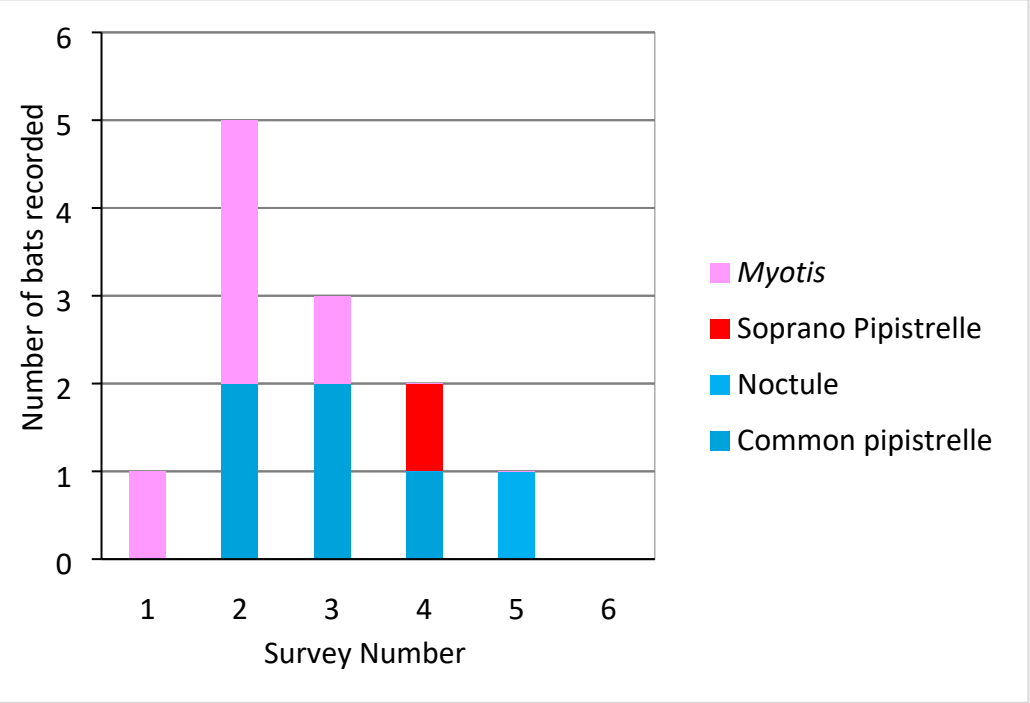


Figure 3-19 – Graph to Show CP8 Survey Data 2021

3.4.39 It should be noted that features A to E (see Figure 7.30 in Appendix G) were not the primary survey points of this potential crossing point location, as this survey focused on how bats cross the road only. However, incidental data were collected by the surveyors on these features; the data suggests that these were regularly used features. This is discussed further in Section 4.

Crossing Point 9 2021

3.4.40 CP9 was not assessed to be a confirmed crossing point. During the initial two surveys, only one noctule bat crossed the road at this location <5 m (on Survey 2), see Appendix D. On this basis, using the criteria set out in Table 2-5, this location was not assessed to be a confirmed crossing point.

3.4.41 Given the area covered in this crossing point survey, and the resulting potential for bats to be missed by the surveyors, it is possible that this crossing point is used more frequently by bats than the 2021 data suggest. Therefore, for the purposes of this assessment it has been classified as a crossing point.

3.5 Advanced Licence Bat Survey Techniques (ALBST)

Tagged Bats

3.5.1 During the course of the survey, no Bechstein's bats (the primary target species) were trapped or tagged.

3.5.2 One lesser horseshoe bat (a secondary target species) was trapped and tagged. However, as detailed below, this bat was not successfully tracked. None of the other secondary target species were captured (barbastelle or greater horseshoe). Species trapped on site included Daubenton's, Natterers, lesser horseshoe, common pipistrelle, soprano pipistrelle, whiskered bat and Noctule. Of these, one Daubenton's, three Natterers and one lesser horseshoe were tagged to be tracked. Details of all bats that were trapped and tagged are shown in Appendix E.

3.5.3 Figures in Appendix G show the data points where bearing locations of each bat were made, the lines between these data points are the shortest route between the two to indicate direction however cannot be assumed to be the bat's exact movement. Where

an assumption of a bat's travel direction / location has been made, this has been detailed within the results below.

Bat 1 Daubenton's (Adult Male)

3.5.4 This bat was trapped at Location 2, and was tracked for eight nights. All of the data points recorded can be seen on in Appendix G. Key findings are outlined in the following paragraphs.

3.5.5 The bat data points were all located within a 3 km^2 area over the eight days. The majority of the activity was to the west of the M5, with very little activity east of Withybridge Lane. The only activity east of Withybridge Lane was directly after the bat was tagged. Bats do not usually follow their normal pattern of behaviour within the first 12 hours due to being tagged[79], so these locations east of Withybridge Lane may not be within the usual home range of the bat. The bat also visited a large waterbody in Barrow, located approximately 2.5 km south east from the existing M5 junction, on several occasions.

3.5.6 Bat 1 primarily remained to the west of the M5. The few exceptions, where the bat was active to the east of the M5 were located within 250 m of the M5 motorway.

3.5.7 Bat 1 primarily roosted in the northern quadrant, north of Stanboro Lane, within an area comprising farm buildings, pockets of woodland and hedgerow bordered pasture fields. Seven of the eight roosting locations were within the northern quadrant within a land parcel where access was not possible. As a result the exact roosting location was not defined.

3.5.8 Where Bat 1 primarily roosted in the northern quadrant, north of Stanboro Lane, this area also seemed to provide a key early foraging location for the bat. Another key foraging location for Bat 1 was the wooded area (approximately 500 m in length) along the River Chelt within the Boddington Estate in the western quadrant. A key foraging site (or potential roost location) was identified at Hedgerow 76.

3.5.9 Bat 1 was recorded twice along Hedgerow 35 within the Boddington Estate, suggesting this may be a key foraging or commuting route for this bat.

3.5.10 To the west of M5 J10 Bat 1 is assumed to travel along the A4019 and cross this road at an unknown location, before using the hedgerow with trees lining Boddington Lane to access the River Chelt.

3.5.11 Bat 1 was seen to cross the M5 on three nights and to cross the A4019 on four nights. The bat was not recorded in the vicinity of the proposed Link Road, with the exception of the first night of tracking (26/05/2021) when the bat was briefly recorded at the north of the proposed Link Road.

Bat 2 Natterer's (Adult Female)

3.5.12 This bat was trapped at Location 2, and was tracked for eight nights, and all of the data points recorded can be seen in Appendix G. Key findings are outlined in the following paragraphs.

3.5.13 Excluding the anomalies (detailed in Appendix E), Bat 2 stayed within a 2.5 km^2 area over the eight days. The bat was primarily recorded west of Withybridge Lane, to the west of the proposed Link Road.

3.5.14 Bat 2 was only recorded to roost during the day within the Butler's Court farm buildings between the M5 and Withybridge Lane. Although the exact location of the roost(s) is unknown, it is assumed that on at least one occasion the bat was roosting in BU_752 based on the triangulated radio tracking position on 28/05/2021. It was also recorded to roost within a small pocket of woodland in the northern quadrant for a short period at night on 29/05/2021.

[79] Advice given from experienced bat trapping lead

3.5.15 One key foraging location for Bat 2 was the woodland to the east of the motorway (within the southern quadrant), with bats recorded frequently in this woodland during static detector surveys. Another key foraging / commuting corridor was along the River Chelt, both sides of the M5.

3.5.16 Bat 2 was shown to cross the M5 and the A4019 regularly; however, the exact location of these crossing points is unknown. It is likely that this bat was utilising the River Chelt culvert given that Bat 2 regularly utilised the River Chelt as a commuting route.

3.5.17 Bat 2 was not recorded in the vicinity of the proposed Link Road.

Bat 3 Natterer's (Adult Female)

3.5.18 Bat 3 was trapped at Location 2, and tracked for eight nights, and all of the data points recorded can be seen in Appendix G. Key findings are outlined in the following paragraphs.

3.5.19 Excluding one anomaly, Bat 3 stayed within an approximate 2.3 km^2 area over the eight days. The bat was generally located south of the A4019; however, the bat did cross to the north side of the A4019, at least once on most nights (seven in total).

3.5.20 The bat was only recorded to roost within the Butler's Court farm buildings between the M5 and Withybridge Lane, with a night roost also assumed to be located in the eastern quadrant, approximately 700 m from M5 J10 in a wooded area.

3.5.21 A key foraging location of Bat 3 was the woodland to the east of the motorway, with bats recorded in this woodland (or in close proximity) on eight occasions by radiotracking. The River Chelt, both sides of the M5, was also used regularly, likely for foraging and commuting.

3.5.22 Bat 3 was recorded as crossing the M5 and the A4019 nightly; however, the exact location of these crossing points is unknown. On at least one occasion (third night of tracking, 28/05/2021), the bat was assumed to have crossed the A4019 under the M5 J10 bridge (as the bat was recorded in quick succession on either side of this location, see Appendix G) or over the A4019 where the slip road ends (Crossing Point Location 8).

3.5.23 Bat 3 was not recorded in the vicinity of the proposed Link Road.

Bat 4 Lesser Horseshoe (Adult Female)

3.5.24 A female, adult, lesser horseshoe bat was trapped on 27/05/2021 at 01:30 at Location 2. The bat was pregnant and weighed 6.5 g. This bat could not be tracked as the signal from the tag could not be detected and so either the bat travelled outside of the range of the tracking system, or more likely, the tag failed.

Bat 5 Natterer's (Adult Male)

3.5.25 Bat 5, trapped at Location 2, was tracked for eight nights, and all of the data points recorded can be seen in Appendix G. Key findings are outlined in the following paragraphs.

3.5.26 Excluding one anomaly, Bat 5 stayed within a 0.9 km^2 area over the eight days, within the southern quadrant, centralised around the River Chelt.

3.5.27 On two occasions Bat 5 was assessed to be likely roosting within a tree south of the River Chelt and on both occasions, the first foraging location after exiting the roost was close to Hedgerow 158, bordering the small orchard adjacent to Withybridge Lane, suggesting this is a key foraging location.

3.5.28 Hedgerow 132 was assessed as likely being a key commuting route for Bat 5. An additional commuting route was identified along (or close to) the tree-lined access track that leads to Butler's Court, as the bat was recorded there on six occasions (twice on the third night (30/05/2021), twice on the sixth night (02/06/2021) and twice on the seventh night (03/06/2021)).

3.5.29 On three occasions Bat 5 was recorded within the field between Hedgerow 155 and 159 (north and south), twice on the sixth night of tracking (02/06/2021) at 22:51 and 23:16, and once on the seventh night (03/06/2021) at 23:19. It is assumed that the bat is using this field for foraging.

3.5.30 The small orchard along Withybridge Lane has been assessed as being a likely key foraging location, as 16 data points were recorded here. Bat 5 was recorded here immediately after emerging on several occasions.

3.5.31 Bat 5 was not shown to cross the M5 or the A4019 and was only recorded in the southern quadrant. Bat 5 was the only bat recorded crossing the location of the proposed Link Road.

4 Evaluation

4.1 Bat Roost Summary

4.1.1 Throughout the study area there are 57 confirmed bat roosts (seven in trees and 50 in structures), and one former bat roost. In addition, on a precautionary basis there are predicted to be a further 39 undetected roosts within unsurveyed/partially surveyed structures and a further 34 undetected roosts within unsurveyed/partially surveyed trees. These are generally spread throughout the survey area but are, however, more likely to be present where more structures are present.

4.1.2 The majority of the confirmed bat roosts (detailed in Table 3-6) were used by 'common' bat species (i.e. brown long-eared, common pipistrelle and soprano pipistrelle) based on Wray et al., (2010)[80]. There were also 'rarer' bats as defined in Wray et al., (2010) including two whiskered bat roosts, ten Natterer's roosts, five noctule roosts and ten lesser horseshoe roosts. One 'rarest' species as defined in Wray et al., (2010) roost was recorded, a barbastelle tree roost in the northern quadrant. The majority of the roosts were day, night, transitional, mating and feeding roosts. However, there was one Natterer's maternity roost, one brown long-eared hibernation roost, three pipistrelle (common or soprano) maternity roosts and one common pipistrelle hibernation roost.

4.1.3 The predicted bat roosts within unsurveyed/partially surveyed structures are shown in Table 3-7 and Appendix F, and comprise a total of 39 roosts (seven hibernation, five high suitability (potentially maternity) roosts and 27 low/moderate suitability (suitable for supporting small numbers of bats) roosts. The species assumed to be present in these roosts include lesser horseshoe, brown long-eared, Natterer's, Barbastelle, serotine, Daubenton's, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, whiskered, Leisler's and noctule. Consideration has been given to the proportion of roosts of each species, taking into account the known species assemblage and species abundance with the survey area. This is detailed in the above-mentioned tables.

4.1.4 The predicted 34 tree bat roosts are detailed in Table 3-9, and are assumed to be made up of 16 high suitability (potential maternity) roosts and 18 low/moderate suitability (suitable for supporting small numbers of bats) roosts. The species assumed to be present in these roosts include barbastelle, Bechstein's, Natterer's, Daubenton's, whickered, Brandt's, Nathusius' pipistrelle, Leisler's, noctule, common pipistrelle and soprano pipistrelle. Consideration has been given to the proportion of roosts of each species, taking into account the known species assemblage and species abundance within the survey area. This is detailed in the above-mentioned table.

4.2 Bat Activity Interpretation

4.2.1 At least thirteen species of bat have been recorded throughout the study area; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* (Natterer's and whiskered confirmed by DNA and Daubenton's confirmed by ALBST), noctule, Leisler's, brown long-eared, lesser horseshoe, greater horseshoe, serotine and barbastelle. This is considered to be a wide range of bat species, which is expected given the size of the survey area and the range of habitats present, albeit the dominant habitat type is agricultural grassland. Given the location of the Scheme within the southwest of England, which is within the ranges of Annex II bat species (lesser horseshoe, greater horseshoe, Bechstein's and barbastelle), the presence of these species is expected. However, given that the habitats are sub-optimal for Annex II bats, comprising predominantly agricultural habitats with small orchards and woodland and relatively limited connecting habitats, it is expected to have only limited usage by Annex II bat species. This is reflected in the low BAI for greater horseshoe (1.3 passes per night) and barbastelle (6.5 passes per night) across the entirety of the survey area. Lesser horseshoe bats had a higher BAI of 26.3 passes per

[80] Wray et al., Valuing Bats in Ecological Impact Assessment (CIEEM (2010) In Practice Number 70)

night, although this is still considerably lower than the BAI for common pipistrelle (BAI of 3,096.6 passes per night) and soprano pipistrelle (BAI of 743.5 passes per night). Pipistrelle species (excluding Nathusius' pipistrelle), *Myotis* species and Nyctaloid were the most abundant species recorded, account for 98.9% of all passes, which is as expected given the agricultural habitats present. It is not possible to differentiate Bechstein's bats from other *Myotis* bat species due to them having similar call structures, therefore abundance of Bechstein's bats has been interpreted from the results of the roost surveys and ALBST, as well as an assessment of the habitats present.

4.2.2 Bat activity was highest in the following areas within the study area:

- Along the River Chelt (both sides of the M5 motorway in the southern and western quadrants), which is due to be intersected by the Link Road in the southern quadrant.
- Along Stanboro Lane (within an area comprising farm buildings, pockets of woodland and hedgerow bordered pasture fields) in the northern quadrant.
- Along Moat Lane (where a large waterbody is present, in the southern quadrant).
- Where HT18 and WD2 meet, north of the A4019 (eastern quadrant) and H86, south of the A4109 (southern quadrant); both of which are located east of The Green.
- The woodland south east of the motorway Junction south of Withybridge Gardens (roadside verge in the southern quadrant).
- Close to where the Link Road meets the B4634 (Hayden Hill Fruit Farm) in the southern quadrant.

4.2.3 Additional commuting and foraging locations were also identified within the study area through ALBST:

- H76 in the northern quadrant, H35 within the eastern quadrant and H132 in the southern quadrant (due to be intersected by the new Link Road).
- The tree lined access track that leads to Butler's Court (within the southern quadrant).
- Between H155 and H159 (within the southern quadrant).
- The small orchard along Withybridge Lane (including trees 60 to 72, within the southern quadrant)).

4.2.4 Bats were observed as part of the ALBST to cross the A4019 at an unknown location, before using the hedgerow with trees lining Boddington Lane to access the River Chelt. Bats were shown to be crossing the M5 motorway under the M5, using the River Chelt culvert, as well as bats being seen to be crossing the M5 motorway itself (assumed to be at risk of collision from vehicles). Bats were confirmed to cross the A4019 at location CP8, CP9 (in this approximate location, although the exact location is unknown) and also under the existing A4019 bridge over the M5.

4.2.5 Levels of activity were lowest for all species in the eastern quadrant, with fewer passes recorded in this area. For the remaining quadrants, levels of activity were comparable for all species, except for brown long-eared bats, which generally exhibited higher levels of activity in the southern quadrant.

4.3 Evaluation of Bat Resource

4.3.1 Based on the results of desk based assessments and surveys that have been completed to support this ES concerning the distribution and abundance of confirmed and potential bat roosts within the study area, the availability of suitable foraging and commuting habitats and the assemblage of species, bat roosts and habitats have been ascribed the values set out in Table 4-1, 4-2 and 4-3.

4.3.2 It should be noted that for all structure or tree bat roosts, the highest importance value for each roost has been presented in the table. For example, a common pipistrelle day and maternity roost would be assigned 'county importance' based on the maternity roost, and not 'local importance' based on the day roost.

4.3.3 The commuting and foraging resource receptors within Table 4-1 are aligned with different areas of the Scheme. Table 4-2 and Table 4-3 have considered the resource importance of known and predicted roosts of species known to utilise the survey area.

Table 4-1 - Bat Resource Importance for commuting and foraging

Commuting and foraging habitats as a receptor	Information to evaluate resource	Bat Resource Importance
Link Road (habitats in the vicinity of) • T5 (S9 and S10). • T7 (S11 and S12). • T8 (S14 and S36). • S40 and S44 • CP3, CP5 and CP4. • ALBST.	At least nine bat species or species groups (common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis*, noctule, Leisler's, brown long-eared, lesser horseshoe, serotine, barbastelle and an unidentified bat) were recorded along the three transect survey locations. The transect surveys indicate that a higher level of bat activity was recorded along the River Chelt close to the location of the Link Road. Two barbastelle (determined to be a 'rarest'[81] bat) passes were recorded along T8; one in June 2019 and the other in October 2019, both along the River Chelt. No other 'rarest' species were recorded during any of the transect surveys. At least eleven species of bat were recorded by the eight static bat detectors at these locations during the automated bat surveys; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis*, noctule, Leisler's, brown long-eared bat, lesser horseshoe, greater horseshoe, serotine and barbastelle. Barbastelle was not recorded at S40 and S44; however, 13 passes were recorded at S10 and S14. S10 and S14 are located adjacent to the location of the Link Road; S10 was located on the River Chelt, which will be crossed by a clear span bridge. 84% of barbastelle activity was recorded during August and September, which may relate to mating activity. S9, S11, S12 and S14 each recorded greater horseshoe on one occasion, with 50% of the calls recorded in May and September respectively. The low occurrence of these calls indicates an absence of potential roosts or important foraging paths for this species. CP3 CP4 and CP5 are considered to be crossing points (CP3 on a precautionary basis). During the ALBST, only Bat 5 (Natterer's, adult, male) regularly crossed the location of the Link Road. Based on Wray et al., (2010), the foraging and commuting habitat in this location would be based on the highest scoring bat species, barbastelle, Bechstein's and greater horseshoe. Undertaking this calculation for barbastelle would be as follows: • 20 points for being one of the 'rarest' species. • 5 points for being only 'individual bats.	Based on Wray *et al.* (2010) the commuting and foraging resource has been assigned regional Importance based on its usage by Annex II bat species.

[81] Wray et al., Valuing Bats in Ecological Impact Assessment (CIEEM (2010) In Practice Number 70)

Commuting and foraging habitats as a receptor	Information to evaluate resource	Bat Resource Importance
	• 3 points for a 'small number' of roosts being nearby (Tree 496, located 560 m from the northern extent of Withybridge Lane). • 5 points for habitat based on the location being assessed as 'complex network of mature well-established hedgerows, small fields and rivers/streams.' Total = 33 points, classified as regional importance (total points between 31 and 40) Undertaking this calculation for greater horseshoe would be as follows: • 20 points for being one of the 'rarest' bat species. • 5 points for being only 'individual bats. • 1 point as no roosts for greater horseshoe have been recorded and the times that greater horseshoe were recorded during the activity surveys suggest that there are no roosts close by. • 5 points for habitat, as above. Total = 31 points, classified as regional importance. Although the Myotis species recorded could have been Bechstein's bats, based on the survey data, which recorded one transitional Bechstein's roost in Tree 172 (located outside of the study area 110m from the Scheme Boundary) with one bat present, it is considered unlikely that any more than small numbers of Bechstein's roosts are present in the vicinity and any more than small numbers of Bechstein's bats utilise the habitats for foraging and commuting. This would result in the habitats being of regional importance.	
A4019 Improvements (habitats in the vicinity of) • T11 (S39 and S43); • T12 (S39b and S43b); • S34 and S37; • CP2; and • CP6, CP7 and CP8	At least eight bat species or species groups (common pipistrelle, soprano pipistrelle, *Myotis*, noctule, Leisler's, brown long-eared, lesser horseshoe and serotine) were recorded along the two transect survey locations. Heatmaps created to visualise the locations of bat passes recorded during transect surveys indicate that higher levels of activity were recorded along the eastern extent of the A4019, particularly at the junction with Moat Lane and The Green. At least ten bat species or species groups (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* species, noctule, Leisler's, brown long-eared bat, lesser horseshoe, greater horseshoe and barbastelle bat) were recorded on the static bat detectors. The peak total count of barbastelle bats on static detectors deployed in the vicinity of the A4019 ranged between seven and 42 passes across the four static detectors, with S43b and S43 recording the highest levels of barbastelle activity within the whole study area. The highest level of greater horseshoe bat activity (another 'rarest' species) was also recorded at S43b, with 12 calls recorded at this location.	Based on Wray *et al.* (2010) the commuting and foraging resource has been assigned regional Importance based on its usage by Annex II bat species.

Commuting and foraging habitats as a receptor	Information to evaluate resource	Bat Resource Importance
	CP2 recorded at least four bat species or species groups commuting over the road at this location (common pipistrelle, soprano pipistrelle, pipistrelle species, noctule, serotine and an unidentified bat) however numbers were low so this was not a confirmed crossing point. CP6/CP7 was not assessed to be a confirmed crossing point as only two common pipistrelles crossed at this location at an unsafe height during the initial two surveys. Noctule, serotine and *Myotis* were however incidentally recorded while surveying at this location. CP8 was shown to be a confirmed crossing point, with common pipistrelle, *Myotis* and noctule recorded to cross at this location at an unsafe height. During the ALBST, Bat 1 (Daubenton's, adult male), Bat 2 and Bat 3 (both Natterer's, adult females) regularly crossed the A4019. Based on Wray *et al*., (2010), the foraging and commuting habitat in this location would be based on the highest scoring bat species present, barbastelle, Bechstein's and greater horseshoe. Undertaking this calculation for barbastelle would be as follows: • 20 points for being the 'rarest' species. • 10 points for being only 'small numbers' of bats. • 3 points for a 'small number' of roosts being nearby (Tree 496, located 230 m from the A4019). • 2 points for habitat based on the location being assessed as 'suburban areas or intensive arable land.' Total = 35 points assessed as regional importance (total points between 31 and 40) Undertaking this calculation for greater horseshoe would be as follows: • 20 points for being one of the 'rarest' bat species. • 5 points for being only 'individual bats. • 1 point as no roosts for greater horseshoe have been recorded and the times that greater horseshoe were recorded during the activity surveys suggest that there are no roosts close by. • 2 points for habitat, as above. Total = 28 points, classified as county importance. Although the Myotis species recorded could have been Bechstein's bats, based on the survey data, which recorded one transitional Bechstein's roost in Tree 172 (located outside of the study area 110m from the Scheme Boundary) with one bat present, it is considered unlikely that any more than small numbers of Bechstein's roosts are present in the vicinity and any more than small numbers of Bechstein's bats utilise the habitats for foraging and commuting. This would result in the habitats being of regional importance.	

Commuting and foraging habitats as a receptor	Information to evaluate resource	Bat Resource Importance
M5 J10 Improvements (and habitats in the vicinity of) • T2 (S3 and S4); • T4 (S7 and S8); • T9 (S15 and S16); • T10 (S17 and S18); • Southern quadrant directly south east of the junction (S21 and S35); • National Highways land (S22, S23, S41, S41b, S42 and S42b); • S45 and S45b; and • CP1 and CP9	Three of the four transect routes in this area recorded the highest number of bat passes throughout the study area (T2, T4 and T9). Between all the transects, at least nine bat species or species groups were recorded (common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis* species, noctule, Leisler's, brown long-eared, lesser horseshoe, serotine, barbastelle and an unidentified bat). The majority of the transect activity, based on interpretation of the heatmap in Appendix G, was recorded to the west of the M5 in three locations; along Hedgerow H35 to the south of the A4019, along the A4019 itself and adjacent to the M5, to the north of the A4019. At least eleven species of bat were recorded during the static bat detector surveys at these locations (common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, *Myotis* species, noctule, Leisler's, brown long-eared bat, lesser horseshoe, greater horseshoe, serotine, barbastelle and an unidentified bat). Barbastelle was recorded between zero and 16 times across these locations, with S8 (located adjacent to the M5 north of the A4019) recording the third highest activity across the entire survey area for this species. S3, S4, S8, S21, S17 and S18 recorded greater horseshoe activity, with a peak of seven calls recorded at S21, located adjacent to the M5 close to the A4019 on the southern side. CP1 recorded at least four bat species or species groups commuting at this location (common pipistrelle, soprano pipistrelle, pipistrelle species, *Myotis* and lesser horseshoe bat) and is therefore considered to be a crossing point. CP9 recorded only one bat species (noctule) crossing the road at an unsafe height (<5 m) during the initial two crossing point surveys. On this basis it was not determined to be a bat crossing point; however, there were survey limitations at this location and it is assumed to be a crossing point on a precautionary basis(see section 2.3.116). During the ALBST, Bat 1 (Daubenton's, adult male), Bat 2 and Bat 3 (both Natterer's, adult females) regularly crossed the M5; however, the exact location is unknown. Bat 1 was assumed to have passed beneath the A4019 bridge over the M5 twice. Based on Wray *et al.,* (2010), the foraging and commuting habitat in this location would be based on the highest scoring bat species, barbastelle, Bechstein's and greater horseshoe. Undertaking this calculation for barbastelle would be as follows: • 20 points for being the 'rarest' species.	Based on Wray *et al.* (2010) the commuting and foraging resource has been assigned regional Importance based on its usage by Annex II bat species.

Commuting and foraging habitats as a receptor	Information to evaluate resource	Bat Resource Importance
	• 5 points for being only 'individual' bats. • 3 points for a 'small number' of roosts being nearby (Tree 496, due to be felled by the Scheme at this location). • 5 points for habitat based on the location being assessed as 'complex network of mature well-established hedgerows, small fields and rivers/streams' Total = 33 points assessed as regional importance (total points between 31 and 40) Undertaking this calculation for greater horseshoe would be as follows: • 20 points for being one of the 'rarest' bat species. • 5 points for being only 'individual' bats. • 1 point as no roosts for greater horseshoe have been recorded and the times that greater horseshoe were recorded during the activity surveys suggest that there are no roosts close by. • 5 points for habitat, as above. Total = 31 points, classified as regional importance. Although the Myotis species recorded could have been Bechstein's bats, based on the survey data, which recorded one transitional Bechstein's roost in Tree 172 (located outside of the study area 110m from the Scheme Boundary) with one bat present, it is considered unlikely that any more than small numbers of Bechstein's roosts are present in the vicinity and any more than small numbers of Bechstein's bats utilise the habitats for foraging and commuting. This would result in the habitats being of regional importance.	

Table 4-2- Bat Resource Importance of Known Roosts

Species Roosts as a receptor	Information to evaluate resource	Bat Resource Importance
Natterer's	Natterer's bats are described as a 'rarer' bat species in England (Wray et al., (2010)). • One maternity roost (BU_752) - based on the criteria provided in Wray et al., (2010), maternity sites of 'rarer' bats are of regional importance. • 12 low conservation roosts including transitional, day, night, feeding and mating (BU_723, BU_752, BU_854, BU_857, BU_761, BU_763, BU_854, BU_766, BU_853, BU_857, Tree 86 and Tree 101) - based on the criteria provided in Wray et al., (2010), small numbers of non-breeding	Considering one maternity roost and 12 low conservation roosts of Natterer's the overall resource importance is assigned regional importance.

Species Roosts as a receptor	Information to evaluate resource	Bat Resource Importance
	or individual 'rarer' bats are of county importance.	
Common pipistrelle	Common pipistrelles are abundant in the area, as indicated by the local records and the records from the surveys completed. They are listed as 'common' in England (Wray *et al*., (2010). 'Pipistrelle' are considered to be of conservation importance within the Gloucestershire Biodiversity Action Plan (BAP)[82]. • One (BU_638) hibernation roost - based on the criteria provided in Wray *et al.,* (2010) small numbers of hibernating sites of 'common' bats are of county importance. • Two (BU_854 and BU_1030) maternity roosts - based on the criteria provided in Wray *et al.* (2010), maternity sites of 'common' bats are of county importance. • 20 low conservation roosts including transitional, day, night, feeding and mating (BU_1034, BU_1039, BU_376, BU_378, BU_653, BU_735, BU_834, BU_972, BU_981, BU_661, BU_705, BU_737, BU_751, BU_762, BU_771, BU_850, BU_855, BU_862 BU_965 and BU_990) - based on the criteria provided in Wray *et al.,* (2010), roosts of small numbers of non-breeding or individual 'common' bats are of district, local or parish importance.	Considering one hibernation roost, two maternity roosts and 20 low conservation roosts of common pipistrelle the overall resource importance is assigned county importance.
Soprano pipistrelle	Soprano pipistrelle bat is abundant in the area, as indicated by the surveys completed, and as listed as 'common' in England (Wray *et al*., (2010). 'Pipistrelle' are however considered to be of conservation importance within the Gloucestershire BAP[82]. Soprano pipistrelle bat is also listed as a priority species on the UK BAP. • One maternity roost (BU_987) - based on the criteria provided in Wray et al., (2010), maternity sites of 'common' bats are of county importance. • Eight low conservation roosts including transitional, day, night, feeding and mating (BU_1034, BU_1042, BU_614, BU_653, BU_963, BU_981, BU_364 and BU_753) based on the criteria provided in Wray *et al*., (2010), small numbers of non-breeding or individual 'common' bats are of district, local or parish importance.	Considering one maternity roost and eight low conservation roosts of soprano pipistrelle the overall resource importance is assigned county importance.
Brown long-eared	Brown long-eared bat is listed as 'common' in England (Wray *et al*., (2010) in England. Brown	Considering one hibernation roost and

[82] Gloucestershire Biodiversity Partnership (2000) Biodiversity Action Plan for Gloucestershire. Online: https://www.gloucestershirenature.org.uk/biodiversity-action-plan-bap

Species Roosts as a receptor	Information to evaluate resource	Bat Resource Importance
	long-eared bat is however considered to be of conservation importance within the Gloucestershire BAP[82]. Brown long-eared is also listed as a priority species on the UK BAP. • One hibernation roost (BU_378) - based on the criteria provided in (Wray *et al.*, (2010), small numbers of hibernating 'common' bats are of county importance. • Nine low conservation roosts including transitional, day, night, feeding and mating (BU_694, BU_691 BU_965, BU_751, BU_752, BU_757, BU_761, BU_853 and BU_854) - based on the criteria provided in Bat Mitigation Guidelines, small numbers of non-breeding or individual 'common' bats are of district, local or parish importance.	nine low conservation roosts of brown long-eared bats the overall resource is assigned county importance.
Lesser horseshoe roosts	Lesser horseshoe bat is an Annex II species that has been recorded during the surveys across the study area, and is described as a 'rarer' bat species in England (Wray et al., (2010)). Lesser horseshoe bat is considered to be of conservation importance within the Gloucestershire BAP[82]. Lesser horseshoe bat is also listed as a priority species on the UK BAP. • Ten low conservation roosts including transitional, day, night, feeding and mating (BU_11, BU_747, BU_752, BU_757, BU_507, BU_611, BU_668, BU_709, BU_694 and BU_819) - based on the criteria provided in Wray et al., (2010), small numbers of non-breeding or individual 'rarer' bats are of county importance.	Considering ten low conservation roosts of lesser horseshoe bats, and low evidence of usage, the overall resource is assigned county importance.
Barbastelle	Barbastelle bat is an Annex II species that have been recorded infrequently during the activity surveys across the study area, and are determined to be one of the 'rarest' bat species in England (Wray *et al.,* (2010)). Barbastelle bat is considered to be of conservation importance within the Gloucestershire BAP[82]. Barbastelle bat is also listed as a priority species on the UK BAP. • One low conservation transitional roost (Tree 496) - based on the criteria provided in Wray *et al.,* (2010), small numbers of non-breeding 'rarest' bats are of county importance.	Considering one transitional roost of barbastelle bats, the overall resource is assigned county importance.
Noctule	Noctule bat is common in the area, as indicated by the local records and the records from the surveys completed within the study area. However, noctule are described as a 'rarer' bat species in England (Wray *et al.,* (2010)). Noctule bat is listed as a priority species on the UK BAP[82]. • Five low conservation day roosts (BU_610, Tree 576, Tree 578, Tree 627 and Tree 675) were	Considering five transitional roosts of noctule bats, the overall resource is assigned county importance.

Species Roosts as a receptor	Information to evaluate resource	Bat Resource Importance
	recorded. Based on the criteria provided in Wray *et al.,* (2010), small numbers of non-breeding 'rarer' bats are of county importance.	
Whiskered	Whiskered bats are described as a 'rarer' bat species in England (Wray *et al.,* (2010)). • Two low conservation roosts including transitional, day, night, feeding and mating (BU_857 and BU_992) – based on the criteria provided in Wray *et al.,* (2010, small numbers of non-breeding or individual 'rarer' bats are of county importance.	Considering two transitional roost of whiskered bats, the overall resource is assigned county importance.
Unknown roost	Three unknown but confirmed bat roosts are within the survey area (BU_370, BU_357 BU_765).	Given the low evidence of usage and that these are unlikely to support high conservation roosts, these have been assigned local importance.

Table 4-3- Bat Resource Importance for Predicted Additional Bat Roosts[83]

Predicted Species Roosts as a receptor	Categorising Bats by Distribution and Rarity[84]	Evaluation of resource based on Wray et al. (2010)	Bat Resource Importance
2 x barbastelle (low/moderate suitability, small numbers of bats) 1 x barbastelle hibernation roost supporting a solitary bat 3 x barbastelle or Bechstein's tree roosts (low/moderate suitability, small numbers of bats)	Rarest	Solitary hibernation sites of the 'rarest' bats are of regional importance. Low status bat roosts supporting individual/small numbers of 'rarest' bats are of county importance.	Considering the predicted presence of a hibernation roost supporting a solitary barbastelle, and five roosts supporting small numbers of bats of this rarest species, on a precautionary basis the overall resource importance for the predicted barbastelle bat roosts is regional importance.
1 x lesser horseshoe potential maternity roost	Rarer	Maternity sites of 'rarer' bats are of regional importance.	Considering the predicted potential presence of a maternity roost and

[83] As explained earlier in this document, the emerging 2023 survey work is confirming that a precautionary approach has been taken, and the predicted roosts presented here are likely to be an over-estimation.
[84] Based on Wray et al., (2010)

Predicted Species Roosts as a receptor	Categorising Bats by Distribution and Rarity[84]	Evaluation of resource based on Wray et al. (2010)	Bat Resource Importance
5 x lesser horseshoe (low moderate suitability, small numbers of bats)		Small numbers of low status bats roosts of 'rarer' bats are of county importance.	five roosts supporting small numbers of bats, on a precautionary basis the overall resource importance for the predicted lesser horseshoe bat roosts is regional importance[85]
Nathusius' pipistrelle, Natterer's, Daubenton's whiskered, Leisler's, noctule and/or serotine • 1 x potential maternity • 6 x low/moderate suitability, small numbers of bats Lesser horseshoe, Natterer's, serotine, Nathusius' pipistrelle, Leisler's, Daubenton's, whiskered, Brandt's and / or noctule: • 1 x hibernation roost for larger numbers of bats • 1 x hibernation roost supporting a solitary bat Natterer's, Daubenton's, whiskered, Brandt's, Nathusius' pipistrelle, Leisler's and / or noctule: • 5 x potential maternity tree roosts • 5 x low/moderate tree roosts	Rarer	Maternity sites of 'rarer' bats are of regional importance. Significant hibernation sites are of regional importance. Small numbers of hibernating bats of 'rarer' species are of county importance. Small numbers of low status bats roosts of 'rarer' bats are of county importance.	Considering the predicted presence of up to seven maternity roosts, two hibernation roosts and 12 low/moderate conservation roosts, on a precautionary basis the overall resource importance for the predicted 'rarer' bat roosts is regional importance.

[85] Note that the potential for additional lesser horseshoe hibernation roosts (including for larger numbers of bats) is considered below. However, according to Wray et al., these would not likely classify to be of more than **regional importance**. Therefore, the evaluation of the bat resource importance for lesser horseshoes being of regional importance is deemed appropriate.

Predicted Species Roosts as a receptor	Categorising Bats by Distribution and Rarity[84]	Evaluation of resource based on Wray et al. (2010)	Bat Resource Importance
suitability, small numbers of bats Natterer's, serotine and Daubenton's • 1 x potential maternity • 1 x low/moderate suitability, small numbers of bats			
Brown long-eared: • 3 x low/moderate suitability, small numbers of bats Common pipistrelle or soprano pipistrelle: • 2 x potential maternity roosts • 10 x low/moderate suitability, small numbers of bats • 12 x potential maternity tree roosts • 10 x low/moderate suitability, small numbers of bats tree roosts Brown long-eared, common pipistrelle or soprano pipistrelle: • 1 x hibernation roost for larger numbers of bats • 3 x hibernation roosts supporting a solitary bat	Common	Significant hibernation sites for all species assemblages are of regional importance. Maternity sites of 'common' bats are of county importance. Small numbers of hibernating bats of 'common' bats are of county importance. Small numbers of non-breeding 'common' bats are of district, local or parish importance	Considering the predicted presence of up to one hibernation roost for larger numbers of bats, three further hibernation roosts supporting a solitary bat, 14 maternity roosts and 23 low/moderate conservation roosts, on a precautionary basis the overall resource importance for the predicted 'common' bat roosts is regional importance.

4.3.4 When considering all the commuting and foraging habitats utilised by bats within the survey area, they have been assigned regional importance as a whole due to the usage of Annex II bat species and connectivity by hedgerows and watercourses.

4.3.5 When considering the roost opportunities for species within the survey area, these overall have been assigned regional importance due to the known maternity roosts and predicted presence (on a precautionary basis) of additional maternity roosts.

Appendices

Appendix A. Structure Survey Results

A.1. Preliminary Bat Roost Assessment (PBRA), Emergence and Hibernation Survey Data and Results[86][87]

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_1002	Single storey breeze block shed that is open on the eastern gable end. The roof is dual pitched asbestos sheeting.	Low *(no internal access)*	01/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 09/05/2022	N/A	N/A	Yes	No internal access Access retracted
BU_1005	A two-storey, detached residential building with a hipped roof comprised of slate roof tiles.	Moderate *(no internal access)*	27/10/2020	No typical hibernating sites identified	Completed – not required	Dusk 19/05/2021	Dawn 24/06/2021	N/A	Yes	No internal access
BU_1006	A two-storey residential building with a dual pitched gable roof.	Moderate *(no internal access)*	14/12/2020	No roof void and no typical hibernating sites identified (however no internal survey completed)	N/A	No access	No access	N/A	No	No internal access Access retracted
BU_1007	A two-storey residential building with a dual pitched gable ended roof comprised of slate imitation tiles.	Low *(no internal access)*	24/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 06/08/2019	N/A	N/A	Yes	No internal access and unable to fully inspect the base of the chimney, and entirety of roof.
BU_1008	A single-storey garage comprised of concrete panelling with a corrugated metal roof.	Low *(no internal access)*	24/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 06/08/2019	N/A	N/A	Yes	No internal access
BU_1011	A single-storey concrete walled workshop with a corrugated metal roof.	Low *(no internal access)*	03/12/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 23/06/2021	N/A	N/A	Yes	No internal access Access retracted
BU_1012	A two-storey semi-detached house with a gross gabled roof of slate imitation tiles.	Low	14/12/2020 (internal 13/01/2022)	No typical hibernating sites identified	N/A	Dusk 20/07/2021	N/A	N/A	Yes	
BU_1012b	A two-storey wooden garage with a dual pitched gable ended roof.	Low *(no internal access)*	14/12/2020 (internal 13/01/2022)	No typical hibernating sites identified	N/A	Dusk 20/07/2021	N/A	N/A	Yes	No internal access
BU_1025	A single-storey timber shed with a mono pitched bitumen felted roof.	Low *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_1027	A two-storey residential building with a gabled and hipped roof with clay roof tiles.	Moderate *(no internal access)*	21/08/2019	No typical hibernating sites identified however no internal survey or close inspection completed	N/A	No access	No access	N/A	No	Access retracted
BU_1030	A two-storey residential building with a cross tabled roof with slate roof tiles.	Confirmed *(no internal access)*	31/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 28/08/2020	Dawn 30/07/2021	No access	No	No internal access
BU_1033	Two-storey residential property with a cross gabled roof comprised of flat clay tiles.	High *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed, little roof void	N/A	Dusk 20/08/2019	Dusk 27/06/2021	Dawn 23/07/2021	Yes	No internal access Access retracted
BU_1034	A two-storey property comprising of two semi-detached properties. Property is gable ended with clay flat roof tiles.	Confirmed *(no internal access)*	01/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 13/08/2019	Dawn 09/09/2021	Dusk 21/09/2021	No	No internal access Access retracted

[86] This table excludes the following structures where no access was possible: BU_01 BU_06 BU_08 BU_1013 BU_1014 BU_1027a BU_1091 BU_1093 BU_1094 BU_1097 BU_12 BU_1396 BU_1399 BU_1401 BU_1404 BU_1405 BU_1422 BU_1424 BU_1 BU_1520425 BU_1426 BU_1427 BU_1429 BU_1430 BU_1431 BU_1432 BU_1434 BU_1496 BU_1507 BU_1513 BU_1517 BU_1518 BU_1519 BU_1520 BU_1521 BU_1523 BU_1524 BU_1529 BU_1530 BU_1531 BU_1532 BU_1533 BU_1534 BU_1535 BU_1536 BU_1537 BU_17 BU_18 BU_19 BU_25 BU_28 BU_29 BU_30 BU_33 BU_342 BU_359 BU_363 BU_41 BU_45 BU_48 BU_493 BU_496 BU_497 BU_50 BU_500 BU_501 BU_521 BU_524 BU_525 BU_53 BU_541 BU_550 BU_56 BU_585 BU_589 BU_599 BU_602 BU_609 BU_612 BU_613 BU_615 BU_619 BU_657 BU_666 BU_693 BU_710 BU_725 BU_726 BU_738 BU_741 BU_742 BU_776 BU_792 BU_836 BU_864 BU_877 BU_892 BU_894 BU_903 BU_904 BU_910 BU_912 BU_924 BU_927 BU_960 BU_976 BU_984 BU_989

[87] This table excludes the following structures that were assessed as negligible: BU_1006a, BU_1008a BU_1008b BU_1008c BU_1010 BU_1010a BU_1012a BU_1023a BU_1025a BU_1033a BU_1033b BU_1033c BU_1036 BU_1037 BU_1040 BU_1041a BU_1047a BU_1047b BU_1095 BU_15 BU_1526 BU_40 BU_522 BU_572 BU_573a BU_641a BU_641b BU_645a BU_656 BU_656a BU_669, BU_687 BU_688 BU_691 BU_716a BU_716b BU_722a BU_722b BU_728a BU_768b BU_786 BU_817 BU_840 BU_908 BU_923 BU_962 BU_965a BU_965b BU_965c BU_965d BU_965e BU_965f BU_967 BU_971a BU_973 BU_974 BU_975 BU_975a BU_978a BU_978b BU_980 BU_985b BU_985c BU_987a BU_987b BU_987d BU_987c BU_988b BU_996

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_1034a	Single-storey brick folly with a tiled roof. Owner has previously found two bats' dead within the folly.	Low – former bat roost *(no internal access)*	01/08/2019	No typical hibernating sites identified however as bats have been assumed to be present, hibernation is considered possible	No access	Dusk 13/08/2021	Dusk 23/09/2021	Dawn 18/05/2022	No	No internal access Access retracted
BU_1039	Three connected single-storey timber sheds with corrugated metal roofing.	Confirmed *(no internal access)*	01/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dawn 10/09/2021	Dusk 21/09/2021	Dusk 10/05/2022	No	No internal access Access retracted
BU_1041	A two-storey residential building with a cross gabled roof and simple clay roof tiles.	Moderate *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	No access	No access	N/A	No	No internal access Access retracted
BU_1041b	A single-storey breeze block stable with a corrugated metal flat roof.	Low *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_1042	A two-storey residential brick building with a cross gabled roof of concrete or clay roof tiles.	Confirmed *(no internal access)*	31/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Not completed	Dusk 18/08/2020	Dawn 22/07/2021	Not completed	No	No internal access
BU_1043	A single-storey breezeblock outhouse with a flat metal roof on one half and a pitched corrugated roof on the other.	Low *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_1044	A single-storey brick building with a dual pitched gable ended clay roof tile.	Moderate *(no internal access)*	18/11/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 09/05/2022	No access	N/A	No	No internal access
BU_1045	A two-storey residential building with a dual pitched gable ended slate tiled roof.	Low *(No internal access)*	12/04/2022	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_1045a	Single storey brick wood store with a tiled pitched roof and open on one side.	Low	12/04/2022	No	N/A	No access	N/A	N/A	No	Access retracted
BU_1045b	Single storey wooden workshop.	Low	12/04/2022	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_1046	A single-storey double garage comprising of breeze blocks and a dual pitched gable ended corrugated asbestos roof.	Low *(no internal access)*	27/10/2020	No	N/A	Dawn 21/07/2021	N/A	N/A	Yes	No internal access Access retracted
BU_1047	Two storey semi-detached residential property with a cross gabled slate roof.	Moderate *(no internal access)*	27/10/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 21/07/2021	Dusk 24/08/2021	N/A	Yes	No internal access Access retracted
BU_1092	Two storey residential property with a dual-pitched, gable-ended roof.	Low *(no internal access)*	27/10/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 29/06/2021	N/A	N/A	Yes	No internal access
BU_1092a	A single-storey brick garage with a dual pitched concrete tile roof.	Low *(no internal access)*	27/10/2020	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	Yes	No internal access
BU_1096	A concrete pre-cast motorway bridge allowing the A4019 to pass over the M5, with concrete abutments and concrete piers.	Moderate	27/07/2021	Yes	Endoscoped on 01/12/2021 and 18/01/2022.	Dusk 19/07/2021	Dusk 27/08/2021	N/A	Yes	-
BU_1098	Two pre-cast concrete culverts running under the M5.	High	18/01/2022	Yes *(no internal access, based on results within the culvert inspection report only)*	No access – as licence agreement to access land parcel could not be gained in time	Static survey of both the (as a replacement to a single traditional bat emergence survey – see survey limitations) 04/05/2022 to 24/05/2022[88]	No access	No access	No	Partial access to only the western side of the culvert

[88] The one static survey that was conducted instead of an emergence survey, due to this survey limitation was not assessed to be able to sufficiently determine it bas were roosting within the culvert, therefore it is assessed that three surveys are still outstanding

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_11	A single storey brick garage a dual pitched concrete tiled roof. Internally there is an open loft with access at the rafters. Bat droppings were found in the attic at the northern gable end, DNA analysis showed they were lesser horseshoe.	Confirmed	09/03/2022	No typical hibernating sites identified	N/A	Dusk 26/04/2022	No survey completed	No survey completed	No	-
BU_1408	A three-storey residential property with dual pitched roof laid with plain clay tiles.	High *(no internal access)*	22/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 24/09/2019	No access	No access	No	No internal access Access retracted
BU_1477	Two attached single-storey timber sheds with bitumen felted mono-pitch roofs.	Low *(no internal access)*	27/07/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 24/08/2021	N/A	N/A	Yes	No internal access
BU_1514	A single-storey wooden outbuilding with a dual pitched corrugated metal roof.	Low	05/01/2022	No	N/A	Dusk 26/04/2022	N/A	N/A	Yes	-
BU_1522	A single pipe pre-cast concrete culvert flowing underneath the M5, south of J10. Only the culvert entrances can be seen.	High *(no internal access)*	27/07/2021	Yes	SM4 deployed at each end of the culvert between 13/12/2021 and 03/01/2022	Dusk 04/05/2022	No access	No access	No	Partial access to the western aspect of the culvert only
BU_1527	A culvert running beneath the A4019 north west to south east. One side (north of the A4019) entrance not visible due to overgrown vegetation. The entrance south of the A4019 is visible and the entrance is approximately 1.5 m tall, with very little water present. There is a large void (with open entrance) that leads to two culverts. Assumed on a precautionary basis to be High as it may provide hibernation habitat within the joints of the culvert.	High	04/05/2022	Yes (assumed)	No survey	Static survey detectors used between 04/05/2022 and 24/05/2022 on southern culvert entrance only[89]	Not completed	Not completed	No	
BU_1528	A single storey brick bus stop with a dual pitched clay tiled roof with clay roman roof and ridge tiles.	Moderate	12/04/2022	N/A	N/A	dawn 28/04/2022	Not completed	N/A	No	-
BU_20	A single-storey residential property with a composite tile multi pitch roof.	Low *(no internal access)*	30/06/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 17/08/2021	N/A	N/A	Yes	No internal access Access retracted
BU_356	A single-storey timber barn with a dual pitched corrugated asbestos roof.	Moderate	17/07/2019 (internal 13/01/2022)	No	N/A	Dusk 22/07/2019	Dawn 02/07/2021	N/A	Yes	-
BU_357	An open agricultural barn on two of four aspects, with open metal trusses and a corrugated asbestos roof.	Confirmed	22/08/2019 (internal survey on the same date)	No	N/A	Dusk 05/08/2020	Dusk 02/09/2020	No access	No	Access retracted
BU_360	A single-storey brick residential property with a composite multi pitch roof.	High *(no internal access)*	05/09/2019	No typical hibernating sites identified and no roof void	N/A	No access	No access	No access	No	No internal survey Access retracted
BU_362	A two-storey brick residential property with a dual pitched terracotta clay tiled roof.	Moderate *(no internal access)*	24/09/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 15/07/2021	Dusk 30/07/2021	N/A	Yes	No internal survey Access retracted
BU_364	Dutch barn consisting of two duo pitched corrugated asbestos barns attached to each other, open on all sides except southern elevation where partition made of corrugated metal is present. Southern section only open on eastern side.	Confirmed	22/08/2019 (internal survey on the same date)	No	N/A	Dusk 12/09/2019	Dusk 03/08/2020	No access	No	Access retracted
BU_366	A single storey, gable-ended, wooden agricultural outhouse with a corrugated metal roof.	Low *(no internal survey)*	22/08/2019	No	N/A	Dusk 06/08/2020	N/A	N/A	Yes	No internal access

[89] The one static survey that was conducted instead of an emergence survey, due to this survey limitation was not assessed to be able to sufficiently determine it bas were roosting within the culvert, therefore it is assessed that three surveys are still outstanding

