BAT MANAGEMENT PLAN
(INCLUDING BAT SURVEY RESULTS)

All Saints Church, Hoby

18th October 2021

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Control Sheet

General Report Information	
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Executive Summary

- The Bats in Churches (BiC) project is a pioneering endeavour to empower church communities to co-exist with their resident bats. It is a unique cross-sectoral partnership of organisations with distinctive priorities, led by Natural England, and involving the Church of England, the Bat Conservation Trust, the Churches Conservation Trust and Historic England. Lasting five years (2019 – 2023), the project is largely funded by the National Lottery Heritage Fund after a successful development phase. All Saints Church, Hoby was selected as one of the project churches.

- Bat surveys carried out in 2021 as part of the BiC project have confirmed that All Saints Church, Hoby supports a large maternity colony (35-104 bats in 2021, up to 378 historically) of Daubenton's bats. The bats predominantly roost in the sarking boards and behind the trusses of the north aisle (see 3.2.4 and Figure 4 - Page 32. The bats emerge into the church interior before exiting the church via openings at the top of the north wall of the north aisle. A small day roost of common pipistrelles is also present within the church interior.

- Bat droppings and urine staining has caused damage and staining to paintings, the organ, pews, lectern, pulpit, carpets, floor tiles and artefacts. There is a constant requirement to clean up droppings with all cleaning performed by volunteers.

- This Bat Management Plan provides practical advice on the potential to manipulate the way bats are using the church interior to restrict the impact they are having on the community and church heritage, or to exclude the bats from the interior without negatively affecting the Favourable Conservation Status of the population. The following is a summary of the preferred option (Option 5) which are displayed in Figures 5 and 6 and Photographs 26 and 27 (Pages 38-40) and presented in more detail in Sections 5.5, 5.6 and 6:
    - The site will be registered under the BiCCL (see Appendix) before work commences.
    - A temporary waterproof fabric ceiling will be installed under the corbels in the north aisle to enclose the primary bat roosting areas, access points and flight areas within the church. The ceiling will be on a system of pulleys so that it can be raised into place in March before the bats return and then lowered and cleaned in late October after the bats have departed from the church. It could potentially be stored on top of the toilet cubicle.
    - In Year 1 the openings into the north aisle at the top of the arches of the arcade will be left uncovered to allow bats to move freely throughout the church so they can get used to the reduction in space around the main roosting areas and access points.
    - In Year 2, assuming that the measures in Year 1 have been tolerated by the bats, the openings into the north aisle at the top of the arches of the arcade will also be covered.
    - The common pipistrelle colony will be accommodated within the existing openings leading to the cavity between the sarking and the slates, constructed during previous roofing work.

- Monitoring will be carried out from Year 1 to Year 4 to determine whether bats have responded favourably to the mitigation measures.

- Estimated costs are provided in Section 7.

1 Introduction

1.1 Background

This report presents the Bat Management Plan (BMP) for All Saints Church, Hoby, Leicestershire (also referred to hereafter as 'the church') as part of the Bats in Churches (BiC) Heritage Lottery Fund (HLF) Project led by Natural England.

All Saints Church supports a large maternity colony of adult female Daubenton's bats and a day roost of common pipistrelles both of which predominantly roost among the roof timbers of the church. The management plan considers and prescribes bespoke measures intended to reduce the impacts of these bats inside the church while ensuring that there is no harm to the bats or the favourable conservation status of the local populations to which they belong.

The strategy presented is based on the findings of a detailed suite of bat surveys of All Saints Church completed by Ridgeway Ecology Ltd in 2021, details of which are contained within this report, a suite of bat surveys of the church undertaken by Wild Wings Ecology in 2019, surveys undertaken by BJ Collins Protected Species Surveyors from 2009 - 2013, bat usage of the church provided by Jenny Harris of Leicestershire & Rutland Bat Group (LRBG), relevant recent research into mitigating the impacts of bats on churches, and ongoing consultation with stakeholders. The measures proposed will be implemented via the Bats in Churches Class Licence (BiCCL) which is a unique Natural England licence designed to help suitably qualified bat ecologists (Registered Consultants) manage the adverse effects of bat activity on places of worship.

1.2 Church Location

The central Ordnance Survey Grid Reference (OSGR) of All Saints Church is SK 6691 1735. The postcode of the church is LE13 3DT and it is located here: https://goo.gl/maps/e6sG6U9QkQ6dj7mQ7. The church can be seen in Photograph 1.

Photograph 1: All Saints Church, Hoby (north and east elevations)

The church is located on Main Street Hoby, which is a small rural village in the Melton district of Leicestershire, England. It is situated around 7 km from the town of Melton Mowbray and around 13km north-east of the city of Leicester. The village forms part of the civil parish of Hoby with Rotherby.

1.3 Church Description

All Saints Church is listed Grade I (Listing Entry: 1075004), the highest listing grade. Both the church and its churchyard are important elements in the Hoby Conservation Area.

The church is largely medieval, with many elements typical of the years on either side of 1300, including the window tracery and the columns of the nave arcades with their subtly varied forms.

The plan comprises a nave with north and south aisles, a west tower with a spire and a chancel with a south vestry. The nave and aisles and the lower part of the tower all date from about 1300. The top of the tower was added in the fourteenth century and the nave walls were raised to form a clerestory in the fifteenth century.

The church was restored in the 1860s by Ewan Christian, who largely rebuilt the chancel and stripped the plaster from the internal walls. The church contains furnishings of high value which enhance the significance of the building. These include a collection of fifteenth-century timber benches with poppyhead ends in the nave and an elaborate early twentieth-century decorative scheme in the chancel commemorating the Beresford family, who were both rectors and patrons of the living for nearly a century.

The walls are built of local ironstone with dressings of contrasting white limestone. The nave roof and the shallow-pitched lean-to aisle roofs are covered with lead, while the chancel roof is covered with Swithland slate. The west tower is of three unequal stages, with corner buttresses and a plain parapet enclosing the base of the stone broach spire. The top stage of the tower has a two-light window on each face. The nave has four clerestory windows on each side, of three cusped lights with tracery and set in round-headed arches of grey sandstone. The clerestory walls rise to a plain limestone parapet with a moulded top. The south aisle has a pointed doorway with a triple-moulded surround (rebuilt by Christian) and two three-light traceried windows of c1300 (the tracery much renewed). The east window of the aisle is of the same date and is of four lights with pointed trefoils and foiled circles. The north aisle has three-light traceried windows at each end with two-light windows in the north side wall with Y-tracery and a western door. The chancel has a three-light window in the south wall (a medieval window re-set by Christian, according to Brandwood), and a tall three-light east window with cusped intersecting tracery.

1.4 Relevant Legislation

The information below is intended only as guidance to the legislation relating to these species. The Acts themselves should be referred to for the correct legal wording.

Annex IV of the EC Habitats Directive (Council Directive 92/43/EEC 1992 on the conservation of natural habitats and of wild fauna and flora) lists animal and plant species of Community interest in need of strict protection across member states, which includes all bat species (and their habitats). The EC Habitats Directive is transposed into law in England and Wales via the Conservation of Habitats and Species Regulations 2017, which are usually referred to as the
'Habitats Regulations'. As a result of this legislation, all UK bats are considered European Protected Species (EPS). In addition to EU regulations, however, all bats and their habitats are also protected by

UK law under the Wildlife and Countryside Act 1981 (as amended), which was reinforced in England and Wales by the Countryside and Rights of Way Act 2000.

In combination, the above legislation makes it an offence to:

- Deliberately capture, injure or kill a bat;
- Deliberately disturb any bat; in particular, any disturbance which is likely to (i) impair a bats' ability to survive, breed, reproduce or to rear or nurture their young; or in the case of hibernating or migratory species, to hibernate or migrate; or (ii) to affect significantly the local distribution or abundance of the species to which they belong;
- To be in possession or control of any live or dead bat or any part of, or anything derived from a bat;
- Damage or destroy a breeding site or resting place of a bat;
- Intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection; and
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

Note that damaging or destroying a place used by a bat for breeding or resting anywhere in the UK is an absolute offence carrying strict liability under the Habitats Regulations. This means that no element of intent, reckless, or deliberate action needs to be evidenced to establish guilt; the prosecution only needs to demonstrate that the accused performed the prohibited act.

Also note that the term 'roost' is not used in the above legislation, however, a site that a bat uses for breeding, resting, shelter or protection is called a roost in ecological terms. Bats tend to re-use the same roost sites and sometimes over many years but may not always be in residence. Current legal opinion is that a roost is protected irrespective of whether the bats are present.

As a result of the above legislation, where work will result in any destruction, damage or obstruction of any bat roost, whether occupied or not, or risks harming or disturbing bats then an EPS derogation licence (often also called a development licence or a mitigation licence) is required from the Statutory Nature Conservation Body (e.g. Natural England) before such work can proceed.

In determining whether to grant such a licence Natural England must apply the requirements of Regulation 53 of the Habitats Regulations, and, in particular, apply the following three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b):

1. Regulation 53(2)(e) states that: a licence can [only] be granted for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment";
2. Regulation 53(9)(a) states that the appropriate authority (i.e. Natural England) shall not grant a licence unless they are satisfied "that there is no satisfactory alternative" to the proposed actions; and,
3. Regulation 53(9)(b) states that the appropriate authority shall not grant a licence unless they are satisfied "that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range".

These three tests are commonly referred to as the 'purpose test', the 'NSA test' and the 'FCS test' respectively.