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_367	Three storey residential building constructed from red brick with a hipped slate tile roof.	High *(no internal survey)*	24/10/2019	No typical hibernating sites identified however no internal survey carried out	N/A	No access	No access	No access	No	No internal access Access retracted
BU_370	Two storey, gabled-ended storage barn with clay tiled roof. All windows have been boarded from inside and northern elevation appears to have formerly been open and was subsequently bricked up.	Confirmed *(no internal survey)*	24/10/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	No access	No access	No access	No	No internal access Access retracted
BU_376	Brick constructed building with chimney and cross gabled roof laid with double Roman concrete tiles.	Confirmed	17/07/2019 (internal 13/01/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	02/03/2021 25/03/2021	Dusk 17/07/2019	Dawn 30/09/2020	Dusk 23/06/2021	Yes	-
BU_378	Breezeblock lean-to with corrugated asbestos roof sheets attached to BU_356. . South elevation is open to one section of the building. The rest of the building is compartmentalised.	Confirmed	17/07/2019 (internal 13/01/2022)	Yes	12/01/2022 20/02/2022	Dusk 22/07/2019	Dusk 16/09/2020	Dawn 02/07/2021	Yes	-
BU_507	Two-storey semi-detached brick residential property attached to BU_629 with a hipped slate imitation tiled roof. Internally the loft space is open and lined with sarking boarding with direct access between BU_507 and BU_629.	Confirmed	25/09/2020 (internal on 16/02/2022	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	16/02/2022 - 31/03/2022 (last recording was on 03/04/2022 but that goes out of the hibernation season)	Dawn 09/06/2021	Dusk 07/07/2021	Dusk 28/04/2022	Yes	-
BU_54	Two storey brick residential building, with a single storey extension on the northern aspect both with a hipped clay tiled roof. Some tiles were lifted and broken.	Moderate *(no internal access)*	03/02/2021	No typical hibernating sites identified however no internal survey completed	N/A	Required – no access	Required – no access	N/A	No	No internal access Access retracted
BU_565	Breezeblock construction with a pitched roof covered with corrugated asbestos sheets. Rear of building covered by ivy growth.	Low	25/08/2020	No	N/A	Dusk 28/06/2021	N/A	N/A	Yes	
BU_569	Breezeblock open-fronted barn, with steel frame and corrugated metal exterior and corrugated asbestos roof sheets.	Low	25/08/2020	No	N/A	Dusk 11/05/2022	N/A	N/A	Yes	-
BU_573	Single storey insulated chip board annex with flat bitumen felt roof.	Low	25/08/2020	No	N/A	Dusk 12/05/2022	N/A	N/A	Yes	-
BU_577	Single-storey, wooden clad building.	High (on a precautionary basis)	13/05/2022	Unknown	Unknown	Dusk 05/05/2022	No access	No access	No	No internal access
BU_578	Single-storey, wooden clad garage.	High (on a precautionary basis)	13/05/2022	Unknown	Unknown	Dusk 05/05/2022	No access	No access	No	No internal access
BU_595	Semi-detached, gable-ended dual pitched building with double roman clay tile roof.	Low	10/02/2022 (internal survey on the same date)	No typical hibernating sites identified	N/A	Dusk 27/04/2022	N/A	N/A	Yes	-
BU_600	Semi-detached, singularly gable-ended bungalow with a slate pitched roof with gaps under the ridge tiles., At the single gable end there are gaps behind the fascia boards, that are likely to lead to the wall cavity.	Low	22/02/2022 (internal survey on the same date)	No typical hibernating sites identified	N/A	No access	N/A	N/A	No	Access retracted
BU_610	Two-storey semi-detached residential property with a hipped slate imitation roof. Internally the loft space is open and lined with sarking boarding with direct access between BU_611 and BU_610	Confirmed	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	16/02/2022 – 31/03/2022 (last recording was on 06/04/2022 but that goes beyond f the hibernation season)	Dusk 22/06/2021	Dusk 15/07/2021	Dusk 04/08/2021	Yes	-

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_611	Two-storey semi-detached residential property with slate imitation tile roof and some evidence of lifted tiles. The rear, northern elevation has an extension in which there is a confirmed bat roost. Internally the loft space is open and lined with sarking boarding with direct BU_610 and BU_611.	Confirmed	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	16/02/2022 – 31/03/2022 (last recording was on 06/04/2022 but that goes beyond the hibernation season)	Dusk 15/07/2021	Dawn 03/08/2021	Dusk 22/06/2021	Yes	-
BU_614	Brick-built bungalow with a pitched clay pantile roof with eaves on the front and back of the property.	Confirmed	09/03/2022	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 26/04/2022	No access	No access	No	-
BU_629	Semi-detached residential property with a hipped slate imitation tiled roof. On the northern elevation, the rear of the property, there is an extension with an outhouse with two rooms. Internally the loft space is open and lined with sarking boarding.	Moderate	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 09/06/2021	Dusk 07/07/2021	N/A	Yes	-
BU_630	Single-storey brick garage with hipped tiled roof. There are no features that could be used by roosting bats.	Low *(no internal access)*	30/06/2021	No	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_638	Two-storey property with cross-gabled roof with rear mono-pitched two-storey extension both with a clay tiled roof.	Confirmed *(no internal access)*	14/12/2020	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Static 17/01/2021 to 31/03/2021	Dusk 11/05/2021	Dusk 08/07/2021	Dawn 12/08/2021	Yes	-
BU_641	A residential property with a multi pitch, cross gabled concrete tiled roof.	Moderate *(no internal access)*	27/07/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 24/08/2021	Dusk 15/09/2021	N/A	Yes	
BU_641c	A wooden shed with a mono-pitch felt roof and red brick garage with a corrugated metal and felt-lined roof directly adjacent to each other.	Low	27/07/2021	No	N/A	Dusk 24/08/2021	N/A	N/A	Yes	
BU_645	Two storey gable-ended residential property with dual-pitched clay tiled roof	High *(no internal access)*	03/02/2021	No typical hibernating sites identified however no internal survey completed	N/A	No access	No access	No access	No	No internal access Access retracted
BU_646	Single storey garage with dual-pitched clay tiled.	Low *(no internal access)*	14/12/2020	No	N/A	Dusk 26/07/2021	N/A	N/A	Yes	No internal survey
BU_652	Two-storey semi-detached brick building with Tudor style timber present on north elevation with dual-pitched concrete tiled roof.	Low *(no internal access)*	14/12/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 14/06/2021	N/A	N/A	Yes	No internal access
BU_653	Reconstituted concrete brick bungalow with double Roman clay tiled roof. .	Confirmed	27/10/2020 (internal on 13/12/2021)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	13/12/2021 – 02/01/2022 (last recording, despite being collected on 20/01/2022)	Dusk 17/06/2021	Dusk 16/08/2021	Dawn 03/09/2021	Yes	-
BU_654	Residential bungalow with cross-gabled concrete tiled roof with lean-to out building with corrugated roof. Garage with corrugated metal roof.	Low *(no internal access)*	27/10/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 11/05/2022	N/A	N/A	Yes	No internal access
BU_659	Single-storey, breezeblock construction open at the front with mono pitched corrugated metal sheeting roof	Low	25/08/2020 (internal completed 09/03/2022)	No	N/A	Dusk 19/07/2021	N/A	N/A	Yes	-
BU_660	Two storey detached brick property with Tudor style timber beams with a dual-pitched clay tiled roof	High	14/12/2020	No	N/A	Dusk 18/05/2021	Dusk 28/07/2021	Dawn 12/8/2021	Yes	No internal survey
BU_661	Gable-ended outdoor workshop to the east of the main house with dual-pitched clay tiled roof.	Confirmed	14/12/2020	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Not completed	Dusk 01/07/2021	Dusk 13/09/2021	No access	No	No internal survey
BU_662	Single storey brick, stable block style outbuilding with gable-ended clay tile roof which is split between LP5 and GR184011.	Moderate *(no internal access)*	27/10/2020	No typical hibernating sites identified	N/A	Dusk 31/08/2021	Dusk 31/08/2021	N/A	Yes	
BU_663	Open-fronted barn with corrugated metal sides and back corrugated cement asbestos sheeting roof. Extensive ivy growth internally and externally, partly	Low	25/08/2020 (internal completed on 09/03/2022)	No	N/A	Dusk 12/05/2022	N/A	N/A	Yes	-

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
	also covers the rear of BU_565. Large hole in rear metal wall backing onto BU_565.									
BU_667	Single storey, gable-ended building with dual-pitched double Roman interlocking clay tiled roof Extensive growth of ivy and staghorn sumac. This building is only accessible internally by BU_718 via the single open archway	Moderate	25/08/2020 (internal completed 09/03/2022)	No typical hibernating sites identified	N/A	Dusk 05/05/2022	Not completed	N/A	No	
BU_668	Single storey brick open outhouse with tiled roof. Property is predominantly covered in ivy and has a single open door .	Confirmed	09/03/2022	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 10/05/2022	No access	No access	No	
BU_694	Two-storey semi-detached residential property with hipped slate imitation tiled roof Extension outhouse with clay tiled roof on the northern, rear, elevation with two buildings including an external toilet.	Confirmed	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	16/02/2022 – 31/03/2022 (last recording was on 04/04/2022 but that goes out of the hibernation season)	Dusk 24/06/2021	Dusk 17/08/2021	Dusk 26/07/2022	Yes	-
BU_701	Brick gable-ended summer house with dual-pitched clay and slate tiled roof,	High	14/12/2020 (internal survey on the same date)	No typical hibernating sites identified	N/A	Dusk 17/05/2021	Dusk 26/07/2021	Dawn 13/08/2021	Yes	-
BU_705	Recently converted two-storey brick gable-ended barn with dual pitched slate tiled roof	Confirmed	27/10/2020 (no internal assessment necessary as landowner confirmed no loft space available due to vaulted ceiling)	No typical hibernating sites identified and no roof space	N/A	Dusk 16/06/2021	Dusk 07/09/2021	No survey completed however adjacent survey recorded roost. Was Dawn 13/8/2021	No	-
BU_709	Small breezeblock building with a flat bitumen felt roof.	Confirmed	27/10/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified	16/02/2022 to 31/03/2022 (last recording on 05/04/2022 but that is out of the hibernation season)	Dusk 24/06/2021	Dawn 09/07/2021	Dusk 17/08/2022	Yes	
BU_711	Gable-ended reconstituted stone brick residential bungalow with a double Roman interlocking concrete tiled roof.	Low *(no internal access)*	03/12/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 15/06/2021	N/A	N/A	Yes	No internal access
BU_716	Gable-ended end-of-terrace residential property with clay tiled roof. Internally the loft space is open felt lined	Low	02/02/2022	No typical hibernating sites identified	N/A	No access	N/A	N/A	No	Access retracted
BU_718	Breezeblock and brick stable-like construction with timber frame and mono-pitched cement asbestos sheet roof. . Northern corner and part of back covered by dense ivy. Direct access between BU_667 and BU_718.	Low	25/08/2020 (internal completed 09/03/2022)	No	N/A	Dawn 19/08/2021	N/A	N/A	No	Unable to survey fully due to active wasps' nest.
BU_722	Gable-ended two storey semi-detached brick residential building with a clay tiled roof. A single storey extension with a steep mono-pitched roof present on the northern rear elevation,	Low *(no internal access)*	28/10/2020	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 14/06/2021	N/A	N/A	Yes	No internal access
BU_723	Two gable-ended open barns directly adjacent forming a single large open barn with dual-pitched corrugated asbestos sheet roof .	Confirmed	28/07/2021	No	N/A	Dusk 23/08/2021	Dawn 01/09/2021	Dusk 16/09/2021	Yes	
BU_728	Cross gabled red brick bungalow. with 3 gable ends to the south, east and west. The roof comprises concrete tiles.	Low *(no internal access)*	03/02/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 10/05/2021	N/A	N/A	Yes	-
BU_732	Single storey brick garage with dual-pitched gable ended clay tiled roof.	Low *(no internal access)*	03/02/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 01/07/2021	N/A	N/A	Yes	No internal access

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_735	Two storey, semi-detached, cross-gabled building with clay tiled roof turning into a single-storey extension with catslide roof. Half of the building is located in a different land parcel.	Confirmed	27/10/2020	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 11/05/2021	Dusk 26/07/2021	Dawn 20/09/2021	No	Access retracted
BU_736	Gable-ended timber workshop of shiplap cladding with dual-pitched corrugated metal roof. Both gable ends are covered in thick ivy.	Low	03/02/2021	No	N/A	Dusk 12/07/2021	N/A	N/A	Yes	See sections 2.3 for full details
BU_737	Multi-extended two storey residential building with main cross gabled roof with gable ends to the northern, southern, eastern, and western aspects.	Confirmed *(no internal access)*	03/02/2021	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 12/07/2021	Dawn 19/08/2021	Dusk 09/09/2021	No	No internal access
BU_747	Timber framed shed with, flat corrugated asbestos sheet roof and walls with one partially brick wall	Confirmed	18/07/2019 (internal survey on the same date)	No	N/A	Dusk 05/09/2019	Required – no access	Required – no access	No	Access retracted
BU_750	Large shed with corrugated asbestos cladding to the top part of the side elevation and breeze block walls below. The roof consists of asbestos sheeting. Ivy cover is present on northern gable end.	Low *(no internal access)*	18/07/2019	No	N/A	Dusk 25/06/2019	N/A	N/A	Yes	No internal access Access retracted
BU_751	Red brick building with two storeys and pitched roof with gable ends; separate loft space; flat, plain clay tiles with clay ridge; gable end has timber cladding in old window opening (South). No bargeboards present. Tiles directly on top of wall plate; battens visible at Northern gable end; lead flashing on Southern gable end.	Confirmed *(no internal access)*	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 29/07/2019	Dusk 09/09/2020	No access	No	No internal access Access retracted
BU_752	Single-storey gable-ended brick outbuilding with internal breeze block walls The roof is dual--pitched and clay tiled.	Confirmed	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 19/08/2019	Dusk 24/09/2020	No access	No	Access retracted
BU_752a	Breezeblock lean-to attached to north west elevation with corrugated asbestos roof and metal doors (no internal access).	Low *(no internal access)*	22/08/2019	No	N/A	Dusk 19/08/2019	Dusk 24/09/2020	N/A	Yes	No internal access Access retracted
BU_753	Converted single-dwelling brick mill house. with clay and interlocking concrete tiled roof Two lean-to extensions present on northern elevation. Wood store/shed attached to south western gable end with corrugated cement asbestos roof.	Confirmed *(No internal access)*	05/09/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Completed	Dusk 11/09/2019	Dusk 27/07/2020	No access	No	No internal access Access retracted
BU_755	Dilapidated, wooden structure with corrugated metal roof. Open on two sides. Overgrown with ivy and elder. Old beams with tenon and mortis joints.	Moderate *(no internal access)*	22/08/2019	No	N/A	Dusk 05/08/2020	Dusk 29/09/2020	N/A	Yes	No internal access
BU_757	Red brick barn with cross-gabled clay tiled and corrugated metal roof.	Confirmed	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 05/09/2019	Dusk 29/09/2020	No access	No	No access Access retracted
BU_758	Open-fronted, breezeblock Dutch style barn with corrugated metal sides and roof.	Low	18/07/2019 (internal survey on the same date)	No	N/A	No access	N/A	N/A	No	No access Access retracted
BU_761	Open-fronted, breezeblock Dutch style barn corrugated asbestos sheet roof	Confirmed	18/07/2019	No	N/A	Dusk 29/09/2020	No access	No access	No	No access Access retracted
BU_762	Barn-converted brick residential building with car port with dual-pitched clay tiled roof.	Confirmed	22/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dawn 06/09/2021	Dusk 17/09/2020	No access	No	Access retracted
BU_763	Gable-ended brick barn with dual-pitched clay tiled roof.	Confirmed	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 19/08/2019	Dusk 09/09/2020	No access	No	Limited internal access Access retracted
BU_765	Large breezeblock shed/barn with corrugated metal cladding and corrugated metal roof	Confirmed	18/07/2019	No	N/A	Dawn 20/08/2019	Dusk 15/09/2020	No access	No	No access Access retracted

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_766	Timber framed lean-to with corrugated metal roof.	Confirmed	18/07/2019 (internal survey on the same date)	No	N/A	Dusk 05/09/2019	No access	No access	No	No access Access retracted
BU_768	-	Low *(no internal access)*	22/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_768a	Concrete garage with asbestos and metal sheeted roof.	Low	22/08/2019	No	N/A	No access	N/A	N/A	No	Access retracted
BU_770	L-shape timber stables of shiplap cladding with a corrugated asbestos roof. Stables partially open where half doors (stable doors) are present.	Low *(no internal access)*	05/09/2019	No	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_771	Large open-fronted timber barn with corrugated asbestos roof and sides.	Confirmed *(no internal access)*	22/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dawn 29/08/2019	Dusk 14/09/2020	No access	No	No internal access Access retracted
BU_772	-	Low	22/08/2019 (internal survey on the same date)	No	N/A	Dusk 05/08/2020	N/A	N/A	Yes	
BU_797	Single storey garage with a smooth surfaced garage door indicating no ability for bats to grip onto or land on.	Moderate	04/05/2022	No typical hibernating sites identified	N/A	Not completed	Not completed	N/A	No	No internal access
BU_800	Single storey gable-ended bungalow with smooth, rendered exterior walls.	Low *(no internal access)*	04/05/2022	No typical hibernating sites identified	N/A	Not completed	N/A	N/A	No	No internal access
BU_803	Two-storey semi-detached brick residential property with a hipped flat slate imitation tiled roof,	Moderate	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 09/06/2021	Dawn 15/07/2021	N/A	Yes	No internal access
BU_819	Two-storey semi-detached residential property with a hipped slate imitation tiled roof. Extension at the northern elevation. Internally the loft space is open and lined with sarking boarding. This property is attached to BU_45. However, there is no direct access point between BU_45 and BU_819.	Confirmed	25/09/2020 (internal Survey 16/02/2022)	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access at the right time of year	Dusk 08/07/2021	Dawn 22/07/2021	Dusk 09/08/2021	No	-
BU_824	Two-storey structure comprising a pub and residential property with a multi-pitched slate tiled roof. On the southern aspect there is a wooden lean-to with cladding. A conservatory style extension to the south with a flat roof likely plastic.	Moderate *(no internal access)*	01/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 08/07/2021	Dawn 27/08/2021	N/A	Yes	No internal access
BU_826	Brick and corrugated asbestos barn, with large wooden double doors at front (NE). Ivy covering the exterior.	Low *(no internal access)*	21/08/2019	No	N/A	Dusk 22/07/2020	N/A	N/A	Yes	No internal access Access retracted
BU_827	Two storey gable-ended residential building with dual-pitched flat concrete and clay tiled roof There is a single-storey conservatory with pitched concrete and clay tiled roof	Low *(no internal access)*	24/09/2019	No	N/A	Dawn 13/09/2019	N/A	N/A	Yes	No internal access Access retracted
BU_834	Brick gable-ended barn with dual-pitched double roman clay tiled roof	Confirmed	17/07/2019 (internal 13/01/2022)	No	N/A	Dusk 22/07/2019	Dusk 16/09/2020	Dawn 02/07/2021	Yes	
BU_839	Single storey brick double garage (same as BU_376) with dual-pitched double roman concrete tiled roof	Low	17/07/2019 (internal 13/01/2022)	No typical hibernating sites identified	N/A	Dusk 23/07/2019	N/A	N/A	Yes	-
BU_841	Wooden cladded shed with wooden roof tiles.	Moderate *(no internal access)*	01/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 23/06/2021	Dusk 15/07/2021	N/A	Yes	No internal access
BU_850	Three storey residential building with multiple extensions. The main house is cross-gabled with clay tiled roof. The northern elevation has a two-storey extension with gabled roof and church style windows with stone surrounds. The eastern elevation has a two-storey extension with dormer window. There is single	Confirmed *(no internal access)*	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 05/09/2019	No access	No access	No	No internal access Access retracted

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
	storey extension containing garages which is listed as a separate building (BU_855).;									
BU_853	Single storey open-ended brick barn with timber-cladded gable end. The roof is clay tiled with an open roof void ;	Confirmed	18/07/2019	No	N/A	Dusk 27/06/2019	Dusk 29/07/2019	No access	No	Access retracted
BU_854	Large gable-ended brick hay barn with cross-gabled roof laid with corrugated metal sheeting., The barn is open at both the east and west facing gable ends Internally traditional lath and plaster is present below the metal sheeting. A lean-to used for storage is attached on the northern side.	Confirmed *(limited internal access)*	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 24/06/2019	Dawn 30/07/2019	Dusk 26/05/2021	No	Limited internal access Access retracted
BU_855	Series of brick garages attached to BU_850 and BU_757 with dual- pitched clay tiled roof Internally the roof void is partially open. Middle garage has chipboard ceiling and breeze block wall; corrugated metal sliding doors.	Confirmed	18/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 05/09/2019	Dusk 27/05/2021	No access	No	Access retracted
BU_857	Large breezeblock shed/barn with corrugated metal cladding and corrugated metal roof divided into two sections; internally the roof is supported by timber beams.	Confirmed	18/07/2019	No	N/A	Dawn 20/08/2019	Dusk 15/09/2020	No access	No	No access Access retracted
BU_858	Large steel framed breezeblock Dutch style barn covered with corrugated cement asbestos roof; side elevations are partially cladded with corrugated metal sheeting.	Low *(no internal access)*	18/07/2019	No	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_859	Breezeblock stable block mono-pitched corrugated asbestos roof.	Low *(no internal access)*	18/07/2019	No	N/A	No access	N/A	N/A	No	No internal access Access retracted
BU_862	Cross-gabled residential building with clay tiled roof Conservatory present on northern elevation.	Confirmed *(no internal access)*	21/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Completed	Dusk 20/07/2020	Dusk 21/09/2020	Dusk 02/08/2021	Yes	No internal survey Access retracted
BU_862a	Garage with wooden front door and concrete roof tiles Plastic cladding at the front gable end.	Low *(no internal access)*	21/08/2019	No	N/A	Dusk 22/07/2020	N/A	N/A	Yes	No internal access Access retracted
BU_890	Brick bungalow of modern construction (2012) with multi-pitched composite concrete tiled roof. Conservatory to the rear of the property with a plastic uPVC and glass pitched roof. Internally the loft space is not open as it is being used for storage.	Low	30/06/2021 / 22/02/2022 (internal)	No typical hibernating sites identified	N/A	Dusk 12/08/2021	N/A	N/A	Yes	-
BU_893	Bungalow with a main pitched slated tiled roof, with small dormer roof sections coming off.	Low	02/02/2022	No typical hibernating sites identified	N/A	Dusk 04/05/2022	N/A	N/A	Yes	-
BU_909	Bungalow with a multi-pitched hipped composite tiled roof.	Low *(no internal access)*	30/06/2021	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 02/08/2021	N/A	N/A	Yes	No internal access
BU_926	Garage with clay tiled roof with many access points, including at the gable walls.	Low	22/02/2022 (internal survey on the same date)	Low	N/A	No access	N/A	N/A	No	No access
BU_963	Two storey brick residential building with cross gabled roof laid with simple, flat concrete tiles.	Confirmed *(no internal survey)*	01/08/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 03/07/2019	Dawn 21/08/2019	Dusk 07/07/2021	No	Partial access
BU_964	Two storey brick residential building with slate imitation tiled roof, gable fronted porch and two gable dormers on the northern aspect.	Low *(no internal access)*	03/12/2020	No typical hibernating sites identified however no internal survey completed	Completed (by landowner placing static in the loft due to internal access) not required	Not completed	N/A	N/A	No	No Internal access Access retracted
BU_965	Two storey residential building with a hipped slate tiled roof. A cross gabled extension is present to the south of the main house. Conservatory in south-eastern corner of house.	Confirmed *(no internal access)*	31/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	Completed	Dusk 07/09/2020	Dusk 26/07/2021	Not completed	No	No internal access Access retracted

Feature	Brief description of structure	PBRA Results	PRA Survey Date	Hibernation suitability	Hibernation Survey	Roost Survey 1	Roost Survey 2	Roost Survey 3	Surveys complete	Access Limitations (Any further limitations are detailed in the section below)
BU_966	Residential building with two newer extensions. Main building has a hipped pitched slate tiled roof Concrete block modern single storey extension on the southern elevation, with asbestos slates.	Moderate *(no internal access)*	24/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dusk 28/09/2020	No access	N/A	No	No internal access Access retracted
BU_968	Two breezeblock and brick shed, one with a corrugated metal pitched roof and one with a corrugated asbestos pitched roof.	Moderate *(no internal access)*	01/08/2019	No typical hibernating sites identified however no internal survey completed	N/A	Dawn 29/09/2021	Dawn 18/05/2022	N/A	Yes	No internal access Access retracted
BU_969	Single story garage with a pitched double roman concrete tiled roof lined with bitumen felt and timber-cladded gable end. The loft space is open.	Low	24/07/2019 (internal 13/12/2021)	No	N/A	Dawn 03/09/2020	N/A	N/A	Yes	
BU_969a	Small timber garden shed with bitumen felt tiled roof.	Low *(no internal access assessed necessary)*	24/07/2019	No	N/A	Dawn 03/09/2020	N/A	N/A	Yes	
BU_970	Two storey brick residential building with cross-hipped flat slate tiled roof.	Low *(no internal access)*	24/07/2019	No	N/A	Dawn 07/08/2019	N/A	N/A	Yes	No internal access Access retracted
BU_971	Concrete pebble dash building with slightly pitched corrugated metal roof with felt at the gable ends.	Moderate *(no internal access)*	01/08/2019	No typical hibernating sites identified however no accessible roof void	N/A	Dawn 23/09/2021	Dusk 04/05/2022	N/A	Yes	No internal access
BU_972	Breeze block and intermittent brick structure with corrugated asbestos roof. Cladding on eastern aspect.	Confirmed *(no internal access)*	01/08/2019	No typical hibernating sites identified due to the outbuilding nature of the structure	N/A	Dusk 06/09/2021	Dusk 29/09/2021	Dusk 10/05/2022	Yes	No internal access
BU_978	Gable ended wooden workshop. with wooden bargeboard and bitumen felt roof.	Low *(no internal access)*	03/12/2020	No	N/A	No access	N/A	N/A	No	Access retracted
BU_981	Residential property with a cross gabled clay tiled roof Wooden cladding on front gable end and porch roof.	Confirmed *(no internal access)*	03/12/2020	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	19/01/2021 – 25/03/2021	Dusk 15/06/2021	Dusk 08/07/2021	No access	No	No internal survey Access retracted
BU_982	Multi-pitched residential building with hipped clay tiled roof and large brick extension at the rear of the house.	Low	24/07/2019 (internal 13/12/2021)	No typical hibernating sites identified however roof void inaccessible	N/A	Dusk 20/08/2020	N/A	N/A	Yes	.
BU_983	Two-storey house with single storey extension with a hipped flat clay tiled roof. Two dormers on the front, north face, of the house have shiplap timber cladding to the sides.	Moderate *(no internal access)*	31/07/2019	No typical hibernating sites identified however no internal survey completed	N/A	no access	no access	N/A	No	No internal access Access retracted
BU_985	Garage constructed from concrete panels with corrugated asbestos sheets as roof covering and timber bargeboard. Gaps under asbestos mostly filled.	Low *(no internal survey)*	31/07/2019	No	N/A	Dusk 16/06/2021	N/A	N/A	Yes	.
BU_987	Two-storey multi-pitched residential building with several extensions. Main house has a gabled hipped roof. Entire eastern aspect is a new extension.	Confirmed *(no internal survey)*	24/07/2019	No typical hibernating sites identified however as bats have been confirmed to roost, hibernation is considered possible	No access	Dusk 01/09/2020	Dusk 31/08/2021	No access	No	No internal access Access retracted
BU_988	Two-storey brick detached house with a cross gabled concrete double Roman tiled roof with an additional parallel gable ended roof.	Moderate *(no internal survey)*	21/08/2019	No typical hibernating sites identified however no internal survey completed	Completed – not required	Dusk 03/09/2020	Dawn 14/05/2021	N/A	Yes	No internal access Access retracted
BU_988a	Brick and breezeblock garage with a corrugated asbestos roof	Moderate	21/08/2019 (internal access on the dame date)	No	N/A	Dawn 11/06/2021	Dusk 28/06/2021	N/A	Yes	Access retracted
BU_990	Small, single storey traditional barn that is in-use. Timber framed barn with timber cladding. Clay double roman tiles on a dual pitched roof.	Confirmed *(no internal survey)*	31/07/2019	No	N/A	Dusk 24/07/2019	Dawn 13/08/2019	Dusk 29/07/2020	Yes	No internal access Access retracted
BU_992	Brick farmhouse with cross-gabled clay tiled roof	Confirmed *(no internal survey)*	31/07/2019	No typical hibernating sites identified and no roof void (based on the asbestos report) to be able to complete a survey	N/A	Dusk 31/07/2019	Dusk 12/08/2019	Dusk 14/07/2020	Yes	No internal access Access retracted
BU_995	Two storey detached house with multi pitched concrete tiled roof and back extension. Attic has been converted.	Low *(no internal access)*	14/12/2020	No, skylight and likely small roof void, if at all (however no internal access)	N/A	Dusk 27/09/2021	N/A	N/A	Yes	No internal access

A.2. Structure Survey Limitations - PBRA

Structure	What the Limitation Was	How Significant was the Limitation?
BU_1012	No view of the roof tiles from south or west elevations.	This was not considered to be significant limitation as the bat emergence survey completed at this location would have allowed for evidence of roosting bats to be identified.
BU_1012 and BU_600	The loft was only a crawl space (BU_1012) and the loft was full of storage (BU_600), and the surveyors were unable to see clearly inside the entirety of the loft spaces.	On this basis a precautionary approach was adopted with the structures' roost assessments (i.e. they were considered to have higher bat roost suitability than may have otherwise been assigned) and this was therefore not considered to be a significant limitation.
BU_1025, BU_1025a, BU_1033a, BU_1033c, BU_1036, BU_1039, BU_1041b, BU_1043, BU_573a, BU_641, BU_641b, BU_661, BU_667, BU_669, BU_709, BU_718, BU_723, BU_736, BU_755, BU_762, BU_768, BU_768a, BU_772, BU_862a, BU_965e, BU_969a, BU_971a, BU_973, BU_985, BU_987a-d, BU_988, BU_988a-b and BU_893	No access to at least one elevation of these structures was possible during the survey due to dense vegetation.	This was not considered to be a significant limitation as the dense vegetation at these locations would have made roosting almost certainly impossible at these locations.
BU_1027	A loose dog was present and no resident, therefore an assessment of this structure was made from the gate only due to health and safety concerns.	On this basis, a precautionary approach was adopted for the structure's roost assessment, and this was therefore not considered to be a significant limitation.
BU_1098 and BU_1527	No access to one side of these culverts was possible (east for BU_1098 and north for BU_1527) due to health and safety concerns at BU_1098 and dense vegetation at BU_1527	This was not considered to be a significant limitation as the roost assessment and roost characterisation took account of this limitation, by ascribing these culverts the highest suitability value to bats without the full survey information (i.e. assuming they contain bat roosts of high conservation value).
BU_1098, BU_1522, BU_1526 and BU_1527	These are all confined spaces and were not entered for health and safety reasons, so no internal inspections were undertaken. The internal inspections relied on an inspection report that was provided by the client.	This was considered not to be a significant limitation as this was considered within the roost characterisations (by assigning the highest value for these culverts).
BU_667 and BU_668	The internal spaces of these structures were very cluttered, and there was the possibility that some bat evidence may have been missed.	This was not considered to be significant limitation as emergence surveys and DNA testing allowed sufficient roost characterisation to be undertaken, and also assumptions based on incomplete survey data have been accounted for separately.
BU_797	No access to the exterior at the rear of the building was provided (despite access being agreed, the landowner was not present).	This was considered within the assessment of the structure's bat roost suitability (a higher bat roosting suitability was assumed than may have otherwise been selected) and so this was not considered to be a significant limitation.
BU_969, BU_970 and BU_982	During the PBRA assessment, glare from the sun made observing these structures difficult.	However, as this was followed up with emergence surveys, this was not considered to be a significant limitation.
BU_982	Due to the location of the loft hatch over the top of the stairs, an internal inspection of the loft was not possible.	On this basis a precautionary approach was adopted with the structure's roost assessment (being assigned higher than may have otherwise been selected), and therefore this was not considered to be a significant limitation.

A.3. Structure Survey Limitations – Emergence/re-entry Survey

Structure	What the Limitation Was	How Significant was the Limitation?
BU_1098 and BU_1527	Standard bat emergence surveys were not possible for these culverts due to the dense vegetation around the culvert entrances, and due to water with deep silt concentrations (BU_1098), and due to being located directly next to a dual carriageway (BU_1527), which meant it was unsafe for surveyors to access these locations at night.	The emergence / re-entry surveys of these culverts were replaced with a static bat detectors placed in one of the culvert entrances (no detectors were placed on the eastern culvert entrances of BU_1098 and the north entrances of BU_1527, as access was not possible). These were left for a period of two weeks and then the data on the static bat detectors in each entrance was reviewed. On this basis this survey method was not considered to be a significant limitation.
BU_11, BU_1002, BU_1011, BU_1034a, BU_1039, BU_1044, BU_1514, BU_1522, BU_1528, BU_565, BU_569, BU_573, BU_577, BU_578, BU_595, BU_654, BU_668, BU_968 and BU_970	Surveys at these structures included surveys in April 2022, which is the month before the recommended bat survey season (May to September), based on the BCT Guidelines.	However, weather conditions were deemed to be suitable (as per the BCT Guidelines), so this was not considered to be a significant limitation.

Structure	What the Limitation Was	How Significant was the Limitation?
BU_1005, BU_1007, BU_1008, BU_1033, BU_1046, BU_1047, BU_641, BU_652, BU_660, BU_663, BU_728, BU_732, BU_736, BU_803, BU_966, BU_573, BU_661, BU_701, BU_723, BU_736, BU_755 and BU_762	No access to at least one elevation on each of these structures during the emergence surveys was possible, due to property boundaries.	Surveyors positioned themselves so that they would have the best view possible, and surveys were completed of the adjacent properties, therefore this was not considered to be a significant limitation.
BU_668, BU_709 and BU_755	At least one elevation was obscured by vegetation.	This was not considered to be a significant limitation by the surveyors, as it reduces the potential to be used by bats (due to difficulties with dropping out of and accessing roost locations).
BU_1033, BU_694, BU_966 and BU_985	There was light rain on these surveys.	This was not considered to be a significant limitation as bats were recorded throughout the surveys suggesting this did not lead to a drop in bat activity.
BU_752 and BU_660	On one survey for each of these structures there was moderate rain. Bat passes were recorded, but no foraging activity, as there had been on the previous survey / as had been expected.	This was not considered to be a limitation as three surveys were proposed for each of these structures, and it was considered that a significant bat roost is unlikely to have gone undetected during these three surveys.
BU_660, BU_701 and BU_752a	At BU_660 the survey on the 18/06/2021 was called off at 22:15, 83 minutes after sunset, due to heavy rainfall. Although the survey was scheduled to continue for 120 minutes after sunset, the minimum survey effort recommended in the BCT Guidelines is for 90 minutes after sunset. At BU_701 the survey on the 13/08/2021 finished four minutes early (116 minutes after sunset) due to rain and at BU_752a the survey finished 30 minutes early (90 minutes after sunset) also due to rain.	For BU_660 and BU_701, the survey was only a few minutes short, so it was not considered necessary to repeat it. As another two full length surveys were completed at these structures, it was considered unlikely that the loss of a few minutes from one survey would result in a roost being unrecorded. Therefore, this was not considered to be a significant limitation. At BU_752a, a low potential building, an additional survey was undertaken. Therefore, this is not considered to be a significant limitation.
BU_1033, BU_1477, BU_362, BU_641c, BU_824, BU_890 and BU_971	Very bright lights made it difficult to see bats when they switched on.	This was not considered to be a significant limitation as it was considered that bats were unlikely to be roosting in these well-lit locations, therefore no roost is likely to have gone undetected
BU_1477, BU_654 and BU_736	For BU_1477, the infrared lamps stopped working at 21:31 which meant the camera finished recorded at this point (35 minutes at the end of the survey with no camera recording). For BU_654, the battery on the infrared camera at the back of the property discharged at 22:22 and the battery on the infra-red camera at the front of property discharged at 22:44. Additionally, at BU_736 on the 12/07/2021 at 22:30, the camera stopped recording due to the memory card being full.	In all these cases, this was not considered to be a significant limitation as the surveyors were still able to view the structures.
BU_356	Only two surveyors watched this structure for a dawn survey on the 02/07/2021.	This was not considered to be a significant limitation as surveyors back tracked continually along the perimeter of the structure to identify any swarming activity, which was deemed to be effective.
BU_573 and BU_663	Both structures were surveyed on the 12/05/2022. At the start and end of the survey the wind speed was deemed suitable (BCT Guidelines), but for a very short period the wind was deemed to be a 5 on the Beaufort scale.	This was not considered to be a significant limitation as bats were still recorded during and after this period, therefore, it is unlikely to have affected bat activity significantly.
BU_1044	One survey was late starting by less than ten minutes on the 09/05/2022 due to issues with gaining access.	As the survey still began before dusk, and most bats will not emerge until afterwards, this was not considered to be a significant limitation.
BU_966	One surveyor started the survey 10 minutes late, due to traffic issues.	They were in place before any bat activity was recorded by the other surveyors and before dusk (before which, bats do not usually emerge), therefore this was not considered to be a significant limitation.
BU_988	The temperature for the dawn survey on the 14/06/2021 was 9 ^{0}C at dawn, which is one degree lower than optimal temperatures.	As bat activity was recorded during the survey, and considering that two emergence / re-entry surveys were conducted on this structure, it was not considered to be a significant limitation.

A.4. Confirmed Bat Roost Assessment

Table 4-4 – Survey Results BU_1030

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2021	PBRA (external only)	BU_1030	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection: Missing tile on eastern aspect of southern elevation. Gaps under southern bargeboard. Broken tile on the southern aspect to west of pitched roof end. No bat evidence recorded.				
Hibernation survey. Not completed				
28/08/2020	19:49 to 21:34 (sunset = 20:04)	BU_1030	Batlogger, EMT 2 x 2, Scout	Air temp: 14.3 down to 12.7 (˚C), no rain, cloud cover 8, wind speed 2/ 3
Comments:				
Roost survey results: Noctules commuting/foraging overhead, single passes from common pipistrelle, *Myotis* and long-eared bat. Two common pipistrelle bats emerged from apex and flew south at 20:30 and 20:36 (26 and 32 minutes after sunset).				
13/09/2021	19:12 to 20:57 (sunset = 19:27)	BU_1030	EMT 2 x 4	Air temp: 18 down to 17 (˚C), no rain, cloud cover 7/6, wind speed 1
Comments:				
Roost survey results: Surveyors on the south side of the house saw one unknown species (not echolocating) emerge from the soffit gap at the back of the building (19:50).				
Survey 3 – No access				
Photos/ diagrams: 				
Roost Characterisation: Com with limitations)				

Table 4-5 – Survey Results BU_1034

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
01/08/2019	PBRA (external only)	BU_1034	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: No gaps present under the eaves of the porch for access. Gaps between bricks in walls by middle door. The southern chimney has some lifted tiles below in the eastern aspect. Evidence of some lifted or broken tiles across the roof. No evidence of bats recorded.				
Access refused for hibernation survey				
13/08/2019	20:22 to 22:07 (sunset = 20:37)	BU_1034	Batlogger and EMT 2 x 3	Air temp: 16.5 down to 14 (˚C), no rain, cloud cover 8, wind speed 0
Comments:				
Roost survey results: Two common pipistrelle emergences from south-east corner of the house and from east side under the board (20:44). FAIRLY CONSTANT FORAGING BY PIP45 AND PIP55. ALSO PASSES BY MYOTIS AND NOCTULE				
09/09/2021	05:03 to 06:48 (sunrise = 06:33)	BU_1034	EMT 2 x 4 and IR Canon XA15 and 2x Eerel 140 LED IR lamps	Air temp: 17 (˚C), no rain, cloud cover 4, wind speed 0
Comments:				
Roost survey results: Three soprano pipistrelle bats swarming near to the wall and roof tiles at 05:52. One individual noted to clearly be ‘landing’ on roof tiles one by one as if testing them for roost potential. All three bats spend at least ten minutes behaviour as if they are about to return to roost on a feature somewhere on the southern end of the building. Eventually at 06:07 one flew towards where the surveyor was positioned and two other flew north-east up the driveway. No return to roost identified. Additionally, two common pipistrelle bats (and later three more, totalling five) showed swarming behaviour around the southern gable end. At 06:06 they all flew off, not roosting.				
21/09/2021	19:04 to 21:10 (sunset = 19:10)	BU_1034	EMT 3 x 3, 2 x Walkabout 4 and Canon XA11 x1 (#2) (technical issue with IR light meant camera had to be used without additional IR lighting)	Air temp: 17 (˚C), no rain, cloud cover 4, wind speed 0
Comments:				
Roost survey results: One common pipistrelle bat at 19:52 landing and returning for about three minutes, displaying roosting behaviour; however, like last survey they didn’t appear to return to the roost or emerge. Additionally, at 19:51 three common pipistrelle bats were swarming the southern end of the building. No emergence recorded.				
Photos/ diagrams: 				
Roost Characterisation: Common pipistrelle – day / mating roost; and Soprano pipistrelle – mating roost				

Table 4-6 – Survey Results BU_1039

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
01/08/2019	PBRA (external only)	BU_1039	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: Three interconnected sheds. Gap behind the fascia. Two large timber doors on the eastern aspect with gaps around them. No evidence of bats.				
Access refused for hibernation survey				
10/09/2021	05:04 to 06:49 (sunrise = 06:34)	BU_1039	EMT 2 x 3 and one IR Canon XA15 and 2x Eerel 140 LED IR lamps	Air temp: 19 down to 18 (˚C), rain 1/0, cloud cover 8, wind speed 0
Comments:				
Roost survey results: Frequent passes by common pipistrelle with occasion or infrequent passes by soprano, brown long-eared and noctule. Single pass by *Myotis* recorded. No emergences recorded.				
21/09/2021	18:50 to 21:05 (sunset = 19:05)	BU_1039	Walkabout x 4 and one IR camera (Canon XA11) and IR lamp (technical issue with IR lamp, meant that camera had to be used without additional IR lighting from 20:00. Camera has in-built IR.)	Air temp: 16 to 13 (˚C), no rain, cloud cover 0, wind speed 0
Comments:				
Roost survey results: Possible emergence from south west gable of a non-echolocating bat seen at 19:27. However, building thoroughly observed at end of survey with no obvious potential roosting features.				
10/05/2022	20:32 to 22:47 (sunset = 20:47)	BU_1039	Walkabout x 4	Air temp: 13 to 12 (˚C), no rain, cloud cover 8, wind speed 0
Comments:				
Roost survey results: No emergences.				
Photos/ diagrams:  				
Roost Characterisation: Common pipistrelle – day roost				

Table 4-7 – Survey Results BU_1042

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019	PBRA (external only)	BU_1042	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: Gaps where dormers meet main roof in valley. Hole in apex on western gable end. Access to soffit box on the southern aspect of the house. No evidence of bats.				
DNA: no droppings collected				
Hibernation survey – not completed				
18/08/2020	20:25 to 21:55 (sunset = 20:25)	BU_1042	Batlogger x 2, Anabat Scout, EMT 2	Air temp: 21 (˚C), rain 0/1, cloud cover 6/8, wind speed 2
Comments: Limitations: None				
Roost survey results: Single soprano pipistrelle emerged at 20:38 from under ridge tile of western gable end, then flew west.				
22/07/2021	03:15 to 05:30 (sunrise = 05:15)	BU_1042	EMT 2 x 2	Air temp: 18 down to 17 (˚C), no rain, cloud cover 0/1, wind speed 0
Comments: , Limitations: None				
Roost survey results: No roosting observed.				
Survey 3 – not completed				
Photos/ diagrams: 				
Roost characterisation: Soprano pipistrelle – day roost				

Table 4-8 – Survey Results BU_370

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
24/10/2019	PBRA (external only)	BU_370	N/A	No rain, cloud cover 5, wind speed 0, sunny spells, cool
Comments:				
Visual inspection Several timber doors and windows present on western elevation. During the PBRA the tenant made an un-verified comment about seeing a bat leave the structure. No evidence of bats was recorded by the surveyors.				
Access refused for hibernation survey				
Survey 3 – access refused				
Survey 3 – access refused				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Bat – unknown roost (assumed, with limitations)				

Table 4-9 – Survey Results BU_376

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
17/07/2019 / 12/01/2022	PBRA 17/07/2019 (external only) and 12/01/2022 (internal survey)	BU_376	N/A	17/07/2019: Air temp: 23 (˚C), no rain, cloud cover 7, wind speed 1. 12/01/2022: 12/01/22: Air temp: 5 (˚C), no rain, cloud cover 2, wind speed 1
Comments:				
Visual inspection results: Likely pipistrelle droppings on window below soffit under gable, although this was not sent for DNA analysis in 2019. In 2022, bat droppings were recorded in the roof and these were sent off for DNA analysis.				
DNA: date collected 02/02/2022 (attic of bungalow) – common pipistrelle				
02/03/2021 – 25/03/2021	Hibernation static deployment	BU_376	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between -3.5 and 22 (˚C)
Comments: Deployed internally by landowner				
Hibernation results: No bat activity was recorded				
17/07/2019	21:04 to 22:49 (sunset = 21:19)	BU_376	Walkabout x 3	Air temp: 19 down to 18 (˚C), no rain, cloud cover 7, wind speed 1
Comments:				
Roost survey results: Common pipistrelle appeared at 21:47 (28 minutes after sunset) and the exact roost location could not be determined, but the roost is likely in a structure nearby. No bat activity was recorded roosting in this structure.				
16/09/2020	05:09 to 07:24 (sunrise = 07:09)	BU_376	Walkabout x 2, Scout x 2 and Batlogger	Air temp: 10 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Roost survey results: No bats seen to emerge.				
23/6/2021	21:15 to 23:10 (sunset = 21:32)	BU_376	Walkabout x 3	Air temp: 19.6 to 19.9 (˚C), no rain, cloud cover 5/6, wind speed 1
Comments:				
Roost survey results: Three common pipistrelle bats emerged in total. Two common pipistrelle emergences from soffit on south elevations (view obscured by pergola) at 21:59 and 22:17 (27 and 45 minutes after sunset). A further common pipistrelle was seen to emerge at 22:28 from the southern gable at 22:28 (37 minutes after sunset).				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost				

Table 4-10 – Survey Results BU_378

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
17/07/2019	PBRA external inspection (17/07/2019) and internal inspection (12/01/2022)	BU_378	N/A	17/07/2019: Air temp: 23 (˚C), no rain, cloud cover 7, wind speed 1. 12/01/22: Air temp: 5 (˚C), no rain, cloud cover 2, wind speed 1
Comments:				
Visual inspection results: Bat droppings on top of car. Additional droppings identified within building, including feeding remains likely from brown long-eared bats, and droppings, likely to be from brown long-eared under a wire in the “cool room”				
DNA: date collected 17/07/2019 – Common pipistrelle, date collected 12/01/2022 – brown long-eared (cool room and workshop)				
12/01/2022 – 20/02/2022	Hibernation static deployment	BU_378	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between 3.2 and 6.5 (˚C)
Comments:				
Hibernation results: Brown long-eared recorded once on the 15/02/2022				
22/07/2019	20:58 to 23:13 (sunset = 21:13)	BU_834/BU_378/ BU_356	Walkabout x 1 and EMT 2 x 3	Air temp: 19.8 down to 16.9 (˚C), no rain, cloud cover 6, wind speed 0
Comments:				
Roost survey results: One common pipistrelle emerged from east facing roof pitch of a different structure BU_834.				
16/09/2020	19:05 to 20:50 (sunset = 19:20)	BU_834/BU_378/ BU_356	Walkabout, Batlogger M, EMT 2 and Scout	Air temp: 19 down to 17 (˚C), no rain, cloud cover 8, wind speed 3/ 5
Comments:				
Roost survey results: No bats seen to emerge.				
02/07/2021	02:00 to 06:00 (sunrise 04:55)	BU_356/BU_378/ BU_834	EMT 2 x 2	Air temp: 16 down to 18 (˚C), no rain, cloud cover 8 / 7, wind speed 4
Comments: Limitations: None				
Roost survey results: No emergence recorded.				
Photos/ diagrams:   				
Roost characterisation: Common pipistrelle – Night/ feeding roost; brown long-eared hibernation roost				

Table 4-11 – Survey Results BU_507

Date of Survey	Start and End Times	Structure Reference	Equipment Used (include make of bat detectors and	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	PBRA (external only)	BU_507	N/A	Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: In one outbuildings, with doors propped open, there is a concentration of droppings (see DNA below) found in the middle room of the extension which can be accessed via an open door. There are a number of slipped and missing roof tiles and uneven ridge tiles present on the main house. There is missing lead flashing between the extension and house with mortar missing between the bricks. Closed soffits are present under the eaves of the main house with some minor gaps between the structure and soffit box. The porch roof tiles and ridge tiles are significantly damaged. The porch cladding has been painted and hence there are no gaps suitable for roosting.				
DNA: date collected 28/10/2020 – Lesser horseshoe				
16/02/2022 to the 31/03/2022 (the last recording was on the 03/04/2022 but that goes out of the hibernation season)	Hibernation static deployment	BU_507	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 3.4 and 6.3 (˚C) over the time period
Comments:				
Hibernation results: No bat activity was recorded				
09/06/2021	03:14 to 04:59 (sunrise = 04:44)	BU_507	EMT 2 x 4	Air temp: 13 down to 10 (˚C), no rain, cloud cover 0, wind speed 5/ 2
Comments:				
Roost survey results: Return to roost (soprano pipistrelle) on east side porch under tiles of BU_507 (circled in front of roost then appeared to fly under one of the slipped tiles on the small porch over door) at 03:56 (48 minutes before sunrise).				
07/07/2021	21:14 to 23:29 (sunset = 21:29)	BU_507	EMT 2 x 2	Air temp: 16 down to 14 (˚C), no rain, cloud cover 6/7, wind speed 5
Comments:				
Roost survey results: No emergences observed.				
28/04/2022	20:13 to 22:28 (sunset = 20:28)	BU_507	Walkabout x 2	Air temp: 10 down to 6 (˚C), no rain, cloud cover 2/1, wind speed 1/0
Comments:				
Roost survey results: Recorded a re-entry to the porch on the east elevation (pipistrelle (assumed to be soprano pipistrelle at 21:22, 54 minutes after sunset) in the same location a re-entry confirmed on the 2021 re-entry survey.				

Photos/ diagrams:	 
Roost characterisation: Soprano pipistrelle – day roost; and Lesser horseshoe – day/ feeding roost	

Table 4-12 – Survey Results BU_610

Date of Survey	Start and End Times	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	PBRA (external only)	BU_610	N/A	Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: There are a number of missing, broken, uneven or slipped roof tiles. The hip tiles on the north west hip are uneven and the last tile is missing. There are gaps under the ridge tiles. Between the extension and main house the lead flashing is missing with missing mortar between the bricks which would have been covered by lead flashing. There is ivy on the front of the house which may hide features. On the western aspect there appears to be a gap in the chimney above the lead flashing. There is a waste pipe out of the roof with possible lifted lead flashing at its base but which may not provide a suitable crevice. Across the structure, including the extension, there is a soffit box with small gaps evident above the second storey windows. On the extension there are a number of slipped tiles. The ridge tiles of the extension are uneven. The left hand door (central) was boarded shut. One noted access point into structure through open vent (missing vent pipe approx. 7cm across). Ivy cover potentially hiding gaps. Access points for bats into structure through open vent (missing vent pipe approx. 7 cm across).				
16/02/2022 to the 31/03/2022 (the last recording was on the 06/04/2022 but that goes out of the hibernation season)	Hibernation static deployment	BU_610	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 4.1 and 6.5 (˚C) over the time period
Comments:				
Hibernation results: No bat activity was recorded				
22/06/2021	21:17 to 23:05 (sunset = 21:32)	BU_610/ BU_611	Walkabout x 4	Air temp: 16 down to 10 (˚C), no rain, cloud cover 1, wind speed 0
Comments:				
Roost survey results: Noctule emergence at 22:11 (39 minutes after sunset) from the base of the chimney. One common pipistrelle also emergence from a gap under the tile at 22:00 (28 minutes after sunset), observed by a surveyor on the south eastern observation location (both from BU_610).				
15/07/2021	21:17 to 23:05 (sunset = 21:32)	BU_610/ BU_611	SM4/ Duet	Air temp: 22 down to 18 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:				
Roost survey results: No emergences observed. Bats not inside the outdoor room.				
03/08/2021	20:41 to 22:54 (sunset = 21:54)	BU_610/ BU_611	SM4/ Duet and EMT 2	Air temp: 19 down to 17 (˚C), no rain, cloud cover 6/ 7, wind speed 0
Comments:				
Roost survey results: One common pipistrelle emergence from the north side of roof (21:31).				

Photos/ diagrams:	 
Roost characterisation: Common pipistrelle – day roost; and Noctule – day roost	

Table 4-13 – Survey Results BU_611

Date of Survey	Start and End Times	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	PBRA	BU_611		Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: To the rear, northern elevation, of the property there is an extension with two outhouse doors facing east. One of these doors, on the right, was left open. Within this external toilet there were 100+ bat droppings found (see below). Ridge tiles on the NE hip roof ridge of the main house had some gaps, with a small gap below one of the hip tiles. There are also lifted lead flashing on the eastern aspect of the chimney. Left hand side room to the extension was a confirmed bat roost, within the room there is a hole in the top right-hand corner of the room which may lead into a roof void. Although the most likely access into the toilet is via the open door. There are gaps under the ridge tile of the extension, and holes in the wall and bricks above the extension.				
DNA: date collected 28/10/2020 – Lesser horseshoe				
16/02/2022 to the 31/03/2022 (the last recording was on the 06/04/2022 but that goes out of the hibernation season)	Hibernation static deployment	BU_610	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 41. And 6.5 (˚C) over the time period
Comments:				
Hibernation results: No bat activity was recorded				
22/06/2021	21:17 to 23:05 (sunset = 21:32)	BU_611	Walkabout x 4	Air temp: 16 down to 10 (˚C), no rain, cloud cover 1, wind speed 0
Comments:				
Roost survey results: No emergences from this property during the survey.				
15/07/2021	21:17 to 23:05 (sunset = 21:32)	BU_610/ BU_611	SM4/ Duet x 2	Air temp: 22 down to 18 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:				
Roost survey results: No emergences observed. Bats not inside the outdoor room.				
04/08/2021	20:41 to 22:54 (sunset = 21:54)	BU_610/ BU_611	SM4/ Duet and EMT 2	Air temp: 19 down to 17 (˚C), no rain, cloud cover 6/ 7, wind speed 0
Comments:				
Roost survey results: No bats emerged from BU_611.				

Photos/ diagrams:	 
Roost characterisation: Lesser horseshoe – day/ feeding roost	

Table 4-14 – Survey Results BU_614

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
09/03/2022	PBRA	BU_614	N/A	Air temp: 20˚C, no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: Features were identified under the ridge tiles to the read of the property. On the front of the property gaps were identified between the roof tiles and barge board on the porch dormer, and slipped side on the dormer roof. There is a gap in the plastic soffit box above the security light on the porch dormer. Attic is converted with attic space restricted only to the eaves. Eaves on the front and back (north and south) of the property. Each is approximately 1 m wide, 1 m high and 8 m long (length of the house). Access is possible through crawl space doors. The northern crawl space was boarded across the rafters along its length. Insulation blocks and plasterboard was covering the roof trusses along the entire length of the house. There were no obvious gaps, and no droppings of any kind were found. The southern crawl space - no bat droppings were identified.				
No hibernation survey competed				
26/04/2022	20:10 to 22:25 (sunset = 20:25)	BU_614	Walkabout x 2	Air temp: 10 to 9 (˚C), no rain, cloud cover 8/5 wind speed 1/1
Comments: Limitations: Survey was carried out a few days before the start of the official bat survey season (May to September); however, weather conditions were suitable, so not considered to be a significant limitation				
Roost survey results: A single soprano pipistrelle bat emerged at 20:41 (16 minutes after sunset) from underneath a roof tile on the western gable end and flew north.				
Survey 2 – No survey completed				
Survey 3 – No survey completed				
Photos/ diagrams: 				
Roost characterisation: Soprano pipistrelle – day roost				

Table 4-15 – Survey Results BU_653

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
27/10/2020	PBRA (external only)	BU_653	N/A	Air temp: 10 (˚C), rain 2, cloud cover 7, wind speed 1
Comments:				
Visual inspection: The northern aspect between the western gable end and the flat roof extension there is a gap between the soffit box and wall which appears to extend inwards. On the western gable end there is a brick porch with plastic soffit boxing. There are gaps between the porch which may offer suitable roosting opportunities. On the house on the southern aspect there are no gaps under the soffit box. The garage has flat concrete roof tiles and no pitch. Garage is a new construct, very fresh as the mortar is still fresh on the base of the walls. No evidence of bats.				
DNA: date collected 16/02/2022 (attic) – No bat DNA, pygmy shrew and house mouse recorded				
13/12/2021 – 02/01/2022 (last recording, despite being collected on the 20/01/2022)	Hibernation static deployment	BU_653	Swift and EasyLog USB – Lascar temperature and humidity data logger (didn't work)	No data recorded
Comments:				
Hibernation results: No bat activity was recorded				
17/06/2021	21:17 to 23:32 (sunset = 21:32)	BU_653	EMT 2 x 3 and Batlogger M2	Air temp: 17 down to 14 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Roost survey results: Common pipistrelle emerged from the soffit box on the north west aspect of the property (21:49). Other bat activity included foraging south and east of the property outside of the property boundaries.				
16/08/2021	20:16 to 22:21 (sunset = 20:31)	BU_653	Walkabout x 4 and Canon XA11 + IR	Air temp: 15 down to 13 (˚C), no rain, cloud cover 6/2, wind speed 0/1
Comments:				
Roost survey results: No bats emerged				
03/09/2021	04:54 to 06:39 (sunrise = 06:24)	BU_653	EMT 2 x 4 and IR Canon XA15 and 2x Eerel 140 LED IR lamps	Air temp: 14.1 down to 13.9 (˚C), no rain, cloud cover 7/8, wind speed 0
Comments:				
Roost survey results: No bats emerged.				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost; or Soprano pipistrelle – day roost				

Table 4-16 – Survey Results BU_694

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	PBRA (external only)	BU_694	N/A	Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: The building has a hipped roof laid with slate imitation tiles which are generally in good condition with a few minor lifted tiles and gaps under the roof tiles. The ridge tiles comprised concrete, there is one missing ridge tile which appears to have been filled with cement. On the northern, rear, elevation there is an extension outhouse with two buildings including an external toilet. The porch on the eastern aspect has plastic cladding with no gaps for suitable roosting crevices. Around the building there is a closed soffit box with gaps underneath which may provide suitable roosting opportunities. On the extension there are a number of slipped clay tiles, and missing ridge tiles. On the northern aspect of the main roof the second hip tile is missing. There is a small amount of missing brick on the chimney.				
DNA: date collected 16/02/2022 (loft in bedroom and kitchen) – Lesser horseshoe and brown long-eared				
16/02/2022 to the 31/03/2022 (last recording on the 04/04/2022, but that is out of the hibernation season)	Hibernation static deployment	BU_694	Swift and EasyLog USB – Lascar temperature and humidity data logger	Temps between 3.3 and 6.6 (˚C) over the time period
Comments:				
Hibernation results: No bat activity was recorded, on the 18/03/2022 noise file only recorded				
24/06/2021	21:20 to 23:35 (sunset = 21:35)	BU_694	SM4/ Duet and EMT 2	Air temp: 20 down to 15 (˚C), rain 2/ 1, cloud cover 7, wind speed 1
Comments: limitations: light rain				
Roost survey results: No bat emergences.				
17/08/2021	20:14 to 21:59 (sunset = 20:29)	BU_694	EMT 2 x 4 and IR Canon XA15 and 2x Eerel 140 LED IR lamps	Air temp: 15 down to 14 (˚C), rain 0, cloud cover 6/7, wind speed 0
Comments:				
Roost survey results: No bat emergences.				
26/07/2022	20:53 to 23:08 (sunset = 21:08)	BU_694	Anabat Walkabout x 3 and bat logger, and 2 x IR Canon cameras and IR lamps	Air temp: 18 down to 13 (˚C), rain 0, cloud cover 0/6, wind speed 1
Comments:				
Roost survey results: At 22:02 a *Myotis* bat was recorded entering the outhouse doorway of BU_709 and emerging a six minutes later from the same doorway.				
Photos/ diagrams: 				
Roost characterisation: Lesser horseshoe – day / night roosts; and brown long-eared – day roost				

Table 4-17 – Survey Results BU_709

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	N/A PBRA (external only)	BU_709		Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: On the main house there are gaps under the ridge tiles near the westernmost chimney. Missing mortar is present below the hip tiles on the north west aspect. The roof tiles of the porch have slipped, but the lead flashing between the porch and house is flush. Out of the roof there is a waste pipe, the lead flashing at the base of this appears to be lifted but may not provide a suitable crevice. Visibility of these aspects is limited due to the vegetation. There is lead flashing missing between the extension and the main house. The roof tiles on the western elevation of the extension are severely damaged with large numbers missing. The outhouse door to the toilet was left open allowing access to the inside and number of further crevices were found within the toilet and storage structures. A concentration of droppings characteristic of lesser horseshoe bats was found in the outhouse toilet.				
DNA: date collected 28/10/2020 – Lesser horseshoe				
16/02/2022 to the 31/03/2022 (last recording on the 05/04/2022, but that is out of the hibernation season)	Hibernation static deployment	BU_709	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 3.9 and 6.6 (˚C) over the time period
Comments:				
Hibernation results: No bat activity was recorded				
24/06/2021	21:20 to 23:35 (sunset = 21:35)	BU_709	SM4/ Duet and EMT 2	Air temp: 20 down to 15 (˚C), rain 2/ 1, cloud cover 7, wind speed 1
Comments:				
Roost survey results: No bat emergences.				
17/08/2021	20:14 to 21:59 (sunset = 20:29)	BU_709	EMT 2 x 4 and IR Canon XA15 and 2x Eerel 140 LED IR lamps	Air temp: 15 down to 14 (˚C), rain 0, cloud cover 6/7, wind speed 0
Comments:				
Roost survey results: No bat emergences.				
26/07/2022	20:53 to 23:08 (sunset = 21:08)	BU_694	Anabat Walkabout x 3 and bat logger, and 2 x IR Canon cameras and IR lamps	Air temp: 18 down to 13 (˚C), rain 0, cloud cover 0/6, wind speed 1
Comments:				
Roost survey results: At 22:02 a *Myotis* bat was recorded entering the outhouse doorway of BU_709 and emerging a six minutes later from the same doorway. It was determined not to be roosting in this location.				
Photos/ diagrams:  				
Roost characterisation: Lesser horseshoe – day / feeding roost				

Table 4-18 – Survey Results BU_723

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
28/07/2021	N/A PBRA (external only)	BU_723		Air temp: 16 (˚C), limited rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: On the northern, eastern aspects there are brick walls enclosing the barn which were only accessible internally. The eastern and southern aspects are open with gates to keep cattle in. At the time of survey there were no cattle present. The roof was not fully visible from ground level. No bat evidence recorded.				
DNA: date collected 20/07/2022 – No bat DNA recorded				
No hibernation suitability				
23/08/2021	20:00 to 21:45 (sunset = 20:15)	BU_723	EMT 2 x 4 (no IR camera used)	Air temp: 20 down to 18 (˚C), rain 0, cloud cover 2/5, wind speed 1
Comments:				
Roost survey results: Limitations with no IR camera. The barn can only be watched from the western aspect (barn entrance) from the outside, all other walls back and side are overgrown and not visible to watch. During the survey it is likely that up to four common pipistrelle bats (20:30/31, 20:32, 20:43/45 and 20:41) which all appeared to drop from inside roof of barn and flew around inside. Additionally, a *Myotis* (21:02) was roosting in/near the barn but unable to confirm where it came from, before it moved outside at 21:06 (assumed to be roosting behaviour).				
01/09/2021	04:20 to 06:35 (sunrise = 06:20)	BU_723	EMT 2 x 4 and thermal camera	Air temp: 13 (˚C), no rain, cloud cover 7, wind
Comments:				
Roost survey results: No emergences.				
16/09/2021	19:28 to 21:22 (sunset = 19:29)	BU_723	Walkabout x 4 and 2 x Canon XA11 IR cameras	Air temp: 18 down to 15 (˚C), rain 0, cloud cover 4, wind speed 1
Comments: Limitation: Delayed start for three surveyors due to traffic delaying surveyor with kit, limited visibility from start.				
Roost survey results: One confirmed emergence by common pipistrelle from inside building from unknown location (19:44).				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost; and *Myotis* (assumed to be Natterer's) – day roost				

Table 4-19 – Survey Results BU_735

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
27/10/2020	PBRA (external only)	BU_735	N/A	Air temp: 10 (˚C), rain 4, cloud cover 6, wind speed 1
Comments:				
Visual inspection results: Simple clay tiles are present with multiple missing and lifted. Slate ridge tiles with some missing mortar. Lead flashing at the base of the central chimney which is lifted. Three chimneys across the roof, all have lifted lead flashing. Gap under soffit next to the catslide roof above French doors. On western gable end number of gaps under soffit box. On northern front aspect there is a porch with a gable dormer. Some lifted lead flashing between porch and house. On front aspect some lifted tiles, some gaps under ridge tiles on the roof. Large gaps under tiles on western edge of building adjacent to neighbouring land parcel.				
Hibernation survey – no access				
11/05/2021	20:30 to 22:32 (sunset = 20:49)	BU_735	Walkabout x 3 and EMT 2	Air temp: 12 down to 11 (˚C), rain 1, cloud cover 8, wind speed 2/3
Comments:				
Roost survey results: A brown long eared was recorded flying near neighbours building to the west BU_661 (possible emergence, 21:34).				
26/07/2021	20:54 to 23:09 (sunset = 21:09)	BU_735	SM4/ Duet x 4 and FLIR T540	Air temp: 23 down to 21 (˚C), no rain, cloud cover 3/8, wind speed 0/2
Comments:				
Roost survey results: One common pipistrelle emergence seen at 21:54 (45 minutes after sunset) from the house to the west (BU_638.				
23/09/2021	04:55 to 07:10 (sunrise = 06:55)	BU_735	EMT 2 x 3 and FLIR T540	Air temp: 14 down to 13 (˚C), rain 0, cloud cover 2/1, wind speed 2/3
Comments:				
Roost survey results: One common pipistrelle re-entered to the cracked brick to the right of 1st floor window at 06:21. A further common pipistrelle was recorded at 06:01 circling above behind house then assumed to re-enter a roost. Finally a third common pipistrelle bat was seen at 06:08 circling above house near chimney on adjacent property (BU_638). It was assumed that it re-entered on adjacent property in between roof pitches.				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost				

Table 4-20 – Survey Results BU_819

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
25/09/2020	PBRA (external only)	BU_819	N/A	Air temp: 11 (˚C), no rain, cloud cover 2, wind speed 4
Comments:				
Visual inspection results: There are some gaps between the closed soffit box and the wall. There is some lifted lead flashing at the base of the chimney. There are some uneven roof tiles on the main house. There is a large gap around the waste pipe on the north west corner of the structure. The slate imitation tiles on the extension to the north are mostly flush to the roof with some evidence of lifting. On the northern elevation there is a waste pipe under the guttering, with a potential bat access point for bats. There are small gaps in the soffit box above the door to the extension either side of the door approximately 2 to 4 cm. An original door to the outhouse remains, which has been left open allowing bats access to the toilet. A number of bat droppings (approx. 30) characteristic of lesser horseshoe bats were found and droppings collected (see DNA below).				
DNA: date collected 28/10/2020 – Lesser horseshoe				
Hibernation survey not carried out as internal access could not be arranged by the landowner during the correct time period				
08/07/2021	21:14 to 23:29 (sunset = 21:29)	BU_819	EMT 2 x 2	Air temp: 16/ 15 (˚C), no rain, cloud cover 8/ 3, wind speed 1
Comments				
Roost survey results: No bats emerged.				
22/07/2021	03:16 to 05:31 (sunrise = 05:16)	BU_819	EMT 2 and Batlogger M2	Air temp: 16/ 15 (˚C), no rain, cloud cover 8/ 3, wind speed 1
Comments:				
Roost survey results: No bats emerged.				
09/08/2021	20:29 to 22:44 (sunset = 20:44)	BU_819	EMT 2 x 2 and thermal camera	Air temp: 16/ 15 (˚C), no rain, cloud cover 8/ 3, wind speed 1
Comments:				
Roost survey results: Two common pipistrelle emerged at 21:12 (28 minutes after sunset).				
Photos/ diagrams:  				
Roost characterisation: Lesser horseshoe - transitional roost; and Common pipistrelle – day roost				

Table 4-21 – Survey Results BU_834

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
17/07/2019	N/A PBRA (external only)	BU_834	N/A	Air temp: 23 (˚C), no rain, cloud cover 7, wind speed 1
Comments:				
Visual inspection results: No evidence recorded, potential bat access under ridge from southern gable end.				
No hibernation suitability				
22/07/2019	20:58 to 23:13 (sunset = 21:13)	BU_834/ BU_378/	Walkabout x 1 and EMT 2 x 3	Air temp: 19.8 down to 16.9 (˚C), no rain, cloud cover 6, wind speed 0
Comments:				
Roost survey results: One common pipistrelle emerged from east facing roof pitch of BU_834 (21:55).				
16/09/2020	19:05 to 20:50 (sunset = 19:20)	BU_834/ BU_378/ BU_356	Walkabout, Batlogger M, EMT 2 and Scout	Air temp: 19 down to 17 (˚C), no rain, cloud cover 8, wind speed 3/5
Comments:				
Roost survey results: No bats seen to emerge.				
02/07/2021	02:40 to 05:10 (sunrise 04:55)	BU_834	EMT 2 x 2	Air temp: 16 down to 18 (˚C), no rain, cloud cover 8 / 7, wind speed 4
Comments:				
Roost survey results: No emergences recorded.				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost				

Table 4-22 – Survey Results BU_963

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
01/08/2019	N/A PBRA (external only)	BU_963		Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection Gaps behind timber fascia boards which extend under the eaves of the structure. Ridge tiles appear to be concrete and there are slight gaps under the ridge tiles. Some missing mortar under roof tiles on southern gable end.				
Hibernation survey – no access				
03/07/2019	21:15 to 23:30 (sunset = 21:30)	BU_963	Walkabout x 4	Air temp: 24 down to 21 (˚C), no rain, cloud cover 0, wind speed 0
Comments:				
Roost survey results: No bats emerged.				
21/08/2019	04:28 to 06:15 (sunrise = 05:58)	BU_963	Batlogger M and EMT 2 x 2	Air temp: 12 to 17 (˚C), no rain, cloud cover 0, wind speed 1/ 0
Comments:				
Roost survey results: One soprano pipistrelle was recorded circling the car park before roosting within the structure at 05:36 (32 minutes before sunrise).				
07/07/2021	21:12 to 23:22 (sunset = 21:27)	BU_963	EM Touch and Walkabout	Air temp: 18 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Roost survey results: No bats observed emerging by any surveyor.				
Photos/ diagrams:  				
Roost characterisation: Soprano pipistrelle – day roost				

Table 4-23 – Survey Results BU_972

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
01/08/2019	PBRA (external only)	BU_972	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection: Southern room of barn more intact with a broken window and gaps around the door leading to internal access. No evidence recorded.				
No traditional hibernation suitability *(no internal access)*				
06/09/2021	19:29 to 21:29 (sunset = 19:44)	BU_972	Walkabout x 3 and 1 x Canon XA11 IR	Air temp: 26 down to 18 (˚C), no rain, cloud cover 0, wind speed 0
Comments:				
Roost survey results: At 20:05 a non-echolocating bat was recorded emerging from behind fascia board, considered likely to be a pipistrelle. At 20:00 a common pipistrelle emerged on the south elevation, 1.5 m high, flew straight and horizontal from the corner of building (probably emerged at near corner door). At 20:07 a further common pipistrelle bat was recorded from window frame.				
29/09/2021	18:36 to 20:51 (sunset = 18:51)	BU_972	Walkabout x 2, Batlogger M2 x 1	Air temp: 14 down to 9 (˚C), no rain, cloud cover 2/3, wind speed 0/1
Comments:				
Roost survey results: Common pipistrelle bat emerged from the south east corner of the building at 19:14, from the wooden post on the corner of the building by the top of the garage door.				
10/05/2022	20:33 to 22:48 (sunset = 20:48)	BU_972	Batlogger M2 x 3	Air temp: 14 down to 12 (˚C), no rain, cloud cover 8, wind speed 4/1
Comments:				
Roost survey results: No bat emergences				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost				

Table 4-24 – Survey Results BU_965

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019	PBRA (external only)	BU_965	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: Ridge tiles also slate some gaps are present. Broken slate tile on the porch. Possible holes under eaves on western elevation of the house. Some loose tiles allowing access. No evidence recorded.				
19/01/2021 to the 25/03/2021	Hibernation static deployment	BU_965	Swift and EasyLog USB – Lascar temperature and humidity data logger	temps between 2.5 and 30.5 (˚C) over the time period
Comments: Deployed internally by landowner (due to no internal access)				
Hibernation results: No bat activity was recorded				
07/09/2020	19:26 to 21:11 (sunset = 19:41)	BU_965	Scout x 2, EM2 and Bat Logger M	Air temp: 17 to 16 (˚C), rain 0, cloud cover 7/8, wind speed 2
Comments: Limitations: None				
Roost survey results: A single non-echolocating bat emerged at 19:58 (17 minutes after sunset) from the ridge of the roof then flew west. It was assumed to be a common pipistrelle based on the time of emergence combined with the later bat record of a common pipistrelle roosting at this location. Single pipistrelle (21:47) bat seen emerging from neighbours shed, which back onto the garden – bat foraged around garden for a while until it disappeared. No emergences for this property. Noctules and *Myotis* also recorded, not much activity by the end of the survey.				
26/07/2021	20:53 to 23:08 (sunset = 21:00)	BU_965	Walkabout x 4	Air temp: 23 down to 21 (˚C), rain 0, cloud cover 5/7, wind speed 0/2
Comments: Limitations: None				
Roost survey results: A single common pipistrelle bat was seen to emergence at 21:40 from the ridge then passed close to the top of the building (the same location as the previous roost).				
19/05/2021	20:47 to 22:32 (sunset = 21:02)	BU_1005 (incidental sighting of BU_965)	EMT 2 x 4	Air temp: 14 down to 10 (˚C), rain 0, cloud cover 1/2, wind speed 2
Comments: Limitations: No access to the east side of the house				
Roost survey results: Two brown long-eared bats picked up from the back of the house with one of them emerging from neighbouring structure (BU_965).				
Survey 3 – not completed				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost; and Brown long-eared – day roost				

Table 4-25 – Survey Results BU_981

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
03/12/2020	PBRA (external only)	BU_981	N/A	Air temp: 5 (˚C), very light rain, cloud cover 8, wind speed 1
Comments: Visual inspection. Emergence features: Wooden cladding sufficiently lifted to allow roosting opportunities, closed soffit on gable end may have small gaps, roof tiles are slipped and uneven, with some missing roof tiles, some lifting under ridge tiles, hanging tiles on the eastern aspect are generally loose and lifted. On the south east corner there is a gap at the base of the roof tiles behind the guttering. Indent above front window appears to be a bird nesting site. No bat evidence recorded.				
19/01/2021 – 25/03/2021	Hibernation static deployment	BU_981	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between 6.5 and 21 (˚C)
Comments: Deployed internally by landowner				
Hibernation results: No bat activity was recorded				
15/06/2021	21:15 to 23:05 (sunset = 21:29)	BU_981	Walkabout and EMT 2	Air temp: 17 (˚C), no rain, cloud cover 0, wind speed 1
Comments: Roost survey results: The following bats emerged: • From the hanging tiles on the eastern facing gable:1 x soprano pipistrelle (21:43), 1 common pipistrelle (22:24) and 2 pipistrelle species (22:09); • From the top right of the south facing gable end heading past the copper beach tree into the adjacent lane – 1 x non-echo-locating bat (21:51); • Emerged from the eaves of the house – 1 x common pipistrelle (21:50); and • Emergence from the roof tiles – 1 x common pipistrelle (22:09). Six emerging pipistrelle bats from four different locations on the structure (one soprano pipistrelle, two pipistrelle species of bat and three common pipistrelles) and one additional non-echolocating bat assumed to be a pipistrelle).				
07/07/2021	21:12 to 23:27 (sunset = 21:27)	BU_981	Walkabout x 4	Air temp: 19 (˚C) no rain, cloud cover 7, wind speed 1
Comments: Roost survey results: Common pipistrelle emerged at 21:42 (15 minutes after sunset). A non-echo-locating bat emerged from the wooden cladding at 21:51 (24 minutes after sunset), this was seen by two surveyors, with no bat calls recorded.				
Survey 3 – access refused				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle –				

Table 4-26 – Survey Results BU_987

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
24/07/2019	PBRA (external only)	BU_987	N/A	Air temp: 20 (˚C), no rain, cloud cover 2, wind speed 2
Comments:				
Visual inspection: Closed soffits with minor access. Minor lifting of the ridge tiles. Decorative bargeboard has small access points behind. Gaps on eaves under the soffit board. No bat evidence.				
Access refused for hibernation survey (landowners suggest no loft space, however, it's understood that an eaves loft space is present form the asbestos survey)				
01/09/2020	19:35 to 21:20 (sunset = 19:50)	BU_987	Scout x 2, EMT 2 and Walkabout	Air temp: 16 down to 14 (˚C), no rain, cloud cover 1, wind speed 2
Comments:				
Roost survey results: A single soprano pipistrelle bat emerged from the apex of south gable end and flew SW at 20:09 (19 minutes after sunset).				
31/8/2021	19:43 to 21:58 (sunset = 19:58)	BU_987	EMT 2 and Samsung tablets x 4 plus one infra-red Canon XA15 and two x Eerel 140 LED Infra-red lamps	Air temp: 16 (˚C), no rain, cloud cover 3, wind speed 2
Comments:				
Roost survey results: Two emergences recorded from the same feature (from very top of the roof where it looks-like loose lead flashing is present), of soprano pipistrelle (20:09 and 20:12, 12 and 15 minutes after sunset).				
Survey 3 – no access				
Photos/ diagrams:  				
Roost characterisation: Soprano pipistrelle – maternity / day roost (assumed, with limitations)				

Table 4-27 – Survey Results BU_11

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
09/03/2022	PBRA (internal survey on the same date)	BU_11	N/A	Air temp: 20˚C, no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection results: At the eaves of the roof there were gaps along the east and west aspect approx. 10 cm wide where the boarding does not meet the roof. Access is possible via the southern gable end where three bricks were missing each approximately 10 cm x 20 cm in size. At the northern gable end approximately 70 lesser horseshoe droppings were identified, later confirmed from eDNA analysis. The roof was lined with felt with no obvious gaps or tears. There are some minor gaps under the ridge tiles.				
DNA: date collected 16/02/2022 – Lesser horseshoe				
No hibernation survey competed				
26/04/2022	20:10 to 22:25 (sunset = 20:25)	BU_11 (watching BU_11 and BU_614)	Walkabout x 2	Air temp: 10 to 9 (˚C), no rain, cloud cover 8/5 wind speed 1/1
Comments: Limitations: Survey was carried out a few days before the start of the official bat survey season (May to September); however, weather conditions were suitable, so not considered to be a significant limitation.				
Roost survey results: No bats emerged.				
Survey 3 – No survey completed				
Survey 3 – No survey completed				
Photos/ diagrams:   				
Roost characterisation: Lesser horseshoe – day roost				

Table 4-28 – Survey Results BU_357

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
22/08/2019	PBRA	BU_357	N/A	Air temp: 19 (˚C), very light rain, cloud cover 8, wind speed 1
Comments:				
Visual inspection: Bat dropping indicative of pipistrelle droppings were recorded throughout the barn (no DNA analysis has been carried out).				
No hibernation suitability				
05/08/2020	20:35 to 22:20 (sunset = 20:50)	BU_357	Walkabout x 2	Air temp: 19 down to 17 (˚C), no rain, cloud cover 7/ 2, wind speed 2
Comments:				
Roost survey results: No emergences were recorded.				
30/09/2020	19:36 to 21:21 (sunset = 19:51)	BU_357	Walkabout x 2	Air temp: 17 down to 16 (˚C), no rain, cloud cover 7, wind speed 2
Comments:				
Roost survey results: No emergences were recorded.				
Survey 3 – Access refused				
Photos/ diagrams:  				
Roost characterisation: Unknown species – Night/ feeding roost				

Table 4-29 – Survey Results BU_364

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
22/08/2019	PBRA	BU_364	N/A	Air temp: 19 (˚C), very light rain, cloud cover 8, wind speed 1
Comments:				
Visual inspection results: No obvious roosting locations recorded. Likely pipistrelle droppings scattered throughout open barn area mostly small sized including on cars in open section of the barn (see DNA below). Additionally, a collection of yellow underwing moth wings were recorded, likely from brown long-eared bats, along with two droppings.				
DNA: date collected 22/08/2019 (south) – Soprano pipistrelle bat (brown long-eared suspected)				
No hibernation suitability				
12/09/2019	19:17 to 21:02 (sunset = 19:32)	BU_364	Walkabout, EMT 2 x 2 and Scout	Air temp: 18.9 down to 17.1 (˚C), no rain, cloud cover 7, wind speed 5
Comments:				
Roost survey results: No bats seen to emerge.				
03/08/2020	20:38 to 22:23 (sunset = 20:53)	BU_364	Walkabout x 4	Air temp: 20 down to 16 (˚C), no rain, cloud cover 6, wind speed 0
Comments:				
Roost survey results: No bats seen to emerge.				
Survey 3 – Access refused				
Photos/ diagrams:   				
Roost characterisation: Soprano pipistrelle – Night/ feeding roost				

Table 4-30 – Survey Results BU_638

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
14/12/2020	PBRA (external only)	BU_638	N/A	Air temp: 10 (˚C), no rain, cloud cover 3, wind speed 1
Comments:				
Visual inspection results: Possible roosting features include: Lifted lead flashing in between roof tiles, slipped and uneven tiles, gaps under ridge tiles, gaps in mortar at base of repaired chimney, gap next to guttering where single storey extension meets two storey extension and Open timber vent on southern gable end. No evidence of bats recorded.				
DNA: date collected 02/02/2022 – Pygmy shrew (roof void)				
17/01/2021 – 31/03/2021	Hibernation static deployment	BU_638	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between -1.5 and 20.5 (˚C)
Comments: Deployed internally by landowner				
Hibernation results: A static bat detector was deployed by the landowner into the roof space as no internal access was possible due to Covid-19. Common pipistrelle was recorded on the 21/02/2021, 22/02/2021, 24/02/2021, 15/03/2021, 17/03/2021, 21/03/2021 and 31/03/2021. During the February recording of bats the temperature within the roof space was recorded to be around 17°C, just after a cooler period. In the absence of further information, it has been assumed that the pipistrelle(s) were hibernating somewhere within the property.				
17/05/2021	20:34 to 22:19 (sunset = 20:49)	BU_638	EMT 2 and Samsung Tablet	Air temp: 14 down to 13 (˚C), no rain, cloud cover 1, wind speed 0
Comments:				
Roost survey results: No roosting activity noted.				
08/07/2021	21:22 to 23:27	BU_638	SM4/ Duet x 4 and one thermal camera	Air temp: 14 down to 13 (˚C), no rain, cloud cover 1, wind speed 0
Comments:				
Roost survey results: One common pipistrelle emerged from the northern elevation of the structure (21:58). A second common pipistrelle is likely to have emerged from the eastern side (22:16).				
12/08/2021	04:05 to 06:01 (sunrise = 05:46)	BU_638	EMT 2 x 4	Air temp: 14 down to 13 (˚C), no rain, cloud cover 1, wind speed 0
Comments:				
Roost survey results: No bats emerged.				
23/09/2021	04:55 to 07:10 (sunrise = 06:55)	BU_735	EMT 2 x 3 and FLIR T540	Air temp: 14 down to 13 (˚C), rain 0, cloud cover 2/1, wind speed 2/3
Comments:				
Roost survey results: A common pipistrelle bat was seen at 06:08 circling above house near chimney on BU_638, when surveying BU_735. It was assumed that it re-entered on adjacent property in between roof pitches (BU_735).				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost / hibernation roost				

Table 4-31 – Survey Results BU_661

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
14/12/2020	PBRA (external only)	BU_661	N/A	Air temp: 10 (˚C), rain 0, cloud cover 3, wind speed 1
Comments: Limitations: No access to north or west elevations. East elevation is border to adjacent land parcel.				
No evidence recorded. Lifted and broken tiles across the roof.				
Hibernation survey required – not completed				
01/07/2021	02:50 to 05:08 (sunrise = 04:53)	BU_661	EMT 2 x 2	Air temp: 14 down to 13 (˚C), no rain, cloud cover 8 / 6, wind speed 2
Comments: Limitations: Surveyors were unable to access the north of the property because entry is required via the household. The view of the roof was therefore restricted to the southern and west elevations.				
Roost survey results: No re-entry or swarming behaviour observed.				
13/09/2021	19:12 to 21:27 (sunset = 19:27)	BU_661	EM touch 2 Pro x 2 and Canon camera	Air temp: 19 down to 17 (˚C), no rain, cloud cover 8, wind speed 0
Comments: Limitations: No access to the back garden so view restricted to southern gable and very restricted view along the roof line.				
Roost survey results: No emergences.				
11/05/2021	20:30 to 22:32 (sunset = 20:49)	BU_735 (adjacent property)	Walkabout x 3 and EMT 2	Air temp: 12 down to 11 (˚C), rain 1, cloud cover 8, wind speed 2/3
Comments:				
Roost survey results: A brown long eared was recorded flying near neighbours building to the west BU_661 (possible emergence, 21:34).				
16/06/2021	21:15 to 23:00 (sunset = 21:30)	BU_705 (adjacent property)	Walkabout x 4 and EMT 2	Air temp: 22 down to 24 (˚C), rain 0 / 2, cloud cover7 / 8, wind speed 1
Comments: Limitations: On and off drizzle throughout the survey – more consistent towards the end. DT's detector did not record. IR camera put away at 22:16 to avoid water damage.				
Roost survey results: Single pipistrelle bat seen emerging from neighbours shed (21:47), which back onto the garden – bat foraging around garden for a while until it disappeared.				
Survey 3 – no access				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost; and brown long-eared – day roost				

Table 4-32 – Survey Results BU_668

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
09/03/2022	PBRA	BU_668	N/A	Air temp: 10 (˚C), rain 2, cloud cover 7, wind speed 1
Comments: Limitations: Unable to fully inspect inside due to dirt and ivy.				
Visual inspection: Scattered bat droppings recorded in the structure.				
DNA: date collected 09/03/2022 – Lesser horseshoe				
Hibernation survey required – not completed				
10/05/2022	20:32 to 22:47 (sunset = 20:47)	BU_686	Walkabout x 4 and Canon camera and infra-red lighting	Air temp: 15 down to 12 (˚C), no rain, cloud cover 8, wind speed 2 / 1
Comments: Limitations: One elevation was completely covered with ivy. All other elevations had some level of ivy obscuring the view.				
Roost survey results: Common pipistrelle bat was seen to emerge from the roof on the northern elevation, top left from the open door where the roof is covered in vegetation at 21:11 (24 minutes after sunset)), then fly north. A lesser horseshoe bat was seen to emerge (21:14) from the open door on the northern elevation, then flay along the building Lesser horseshoe bat emerged from the doorway and flew at a height of 1.5m along the side of the structure, following the hedgerow away, heading south.				
Survey 2 – no access				
Survey 3 – no access				
Photos/ diagrams: 				
Roost characterisation: Lesser horseshoe – day roost; and common pipistrelle – day roost				

Table 4-33 – Survey Results BU_705

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
27/10/2020	PBRA (external only)	BU_705	N/A	Air temp: 10 (˚C), rain 4, cloud cover 6, wind speed 1
Comments:				
Visual inspection results: Red brick walls with minor missing mortar.				
No hibernation suitability				
16/06/2021	21:15 to 23:00 (sunset = 21:30)	BU_705	Walkabout x 4	Air temp: 22 to 24 (˚C), rain 0/2, cloud cover 7/8, wind speed 1
Comments:				
Roost survey results: Single pipistrelle (21:47) bat seen emerging from neighbours shed (BU_661), which back onto the garden – bat foraged around garden for a while until it disappeared. No emergences for this property.				
13/08/2021	03:30 to 05:15 (sunrise = 05:00)	BU_646 (incidental sighting of BU_705)	EMT 2 x 2	Air temp: 15 (˚C), some rain, cloud cover 8, wind speed 4
Comments: Limitations: Could only see three sides of the property on the re-entry survey				
Roost survey results: While surveying BU_646, a common pipistrelle entered and roosted in the south east corner of the shed BU_705 (was labelled as BU_646 incorrectly at the time).				
7/09/2021	19:28 to 21:13 (sunset = 19:43)	BU_705	EMT 2 x 2 and IR Canon XA15 and x2 140 LED lamps	Air temp: 27 down to 23 (˚C), rain 0, cloud cover 1, wind speed 2
Comments:				
Roost survey results: No bat emergences.				
Survey 3 – not completed				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost				

Table 4-34 – Survey Results BU_737

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
03/02/2021	N/A PBRA (external only)	BU_737		Air temp: 7 (˚C), no rain, cloud cover 5, wind speed 3
Comments:				
Visual inspection results: No bat evidence recorded				
Hibernation survey – not completed				
12/07/2021	21:08 to 23:23 (sunset = 21:23)	BU_737	Wildlife Acoustics SM4 zc + Batbox Duet x 3 EMT x 2 and FLIR T540 thermal camera	Air temp: 18 down to 15 (˚C), no rain, cloud cover 7/8, wind speed ½
Comments:				
Roost survey results: At 21:49 a common pipistrelle bat emerged from around dormer window, possibly from behind wooden facia and headed in a north east direction.				
18/08/2021	20:10 to 22:25 (sunrise = 20:25)	BU_737	EMT 2 x 4	Air temp: 20 down to 18 (˚C), no rain, cloud cover 7/8, wind speed 2
Comments:				
Roost survey results: At 20:34/35 a common pipistrelle bat was recorded emerging east, from south eastern window.				
09/09/2021	19:23 to 21:38 (sunset = 19:38)	BU_737	EMT 2, Walkabout x 2 and Batlogger M x 1 and Canon XA11 camera x 2	Air temp: 19 down to 17 (˚C), rain 1/0, cloud cover 8, wind speed 1
Comments: light rain between 19:23-19:33 only, remainder of survey sunny and dry				
Roost survey results: Two emergences of common pipistrelle from the west dormer (20:00 and 20:06/07), the same location as on the 12/07/2021. They appeared from left side of dormer from behind wooden barge board (video file 55 at 03:30 minutes).				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day / transitional roost				

Table 4-35 – Survey Results BU_747

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA (external only)	BU_747	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Shed with timber frame, flat corrugated asbestos roof and walls; one wall is partially brick; concrete floor. Approximately four small sized droppings on stored wood.				
No DNA analysis completed				
No hibernation suitability				
05/09/2019	19:32 to 21:17 (sunset = 19:47)	BU_747	EMT 2 and Walkabout	Air temp: 12.4 down to 11 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:				
Roost survey results: One lesser horseshoe bat at 20:16 emerged (29 minutes after sunset).				
Survey 2 – access refused				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Lesser horseshoe – transitional / day roost				

Table 4-36 – Survey Results BU_751

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA (external only)	BU_751	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Access points include: Uneven, slipped, missing roof tiles; gaps between brick at south gable end; gaps where tiles meet wall plate; gaps at northern gable end where battens and tiles overhang.				
Access refused for hibernation survey				
29/07/2019	20:43 to 22:33 (sunset = 21:03)	BU_751	Walkabout and EMT 2	Air temp: 18.3 down to 16.5 (˚C), no rain, cloud cover 4, wind speed 3
Comments:				
Roost survey results: Four common pipistrelle bats emerging from the west elevation: Three from the ridge tiles, close to the gable end at 21:24, 21 minutes after sunset. One further common pipistrelle emerged at 21:35 (orange line) (33 minutes after sunset) from the gable end. Also an assumed brown long-eared bat was seen returning to the roost at 21:50 in BU_757 (47 minutes after sunset), but was not echo-locating.				
09/09/2020	19:20 to 21:05 (sunset = 19:36)	BU_751	Scout and EMT 2	Air temp: 18 down to 16 (˚C), no rain, cloud cover 3, wind speed 2
Comments:				
Roost survey results: Likely brown long-eared bat emerged at 19:58 (22 minutes after sunset) from wooden slats on gable end. Emerged and flew west (no recorded noise).				
Survey 3 – access refused				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost; and brown long-eared – day roost				

Table 4-37 – Survey Results BU_752

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_752	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Several droppings recorded in structure.				
DNA: date collected 18/07/2019 – Natterer's bat (lesser horseshoe suspected)				
Access refused for hibernation survey				
19/08/2019	21:00 to 23:15 (sunset = 21:15)	BU_752	EMT 2 x 2 (AM and HS)	Air temp: 15 down to 14 (˚C), no rain, cloud cover 0, wind speed 3/4
Comments:				
Roost survey results: Lesser horseshoe seen through a window roosting within BU_752 before the survey began. A lesser horseshoe bat feeding and hanging on a perch at 22:06 (51 minutes after sunset). AM located on the south east corner of the structure recorded re-entering (one *Myotis* at 21:20 returning to roost, 5 minutes after sunset) and emergence (one *Myotis* at 21:25 (10 minutes after sunset) emerging via leaving the structure, exact roost site unknown). HS recorded a potential emergence from *Myotis* at 21:32 (17 minutes after sunset); however, the location it came from could not be confirmed, so this is included as a roost as a precautionary basis; however, visibility was too poor to guarantee confirmation of emergence from north west side. 21:25 brown long-eared left building, assumed to be emerging.				
24/09/2020	18:48 to 20:31 (sunset = 19:03)	BU_752	Batlogger M, EMT 2, Walkabout and Scout	Air temp: 11 down to 10 (˚C), no rain (0) to 3 (moderate rain) by the end of the survey, cloud cover 4 up to 7, wind speed 1
Comments: Limitations: Some rain during the survey, not considered to be a significant limitation				
Roost survey results: Common pipistrelle foraging and noctule passes (seen foraging on previous surveys). No emergences.				
28/05/2021	Advanced licence bat survey techniques (radio tracking)	BU_752 (assumed with significant limitations)	Radio tracking	N/A
Comments: Bat 2 was a Natterer's (female adult in breeding condition) and was only recorded to roost during the day within Butler's Court farm buildings between the M5 and Withybridge Lane. Due to the inaccuracy[90] of radio tracking the exact location of this bat's roost(s) is unknown; however, it is assumed that on at least one occasion the bat was roosting in BU_752 (grid reference 390212.5, 224854.8) based on the triangulated radio tracking position on the 28/05/2021.				
Survey 3 – access refused				
Photos/ diagrams:   				
Roost characterisation: Natterer's –maternity / day / night roost; brown long-eared – day roost; and Lesser horseshoe – day roost				

[90] Triangulated points have a radius of error for each plotted point, this is generally estimated to be 20 m within the ranges worked with

Table 4-38 – Survey Results BU_753

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
05/09/2019	PBRA (external only)	BU_753	N/A	Air temp: 16 (˚C), no rain, cloud cover 5, wind speed 1
Comments:				
Visual inspection: No evidence recorded				
02/03/2021 – 25/03/2021	Hibernation static deployment	BU_753	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between 1 and 25 (˚C)
Comments: Deployed internally by landowner				
Hibernation results: No bat activity was recorded				
11/09/2019	19:19 to 21:04 (sunset = 19:34)	BU_753	Walkabout x 2 and EMT 2 x 2	Air temp: 19.7 down to 17.1 (˚C), no rain, cloud cover 7/ 6, wind speed 2
Comments:				
Roost survey results: No emergences.				
27/07/2020	20:50 to 22:35 (sunset = 21:05)	BU_753	Walkabout x 4	Air temp: 17 down to 16 (˚C), no rain, cloud cover 0/ 1, wind speed 1/ 2
Comments:				
Roost survey results: At 21:25 a single soprano pipistrelle was seen by the lead surveyor to have emerged; however, the exact location was not recorded.				
Survey 3 – access refused				
Photos / diagrams:  				
Roost characterisation: Soprano pipistrelle – day roost				

Table 4-39 – Survey Results BU_757

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_757	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. points: Exposed beams and ridge; gaps in ridge; uneven, loose, missing tiles. Open door. Droppings recorded: Medium sized droppings in eastern section (no DNA analysis).				
Access refused for hibernation survey				
05/09/2019	19:32 to 21:17 (sunset = 19:47)	BU_757	EMT 2 and Walkabout	Air temp: 12.4 down to 11 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:				
Roost survey results: Lots of common pipistrelle foraging and commuting with occasional *Myotis* passes. Regular bat activity throughout survey by *Myotis* (likely Natterer's based on call analysis), common pipistrelle and few passes from brown long-eared and soprano pipistrelle bats. A lesser horseshoe from BU_757 at 20:11 (24 minutes after sunset), was an early detection but not sighted, possible light sampling before emergence; seen later (20:17) commuting low to the ground from BU_757 E-W past BU_855. Considered to be an emergence of a single lesser horseshoe with no further data available.				
29/09/2020	18:35 to 20:50 (sunset = 18:50)	BU_757	EMT 2, Scout x 2 and Batlogger M2	Air temp: 14 down to 13 (˚C), no rain, cloud cover 2/ 4, wind speed 1
Comments:				
Roost survey results: Four emergences recorded from the gaps in the brick wall. Eight re-entries also recorded into the same spaces. A couple of times the bats emerged then re-entered immediately. There was a lot of activity after it was dark as well so potentially more emergences/ re-entries as they were flying around this area of the structure continuously, but it had got too dark to be sure. There was a lot of foraging activity in front of the structure and commuting bats from south-north. Mainly common pipistrelles recorded but also a *Myotis* and noctule. One lesser horseshoe and one brown long-eared was recorded. Common pipistrelle emerged at 19:26 (36 minutes after sunset), then a bat re-entered at 19:27. Common pipistrelle entered the brickwork from south,-re-entry into gap on left side at 19:28 (38 minutes after sunset). Common pipistrelle entered third row from the top left side. Common pipistrelle emergence, flew north from right side. Common pipistrelle entered from north to top, right of structure. Common pipistrelle entered middle, 3rd row down.				
29/07/2019	20:43 to 22:33 (sunset = 21:03)	BU_751 (additional info while surveying here)	Walkabout and EMT 2	Air temp: 18.3 down to 16.5 (˚C), no rain, cloud cover 4, wind speed 3
Comments:				
Roost survey results: While surveying BU_751 on the 29/07/2019, a possible re-entry into BU_757 close to the ridge tiles was seen.				
Survey 3 – access refused				
Photos/ diagrams:   				
Roost characterisation: Common pipistrelle –mating roost; brown long-eared – day roost; and lesser horseshoe – day roost				

Table 4-40 – Survey Results BU_761

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_761	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Open-fronted, dutch style barn with breeze block walls and corrugated asbestos sheets on roof; metal clad walls. Metal frame. Dropping found on caravan inside shed (no DNA analysis carried out).				
No Hibernation suitability				
29/09/2020	18:34 to 20:49 (sunset = 18:49)	BU_761	Walkabout x 2	Air temp: 16 down to 15 (˚C), a light drizzle at 19:05, cloud cover 3/ 7, wind speed 0/ 1
Comments:				
Roost survey results: Social calls by common pipistrelle throughout survey. Frequent *Myotis* passes recorded. At 19:39 and 19:42 (50 and 53 minutes after sunset) *Myotis* (from call analysis assessed to be Natterer's) bats were recorded emerging from the barn. At 19:43 and subsequently at 19:46 *Myotis* bats were recorded re-entering the roost at the same location. At 20:26 and 20:35 *Myotis* (from call analysis assessed to be Natterer's) bats were recorded emerging, assumed likely to be the same as the bats that previously entered i.e. maximum count of two *Myotis* (assessed to be Natterer's). A brown long-eared bat was recorded within the barn at 20:49 (2 hours after sunset) assumed to be using the barn.				
Survey 2 – access refused				
Survey 3 – access refused				
Photos/ diagrams: 				
Roost characterisation: Brown long-eared bat – night/ feeding roost; and *Myotis* (assumed to be Natterer's) – transitional roost.				