2 Statement of Heritage Significance

As part of the initial phases of the BiC Project, a Statement of Heritage Significance (SoHS) was prepared in respect of the heritage importance of each project church and the impact upon it from bat activity. The following comprises the relevant sections from the BiC SoHS for All Saints Church, Hoby:

The church is listed Grade I, the highest listing grade. The body of the church is largely medieval and the building is of ***high archaeological, historical and architectural significance.*** *The church also contains furnishings of high value which enhance the significance of the building. Both the church and its churchyard are important elements in the Hoby Conservation Area.*

The significance of the church lies mainly in the medieval fabric and the design of the decorative elements, including the window tracery, especially the tracery of the south aisle windows, the columns of the nave arcades with their subtly varied forms and the elaborate moulded door surrounds and the moulded arches of the sedilia in the south aisle. All these elements are of high significance, as are the timber roofs of the nave and north aisle which are at least partly late medieval. Ewan Christian was architect to the Ecclesiastical Commissioners; his restoration in the 1860s was typically competent and generally preserved the early fourteenth-century character of the building, but is of moderate significance in itself. His removal of the wall plaster is regrettable; this was a practice widely adopted by Victorian church restorers and was vociferously opposed by the Society for the Protection of Ancient Buildings (the SPAB becoming known as 'anti-scrape').

Of the furnishings, the collection of fifteenth-century timber benches with poppyhead ends in the nave is of ***high significance.***

The various elements of the early twentieth-century decorative scheme in the chancel constituting the Beresford family memorial, including the chancel screen, choir stalls, high altar, encaustic tile floor coverings, painted wall friezes, Commandment and Lord's Prayer boards and the chancel stained glass windows are collectively of ***moderate to high significance*** *and might be of high significance if their author could be identified.*

The George III royal arms, the plain medieval stone font and the memorial brass are also of ***moderate to high significance.***

Most of the other furnishing including the pulpit, the early twentieth-century poppyhead benches in the body of the church and the organ are of ***moderate significance.***

Surviving medieval furnishings include:

- *A collection of fifteenth-century timber benches in the nave with poppy heads*
- *Plain octagonal stone font on a stone stem, inside the south door*
- *Memorial brass of c1480 in south aisle with lower half of a knight in armour.*

Post-medieval, pre-Victorian furnishings include:

- *Large royal arms of King George III painted on canvas and hung above the tower arch*
- *Marble wall monument to Sarah Standley d.1792 and various other minor wall tablets in the chancel.*

Of the Victorian and post-Victorian furnishings, the most conspicuous are the various elements of the early twentieth-century decorative scheme in the chancel. The artists and craftsmen responsible have not been identified. The main elements of the scheme comprise:

- *The timber high altar with decorative carving and small painted panels on the front*
- *Small Commandment and Lord's Prayer boards with decorative cresting flanking the east window*
- *Timber choir stalls with carved decoration*
- *Encaustic tiled floor with elaborate patterns in red, yellow and brown*
- *Painted and lettered friezes at the head of the side walls*
- *Perpendicular-style chancel screen with painted figures of saints on the lower part, traceried carved open lights to the central part and a coved canopy with painted decoration and lettering.*
- *Stained glass in the south and east chancel windows.*

Other furnishings of this period include

- *Carved timber pulpit on a stone base; these and the reading desk and lectern are from 1888 (Brandwood)*
- *Timber poppyhead benches in the aisles*
- *The organ housed in the lower part of the tower, with choir benches in front. It was built in 1876 by S. Taylor of Leicester.*
- Stained glass memorial window in the north aisle.

The SoHS provides the following assessment of the impacts of bats and the priorities for bat mitigation:

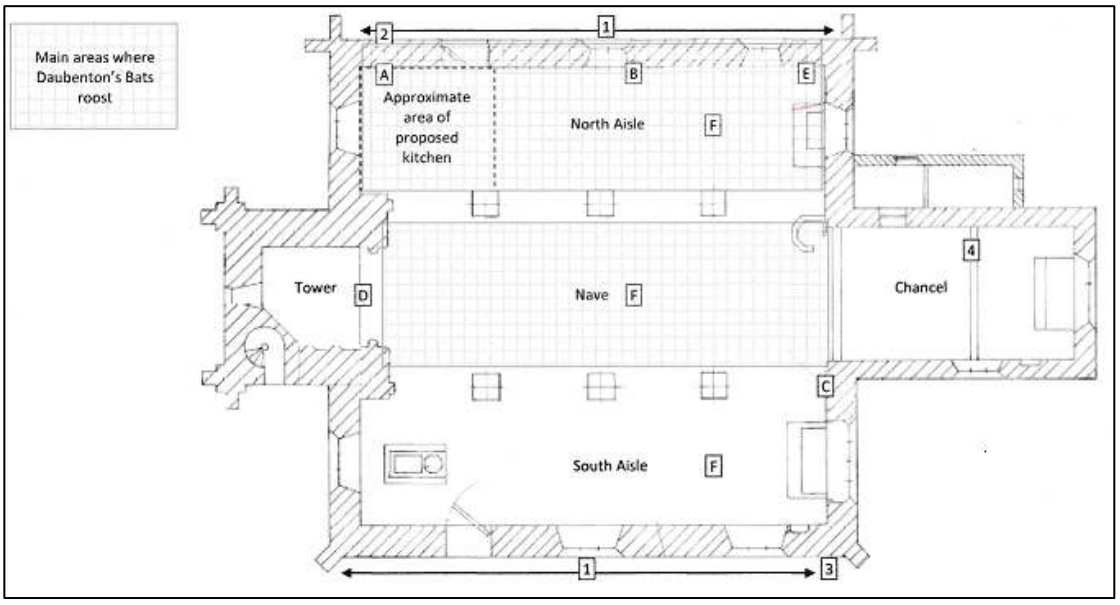
The Light Touch Survey was carried out in August 2017. Fresh droppings were found scattered throughout the church but with most aggregations along the inside of the north aisle wall. The droppings were mainly those typical of a medium-sized myotis bat (in this case Daubenon's) with a smaller number typical of a smaller species (probably common pipistrelle). The Daubenon's bats roost primarily beneath the lead but above the sarking boards of the north aisle roof and can then the interior where the roof of the north aisle abuts the nave wall. Bats also roost above the sarking boards of the nave and south aisle. Staining from bat urine is clearly visible on both floor coverings and timber furnishings, principally those in the nave and north aisle, and has apparently caused damage to the recently re-gilded pipes of the organ under the tower arch. The parish representatives would like bats to be excluded from the interior of the church because of the amount of cleaning required to keep it useable. A new kitchen area is shortly to be formed at the west end of the north aisle.

The proposed kitchen area was completed in 2020.

The SoHS also provided a table (reproduced as Table 1) to show the significance of bat impacts in each area of the church in 2017, and a plan (Figure 1) showing the areas of high significance most affected by bats as identified in the 2016 Quinquennial Inspection Report.

Table 1. Significance of bat impacts in the various areas of the church in 2017

Area/item	Significance	Impact	Total
Roof structures	4	1	4
Wall surfaces (plain)	4	1	4
Wall surfaces (painted or decorated)	-	-	-
Floor surfaces (chancel)	4	2	8
Wall monuments	2	2	4
Floor memorials/brasses	3	2	6
Altar/communion table	3	2	6
Reredos	-	-	-
Seating (chancel)	4	2	8
Rood screen	4	2	8
Pulpit	2	3	6
Lectern	2	3	6
Seating (nave)	5	3	15
Seating (aisles)	2	3	6
Font	4	1	4
Organ	3	3	9
Royal Arms	4	3	12
Overall impact on significance			**106**



1. Gaps beneath eaves
2. Main access location at northwest corner
3. Access point at south east corner

A, B. Aggregations of droppings
C. Bats audible here, probably above sarking
D. Organ with pipes stained by urine

Figure 1: Plan showing bat access points and main location of droppings (RSK)

3 Survey

3.1 Methods

3.1.1 Desk study

An initial desk study for relevant information about bats at All Saints Church, Hoby was undertaken in April 2021, and this was revisited in October 2021 prior to issuing this report. The desk study comprised a review of all prior bat survey and assessment reports made available to Ridgeway Ecology Ltd by Natural England or by the church, namely:

- Bats in Churches Bat Roost Visit Report Form completed by Matt Cook following a visit to the church on 17th August 2017
- Barry Collins Bat Survey Report 2011 prepared to support re-roofing of the building
- Wildwings Ecology 2019 Bat Survey data report prepared by Dr Charlotte Packman

A search of the Natural England Multi-Agency Geographic Information for the Countryside (MAGIC) web portal was also undertaken for:

- Any statutory designated sites of nature conservation importance where bats are mentioned in their citations or qualifying criteria within a 5 km radius of the church i.e. Sites of Special Scientific Interest, Local or National Nature Reserves, or Special Areas of Conservation; and,
- Any EPS development licences issued for bats within 2 km of the church since 2008.

In addition to the above, Leicestershire and Rutland Bat Group (LRBG) were consulted for any relevant information pertaining to bats at the church. In view of this consultation records of bats in the area surrounding the site were not then also requested from Leicestershire and Rutland Environment Records Centre for this study.

Aerial images (Google Earth) and Ordnance Survey maps were also consulted as part of the dusk study, to assess the potential value of the habitat surrounding the church for roosting, foraging and commuting bats.

3.1.2 Daytime Bat Roost Assessments and Inspections

The suite of field surveys completed at the church was undertaken in accordance with the minimum survey standards required to register the church with Natural England to implement suitable mitigation measures via the BiCCL (Annex B) – see Appendix. All field surveys were led and undertaken by Dr Jon Russ CEnv MCIEEM, who is an experienced Natural England licensed bat ecologist.

An initial bat roost assessment and inspection of the church was completed on 14th April 2021. The principal aims of this initial site visit were to assess the suitability of the various construction features within the church for roosting and hibernating bats, and to undertake a search for evidence of bat presence, typically indicated by bat droppings, the remains of prey (such as discarded moth wings), characteristic staining from urine or fur, or the presence of live or dead bats. This site visit was also

intended to provide a platform for designing a suitable nocturnal survey strategy for the summer of 2021.

Following on from the initial daytime appraisal completed on 17th April 2019, further comparative assessment and inspection of bat activity inside the church was also undertaken before the four dusk emergence surveys on 25th May 2021, 21st July 2021, 19th August 2021 and 1st September, and before a meeting on 22nd September 2021.

3.1.3 Nocturnal Bat Surveys

Five nocturnal bat surveys – four dusk emergence surveys and one pre-dawn re-entry survey - were undertaken at the church in the summer of 2021. The main aims of these bat activity surveys were to determine the current status of the bat roosts that had previously been identified at the church and to establish if any further bat roosts were present, along with relevant information on their status if they were.

The nocturnal surveys were all undertaken within the optimum period for bat activity as stated in Collins (ed.) (2016), which is May through August. They were also undertaken within each of the required periods according to Natural England BiCCL criteria – see Appendix.

Table 2 shows the dates and timings for each of the nocturnal surveys undertaken at the church in the summer of 2021. Table 3 shows the weather conditions for these surveys.

Table 2. Timings of nocturnal surveys

Survey Date	Survey Start Time	Survey End Time	Sunset/(Sunrise)
25/05/2021	20:40	22:45	20:55
26/05/2021	03:35	04:54	(04:41)
21/07/2021	20:45	23:15	21:14
19/08/2021	20:00	22:15	20:22
01/09/2021	19:15	22:00	19:53

Table 3. Weather conditions during the nocturnal surveys

Survey Date	Temperature at Start of Survey (°C)	Temperature at End of Survey (°C)	Cloud Cover (%)	Wind (Beaufort Scale)	Precipitation
25/05/2021	12	10	100	0	None
26/05/2021	11	11	100	0	None
21/07/2021	22	20	60	1	None
19/08/2021	19	17	20	1	None
01/09/2021	16	15	70	1	None

The emergence surveys all commenced at least 20 minutes before dusk and extended for at least two hours post-sunset, and the re-entry survey commenced at least two hours before dawn and extended until sunrise. Surveyors recorded key information regarding possible bat roosts in the church, such as exit or entry points and/or roosting locations (suspected or confirmed), key flight-lines and times of bat activity, and the bat species concerned. Where bat activity could not be confirmed to species level, i.e. for the cryptic *Myotis* bats (*Myotis* spp.), it was instead attributed to the appropriate genus - see Section 3.1.6.

Each emergence and re-entry survey involved at least four suitably experienced surveyors watching and listening with bat detectors for any bats exiting from or entering the church, including at least one

stationed inside the church. On all nocturnal surveys at least two (up to four) high-specification wide-angle infrared cameras (alongside high specification infrared illuminators) were used, with a thermal scope being used on the last two surveys.

3.1.4 Personnel

Field surveys were led by Dr Jon Russ CEnv, MIEEM (Natural England Class 3 & 4 Bat Licences CLS2294). Jon is a terrestrial and behavioural ecologist with a specialist interest in bats. As Director of his successful consultancy firm (Ridgeway Ecology Ltd), and through his academic research and work with the Bat Conservation Trust, he has managed, designed and carried out large and small scale bat surveys and bat monitoring programmes in the UK and the tropics. He has extensive experience of the United Kingdom and European Union legislation regarding bats and has been a fully licensed bat worker for over 20 years, holding bat conservation, education and scientific licences for radio-tracking, mist-netting, ringing, harp-trapping, ultrasonic playback and DNA sampling. His publication record includes a large number of articles in scientific journals as well as other publications including the widely used book, "The Bats of Britain and Ireland: Echolocation, Sound Analysis, and Species Identification", "Review of ASSI designation for bats in Northern Ireland", "The Northern Ireland Bat Action Plans" which he coordinated and delivered, "British Bat Calls: A Guide to Species Identification" and more recently "Bat Calls of Britain & Europe" published in August 2021. He is currently Warwickshire Bat Group Treasurer and Project Officer. Jon holds Natural England Class 3 & 4 Licences, Bat Low Impact Class Licence, HS2 Bat Low Impact Class Licence for Trees, HS2 Bat Low Impact Class Licence for Buildings and has been named ecologist on over 100 EPSL's, including 10 historic buildings and has successfully registered 70 BLICL's of which 15 have been historic and/or listed buildings. Jon has personally surveyed 30 churches and assisted with the mitigation measures required during remedial work.

For the nocturnal surveys Jon was assisted by the following people, who are all professionally experienced in undertaking nocturnal bat emergence and re-entry surveys:

James Whiteford MSc Cecol	Natural England Level 2 Class Licence (2015-14621-CLS- CLS), c.12 years' relevant professional experience.
Jackie Underhill PhD CIEEM	Natural England Level 2 Class Licence (2015-14790-CLS-CLS), c.15 years' relevant experience.
Amy Trewick BSc ACIEEM	Natural England Level 2 Class Licence (2018-37960-CLS-CLS), c.9 years' relevant professional experience.
Nathalie Cossa	Natural England Level 4 Class Licence, c.15 years' relevant experience.
Zoe Jackson MSc ACIEEM	c. 12 years' experience
Katie Warren MSc	Natural England Level 1 Class Licence (2021-52120-CLS-CLS), c.5 years' relevant experience.

In addition to the professional surveyors, Jenny Harris, a volunteer bat worker with *c*.30 years' experience, as well as other members of the Leicestershire and Rutland Bat Group attended the surveys in May and July.

3.1.5 Equipment

Equipment used for the daytime assessments and inspections comprised a combination of the following: a 450 lumen Lenser P7 LED hand-torch, close-focusing Nikon binoculars, a Ridgid Seesnake CA-300 endoscope, and a Canon Powershot SX540 HS digital camera for photographs.

Equipment used by the surveyors on the nocturnal surveys comprised combinations of the following bat detectors: Pettersson D980, Peersonic RPA3, Pettersson M500-384, Elekon Batlogger M, Wildlife Acoustics Echometer Touch 2 Pro and Pettersson D240x. Bat call analysis software used comprised Anabat Insight, Sonobat and BatSound.

Professional-standard infrared recording equipment supported by high-specification infrared illuminators were integral to the efficacy of the nocturnal surveys. These units comprised Sony HDR-SR12, Sony HDR-SR11 and Sony HDR-SR0 and Canon XA2 cameras with various infrared floodlights. In addition, a Guide TrackIR Pro 19 thermal scope was used on the final survey.

3.1.6 Bat Detecting and Sound Analysis: Important General Considerations

Bat echolocation calls were identified to species level via sound analyses wherever possible. It is important to note, however, that confident identification to species level is not always possible because the calls of some bats and bat species are cryptic and/or difficult to detect, and in some genera, even the most characteristic calls cannot readily be assigned to a single species. This appraisal considers the following criteria as appropriate for this study:

- The UK *Myotis* bat species *Myotis* spp. cannot be separated from each other with certainty because of the short duration, frequency-modulated echolocation calls that are characteristic of all UK bats in this genus. As such, where a Myotis bat species has been recorded during these surveys it is considered at the genus level only as a 'Myotis bat'. Two of the six Myotis bat species that breed in the UK, Bechstein's bat M. bechsteinii and Alcathoe bat M. alcathoe, are not currently known to reside in the East Midlands. For this study, unless specified otherwise, a '*Myotis* bat' is therefore considered to be one or more of the following: Natterer's bat *M. nattereri*, Daubenton's bat *M. daubentonii*, whiskered bat *M. mystacinus* and/or Brandt's bat *M. brandtii*.

- It can also be difficult to separate the calls of the two *Plecotus* bat species *Plecotus* spp. that breed in the UK: the grey long-eared bat *P. austriacus* and the brown long-eared bat *P. auritus*. The grey long-eared bat is not currently considered to be resident in the East Midlands, however, and therefore any *Plecotus* bat referred to in this report is considered a brown long-eared bat by default.

- There are three pipistrelle species *Pipistrellus* spp. of bat resident in the East Midlands: common pipistrelle *P. pipistrellus*, soprano pipistrelle *P. pymaeus*, and the uncommon Nathusius' pipistrelle *P. nathusii*. Usually, these species are readily distinguishable by their echolocation calls. However, it should be noted that where common pipistrelle calls have a frequency of maximum energy (FMaxE) at 48 Khz or above these can overlap with atypically low soprano pipistrelle calls, and where common pipistrelle calls have an FMaxE of below 41 Khz these can overlap with high Nathusius' pipistrelle calls. Therefore, where a pipistrelle call exhibits the above or where it cannot reliably be identified to species level (e.g. because it is faint or very brief) it has been assigned to the parent *Pipistrellus* genus.

- It can also occasionally be problematic to distinguish between the echolocation calls of the two bats in the *Nyctalus* genus *Nyctalus* spp., noctule *N. noctula* and Leisler's bat *N. leisleri*, and sometimes serotine *Eptesicus serotinus* as well; for example, where these large bats are recorded in cluttered surroundings or where multiple bats are present. Therefore, where one

of these difficult-to-identify 'big bat' calls cannot reliably be identified to species level it has been labelled as such.

It is also important to note that in almost any acoustic study of bats several variables affect the 'detectability' of a bat; ranging from its biology and ecology; to the environmental conditions and the condition of the acoustic survey equipment; to the type of bat detector and microphone used. These variables mean that there can be biases in the data gathered from acoustic bat surveys, particularly those that involve only automated units deployed remotely. As such, any conclusions drawn from such surveys alone should consider these biases.