Table 4-41 – Survey Results BU_762

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
22/08/2019	PBRA (external only)	BU_762	N/A	Air temp: 19 (˚C), very light rain, cloud cover 8, wind speed 1
Comments:				
Visual inspection results: Long barn half of which has been converted into a residential structure with other half type of car port. Car port ceiling has been boarded with timber panelling. Two timber trusses without central post present. Roof duo pitched, laid with simple plain clay tiles and clay ridge. Walls brick. Some old timber beams present. Timber fascia present. Droppings likely from pipistrelle were recorded inside car port, on top of wood pile at eastern end of barn. Potential roosting locations include gaps between internal timber panels and wall.				
Access refused for hibernation survey				
06/09/2019	04:58 to 06:43 (sunrise = 06:28)	BU_762	Walkabout and EMT 2 x 3	Air temp: 13.1 up to 13.6 (˚C), no rain, cloud cover 100%, wind speed 1/ 2
Comments:				
Roost survey results: Very little bat activity, all but one bat (soprano pipistrelle) were common pipistrelles and one brown long-eared bat, recorded foraging and commuting. A common pipistrelle was seen at 06:17 (26 minutes before sunrise) that was assumed to return to the roost in BU_771.				
17/09/2020	19:02 to 20:47 (sunset = 19:17)	BU_762	Walkabout x 4	Air temp: 21.3 down to 18.1 (˚C), no rain, cloud cover 0, wind speed 1
Comments:				
Roost survey results: At 19:35 a common pipistrelle bat was seen to emerge from the southern elevation although the exact location was unknown. A further common pipistrelle emerged from under the apex ridge tile and headed south at 19:40 (23 minutes after sunset). Other bats included soprano pipistrelle and *Myotis*.				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – mating / transitional roost				

Table 4-42 – Survey Results BU_763

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA (limited internal access)	BU_763 (also known as BU_849)	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Brick barn with duo-pitched roof. Roof laid with clay tiles and clay ridge tiles, no underlay. Open doorway at Northern gable end and Eastern side elevation. Timber beams along wall plate/ lintel. Droppings record on a stack of bricks adjacent to east elevation (outside structure). Roosting features: Accessible ridge beam and exposed rafters; uneven, missing and loose tiles. Bat droppings in doorway at the beginning of survey on 09/09/2020 (no DNA analysis undertaken).				
Access refused for hibernation survey				
19/08/2019	20:20 to 21:55 (sunset = 20:25)	BU_763	Batlogger & EMT 2	Air temp: 23 up to 26 (˚C), no rain, cloud cover 0/ 1, wind speed 3/ 4
Comments:.				
Roost survey results: Regular activity by *Myotis* probably Natterers bat as well as foraging activity by common and soprano pipistrelle. No emergence seen but difficult structure to see emergence once light levels dropped.				
09/09/2020	19:20 to 21:05 (sunset = 19:36)	BU_763	Annabat Scout and EMT 2	Air temp: 18 down to 16 (˚C), no rain, cloud cover 2/ 3, wind speed 2
Comments:				
Roost survey results: A roosting pipistrelle species (no sound file to confirm species) under northern apex of the structure (labelled as BU_849 on the notes but is actually BU_763) at 19:20 (15 minutes before sunset). A further roosting pipistrelle species (no sound file to confirm species) emerged at 20:01 (25 minutes after sunset) emerged from the same location. At 20:10 (34 minutes after sunset) a common pipistrelle bat emerged from BU_763. At 20:22 and 20:25 (46 and 49 minutes after sunset) *Myotis* were seen to emerge (two in total one briefly re-entering).				
29/09/2020	18:34 to 20:49 (sunset = 18:49)	BU_761 (incidental sighting)	Walkabout x 2	Air temp: 16 down to 15 (˚C), no rain, cloud cover between 3 and 7, wind speed 0/1
Comments:				
Roost survey results: While surveyors were surveying BU_761 they saw a likely emergence from adjacent structure (BU_763), of a common pipistrelle.				
Survey 3 – access refused				
Photos / diagrams:  				
Roost characterisation: Common pipistrelle – mating / transitional roost; and *Myotis* (assumed to be Natterer's) – transitional roost				

Table 4-43 – Survey Results BU_765

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_765	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Large shed/ barn used for caravan parking. Breeze block walls with corrugated metal cladding and corrugated metal roof divided into two sections; internally the roof is supported by timber beams. Droppings likely from brown long-eared and pipistrelle on cars at western end of structure.				
No hibernation suitability				
20/08/2019	04:30 to 06:15 (sunrise = 06:15)	BU_765	EMT 2 x Walkabout	Air temp: 10 (˚C), no rain, cloud cover 0, wind speed 1
Comments:				
Roost survey results: Regular activity by *Myotis* probably Natterers bat as well as foraging activity by common and soprano pipistrelle. No emergence seen but difficult structure to see emergence once light levels dropped.				
15/09/2020	19:07 to 20:52 (sunset = 19:22)	BU_765	EMT 2 and Scout	Air temp: 23/ 22 (˚C), no rain, cloud cover 3/ 5, wind speed 0
Comments:				
Roost survey results: No bats were recorded emerging from the structure. Bats recorded during the survey included noctule, common pipistrelle, *Myotis* and soprano pipistrelle.				
Survey 3 – access refused				
Photos/ diagrams: 				
Roost characterisation: Unknown species (potentially brown long-eared or pipistrelle) – day roost				

Table 4-44 – Survey Results BU_766

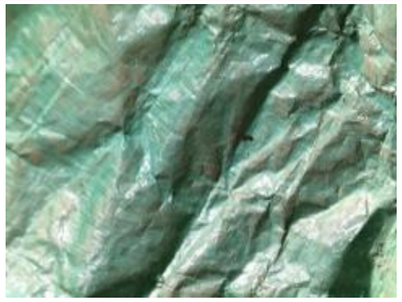
Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_766	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection. Timber framed lean-to with corrugated metal roof. Used for storage. Scattered droppings and moth wing found				
DNA: date collected 18/07/2019 – Natterer's, common pipistrelle and soprano pipistrelle				
No hibernation suitability				
05/09/2019	19:32 to 21:17 (sunset = 19:47)	BU_766	EMT 2 and Walkabout	Air temp: 12.4 down to 11 (˚C), no rain, cloud cover 0, wind speed 0/1
Comments:				
Roost survey results: Lots of common pipistrelle foraging and commuting with occasional *Myotis* passes. Regular bat activity throughout survey by *Myotis* (likely Natterer's from call analysis), common pipistrelle and few passes from brown long-eared and soprano pipistrelle. No emergences were recorded.				
Survey 2 – access refused				
Survey 3 – access refused				
Photos / diagrams:  				
Roost characterisation: Natterer's – Night/ feeding roost; Common pipistrelle – Night/ feeding roost; and Soprano pipistrelle – Night/ feeding roost (all assumed with limitations)				

Table 4-45 – Survey Results BU_771

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
22/08/2019	PBRA (external only)	BU_771	N/A	Air temp: 19 (˚C), very light rain, cloud cover 8, wind speed 1
Comments:				
Visual inspection results: Cross gabled roof laid with plain clay tiles and clay ridge tiles. Brick walls and extensive wooden cladding along most of main walls. Decorative timber eaves (undersides). Timber bargeboards on gable ends clad with timber boarding. No bargeboard present on gable end without cladding. Many gaps under wooden cladding on walls, gaps around door frames and windows, lead flashing over window on west roof with gaps underneath. Gaps around beam ends on west and east walls and gaps at top of gable end. Gaps under tiles. No specific evidence of bat usage during the PBRA.				
Access refused for hibernation survey				
06/09/2019	04:58 to 06:43 (sunrise = 06:28)	BU_762 (incidental sighting)	Walkabout and EMT 2 x 3	Air temp: 13.1 up to 13.6 (˚C), no rain, cloud cover 100%, wind speed 1/ 2
Comments:				
Roost survey results: Very little bat activity, all but one bat (soprano pipistrelle) were common pipistrelles and one brown long-eared bat, recorded foraging and commuting. A common pipistrelle was seen at 06:17 (26 minutes before sunrise) that was assumed to return to the roost in BU_771 but exact location unknown as obscured from surveyor position.				
29/08/2019	04:45 to 06:28 (sunrise = 06:13)	BU_771	Walkabout and EMT 2 x 3	Air temp: 9 up to 5.6 (˚C), no rain (but had been heavy rain earlier in the night, cloud cover 0, wind speed 0
Comments:				
Roost survey results: Very little bat activity, with passes from soprano pipistrelle, common pipistrelle, and two noctule passes. No bats seen to re-enter a roost.				
14/09/2020	19:09 to 20:55 (sunset = 19:24)	BU_771	Scout x 2 and EMT 2 x 2	Air temp: 22 (˚C), no rain, wind speed 0, cloud cover 0
Comments:				
Roost survey results: Few noctule passes and constant common pipistrelle and some soprano pipistrelle foraging behind the barn, some social calls were also recorded. One common pipistrelle emerged from the lower, left gable end at 19:52 (28 minutes after sunset) and flew north.				
Survey 3 – access refused				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – transitional roost				

Table 4-46 – Survey Results BU_850

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	N/A PBRA (external only)	BU_850	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection: Three storey residential structure with a series of extensions. On the northern elevation a two-storey extension with gabled roof and church style windows with stone surrounds (maybe formerly a chapel). On the eastern elevation of the main house a two-storey extension is attached with a dormer window on the southern side, attached to the east of this a single storey extension containing garages which is listed as a separate structure (BU_855). Main house is cross-gabled; three brick chimneys; plain clay tiles; stone ridge; lead flashing; dormer window covered with lead. Some new PVC windows. Timber beams on wall plate with joint holes. A brick wall is attached to the northern most extension. Stone wall (attached to house) has gaps between brickwork. No internal access.				
Access refused for hibernation survey				
05/09/2019	19:32 to 21:17 (sunset = 19:47)	BU_850	EMT 2 and Walkabout	Air temp: 12.4 down to 11 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:.				
Roost survey results: Lots of common pipistrelle foraging and commuting with occasional *Myotis* passes. Regular bat activity throughout survey by *Myotis* (likely Natterer's) , common pipistrelle and few passes from brown long-eared and soprano pipistrelle. One common pipistrelle emergence from gable end at 20:00 (13 minutes after sunset).				
Survey 2 – access refused				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost				

Table 4-47 – Survey Results BU_853

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	PBRA	BU_853	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection Single storey barn open at the front and with open roof void dating from 1858. Walls are constructed from red brick; top of the northern (front) gable end is clad with timber boards; The roof is laid with plain, flat clay tiles and clay ridge tiles. There is no underlay present below tiles. Roof is supported by a traditional timber truss construction in A-frame formation with no central beam and one purlin each side. Materials are stored on the trusses potentially obscuring bat droppings.				
No hibernation suitability				
27/06/2019	21:17 to 23:32 (sunset = 21:32)	BU_853	Walkabout x 2	Air temp: 20 down to 18 (˚C), no rain, cloud cover 0, wind speed 0-6
Comments:				
Roost survey results: Calls from *Nyctalus* spp, common pipistrelle soprano pipistrelle, *Myotis* and brown long-eared. At 22:33 (59 minutes after sunset) a *Myotis* (Likely to be Natterer's from sound analysis) emerged from a lifted roof tile. At 22:46 (1 hr 14 minutes after sunset) a brown long-eared bat was seen to emerge from the barn. Finally, 22:50 (1 hr 22 min after sunset) a further *Myotis* (likely to be Natterer's from sound analysis) bat was seen to emerge from the open front of the shed.				
29/07/2019	20:43 to 22:33 (sunset = 21:03)	BU_853	EMT 2 x 2	Air temp: 18 down to 16.5 (˚C), no rain, cloud cover 4-6, wind speed 0-3
Comments:				
Roost survey results: Foraging bats recorded include common pipistrelle and noctule. No bats were recorded to emerge from the structure.				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: *Myotis* (assumed to be Natterer's) – Day roost; and Brown long-eared – Day roost				

Table 4-48 – Survey Results BU_854

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	N/A PBRA (external only)	BU_854	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection BU 854, 863, 355, 865 and 860 (all one structure): Large brick hay barn with cross-gabled roof laid with corrugated metal sheeting, dated 1837; the barn is open at both the east and west facing gable ends, on the eastern gable end large open barn doors are present. A timber lintel is present above the barn door. The west facing gable end is stacked high with hay. Stone coping stones present on the gable ends; square holes are present in the northern and southern gable end walls and alongside elevations. Internally traditional lath and plaster is present below the metal sheeting, this would have been likely laid with tiles in the past. A bat roost is present beneath the lath and plaster (see evidence section below). Traditional timber trusses in A shape without central beam.				
DNA: date collected 18/07/2019 – Natterer's bat, brown long-eared and common pipistrelle				
Access refused for hibernation survey				
24/06/2019	21:18 to 23:31 (sunset = 21:31)	BU_854	Walkabout x 5	Air temp: 22 to 24 (˚C), no rain, cloud cover 7, wind speed 0
Comments:				
Roost survey results: Species heard includes: Nyctaloid, common pipistrelle, *Myotis*, brown long-eared, and soprano pipistrelle calls, later in the survey. Internal roosting locations not known. 21:45 (14 minutes after sunset) a common pipistrelle was observed emerging out of the main barn. A further bat (not recorded on the detector, although it's assumed it was a common pipistrelle) emerged from the top of the roof entrance and flew into the barn. Between 21:56 and 22:01 an assumed seven (maximum three bats were seen at one time) further common pipistrelles emerged from the structure, likely to be light sampling/ foraging under cover. Additionally, two *Myotis* (assumed to be Natterer's based on DNA dropping analysis) bats emerged at 22:13 and 22:19 from the barn.				
30/07/2019	03:58 to 05:43 (sunrise = 05:28)	BU_854	EMT 2 x 3 and Walkabout	Air temp: 16.2 down to 15.6 (˚C), no rain, cloud cover 0, wind speed 2
Comments:				
Roost survey results: Very little bat activity from *Myotis* and common pipistrelle and soprano pipistrelle and brown long-eared bats. At 04:51 (37 minutes before sunrise) a common pipistrelle was recorded likely to be re-entering the roost to the open front, east orientation of BU_854.				
26/05/2021	20:56 to 23:11 (sunset = 21:11)	BU_854	EMT 2 x4	Air temp: 15 down to 9 (˚C), no rain, cloud cover 3/ 2, wind speed 5/ 2
Comments: Limitations: Security lights on the southern end of the structure cast a glare and shadows. The sound of the river flowing overwhelmed any possibility of audibly detecting bats by ear unless they were very close.				
Roost survey results: Relatively quiet survey. No signs of emerging bats, despite noting some feeding debris (butterfly wings) inside the barn on the northern internal wall. IR camera was facing the northern aspect on this survey. Only a couple of pips were in the space around the farmyard and structure, generally foraging back and forth towards the end of the survey.				
Photos/ diagrams:   				
Roost characterisation: Common pipistrelle – maternity roost; Natterer's – day roost; and Brown long-eared – day roost				

Table 4-49 – Survey Results BU_855

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	N/A PBRA	BU_855	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection Series of garages attached to BU_850 and BU_757 with duo pitched roof laid with plain clay tiles and clay ridge tiles. Walls are constructed from red brick. Most eastern garage has a stud ceiling but is partially open to the roof void, it has a traditional timber truss construction, no underlay is present below tiles. Small number of scattered droppings were found here. Middle garage has chipboard ceiling and breeze block wall; corrugated metal sliding doors. Access includes: Uneven roof tiles; gaps between beams; hole in gable end.				
DNA: date collected 18/07/2019 – Common pipistrelle bat				
Access refused for hibernation survey				
05/09/2019	19:32 to 21:17 (sunset = 19:47)	BU_855	EMT 2 and Walkabout	Air temp: 12.4 down to 11 (˚C), no rain, cloud cover 0, wind speed 0/ 1
Comments:				
Roost survey results: Lots of common pipistrelle foraging and commuting with occasional *Myotis* passes. Regular bat activity throughout survey by *Myotis* (likely Natterer's) , common pipistrelle and few passes from brown long-eared and soprano pipistrelle. No emergences from this structure.				
27/05/2021	21:00 to 23:15 (sunset = 21:15)	BU_855	Batlogger M2 and EMT 2 x 3	Air temp: 18 down to 11 (˚C), no rain, cloud cover 5-10, wind speed 2/ 1
Comments:				
Roost survey results: Mostly common pipistrelles with occasional soprano pipistrelle were observed, brown long eared also seen commuting and foraging around the structure, as well as *Myotis* bat calls. At 21:19 and 21:37 (4 and 22 minutes after sunset) common pipistrelle bats were seen to emerge, dropping out of the garage and flying north east and another flying east over the house.				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost				

Table 4-50 – Survey Results BU_857

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/07/2019	N/A PBRA (external only)	BU_857	N/A	Air temp: 19 (˚C), no rain, cloud cover 6, wind speed 1
Comments:				
Visual inspection Large shed/ barn used for caravan parking. Breeze block walls with corrugated metal cladding and corrugated metal roof divided into two sections; internally the roof is supported by timber beams. Droppings recorded.				
DNA: date collected 31/07/2019 – Natterer's, whiskered and common pipistrelle (notes say BU_852, which is the same structure as BU_857)				
No hibernation suitability				
20/08/2019	04:30 to 06:16 (sunrise = 06:15)	BU_857	Batlogger & EMT 2	Air temp: 18 down to 11 (˚C), no rain, cloud cover 0/ 1, wind speed 2/ 1
Comments:.				
Roost survey results: Regular activity by *Myotis*, probably Natterer's bat as well as foraging activity by common and soprano pipistrelle. No emergence seen but difficult structure to see emergence once light levels dropped.				
15/09/2020	19:07 to 20:52 (sunset = 19:22)	BU_857	Batlogger & Scout	Air temp: 23 down to 22 (˚C), no rain, cloud cover 3/ 5, wind speed 0
Comments:				
Roost survey results: No emergences recorded. Bat recording included noctule, common and soprano pipistrelle and brief passes from lesser horseshoe, *Myotis* and brown long-eared.				
Survey 3 – access refused				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – Night / feeding roost; Natterer's – Night / feeding roost; and Whiskered – Night / feeding roost				

Table 4-51 – Survey Results BU_862

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
21/08/2019	N/A PBRA (external only)	BU_862	N/A	Air temp: 18 (˚C), no rain, cloud cover 4, wind speed 0
Comments:				
Visual inspection Residential structure (incl. barn conversions) A few gaps in roof tiles, but fairly tight. Soffit box has one small gap, no droppings.				
02/03/2021 – 25/03/2021	Hibernation static deployment	BU_862	Swift and EasyLog USB – Lascar temperature and humidity data logger	Between -0.5 and 27 (˚C)
Comments: Deployed internally by landowner				
Hibernation results: No bat activity was recorded				
20/07/2020	20:59 to 22:44 (sunset = 21:14)	BU_862	Walkabout x 4	Air temp: 19 down to 17 (˚C), no rain, cloud cover 1/ 7, wind speed 1
Comments:				
Roost survey results: At 21:32 two bats (not echolocating) emerged from under the ridge. One further bat emerged from this location and heading north at 22:06 (52 minutes after sunset), determined to be a common pipistrelle bat. On this basis all three bats have been presumed to be common pipistrelle. At 21:57 (43 minutes after sunset) a re-entry and possible emergence of another common pipistrelle coming from a different gable wall was detected. At 21:45 and 21:54 (29 and 38 minutes after sunset) two common pipistrelle bats in total emerged from a ridge tile at gable end.				
21/09/2020	18:53 to 20:38 (sunset = 19:08)	BU_862	Scout, Walkabout, Batlogger M2 and EMT 2	Air temp: 22 down to 19 (˚C), no rain, cloud cover 1/ 3, wind speed 1
Comments:				
Roost survey results: Regular bat calls from common pipistrelle with occasional noctule and *Myotis*. No bats emerged.				
03/08/2021	20:26 to 22:56 (sunset = 20:56)	BU_862	SM4/ Duet	Air temp: 18 down to 16 (˚C), light drizzle then dry, cloud cover 8/ 6, wind speed 0
Comments:				
Roost survey results: Limited activity, occasional foraging. No emergences.				
Photos/ diagrams:  				
Roost characterisation: Common pipistrelle – day roost				

Table 4-52 – Survey Results BU_990

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019	PBRA (external only)	BU_990	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection: Timber framed barn with timber cladding. Clay double roman tiles on a duo-pitched roof. Clay ridge tiles. Ridge very lifted, many open spaces. Gable ends only partially clad, therefore open to outside. Many open spaces between timber panels. Door on the northern gable end, and another on the eastern aspect have large gaps around them. Large missing panels on all aspects.				
No hibernation suitability				
24/07/2019	20:56 to 22:55 (sunset = 21:11)	BU_990	Walkabout x 2	Air temp: 26 down to 21 (˚C), no rain, cloud cover 6/ 1, wind speed 0/ 1
Comments:				
Roost survey results: Passes of common pipistrelle early, probably emerged from one of the adjacent barns. Frequent foraging between barns and in the field to north of structures. Occasional soprano pipistrelle passes. Noctule passes recorded early on and throughout (occasionally). At 21:55 (44 minutes after sunset) a single bat emerged from the end of the barn. No data as the card was corrupt; however, common pipistrelle was recorded by the other surveyor at the same time, so this species was assumed to be a single common pipistrelle bat.				
13/08/2019	04:20 to 06:05 (sunrise = 05:50)	BU_990	EMT 2 x 2	Air temp: 11.1 down to 8.8 (˚C), no rain, cloud cover 0, wind speed 0
Comments:				
Roost survey results: Very little bat activity from common pipistrelle's and noctules and one *Myotis*. One common pipistrelle bat re-entered BU_992, not this structure.				
29/07/2020	20:47 to 22:32 (sunrise = 21:02)	BU_990	Walkabout x 2	No data
Comments):				
Roost survey results: One common pipistrelle bat was seen to emerge at 21:19 from the northern gable that is vegetated with elder or the south easter elevation (the exact location was unknown). Other bats recorded regularly during the survey were *Myotis*, common pipistrelle and noctule.				
Photos/ diagrams: 				
Roost characterisation: Common pipistrelle – day roost				

Table 4-53 – Survey Results BU_992

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
31/07/2019	N/A PBRA (external only)	BU_992	N/A	Air temp: 20 (˚C), no rain, cloud cover 8, wind speed 2
Comments:				
Visual inspection: Brick farmhouse currently in residential use. Cross gabled roof laid with plain clay tiles. Ridge tiles made of slate, no obvious gaps under ridge tiles. Large gable overhangs are present with decorative bargeboards. Red brick chimney with lead flashing. Hole visible in the chimney. Ventilation tiles in roof. Conservatory on the northern aspect of the house. In addition, a single storey lean-to is also present on the northern elevation. Gaps present under eaves of lower pitched roof. Gaps under fascia on western aspect. Stone surroundings of all windows with old timber frames. A porch is present at the southern elevation of the house. Porch made of timber with clay tiles on a pitched roof. Bat droppings found on porch floor. Possibly accessing behind the timber frame between the porch and house. Access around stone window ledge into brickwork but a unable to see full extension from the ground. Ventilation grate above bay window on southern aspect. Blocked up window on the eastern aspect. Unable to see if there are gaps under the eaves throughout due to remnant dead vegetation. Swallows nest in southern gable end. Tenant in house has previously mentioned a bat being in the bedroom. Unable to reach feature to endoscope. Able to visually inspect from the ground using a torch. Approximately 15 droppings in the porch.				
No hibernation survey possible as there is no roof void based on the asbestos report				
DNA: date collected 31/07/2019 – Whiskered bat				
31/07/2019	20:45 to 22:55 (sunset = 21:00)	BU_992	Walkabout x 4	Air temp: 22 down to 18 (˚C), no rain, cloud cover 7/ 8, wind speed 1
Comments:				
Roost survey results: Bat species recorded included common pipistrelle, noctule, soprano pipistrelle. One barbastelle was recorded at 22:22. A common pipistrelle bat was recorded emerging at 21:15/16 (15/ 16 minutes after sunset) from the eaves of the house on the north east gable towards the barn. One bat (not recorded) emerged from under the eaves emerging from the south west gable at approximately 21:18 (18 minutes after sunset), assumed to be a pipistrelle based on the time of emergence (and later bat species identification). A further common pipistrelle bat was seen to emerge at 21:21 (21 minutes after sunset) from the south west gable. A bat was seen to exit the structure at this location at 21:27, although it was not echolocating it was assumed to be a common pipistrelle based on the location, time and other bat recorded from this location. A total of 4 x common pipistrelle bats emerged from two locations.				
12/08/2019	20:23 to 22:08 (sunset = 20:38)	BU_992	EMT 2 x 2 and Batlogger M2 x 2	Air temp: 18 down to 16 (˚C), no rain, cloud cover 0/ 1, wind speed 2
Comments:				
Roost survey results: Multiple passes and foraging of common pipistrelle and serotines between structures BU_993 and BU_990, foraging about BU_992. There were also a few noctule / serotine passes and brown long-eared and possible *Myotis*. A single common pipistrelle bat emerged from the raised roof tiles nearest to the chimney stack at 20:58 (20 minutes after sunset).				
13/08/2019	04:20 to 06:05 (sunrise = 05:50)	BU_990 (incidental sighting)	EMT 2 x 2	Air temp: 11.1 down to 8.8 (˚C), no rain, cloud cover 0, wind speed 0
Comments:				
Roost survey results: Very little bat activity from common pipistrelle's and noctules and one *Myotis*. One bat re-entered BU_992, out of sight of the surveyors on the south west side of the structure.				
14/07/2020	21:04 to 22:51 (sunset = 21:21)	BU_992	Walkabout x 4	Air temp: 17 down to 16 (˚C), no rain, cloud cover 8, wind speed 1
Comments:				
Roost survey results: At 21:34 (21:13 minutes after sunset) a common pipistrelle bat exited from the gable wall. At 21:35 (14 minutes after sunset) a common pipistrelle bat was seen foraging and then re-entering the same location. At 21:42 (21 minutes after sunset) a common pipistrelle bat was seen to exit from the same location. Bats recorded during the survey include serotine, noctule, *Myotis*, common and soprano pipistrelle and Leisler's. A total of 2 x common pipistrelle bats emerged.				

Photos/ diagrams:	  
Roost characterisation: Common pipistrelle – day roost; and Whiskered – transitional roost	

Appendix B. Tree Assessments

B.1. Tree Survey Results[91]

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
34	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb Surveyor initials: SS &JK	Emergence [93] 11/08/2020 Weather: temp 29°C, wind 1, rain 0 and cloud cover 2 Survey start time: 20:20 Survey end time: 22:15 Sunset/sunrise time: 20:39 Limitations: an unaccompanied camera was used Results: No emergence observed	Emergence 26/08/2020 Weather: temp 19°C, wind 1, rain 0 and cloud cover 4 Survey start time:19:57 Survey end time: 20:08 Sunset/sunrise time:21:48 Limitations: an unaccompanied camera was used Results: No emergence observed	N/A	Moderate	W. Willow	Ivy cover at 2m on the eastern aspect Split bark at 2m on the eastern aspect A rot hole at 2m on the eastern aspect
35	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	N/A	Tree climb – 11/08/2020 Weather: temp 28, wind 2, rain 0 and cloud cover 0 Hot Limitations: No Limitations Results: Feature of low suitability to support roosting bats	N/A	N/A	Low	Hawthorne	Ivy cover at all heights and orientations
36	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	N/A	Tree climb – 11/08/2020 Weather: temp 28, wind 2, rain 0 and cloud cover 0 Hot Limitations: No Limitations	N/A	N/A	Low	Hawthorn	Tree is 7m tall with a 25cm DBH. Ivy cover at all heights and orientations

[91] The table excludes the following: Trees where there was no access for survey - 725, 726, 272, 728, 729, 730, 731, 732, 733, 734, 735, 736; negligible suitability trees - 18, 19, 21, 30, 31, 32, 33, 44, 47, 54, 58, 59, 74, 75, 77, 78, 79, 81, 82, 83, 88, 90, 91, 98, 99, 100, 102, 103, 107, 108, 111, 112, 117, 118, 119, 121, 122, 133, 134, 135, 138, 139, 140, 141, 142, 143, 157, 158, 159, 165, 166, 167, 168, 169, 170, 195, 196, 198, 199205, 210, 215, 221, 227, 228, 234, 238, 239, 266, 267, 268, 269, 274, 275, 279, 280, 282, 324, 325, 327, 328, 331, 332, 333, 336, 337, 338, 339, 340, 500, 501, 503, 513, 519, 554, 555, 557, 572, 573, 585, 595, 597, 598, 599, 600, 601, 603, 604, 606, 617, 618, 619, 621, 638, 676, 679, 684, 689, 699, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 718, 719; low suitability trees - 17, 20, 24, 25, 37, 38, 46, 63, 68, 69, 71, 76, 80, 84, 85, 94, 95, 104, 105, 110, 113, 114, 115, 120, 130, 137, 171, 213, 214, 225, 243, 245A, 250, 255, 256, 278, 283, 284, 285, 326, 329, 330, 334, 335, 486, 498, 504, 505, 514, 518, 520, 544, 545, 546, 548, 549, 551, 570, 571, 605, 640, 641, 642, 643, 668, 680, 681, 698, 700, 714, 715, 716, 717; negligible suitability tree groups - G3, G4, G14, G17, G18, G20, G23, G38, G42, G44, G84, G85, G86, G87, G88, G89, G95, G96, G97, G99, G100, G101, G102, G103, G106, G107, G108, G111, G112, G113, G114, G115, G116, G117, G118, G119, G120, G121, G122, G123, G124, G125, G126, G127, G130, G131, G132, G139, G140, G142, G143, G144, G145, G146, G147, G148, G149, G150, G151, G152, G153, G156, G157, G158, G159, G160, G161, G162, G163, G164, G165, G28, G30, G34, G36; low suitability tree groups - G10, G11, G12, G13, G15, G16, G19, G21, G22, G24, G25, G27, G39, G40, G41, G45, G46, G47, G48, G49, G50, G54, G55, G56, G98, G109, G141, G154, G155, G166.

[92] Survey equipment included high powered torches, binoculars and an endoscope

[93] All emergence surveys were undertaken using Peersonic RPA3 and Elekon Batlogger M detectors accompanied by high-definition infra-red cameras (5-50mm lens with sony image sensors and six inbuilt IR illuminators per camera.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Results: Feature of low suitability to support roosting bats					
39	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	N/A	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No Limitations Results: no bats observed	N/A	N/A	Low	W. Willow	Tree is 15m tall with a 180cm DBH. Small knot holes on the eastern aspect between 5 and 10cm. Superficial holes in pollarded head between 5 and 10cm.
40	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Low	W. Willow	Tree is 6m tall with a 30cm DBH. Shallow, exposed butt rot 1m on the southern aspect Small areas of lifting bark4m on the eastern aspect
41	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Low	W. Willow	Tree is 12m tall with a 30cm DBH. Butt rot extending into two chambers from ground level up to 30cm and 60cm, with an 8cm internal diameter
42	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	Emergence - 11/08/2020 Weather: temp 28, wind 2, rain 0 and cloud cover 0 Hot Survey start time:20:20 Survey end time: 22:10 Sunset/sunrise time: 20:39 Limitations: an unaccompanied camera was used Results: No emergence observed	Emergence - 26/08/2020 Weather: temp 18, wind 7mph, rain 0 and cloud cover 0 Fair Survey start time: Survey end time Sunset/sunrise time: Limitations: Assisted Emergence - SD card failure so conducted survey using IR & Cam visually. No emergence observed. Results: No emergence observed	N/A	Moderate	W. Willow	Tree is 9m tall with a 32cm DBH. Loose bark 3m high on the eastern aspect, extends upwards 20 – 30cm.
43	Moderate	04/06/2019	No	21/02/2020	N/A	N/A	N/A	Low	W. Willow	Tree is 15m tall with a 34cm DBH.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
		Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations		Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb Surveyor initials: SS &JK						Wound on base around dead heartwood, open from top therefore leaving it damp and exposed.
45	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	W. Willow	Tree 8m tall with a 100cm DBH.Loose bark 2m high on the southern aspect Large open stem cavity at 1m, some secondary crevices but heavily obscured by surrounding vegetation
48	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	W. Willow	Tree 15m tall with a 45cm DBH. Wound 2m high on the western aspect. Wound extends upwards 1.5m and is smooth and dry
49	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	Yes	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: No bats recorded	Tree climb - 17/08/2020 Weather: temp 19°C, wind 2, rain 2 and cloud cover 0 Limitations: None Results: No bats recorded	Tree climb - 01/09/2020 Weather: temp 14, wind 1, any rain 0 and cloud cover 0 Warm and clear Limitations: None Results: No bats recorded	High	W. Willow	Tree 10m tall with a 30cm DBH. Wound approximately 2m high on the northern aspect which extends upwards approximately 1m, is dry and dusty internally. Two chambers at the apex
50	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed bats recorded	N/A	N/A	N/A	Low	W. Willow	Tree 12m tall with a 28cm DBH. Woodpecker hole at 4m on the northern aspect, feature extends downwards 8cm and is damp at the base
51	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers	N/A	N/A	N/A	Low	W. Willow	Tree of 14m tall with a 45cm DBH. Moderate ivy cover on the steam Tear outs with limited shelter approximately 8m high.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
				Limitations: None Results: no bats observed						
52	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	W. Willow	Tree of height 13m with a 30cm DBH Moderate ivy cover offering some limited shelter
53	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	W. Willow	Tree of height 13m with a 40cm DBH. Moderate ivy cover offering some limited shelter
55	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Emergence - 11/08/2020 Weather: temp 29, wind 1, rain 0 and cloud cover 2 Hot Survey start time: 20:20 Survey end time: 22:10 Sunset/sunrise time: 20:39 Limitations: due to adjacent vegetation the survey position was sub-optimal, only one camera used. The camera was unaccompanied Results: No emergence observed	Tree climbing – 01/09/2020 Weather: temp 14°C, wind 1, rain 0 and cloud 0. Limitations: none. Results: no bat evidence found, tree has failed completely prior to the survey and no longer provides any suitability.	N/A	Negligible	W. Willow	Tree of height 16m with a 100cm DBH. Originally identified to have a compression fork at the base, a hazard beam at 3m on the southern aspect and large lifting bark at 1m on the north eastern aspect. All features lost when the tree failed as the features became very exposed.
56	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations Surveyor initials: CG and HC	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: unable to climb due to the pond at base	Tree climb - 11/08/2020 Weather: temp 28, wind 2, any rain 0 and cloud cover 0 Results: features are of low suitability to supporting roosting bats	N/A	N/A	Low	W. Willow	A tree 13m tall with a 13cm DBH. Feature includes lifting bark at 1m on the eastern aspect.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
				Results: no bats observed						
57	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	Yes	No survey - No survey possible due to large low hanging limbs and an unstable stem making a tree climb unsuitable	Emergence: 11/08/2020 Weather: temp 29, wind 1, rain 0 and cloud cover 2 Survey start time: 20:17 Survey end time: 21:39 Sunset/sunrise time: 22:10 Limitations: All surveys missed the maternity period, an unaccompanied camera was used Results: No emergence observed	Emergence: 26/08/2020 Weather: temp 19, wind 1, rain 0 and cloud cover 4 Survey start time: 19:57 Survey end time: 20:08 Sunset/sunrise time: 22:16 Limitations: All surveys missed the maternity period, an unaccompanied camera was used Results: No emergence observed	Emergence: 16/09/2020 Weather: temp 17, wind 2, rain 0 and cloud cover 3 Survey start time: 18:32 Survey end time: 19:20 Sunset/sunrise time: 21:05 Limitations: All surveys missed the maternity period, an unaccompanied camera was used Results: No emergence observed	High	W. Willow	Tree is 15m tall with a 120cm DBH. Branch cavities and tear outs present. A butt rott with a large open cavity was identified at 1m on the eastern aspect
60	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Emergence - 17/08/2020 Weather: temp 19, wind 1, rain 0 and cloud cover 5 Survey start time: 20:01 Survey end time: 20:27 Sunset/sunrise time: 21:57 Limitations: an unaccompanied camera was used Results: No emergence observed	Emergence - 02/09/2020 Weather: temp 15, wind 3, rain 0 and cloud cover 7 Survey start time: 19:35 Survey end time: 19:52 Sunset/sunrise time: 21:36 Limitations: an unaccompanied camera was used Results: No emergence observed	N/A	Moderate	Pear spp.	Tree is 7m tall with a 40cm DBH. Large helical split down the stem exposing the heartwood.
61	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bat found	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: No survey limitations Results: No bat found	N/A	Moderate	Pear Spp.	Tree is 15m tall with a 45cm DBH. Mature pear tree with a wound at 2m on the northern aspect that extends upwards 8cm
62	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	N/A	N/A	N/A	Low	Apple Spp.	Tree is 5m tall with a 35cm DBH. A large stem cavity at 1m on the northern aspect. Inspected to be very open and exposed.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
64	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	N/A	N/A	N/A	Low	Apple Spp.	Branch cavities at 4m high on the eastern aspect, at 4 m high on the north eastern aspect and 9m high on the northern aspect, loose bark on all aspects, and a woodpecker hole at 7m high on the north-eastern aspect.
65	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: Unable to fully inspect due to nesting material. Results: No bats observed	N/A	Moderate	Apple Spp.	Tree is 5m tall with a 40cm DBH. Butt rott at ground level that is very open and exposed, extending up to 2m. A woodpecker hole was identified at 4m on the eastern aspect which extends upwards 45cm it was found to be dry and well sheltered.
66	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: No survey limitations Results: no bats observed	N/A	Moderate	Pear spp.	Tree is 18m tall with a 55cm DBH. A wound was identified at 8m on the northern aspect that extends up 15cm, and downwards 30cm.
67	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	N/A	N/A	N/A	Low	Pear spp.	Tree is 14m tall with a 35cm DBH. Large open stem cavity at 1.5m high on the eastern aspect which has 4 access points but it very open, dusty and cobwebbed inside.
70	Moderate	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	N/A	N/A	N/A	Low	Apple spp.	Tree is 15m tall with a 45cm DBH. A wound at 2m high on the western aspect which extends upwards 1.5m and is smooth and dry however the tree has failed.
72	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	Yes	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 27/07/2020 Weather: temp 20, wind 1, any rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations, little owl in base of tree Results: No bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, any rain 0 and cloud cover 2 Warm, light breeze Limitations: No survey limitations Results: No bats observed	Tree climb - 02/09/2020 Weather: temp 17, wind 9, any rain 0 and cloud cover 0 Fair Limitations: No survey limitations Results: No bats observed	High	Apple spp	Tree is 7m tall with a 45cm DBH. Butt rot at 1m on the western aspect which extends upwards 1m to a secondary egress point. Little owl identified within the feature on 27/07/2020.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
73	High	04/06/2019 Weather: 12°C, wind 2, rain 1, cloud 8 Limitations: No limitations	No	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 17/08/2020 Weather: temp 19, wind 2, any rain 0 and cloud cover 2 Warm, light breeze Limitations: No limitations Results: No bats observed	No survey – tree climb	N/A	Low	W, Willow	Tree is 5m tall with a 200cm DBH. A wound at 2m within the pollard head with a number of crevices but generally very open and dusty,
86	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	Yes	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unable to fully inspect as unsafe to climb	Emergence - 17/08/2020 Weather: temp 19, wind 1, rain 1 and cloud cover 5 Warm, light breeze Survey start time: 20:08 Survey end time: 22:02 Sunset/sunrise time: 20:27 Limitations: some light rain at the end of the survey, an unaccompanied camera was used Results: No emergence observed	Emergence - 02/09/2020 Weather: temp 15, wind 3, rain 0 and cloud cover 7 Fair Survey start time: 19:30 Survey end time: 21:23 Sunset/sunrise time: 19:52 Limitations an unaccompanied camera was used Results: No emergence observed	Emergence - 16/09/2020 Weather: temp 17, wind 2, rain 0 and cloud cover 3 Fair Survey start time: 18:43 Survey end time: 20:50 Sunset/sunrise time: 19:20 Limitations: an unaccompanied camera was used Results: No emergence observed	Confirmed	Ash dead	ALBST recorded a Natterer's male likely roosting in this tree on the 30/05/2021 Tree is 14m tall with a 55cm DBH. Large open stem cavity. Hollow from approx. 1.5m to above 7m. Five woodpecker holes at 8m high on various aspects leading into the stem
87	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Negligible	Oak	Tree is 18m tall with a 110cm DBH. A tear out 4m high on the western aspect and a weld 6m on the north-eastern aspect.
89	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	Emergence - 17/08/2020 Weather: temp 19, wind 1, rain 2 and cloud cover 5 Warm, light breeze Survey start time: 20:12 Survey end time: 21:48 Sunset/sunrise time: 20:27 Limitations: Survey stopped early due to rain, an unaccompanied camera was used	Emergence - 02/09/2020 Weather: temp 17, wind 9, any rain 0 and cloud cover 0 Fair Survey start time: 19:30 Survey end time: 21:23 Sunset/sunrise time: 19:52 Camera: B8 camera used Limitations: an unaccompanied camera was used Results: No	N/A	Moderate	W. Willow	Tree is 12m tall with a 220cm DBH. Willow pollard. Numerous small cavities, large open stem cavity

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Results: No emergence observed	emergence observed				
92	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Negligible	W. Willow	N/A
93	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Negligible	W. Willow	Tree is 12m tall with a 60cm DBH. Several cavities on a a stem all are shallow and damp.
96	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	N/A	N/A	N/A	Low	Plum	Tree is 8m tall with a 30cm DBH. Wounds identified on the stem at 1m on both the east and north aspect.
97	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	Tree climb - 30/07/2020 Weather: temp 22, wind 1, any rain 0 and cloud cover 0 Hot Limitations: No limitations Results: No bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, any rain 0 and cloud cover 2 Warm, light breeze Limitations: No Limitations Results: No bats observed	N/A	Moderate	W. Willow	Tree is 14m tall with a 200cm DBH. Wounds identified at 1m on the southern aspect that extends upwards 1m and downwards 10cm. Was found to be dry and dusty.
101	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Limitations: none Results: no bats observed	No survey – tree climb	No survey – tree climb	No survey – tree climb	Confirmed	Hawthorn	ALBST identified a Natterer's roosting in May 2021. Tree is 3m tall with a 28cm DBH. Hawthorn is mostly dead, several splits, loose bark, small cavities. All very superficial, limited shelter & exposed
106	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	Yes	18/02/2020 Weather: temp 7, wind 3, any rain 1 and cloud cover 8 Cold with occasional showers	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3	Tree climb - 17/08/2020 Weather: temp 19, wind 2, any rain 0 and cloud cover 2 Warm, light breeze	Tree climb - 02/09/2020 Weather: temp 17, wind 9, any rain 0 and cloud cover 0 Fair	High	Alder	Tree is 10m tall with a 35cm DBH. A woodpecker hole at 5m on the north eastern aspect which extends inwards to join the cavity, and a wound at 4m on the northern aspect has a 10cm diameter chamber.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Warm, slightly overcast Limitations: No Limitations Results: no bats observed	Limitations: No limitations Results: No bats observed	Limitations: no limitations Results: No bats observed			
109	Moderate	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	N/A	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Surveyor initials: SS & WE Limitations: no limitations Results: no bats observed	N/A	N/A	Low	Quince	Tree is 5m tall with a 16cm DBH. A wound on the stem on the eastern aspect extends upwards 10cm and is dry and smooth.
116[94]	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	N/A	Tree climb – 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: no limitations Results: no bats observed	N/A	N/A	Negligible	Robinia	A 16m tall with 35cm DBH a wound was identified at 7m on the north western aspect the feature does not extend.
123	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: No bats recorded	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: None Results: no bats observed	N/A	Moderate	W. Willow	A 4m willow with a 240cm DBH which is dead. The tree had been recently pollarded but had a butt rot at 2m on the south western aspect.
124	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: No bats recorded	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: None Results: no bats observed	N/A	Moderate	W. Willow	A willow in a line of willows 17m tall and approximately 190cm DBH. A hazard beam is at 2m on the northern aspect, and butt rot at 1m on the western aspect.
125	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations Surveyor initials: CG and HC	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm	N/A	Moderate	W. Willow	A willow in a line of willows 17m tall and with a 220cm DBH.Has a shearing crack at 1m on the southern aspect, and a wound at 1m on the north western aspect.

[94] Note that on the results from the surveyor this is listed as 136 incorrectly