3.2 Results

3.2.1 Desk study

The Leicestershire and Rutland Bat Group have been monitoring the church for many years. Jenny Harris, chair of LRBG kindly provided the following summary of results:

1. *In April 2008 I visited the church at the request of Natural England, as the north aisle required re-roofing. Following my report, this work was put in the hands of a consultant, Barry Collins, as it was considered to be too big a job for volunteers.*

2. *2 July 2008. Approximately 250 Myotis bats were counted emerging from at least two sites under eaves of the north aisle and one site on the south-west corner of the south aisle. A dead juvenile bat was found, later identified as juvenile female Daubenton's. This was determined by Dr. R. E. Stebbings in October 2008. Even now this is the only known maternity colony of Daubenton's bats known in Leicestershire and Rutland.*

3. *30 June 2009. A count of approximately 140 bats was made, but the start of emergence was missed while Barry caught several bats with a hand net as they emerged from the north-west corner of the north aisle. This was to confirm the identification of Daubenton's bats breeding at the church for the purpose of a Natural England licence for the re-roofing.*

4. *4 June 2010. Leicestershire and Rutland Bat Group (LRBG) visit; 378 bats were counted, following re-roofing in 2009.*

5. *6 July 2011. 7.30pm visit by LRBG to Brooksby Road Bridge. Approximately 50 Daubenton's bats were roosting beneath the bridge, many of which appeared to be juveniles but with adult bats also present. The bats were observed in situ by walking under the bridge. We did not handle any of the bats. It was surmised that these bats were part of the Hoby Church colony. Jools and I believe that when juvenile bats from this roost begin to fly they, and some of the adults, move to the Brooksby Road bridge over the River Wreake which is a little over a kilometre from the church, following the river. However, we have not been able to verify this. From approx. 9.15pm at Hoby church. Following our visit to the bridge, we carried out an emergence survey using night vision video monitors (Jools Partridge). 204 bats were counted.*

6. *3 July 2013 256 bats were counted*

7. *1st July 2015 139 bats were counted.*

In 2009/2010 Barry Collins undertook surveys of the church before repairs to the north aisle roof and confirmed the presence of Daubenton's bats and counted 226 Daubenton's bats emerging from the church. Barry was named ecologist on an EPS licence associated with this work.

A Light Touch Survey carried out by Matt Cook of RSK on 17th August 2017 revealed the presence of a Daubenton's bat maternity roost and common pipistrelle roosts:

> *There are droppings scattered throughout the church (and urine) but most aggregations are shown in the attached plan and photos. The droppings are of varying ages including fresh / recent. They are mainly those typical of a mediumsized Myotis bat (i.e. Daubenton's Bats here) with a smaller number typical of a smaller species (i.e. Pipistrelle bats, understood to be Common Pipistrelle here).*
>
> *The Daubenton's Bats primarily roost beneath the lead but above the sarking in the box-like void between the rafters of the north aisle. They can then access the internal space of the church where the roof of the north aisle abuts the north arcade / nave wall. Bats also roost above the sarking of the nave and the south aisle, accessed via small gaps between the sarking and / or where the roof structure abuts the internal wall (as it rests on the corbels).*
>
> *A street light was installed over the gate into the churchyard in 2013, which may have significantly reduced bat usage of the access / egress feature in this location but it is unclear why the numbers at this roost have dropped otherwise, or what the current usage of the church is. Although there is also a small maternity roost of Common Pipistrelle here in most years these numbers presumably relate to Daubenton's Bats. Jenny also reported that the church has been to the local press before about the 'bat problems' (on the survey visit the representatives were particularly upset about the damage to the brasses of the organ that was refurbished in 2007, and the war memorials).*

In 2019 Wild Wings Ecology, led by Dr Charlotte Packman, carried out a suite of nocturnal surveys involving several surveys using bat detectors and infrared cameras. In addition, bats were trapping using a harp trap:

1. ***28th May 2019, dusk survey****. 96 Daubenton's bats, 1 Myotis sp. and 9 common pipistrelles were observed emerging from the church.*
2. ***31st May 2019, dawn survey****. 63 (est.) Daubenton's bats, 36 Myotis sp. and 5 unidentified bats were observed re-entering the church.*
3. ***15th July 2019, dusk survey****. 5 unidentified bats, 35 Myotis sp. and 25 common pipistrelles were observed emerging from the church.*
4. ***4th September*** *2019, dusk survey. 3 unidentified bats, 10 Myotis sp. and 10 common pipistrelles were observed emerging from the church.*
5. ***5th September 2019, trapping survey****. Daubenton's bats – 3 adult females, 1 adult male, 2 juvenile females and 1 juvenile male were hand-netted.*

3.2.2 Daytime Bat Roost Assessments and Inspections

Six daytime roost inspections produced fairly consistent results which were also similar to those obtained by RSK Limited (LTS, Matt Cook, RSK 2017):

- A few hundred Daubenton's bat droppings on the piano and at the bottom of the east wall at the south-east corner of the north aisle (Figure 2 (a); Photographs 2 and 3). Fresh droppings were present in this location from 25th May to 22nd September 2021.
- Several hundred Daubenton's bat droppings on the floor and adhered to the wall at the north-east corner of the north aisle (Figure 2 (c); Photograph 4).
- Hundred of Daubenton's bat droppings on top of the toilet at the north-west corner of the north aisle (Figure 2 (c); Photograph 5).
- Approximately two hundred Daubenton's bat droppings on the floor under the north wall (Figure 2 (d); e.g. Photograph 6).
- A few dozen Daubenton's bat droppings at the base of the first pillar from the eastern end of the north aisle (Figure 2 (e); Photograph 7).
- Around one hundred Daubenton's bat droppings on a pew and floor in the nave (Figure 2 (f); Photograph 8).
- Approximately 50 small-sized bat droppings on the floor and table at the south-east corner of the south aisle (Figure 2 (f); Photograph 9).

Small numbers of droppings were also widely scattered through the nave and aisles but much more visible was the extent of the urine splashes and stains throughout these areas.

Photograph 2. Daubenton's bat droppings on the piano at the south-east corner of the north aisle (see Figure 2 (a))

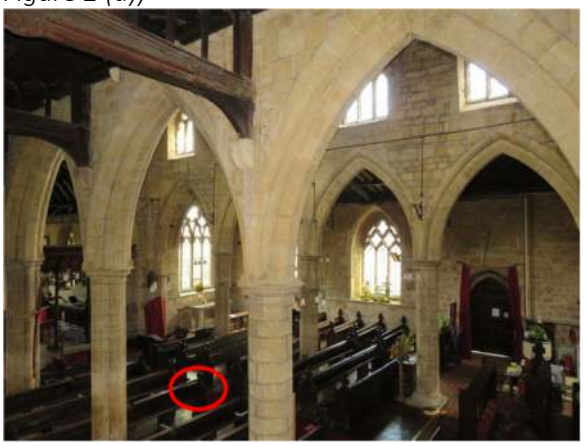
Photograph 3. Daubenton's bat droppings on the floor at the south-east corner of the north aisle (see Figure 2 (a))

Photograph 4. Daubenton's bat droppings at the north-east corner of the north aisle (see Figure 2 (b))

Photograph 5. Daubenton's bat droppings on top of the toilet at the north-west corner of the north aisle (see Figure 2 (c))

Photograph 6. Daubenton's bat droppings under the north wall in the north aisle (see Figure 2 (d))

Photograph 7. Daubenton's bat droppings at the base of the first pillar from the eastern end of the north aisle (see Figure 2 (e))



Photograph 8. Location of Daubenton's bat droppings in the nave (see Figure 2 (f))

Photograph 9. Pipistrelle bat droppings at the south-east corner of the south aisle (see Figure 2 (g))

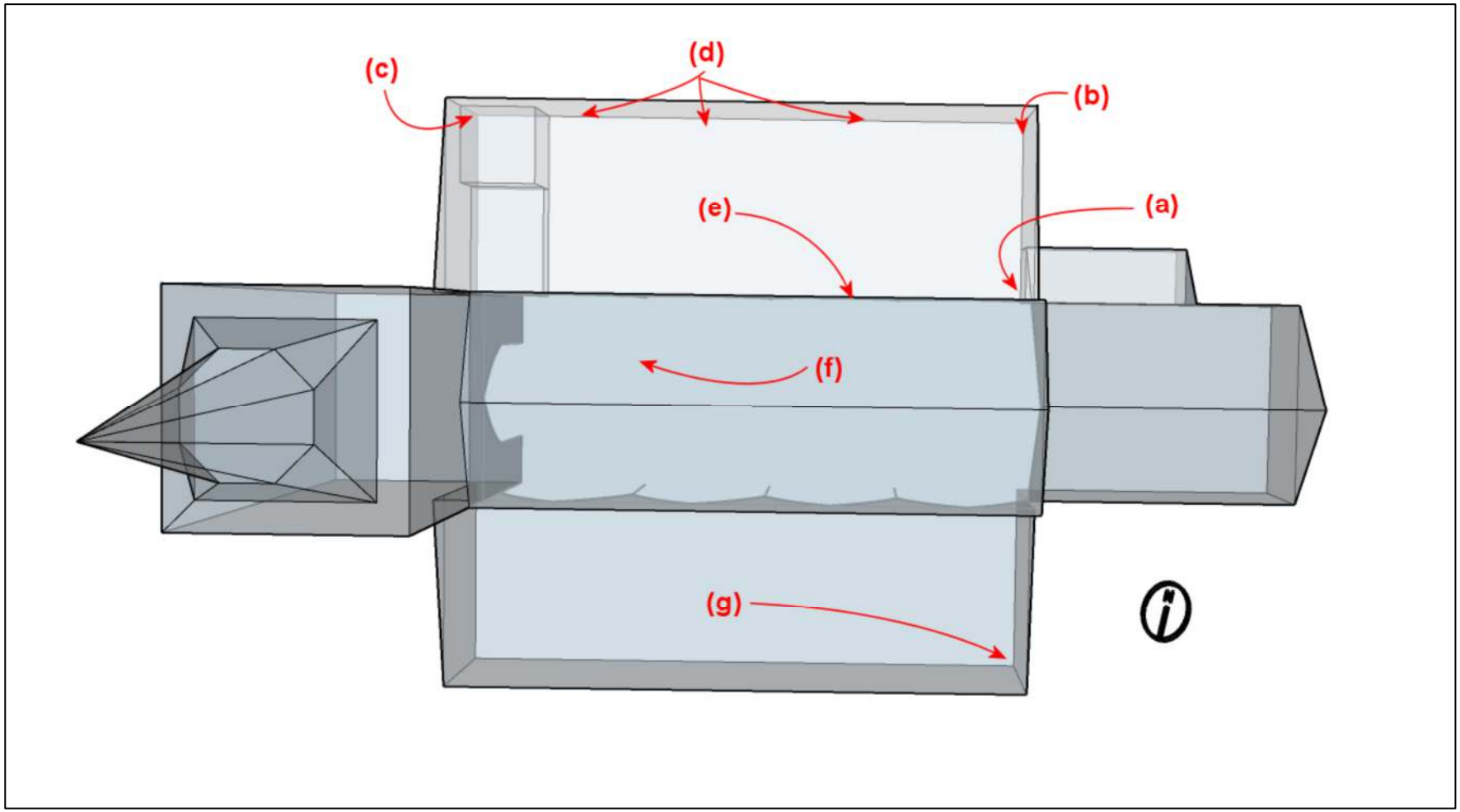


Figure 2. Plan of the church showing the location of the main accumulations of droppings from April to September 2021 (inclusive)

3.2.3 Nocturnal bat surveys

25th May 2021 – Dusk survey

Common pipistrelles bats began flying within the church interior at 21:16 with two bats being observed at a single time. Four common pipistrelles subsequently emerged from the church at 21:23, 21:30, 21:37 and 21:40 via three openings at the top of the north wall (see Photographs 10 and 11: E2, E3 and E4).

At 21:22 social calls were audible with calls being located at the top of the south-east and north-west corners of the north aisle.

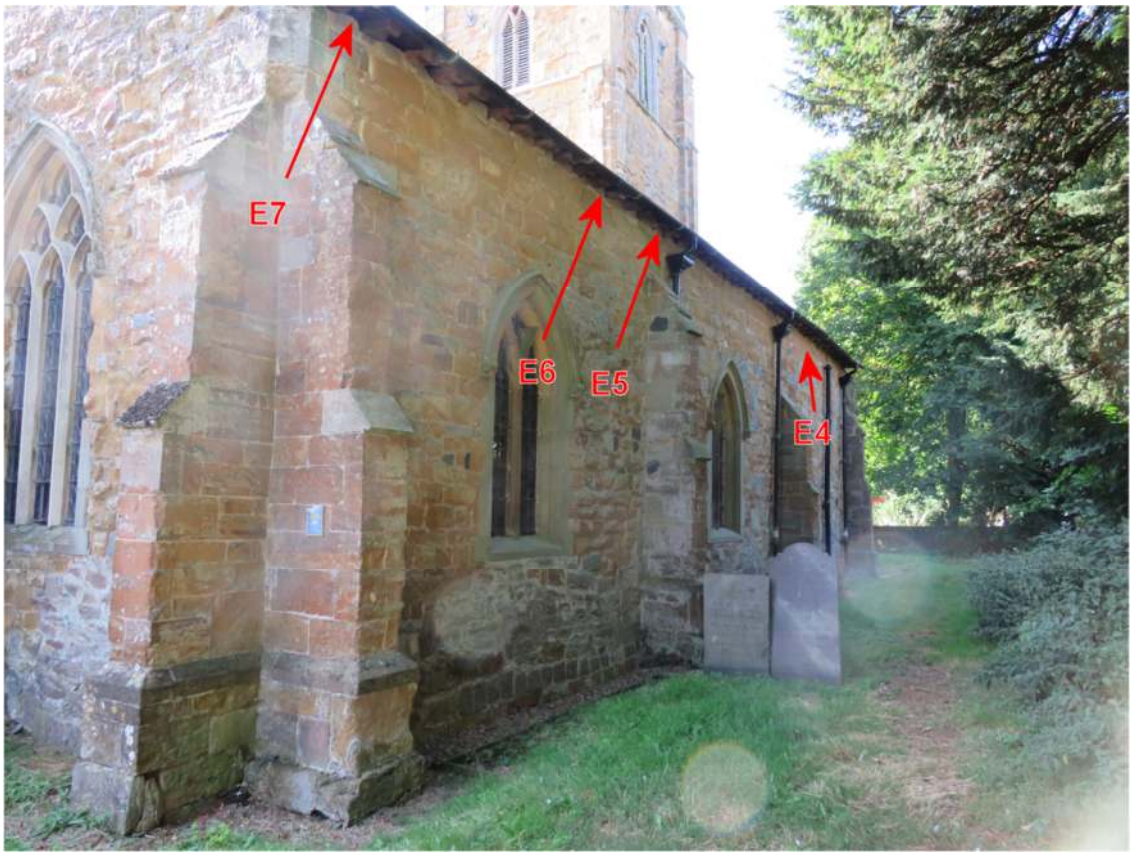
At 21:31 the first Daubenton's bat appeared within the church interior and following this bats began flying in larger numbers within the church, mainly within the north aisle but also in the nave and occasionally the south aisle. The first Daubenton's bat emerged from the church at 21:52 from the top of the wall at the north-west corner of the north aisle (Photographs 10 and 11: E1). In total 33 bats were observed emerging from this access point, the last one emerging at 22:43.

From 21:47 to 22:51, 71 Daubenton's bats emerged from the eastern end of the north wall of the aisle (Photographs 10-12: E5, E6 and E7).

Daubenton's bats generally headed eastwards along the north side of the church following emergence or south after flying around the tower.

The total emergence count for Daubenton's bats was 104 individuals.

Photograph 10. Location of bat access points along the north wall of the aisle (view from north-west corner)



Photograph 11. Location of bat access points along the north wall of the aisle (view from north-east corner)

Photograph 12. Daubenton's bat emerging from a gap above the wall at the north-west corner of the north aisle

26th May 2021 – Dawn survey

Activity was very high with bats swarming from 03:35 between the north wall and the treeline and then inside the church interior. In total, 58 bats were observed entering the church at the north-west corner of the north aisle (Photographs 10 and 11: E1) between 03:38 and 04:18. During this period 3 bats entered the church above the north wall in the centre of the north aisle (Photographs 10 and 11: E5) and 24 bats at the north-east corner (Photographs 10 and 11: E7).

The total emergence count for Daubenton's bats was 85 individuals.

21st July 2021 – Dusk survey

A single common pipistrelle was recorded flying within the church interior at 21:16.

Daubenton's bats began emerging into the church interior at 21:54. The majority of the activity within the church was located within the roof void of the north aisle although bats occasionally flew within the clerestory within the nave.

Infrared cameras were used to determine how bats leave the church and these revealed that bats land on the trusses at the east and west ends of the north-aisle, crawl over the top of the tie beam and presumably crawl along behind the beam to the access points at the north-east and north-west corners (see Photographs 10 and 11: E1, E2, E3 and E7).

Activity ceased at 22:47 although bats could still be heard chattering in the roost site located at the south-east corner of the north aisle.

In total, 37 Daubenton's bats were observed emerging from the church, 30 from the north-west corner of the aisle (Photograph 10 and 11: E1), 3 from the centre (Photograph 10 and 11: E5 and E6) and 5 from the north-east corner (Photograph 10 and 11: E7).

During the survey, a Tawny Owl was observed perched above the roost entrance at the north-west corner of the north aisle.

Photograph 13. Location of Daubenton's bat landing/exiting points along the truss at the eastern end of the nave

Photograph 14. Location of Daubenton's bat landing/exiting points along the truss at the eastern end of the nave. Bats in flight are circled.

19th August 2021 – Dusk survey

This additional survey to those originally planned was carried out to obtain more detail about the location of the roost sites within the north aisle. Two infrared cameras and two thermal scopes were deployed within the north aisle.

The location of roosts at the south-east and north-east corner of the north-aisle were immediately identified using a thermal scope (Photograph 15).

Approximately 26 bats were observed emerging from the north-west corner (8 bats) and north-east corner (18 bats) of the north-aisle giving a total count of 34 bats.

Photograph 15. Thermal image showing the two Daubenton's bat roosts at the eastern end of the north aisle.