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
				Surveyor initials: SS & JK Limitations: None Results: no bats observed	Surveyor initials: SS & WE Limitations: Recently pollarded, no survey limitations Results: no bats observed	Surveyor initials: SS & EK Limitations: None Results: no bats observed				
126	High	05/06/2019 Weather: 11°C, wind 4, rain 1, cloud 7 Limitations: No limitations	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: No bats recorded	N/A	N/A	Low	W. Willow	A willow at 16m tall, 150cm DBH. Features include a butt rot at 2m on the northern aspect and a shearing crack at 2m on the northern aspect
129	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: None Results: no bats observed	N/A	N/A	Negligible	Ash	An ash tree at 16m with a 45cm DBH. A knot hole was identified at 2m on the eastern aspect, all knot holes identified were shallow and superficial.
131	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: No survey limitations. Results: no bats observed	N/A	N/A	Low	Ash	A 19m tall ASH with a 85cm DBH with ivy on all aspects, and several small shallow knot holes throughout the canopy.
132	High	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	Yes	No survey Un-safe to climb 21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 6 Very cold with moderate breeze Limitations – Unsafe to climb Surveyor initials: SS &JK	Emergence – 18/08/2022 Weather: 22°C, wind 2, rain 0, cloud 4 Survey start: 20:14 Sunset time: 20:25 Survey end: 21:51 Limitations: rain started at 21:48, an unaccompanied camera was used Results: no emergence observed.	Emergence – 01/09/2020 Weather: 16°C, wind 0, rain 0, cloud 0 Survey start: 19:38 Sunset time: 19:54 Survey end: 21:25 Limitations: an unaccompanied camera was used Results: no emergence observed.	Emergence – 17/09/2020 Weather: 16°C, wind 2, rain 0, cloud 0 Survey start: Unknown Sunset time: 19:20 Survey end: 20:48 Limitations: an unaccompanied camera was used Results: no emergence observed. The previous north western limb has been lost and hence a number of woodpecker holes have been lost.	High	Weeping Ash	A 14m tall tree with a 85cm DBH with a shearing crack at 4m on the southern aspect, a transverse snap at 6m on the western aspect and woodpecker hole at 8m on the northern aspect.
136	Moderate	12/06/2019	No	18/02/2020	N/A	N/A	N/A	Negligible	Willow	Stem cavities at 1.5m on the western aspect, 2m on the western aspect, 2m on the norther aspect, split bark at 1m on the eastern aspect, a rot hoe at 2m on the eastern aspect and loose bark on all aspects.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
		Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations		Weather: temp 7, wind 3, rain 1 and cloud cover 3 Cold with occasional showers Limitations: None						
155	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: No survey limitations. Results: no bats observed	N/A	N/A	Negligible	Common Ash	A 15m tree with a 45cm DBH. Several knot holes were identified on the stem at approximately 2m which were all inspected to be shallow.
156	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	21/02/2020 Weather: temp 5, wind 2, any rain 0 and cloud cover 8 Very cold with moderate breeze Limitations – Unsafe to climb	Emergence - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 4 Warm Survey start: 20:05 Sunset time: 20:25 Survey end: 20:03 Limitations: Heavy rain from 21:46, only one camera used due to land access where two were recommended. An unaccompanied camera was used Results: no emergence observed	Emergence - 01/09/2020 Weather: temp 16, wind 0, rain 0 and cloud cover 0 Warm and clear Survey start: 19:03 Sunset time: 19:54 Survey end: 21:48 Limitations: only one camera used due to land access where two were recommended, an unaccompanied camera was used Results: No emergence observed, rat observed in the cavity between 20:03 and 20:30	N/A	Moderate	Weeping willow	A 4m veteran willow with a 90cm DBH. The tree has been pollarded and then flailed leading to extensive brown rot. Features include butt rot at 1m on the eastern aspect and a wound at 4m on the northern aspect.
160	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: no bats observed	N/A	N/A	Negligible	Common Ash	17m high ash tree with a 32cm DBH. A single wound was identified at 1m on the western aspect which was inspected to be shallow and exposed.
161	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: no bats observed	N/A	N/A	Negligible	Common Ash	A 14m high ash tree with a 25cm DBH. The top of the tree has snapped out, and there is a wound at 4m on the eastern aspect inspected to be shallow and exposed.
162	Moderate	12/06/2019	No	N/A	Tree climb - 01/09/2020	N/A	N/A	Negligible	Common Ash	A 16m tall ash tree with a 32cm DBH. There is an upwards facing tear out at 6m which is very exposed.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
		Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations			Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: no bats observed					
163	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: no bats observed	N/A	N/A	Negligible	Common Ash	A 17m tall ash tree with a 30cm DBH. There is a wound at 2m on the northern aspect that is shallow and exposed.
164	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	N/A	Not completed - tree climb	Not completed - tree climb	N/A	Moderate	Common Ash	A 18m tall ash tree with a 37cm DBH. Features identified include a woodpecker hole at 4m on the northern aspect, and wounds at 5m on the eastern aspect, and on the southern aspect at 5m and 6m. All features were shallow and exposed.
200	High	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, any rain 0 and cloud cover 2 Warm, light breeze Limitations: None Results: no bats observed	N/A	Moderate	Pissards plum	Tree is 5m in height with a 30cm DBH. Features include a butt rott on the northern aspect that extends upwards and is open and exposed, and also a wound at 2m on the southern aspect extending upwards approximately 30cm.
201	Moderate	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: No survey limitations Results: No bats found	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	N/A	Moderate	Pissards Plum	Tree is 5m in height with a 30cm DBH. Tree has a wound at 1m on the northern aspect extending upwards beyond 1m.
202	Moderate	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 17/08/2020 Weather: temp 19°C, wind 2, rain 2 and cloud cover 0 Limitations: None Results: No bats recorded	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	N/A	Moderate	Pissards Plum	Tree is 5m tall with a 30cm DBH. There is a wound at 0m on the northern aspect which extends upwards 70cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
203	Moderate	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 17/08/2020 Weather: temp 19°C, wind 2, rain 2 and cloud cover 0 Limitations: None Results: No bats recorded	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	N/A	Moderate	Pissards Plum	Tree is 5m tall with a 20cm DBH. There is butt rot at 1m on the north eastern aspect which extends upwards over 1m.
204	Moderate	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	17/02/2020 Weather: temp 8, wind 3, rain 2 and cloud cover 5 Windy with heavy rain showers Limitations: None Results: no bats observed	Tree climb - 17/08/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, light breeze Limitations: No survey limitations Results: No bats found	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	N/A	Moderate	Pissards Plum	Tree is 5m tall with a 20cm DBH. The tree has butt rot at 1m on the northern aspect that extends upwards the length of the stem with some evidence of nesting material observed.
211	High	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none Results: no bats observed	N/A	Moderate	Common Walnut	A 15m tall tree with a 70cm DBH. The tree had a number of wounds including; at 6m on the eastern aspect extending 60cm, at 7m on the north west aspect extending 30cm to the tip, 6m on the southern aspect extending downwards into an open cavity.
229	High	24/06/2019 Weather: 15°C, wind 2, rain01, cloud 7 Limitations: no limitations	No	N/A	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Surveyor Initials: SS & WE Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Surveyor Initials: SS & EK Limitations: none Results: no bats observed	N/A	Moderate	Weeping willow	A 17m tall willow with a 260cm DBH. Features identified include a large open central cavity with some secondary cavities but these are primarily shallow and exposed, and a fallen limb with an exposed fallen limb leading to its base and lifting bark at 2m on the north eastern aspect
230	High	24/06/2019 Weather: 15°C, wind 2, rain 1, cloud 7 Limitations: no limitations	Yes	No survey completed	No survey completed	No survey completed	No survey completed	High	Weeping Willow	Trunk cavity at 0.5m high on the western aspect. No access to inspect further
235	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	20/02/2020 Weather: temp 8, wind 4, any rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: No features. 235A matches features but with correct location	N/A	N/A	N/A	Negligible	Common Ash	A trunk cavity at 7m on the southern aspect. Was not identified to have features during tree climbing, but a tree adjacent was identified (235A) which matched the feature description.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
235 A	High	20/02/2020 Weather: temp 8, wind 4, any rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: features match those described for 235 however grid reference did not so 235A created	Yes	20/02/2020 Weather: temp 8, wind 4, any rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None	Emergence - 10/08/2020 Weather: temp 26, wind 1, rain 0 and cloud cover 2 Fair Survey start: 20:20 Sunset time: 20:41 Survey end: 22:11 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	Emergence - 24/08/2020 Weather: temp 16, wind 1, rain 0 and cloud cover 7 Fair Survey start: 19:57 Sunset time: 20:08 Survey end: 21:40 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	Emergence - 14/09/2020 Weather: temp 23, wind 2mph, any rain 0 and cloud cover n/a Fair Survey start: 18:53 Sunset time: 19:24 Survey end: 20:54 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	High	Not specified	Tree is 15m tall with a 25cm DBH. Features include a squirrel hole at 6m on the south western aspect and a wound at 2m on the southern aspect
236	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	20/02/2020 Weather: temp 8, wind 4, any rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none Results: no bats observed	N/A	Moderate	Weeping Willow	Tree is 17m tall with a 45cm DBH. Lifting bark is at 2m on the southern aspect and extends upwards 60cm and is smooth and dry.
237	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	Yes	No full survey 20/02/2020 Weather: temp 8, wind 4, any rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: unable to fully inspect No evidence	Emergence - 10/08/2020 Weather: temp 26, wind 1, rain 0 and cloud cover 2 Fair Survey start: 20:30 Sunset time: 20:41 Survey end: 22:12 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	Emergence - 24/08/2020 Weather: temp 16, wind 1, rain 0 and cloud cover 7 Fair Survey start: 19:57 Sunset time: 20:08 Survey end: 21:47 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	Emergence - 14/09/2020 Weather: temp 23, wind 2mph, any rain 0 and cloud cover n/a Fair Survey start: 18:53 Sunset time: 19:24 Survey end: 21:00 Limitations: only able to view southern aspect of the tree, an unaccompanied camera was used Results: No emergence observed	High	Weeping Willow	A tree 11m tall with a 210cm DBH. Tree has a failed stem split at 2m with possible secondary crevices. Emergence surveys recommended due to the proximity to the road.
240	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	Completed - 02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Limitations: none Results: no bats observed	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: none Results: no bats observed	No survey completed – tree climb	N/A	Moderate	Field Maple	A tree at 15m tall with a 45cm DBH. Features include a wound at 1m on the northern aspect and 1m on the south eastern aspect which extends upwards 20cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
241	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	Yes	Completed - 02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Limitations: none Results: no bats observed	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: none Results: no bats observed	No survey completed – tree climb	No survey completed – tree climb	High	Common Ash	A tree 18m with a 50cm DBH. Features include a knot hole at 4m on the western aspect, a weld at 6m on the western aspect and a woodpecker hole at 7m on the northern aspect.
242	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	Completed - 02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Limitations: none Results: no bats observed	N/A	N/A	N/A	Low	Common Ash	A tree with 19m and 45cm DBH. Features include a knot hole at 6m on the southern aspect, at 3m on the western aspect and a shearing crack at 6m on the north western aspect.
244	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	Completed - 19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A 8m tall tree with 190cm DBH,. Features include butt rot at 1m on the northern aspect, a hazard beam on the south western aspect laying on the floor, lifting bark on various aspects and a wound at 1m on the southern aspect extending upwards 60cm but is draughty throughout.
245	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	Completed - 19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A 13m tall tree with a 65cm DBH. Features include a but rott that extends into a large open cavity extending 35cm that is open and draughty, and a transverse snap at 1m on the western aspect that extends inwards 30cm but is dry and dusty.
246	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	-19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A 16m tall tree with 200cm DBH. Features include butt rot with small secondary crevices and a transeverse snap at 1m on the north western aspect which extends upwards 30cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
247	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none Results: no bats observed	N/A	Moderate	Willow	A tree 13m tall with a 180cm DBH. Features include butt rot on the eastern and northern aspects both extending approximately 60cm.
248	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none Results: no bats observed	N/A	Moderate	Willow	A tree 17m tall with a 200cm DBH. Features include butt rot on the northern aspect with several secondary crevices some extending up to 30cm.
249	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A tree 17m tall with 180cm DBH. Tree has butt rot on the northern aspect with cavities that extend up 20cm.
251	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A tree 16m tall with a 220cm DBH. Butt rott is on the northern aspect offering limited shelter and a shearing crack at 2m on the northern aspect exposed from the top.
252	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none Results: no bats observed	N/A	Moderate	Willow	A tree 17m tall with a 250cm DBH. The tree has a butt rot on the southern aspect extending upwards 1m, and a shearing crack which links to this.
253	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None	Tree climb - 18/08/2020 Weather: temp 22, wind 2, rain 0 and cloud cover 2 Warm Limitations: none	N/A	Moderate	willow	A tree 16m tall with a 200cm DBH. There is an exposed hazard beam at 2m on the southern aspect, and butt rot on the eastern and southern aspects that extend upwards approximately 50cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
				Results: no bats observed	Results: no bats observed	Results: no bats observed				
254	Moderate	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	No	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Willow	A tree 16m tall with 180cm DBH. Butt rot cavity extending into the north eastern stem inside the pollard head and extends beyond 1m.
257	High	25/06/2019 Weather: 12°C, wind 3, rain 3, cloud 8 Limitations: no limitations	Yes	20/02/2020 Weather: temp 8, wind 4, rain 1 and cloud cover 8 Windy with showers and gusts up to 40mph Limitations: None Results: no bats observed	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: no bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: no bats observed	Tree climb - 01/09/2020 Weather: temp 14, wind 1, any rain 0 and cloud cover 0 Warm and clear Limitations: None Results: No bats recorded	High	Willow	Tree 16m tall with a 230cm DBH. Features include a hazard beam at 1m on the eastern aspect extending 15cm in both directions, a tear out at 1m on the southern aspect, wounds at 1m on the south western aspect and 2m on the western aspect extending inwards.
276	High	29/08/2019 Weather: 18°C, wind 2, rain 0, cloud 1 Limitations: no limitations	No	28/02/2020 Weather: temp 5, wind 2, any rain 3 and cloud cover 8 Constant rain, moderate breeze with gusts Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Common Ash	An ash tree 18m tall and 50cm DBH. Features include a knot hole at 10m on the northern aspect with bird droppings in the entrance, a woodpecker hole at 14m on the northern aspect extending 25cm downwards and all other identified wounds are superficial providing no shelter.
277	Moderate	29/08/2019 Weather: 18°C, wind 2, rain 0, cloud 1 Limitations: no limitations	No	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Common Ash	An ash tree 15m tall with a 55cm DBH. Features include wounds 8m high on the northern aspect that doesn't extend inwards and 1m on the south eastern aspect extending upwards approximately 30cm.
281	Moderate	29/08/2019 Weather: 18°C, wind 2, rain 0, cloud 1 Limitations: no limitations	No	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: None Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: None Results: no bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 4 and cloud cover 8 Heavy rain Limitations: None Results: no bats observed	N/A	Moderate	Willow (originally mis identified as a Crab apple)	A tree 17m tall, with a 30cm DBH. Features include butt rott at 1m on the western aspect which extends into the stem cavity and a wound at 2m on the north western aspect that extends upwards 35cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
487	High	29/10/2019 Weather: 5°C, wind 0, rain 0, cloud 2 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Surveyor initials: SS & JK Limitations: none Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Surveyor initials: SS & WE Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Surveyor Initials: SS & EK Limitations: none Results: no bats observed	N/A	Moderate	Willow	W 14m tall willow with a 240cm DBH. A branch cavity at 3m on the western aspect and butt rot on the southern aspect which extends into numerous smaller cavities.
488	Moderate	29/10/2019 Weather: 5°C, wind 0, rain 0, cloud 2 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Surveyor initials: SS & JK Limitations: none Results: no bats observed	N/A	N/A	N/A	Low		A 14m tall willow with 250cm DBH. This tree has lifting bark on all aspects at approximately 2m that was all moderately exposed. There is also wounds at 2m on the north eastern aspect and 2m on the south eastern aspect extending upwards,
489	High	29/10/2019 Weather: 5°C, wind 0, rain 0, cloud 2 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Surveyor initials: SS & JK Limitations: none Results: no bats observed	N/A	N/A	N/A	Low	Willow	A 14m willow with a 70cm DBH. Features include butt rot on the northern aspect that leads to minor areas of shelter that are damp and exposed.
490	Moderate	29/10/2019 Weather: 5°C, wind 0, rain 0, cloud 2 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Surveyor initials: SS & JK Limitations: none Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: no bats observed	N/A	Moderate	Willow	A 12m willow with a 160cm DBH. There are wounds at 1m on the northern aspect and at 1m on the south eastern aspect. From these wounds there are small crevices offering shelter extending inwards between 10 and 30cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
496	Confirmed	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations Barbastelle bat roosting in a wound at 1m on the south eastern aspect and extends inwards approximately 35cm.	Yes	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: no bats observed	Tree climb - 01/09/2020 Weather: temp 14, wind 1, any rain 0 and cloud cover 0 Warm and clear Limitations: None Results: No bats recorded	Confirmed	Willow	A 7m tall willow with a 90cm DBH. There is lifting bark across this tree including at 2m on the south western aspect which extends upwards 15cm and is dry with heavy cobwebbing.
498	Low	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	N/A	N/A	N/A	N/A	Low	Common ash	A callus roll at 9m on the eastern aspect that was observed to be very narrow.
499	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: no bats observed	N/A	Moderate	Willow	An 8m willow tree with a 78cm DBH. Features include butt rot at 1m on the southern aspect and lifting bark at 2m on the north eastern stem.
502	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	N/A	N/A	N/A	Negligible	Common horse chestnut	A 9m tall tree with a 35cm DBH. The tree has a wound at 3m on the northern aspect which is shallow and exposed.
512	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	N/A	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: unable to fully inspect - recommend emergence/ re-entry surveys for this tree going forwards. Results: no bats observed	No survey – tree climb	N/A	Moderate	Willow	A white willow with a trunk cavity on the western aspect, flaking bark from 0m to 3m on all aspects, a tear out at 2.5m on the northern and aspect of the tree and ivy plating at 2m on the eastern aspect.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
515	High	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: None Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 4 and cloud cover 8 Heavy rain Limitations: None Results: no bats observed	N/A	Moderate	Willow	A 11m tall willow with a 45cm DBH. There is butt rot at 2m on the north eastern aspect extending upwards 50cm and a tear out at 6m on the western aspect which provides limited shelter.
516	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: None Results: no bats observed	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 4 and cloud cover 8 Heavy rain Limitations: None Results: no bats observed	N/A	Moderate	Willow	A 17m tall willow with a 50cm DBH. There are a number of woodpecker holes on the tree including at 8m on the southern aspect extending downwards 40cm and 5m on the south western aspect.
517	High	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: None Results: no bats observed	N/A	N/A	N/A	Low	Oak	A 18m tall oak with a 120cm DBH. Features include a hazard beam at 5m on the southern aspect which doesn't extend and is too narrow for access by bats and a tear out at 7m on the north western aspect.
521	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	No survey – tree climb	No survey – tree climb	N/A	Moderate	Common ash	A 15m tall ash tree with a 210cm DBH. Tree has butt rot on the north eastern aspect that leads up into the stem, extending upwards by up to 1.8m.
522	High	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 0 Limitations: no limitations	No	19/02/2020 Weather: temp 6, wind 3, rain 1 and cloud cover 8 Cold with occasional rain Limitations: None Results: no bats observed	No survey – tree climb	No survey – tree climb	N/A	Moderate	Common ash	A 13m tall common ash tree with a 300cm DBH. Features include a butt rot on the northern aspect, a knot hole at 5m on the north eastern aspect extending downwards 20cm, a tear out at 8m on the south eastern extending downwards 30cm and a woodpecker hole at 8m on the southern aspect extending 10cm.
543	Moderate	24/10/2019 Weather: 8°C, wind 0, rain 0, cloud 4 Limitations: no limitations	No	Completed - 24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3	N/A	N/A	N/A	Low	Willow	Tree 15m tall with a 44cm DBH with a hazard beam that is 4m on the south western aspect that is open and exposed.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
				Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed						
552	Moderate	23/10/2019 Weather: 12°C, wind 0, rain 0, cloud 8 Limitations: no limitations	No	N/A	Tree climb - 27/07/2020 Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bat observed	N/A	N/A	Low	Sycamore	An 18m sycamore with a 50cm DBH, the tree had moderately thick stemmed ivy with several small pockets of shelter.
553	High	23/10/2019 Weather: 12°C, wind 0, rain 0, cloud 8 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	N/A	N/A	N/A	Low	Scots pine	An 18m scots pine with a 35cm DBH, a total of six knot holes were identified between 3m and 7m extending back no further than 8cm and were open and exposed.
569	High	23/10/2019 Weather: 8°C, wind 0, rain 0, cloud 8 Limitations: no limitations	No	N/A	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: None Results: no bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: no bats observed	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: no bats observed	High	Common Ash	A 17m tall ash tree with 100cm DBH. Features identified include a knot hole at 5m on the eastern aspect, and woodpecker holes across the south western aspect some of which extend upwards to a dry cavity.
576	High	23/10/2019 Weather: 8°C, wind 0, rain 0, cloud 8 Limitations: no limitations	Yes	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: None Results: no bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: one noctule observed, droppings collected but not sent for analysis	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: one noctule observed	Confirmed	Ash	A 19m tall ash tree with a 45cm DBH. Features include a woodpecker hole at 8m on the south eastern aspect, and one at 10m on the southern aspect which was found to have a single noctule bat present.
578	High	23/10/2019 Weather: 8°C, wind 0, rain 0, cloud 8 Limitations: no limitations	Yes	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	Tree climb - 28/07/2020 Weather: temp 19, wind 2, rain 0 and cloud cover 2 Warm, clear Limitations: None Results: no bats observed	Tree climb - 19/08/2020 Weather: temp 16, wind 3, rain 0 and cloud cover 0 Warm Limitations: none Results: two to three noctules present	Tree climb - 01/09/2020 Weather: temp 14, wind 1, rain 0 and cloud cover 0 Warm and clear Limitations: None Results: one noctule observed	Confirmed	Ash	A 16m tall ash tree with a 40cm DBH. Features identified include a wound at 5m on the northern aspect, and 3m on the southern aspect which were both very exposed. A woodpecker hole at 10m on the northern aspect was inspected to extend upwards 8cm and downwards 40cm and was found to contain roosting noctule bats.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
596	Moderate	12/11/2019 Weather: 5°C, wind 2, rain 0, cloud 8 Limitations: no limitations	No	N/A	Not survey	Not survey	N/A	Moderate	Weeping willow	Woodpecker hole at 3m on the northern aspect in a mature weeping willow which does not appear to extend up or down. Woodpecker hole at 8m on the western aspect, unable to see the extension of the feature from ground level. Twisted branch with crack and knot rolls at 8.5m on the western aspect but it is unknown if this extends into the branch.
602	Moderate	12/11/2019 Weather: 5°C, wind 2, rain 0, cloud 8 Limitations: no limitations	No	N/A	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Surveyor initials: SS & WE Results: No bats recorded	N/A	N/A	Negligible	Weeping willow	Weeping willow 19m tall. Some pruning cuts and rotting. Approx. 13m high downwards facing twisted branch with possible crack and lifted bark. Downwards facing when facing south, branch on the east of the tree in the canopy.
607	Moderate	12/11/2019 Weather: 5°C, wind 2, rain 0, cloud 8 Limitations: no limitations	No	N/A	Tree climb - 30/07/2020 Weather: temp 22, wind 1, rain 0 and cloud cover 0 Hot Limitations: None Results: No bats recorded	N/A	N/A	Low	Unconfirmed pine species	Tree is likely dead and is 2m tall with a 20cm DBH. Crack in stem approximately 1, high, some extension. Rigid endoscope head is too large to fully observe. Two cracks in branch facing north, two features meet with no cavity.
616	Moderate	12/06/2019 Weather: 12°C, wind 2, rain 1, cloud 7 Limitations: no limitations	No	27/02/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	N/A	N/A	N/A	Negligible	Common Ash	A 18m tall ash tree with a 37cm DBH. Features identified include a woodpecker hole at 4m on the northern aspect, and wounds at 5m on the eastern aspect, and on the southern aspect at 5m and 6m. All features were shallow and exposed.
620	Moderate	12/11/2019 Weather: 5°C, wind 2, rain 0, cloud 8 Limitations: no limitations	No	27/02/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	N/A	N/A	N/A	Negligible	Pedunculate oak	Large mature 18m oak with a 45cm DBH. ivy cover at 1m on the eastern aspect. Tear out at 15m on the eastern aspect offering limited access. A wound at 4m on the eastern aspect which is shallow extending inwards approximately 5cm.
627	High	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	Yes	02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Surveyor initials: SS & JK Limitations: none Results: no bats observed	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Surveyor initials: FT & NW Limitations: unable to fully inspect recommend activity surveys for this tree going forwards. Results: no bats observed	No survey – tree climb	No survey – tree climb	Confirmed	Common ash	Roost has been confirmed from surveyors conducting a transect observing a noctule bat emerging from the tree on 08/10/2019. A common ash tree 16m tall and 40cm DBH. There is a woodpecker hole at 7m on the western limb.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
635	Moderate	24/10/2019 Weather: 10°C, wind 1, rain 0, cloud 5 Limitations: no limitations	No	N/A	No survey – tree climb	No survey – tree climb	N/A	Moderate	Prunus sp.	A prunus with a but rot at 1m on the north western aspect.
636	Moderate	24/10/2019 Weather: 10°C, wind 1, rain 0, cloud 5 Limitations: no limitations	No	N/A	No survey – tree climb	No survey – tree climb	N/A	Moderate	Wild Cherry	A wild cherry which is dead with a knot hole at 2m on the southern aspect, and loose bark across the entirety of the trunk.
637	Moderate	24/10/2019 Weather: 10°C, wind 1, rain 0, cloud 5 Limitations: no limitations	No	N/A	No survey – tree climb	No survey – tree climb	N/A	Moderate	Common horse chestnut	A dead horse chestnut with a canker at 2m on the northern aspect and loose bark on the southern aspect.
639	Moderate	24/10/2019 Weather: 10°C, wind 1, rain 0, cloud 5 Limitations: no limitations	No	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	N/A	N/A	N/A	Low	Crack willow	A crack willow with a split at 4m on the southern aspect.
644	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	No	27/02/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	N/A	N/A	N/A	Negligible	Scots pine	A scots pine 15m tall with a 32cm DBH. A split at 2m on the northern aspect.
645	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	Yes	24/02/2020 Weather: temp 6, wind 3, any rain 3 and cloud cover 3 Moderate to heavy rain with a strong breeze / gusts Limitations: none Results: no bats observed	Emergence – 19/08/2020 Weather: temp 21, wind 2, rain 0 and cloud cover 5 Survey start time:20:08 Survey end time: 21:45 Sunset/sunrise time: 20:23 Limitations: raining from 21:39 onwards. Unable to access the southern aspect of the tree. an unaccompanied camera was used Results: No emergence observed	Emergence – 03/09/2020 Weather: temp 18, wind 2, rain 0 and cloud cover 5 Survey start time: 19:41 Survey end time: 21:22 Sunset/sunrise time: 19:53 Limitations: Unable to access the southern aspect of the tree. an unaccompanied camera was used Results: No emergence observed	Emergence – 17/09/2020 Weather: temp 16, wind 2, rain 0 and cloud cover 0 Survey start time: 19:06 Survey end time: 20:48 Sunset/sunrise time: 19:17 Limitations: Unable to access the southern aspect of the tree. an unaccompanied camera was used Results: No emergence observed	High	Common Ash	A tree 18m tall with a 80cm DBH. Dense ivy cover at 2m offering substantial shelter and numerous access points. Recommended to be surveyed by emergence surveys as unable to fully inspect..
646	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8	No	27/02/2020	Tree climb - 27/07/2020	Tree climb - 05/05/2022	N/A	Moderate	Horse chestnut	A 11m tall tree with a 45cm DBH. Features include lifting bark offering small pockets of shelter, and a wound at 1m on the southern aspect extending upwards 20cm.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
		Limitations: no limitations		Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	Weather: temp 20, wind 1, rain 0 and cloud cover 3 Warm, slightly overcast Limitations: No survey limitations Results: No bat found	Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: unable to fully inspect recommend activity surveys for this tree going forwards. Results: no bats observed				
647	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	No	27/02/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	N/A	N/A	N/A	Negligible	Horse chestnut	A mature 9m horse chestnut with a 35cm DBH. Features include a 3m wound on the northern aspect that is shallow and exposed.
648	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	Yes	02/03/2020 Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze Limitations: none Results: no bats observed	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: none Results: no bats observed. Branch has snapped resulting in the failure of the feature.	N/A	N/A	Low	Willow	A mature willow 18m tall with a 45cm DBH. Features include a hazard beam at 4m on the eastern aspect.
649	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	Yes	03/03/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 7 Cold, overcast with rain showers Limitations: Unable to fully inspect recommend activity surveys Results: no bats observed	Tree climb - 05/05/2022 Weather: temp 19, wind 1, rain 0 and cloud cover 2 Limitations: none Results: no bats observed.	No survey – tree climb	No survey – tree climb	High	Common ash	A 17m ash tree with a 50cm DBH. Features include three woodpecker holes at 7m on the southern aspect, and a wound at 4m and 7m on the eastern aspect extending upwards
650	Moderate	28/11/2019 Weather: 10°C, wind 1, rain 0, cloud 8 Limitations: no limitations	No	27/02/2020 Weather: temp 4, wind 2, rain 1 and cloud cover 8 Very cold with light breeze, occasional rain / sleet/snow shower Limitations: None	N/A	N/A	N/A	Low	Willow	A mature willow 18m tall with a 150cm DBH. Ivy covering the whole tree that provides some limited shelter.
675	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	No	N/A	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44	No survey - emergence survey	No survey - emergence survey	Confirmed	Alder	Few fallen branches, one at 6m and two at 8m. One at 8m is rot hole. All NE facing. No access to south due to Chelt. Two callus rolls, one found about 6m high NW facing

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Results: Emergence observed at 21:33, noctule recorded at this time on the Batlogger Equipment: Canon XA11 and Batlogger M2					
677	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Surveyor initials: BC Results: No emergence observed Equipment: Canon XA11 and Batlogger M2	No survey - emergence survey	N/A	Moderate	Common alder	No features to north, top 7m of tree dead, likely hollow inside, no access to southern aspects. S
678	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	No survey - emergence survey	No survey - emergence survey	N/A	Moderate	Willow	Dead willow spp very limited visibility would need assessment from south of Chelt
682	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Surveyor initials: CB Results: No emergence observed	No survey - emergence survey	N/A	Moderate	Common ash	Large callus roll, can't get close enough to see any gaps. Branch facing upwards, no visible sign of gaps. Clean break

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Equipment: Canon XA11 and Batlogger M2					
683	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Surveyor initials: CB Results: No emergence observed Equipment: Canon XA11 and Batlogger M2	No survey - emergence survey	N/A	Moderate	Common alder	Small hole, unable to see how far it goes. No access to south of Chelt. Ivy covers most of trunk to the south, up to 13m. Tree looks good condition however ivy cover is thick so unable to see if features are underneath
685	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Results: No emergence observed Equipment: Canon XA11 and Anabat Walkabout	No survey - emergence survey	N/A	Moderate	Willow	Pollarded willow dense ivy cover, no access to view features, precautionary moderate to bat suitability
686	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Surveyor initials: AP Results: No emergence observed	No survey - emergence survey	N/A	Moderate	Poplar sp.	7 rot holes on northern and NE aspect. 6 branch limbs, potentially sawn off, unable to see if features present, dead branch with fungus, potential wasps nest by callus roll, therefore potential cavity inside.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
					Equipment: Canon XA11 and Batlogger M2					
687	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	No	No survey - Unsuitable for tree climbing therefore survey not possible for hibernation	Unsuitable for tree climbing Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Infrared camera only Results: No emergence observed	N/A	N/A	Moderate	Willow	Pollarded willow, limited access to see trunk and any features. Tops of willow branches tall and thin and good condition, no access to south
688	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	Emergence survey: 17/05/2022 Weather: temp 17°C, wind 0, rain 1 and cloud cover 6 Survey start time: 20:44 Survey end time: 22:58 Sunset/sunrise time: 20:58 Limitations: unable to observe south of the tree due to River Chelt Results: No emergence observed Equipment: Canon XA11 and Batlogger M2	No survey – emergence survey	N/A	Moderate	Sycamore	Two branches rubbing together. Precautionary moderate low visibility no access to Chelt
690	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects Weather: 18°C, wind 4, rain 0, cloud 1 Limitations: unable to access trees around the River Chelt on both aspects	Yes	No survey	No survey	No survey	N/A	Low	Poplar sp.	Precautionary moderate for southern aspects no visibility tree in good condition. Small hole northern aspects, diameter 2cm.
701	Moderate	18/08/2021 Weather: 18°C, wind 4, rain 0, cloud 1	Yes	No survey	No survey – emergence survey	No survey – emergence survey	N/A	Moderate	Goat willow	Broken branch leaving exposed possible cavity/ rot hole with a feature at 4m on the eastern aspect. Ivy cover covering most of trunk. Unable to see features beneath.

Tree ref	GLTA result	PRA Survey Details[92] Detailed as temperature, wind speed (Beaufort Scale), rain (scale of 0 to 5) and cloud cover (oktas)	Hibernation suitability	Hibernation Survey 2020	Roost Survey 1	Roost Survey 2	Roost Survey 3	Overall Tree Assessment	Tree species	Description and features
		Limitations: unable to access trees around the River Chelt on both aspects								

B.2. Confirmed Bat Roost Assessment (Tree Roosts to be Felled or Disturbed)

Table 4-54 – Survey Results Tree 86

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
23/10/2019	GLTA	86	Torch and endoscope	Air temp: 8°C, wind 0, rain 0 and cloud cover 8.
Comments:				
Visual inspection: A mature common ash tree within a line of trees along an agricultural field boundary. Approximately 19 m tall with a 45cm DBH. Two roosting features were identified from the ground, a callus roll and a woodpecker hole.				
21/02/2020	Hibernation tree climbing	86	Endoscope	Weather: Temp 5 oC, wind 2, rain 0 and cloud cover 8
Comments:				
Hibernation results: No bats				
17/08/2020	Survey start time: 20:08, Survey end time: 22:02	86	2 x bat detectors and IR camera	Weather: temp 19, wind 1, rain 0 and cloud cover 5
Comments:				
Roost survey results: No emergence observed				
19/08/2020	18:43 to 20:50 (sunset 18:58)	86	2 x bat detectors and IR camera	Weather: temp 15, wind 3, rain 0 and cloud cover 7
Comments:				
Roost survey results: No emergence observed				
02/09/2020	19:30 to 21:23 (sunset 19:52)	86	2 x bat detectors and IR camera	Weather: temp 17, wind 2, rain 0 and cloud cover 3
Comments:				
Roost survey results: No emergence observed				
ALBST recorded a Natterer's male likely roosting in this tree on the 30/05/2021 for one night				
Photos: 				
Roost characterisation: Natterer's – day roost (assumed, with limitations)				

Table 4-55 – Survey Results Tree 576

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
05/06/2019	GLTA	576	Torch and endoscope	Weather: 11°C, wind 4, rain 1, cloud 7
Comments:				
Visual inspection: Dead ash tree				
24/02/2020	Hibernation tree climbing	576	Endoscope	Air temp 6°C, wind 3, cloud cover 8, rain 3.
Comments:				
Hibernation results Woodpecker hole facing south approximately 10 m high was fully inspected and found to extend 40 cm with nesting materials at the base. A second woodpecker hole facing south east approximately 8m high extended inwards 10cm, then upwards 20 cm with a smooth dry substrate.				
28/07/2020	Aerial tree climbing	576	Endoscope	Air temp: 19°C, wind 2, cloud cover 2, rain 0.
Comments:				
Roost survey results: Woodpecker hole facing south approximately 10m high was fully inspected and found to extend inwards 10cm then upwards by 20 cm. A second woodpecker hole facing south east approximately 8 m high extended inwards approximately 20cm with nesting materials at it base.				
19/08/2020	Aerial tree climbing	576	Endoscope	Air temp: 16°C, wind 3, cloud cover 8, rain 4
Comments:				
Roost survey results: The woodpecker hole facing south has snapped out leaving only the south east facing feature. The south east facing feature had a single noctule bat present with droppings observed at the base.				
01/09/2020	Aerial tree climbing	576	Endoscope	Air temp: 14°C, wind 1, cloud cover 0 and rain 0
Comments:				
Roost survey results: The south-east facing feature had a single noctule bat present.				
Photos:  				
Roost characterisation: Noctule day roost				

Table 4-56 – Survey Results Tree 578

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
23/10/2019	GLTA	578	Torch	Air temp: 8°C, wind 0, rain 0 and cloud cover 8.
Comments:				
Visual inspection: An over-mature ash tree approximately 16m high with a 40cm DBH, situated within a field boundary of agricultural fields. The tree was identified to have a number of features include a woodpecker hole facing south, and north and a callus roll facing south west.				
24/02/2020	Hibernation tree climbing	578	Endoscope	Air temp 6°C, wind 3, cloud cover 8, rain 3.
Comments:				
Hibernation results: Three woodpecker holes were identified; on the northern aspect 9 m high extending upwards by 8cm and downwards by 40cm with nesting materials at the base. On the northern aspect at 12 m high which had failed to become exposed and damp. And a third south facing approximately 8m high extending upwards 20 cm, downwards 30cm with nesting materials at the base whilst being smooth, clean and dry. Two wounds were also inspected, one south facing at 3 m high exposed with a 10 cm diameter open cavity extending upwards by 8cm. A further wound was identified on the northern aspect 5 m high and found to be shallow and exposed.				
28/07/2020	Aerial tree climbing	578	Endoscope	Air temp: 19°C, wind 2, cloud cover 2, rain 0.
Comments:				
Roost survey results: Two woodpecker holes were inspected, one north facing approximately 10m high extending upward 8cm, back and down approximately 40 cm and was found to be dry and dusty. A second woodpecker hole 8m and south facing was found to have numerous feathers and nesting materials present, extending downwards by 40 cm.				
19/08/2020	Aerial tree climbing	578	Endoscope	Air temp: 16°C, wind 3, cloud cover 8, rain 4
Comments:				
Roost survey results: The woodpecker hole facing north at 10m high at the base of a dead limb was found to have a single noctule bat present.				
01/09/2020	Aerial tree climbing	578	Endoscope	Air temp: 14°C, wind 1, cloud cover 0 and rain 0
Comments:				
Roost survey results: The woodpecker hole facing north at 10m high at the base of a dead limb was found to have a small number (assumed three) noctules present.				
Photos:  				
Roost characterisation: Noctule – day roost				

Table 4-57 – Survey Results Tree 496

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
24/10/2019	GLTA	496	Torch and endoscope	Air temp. 5 °C, wind 0, cloud 2, rain 0
Comments:				
Visual inspection: A mature willow tree located in the middle of field. Approximately 90cm DBH and a height of 7m. Features on this tree include lifting bark on the southwest aspect 2m high, and a wound on the south east aspect 1m high. During ground level tree assessment of the tree a barbastelle was observed within the wound using a torch.				
24/02/2020	Hibernation assessment	496	Endoscope	Moderate to heavy rain with a strong breeze / gusts. Temp 6°C, wind 3, cloud cover 8 and rain 3
Comments:				
Roost survey results: Features include lifting bark on the south west aspect, 1 m high which extends upward approximately 40cm and was damp and smooth. The wound facing south east extends inwards approximately 35 cm which was smooth and dry inside.				
24/07/2020	Ground and aerial assessment	496	Endoscope	Air temp. 4 °C, wind 2, cloud 7, rain 1
Comments:				
Roost survey results: The south west facing lifting bark extends upwards approximately 15 cm and was very dusty with cobwebs. The south east facing wound was heavily cobwebbed and dust inside.				
19/08/2020	Ground and aerial assessment	496	Endoscope	Air temp. 16 °C, wind 3, cloud 8, rain 4
Comments:				
Roost survey results: The south west facing lifting bark extends upwards approximately 15 cm and was very dust with cobwebs. The south east facing wound was heavily cobwebbed and dust inside.				
01/09/2020	Ground and aerial assessment	496	Endoscope	Not provided
Comments:				
Roost survey results: The south west facing lifting bark extends upwards approximately 15 cm and was very dust with cobwebs. The south east facing wound was heavily cobwebbed and dust inside. A further lifting bark feature was inspected east facing which was dry smooth and partially dusty.				
   Photos:				
Roost characterisation: Barbastelle – transitional roost				

B.3. Confirmed Bat Roost Assessment (Tree Roosts to be Retained and Protected)

Table 4-58 – Survey Results Tree 101

Date of Survey	Start and End Times and Time of Sunset	Tree Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
05/06/2019	GLTA	Tree 101	Torch and endoscope	Air temp. 11°C, wind 4, cloud 7, rain 1
Comments:				
Visual inspection: Hawthorn, tree is 3m tall with a 28cm diameter at breast height. Hawthorn is mostly dead, several splits, loose bark, small cavities. All very superficial, limited shelter & exposed.				
02/03/2020	Hibernation tree climb	Tree 101	Torch and endoscope	Weather: temp 6, wind 2, rain 0 and cloud cover 1 Cold and sunny with light breeze
Comments:				
Results: No bats observed				
30/05/2021	Advanced licence bat survey techniques (radio tracking)	Tree 101 (assumed with significant limitations)	Radio tracking	N/A
Comments: Natterer's bat tagged and radio tracked over a seven night period. On the 3rd night (30/05/2021) the male Natterer's bat was recorded to be roosting for the day (day roost) at the grid reference SO 90898 24548. Due to the inaccuracy[95] of radio tracking the exact location of this bat roost is unknown. As Tree 101 is a tree located within 20 m of this grid reference, as a precautionary basis it is assumed that Tree 101 is a Natterer's day roost.				
Roost Survey 1 – not completed				
Roost Survey 2 – not completed				
Roost Survey 3 – not completed				
Photo: 				
Roost characterisation: Natterer's – day roost				

[95] Triangulated points have a radius of error for each plotted point, this is generally estimated to be 20 m within the ranges worked with

Table 4-59 – Survey Results Tree 627

Date of Survey	Start and End Times and Time of Sunset	Structure Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
28/11/2019	GLTA	627	Torch and endoscope	Air temp. 0 °C, wind 0, cloud 8, rain 0
Comments:				
Visual inspection: A mature ash tree within a field boundary, approximately 16 m tall and 40 cm DBH. The common ash was identified to have ivy covering throughout and a woodpecker hole west facing at 7 m.				
08/10/2019	Transect (incidental)	627	Walkabout	Air temp. 13 °C, wind 3, cloud 3, rain 0
Comments:				
Roost survey results: Whilst undertaking T5, and stationary at stopping point 3 a big bat (considered to be noctule based on call analysis) was observed emerging from the tree at 19:05 then flying northwest.				
02/03/2020	Hibernation tree climb	627	Endoscope	Air temp: 6 °C, wind 2, cloud cover 1, rain 0
Comments:				
Roost survey results: A single woodpecker hole west facing at 7 m was identified and inspected. One feeding hole and two holes were present within the branch connecting into a larger cavity assessed to be too exposed to be suitable to roosting bats.				
05/05/2022	Roost tree climb survey	627	Endoscope	Air temp: 19 °C, wind 1, cloud cover 2, rain 0
Comments: Limitations: Unable to fully inspect recommend activity surveys for this tree going forwards.				
Roost survey results: No bats observed				
Roost Survey 2 – not completed (needs to be an emergence survey)				
Roost Survey 3 – not completed (needs to be an emergence survey)				
Photos:  				
Roost characterisation: Noctule – day roost				

Table 4-60 – Survey Results Tree 675

Date of Survey	Start and End Times and Time of Sunset	Tree Reference	Equipment Used (include make of bat detectors and logging equipment)	Weather (include start and end temps, precipitation, Beaufort wind scale etc)
18/08/2021	GLTA	Tree 675	Torch and endoscope	Air temp. 18°C, wind 4, cloud 1, rain 0
Comments:				
Visual inspection: Alder tree with a few fallen branches, one at 6m and two at 8m. One at 8m is rot hole. All NE facing. No access to south due to Chelt. Two callus rolls, one found about 6m high NW facing				
No hibernation suitability				
17/05/2022	20:44 to 22:58 (sunset = 20:58)	Tree 675	Canon XA11 and Batlogger M2	Air temp: 17 (˚C), rain 1, cloud cover 6, wind speed 0
Comments:				
Roost survey results: A bat was recorded at 21:33, appearing from the direction of Tree 675. Due to the survey limitations (access on one side of the tree only) it cannot be confirmed that a bat did, or did not emerge from the tree. On a precautionary basis, it is assumed that a bat emerged from the tree. The only bat species call at the time the bat was seen was a noctule, therefore on a precautionary basis it is considered to be a noctule bat roost.				
Roost Survey 2 – not completed				
Roost Survey 3 – not completed				
Photo: No photo available				
Roost characterisation: Noctule – day roost				

Appendix C. Transect and Static Detector Surveys

C.1. Transect Survey limitations

Transect	What the Limitation Was	How Significant was the Limitation?
T2	Survey started 13 minutes after sunset on the June survey.	This was not considered to be a significant limitation as data was still gathered from this survey and the BAI allows for comparisons between sites, regardless of how many times point counts were visited (by providing a number of bat passes, per point count, per hour).
	For the July survey, no weather data was collected during the survey, therefore historical data has been used[96].	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T4	No access to one field, due to aggressive cows on the July survey.	This was not considered to be a significant limitation as the BAI allows for comparisons between sites, regardless of how many times point counts were visited (by providing a number that bats passes, per point count, per hour).
	For the May, July and September surveys, no weather data was collected during the survey, therefore historical data has been used.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T5	No bat pass data saved due to error on the June survey.	This is not considered to be a significant limitation as data was collected during other months.
	No end of survey weather data on the May survey.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
	Point Count 2 abandoned as cows in field during the April survey.	This was not considered to be a significant limitation as the BAI allows for comparisons between sites, regardless of how many times point counts were visited (by providing a number of bat passes, per point count, per hour).
	Detector error at 22:32 so swapped detector during the June survey.	This was not considered to be a significant limitation as recording was only stopped for less than one minute.
T7	Detector screen froze at 21:55 during the April survey.	This was not considered to be a significant limitation as recording was only stopped for less than one minute.
	For the June survey the most southerly hedgerow (point count 7) was not surveyed on the first loop due to surveyors surveying the hedgerow for a crossing point survey, this was surveyed afterwards.	This was not considered to be a significant limitation as the BAI allows for comparisons between sites, regardless of how many times point counts were visited (by providing a number of bat passes, per point count, per hour).
	For the June survey, the detector froze at 00:01 and crashed at 00:09.	This was not considered to be a significant limitation as recording was only stopped for less than one minute each time.
	For the May, June and August surveys, no weather data was collected during the survey, therefore historical data has been used.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T8	For the June survey, point count 1 was not surveyed during the latter part of survey due to access gate being blocked.	This was not considered to be a significant limitation as the BAI allows for comparisons between sites, regardless of how many times the point count was visiting (by providing a number of bat passes the point count, per hour).
	No access to field with point count 1 in it on the July survey.	
	For the May survey, no weather data was collected during the survey, therefore historical data has been used.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T9	For the June survey, the surveyors swapped the detector at 22:35 due to dead battery. At 22:38 the detector sound stopped, visual only. Reboot at 00:04, and the detector sound functioned again.	This was not considered to be a significant limitation as recording was only stopped for less than one minute each time.
	For the April survey, the detector had an issue at 21:18, the detector was therefore replaced. Point count B was repeated later in the survey on this basis.	This was not considered to be a significant limitation as recording was only stopped for less than one minute, and the BAI allows for comparisons between sites, regardless of how many times the point count was visiting (by providing a number that bats passed the point count, per hour).

[96] Gathered from https://www.yourweather.co.uk/weather_Uckington-Europe-United+Kingdom-Gloucestershire--1-123446.html?d=historical

Transect	What the Limitation Was	How Significant was the Limitation?
	For the May and June surveys, no weather data was collected during the survey, therefore historical data has been used.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines
T10	No access provided for the July survey	This was not considered to be a significant limitation, as the BAI allows for comparisons between sites, regardless of how many times the point count was visiting (by providing a number of bat passes the point count, per hour).
	For the October survey there was a brief rain shower at 19:54	This was not considered to be a significant limitation as bat activity continued even throughout the rain. Additionally, due to the number of times that all of the locations were visited, it was considered that this small rain shower would not significantly affect the results.
	For the May survey, no weather data was collected during the survey, therefore historical data has been used	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T11	For April survey the detector had an error at 22:16, which resumed at 22:18. There was also a restart required at 23:17 and again at 00:12.	This was not considered to be a significant limitation as recording was only stopped for less than two minutes each time.
	No end of survey weather info collected by the surveyors.	This was not considered to be a significant limitation as surveyors noted that the weather was within the BCT Guidelines.
T12	For the April survey the hand held detector kept stalling on the screen and wouldn't show the data, had to be repeatedly turned on and off to reboot.	This was not considered to be a significant limitation as recording was only stopped for less than one minute each time.
	For the May survey, there was light rain at the beginning of survey and wind picked up throughout the survey.	This was not considered to be a significant limitation as bat activity continued even throughout the rain and wind. Additionally, due to the number of times that all of the locations were visited, it was considered that this small rain shower and wind would significantly affect the results.
	For the June survey, there was light rain throughout duration of survey.	This was not considered to be a significant limitation as bat activity continued even throughout the rain. Additionally, due to the number of times that all of the locations were visited, it was considered that this small rain shower would not significantly affect the results.
	For the October survey, no post survey data as the bat detector may have stopped recording between 19:34 and 20:10. No bats seen or heard during this time period.	This was not considered to be a significant limitation as no bats were seen or heard during this time period.

C.2. Static Detector Limitations

	Static	Survey limitations	Significance
Transect 2	3	Surveys undertaken in May 2020 and July 2019 the weather was sub-optimal with heavy rain on the 9th, 11th and 13th of July. In August 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained.	Due to the number of other static bat detector deployments, and other survey methods undertaken it was considered that sufficient information had been gathered. This was therefore not considered to be a significant limitation.
	4	In July 2019 the weather was sub-optimal with heavy rain on the 9th, 11th and 13th. In June 2019 the deployed static bat detector did not record.	
Transect 4	7	In August 2019 and September 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained.	
	8	In August 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained.	
Transect 5	9	The weather for each deployment was sub-optimal with rain consistently recorded across each deployment.	
	10	The weather for each deployment was sub-optimal with rain consistently recorded across each deployment.	
Not associated with a transect	21	In July 2019 the weather was sub-optimal with heavy rain on the 9th, 11th and 13th.	
	33	In May 2020 the temperatures throughout the deployment were consistently below the optimal temperatures. In September 2019 only one night of data was recorded due to access.	
	35	In May 2020 the temperatures throughout the deployment were consistently below the optimal temperatures. In July 2019 deployment was not possible due to no access.	
	40	In the April 2021 deployment there were scattered showers and sub-optimal temperatures. The detector was not deployed in May.	
	44	In August and September 2021 no land access was possible for deployment. In April and May 2021 there was scattered showers throughout the deployment period. In June, July and October 2021 there was showers but these were limited to times where bats were less likely to be affected.	
Transect 7	11	In July 2019 the weather was sub-optimal with heavy rain on the 9th, 11th and 13th.	
	12	In June 2019 and July 2019 the weather was sub-optimal with heavy rain on 23rd and 24th June, and 11th and 13th July 2019. In August 2019 the detector only obtained four nights data despite two deployment periods.	
Transect 8	14	In June 2019 and July 2019 the weather was sub-optimal with heavy rain on 23rd and 24th June, and 11th and 13th July 2019.	
	36	In July 2019 the weather was sub-optimal with heavy rain on the 9th, 11th and 13th. In May 2020 the temperature was frequently below the optimum temperatures. In August and September 2019 for each month the 64GB SD cards were full within four nights of deployment and so the full five nights of data was not obtained.	
Transect 9	15	In August 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained. In September 2019 the detector did not record due to a malfunction.	
	16	No survey limitations were identified	N/A
Transect 10	17	No survey limitations were identified	N/A
	18	In August 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained.	Due to the number of other static bat detector deployments, and other survey methods undertaken it was considered that sufficient information had been gathered. This was therefore not considered to be a significant limitation.
Highways England Land	22	In July 2019 the detector was not deployed due to no land access. In September 2019 the bat detector did not record. In October 2019 the 64GB SD card was full within four nights of deployment and so the full five nights of data was not obtained. In April 2021 the detector was not deployed as sufficient data had been obtained.	
	23	In July 2019 the detector was not deployed due to no land access. In April 2021 the detector was not deployed as sufficient data had been obtained.	
Transect 11	39	In August and September 2021 there is no data available as the detector was lost / stolen. In July and October 2021 there was some rain during the deployment periods.	
	43	In May, July and October 2021 there was some scattered rain throughout the deployment.	
Transect 12	39b	In May, July and October 2021 there was some scattered rain throughout the deployment. In June 2021 the bat detector did not record due to a malfunction.	
	43b	In May, July and October 2021 there was some scattered rain throughout the deployment.	
Statics under the M5 Junction 10 bridge	41	In May and July 2021 there was some rain. In June 2021 the detector was not deployed due to no land access.	
	41b	In May and July 2021 there was some rain. In June 2021 the detector was not deployed due to no land access.	
	42	In May and July 2021 there was some rain. In June 2021 the detector was not deployed due to no land access.	

	Static	Survey limitations	Significance
	42b	In May and July 2021 there was some rain. In June 2021 the detector was not deployed due to no land access.	
Statics along Stanboro Lane	45	In April and May 2021 there were some sub-optimal temperatures recorded. In June 2021 the detector was not deployed due to access issues.	
	45b	In April and May 2021 there were some sub-optimal temperatures recorded. In June 2021 the detector was not deployed due to access issues. In August and September 2021 the detector did not record due to a microphone malfunction.	This was considered a limitation, however CP9 was also undertaken along Stanboro Lane and further statics were also deployed within the Highways land adjacent. As a result this limitation was not considered to be significant

Appendix D. Crossing Point Survey Results

Table 4-61 - Crossing Point 1 Survey Results in 2020

Crossing Point	Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (02/06/2020)	**10** **Soprano pipistrelle (5), Common pipistrelle (5)**	**6** **Noctule**	33
Survey 2 (02/06/2020)	**7** **Soprano pipistrelle (4), Common pipistrelle (2), Pipistrelle (1)**	**1** **Common pipistrelle**	22
Survey 3 (01/09/2020)	**16** **Soprano pipistrelle (3), *Myotis* (10), Common pipistrelle (1), Lesser horseshoe (2)**	**1** **Noctule**	26
Survey 4 (07/09/2020)	**6** **Soprano pipistrelle (2), *Myotis* (1), Common pipistrelle (1), Lesser horseshoe (2)**	**2** **Noctule (1) and Soprano pipistrelle (1)**	43
Survey 5 (17/09/2020)	**13** **Soprano pipistrelle (8), *Myotis* (4), Lesser horseshoe (1)**	N/A	25
Survey 6 (28/09/2020)	**3** **Soprano pipistrelle (1), *Myotis* (1), Common pipistrelle (1)**	N/A	37

Table 4-62 - Crossing Point 1 Survey Results in 2021

Crossing Point	Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (07/06/2021)	**6** **Soprano pipistrelle (1) and pipistrelle (5)**	**20** ***Myotis* (3), soprano pipistrelle (3) common pipistrelle (4) and pipistrelle species (9)**	1
Survey 2 (21/06/2021)	**1** **Common pipistrelle**	**7** ***Myotis* (2), soprano pipistrelle (3), common pipistrelle (1) and pipistrelle species (1)**	8
Survey 3 (14/07/2021)	N/A	**14** ***Myotis* (3) soprano pipistrelle (1) and common pipistrelle (10)**	2
Survey 4 (20/07/2021)	**1** **Common pipistrelle**	**10**[97] ***Myotis* (6), soprano pipistrelle (2) and common pipistrelle (2)**	15
Survey 5 (03/08/2021)	**1** **Common pipistrelle**	**3** ***Myotis* (1) and soprano pipistrelle (2)**	1
Survey 6 (17/08/2021)	**4** **Common pipistrelle (1) and *Myotis***	**6** ***Myotis***	3

[97] This included observations of a common pipistrelle bat flying over the culvert onto the motorway

Table 4-63 - Crossing Point 2 Survey Results in 2020

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (04/06/2020)	Crossing the Road	**4 Common pipistrelle**	N/A	12
	Feature B	**12 Common pipistrelle**	N/A	
	Feature C	**1 Noctule**	N/A	
Survey 2 (16/07/2020)	Crossing the Road	**1 Soprano pipistrelle**	**8 Noctule**	22
	Feature B	**2 Common pipistrelle**	**2 Noctule (1) and Common pipistrelle (2)**	
	Feature C	**8 Common pipistrelle (5), pipistrelle species (1), soprano pipistrelle (1) and Noctule (1)**	**1 Common pipistrelle**	
Survey 3 (10/08/2020)	Crossing the Road	**1 Soprano pipistrelle**	N/A	94
	Feature B	**1 Common pipistrelle**	N/A	
	Feature C	**7 Common pipistrelle)**	**1 Noctule**	
Survey 4 (24/08/2020)	Crossing the Road	**3 Serotine**	**2 Serotine (1) and common pipistrelle (1)**	107
	Feature B	**1 Noctule**	N/A	
	Feature C	**1 Common pipistrelle**	N/A	
Survey 5 (24/08/2020)	Crossing the Road	N/A	**1 Noctule**	87
	Feature B	**1 Common pipistrelle**	N/A	
	Feature C	**1 Unconfirmed bat**	N/A	
Survey 6 (04/06/2020)	Crossing the Road	**4 Common pipistrelle**	N/A	12
	Feature B	**12 Common pipistrelle**	N/A	
	Feature C	**1 Noctule**	N/A	

Table 4-64 - Crossing Point 2 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (09/06/2021)	Road	**2 Common pipistrelle**	N/A	12
	Feature B	**3 Noctule (1) and common pipistrelle (2)**	N/A	
	Feature C	**5 *Myotis* (1) and soprano pipistrelle (4)**	N/A	
Survey 2 (22/06/2021)	Road	N/A	**2 Noctule**	6
	Feature B	N/A	N/A	
	Feature C	N/A	**2 Noctule**	

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 3 (08/07/2021)	Road	**1 Common pipistrelle**	N/A	24
	Feature B	**2 Common pipistrelle**	**2 Noctule**	
	Feature C	N/A	**1 Noctule**	
Survey 4 (22/07/2021)	Road	N/A	N/A	16
	Feature B	N/A	**3 Noctule**	
	Feature C	N/A	**1 Noctule**	
Survey 5 (05/08/2021)	Road	**1 Common pipistrelle**	**1 Noctule**	16
	Feature B	**1 Common pipistrelle**	**1 Common pipistrelle**	
	Feature C	N/A	N/A	
Survey 6 (19/08/2021)	Road	N/A	**15 Common pipistrelle**	47
	Feature B	N/A	N/A	
	Feature C	N/A	**1 Common pipistrelle (8) and *Myotis* sp. (2)**	

Table 4-65 - Crossing Point 3 Survey Results 2020

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (15/06/2020)	Feature A	N/A	N/A	70
	Feature B	**1 Common pipistrelle**	**12 Noctule**	
	Feature C	**5 Common pipistrelle**	N/A	
Survey 2 (01/07/2020)	Feature A	N/A	**1 Noctule**	15
	Feature B	N/A	**3 Noctule**	
	Feature C	N/A	**1 Noctule**	
Survey 3 (26/08/2020)	Feature A	**1 Soprano pipistrelle**	**2 Noctule (1), soprano pipistrelle (1)**	25
	Feature B	N/A	**2 Noctule (1), soprano pipistrelle (1)**	
	Feature C	N/A	**1 Noctule**	
Survey 4 (10/09/2020)	Feature A	**2 Common pipistrelle (1), *Myotis* (1)**	N/A	52
	Feature B	**3 Noctule (1), Common pipistrelle (2)**	**5 Noctule**	
	Feature C	N/A	N/A	
Survey 5 (16/09/2020)	Feature A	N/A	**1 Noctule**	123
	Feature B	**6 Common pipistrelle (4), soprano pipistrelle (1), Unidentified bat (1)**	**1 Noctule**	
	Feature C	**1 Common pipistrelle (1)**	**2 Noctule**	

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 6 (24/09/2020)	Feature A	N/A	N/A	12
	Feature B	**1** **Common pipistrelle**	N/A	
	Feature C	N/A	N/A	

Table 4-66 - Crossing Point 3 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (01/06/2021)	Feature A	**1** **Common pipistrelle**	N/A	5
	Feature B	N/A	N/A	
	Feature C	N/A	N/A	
Survey 2 (14/06/2021)	Feature A	N/A	**2** **Common pipistrelle and *Myotis* sp.**	13
	Feature B	N/A	N/A	
	Feature C	N/A	N/A	
Survey 3 (28/06/2021)	Feature A	**3** **Common pipistrelle**	**1** **Common pipistrelle**	10
	Feature B	**4** **Common pipistrelle**	**1** **Noctule**	
	Feature C	N/A	N/A	
Survey 4 (13/07/2021)	Feature A	**1** **Soprano pipistrelle**	N/A	14
	Feature B	**12** **Common pipistrelle (9) and soprano pipistrelle (3)**	N/A	
	Feature C	N/A	N/A	
Survey 5 (10/08/2021)	Feature A	**1** **Common pipistrelle**	**1** **Common pipistrelle**	7
	Feature B	**4** **Common pipistrelle (3) and serotine (1)**	N/A	
	Feature C	N/A	N/A	
Survey 6 (10/08/2021)	Feature A	N/A	N/A	9
	Feature B	N/A	N/A	
	Feature C	N/A	N/A	

Table 4-67 - Crossing Point 4 Survey Results in 2020

Crossing Point	Total no. of Bats 'Using' the Feature (between 3 m and 8 m)	Total no. of Bats flying at safe heights (up to 3 m and over 8 m	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (08/06/2020)	12 Common pipistrelle (11) and noctule (1)	4 Common pipistrelle (3) and soprano pipistrelle (1)	59
Survey 2 (06/07/2020)	15 Common pipistrelle (10), pipistrelle species (2), un-identified bat (1) and noctule (2)	8 Common pipistrelle (2), Noctule (6)	189
Survey 3 (20/08/2020)	24 Soprano pipistrelle (1), *Myotis sp.* (1), common pipistrelle (18), unidentified bat (1) and pipistrelle species (3)	1 Noctule	176
Survey 4 (27/08/2020)	9 Common pipistrelle (8) and	5 Common pipistrelle (3) and noctule (2)	92

	unidentified bat (1)		
Survey 5 (03/09/2020)	11 Soprano pipistrelle (2), common pipistrelle (7), pipistrelle species (1) and noctule (1)	6 Common pipistrelle (2) and noctule (4)	72
Survey 6 (14/09/2020)	6 Common pipistrelle (3) and noctule (3)	21 Soprano pipistrelle (3), noctule (5) and common pipistrelle (13)	136

Table 4-68 - Crossing Point 4 Survey Results in 2021

Crossing Point	**Total no. of Bats 'Using' the Feature (between 3 m and 8 m)**	**Total no. of Bats flying at safe heights (up to 3 m and over 8 m**	**Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)**
Survey 1 (08/06/2021)	N/A	N/A	12
Survey 2 (23/06/2021)	N/A	50 Common pipistrelle	21
Survey 3 (07/07/2021)	4 Common pipistrelle	316 Common pipistrelle	6
Survey 4 (21/07/2021)	N/A	1 Common pipistrelle	9
Survey 5 (04/08/2021)	2 Common pipistrelle	8 Noctule	6
Survey 6 (18/08/2021)	1 Common pipistrelle	5 Noctule (2) and common pipistrelle (2) and *Myotis* sp. (1)	20