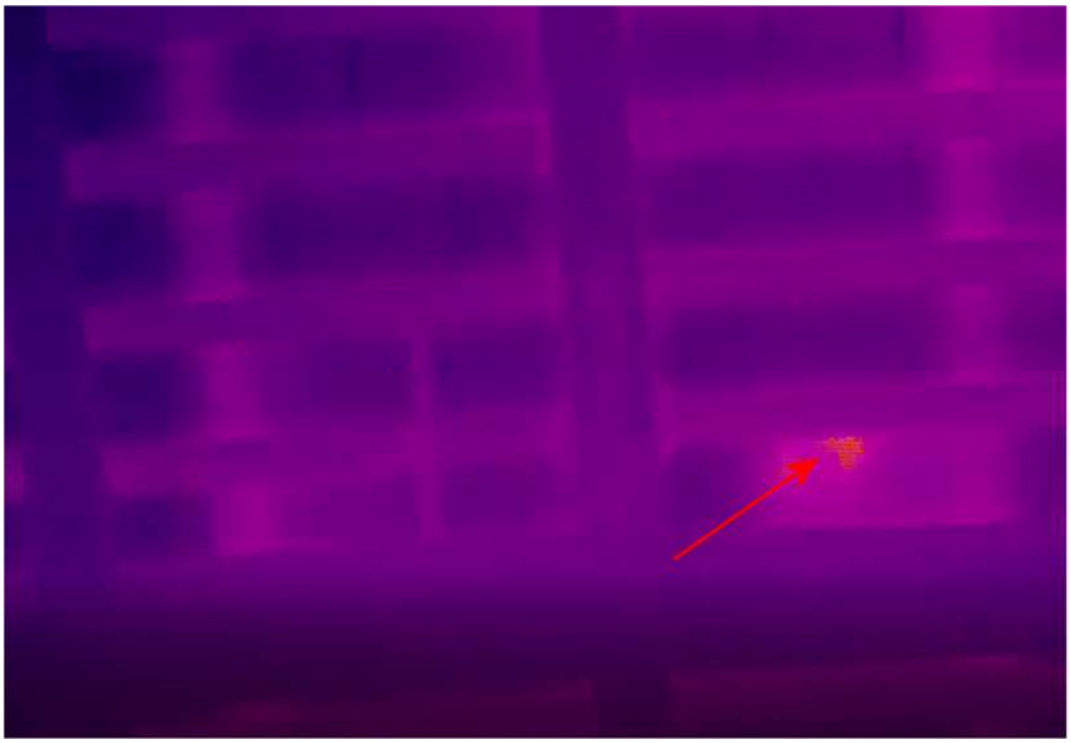
1st September 2021 – Dusk Survey

A single common pipistrelle was observed flying within the nave at 19:50 which entered a roost above the wall in the clerestory for a brief period before re-emerging (see 3.2.4 for more detail). A single common pipistrelle emerged from the access point at the north-west corner of the north aisle (Photograph 10 and 11: E1) at 20:10.

Daubenton's bats started flying within the church interior at 20:05, emerging from the roost at the south-east corner of the north aisle but also from the roost at the north-east corner (see 3.2.4 for more detail). In addition, two bats were observed emerging from a roost identified in the roof of the nave (Photograph 16).

Daubenton's bats flew for some time in the open roof void of the north aisle and occasionally in the nave with the major exit points being the north-east and north-west corners of the north aisle. However, bats landed and exited the building via several other points along the north wall (Photograph 17).

In total, 35 Daubentons bats were counted emerging from the church during the survey: 31 from the north-east corner of the north aisle, 1 from the centre and 3 from the north-west corner. However, it is possible that some of the bats that entered the top of the north wall from inside the church were missed unless they crawled along above the wall or within the ceiling space to get to these exit points.



Photograph 16. Thermal image showing the location of the Daubenton's bat roost identified in the roof of the nave

Photograph 17. Location of bat egress points at the top of the north wall of the north aisle (excluding access points at the corners)

3.2.4 Interpretation

- A large maternity colony of Daubenton's bats are roosting within the church. The population was high in late May (104 bats) and generally tailed off over the summer to the last survey in early September when 35 bats were counted – a slight increase on the previous month (Figure 3). These results are similar to those obtained by Wild Wings Ecology in 2019. However, before 2019, numbers at the church have been much higher – e.g. up to 378 in 2010. A street light was installed over the gate into the churchyard in 2013, which may have significantly reduced bat usage of the access/egress feature in this location but it is unclear why the numbers at this roost have dropped otherwise. The decrease in numbers at the end of each season is probably due to the adults leaving the roost to move to swarming sites where mating occurs.
- During the 2021 survey visits the Daubenton's bat colony roosted in 5 different locations (see Figure 4): behind the truss at the south-east corner of the north aisle (Photograph 18), above the timber sarking at the north-east corner of the north aisle (Photograph 19), behind the truss at the north-west corner of the north aisle (Photograph 20), behind the truss at the top of the first pillar from the eastern end of the north aisle (Photograph 21) and above the timber sarking in the roof of the nave (Photographs 22 and 23). The roost behind the truss at the south-east corner of the north aisle was used on every occasion during the survey visits and social calls were always heard from this location. The use of the other roost sites varied between visits.
- All of the Daubenton's bat access points were located along the top of the north wall of the north aisle (Figure 4; Photographs 10 and 11) with the most frequently used being the openings at the north-east and north-west corners (Photographs 10 and 11: E1 and E7).

- Although Daubenton's bat activity within the church after dusk (following emergence from the roost(s) before egress from the building) and before dawn (following ingress into the building and before entering the roost(s)) occurred through the nave and north and south aisles, the majority of activity occurred within the roof void of the north aisle with bats rarely dipping down below the height of the corbels supporting the trusses.
- A total of four common pipistrelles were identified roosting within the church interior and emerging from the top of the north wall of the north aisle (Figure 4). The main roost was located behind the end rafter at the south-east corner of the south aisle (Photograph 24) based on the number of droppings, but a single bat was also observed roosting above the wall plate near the eastern end of the nave (Photograph 25). The small numbers of bats indicate that it is probably a day roost. However, in 2019, Wild Wings Ecology observed 25 common pipistrelles in total which indicates that it had previously been a maternity roost.

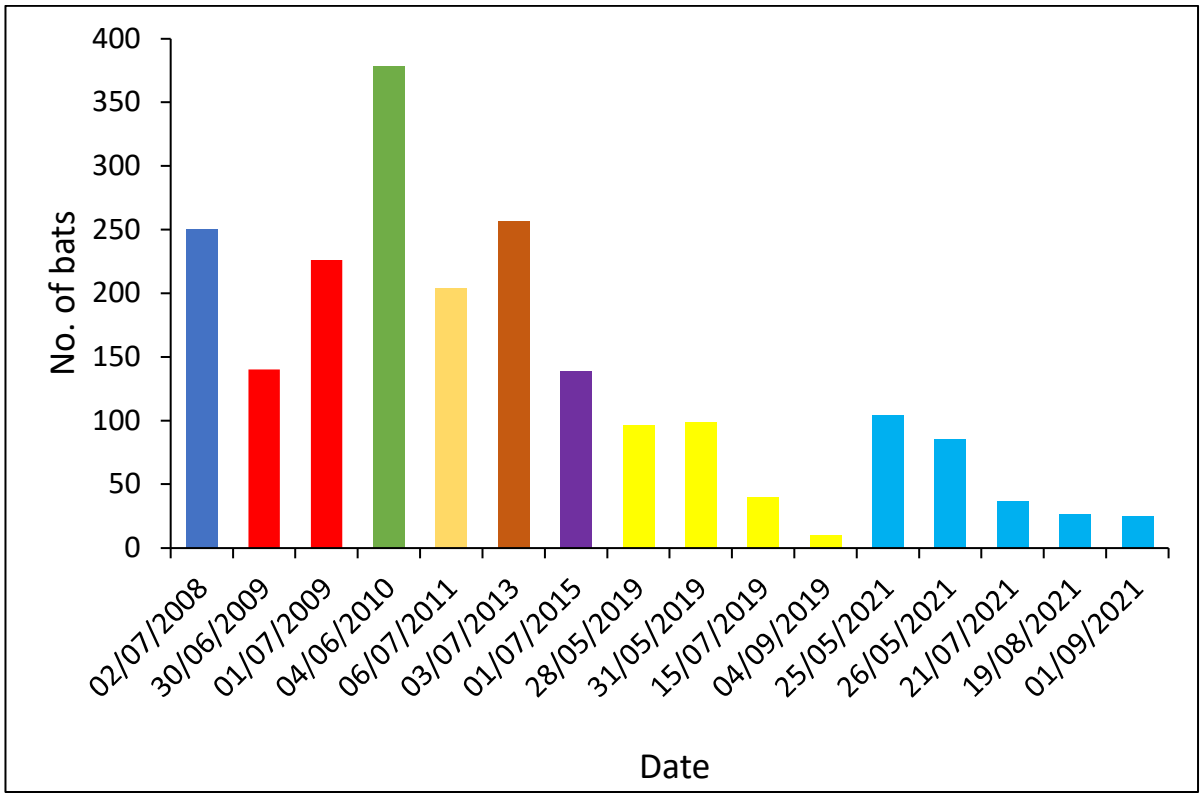


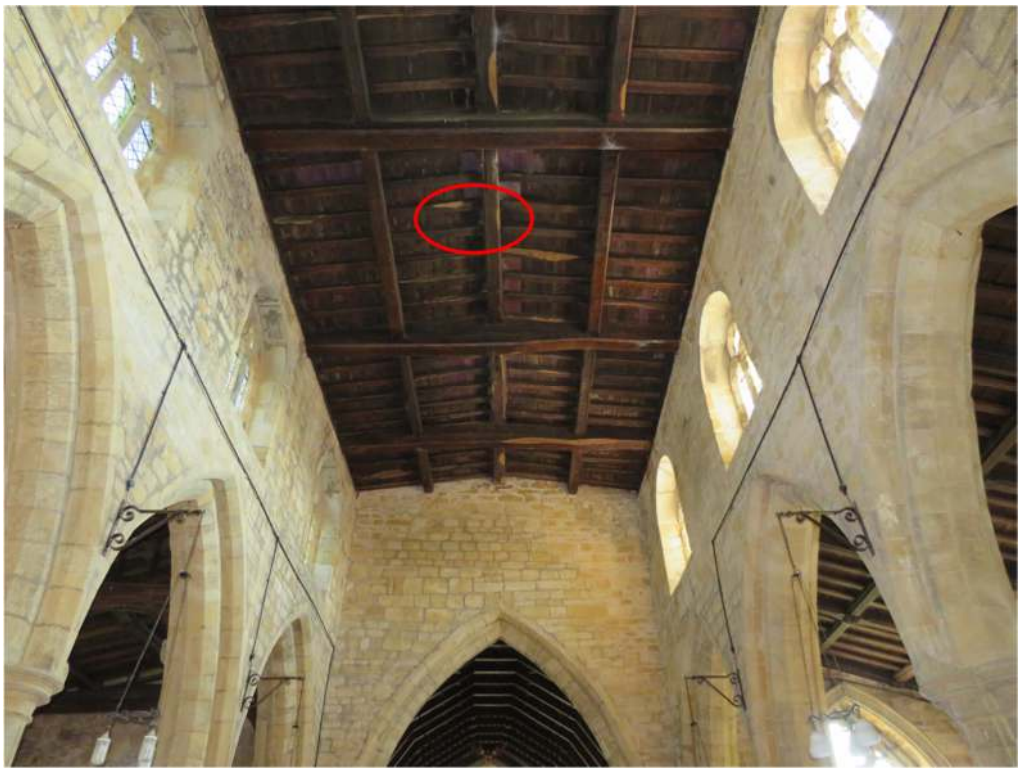
Figure 3. Daubenton's bat roost numbers from 2008 to the present day (see 3.2.1 and 3.2.3 for details). Different years are in different colours.

Photograph 18. Main Daubenton's bat roost behind the truss at the south-east corner of the north aisle

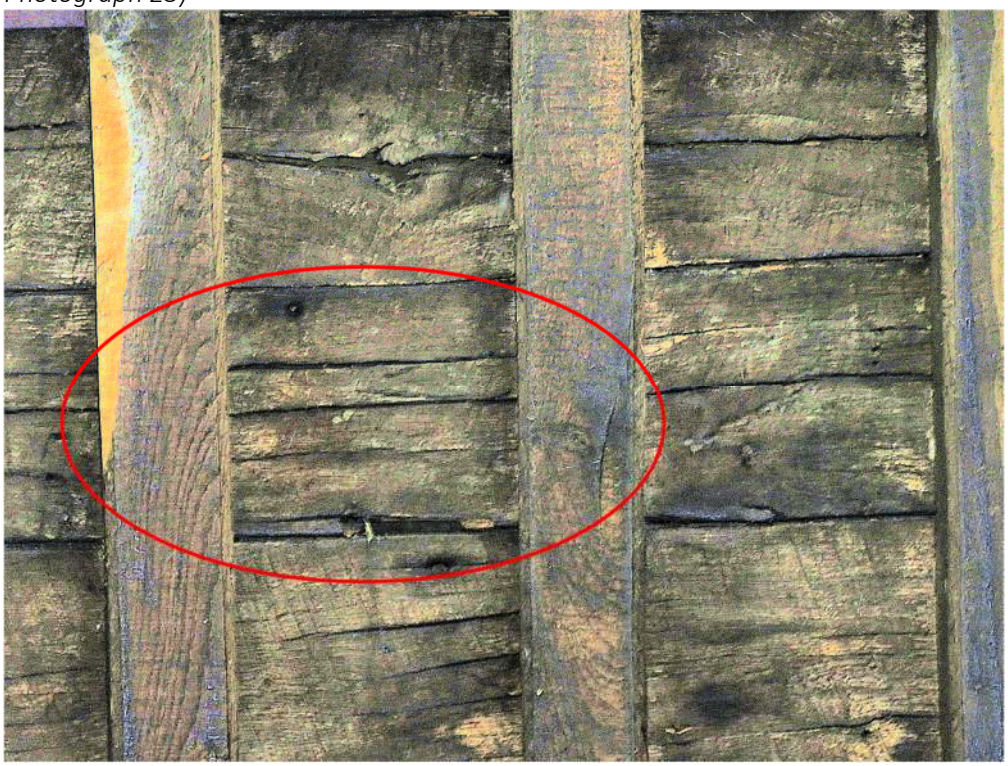
Photograph 19. Daubenton's bat roost above the timber sarking at the north-east corner of the north aisle

Photograph 20. Daubenton's bat roost behind the truss at the north-west corner of the north aisle

Photograph 21. Daubenton's bat roost behind the truss at the top of the first pillar from the eastern end of the north aisle



Photograph 22. Daubentons bat roost above the timber sarking in the roof of the nave (see also Photograph 23)



Photograph 23. Daubenton's bat roost above the timber sarking in the roof of the nave (see also Photograph 22)

Photograph 24. Common pipistrelle day roost behind the end rafter at the south-east corner of the south aisle

Photograph 25. Common pipistrelle day roost above the wall plate near the eastern end of the nave

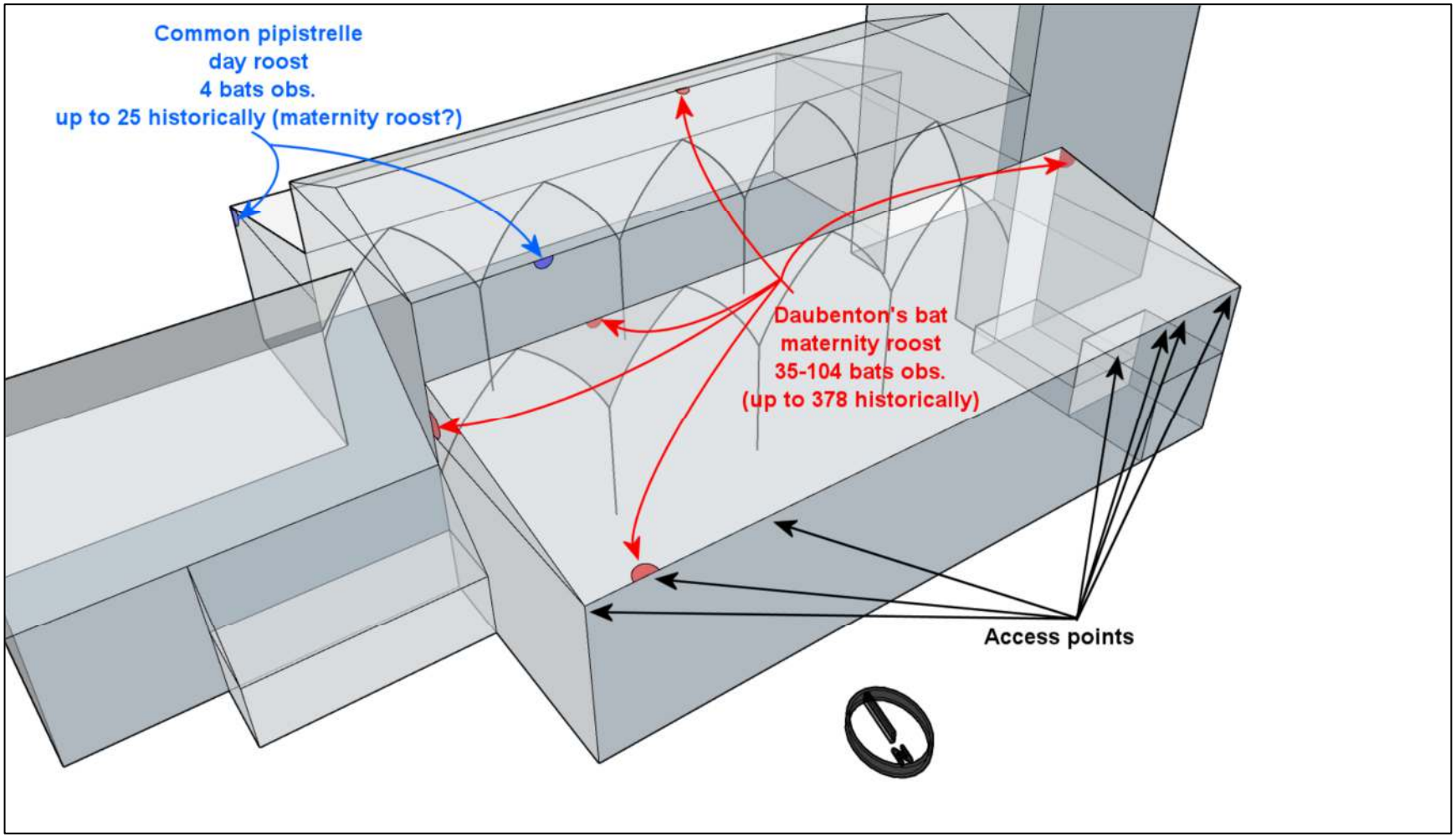


Figure 4. Plan of the church showing the location of the identified bat roosts and access points.

4 Evaluation

4.1 Bat survey effort and expertise

The suite of bat surveys undertaken at All Saints Church, Hoby was completed in accordance with current best practice guidance in respect of professional bat surveys and churches – see Collins (ed.) 2016.

This management plan has been authored by Jon Russ PhD BSc (Hons) CEnv MCIEEM who also led all of the 2021 field surveys of All Saints Church, Hoby. See 3.1.4.

4.2 Stakeholder consultation

The following provides a timeline of formal consultations with the representatives of All Saints Church, Hoby within the scope of the BiC Project:

17th August 2017 - Within round one of the BiC Project Matt Cook of RSK, Coventry met with the church's representatives (led by Vic Allsop, Church Warden) to undertake an initial Light Touch Survey (LTS). The BiC LTS requires a suitably experienced ecologist to collect physical and social information about the church; the names and roles of its representatives and architect; information about the bat species present and how bats use the church; the social and physical impacts caused by bats; and recommendations for solving the problems. This information was then collated and presented to the BiC Project team in a standardised LTS report form intended to help them construct their round two funding application to the HLF in 2018.