Table 4-69 - Crossing Point 5 Survey Results 2020

Crossing Point		**Total no. of Bats 'Using' the Feature (≤ 5 m)**	**Total no. of Bats Not 'Using' the Feature (> 5 m)**	**Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)**
Survey 1 (10/06/2020)	Road	3 Common pipistrelle	N/A	15
	Feature A	9 Common pipistrelle	N/A	
	Feature C	2 Common pipistrelle	1 Noctule	
Survey 2 (24/06/2020)	Road	4 Common pipistrelle (3) and pipistrelle species (1)	N/A	15
	Feature A	6 Common pipistrelle (4) and pipistrelle species (2)	N/A	
	Feature C	3 Common pipistrelle (2) and pipistrelle species (1)	N/A	
Survey 3 (17/08/2020)	Road	1 Common pipistrelle	1 Common pipistrelle	113
	Feature A	11 Common pipistrelle (9), *Myotis* sp. (1) & pipistrelle species (1)	N/A	
	Feature C	1 Common pipistrelle	1 Common pipistrelle (1)	
Survey 4 (08/09/2020)	Road	1 Common pipistrelle	1 Common pipistrelle	25
	Feature A	2 Common pipistrelle (1) and unidentified bat (1)	3 Noctule (2) and serotine (1)	
	Feature C	N/A	1 Common pipistrelle	
Survey 5 (21/09/2020)	Road	2 Common pipistrelle (1) and unidentified bat (1)	N/A	161
	Feature A	N/A	N/A	
	Feature C	1 Common pipistrelle	1 Noctule	

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 6 (28/09/2020)	Road	N/A	1 Common pipistrelle	125
	Feature A	2 Common pipistrelle (1) and noctule (1)	9 Common pipistrelle	
	Feature C	N/A	1 Unidentified bat	

Table 4-70 - Crossing Point 5 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (02/06/2021)	Road	18 Common pipistrelle (17) and *Myotis* sp. (1)	9 Common pipistrelle	35
	Feature A	2 Common pipistrelle (1) & soprano pipistrelle (1)	N/A	
	Feature C	1 Common pipistrelle	13 Common pipistrelle	
Survey 2 (17/06/2021)	Road	26 Common pipistrelle (8) and *Myotis* sp. (18)	8 Common pipistrelle	48
	Feature A	2 Common pipistrelle	N/A	
	Feature C	3 Common pipistrelle	N/A	
Survey 3 (07/07/2021)	Road	34 Common pipistrelle	14 Common pipistrelle (13) & soprano pipistrelle (1)	16
	Feature A	21 Common pipistrelle (13) & soprano pipistrelle (8)	N/A	
	Feature C	1 Soprano pipistrelle	N/A	
Survey 4 (16/07/2021)	Road	8 Common pipistrelle	3 Common pipistrelle	10
	Feature A	2 Common pipistrelle	N/A	
	Feature C	2 Common pipistrelle	N/A	
Survey 5 (20/08/2021)	Road	N/A	4 Common pipistrelle (3) and bat species (1)	5
	Feature A	N/A	2 Bat species	
	Feature C	N/A	1 Common pipistrelle	
Survey 6 (31/08/2021)	Road	N/A	2 Common pipistrelle	5
	Feature A	N/A	N/A	
	Feature C	N/A	N/A	

Table 4-71 - Crossing Point 6/7 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (03/06/2021)	Road	2 Common pipistrelle	2 Noctule and serotine	7
	Feature B	N/A	N/A	
	Feature D	2 *Pipistrelle species (1) and Myotis* sp. (1)	1 Noctule	
Survey 2 (16/06/2021)	Road	N/A	N/A	17
	Feature B	1 Common pipistrelle	N/A	
	Feature D	7 Common pipistrelle (6) and *Myotis* sp. (1)	N/A	

Table 4-72 - Crossing Point 8 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (10/06/2021)	Road	1 *Myotis* sp.	3 Common pipistrelle (2) and noctule (1)	9
	Feature A	N/A	1 Noctule	
	Feature B/C	1 Brown long-eared	N/A	
Survey 2 (09/07/2021)	Road	5 Common pipistrelle (2) and *Myotis* (3)	2 Common pipistrelle	9
	Feature A	1 Common pipistrelle	N/A	
	Feature D	1 Noctule	N/A	
Survey 3 (23/07/2021)	Feature E	1 Soprano pipistrelle	N/A	8
	Road	4 Common pipistrelle (2) and *Myotis* (1)	7 Common pipistrelle (4), noctule (1) and bat (2)	
	Other Features	N/A	N/A	
Survey 4 (03/08/2021))	Road	2 Common pipistrelle and soprano pipistrelle	2 Noctule	11 6
	Feature C	N/A	2 Common pipistrelle and noctule	
	Road	1 Common pipistrelle	2 Common pipistrelle and noctule	
Survey 5 (12/08/2021)	Other features	N/A	N/A	23
	Road	1 Noctule	5 Common pipistrelle (3) and Noctule (2)	
	Feature B	1 Serotine	N/A	
Survey 6 (23/08/2021)	Road	1 *Myotis* sp.	3 Common pipistrelle (2) and noctule (1)	9
	Feature A	N/A	1 Noctule	
	Feature B/C	1 Brown long-eared	N/A	

Table 4-73 - Crossing Point 9 Survey Results 2021

Crossing Point		Total no. of Bats 'Using' the Feature (≤ 5 m)	Total no. of Bats Not 'Using' the Feature (> 5 m)	Total no. of Bats Where Flight Distance from the Feature is Unknown (heard not seen)
Survey 1 (16/06/2021)	Road	N/A	N/A	5
	Feature A	1 Common pipistrelle	N/A	
	Feature B	N/A	N/A	
Survey 2 (01/07/2021)	Road	1 Noctule	N/A	5
	Feature A	1 Common pipistrelle	N/A	
	Feature B	N/A	N/A	

Appendix E. Advanced Licence Bat Survey Techniques (ALBST)

Table 4-74 – ALBST, Trapping Survey Details

Date	Tracking location(s) and equipment	Weather details
22/05/2021	Location 5: 3 x harp traps and 5 x mist nests Location 6: All trees inspected using an endoscope	Temp = 16^{0}C / 4^{0}C Cloud clover[98] = 0 Wind[99] = 1 Rain = None Moon condition: ¾ bright[100]
23/05/2021		Temp = Forecast was lower than 5^{0}C Wind = Forecast was 4 Rain = Forecast was moderate Determined to be sub-optimal overnight temperatures, wind and rain
24/05/2021		Temp = Forecast was lower than 5^{0}C Wind = Forecast was 4 Rain = Forecast was moderate Determined to be sub-optimal overnight temperatures, wind and rain
25/05/2021	**Team 1** Location 3: 1 x harp trap Location 4: 1 x harp trap under furthest tree archway and 2 x mist nets **Team 2** Location 5: 1 x harp trap Location 6: All trees inspected using an endoscope	Temp = 10^{0}C / 6^{0}C Cloud clover = 4 Wind = 2 Rain = None Moon condition: Full
26/05/2021	**Team 1** Location 2: 2 x harp traps and Location 4: 2 x mist nets **Team 2** Location 5: 1 x harp trap Location 6: All trees inspected using an endoscope	Temp = 10^{0}C / 4^{0}C Cloud clover = 0 Wind = 1 Rain = None Moon condition: Full (behind clouds)
27/05/2021	Location 7: 1 x harp trap below the foot bridge and 1 x mist net above the foot bridge Location 8: 2 x mist net	Temp = 16^{0}C / 8^{0}C Cloud clover = 1 Wind = 1 Rain = None Moon condition: Full
28/05/2021	Location 2: 2 x harp traps Location 3: 1 x harp trap Location 4: 2 x mist nets	Temp = 15^{0}C / 8^{0}C Cloud clover = 1 Wind = 1 Rain = None Moon condition: Full
29/05/2021		Temp = 14^{0}C / 8^{0}C Cloud clover = 4 Wind = 0 Rain = None
30/05/2021		Temp = 17^{0}C / 9^{0}C Cloud clover = 1 Wind = 2 Rain = None
31/05/2021		Temp = 17^{0}C / 8^{0}C

[98] Cloud cover was recorded by surveyors using the Okta scale (the unit of measure for cloud cover is the Okta). Using this scale, cloud cover is measured on an eight point scale, 0 Oktas being clear sky, one Okta being 1/ 8 of the sky covered in cloud, and so on, up to 8 Oktas - completely overcast
[99] Windspeed was recorded against Beaufort scale (with scores of 0-12). Using this scale 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane
[100] These details were taken for the trapping period only

Date	Tracking location(s) and equipment	Weather details
		Cloud clover = 6 Wind = 2 Rain = None
01/06/2021		Temp = 16^{0}C / 12^{0}C Cloud clover = 0 Wind = 3 Rain = None
02/06/2021		Temp = 18^{0}C / 11^{0}C Cloud clover = 5 Wind = 1 Rain = Prior
03/06/2021		Temp = 17^{0}C / 10^{0}C Cloud clover = 1 Wind = 1 Rain = None

Table 4-75 – ALBST, Trapping Survey Results

Date	Tagged Bats	Other Bats Recorded But Not Trapped
22/05/2021	N/A	**Location 5:** Soprano pipistrelle, female, adult[101] (breeding condition: parous[102])
23/05/2021	Survey postponed	Survey postponed
24/05/2021	Survey postponed	Survey postponed
25/05/2021	N/A	**Location 3:** Daubenton's, male, adult (5.5g)[103]; Whiskered, male, adult bat (4.8g); and Whiskered, male, adult bat (4.5g)
26/05/2021	**Location 2:** Bat 1: Daubenton's, male, adult bat (7.6g); Bat 2: Natterer's, female, adult bat (7.2g) (breeding condition: parous); Bat 3: Natterer's, female, adult bat (7.2g) (breeding condition: parous); and Bat 4: Lesser horseshoe, female, adult bat (6.5g) (breeding condition: pregnant)	**Location 2:** Natterer's, female, adult bat[104]; Natterer's, male, adult bat (8g)[105] Daubenton's, male, adult bat (5g)
27/05/2021	N/A	**Location 7/8:** Two adult soprano pipistrelle bats (unexamined); Two male, adult soprano pipistrelle bats; Female, adult soprano pipistrelle bat (breeding condition: unknown); Female, adult soprano pipistrelle bat (breeding condition: nulliparous[106]); Male, Daubenton's adult bat (9g)[107]; and Male, noctule adult bat (un-weighed)
28/05/2021	**Location 2:** Bat 5: Male, Natterer's adult bat (8.6g)[108]	**Location 2:** One female soprano pipistrelle bat (4.5g); Two Natterer's bats (male/female), adults (8/6.5g); Two male, adult whiskered bats (4.5/5g); Female, adult common pipistrelle bat (breeding condition unknown) (5.5g); Two male, Daubenton's adult bats (4.5/5.5g); and Female, soprano pipistrelle adult bat (5.5g)

[101] Not weighed as the bat was considered to be very cold and needed to be released as soon as possible.
[102] Parous = raised nipples
[103] Although these incidental bats could be tagged, these bats were underweight and even the smallest tag that the team had was too big for these bats.
[104] Not weighed as only two Natterer's bats were proposed to be tagged, so this bat was released straight away.
[105] As two Natterer's had already been tagged, this was bat not tagged. This is as the criteria originally set out had a maximum of two Natterer's bats.
[106] Nulliparous = tiny unraised nipples
[107] Although this bat could have been tagged based on the criteria, as only a certain number of smaller tags were available, this bat was not tagged so that if a lesser horseshoe bat was caught, there was a small tag available. This was as all of the bats were trapped were underweight compared to what had been assumed, therefore the tags that were being used were smaller than anticipated.
[108] Although this was the third Natterer's bat, which went against the criteria originally set out to only tag two Natterer's bats, it was assessed that as no primary or secondary bat species had managed to be tracked during this session, it was better to gather at least more data on incidental species than no more bat data.

Appendix F. Refined Bat Roost Impact Assessment

Contents

Tables

1. Introduction

1.1. Purpose of the Report

1.1.1. The draft bat licence for the M5J10 Improvements Scheme (hereafter referred to as 'the Scheme') was submitted to Natural England on 05/08/2022. Natural England reviewed the draft licence, and a meeting was held on 03/11/2022 to discuss the findings of their review.

1.1.2. Natural England's key comment was around how gaps in the bat roost survey data had been addressed in the draft bat licence, with Natural England requiring further justification and clarification on this matter. This document seeks to address this comment. It presents a refining process which has been undertaken to address the gaps in the bat roost survey data as far as possible, such that the Scheme impacts can be more accurately predicted and to provide surety that the Scheme adequately compensates for the predicted impacts, taking a reasonably precautionary approach.

1.2. Methodology

1.2.1. There are a total of 296 structures within the Zone of Influence (ZoI) of the Scheme. This figure excludes structures between the M5 motorway and the new Link Road, as these are more than 40 m from the Order limits, and they are not at risk of any impacts (such as fragmentation) from the Scheme.

1.2.2. Of these 296 structures, 74 (25%) are deemed to provide negligible suitability for roosting bats[1]. Of these 296 structures, 146 (49%) have been surveyed in full (in line with the Bat Conservation Trust (BCT) good practice survey guidelines)[2], and a further 45 structures have had incomplete surveys (i.e. the full number of surveys recommended by the guidelines has not been completed). This leaves 105 structures that have not been surveyed at all. Numerous attempts were made to survey these structures however access was either refused or not forthcoming or, in the case of partially surveyed structures, was withdrawn part way through the survey (this is detailed in Appendix 7 of the draft bat licence application). It was not considered appropriate to undertake detailed assessments/surveys from adjacent land parcels or Public Rights of Way (PRoW) and use it as evidence as part of the environmental assessment.

1.2.3. Initially, the **known occupancy rates** of bat roosts were established. This is based on the results of fully completed surveys of 146 structures (the known occupancy rates are detailed in Section 2). Using the known occupancy rates, the **predicted occupancy rates** of bats in the unsurveyed structures (105) and partially surveyed structures (45) has been determined (the predicted occupancy rates are detailed in Section 3).

1.2.4. The process of establishing known and predicted occupancy rates involved the bat roost suitability of all structures being assessed as negligible, low, moderate or high in line with the BCT good practice survey guidelines[2] , as follows:

Table 1: Information taken from Table 4.1 of the BCT Good Practice Survey Guidelines

Suitability	Description of Roosting Feature
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure 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

[1] This includes 68 of the structures that have been surveyed at least in part, and six structures that have only been subject to an aerial imagery and Google street view assessment. Further detail is provided in Section 3.
[2] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

	and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation 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	A structure or tree with one or more potential roost sites that are obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

1.2.5. These categories have been applied for horseshoe bats, other void dwelling bats and crevice dwelling bats. Features required for horseshoe, other void dwelling bats and crevice dwelling bats are as follows:

1. **Horseshoe Bats**

   Bats that require at least a letter box sized access point into a void. This generally excludes residential properties as access points of this size are very unlikely.

2. **Void Dwelling Bats (Excluding Horseshoe Bats)**

   Bats that require a generally undisturbed void to fly/light sample within (i.e. long-eared bats or Natterer's bats that are known to light sample). This category of bats does not require a fly through access point like horseshoes, and instead can utilise the void via crevice features.

3. **Crevice Dwelling Bats**

   Bats that require a crevice feature to roost, and do not need a void.

1.2.6. If the structure did not have potential roost features (PRF) for one of these bat groups, then it was assessed as 'negligible'.

1.2.7. The same process for assigning negligible/low/moderate/high suitability has been used for all structures (surveyed, unsurveyed and partially surveyed) to ensure that the methodology is consistent and transferable. Therefore, it has been necessary to undertake this as a predominantly desk based assessment (despite detailed information about the structures existing for those that have been fully surveyed) using aerial imagery and Google street view. In addition, information provided by the client about a structure, for example if the client had identified a structure as derelict or provided detailed structural reports for culverts, then this information was also taken into consideration. The process for assessing suitability for horseshoe, void dwelling and crevice dwelling bats is outlined in the flow chart in Figure 1.

1.2.8. Alongside this assessment, the location of the structure and surrounding habitat was considered in order to assign each structure as providing either 'low,' 'moderate' or 'high' roost suitability for each category of bats[3]. This included the following general parameters for defining habitat:

- Low - Structures in built up areas, generally including all of the residential properties south of the A4019.
- Moderate - Structures in a more rural setting where hedgerows and agricultural fields link the location to the surrounding habitats.

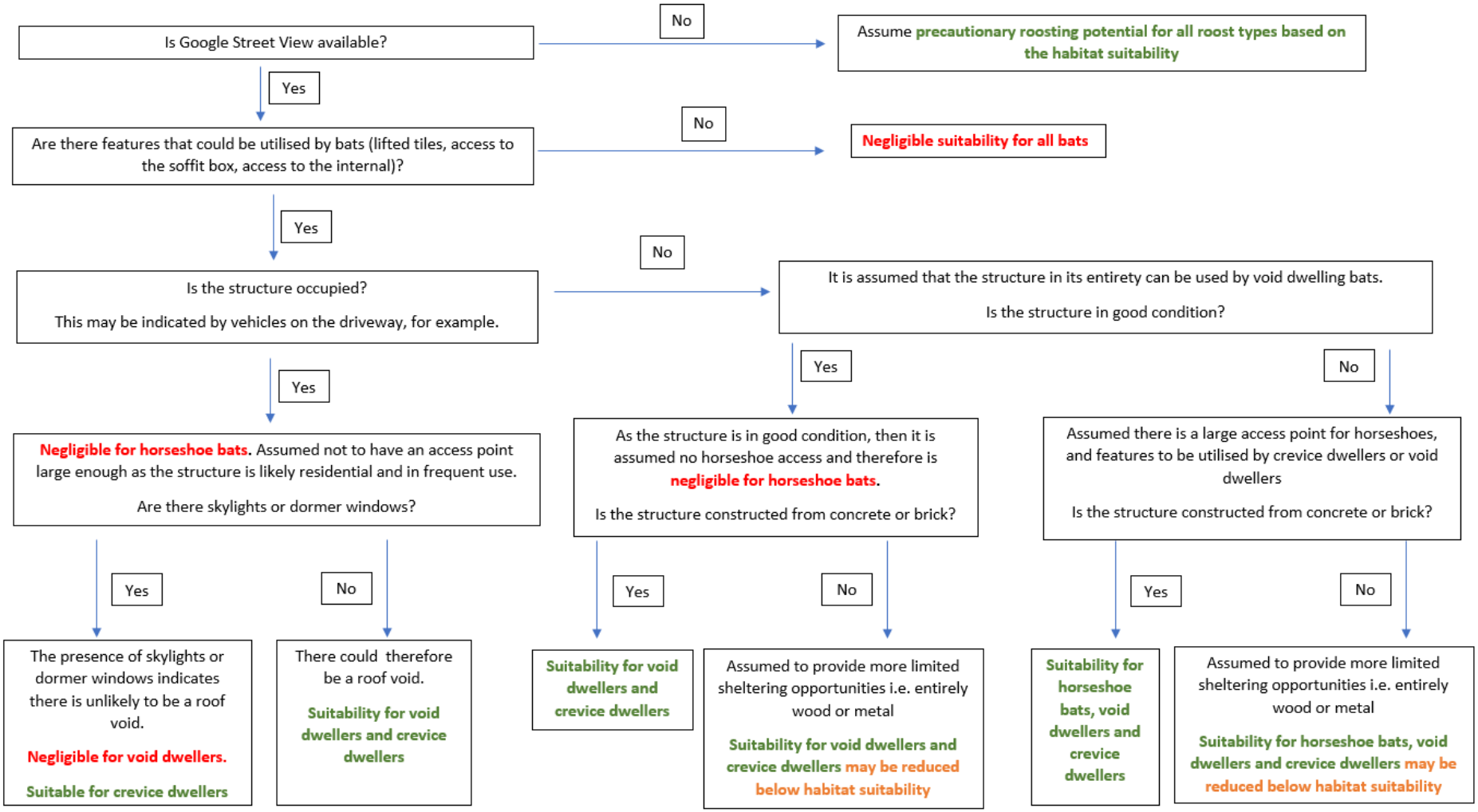
[3] This primarily considered foraging and commuting habitat in the vicinity of the structure.

- High - Areas that have been found during surveys to show high levels of bat activity, this included the northern quadrant, close to Stanboro Lane, around Moat Lane in the southern quadrant and also along the River Chelt.

1.2.9. Therefore, where there was suitability for horseshoe, void dwelling and/or crevice dwelling bats, the assigned habitat rating of low, moderate or high was applied to the identified bat categories, unless stated otherwise. The exception to this was structures that were likely to be outbuildings/sheds constructed from metal/wood (usually within residential back gardens), which were manually adjusted to provide only low bat roosting suitability. In these situations, the modification of bat roost suitably was documented and agreed through the review process.

1.2.10. The assessment was completed by two licensed bat workers, with each structure assessed by a licensed bat worker and their judgements reviewed and checked by another licensed bat worker. The assessment process for each structure is detailed in the Bat Roosts Impact Assessment Excel document, which is available on request.

Figure 1: Process for assessing suitability for horseshoe, void dwelling and/or crevice dwelling bats.



1.2.11. Once the bat roost suitability had been established, it was possible to establish the known occupancy rate for low/moderate/high suitability structures based on the results of the fully completed surveys. These occupancy rates have been applied to the unsurveyed and partially surveyed structures to establish the predicted occupancy rates.

1.2.12. The process for establishing predicted occupancy rates for hibernating bats is described in Section 4, and follows a similar process

1.2.13. Section 5 provides a summary of the predicted bat roosts within the unsurveyed/partially surveyed structures within the Scheme's zone of influence, as well as assumptions regarding the species assemblages within these predicted bat roosts.

1.2.14. This document refers to different sectors of the Scheme as follows, and as defined primarily by the A4019 and the M5:

- Northern quadrant – north of the A4019 and west of the M5.
- Eastern quadrant – north of the A4019 and east of the M5.
- Southern quadrant – south of the A4019 and east of the M5.
- Western quadrant – south of the A4019 and west of the M5.

1.2.15. Known occupancy rates have been established for the east of the M5 and the west of the M5, rather than for each quadrant. This is because the M5 is a major barrier to bats, with the River Chelt culvert beneath the M5 the only safe crossing point beneath this road along this stretch of motorway. The A4019 is less of a barrier to bats, being narrower and currently unlit, and bats have been recorded crossing this road. Although the Scheme will light stretches of this road, the road will be widened and traffic levels will increase, dark corridors will be maintained with hop overs at key locations and a large underpass will be constructed as part of the Scheme to create a traffic free route across this road as part of the Scheme's embedded mitigation. Although known occupancy rates have been calculated for each side of the M5, they have then been applied to the individual quadrants to ensure that the compensation is sited as close to impacts as possible.

1.3. Structure's Suitability and Compensation Provided

1.3.1. The suitability of the unsurveyed/partially surveyed structures for bats has been assessed as negligible, low, moderate or high. To ensure that compensatory features provide at least the same opportunities as predicted to be present within the existing structures, the process shown in Table 1-2 was followed to determine the level of compensation appropriate to the predicted roost suitability. This is detailed in Section 6.

Table 1-2 – How the Structure's Bat Roost Suitability is Translated into the Compensatory Features Provided

Structure's Predicted Bat Roost Suitability	Compensation Provided Based on the Predicted Bat Roost Suitability
Low or moderate suitability	Features suitable for small numbers of bats
High suitability	Features suitable for maternity colonies
Non-traditional hibernation habitat	Features suitable for solitary hibernating bats
Traditional hibernation habitat	Features suitable for larger numbers of hibernating bats

2. Known Occupancy Rates (Structures)

2.1. Horseshoe Category

2.1.1. The assessment to determine the horseshoe occupancy rate of the surveyed structures only analysed structures where an internal survey had been completed[4] (to ensure that the presence/absence of a void had been reliably identified). The results of this assessment are presented in Table 2-1.

Table 2-1 –Horseshoe Bat Occupancy Rates

PRA Result	Quadrant	Number of Structures with Suitability for Horseshoe Bats[5]	Number of Horseshoe Roosts	Max Number of Bats in the Known Roosts	Known Occupancy Rate
Low (56)	Northern	3	0	-	0
	Western	0			
	Southern	37	1	BU_11 **(1)**	1.9%
	Eastern	16			
Moderate (27)	Northern	1	0	-	0
	Western	0			
	Southern	17	5	BU_507 **(1)** BU_611 **(1)** BU_694 **(1)** BU_709 **(1)** BU_819 **(1)**	19.2%
	Eastern	9			
High (8)	Northern	2	0	-	0
	Western	0			
	Southern	6	1	BU_668 **(1)**	16.7%
	Eastern	0			

2.2. Void Dwelling Bats (Excluding Horseshoe) Category

2.2.1. The assessment to determine the void dwelling bat (excluding horseshoe bats) occupancy rate for the surveyed structures only considered structures where an internal survey had been completed[6] (to ensure that the presence/absence of a void had been reliably identified). The results of this assessment are presented in Table 2-2.

[4] Shown as 'yes' in column 'I' on the Bat Roosts Impact Assessment Excel document. This was to ensure that structures where no internal surveys had been carried out and evidence of horseshoe bats was not recorded, did not skew the occupancy rates.
[5] No greater horseshoe roosts have been recorded, therefore all horseshoe roosts only refer to lesser horseshoe roosts.
[6] Shown as 'yes' in column 'I' on the Bat Roosts Impact Assessment Excel document. This was to ensure that structures where no internal surveys had been carried out and evidence of horseshoe bats was not recorded, did not skew the occupancy rates.

Table 2-2 – Void Dwelling Bat Occupancy Rates

PRA Result	Quadrant	Number of Structures with Suitability for Void Dwelling Bats (Excluding Horseshoe)	Number of Void Dwelling Bat Roosts (Excluding Horseshoe)	Max Number of Bats in the Known Roosts	Known Occupancy Rate
Low (59)	Northern	3	0	-	0
	Western	0			
	Southern	39	1	BU_723 (***Myotis*, assumed to be Natterer's based on call data analysis, 1)**	1.8%
	Eastern	17			
Moderate (39)	Northern	1	0	-	0
	Western	0			
	Southern	21	2	BU_378 **(hibernating brown long-eared - 1)** BU_694 **(brown long-eared - 1)**	5.3%
	Eastern	17			
High (9)	Northern	3	0	-	0
	Western	0			
	Southern	6	0	-	0
	Eastern	0			

2.3. Crevice Dwelling Bats Category

2.3.1. The results of the assessment to determine the crevice dwelling occupancy rate for surveyed structures, where all emergence surveys are complete[7], is presented in Table 2-3.

Table 2-3 –Crevice Dwelling Bat Occupancy Rates

PRA Result	Quadrant	Number of Structures with Suitability for Crevice Dwelling bats	Number of Bat Roosts	Max Number of Bats in the Known Roosts	Known Occupancy Rate
Low (57)	Northern	4	0	0	0
	Western	0			
	Southern	38	1		1.9%

[7] Shown as 'yes' in column 'k' on the Bat Roosts Impact Assessment Excel document. This was to ensure that structures where emergence surveys are not complete and evidence of bats was not recorded, did not skew the occupancy rates.

	Eastern	15		BU_723 **(common pipistrelle - 4)**	
Moderate (71)	Northern	5	2	BU_990 **(common pipistrelle - 1)** BU_992 **(common pipistrelle - 4)**	40%
	Western	0			
	Southern	42	11	BU_376 **(common pipistrelle - 1)** BU_378 **(common pipistrelle - 3)** BU_507 **(soprano pipistrelle - 1)** BU_610 **(common pipistrelle - 1[8])** BU_638 **(common pipistrelle - 2)** BU_653 **(soprano pipistrelle - 1)** BU_735 **(common pipistrelle - 3)** BU_737 **(common pipistrelle - 3)** BU_819 **(common pipistrelle - 2)** BU_834 **(common pipistrelle - 1)** BU_862 **(common pipistrelle - 2)**	16.7%
	Eastern	24			
High (13)	Northern	8	3	BU_1034 **(pipistrelle - 3)** BU_1039 **(unknown species - 1)** BU_963 **(soprano pipistrelle - 1)**	37.5%
	Western	0			
	Southern	4	0	-	0
	Eastern	1			

2.4. Hibernation Roosts

2.4.1. The assessment to determine the hibernation occupancy rate for the surveyed structures includes the 14 structures where hibernation surveys have been completed. The results of this assessment are presented in Table 2-4.

Table 2-4 –Hibernation Occupancy Rates

Quadrant	Number of structures with suitability for hibernation bats	Number of Hibernation Roosts	Max Number of Bats in the Known Roosts	Known Occupancy Rate
Northern	2	0	-	0

[8] Additionally, one noctule was recorded in this structure. However, as noctule are usually record within tree crevices, this noctule was excluded from this assessment.

Western	0			
Southern	6[9]	2	BU_378 **(1)** BU_638 **(1)**	16.7%
Eastern	6			

[9] Including a culvert that goes from north to west (BU_1522)

3. Predicted Occupancy Rates (Structures)

3.1. Predicted Horseshoe Roosts

3.1.1. Table 3-1 shows the results of the assessment for unsurveyed structures, as well as structures with incomplete emergence surveys, that are likely to provide PRF for horseshoe bats.

3.1.2. Lesser horseshoe bat roosts have only been recorded in the southern and eastern quadrants of the Scheme. Therefore, no horseshoe bat roosts are predicted within the northern quadrant or western quadrants, and they have been greyed out from this table.

Table 3-1 – Unsurveyed Structures, and Structures with Incomplete Emergence Surveys, Likely to Contain Horseshoe PRF

PRA Result	Quadrant	No. of Unsurveyed/Partially Surveyed Structures	Occupancy Rate from Table 2-1	Predicted Roost Occupancy	Predicted Roost(s) Impact
Low	Northern	6	0	0	-
	Western	0		0	-
	Southern	18[10] 1 lost (culvert) 1 permanent disturbance 16 temporary disturbance	1.9%	1 (rounded from 0.34)	1 lost
	Eastern	9[11] 6 lost 2 permanent disturbance/modified 1 temporary disturbance		1 (rounded up from 0.17)	1 lost
Moderate	Northern	0	0	0	-
	Western	1			
	Southern	9[12] 1 permanent disturbance 8 temporary disturbance	19.2%	2 (rounded from 1.7)	1 permanent disturbance 1 temporary disturbance
	Eastern	5[13] 2 lost		1 (rounded from 0.96)	1 lost

[10] Includes the culvert that links the eastern and southern quadrant: BU_11, BU_1527, BU_01, BU_08, BU_1519, BU_1539, BU_18, BU_30, BU_359, BU_521, BU_524, BU_525, BU_53, BU_612, BU_615, BU_619, BU_864 and BU_904
[11] BU_1098 Barn Farm culvert (Leigh Brook), BU_1527, BU_19, BU_25, BU_48, BU_541, BU_585, BU_589 and BU_989
[12] BU_1093, BU_1094, BU_1097, BU_1523, BU_363, BU_1013, BU_370, BU_667 and BU_668
[13] BU_45, BU_976, BU_54, BU_661 and BU_662

		3 temporary disturbance			
High	Northern	2	0	0	-
	Western	0			
	Southern	3[14] 3 temporary disturbance	16.7%	1 (rounded from 0.5)	1 temporary disturbance
	Eastern	0		0	-

Overview

3.1.3. Therefore, the horseshoe roosts that are predicted to be present across the Scheme (based on the results in Table 3-1) are as follows (note, these have all been rounded up to whole numbers where necessary):

- One low (lost), two moderate (one permanent disturbance and one temporary disturbance) and one high (temporary disturbance) suitability horseshoe roosts within the southern quadrant.
- One low (lost), one moderate (lost) suitability horseshoe roosts within the eastern quadrant.

3.2. Predicted Void Dwelling (Excluding Horseshoe) Roosts

3.2.1. Table 3-2 shows the results of the assessment for unsurveyed structures and structures with incomplete emergence surveys that are likely to provide PRF for void dwelling bats.

3.2.2. Bat roosts of species that carry out light sampling in voids had only been recorded in the southern and eastern quadrants of the Scheme. Therefore, no void dwelling bat roosts are predicted within the northern or western quadrants, and subsequently they have been greyed out from this table.

Table 3-2 – Unsurveyed Structures, and Structures with Incomplete Emergence Surveys, Likely to Contain Void Dwelling (Excluding Horseshoe) PRF

PRF Suitability	Quadrant	No. of Unsurveyed/ Partially Surveyed Structures	Occupancy Rate from Table 2-2	Predicted Roost Occupancy	Predicted Roost(s) Impact
Low	Northern	7	0	0	-
	Western	0		0	-
	Southern	53[15] 6 lost 7 permanent disturbance 39 temporary disturbance 1 retained and protected	1.8%	1 (rounded from 0.95)	1 lost

[14] BU_342, BU_710 and BU_738
[15] BU_01, BU_08, BU_1045, BU_1045a, BU_1045b, BU_12, BU_1519, BU_1539, BU_17, BU_18, BU_20, BU_28, BU_29, BU_30, BU_359, BU_41, BU_493, BU_496, BU_497, BU_50, BU_500, BU_521, BU_524, BU_525, BU_53, BU_550, BU_56, BU_602, BU_612, BU_613, BU_615, BU_619, BU_630, BU_800, BU_864, BU_892, BU_894, BU_903, BU_904, BU_910, BU_912, BU_924, BU_927, BU_1025, BU_1030, BU_1041b, BU_1043, BU_1045, BU_1045a, BU_1045b, BU_11, BU_20, BU_600, BU_614, BU_630, BU_800, BU_926, BU_964 and BU_978

	Eastern	10[16] 6 lost 1 permanent disturbance 3 temporary disturbance		1 (rounded from 0.18)	1 lost
Moderate	Northern	7	0	0	-
	Western	1		0	-
	Southern	25[17] 7 lost 1 permanent disturbance 17 temporary disturbance	5.3%	2 (rounded from 1.33)	1 lost 1 permanent disturbance
	Eastern	12[18] 2 lost 2 permanent disturbance 7 temporary disturbance 1 retained and protected		1 (rounded from 0.64)	1 lost
High	Northern	5	0	0.0	-
	Western	0		0	-
	Southern	10[19] 1 lost (culvert) 1 modified/temporary disturbance (culvert); and 8 temporary disturbance	0	1 (adjusted from 0, see paragraphs below table)	1 lost
	Eastern	1[20] 1 temporary disturbance		0	-

3.2.3. Only very small numbers of void dwelling bat roosts were recorded across the whole Scheme, and there was only a sample of three structures with high suitability within the northern quadrant, and six in the southern quadrant (see Table 2-2), none of which had a confirmed roost (giving an occupancy rate of 0%).

3.2.4. As there are ten unsurveyed structures/structures with incomplete emergence surveys that provide high suitability void dwelling PRF in the southern quadrant, based on the

[16] Six structures that will be demolished including BU_1044, BU_716, BU_19, BU_25, BU_48, BU_541, BU_585, BU_589, BU_599 and BU_989
[17] BU_1013, BU_1091, BU_1093, BU_1094, BU_1097/Withybridge Lane culvert, BU_1517, BU_1518, BU_1520, BU_1521, BU_1523, BU_1524, BU_1540, BU_363, BU_836, BU_1006, BU_1041, BU_1042, BU_370, BU_667, BU_668, BU_797, BU_965, BU_966, BU_983 and BU_987
[18] BU_45, BU_657, BU_666, BU_693, BU_725, BU_726, BU_960, BU_976, BU_984, BU_54, BU_661 and BU_662
[19] Includes one culvert linking the eastern and western quadrant and one culvert linking the southern and western quadrants. BU_342, BU_710, BU_738, BU_741, BU_742, BU_776, BU_367 BU_1522 Piffs Elm Culvert, BU_1527 and BU_645
[20] BU_578

methodology, no bat roosts would be predicted in the southern quadrant. However, given the overall number of void dwelling bat roosts with individual bats, there is potentially a void dwelling maternity roost present within the locality that has not been detected.

3.2.5. It is possible that a void maternity roost is present within unsurveyed/partially surveyed structures within the ZoI of the Scheme, and this is assumed to be the case on a precautionary basis. The majority of the unsurveyed structures that were assigned high suitability for void dwelling bats (a maternity roost would be most likely within a high suitability structure) are in the southern quadrant (ten). The only other location where unsurveyed structures were assigned high suitability for void dwelling bats was in the northern quadrant (five) where no void dwelling roosts have been recorded and in the eastern quadrant (one). Therefore, it is reasonable to assume that the potential void bat maternity roost is within the southern quadrant.

Overview

3.2.6. The void dwelling roosts (excluding horseshoes) that are predicted to be present across the Scheme based upon the results of Table 3-2 and the conclusions within paragraphs 3.2.3 - 3.2.5 (these have all been rounded up to complete numbers where necessary) are as follows:

- One low (lost), two moderate (one lost and one permanent disturbance) and one high suitability (lost) void dwelling roosts within the southern quadrant.
- One low (lost) and one moderate (lost) void dwelling roosts within the eastern quadrant.

3.3. Predicted Crevice Dwelling Roosts

3.3.1. Table 3-3 shows the results of the assessment for unsurveyed structures, and structures with incomplete emergence surveys, that are likely to provide PRF for crevice dwelling bats.

Table 3-3 – Unsurveyed Structures, and Structures with Incomplete Emergence Surveys, Crevice Dwelling Category PRF

PRF Suitability	Quadrant	No. of Unsurveyed/ Partially Surveyed Structures	Occupancy Rate from Table 2-3	Predicted Roost Occupancy	Predicted Roost(s) Impact
Low	Northern	7[21] 1 lost 6 temporary disturbance	0	1 (rounded from 0.1) (adjusted from 0, see paragraphs below table)	1 lost
	Western	0		0	-
	Southern	55[22] 5 lost	1.9%	2 (rounded from 1.05)	1 lost 1 permanent disturbance

[21] BU_1399, BU_1401, BU_1425, BU_1429, BU_1430, BU_1537 and BU_1541
[22] BU_01, BU_08, BU_12, BU_1539, BU_17, BU_18, BU_28, BU_29, BU_30, BU_33, BU_359, BU_41, BU_493, BU_496, BU_497, BU_50, BU_500, BU_501, BU_521, BU_524, BU_525, BU_53, BU_550, BU_56, BU_602, BU_609, BU_612, BU_613, BU_615, BU_619, BU_864, BU_877, BU_892, BU_894, BU_903, BU_904, BU_910, BU_912, BU_924, BU_927, BU_1025, BU_1041b, BU_1043, BU_1045, BU_1045a, BU_1045b, BU_11, BU_20, BU_600, BU_614, BU_630, BU_800, BU_926, BU_964 and BU_978. The only five structures to be demolished are BU_1025, BU_1041b, BU_1043, BU_964 and BU_978

PRF Suitability	Quadrant	No. of Unsurveyed/ Partially Surveyed Structures	Occupancy Rate from Table 2-3	Predicted Roost Occupancy	Predicted Roost(s) Impact
		10 permanent disturbance 40 temporary disturbance			
	Eastern	10[23] 5 lost 1 permanent disturbance 4 temporary disturbance		1 (rounded from 0.19)	1 lost
Moderate	Northern	10[24] 2 lost 1 permanent disturbance 7 temporary disturbance	40%	4	1 lost 1 permanent disturbance 2 temporary disturbance
	Western	1[25] 1 temporary disturbance		1 (rounded from 0.4)	1 temporary disturbance
	Southern	27[26] 8 lost 2 permanent disturbance 17 temporary disturbance	16.7%	5 (rounded from 4.51)	2 lost 1 permanent disturbance 2 temporary disturbance
	Eastern	14[27] 4 lost 2 permanent disturbance 8 temporary disturbance		3 (rounded from 2.34)	1 lost 1 permanent disturbance 1 temporary disturbance
High	Northern	5[28] 2 lost 3 temporary disturbance	37.5%	2 (rounded from 1.86)	1 lost 1 temporary disturbance

[23] BU_19, BU_25, BU_48, BU_541, BU_585, BU_589, BU_599, BU_705, BU_716 and BU_989
[24] BU_1422, BU_1424, BU_1426, BU_1427, BU_1431, BU_1432, BU_1434, BU_1513, BU_1535 and BU_1027
[25] BU_1514
[26] BU_1006, BU_1030, BU_1041, BU_1042, BU_370, BU_667, BU_668, BU_797, BU_965, BU_966, BU_983, BU_987, BU_1013, BU_1014, BU_1091, BU_1093, BU_1094, BU_1517, BU_1518, BU_1519, BU_1520, BU_1521, BU_1523, BU_1524, BU_1540, BU_363, BU_836
[27] BU_45, BU_657, BU_666, BU_693, BU_725, BU_726, BU_960, BU_976, BU_984, BU_1044, BU_1528, BU_54, BU_661 and BU_662
[28] BU_1027a, BU_981 BU_1396, BU_1404 and BU_1405

PRF Suitability	Quadrant	No. of Unsurveyed/ Partially Surveyed Structures	Occupancy Rate from Table 2-3	Predicted Roost Occupancy	Predicted Roost(s) Impact
	Western	0		0	-
	Southern	12[29] 1 lost (culvert) 1 modified/temporary disturbance (culvert); and 10 temporary disturbance	0%	1 (adjusted from 0, see paragraphs below table)	1 lost
	Eastern	3[30] 1 modified/temporary disturbance (culvert); and 2 temporary disturbance		0	-

3.3.2. The predicted occupancy rate for crevice dwelling bats in high suitability structures within the southern and eastern quadrant is 0% (see Table 2-3). This is based on a sample of five structures. Given the overall number of crevice dwelling bat roosts with small numbers of bats, it is likely that a crevice dwelling maternity roost is present within the locality that has not been detected. It is possible that a crevice maternity roost is present within unsurveyed/partially surveyed structures within the ZoI of the Scheme, and this is assumed to be the case on a precautionary basis. The majority of unsurveyed structures that were assigned high suitability for crevice dwelling bats (a maternity roost would be most likely within a high suitability structure) are in the southern quadrant (twelve). Therefore it has been assumed that a potential crevice dwelling bat maternity roost is present within the southern quadrant.

3.3.3. The predicted occupancy rate for crevice dwelling bats in low suitability structures within the northern quadrant is 0% (see Table 2-4). However, this is based on a sample size of just four structures. Given that crevice dwelling bats have been recorded in low suitability structures in the southern and eastern quadrant, and considering that crevice dwelling bats have been recorded in moderate and high suitability structures in the northern quadrant, it is reasonable to assume that low suitability structures in the northern quadrant could also support roosts, and that the low sample size here has skewed the results. On this basis the average occupancy rate from low suitability structures within the southern and eastern quadrants (1.9%) (as shown in Table 2-3) was used. Based on an occupancy rate of 1.9%, of the 7 structures in the northern quadrant with a low suitability PRF (see Table 3-3), one (rounded up from 0.1) predicted roost is likely to be present.

[29] Includes one culvert linking the eastern and western quadrant and one culvert lining the southern and western quadrants.
[30] Includes one culvert linking the eastern and northern quadrant (BU_1098 Barn Farm culvert (Leigh Brook)) and BU_577 and BU_578

Overview

3.3.4. The crevice dwelling roosts that are predicted to be present across the Scheme, based upon the results of Table 3-3 and the conclusions within paragraph 3.3.2 and 3.3.3 (these have all been rounded up to complete numbers where necessary), are as follows:

- One low (lost), four moderate (one lost, one permanent disturbance and two temporary disturbance) and two high (one lost and one temporary disturbance) suitability crevice dwelling roosts within the northern quadrant.
- Two low (one lost and one permanent disturbance), five moderate (two lost, one permanent disturbance and two temporary disturbance) and one high (lost) suitability crevice dwelling roosts within the southern quadrant.
- One low (lost) and three moderate (one lost, one permanent disturbance and one temporary disturbance) crevice dwelling roosts within the eastern quadrant.
- One moderate (temporary disturbance) suitability crevice dwelling roosts within the western quadrant.

4. Incomplete Hibernation Surveys – Predicted Occupancy Rate (Structures)

4.1.1. BU_1527 is a culvert between the eastern and southern quadrant that is proposed to be lost. BU_1098 is a culvert between the eastern and northern quadrant (Leigh Brook culvert) that is proposed to be modified (i.e. temporarily disturbed). Both were unable to be accessed internally and only a previous structural report was available to provide an internal description. Therefore, these have been assumed to provide hibernation habitat for large numbers of bats on a precautionary basis as the habitat could mimic a cave (Excluding horseshoe bats for BU_1098 on the basis of the structural report).

4.1.2. As the culverts both span across quadrants, one is considered within the southern quadrant and the other one is considered within the eastern quadrant. Based on the occupancy rate (16.7%) from Table 2-4, the predicted occupancy rate from these two culverts, would be 0.2, and on a precautionary basis this would be rounded to one in each quadrant. This can be summarised as:

- One large hibernation roost lost from the southern quadrant[31].
- One large hibernation roost temporarily disturbed in the eastern quadrant[32].

4.1.3. All of the structures (other than the two culverts detailed above) were not deemed to have traditional hibernation habitat and therefore the majority of the structures were not subject to hibernation surveys.

4.1.4. It is known, however, that some bat species (i.e. brown long-eared and pipistrelle species) can use non-traditional features to hibernate within, providing that they can maintain a stable temperature through the winter months. It was therefore proposed that all confirmed bat roosts across the ZoI, would be subject to hibernation surveys. Fourteen of the structures with confirmed bat roosts (but no traditional hibernation habitat) have been subject to partial hibernation surveys, as summarised in Table 4-1. Surveys were limited by access restrictions, and due to hibernation surveys requiring internal access, they were severely limited by Covid-19 restrictions.

Table 4-1 – Structures with Incomplete Hibernation Surveys (No Traditional Hibernation Habitat Assumed to be Present)

Quadrant	Structures With Confirmed Bat Roosts with incomplete Hibernation Surveys (14)	Occupancy Rate From Table 2-4	Predicted Roost Occupancy	Predicted Roost(s) Impact
Northern	4[33]	0%	-	-
Western	0		0	0
Southern	6[34] 3 lost 3 temporary disturbance	16.7%	1	1 lost

[31] BU_1527 runs between the eastern and southern quadrants and has been accounted for in the southern quadrant. This culvert is to be lost.
[32] BU_1098 (Leigh Brook culvert) runs between the eastern and northern quadrants and has been accounted for in the eastern quadrant. This culvert is to be modified.
[33] BU_1034, BU_1034a, BU_1039 and BU_963
[34] BU_1030, BU_1042, BU_370, BU_614, BU_668 and BU_987

Eastern	4[35] 1 lost 1 permanent disturbance 2 temporary disturbance		1 (rounded from 0.7)	1 lost

4.1.5. Additionally, it must be considered that of the structures that have not been surveyed at all, all of which were not identified as likely to have traditional hibernation habitat, may contain the occasional solitary hibernating bats (which, based on the proposed methodology would have been subject to hibernation bat surveys).

4.1.6. 146 structures had all of the recommended number of emergence/re-entry surveys completed. Out of these structures, 20 had a confirmed bat roost (any species), this equates to an occupancy rate across the Scheme of 13.7%.

4.1.7. Table 4-2 shows all 99 of the unsurveyed structures (excluding the six that were assumed to be negligible for bat roosts). It assumes that if 13.7% of the structures had bat roosts, then 0%/16.7% (the occupancy rates from Table 2-4) of that result will have a hibernation roost.

Table 4-2 – Structures with No Surveys Completed (No Traditional Hibernation Habitat Assumed to be Present)

Quadrant	Structures Where No Surveys Have Been Completed (99)	Occupancy Rate From Table 2-4	Predicted Occupancy Rate	Predicted Roost Assumed to be Lost or Disturbed
Northern	19	(x 13.7%) x 0%	0	-
Western	0		0	-
Southern	63 8 permanent disturbance 55 temporary disturbance	(x 13.7%) x 16.7%	2 (rounded from 1.4)	1 permanent disturbance 1 temporary disturbance
Eastern	17 6 lost 8 permanent disturbance 3 temporary disturbance		1 (rounded from 0.4)	1 lost

Overview

4.1.8. The hibernation roosts that are predicted to be present across the Scheme are as follows:

- Three hibernation roosts for solitary bats (one lost, one permanent disturbance and one temporary disturbance) and one larger hibernation roost (that could support larger numbers of bats) (lost) within the southern quadrant.
- Two hibernation roosts for solitary bats (both lost) and one larger hibernation roost (that could support larger numbers of bats) (temporary disturbance) within the eastern quadrant.

4.1.9. Although it is recognised that these hibernation roosts are only an assumption based on the available data, it is considered that these will allow for effective compensation to be

[35]BU_661, BU_735, BU_737 and BU_819

put in place to ensure no overall loss of favourable conservation status to the local bat populations.

5. Predicted Occupancy Rate Summary (Structures)

5.1. Species Assemblage for Predicted Bat Roosts (Structures)

5.1.1. Table 5-1 summarises the predicted bat roosts within unsurveyed/partially surveyed structures within each of the quadrants of the Scheme, where impacts as a result of the Scheme are anticipated.

5.1.2. Based on the horseshoe data in Table 5-1 and the known horseshoe roosts in the area, it is assumed that all of these six predicted roosts for horseshoe bats are lesser horseshoe (Annex II species), as these are the only horseshoe bats that have been recorded roosting within the Scheme[36].

5.1.3. For void dwelling/light sampling bats, brown long-eared and Natterer's have been recorded using voids for light sampling across the Scheme. Therefore, both brown long-eared and Natterer's are void dwelling species that could be within the predicted occupancy for void dwelling bats. Additionally, based on the Bat Mitigation Guidelines[37], barbastelle bats are also crevice dwellers that may require light sampling areas, as well as anecdotal evidence that serotine and Daubenton's bats use voids to light sample etc. As these species (or genus) have been recorded across the Scheme, then these are also considered within the void dwelling species assemblage. It should be noted that although six void dwelling roosts are predicted, it is assumed that no more than one of these roosts is likely to be a barbastelle bat (Annex II) roost due to the low number of recordings noted during the bat activity surveys. Further detail is included in Section 7.2.

5.1.4. For crevice dwelling bats, only common and soprano pipistrelle bats were pulled through into the results within Table 2-3[38]. However, species assemblage across the Scheme also includes Nathusius' pipistrelle, *Myotis* species (which could include Bechstein's, Natterer's, Daubenton's, whiskered or Brandt's[39]) Leisler's, noctule, serotine and barbastelle bats (all known to utilise crevices). Therefore, the predicted crevice dwelling bat roosts could include bats from this species assemblage. It should be noted that although 20 crevice dwelling roosts are predicted, it is assumed that no more than one of these roosts is likely to be a barbastelle bat (Annex II) roost due to the low number of recordings noted during the bat activity surveys. Further detail is included in Section 7.2.

[36] Throughout all of the static bat surveys for the Scheme, greater horseshoe were never recorded less than 53 minutes after sunset, suggesting there are no roosts close by, as this species usually emerge 25 to 28 minutes after sunset ([redacted])

[37] Bat Mitigation Guidelines (2004) English Nature

[38] As this table was based on survey results within the Scheme only where emergence surveys were complete.

[39] Alcathoe are not known in the area and have therefore been excluded from this list

Table 5-1 – Predicted Bat Roosts within Unsurveyed/Partially Surveyed Structures Summary and Species Assemblage

Bat Category (Defined in Section 1.2.12)	Species Assemblage	PRF Suitability	Northern Quadrant	Eastern Quadrant	Southern Quadrant	Western Quadrant	**Totals**	
Horseshoe bats	Lesser horseshoe	Low/moderate	-	2 lost	1 lost 1 permanent disturbance 1 temporary disturbance	-	5	6
		High	-	-	1 temporary disturbance	-	1	
Void dwelling/light sampling bats	Brown long-eared, Natterer's, Barbastelle, serotine and Daubenton's	Low/moderate	-	2 lost	2 lost 1 permanent disturbance	-	5	6
		High	-	-	1 lost	-	1	
Crevice dwelling bats	Common, soprano and Nathusius' pipistrelle, Natterer's, Daubenton's whiskered, Leisler's noctule, serotine and Barbastelle	Low/moderate	2 lost 1 permanent disturbance 2 temporary disturbance	2 lost 1 permanent disturbance 1 temporary disturbance	3 lost 2 permanent disturbance 2 temporary disturbance	1 temporary disturbance	17	20
		High	1 lost 1 temporary disturbance	-	1 lost	-	3	
Hibernation roost for larger numbers of bats	Any of the above	High	-	1 temporary disturbance	1 lost	-	2	2
Hibernation roost for solitary bats	Any of the above	High	-	2 lost	1 lost 1 permanent disturbance 1 temporary disturbance	-	5	5
			7	11	20	1	-	-
			39					

6. Predicted Tree Roosts

6.1. Overview

6.1.1. Of the 356 individual trees, 344 (97%) have had some surveys completed. Of the 105 tree groups, all the bat surveys are complete.

6.1.2. From the surveys of all these trees (344 trees and 105 tree groups), ten trees contain bat roosts, which equates to 2% of the trees, that were at least surveyed in part, being used by bats. However, as tree roosts are frequently un-occupied (leading to risk of underestimating the roost resource) it is proposed that compensation is provided based on the potential loss of roost resource. This approach means that all trees where surveys are incomplete are assumed on a precautionary basis to have bat roosts present when considering compensation.

Table 6-1 – Trees with No Surveys Completed/Surveys Incomplete

Quadrant		Trees To Be Felled/Disturbed Where No Surveys Have Been Undertaken	Trees To Be Felled/Disturbed Where Surveys are partially complete
Northern	High	Trees at risk of temporary disturbance[40]: Tree 725, Tree 726, Tree 727, Tree 728, Tree 729, Tree 730, Tree 731, Tree 732, Tree 733, Tree 734, Tree 735 and Tree 736 (12)	Lost tree: Tree 649 (1)
	Moderate	-	Lost trees: Tree 512 (1)
Southern	Confirmed	-	Lost Trees: Tree 101 (1)
	High	-	Lost Tree: Tree 241 (1) Tree at risk of temporary disturbance: Tree 230 (1)
	Moderate	-	Lost Trees: Tree 164, Tree 237, Tree 240, Tree 596, Tree 685, Tree 686 and Tree 701 (7) Trees at risk of temporary disturbance: Tree 635, Tree 636, Tree 637, Tree 677, Tree 678, Tree 682, Tree 683, Tree 687, Tree 688 and Tree 690 (10)
Eastern	-	-	-
Western	-	-	-
Total	**-**	**12**	**22**

[40] All assumed high as no surveys have been completed

6.2. Species Assemblage for Predicted Bat Roosts (Trees)

6.2.1. Table 6-1 summarises the predicted bat roosts within unsurveyed/partially surveyed trees within each of the quadrants of the Scheme, where impacts as a result of the Scheme are anticipated.

6.2.2. Based on bat species known in the vicinity, that are known to roost within trees (Bat Roosts in Trees)[41], the following species are expected to be present within the tree roosts: Common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Bechstein's, Natterer's, Daubenton's, whiskered, Brandt's, Leisler's, noctule and barbastelle.

[41] Bat Roosts in Trees: A Guide to Identification and Assessment for Tree Care and Ecology Professionals

7. Proposed Compensation for Known and Predicted Roosts

7.1. Bat Category Compensation Summaries

Lesser Horseshoe Bats

Eastern Quadrant

7.1.1. The Scheme will result in:

- Known loss of five **low conservation value** bat roosts (BU_611, BU_694, BU_507, BU_709 and BU_819).
- Predicted loss of two **low/moderate suitability** bat roosts.

7.1.2. This will be compensated for by provision of:

- A purpose-built bat structure with two voids and four lean-to/outhouses (One void and three lean to/outhouses provide compensation for these specific impacts).
- Two separate horseshoe night roosts.

Southern Quadrant

7.1.3. The Scheme will result in:

- Predicted temporary disturbance of one **high suitability** bat roost.
- Predicted loss of one **low suitability** bat roost.
- Predicted permanent disturbance of one **moderate suitability** bat roost.
- Predicted temporary disturbance of one **moderate suitability** bat roost.

7.1.4. This will be compensated for by provision of:

- A purpose-built bat structure with two voids and four lean-to/outhouses (one void provides compensation for these specific impacts).
- Three separate horseshoe night roosts.

Lesser Horseshoe Bats Overview

7.1.5. Across the Scheme, only one high suitability lesser horseshoe bat roost (potentially suitable for supporting a maternity roost) was predicted, and this will only be subject to temporary disturbance. As all of the other known and predicted roosts are of low/moderate suitability(and likely to be suitable for supporting small numbers of bats), taking into account the compensation proposed, there will be no impact on the favourable conservation status of this local population of lesser horseshoe bats.

Void Dwelling/Light Sampling Bats

Eastern Quadrant

7.1.6. The Scheme will result in:

- Predicted loss of two **low/moderate suitability** bat roosts.
- Known temporary disturbance of BU_723 (an open barn) which supports a **low conservation value** Natterer's feeding/night roost.

7.1.7. This will be compensated for by provision of:

- A purpose-built bat structure with two voids and four lean-to/outhouses (One void and one lean to/outhouse provides compensation for these specific impacts).

Southern Quadrant

7.1.8. The Scheme will result in:

- Known loss of a **low conservation value** brown long-eared day roost (BU_965).
- Predicted loss of one **high suitability** bat roost.
- Predicted loss of two **low/moderate suitability** bat roosts.
- Predicted permanent disturbance of one **moderate suitability** bat roost.
- Known temporary disturbance of a **low conservation value** brown long-eared day roost (BU_378).

7.1.9. This will be compensated for by provision of:

- A purpose-built bat structure with two voids and four lean-to/outhouses (One void and four lean to/outhouse provides compensation for these specific impacts).
- A hibernation bat box.

Void Dwelling/Light Sampling Bats Overview

7.1.10. Across the Scheme, only one high suitability void dwelling bat roosts (potentially suitable for supporting a maternity roost was predicted, and this will be lost. As all of the other known and predicted void dwelling bat roosts are of low or moderate suitability (and likely to be suitable for supporting small numbers of bats), taking into account the compensation proposed, there will be no impact on the favourable conservation status of this local population of void dwelling bats.

Crevice Dwelling Bats

Eastern Quadrant

7.1.11. The Scheme will result in:

- Known loss of a **low conservation value** soprano pipistrelle day roost (BU_507).
- Known loss of a **low conservation value** common pipistrelle day roost (BU_610).
- Predicted loss of two **low/moderate suitability** bat roosts.
- Known temporary disturbance of three **low conservation value** common pipistrelle day roosts (BU_638, BU_723 and BU_735).
- Predicted permanent disturbance of one **moderate suitability** bat roost.
- Known temporary disturbance of a **low conservation value** soprano pipistrelle day roost (BU_614).
- Predicted temporary disturbance of one **moderate suitability** bat roost.

7.1.12. This will be compensated for by provision of:

- Ten features for roosting within the compensatory bat structure for crevice dwelling bats.

Southern Quadrant

7.1.13. The Scheme will result in:

- Known loss of two pipistrelle **maternity** roosts (BU_1030 and BU_987).

- Known loss of two **low conservation value** soprano pipistrelle day roosts (BU_1042 and BU_987).
- Known loss of two **low conservation value** common pipistrelle day roosts (BU_1039 and BU_965).
- Known loss of a **low conservation value** common or soprano pipistrelle day roost (BU_653).
- Predicted loss of one **high suitability** bat roost.
- Predicted loss of three **low/moderate suitability** bat roosts.
- Predicted permanent disturbance of two **low/moderate suitability** bat roosts.
- Known temporary disturbance of a **low conservation value** common pipistrelle day roost (BU_376).
- Known temporary disturbance of a **low conservation value** common pipistrelle day roost (BU_378).
- Known temporary disturbance of a **low conservation value** common pipistrelle day roost (BU_834).
- Known temporary disturbance of a **low conservation value** Natterer's day roost (Tree 86).
- Known temporary disturbance of a **low conservation value** unknown species roost (BU_370).
- Predicted temporary disturbance of two **moderate suitability** bat roosts.

7.1.14. This will be compensated for by provision of:

- A minimum of two maternity features and 17 crevice features for roosting within the compensatory bat structure for crevice dwelling bats.
- One further maternity bat box.

Western Quadrant

7.1.15. The Scheme will result in:

- Predicted temporary disturbance of one **moderate suitability** bat roost;

7.1.16. This will be compensated for by provision of:

- A minimum of one crevice dwelling bat roost feature (bat box).

Northern Quadrant

7.1.17. The Scheme will result in:

- Known loss of one **low conservation value** common pipistrelle roost (BU_972).
- Known loss of one **low conservation value** soprano pipistrelle roost (BU_963).
- Known loss of a **low conservation value** common and soprano pipistrelle day roost (BU_981).
- Known loss of a **low conservation value** unknown species bat roost (BU_1039).
- Predicted loss of one **high suitability** bat roost.
- Predicted loss of two **low/moderate suitability** bat roosts.
- Known temporary disturbance of one low conservation value common pipistrelle roost and one low conservation value soprano pipistrelle roost (BU_1034).
- Predicted permanent disturbance of one **moderate suitability** bat roost.
- Predicted temporary disturbance of one **high suitability** bat roost.
- Predicted temporary disturbance of two **moderate suitability** bat roosts.

7.1.18. This will be compensated for by provision of:

- One crevice dwelling bat structure (with at least one maternity feature).
- One maternity bat box.
- Five artificial bat boxes (not for maternity or hibernation).

Crevice Dwelling Bats Overview

7.1.19. Across the Scheme, only two high suitability crevice dwelling bat roosts (potentially suitable for supporting a maternity roost) are known/predicted, one of which will only be subject to temporary disturbance. As all of the other known and predicted crevice dwelling bat roosts are of low/moderate suitability (and likely to be suitable for supporting small numbers of bats), there will be no impact on the favourable conservation status of the local population of crevice dwelling bats.

Hibernating bats

Eastern quadrant

7.1.20. The Scheme will result in:

- Predicted temporary disturbance of one larger hibernation roost that could house larger numbers of bats.
- Predicted loss of two hibernation roosts for solitary bats.
- Known temporary disturbance of a common pipistrelle hibernation roost (BU_638).

7.1.21. This will be compensated for by provision of:

- A cool tower within the compensatory structure for larger numbers of hibernating bats.
- Three hibernation bat boxes.

Southern quadrant

7.1.22. The Scheme will result in:

- Predicted loss of one larger hibernation roost that could house larger numbers of bats.
- Predicted loss of one hibernation roosts for solitary bats.
- Predicted permanent disturbance of one hibernation roost for solitary bats.
- Predicted temporary disturbance of one hibernation roost for solitary bats.
- Known temporary disturbance of a **high** conservation value brown long-eared hibernation roost (BU_378).

7.1.23. This will be compensated for by provision of:

- A cool tower within the compensatory structure for larger numbers of hibernating bats.
- Four hibernation bat boxes.

Tree Dwelling Bat Roosts

Eastern Quadrant

7.1.24. The Scheme will result in:

- Loss of a **low conservation value** noctule day roost (BU_610).

7.1.25. This will be compensated for by provision of:

- A tree roosting feature.

Southern Quadrant

7.1.26. The Scheme will result in:

- Predicted loss of two **high suitability** tree roosts (taken as confirmed and high suitability trees).
- Predicted loss of seven **moderate suitability** tree roosts.
- Predicted temporary loss of one **high suitability** tree roost.
- Predicted temporary loss of ten **moderate suitability** tree roosts.

7.1.27. This will be compensated for by provision of:

- Two crevice dwelling bat structures (with at least one maternity feature in each).

Northern Quadrant

7.1.28. The Scheme will result in:

- Known loss of a **moderate conservation value** barbastelle day roost (Tree 486).
- Predicted loss of one **high suitability** tree roost.
- Predicted loss of one **moderate suitability** tree roosts.
- Predicted temporary disturbance of twelve **high suitability** tree roosts.

7.1.29. This will be compensated for by provision of:

- A tree roosting feature.
- Two crevice dwelling bat structures (with at least one maternity feature in each).

Western Quadrant

7.1.30. The Scheme will result in:

- Temporary disturbance of two **low conservation value** noctule day roosts (Tree 576 and 578).

7.1.31. This will be compensated for by provision of:

- Two tree roosting features.

Tree Dwelling Bats Overview

7.1.32. Across the Scheme, there are 16 predicted high suitability tree roosts, of which three are predicted to be lost and the remainder temporarily disturbed; as well as 19 predicted moderate suitability tree roosts, of which eight are predicted to be lost and the remainder temporarily disturbed. In addition, there are four known tree roosts that will be impacted, two of which will be lost and two permanently disturbed.

7.1.33. The compensation provided for tree-dwelling bats across the Scheme includes four tree roosting features, as well as three maternity features, and five crevice dwelling bat structures (with at least one maternity feature in each). This compensation, combined with the very precautionary approach of considering every tree that has not had the surveys completed contains a bat roost, suggests there will be no impact on the favourable conservation status of the local population of tree roosting bats.

Compensation Summaries

7.1.34. Taking account of the known roosts as well as the predicted roosts in Table 5-1 and Table 6-1, as well as the impacts to each of these roosts (lost, permanently disturbed or temporarily disturbed), the following compensation is proposed in Table 7-1, split by quadrants.

7.1.35. All known and predicted bat roosts that are proposed to be lost (demolished) have been represented in red. All roosts assumed to be permanently disturbed (due to increased noise or light levels) have been represented in orange. All roosts that will only be subject to temporary disturbance have been represented in green.

7.1.36. For each compensatory feature, the total number that will be provided is shown in the brackets and in bold.

Table 7-1 – Compensation for Bat Roosts to be Impacted as a Result of the Scheme

	Mitigation measures	Northern Quadrant	Eastern Quadrant	Southern Quadrant	Western Quadrant	Total
Compensatory Bat Structure	**Void suitable for lesser horseshoes/ void dwelling and light sampling species**	-	**(1 structure with 2 voids)** Compensation for two lesser horseshoe roosts in BU_611 and BU_694 to be lost (all surveys complete and no bat has ever been recorded in these structures, only droppings). Compensation for the predicted loss of 2 low/moderate suitability roosts for void dwelling/light sampling bats.	**(1 structure with 2 voids)** Compensation for the predicted temporary disturbance of one high suitability (potentially maternity) horseshoe roost. Compensation for the predicted loss of 1 high suitability (potentially maternity) roost for void dwelling/light sampling bats.	-	**4**
	Lean-to/outhouse within the compensatory bat structure	-	**(1 structure with 4 lean-to/outhouses)** Compensation for three lesser horseshoe roosts in BU_507, BU_709 and BU_819 to be lost (all roosts comprise of small numbers of bats in outdoor toilets, 2m by 1m by 3 m tall). Compensation for BU_723 (an open barn), Natterer's (and common pipistrelle) day/feeding/night roost to be temporarily disturbed	**(1 structure with 4 lean-to/outhouses)** Compensation for BU_965 brown long-eared day roost to be lost. Compensation for BU_378 brown long-eared day roost to be temporarily disturbed. Compensation for the predicted loss of 2 low/moderate suitability roosts for void dwelling/light sampling bats.	-	**8** **(4 on both)**
	Crevices Features (Non-Maternity) Within the Structure	-	**(1 structure with 10 crevice features)** Compensation for: BU_507 soprano pipistrelle day roost to be lost. BU_610 common pipistrelle day roost to be lost. BU_638, BU_723 and BU_735 (all common pipistrelle day roosts, 3) to be temporarily disturbed. The predicted loss of 2 low/moderate suitability roosts for crevice dwelling bats. The predicted permanent disturbance of 1 low/moderate suitability roost for crevice dwelling bats. BU_614 soprano pipistrelle day roost to be temporarily disturbed. The predicted temporary disturbance of 1 low/moderate suitability roost for crevice dwelling bats.	**(1 structure with 17 crevice features)** Compensation for: BU_1039, BU_965 (both common pipistrelle day roosts, 2) to be lost. BU_1042 and BU_987 (both soprano pipistrelle day roosts, 2) to be lost. BU_653 common OR soprano pipistrelle day roost The predicted loss of 3 low/moderate suitability roosts for crevice dwelling bats. The predicted permanent disturbance of 2 low/moderate suitability roosts for crevice dwelling bats. BU_376 and BU_834 common pipistrelle day roosts to be temporarily disturbed. BU_378 common pipistrelle night/feeding roost to be temporarily disturbed. Tree 86 Natterer's crevice day roost to be temporarily disturbed. BU_370 unknown species to be temporarily disturbed. The predicted temporary disturbance of 2 low/moderate suitability roosts for crevice dwelling bats.	-	**27** **(10 on the eastern quadrant and 17 on the southern quadrant)**
	Crevices Features (Maternity) Within the Structure			**(1 structure with 2 maternity crevice features)** BU_1030 common pipistrelle maternity roost to be lost.		**2 southern quadrant)**

				BU_987 soprano pipistrelle, assumed maternity roost to be lost.		
	Cool Tower within the compensatory structure for larger numbers of Hibernating Bats[42]	-	**(1)** Compensation for the predicted temporary disturbance of 1 hibernation roost for larger numbers of bats.	**(1)** Compensation for the predicted loss of 1 hibernation roost for larger numbers of bats.	-	**2**
Horseshoe Night Roost	**Horseshoe Night Roost[43]**	-	**(2)** Compensation for the predicted loss of 2 low/moderate suitability roosts for horseshoe bats.	**(3)** Compensation for the predicted loss of 1 low/moderate suitability roost for horseshoe bats. Compensation for the predicted permanent disturbance of 1 low/moderate suitability roost for horseshoe bats. Compensation for the predicted temporary disturbance of 1 low/moderate suitability roost for horseshoe bats.	-	**5**
Crevice Dwelling Bat Structure	**Crevice Dwelling Bat Structure (each with at least one bat feature suitable for maternity[44] and ten other roosting features)**	**(3 structures, each with at least 1 maternity and 10 other roosting features)** Compensation for the predicted loss of 1 high suitability (potentially maternity) roost for crevice dwelling bats. Compensation for BU_972 common pipistrelle roost (1) and BU_981 common and soprano day roosts (2) to be lost. Compensation for the predicted loss of 2 low/moderate suitability roosts for crevice dwelling bats. Compensation for the predicted loss of 1 high suitability tree roost. Compensation for the predicted loss of 1 moderate suitability tree roost. Compensation for the predicted permanent disturbance of 1 low/moderate suitability roost for crevice dwelling bats. Compensation for the predicted temporary disturbance of 2 low/moderate suitability roosts for crevice dwelling bats. Compensation for the predicted temporary disturbance of 12 high suitability tree roosts.	-	**(2 structures, each with at least 1 maternity and 10 other roosting features)** Compensation for the predicted loss of 2 high suitability tree roosts. Compensation for the predicted loss of 7 moderate suitability tree roosts. Compensation for the predicted temporary disturbance of 1 high suitability tree roost. Compensation for the predicted temporary disturbance of 10 moderate suitability tree roosts.	-	**5** **(5 structures with a combined total of at least 5 maternity and 50 other roosting features)**
	Hibernation bat box (for Small Numbers of Bats)	-	**(3)** Compensation for the predicted loss of 2 hibernation roosts for low numbers of bats.	**(5)** Compensation for the predicted loss of 1 hibernation roost for	-	**8**

[42] This will follow the approximate design of the Lesser Horseshoe 'Cool Tower' as detailed on The Vincent Wildlife Trust's publications section of their website: https://www.vwt.org.uk/wp-content/uploads/2017/02/The-Lesser-Horseshoe-Cool-Tower.pdf
[43] Lesser Horseshoe Bat Night Roosts - Forest of Dean - Bat Conservation Trust (bats.org.uk)
[44] Bat Tower at Ravenglass Railway. Cumbria (original case study requiring update) - Bat Conservation Trust (bats.org.uk)

Artificial Bat Boxes			BU_638 common pipistrelle hibernation roost to be temporarily disturbed.	low numbers of crevice dwelling bats. Compensation for the predicted permanent disturbance of 1 hibernation roost for low numbers of crevice dwelling bats. Compensation for the predicted temporary disturbance of 1 hibernation roost for low numbers of bats. Compensation for the predicted permanent disturbance of 1 low/moderate suitability roost for void dwelling/light sampling bats. BU_378 brown long-eared hibernation roost to be temporarily disturbed.		
	Artificial Crevice Bat Box	**(5)** BU_1039 unknown species day roost (1) to be lost. BU_963 soprano pipistrelle day roost (1) to be lost. BU_1034 common pipistrelle day and mating roost (2) to be temporarily disturbed. BU_1034 soprano pipistrelle mating roost (1) to be temporarily disturbed.	-	-	**(1)** Compensation for the predicted temporary disturbance of 1 low/moderate suitability roost for crevice dwelling bats.	**6**
	Artificial Maternity Bat Boxes	**(1)** Compensation for the predicted temporary disturbance of 1 high suitability (potentially maternity) roost for crevice dwelling bat species.	**-**	**(1)** Compensation for the predicted loss of 1 high suitability (potentially maternity) roost for crevice dwelling bat species..	-	**2**
Tree Features	**Tree Roosting Feature**	**(1)** Compensation for the loss of Tree 496, barbastelle to be lost.	**(1)** Compensation for the loss of BU_610, noctule to be lost.	**-**	**(2)** Compensation for the temporary disturbance of Tree 576 and Tree 578, noctule day roosts.	**4**

7.2. Estimated Number of Bats Associated with Predicted Roosts to be Lost (Structures)

7.2.1. Table 7-2 considers numbers of bats in addition to those within the known bat roosts, i.e. predicted roosts only. This assessment has been based on bat activity levels across the site from activity surveys, and professional judgment of bat workers and has been through an internal check and review process to ensure agreement in the assessment.

7.2.2. Table 7-2 summarises the number of bat roosts likely to be demolished/felled (lost) during the construction stage of the Scheme, based on Table 5-1 and Table 6-1. As no bats will be captured from the permanent or temporarily disturbed structures/trees, only structures to be demolished and trees to be felled have been included.

7.2.3. This table also shows the number of bats that are likely to be recorded by Ecological Clerks of Work while supervising the soft demolition of these structures/felling of trees (works will be timed for when bats are least likely to be in the roost, as well as avoiding maternity and hibernation periods on a precautionary basis).

7.2.4. Based on the predicted number of roosts to be lost, combined with the predicted number of bats within each roost[45], Table 7-2 shows the total number of each bat that will be affected by the Scheme (excluding the known roosts).

Table 7-2 – Predicted Bats to be Captured from Roosts to be **Lost (From Demolished Structures or Felled Trees)** in the Unsurveyed/Partially Surveyed Structures/Trees

Bat Category	Species	Total Number of Roosts in Structures and Trees Predicted to be Lost (Excluding Permanent or Temporary Disturbance)[46]	Predicted Number of Bats in Each Roost (at the Time the Works are Completed)	Total Number of Additional Bats
Horseshoe bats **(Maximum of 3 to be lost, as per Table 5-1)**	Lesser horseshoe	3	1	3
	Greater horseshoe	0	0	0
Void dwelling bats (excluding horseshoes) **(Maximum of 5 to be lost, as per Table 5-1)**	Brown long-eared	5	1	5
	Natterer's	5	1	5
	Barbastelle	1	1	1
	Daubenton's	5	1	5
	Serotine	1	3	3
Crevice Dwelling Bats **(Maximum of 9 to be lost, as per Table 5-1)**	Common pipistrelle	9	3	27
	Soprano pipistrelle	9	3	27
	Nathusius' pipistrelle	1	3	3
	Bechstein's	1	1	1

[45] The number of bats likely to be present is based on an interpretation of the bat activity survey across the Scheme combined with professional judgement.
[46] The maximum number of bat roosts likely to be present is weighted heavily towards more common species, and is reduced for species based on lower bat activity across the Scheme combined with professional judgement.

Bat Category	Species	Total Number of Roosts in Structures and Trees Predicted to be Lost (Excluding Permanent or Temporary Disturbance)[46]	Predicted Number of Bats in Each Roost (at the Time the Works are Completed)	Total Number of Additional Bats
	Natterer's	3	3	9
	Daubenton's	3	3	9
	Whiskered	3	3	9
	Brandt's	3	3	9
	Leisler's	1	3	3
	Noctule	1	3	3
	Serotine	1	3	3
	Barbastelle	1	1	1
Tree Dwelling Bats **(Maximum of 11 to be lost, as per** Table 6-1**)**	Common pipistrelle	11	3	30
	Soprano pipistrelle	11	3	30
	Nathusius' pipistrelle	1	3	3
	Bechstein's	3	1	3
	Natterer's	5	3	15
	Daubenton's	5	3	15
	Whiskered	5	3	15
	Brandt's	5	3	15
	Leisler's	5	3	15
	Noctule	5	3	15
	Barbastelle	3	1	3

7.3. Licensable Area

7.3.1. In the absence of a complete set of surveys (due to access issues), the methodology described above has produced a reasonable precautionary estimate of the number of roosts likely to be lost or disturbed as a result of the Scheme, based on stratified extrapolation of the survey data that were collected. This approach has also enabled estimation of the numbers of bats of each species associated with these roots.

7.3.2. The predicted bats to be captured from roosts to be lost from demolished structures or felled trees relates to the unsurveyed/partially surveyed structures/trees only.

7.3.3. If the number of roosts or bats encountered during the licensed works went above those stated within the licence within these structures, then a modification request would be submitted to Natural England before any works impacting the additional roost/bats proceeded.

7.3.1. For all structures where surveys are complete, when bats are recorded in structures that were not identified as bat roosts, the process outlined in condition 16 of the Annex: Special conditions to individual bat mitigation licence will be followed. This states*:*

7.3.2. ‘If individual bats are discovered unexpectedly, including during periods of adverse weather, then the following steps must be taken:

a) Works to that building/structure must stop immediately. If the Named Ecologist or an Accredited Agent is not on site, he/she must be contacted immediately to attend the site.

b) Do not expose the bat or cause it to fly out of the roost on its own accord.

c) The bat must only be handled by the Named Ecologist or an Accredited Agent unless it is in immediate danger. The bat must be carefully placed in a lidded ventilated box with a piece of clean cloth and a small shallow container with some water. The box must be kept in a safe, quiet location.

d) Care must be taken to avoid rousing the bat during transfer to a suitable location – which may be a suitable hibernation box or other alternative roost constructed, providing a safe, quiet environment with stable, suitable temperature and relatively high humidity, safe from further disturbance.

e) The Named Ecologist must re-assess the structure and determine whether works can continue under this licence, or whether a modification to the licence is required before works re-commence. A written record must be kept of this decision and made available to Natural England or any police officer on request. This incidence must also be reported on the licence return form WLM-LR-BATANN.

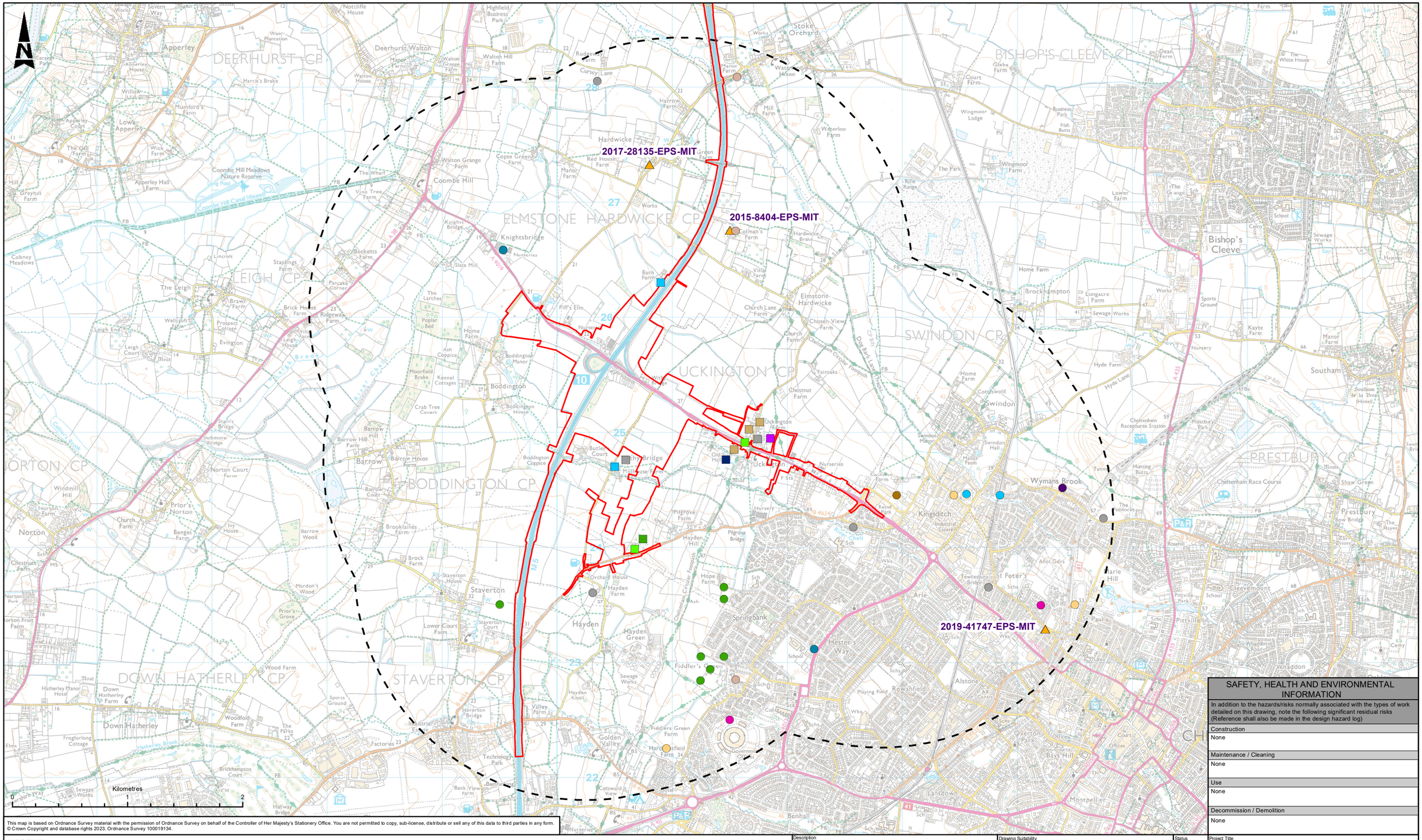
f) Any underweight or injured bats must be taken into temporary care by an experienced bat carer and looked after until such time that the bat can be transferred to a suitable replacement roost at the same site, or weather conditions are suitable for release at the same site.’

Appendix G. Figures

Figure reference	Document title	Sheet	Document number	Revision
7-3 A	Desk study of bat records since 2012 within 2km of the proposed Scheme	1 of 1	GCCM5J10-ATK-EBD-ZZ-GS-GI-000012	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	1 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	2 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	3 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	4 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	5 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 B	Structure impacts (demolished and extended) by the Scheme	6 of 6	GCCM5J10-ATK-EBD-ZZ-GS-GI-000006	0
7-3 C	Structures subjected to bat roost surveys within the study area	1 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000085	0
7-3 C	Structures subjected to bat roost surveys within the study area	2 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000085	0
7-3 C	Structures subjected to bat roost surveys within the study area	3 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000085	0
7-3 D	Confirmed bat roosts	1 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000008	0
7-3 D	Confirmed bat roosts	2 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000008	0
7-3 D	Confirmed bat roosts	3 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000008	0

Figure reference	Document title	Sheet	Document number	Revision
7-3 E	Known roosts to be destroyed through demolition or felling as a result of the Scheme	1 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000052	0
7-3 E	Known roosts to be destroyed through demolition or felling as a result of the Scheme	2 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000052	0
7-3 E	Known roosts to be destroyed through demolition or felling as a result of the Scheme	3 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000052	0
7-3 F	Bat roosts that may be subject to temporary disturbance	1 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000053	0
7-3 F	Bat roosts that may be subject to temporary disturbance	2 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000053	0
7-3 F	Bat roosts that may be subject to temporary disturbance	3 of 3	GCCM5J10-ATK-EBD-ZZ-GS-GI-000053	0
7-3 G	Bat roosts to be retained and protected	1 of 1	GCCM5J10-ATK-EBD-ZZ-GS-GI-000054	0
7-3 I	Bat activity index of static detector locations - bat passes per night (all bats)	1 of 2	GCCM5J10-ATK-EBD-ZZ-GS-GI-000056	0
7-3 I	Bat activity index of static detector locations - bat passes per night (all bats excluding Common & Soprano Pipistrelle)	2 of 2	GCCM5J10-ATK-EBD-ZZ-GS-GI-000056	0
7-3 J	Bat activity index of transect stopping points - bat passes per hour (all bats)	1 of 2	GCCM5J10-ATK-EBD-ZZ-GS-GI-000057	0
7-3 J	Bat activity index of transect stopping points - bat passes per hour (all bats excluding Common & Soprano Pipistrelle)	2 of 2	GCCM5J10-ATK-EBD-ZZ-GS-GI-000057	0
7-3 K	Bat activity index and distribution of Lesser	1 of 1	GCCM5J10-ATK-EBD-ZZ-GS-GI-000059	0

Figure reference	Document title	Sheet	Document number	Revision
	Horseshoe Bat passes			
7-3 L	Bat activity index and distribution of Greater Horseshoe Bat passes	1 of 1	GCCM5J10-ATK-EBD-ZZ-GS-GI-000060	0
7-3 M	Bat activity index and distribution of Barbastelle Bat passes	1 of 1	GCCM5J10-ATK-EBD-ZZ-GS-GI-000061	0



LEGEND

- ORDER LIMITS
- 2KM STUDY
- BAT EUROPEAN PROTECTED SPECIES LICENCE

BAT SPECIES RECORD

- BECHSTEIN'S BAT
- BROWN LONG-EARED BAT
- COMMON PIPISTRELLE
- DAUBENTON'S BAT
- LESSER HORSESHOE
- NOCTULE
- PIPISTRELLE
- SOPRANO PIPISTRELLE
- UNIDENTIFIED BAT

RECORDS OF BAT ROOSTS FROM SURVEY WORK ON THIS SCHEME, OUTSIDE OF THE SURVEY AREA

- BECHSTEIN'S BAT
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS
- NATTERER'S
- PIPISTRELLE
- UNIDENTIFIED BAT

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	WR	AM	CC	LJ	25/08/23

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3A
DESK STUDY OF BAT RECORDS
SINCE 2012 WITHIN 2KM OF THE
PROPOSED SCHEME

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5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
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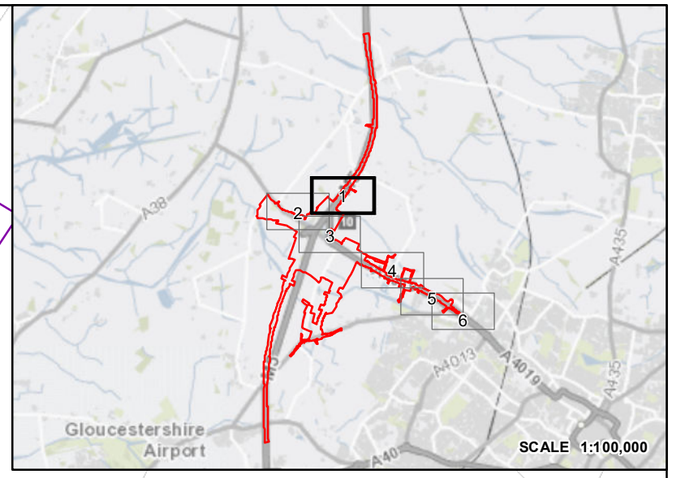
Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000012
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:30,000	5214106	1 of 1	P01

Northern Quadrant



BU_1098

Eastern Quadrant

0 Metres 100 200

LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	SD	RM	LH	25/08/23

Drawing Suitability: PUBLISHED
Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7-3B STRUCTURE IMPACTS (DEMOLISHED AND EXTENDED) BY THE SCHEME

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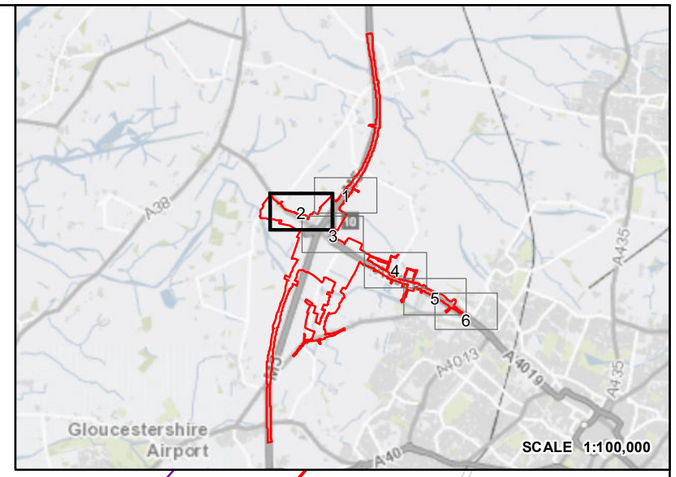
Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

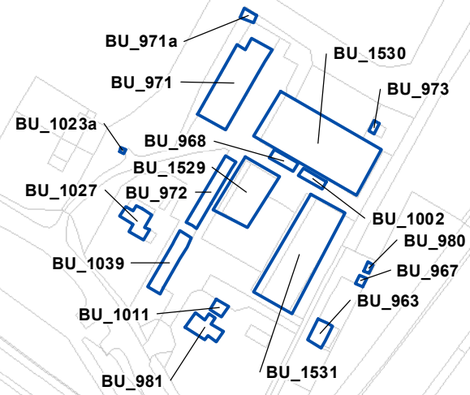
Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD | ZZ - GS - GI - 000006
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	1 of 6	P01

Northern Quadrant





Western Quadrant

Metres
0 100 200

LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normaly associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	SD	RM	LH	25/08/23

Drawing Suitability: PUBLISHED
Status: A1

Project Title: M5 Junction 10 Improvements Scheme

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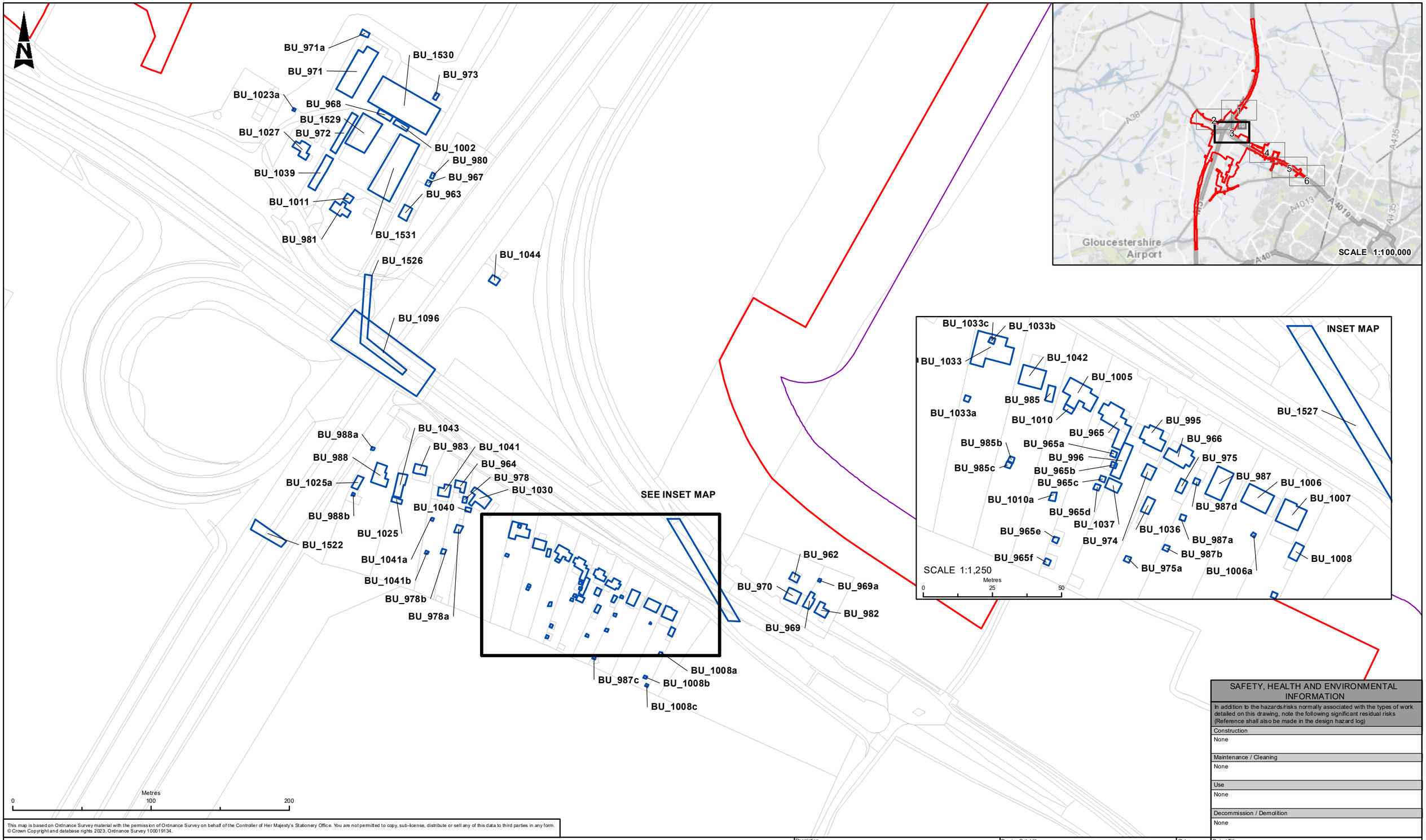
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Title: FIGURE 7-3B
STRUCTURE IMPACTS
(DEMOLISHED AND EXTENDED)
BY THE SCHEME

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000006
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	2 of 6	P01



LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)
Construction
None
Maintenance / Cleaning
None
Use
None
Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description PUBLISHED	Status A1	Revision P01	Drawn EM	Checked SD	Reviewed RM	Authorised LH	Issue Date 25/08/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvements Scheme

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Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
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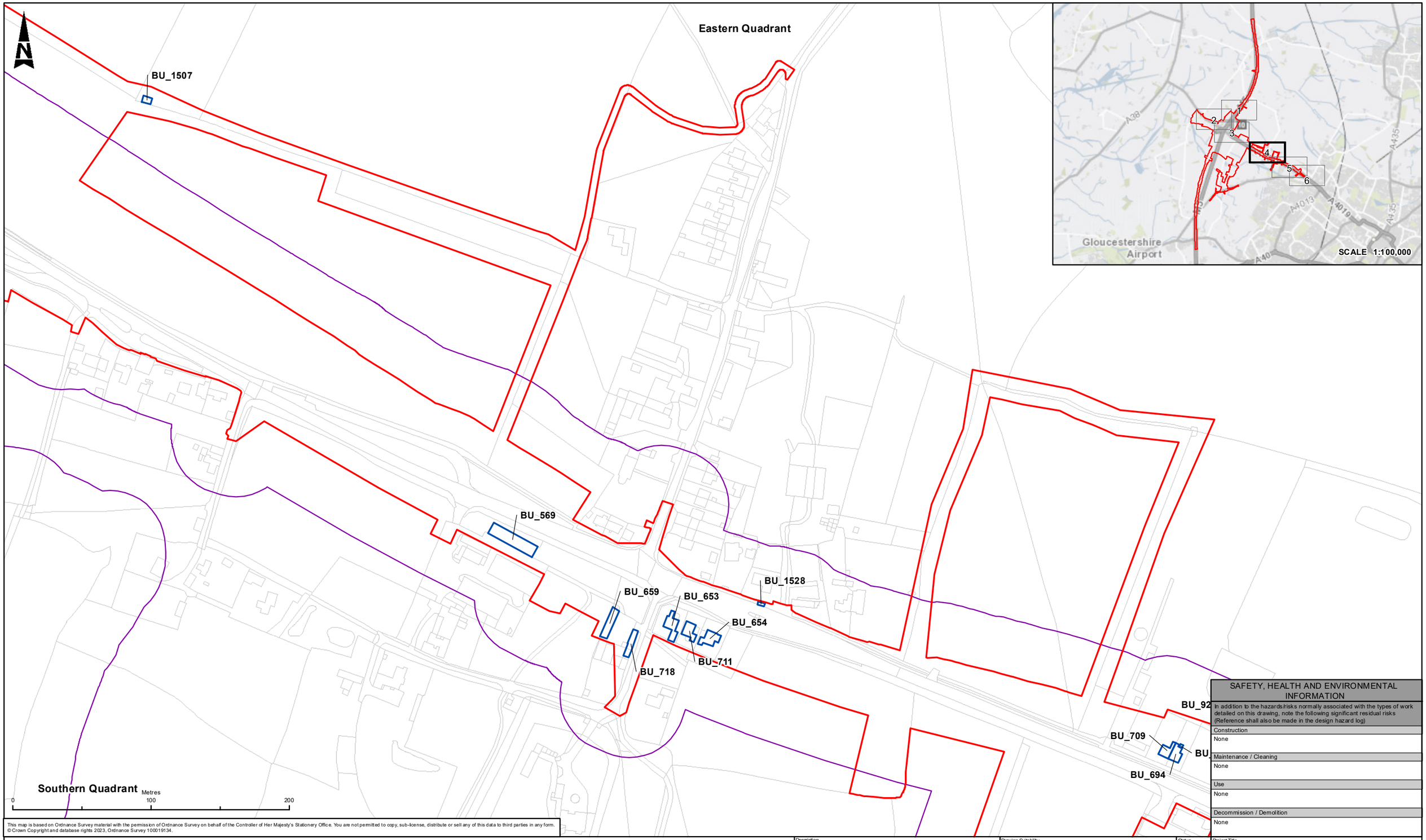
Client: Gloucestershire County Council

Drawing Title: FIGURE 7-3B STRUCTURE IMPACTS (DEMOLISHED AND EXTENDED) BY THE SCHEME

Drawing Number: GCCM5J10 - ATK - EBD ZZ - GS - GI - 000006

(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	3 of 9	P01



LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	SD	RM	LH	250823

Drawing Suitability: PUBLISHED
Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7-3B STRUCTURE IMPACTS (DEMOLISHED AND EXTENDED) BY THE SCHEME

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Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
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Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000006
(Project | Originator | Volume | Location | Type | Role | Number)

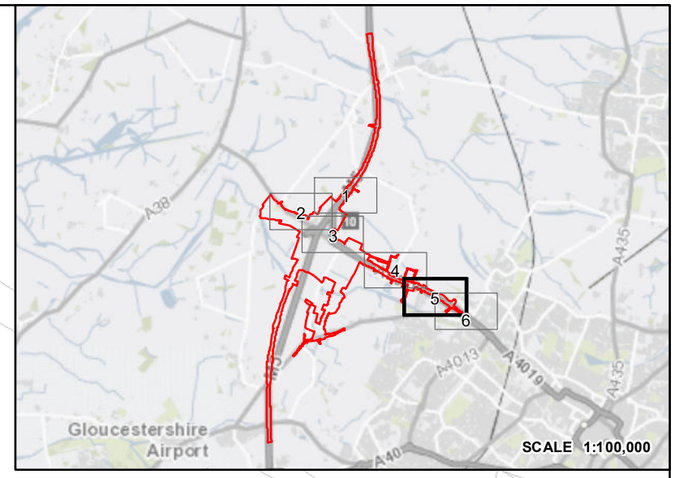
Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	4 of 6	P01

Eastern Quadrant

BU_923
BU_40
BU_709
BU_694a
BU_694
BU_1537
BU_54
BU_803
BU_522
BU_611
BU_610
BU_629
BU_507
BU_819
BU_45
BU_48
BU_25
BU_589
BU_585
BU_541

Southern Quadrant

Metres
0
100
200



LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	SD	RM	LH	250823

Drawing Suitability: PUBLISHED
Status: A1

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7-3B STRUCTURE IMPACTS (DEMOLISHED AND EXTENDED) BY THE SCHEME

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Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
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Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000006
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	5 of 6	P01

BU_629

BU_507

BU_819

BU_45

BU_48

BU_25

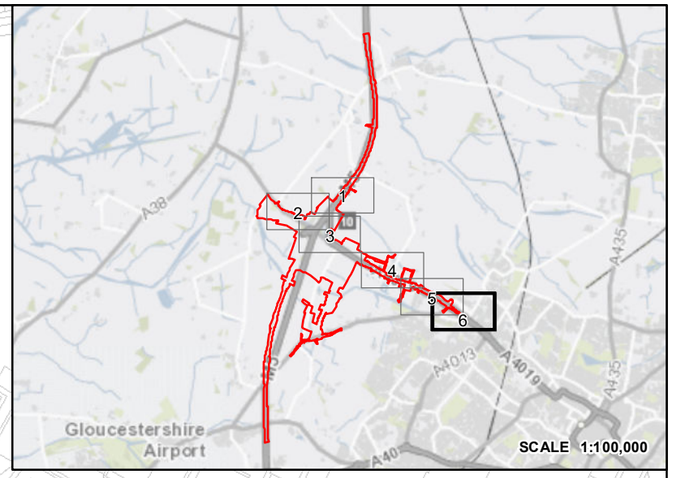
BU_589

BU_585

BU_541

BU_15

Eastern Quadrant



Southern Quadrant Metres

0 100 200

LEGEND

- ORDER LIMITS
- STRUCTURE TO BE DEMOLISHED OR EXTENDED
- BAT ROOST ZONE OF INFLUENCE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	SD	RM	LH	25/08/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvements Scheme

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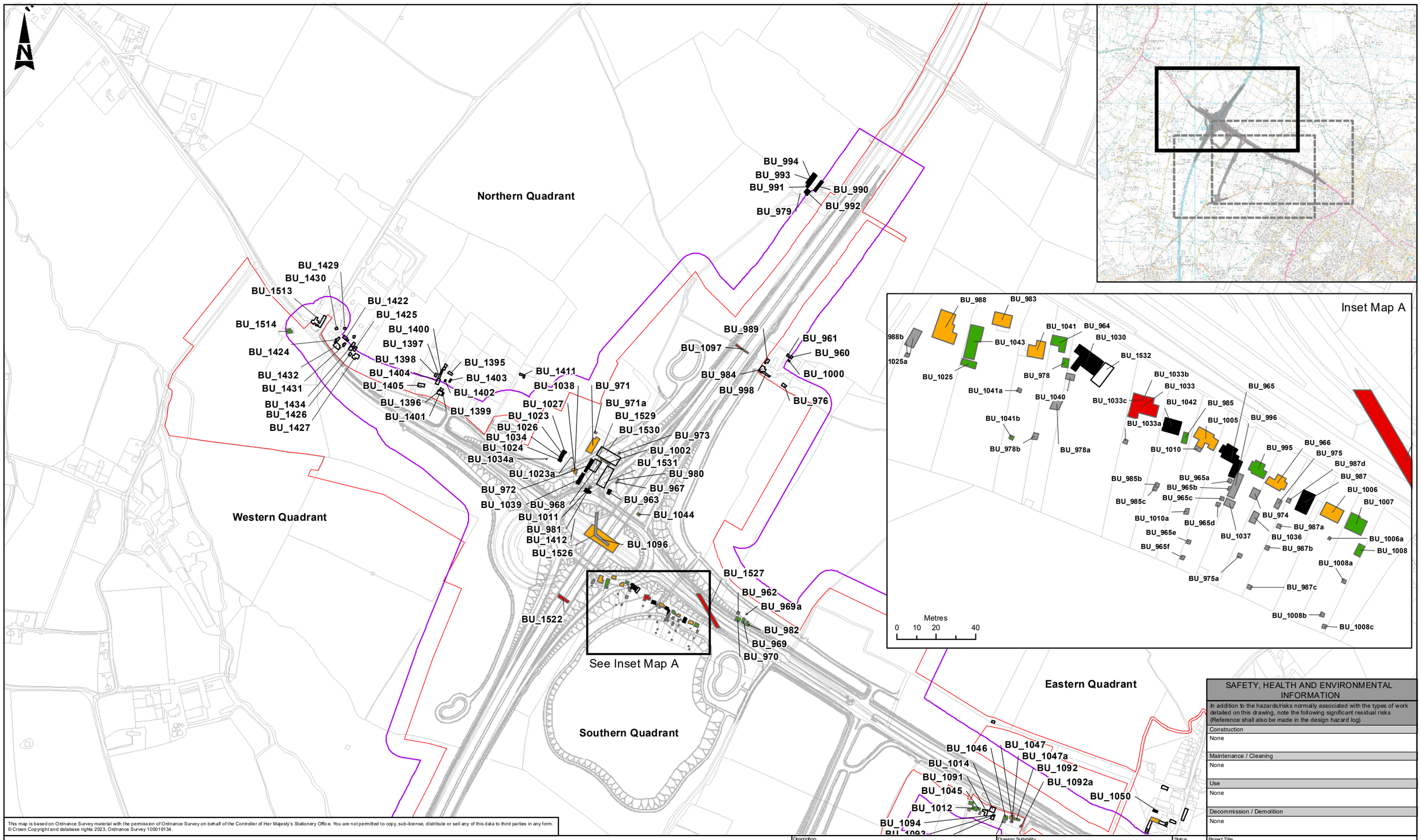
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Drawing Title: FIGURE 7-3B
STRUCTURE IMPACTS
(DEMOLISHED AND EXTENDED)
BY THE SCHEME

Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000006
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:2,500	5214106	6 of 6	P01



LEGEND

- ORDER LIMIT
- SCHEME
- BAT ROOST ZONE OF INFLUENCE

FINAL BRP

- UNSURVEYED
- CONFIRMED
- HIGH
- MODERATE
- FORMER BAT ROOST
- LOW
- NEGLIGIBLE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	EM	SD	AM	–	20/09/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvement

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5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
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Client: Gloucestershire County Council

Drawing Title: FIGURE 7.3C
STRUCTURES SUBJECTED TO BAT ROOST SURVEYS WITHIN THE STUDY AREA

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000085

(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5206696	1 of 3	P02

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

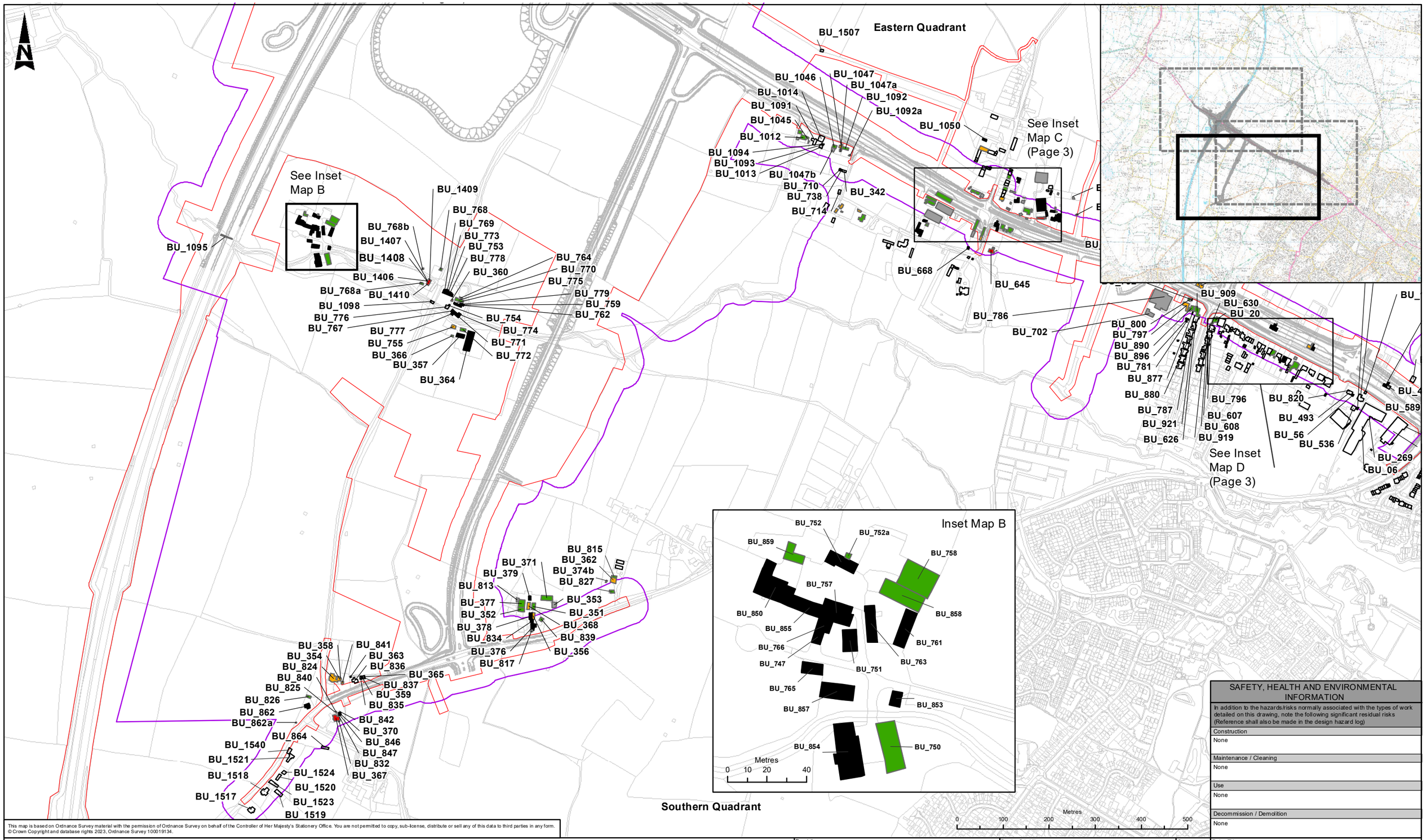
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None



LEGEND

- ORDER LIMIT
- SCHEME
- BAT ROOST ZONE OF INFLUENCE

FINAL BRP

- UNSURVEYED
- CONFIRMED
- HIGH
- MODERATE
- FORMER BAT ROOST
- LOW
- NEGLIGIBLE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	EM	SD	AM	–	20/09/23

Drawing Suitability: PUBLISHED — Status: A1

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Gloucester
GL1 2TH
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Client: Gloucestershire County Council

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction: None

Maintenance / Cleaning: None

Use: None

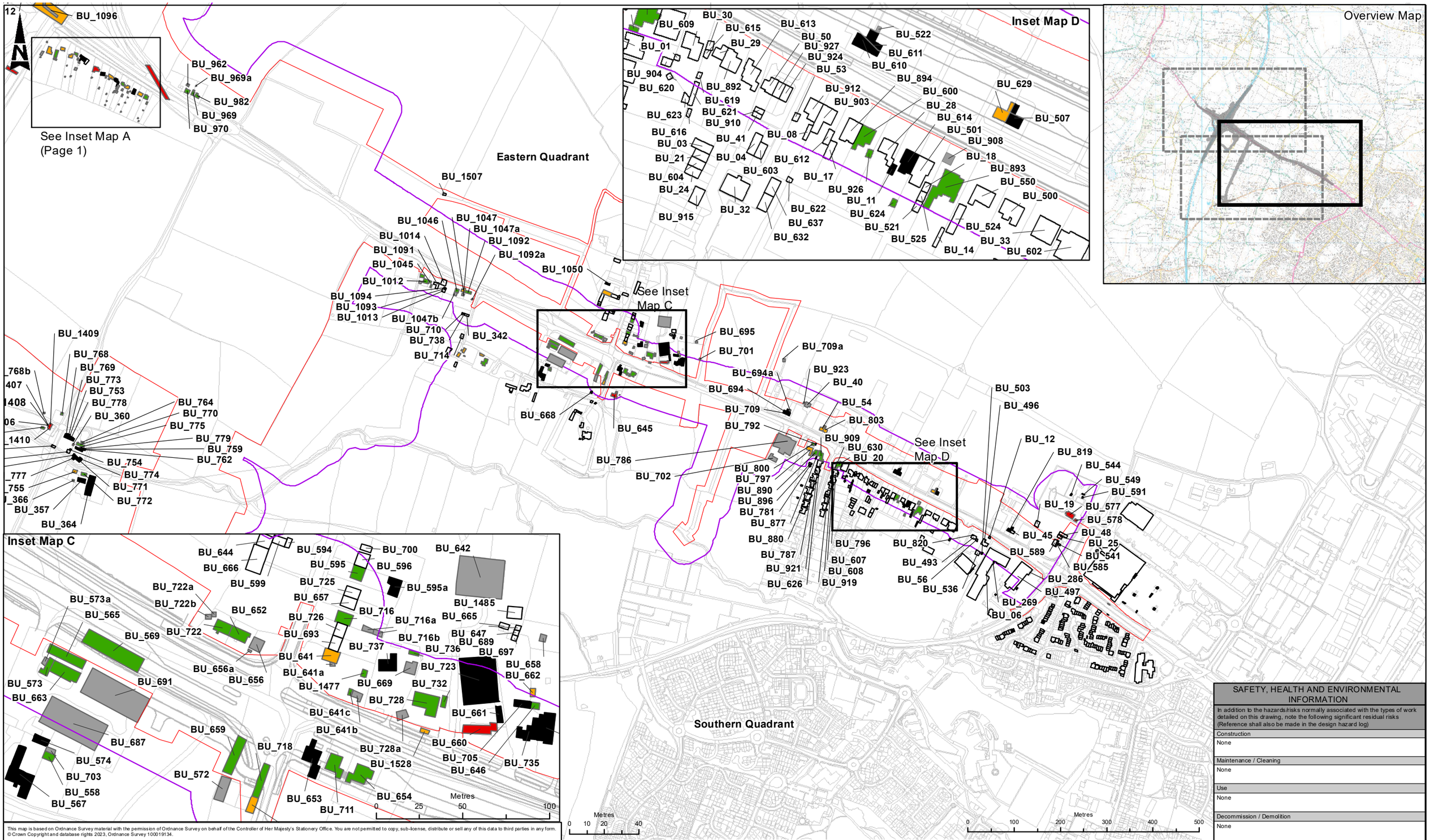
Decommission / Demolition: None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7.3C STRUCTURES SUBJECTED TO BAT ROOST SURVEYS WITHIN THE STUDY AREA

Drawing Number: Project | Originator | Volume: GCCM5J10 - ATK - EBD; Location | Type | Role | Number: ZZ - GS - GI - 000085

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5206696	2 of 3	P02



LEGEND

- ORDER LIMIT
- BAT ROOST ZONE OF INFLUENCE

FINAL BRP

- UNSURVEYED
- CONFIRMED
- HIGH
- MODERATE
- FORMER BAT ROOST
- LOW
- NEGLIGIBLE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	EM	SD	AM	–	20/09/23

Drawing Suitability: PUBLISHED — Status: A1

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Bearland
Gloucester
GL1 2TH
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction: None

Maintenance / Cleaning: None

Use: None

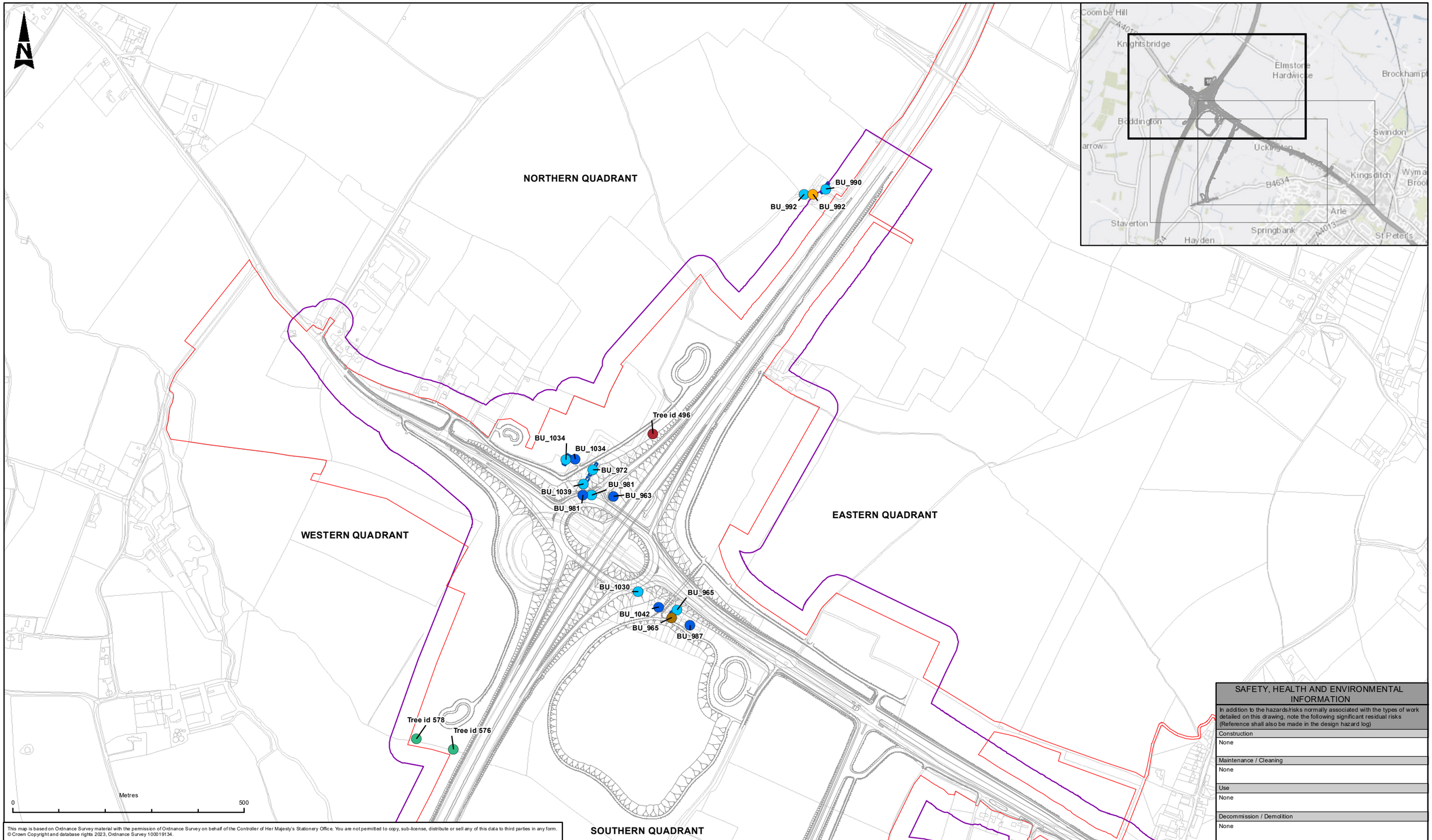
Decommission / Demolition: None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7.3C
STRUCTURES SUBJECTED TO BAT ROOST SURVEYS WITHIN THE STUDY AREA

Drawing Number: Project | Originator | Volume
GCCM5J10 - ATK - EBD
ZZ - GS - GI - 000085
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5206696	3 of 3	P02



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description PUBLISHED						
Status A1	Revision P02	Drawn SD	Checked LH	Reviewed CC	Authorised TT	Issue Date 29/08/23

PUBLISHED | **A1**

M5 Junction 10 Improvements Scheme

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Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
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Client: Gloucestershire County Council

Drawing Title

FIGURE 7.3D
CONFIRMED BAT ROOSTS

Drawing Number

Project | Originator | Volume
GCCM5J10 - ATK - EBD
ZZ - GS - GI - 000008
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P02

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

N

Tree ID 578
Tree ID 576
SEE INSET MAP
BU_753
BU_762
BU_771
BU_357
BU_364
Tree ID 86
Tree ID 627
Tree ID 101
BU_378
BU_378
BU_834
BU_376
BU_862
BU_370
SEE INSET PAGE 3
BU_653
BU_668
BU_709
BU_694
BU_694
BU_610
BU_610
BU_611
BU_507
BU_507
Tree ID 675
BU_11
BU_614
BU_819
BU_

Coombe Hill
A4019
Knightsbridge
Elmstone Hardwicke
Brockhampton
Boddington
Swindon
Uckington
Kingsditch
B4634
Staverton
Arle
Springbank
A4019
Hayden
St Peters

Metres
0
500

SOUTHERN QUADRANT

INSET MAP

BU_752
BU_752
BU_752
BU_757
BU_855
BU_757
BU_757
BU_763
BU_850
BU_766
BU_763
BU_761
BU_766
BU_766
BU_761
BU_747
BU_751
BU_751
BU_765
BU_857
BU_857
BU_857
BU_853
BU_853
BU_854
BU_854
BU_854

Metres
0
25
50

SCALE 1:1,250

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	29/08/23

Drawing Suitability: PUBLISHED
Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3D
CONFIRMED BAT ROOSTS

Drawing Number
Project | Originator | Volume
GCCM5J10 - ATK - EBD
ZZ - GS - GI - 000008
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P02

EASTERN QUADRANT

SOUTHERN QUADRANT

SEE INSET MAP

BU_1030
BU_1042
BU_965
BU_965
BU_965
BU_987
BU_653
BU_668
BU_709
BU_694
BU_694
BU_610
BU_610
BU_611
BU_507
BU_507
BU_11
BU_614
BU_819
BU_819
Tree ID 627
Tree ID 675
BU_753
BU_762
BU_771
BU_357
BU_364
Tree ID 86
Tree ID 101
BU_378
BU_378
BU_834
BU_376

Metres
0
500

Coombe Hill
Knightsbridge
Elmstone Hardwicke
Brockhampton
Boddington
Swindon
Uckington
Kingsditch
Staverton
Springbank
Arle
Hayden
St Peters
A4019
B4634
A4013

INSET MAP

BU_737
BU_723
BU_723
BU_705
BU_661
BU_661
BU_638
BU_735

Metres
0
25
50

SCALE 1:1,250

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- Barbastelle
- Natterer's
- Noctule

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description						
Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description PUBLISHED						
Status A1	Revision P02	Drawn SD	Checked LH	Reviewed CC	Authorised TT	Issue Date 28/06/23

PUBLISHED | **A1**

M5 Junction 10 Improvements Scheme

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Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Title

FIGURE 7.3D
CONFIRMED BUILDING AND TREE BAT ROOST CHARACTERISATIONS

Drawing Number

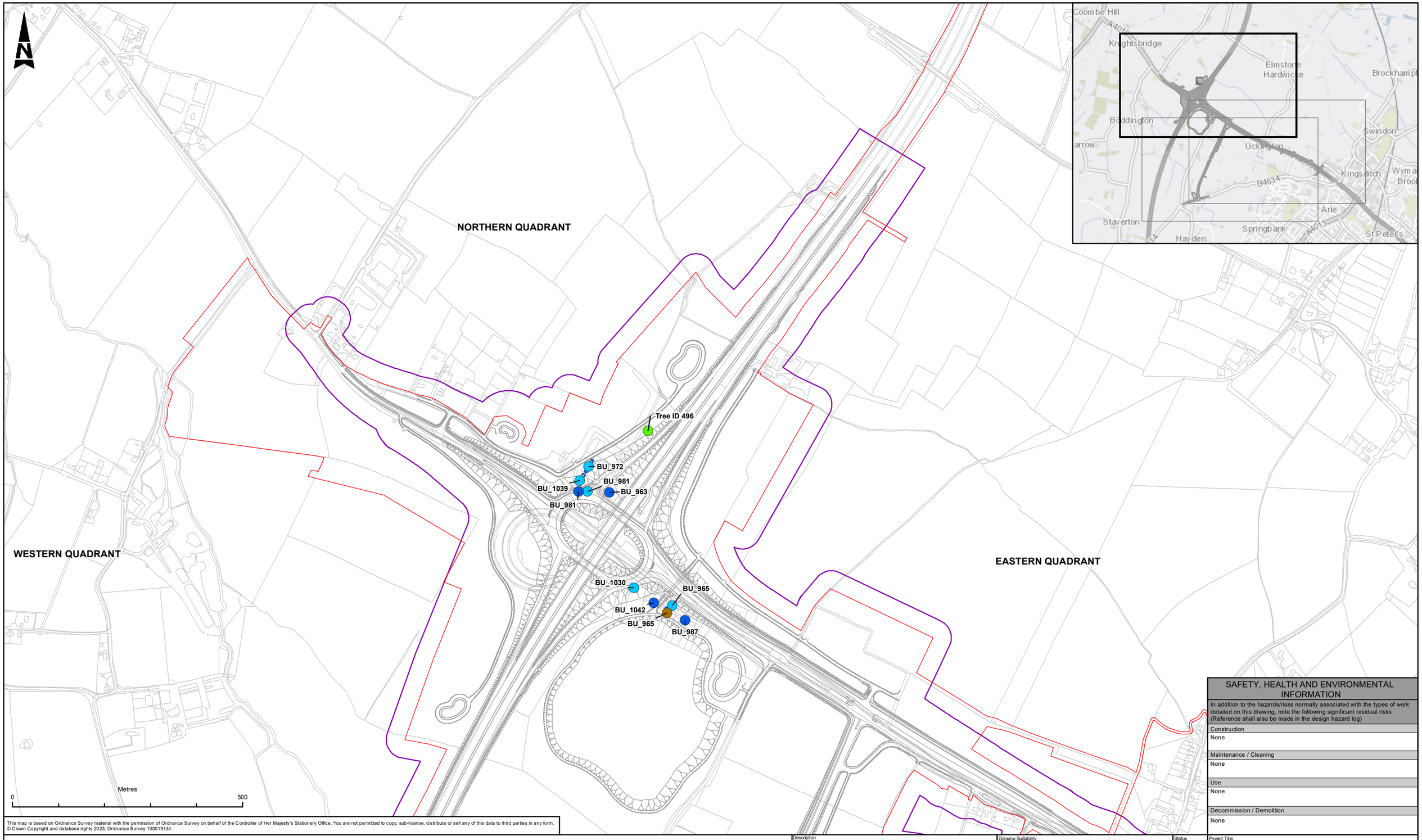
Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	ZZ	GS	GI	000008

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P02

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)

- BARBASTELLE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3E
KNOWN ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

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Bearland
Gloucester
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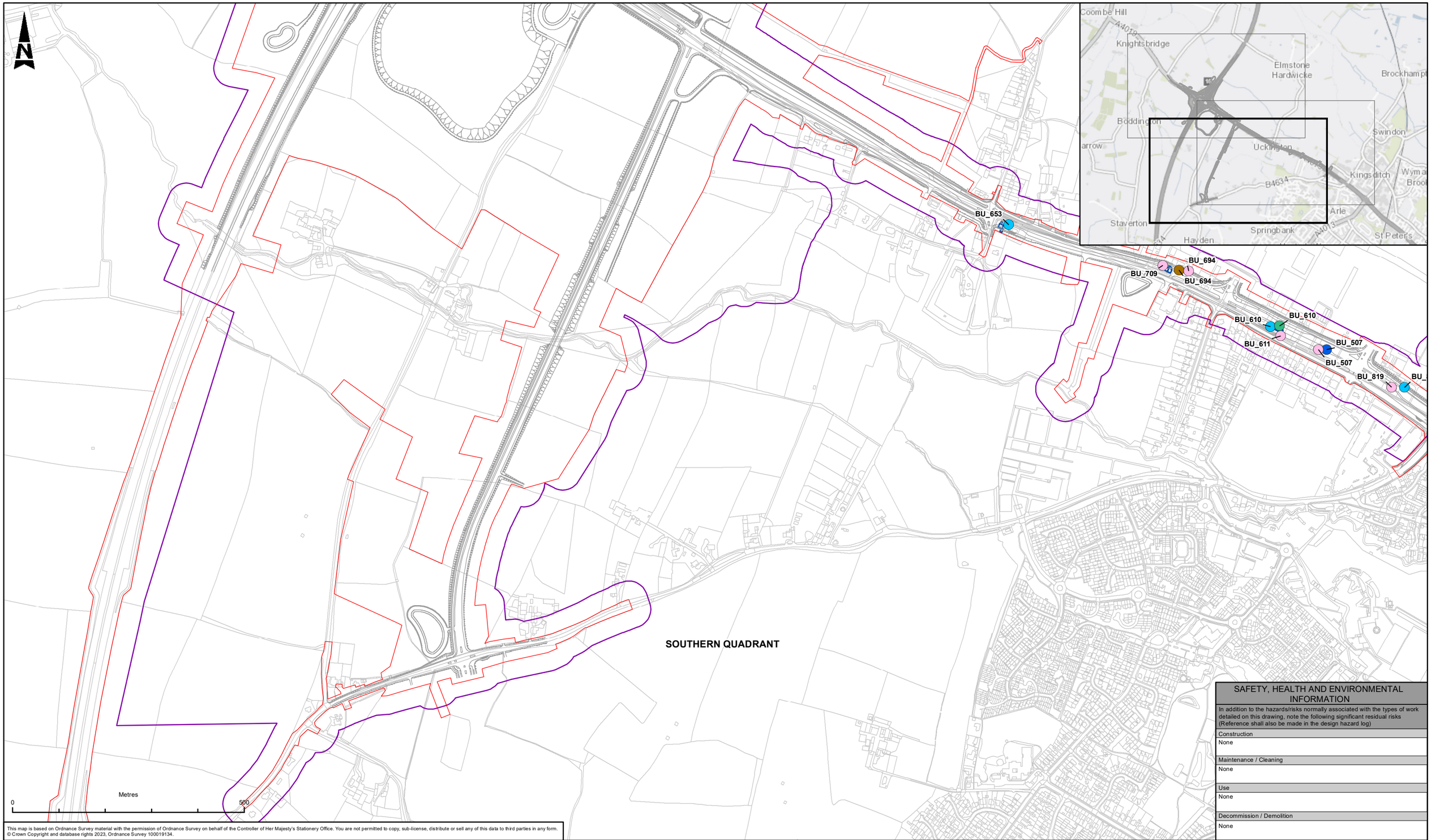
Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000052
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P02



LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)

- BARBASTELLE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: **PUBLISHED**

Status: **A1**

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Gloucester
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3E
KNOWN ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

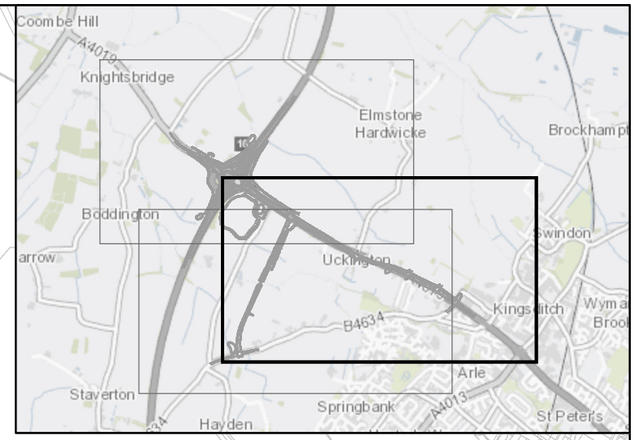
Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000052
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P02

EASTERN QUADRANT

SOUTHERN QUADRANT

BU_1030
BU_965
BU_1042
BU_965
BU_987
BU_653
BU_694
BU_709
BU_694
BU_610
BU_610
BU_611
BU_507
BU_507
BU_819
BU_819



0 Metres 500

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE

BAT SPECIES (TREES)

- BARBASTELLE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: PUBLISHED
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GL1 2TH
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Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3E
KNOWN ROOSTS TO BE DESTROYED THROUGH DEMOLITION OR FELLING AS A RESULT OF THE SCHEME

Drawing Number: Project | Originator | Volume
GCCM5J10 - ATK - EBD
ZZ - GS - GI - 000052
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P02

NORTHERN QUADRANT

WESTERN QUADRANT

EASTERN QUADRANT

BU_1034

BU_1034

TREE ID 578

TREE ID 576

0 Metres 500

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: PUBLISHED

Status: A1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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5th Floor, Block 5
Shire Hall
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Gloucester
GL1 2TH
Tel: 08000 514 514
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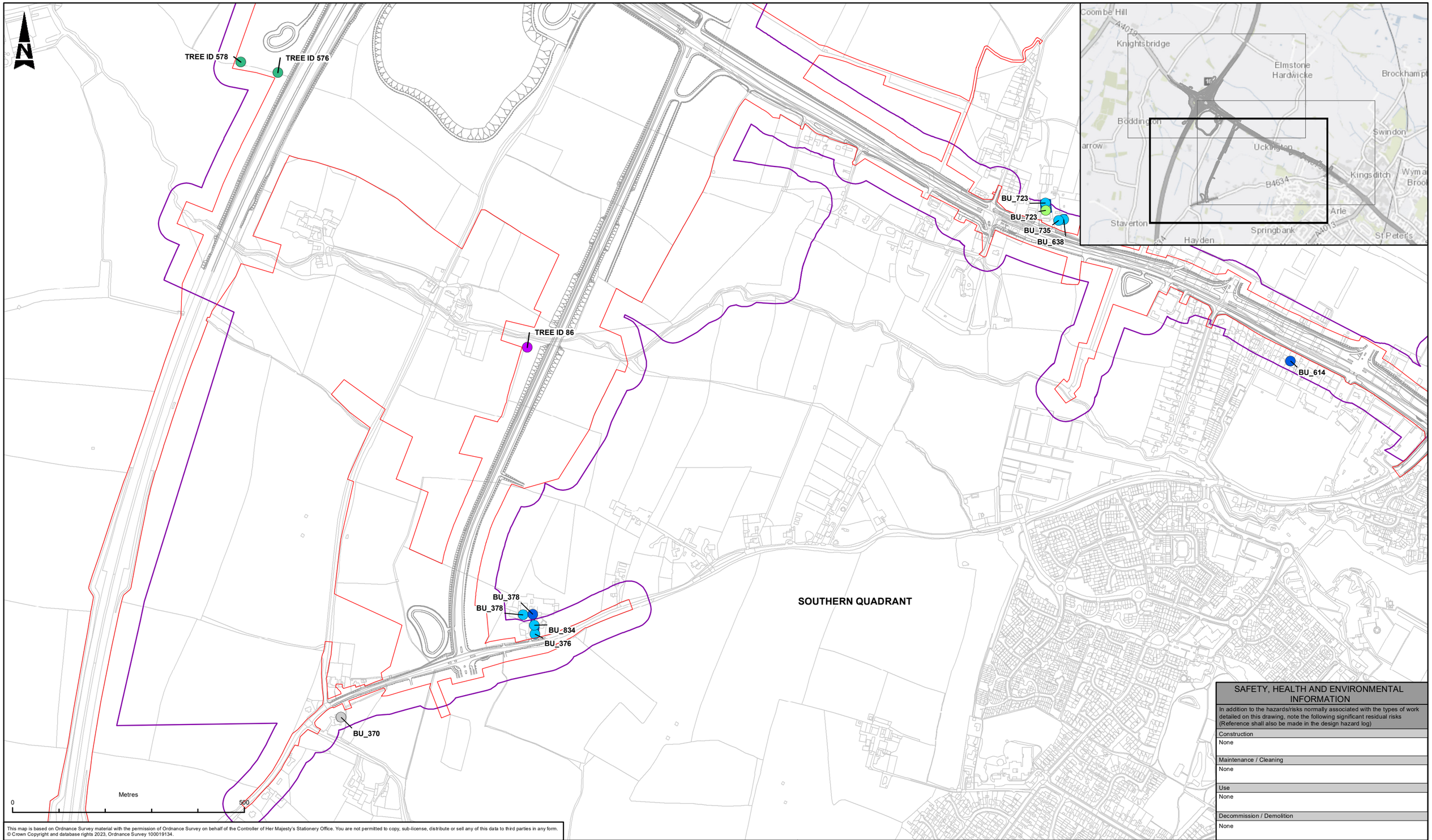
Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3F
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000053

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	1 of 3	P02



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LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvements Scheme

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Gloucester
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Drawing Title: FIGURE 7.3F
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000053
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	2 of 3	P02

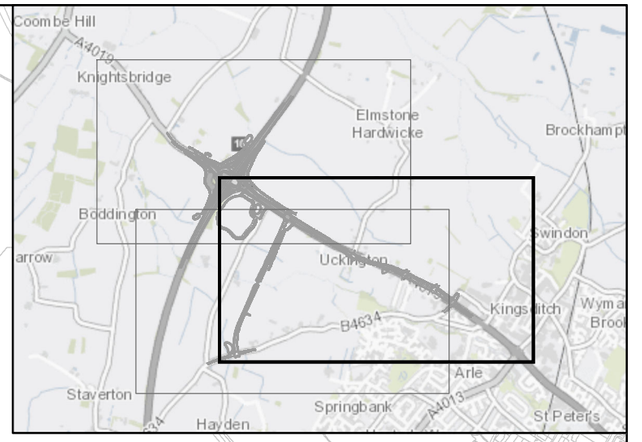
SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

EASTERN QUADRANT

SOUTHERN QUADRANT



TREE ID 86

BU_723
BU_723
BU_735
BU_638

BU_614

BU_378
BU_378
BU_834
BU_376

Metres
0
500

LEGEND

- ORDER LIMITS
- SCHEME ALIGNMENT
- BAT ROOST ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- NOCTULE
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREES)

- BARBASTELLE
- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	SD	LH	CC	TT	25/08/23

Drawing Suitability: PUBLISHED
Status: A1

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Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7.3F
BAT ROOSTS THAT MAY BE SUBJECT TO TEMPORARY DISTURBANCE

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000053
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:7,500	5214106	3 of 3	P02

NORTHERN QUADRANT

WESTERN QUADRANT

EASTERN QUADRANT

SOUTHERN QUADRANT

BU_992

BU_990

BU_992

SEE INSET MAP A

SEE INSET MAP C

SEE INSET MAP B

TREE ID 627

TREE ID 101

TREE ID 675

BU_737

BU_668

BU_11

BU_862

INSET MAP A

BU_752 BU_752 BU_752 BU_850 BU_757 BU_855 BU_757 BU_757 BU_763 BU_763 BU_761 BU_761 BU_766 BU_766 BU_766 BU_747 BU_751 BU_751 BU_765 BU_857 BU_857 BU_857 BU_853 BU_853 BU_854 BU_854 BU_854

Metres 0 25 50

SCALE 1:1,250

INSET MAP B

BU_705 BU_661 BU_661

Metres 0 25 50

SCALE 1:1,250

INSET MAP C

BU_753 BU_762 BU_771 BU_357 BU_364

Metres 0 25 50

SCALE 1:1,250

Metres 0 100 200 300 400 500

LEGEND

- ORDER LIMIT
- PROPOSED SCHEME
- ZONE OF INFLUENCE
- STRUCTURE

BAT SPECIES

- BAT
- BROWN LONG-EARED
- COMMON PIPISTRELLE
- LESSER HORSESHOE
- MYOTIS (ASSUMED TO BE NATTERER'S)
- NATTERER'S
- SOPRANO PIPISTRELLE
- WHISKERED

BAT SPECIES (TREE)

- NATTERER'S
- NOCTULE

LOCATION OF BAT SPECIES POINTS IS INDICATIVE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction: None

Maintenance / Cleaning: None

Use: None

Decommission / Demolition: None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P02	EM	SD	AM	PL	23/08/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7.3G BAT ROOSTS TO BE RETAINED AND PROTECTED

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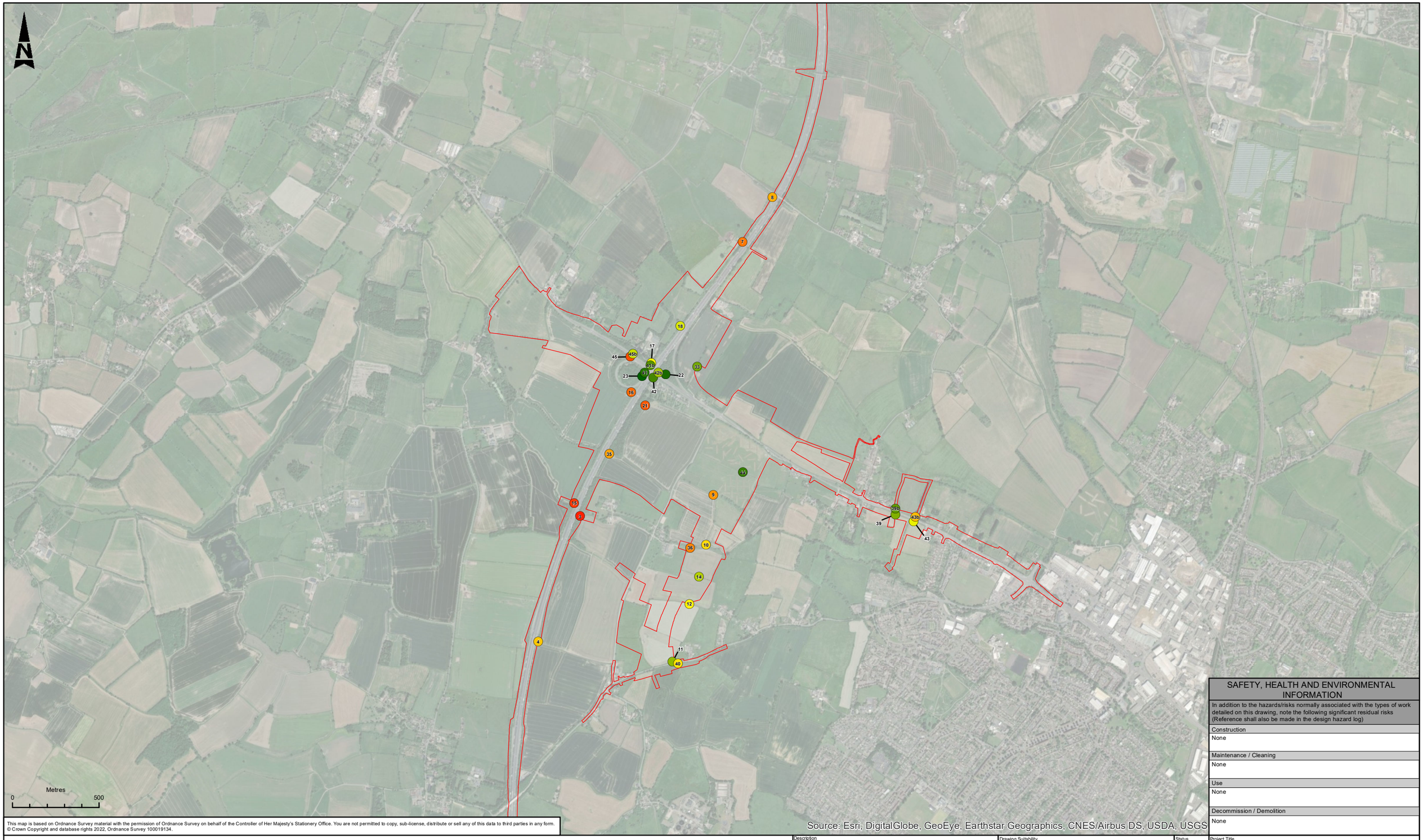
Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000054

(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:12,500	5206696	1 of 1	P02



LEGEND

- ORDER LIMITS

ALL BATS STATIC DETECTOR ACTIVITY INDEX

- LOWEST BAI (2.63 BAT PASSES PER NIGHT)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (1014.76 BAT PASSES PER NIGHT)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P00	KS	AM	JC	TT	22/06/23

Drawing Suitability: PUBLISHED
Status: A1

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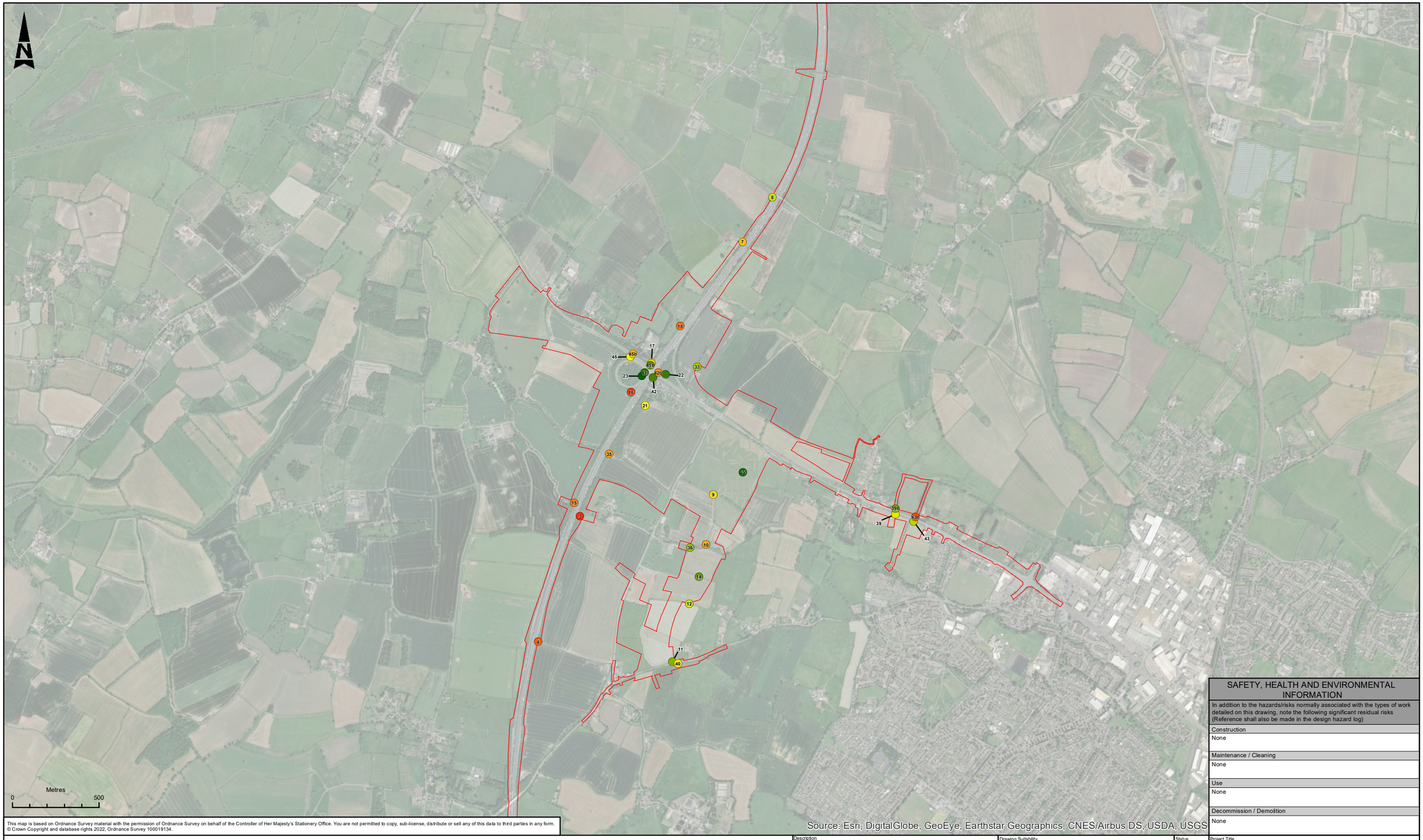
Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7-3I
BAT ACTIVITY INDEX OF
STATIC DETECTOR LOCATIONS -
BAT PASSES PER NIGHT
(ALL BATS)

Drawing Number
Project | Originator | Volume
GCCM5J10 - ATK - EBD
XX - GS - GI - 000056
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:20,000	5214106	1 of 2	P00



LEGEND

ORDER LIMITS

ALL BATS EXCLUDING COMMON & SOPRANO PIPISTRELLE STATIC DETECTOR ACTIVITY INDEX

- LOWEST BAI (2.3 BAT PASSES PER NIGHT)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (233.59 BAT PASSES PER NIGHT)

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P00	KS	AM	JC	TT	22/06/23

Drawing Suitability: PUBLISHED

Status: A1

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7-3I BAT ACTIVITY INDEX OF STATIC DETECTOR LOCATIONS - BAT PASSES PER NIGHT (ALL BATS EXCLUDING COMMON & SOPRANO PIPISTRELLE)

Drawing Number: Project | Originator | Volume
GCCM5J10 - ATK - EBD
XX - GS - GI - 000056
Location | Type | Role | Number

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:20,000	5214106	2 of 2	P00

LEGEND

- SCHEME ALIGNMENT

ALL BATS ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (1.43 BAT PASSES PER HOUR)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (48.75 BAT PASSES PER HOUR)

BAT TRANSECT ROUTES

- TRANSECT 2
- TRANSECT 4
- TRANSECT 5
- TRANSECT 7
- TRANSECT 8
- TRANSECT 9
- TRANSECT 11
- TRANSECT 10
- TRANSECT 12

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
Description PUBLISHED	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
	A1	P01	SD	LH	CC	TT	23/06/23

Drawing Suitability: **PUBLISHED**

Status: **A1**

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

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Gloucester
GL1 2TH
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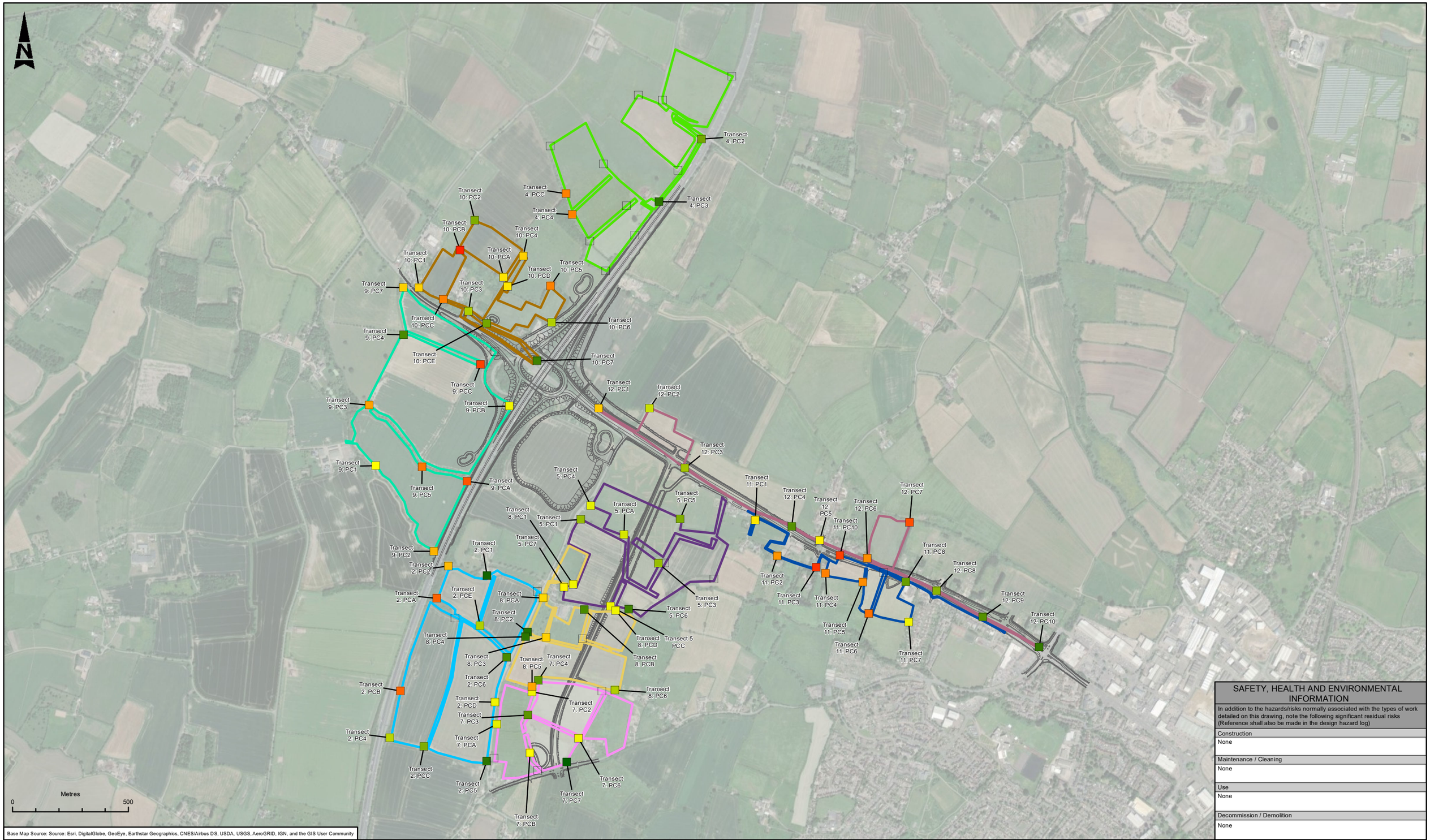
Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7-3J
BAT ACTIVITY INDEX OF
TRANSECT STOPPING POINTS -
BAT PASSES PER HOUR
(ALL BATS)

Drawing Number: GCCM5J10 - ATK - EBD - ZZ - GS - GI - 000057

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	1 of 2	P01



Base Map Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

SCHEME ALIGNMENT

ALL BATS EXCLUDING COMMON & SOPRANO PIPISTRELLE ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (1.25 BAT PASSES PER HOUR)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (20 BAT PASSES PER HOUR)

BAT TRANSECT ROUTES

- TRANSECT 2
- TRANSECT 4
- TRANSECT 5
- TRANSECT 7
- TRANSECT 8
- TRANSECT 9
- TRANSECT 11
- TRANSECT 10
- TRANSECT 12

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	SD	LH	CC	TT	23/06/23

Drawing Suitability: **PUBLISHED** — Status: **A1**

Project Title: M5 Junction 10 Improvements Scheme

Drawing Title: FIGURE 7-3J
BAT ACTIVITY INDEX OF TRANSECT STOPPING POINTS - BAT PASSES PER HOUR (ALL BATS EXCLUDING COMMON & SOPRANO PIPISTRELLE)

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Member of the SNC-Lavalin Group
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Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD ZZ - GS - GI - 000057
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	2 of 2	P01

LEGEND

SCHEME

LESSER HORSESHOE STATIC DETECTOR ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (0.05 BAT PASSES PER NIGHT)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (10.52 BAT PASSES PER NIGHT)

LESSER HORSESHOE TRANSECT STOPPING POINTS ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (1.09 BAT PASSES PER HOUR)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (2.86 BAT PASSES PER HOUR)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	AM	JC	TT	23/08/23

Drawing Suitability: **PUBLISHED** — Status: **A1**

ATKINS
Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7-3K
BAT ACTIVITY INDEX & DISTRIBUTION
OF LESSER HORSEHOE BAT PASSES

Drawing Number: GCCM5J10 - ATK - EBD - XX - GS - GI - 000059
(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	1 of 1	P01

LEGEND

SCHEME

GREATER HORSESHOE STATIC DETECTOR ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (0.03 BAT PASSES PER NIGHT)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (0.34 BAT PASSES PER NIGHT)

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	AM	JC	TT	23/08/23

Drawing Suitability: **PUBLISHED**

Status: **A1**

ATKINS
Member of the SNC-Lavalin Group

5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH

Tel: 08000 514 514

www.atkinsglobal.com

Client: Gloucestershire County Council

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Project Title: M5 Junction 10 Improvement

Drawing Title:

FIGURE 7-3L
BAT ACTIVITY INDEX & DISTRIBUTION OF GREATER HORSEHOE BAT PASSES

Drawing Number

Project	Originator	Volume	Location	Type	Role	Number
GCCM5J10	ATK	EBD	XX	GS	GI	000060

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	1 of 1	P01

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS

LEGEND

SCHEME

BARBASTELLE STATIC DETECTOR ACTIVITY

- NO BAT PASSES
- LOWEST BAI (0.03 BAT PASSES PER NIGHT)
- LOWER
- LOW
- MEDIUM BAI
- HIGH
- HIGHER
- HIGHEST BAI (1.2 BAT PASSES PER NIGHT)

BARBASTELLE TRANSECT STOPPING POINTS ACTIVITY INDEX

- NO BAT PASSES
- LOWEST BAI (2.22 BAT PASSES PER HOUR)
- HIGHEST BAI (2.5 BAT PASSES PER HOUR)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction: None

Maintenance / Cleaning: None

Use: None

Decommission / Demolition: None

Description	Status	Revision	Drawn	Checked	Reviewed	Authorised	Issue Date
PUBLISHED	A1	P01	EM	AM	JC	TT	23/08/23

Drawing Suitability: PUBLISHED

Status: A1

Project Title: M5 Junction 10 Improvement

Drawing Title: FIGURE 7-3M BAT ACTIVITY INDEX & DISTRIBUTION OF BARBASTELLE BAT PASSES

ATKINS
Member of the SNC-Lavalin Group
5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH
Tel: 08000 514 514
www.atkinsglobal.com

Client: Gloucestershire County Council

Drawing Number: GCCM5J10 - ATK - EBD - XX - GS - GI - 000061

(Project | Originator | Volume | Location | Type | Role | Number)

Original Size:	Scale	Project Ref:	Sheet:	Rev:
A3	1:15,000	5214106	1 of 1	P01

ATKINS
Member of the SNC-Lavalin Group

5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH

Tel: +44 (0) 8000 514 514