16th July 2019 – Within round two of the BiC Project Dr Charlotte Packman of Wild Wings Ecology met onsite with the churchwarden, Vic Allsop, and the Bats in Churches Project Engagement Officer, Rose Riddell, to get an update on bat issues at the church and the desired outcomes from the project.

14th April 2021 – Following the inconclusive result from the 2019 surveys, within a second round two of the BiC Project Jon Russ of Ridgeway Ecology Ltd (also referred to as the Bat Ecologist or RC) met onsite with Vic Allsop (the Churchwarden), Rose Riddel (Bats in Churches Project Engagement Officer), Richard Brook (Architect), Rachel Arnold (at The Churches Conservation Trust) and Candice and Garry Barker (Tree and Heritage Wardens) to gain an up-to-date understanding of: the bat impacts at All Saints Church, Hoby; the needs and requirements of the church in respect of these; to provide information about the project and the constraints around any solutions that can be offered; and to answer questions. During this meeting, the 2019 surveys and outcomes of the Wild Wings involvement in the project in 2019 and the scope, aims and programme of the 2021 bat surveys were discussed.

22nd September 2021 – Following the successful completion of the summer bat surveys of Church of St Peter a progress meeting between the church representatives and the Bat Ecologist was held onsite. The architect, BiC Engagement Officer and BiC Heritage Advisor were also present. The proposed bat mitigation measures, and the next steps regarding these, were discussed and agreed upon at this meeting.

Records of the above can be provided by the BiC Project team and/or Ridgeway Ecology Ltd upon request.

Jenny Harris of the Leicestershire and Rutland Bat Group, along with other members of the group, have been extremely helpful over the survey period providing data from previous surveys and also volunteers to assist with the emergence counts and a public event.

In addition to the above formal consultations, informal discussions regarding the previous surveys, bat impacts and proposed mitigation have been ongoing (via email and onsite) between Jon Russ, Matt Cook, Barry Collins and Vic Allsop from April 2019 to date.

4.3 Overall evaluation

Based on the above, it is considered that the level of bat survey effort and expertise and stakeholder consultation involved at All Saints Church, Hoby provides a robust platform for the recommendations contained within this report. Every effort has been made to provide a comprehensive ecological appraisal and appropriate recommendations in the context of the commissioned scope of works and the overall aims of the BiC Project.

Notwithstanding the above, however, it remains important to note that it is impossible to completely characterise or predict the natural environment as wild animals are inherently unpredictable, all habitats are subject to change, and species may colonise or vacate areas for a variety of reasons after surveys have taken place or mitigation has been implemented.

5 Consideration of Bat Management Options

The focus of the proposed mitigation for All Saints Church, Hoby is the largest bat colony that resides there: the c.100 (up to 378 historically) adult female Daubenton's bats. This maternity colony is responsible for the majority of the negative impacts on the church. These impacts comprise several sizeable accumulations of droppings below roosts and urine splashes by the bats in flight which mainly affects the nave and aisles.

The impact of the identified common pipistrelle roost are minor in comparison to that of the Daubenton's bat roost although historically the roost has been larger than it is currently. Nevertheless, the mitigation measures will include this roost as the bats are using the same roosting area and access points as the Daubentons' bat roost.

All of the bat management options considered hereafter propose to retain all of the roosts within All Saints Church, Hoby. The principal reason for not excluding either bat colony from the church is because the Favourable Conservation Status (FCS) of the local populations of the two bat species concerned could be adversely affected by such an action. In this scenario Regulation 53(9)(b) of the Habitats Regulations, 2017 (see above) states that the appropriate authority (Natural England) cannot grant a licence for any activity affecting bats (as EPS) unless they are satisfied "that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range".

In addition to the risks that exclusion would pose to the welfare and FCS of the two protected bat species it is unwarranted when other less harmful and potentially more effective options are currently available at All Saints church, Hoby - see below. The church's representatives also have no desire to exclude the bats. Furthermore, exclusion would be against the spirit of the BIC Project and its principle aim "to transform support for church communities with nationally important historic churches with protected bat roosts …… to create a sustainable partnership that will safeguard a future for bats, historic places of worship and for the people who use them". In practical terms, it is also very difficult to exclude bats from a large old church where there are many apertures that provide potential roost and roost access opportunities.

Based on the above, the following options (sections 5.2 to 5.5) were considered as potential solutions to mitigate and reduce the impacts from the bats (principally from the Daubenton's bats) at All Saints church, Hoby, while allowing the two bat colonies that reside within the fabric of the church to continue to do so. These options have been considered within the context of the suite of bat surveys undertaken at the church in 2019 and 2021, ongoing stakeholder consultation, and relevant research.

5.1 Option 1: Do Nothing

Balancing the need to protect churches and bats - our cultural and our natural heritage - is very challenging. Conserving the bat colonies that occupy churches is important because the bats may not have any alternative suitable roost sites and the loss of an important roost could significantly harm bat populations that are already threatened. At the same time, however, churches are often very important buildings historically and communally, and they can suffer significant negative effects from large colonies of bats. All Saints Church, Hoby comprises one of the main community centres in the village. The upkeep of an old church is difficult, and the mess left by large colonies of bats places an added burden on those that use it.

The Statement of Heritage Significance (SoHS) made the following statement regarding the impacts from bats on this building:

"The impact of bats is most visible in the urine spotting on the timber seating of the nave and aisles, some of which is of high significance, and on other furnishings in these areas. The chancel furnishings are less affected.".

The Church Project Plan (dated 11/12/2020) states that:

"*Bat droppings are everywhere in the church between May and September. Urine staining and pitting very obvious, particularly on organ pipes but elsewhere too. Everything needs to be covered and the war memorial is protected by Perspex sheeting. Significant carved medieval benches, rood screen, organ and Royal arms* [are] *all badly affected*".

The same document makes reference to the feelings of the local community about the bats:

"*General feeling about the bats is negative. The community feels beleaguered and resigned. In the past Natural England has been "heavy handed". Congregation is quite elderly and it is a challenge keeping the church clean and open".*

Based on this, the recommendations from the SoHS, the solutions and outcomes preferred by the church's representatives, and the wider context and principle aim of the BiC Project as described above, it is not appropriate to 'do nothing' at All Saints Church in respect of the impacts from the bats. As such, this option was rejected at an early stage.

5.2 Option 2: Catch-boards

The installation of "catch-boards" – shelves or deep trays - that could be suspended under the roost exit points within the church interior would allow the majority of the droppings to be collected and stop unsightly build-ups below. At least five would be needed under the existing roosts, suspended using a pulley system so that they could be regularly emptied.

Although this would reduce the number of droppings on the floors, pews and piano under the roosts, to a certain extent the church is already managing these accumulations using coverings, plus the new toilet unit roof collects droppings in the north-west corner. In addition, it would not solve the greater problem of droppings and urine scattered throughout the nave and aisles from bats in flight.

5.3 Option 3: Partitioning the north aisle and installing a kitchen canopy

The majority of the Daubenton's bat roosts and flight activity, and all of the access points into and out of the church, are located in the north aisle. Restricting bats to this area using curtains or something more permanent such as a glazed infill (with access doors) would probably eliminate the problem within the rest of the church. As the kitchen is located within the north aisle it would also be necessary to install a canopy over this area to catch the droppings and urine. This would need to be cleaned regularly.

Although this solution would reduce or possibly stop the problem in the rest of the church it is likely to increase the number of droppings and urine splashes in the north aisle. Furthermore, the congregation are unlikely to embrace a solution that concentrates the problem into the kitchen area,

even with a canopy. If a curtain is used it would need to be removed and washes regularly and anything more permanent would also require regular cleaning, particularly if a glazed infill is used.

Based on the above, this option has currently been rejected as a possible bat mitigation strategy for this church.

5.4 Option 4: Permanent ceiling in the north aisle

The majority of the Daubenton's bat roosts and flight activity, and all of the access points into and out of the church, are located in the north aisle and infrared video footage shows that most of the pre-emergence and post-re-entry flight is above the corbels supporting the trusses. If bats could be restricted to an enclosed roof void within the north aisle this should solve the problem with droppings and urine within the church. If installed at a suitable height, the majority of the roosts and all of the access points could be retained.

The ceiling would need to be installed just below the corbels and upright panels of different heights inserted within the top of the arches and the top of the east and west windows to prevent bats from moving into the rest of the church will be required. A hatch would be required for access to clear out the droppings at the end of each season.

A permanent ceiling, although providing long-term solution to the bat issue, is not without its problems. Installing a permanent ceiling with upright panels would probably increase humidity levels within the roof void which may have an impact upon the roof timbers. In addition, cleaning the roof void at the end of every season, or even every two years, would not be an easy matter due to the height of the void and the difficulty in accessing the interior to clean out the droppings. Supporting the additional weight due to the cleaning requirement would probably require much stronger joist supports than could be provided without carrying out major works. Finally, the permanent covering of the existing ceiling, the upright panels at the top of the arches and possibly more importantly the covering of the top of the east and west windows is unlikely to gain faculty approval. As such the option has currently been rejected as a possible bat mitigation strategy for this church.

5.5 Option 5: Temporary ceiling

The final bat management option considered for All Saints Church comprises the installation of a temporary ceiling into the north aisle. The ceiling would have all the benefits of the permanent ceiling as discussed in 5.4 but could be lowered for cleaning and removed during those times of the year when bats are no longer present within the church. It would be of the same dimensions and location as the permanent ceiling but would be suspended on a pulley system allowing it to be carefully lowered cleaned and stored. The upright edges against the arches along the southern side of the north aisle would be tapered to avoid blocking or restricting the roost sites at these corners. The material would need to be of similar strength to sailcloth but possibly more waterproof to prevent it from absorbing urine which would result in unsightly stains on the underside and would add to the cleaning costs. HD Sails has been approached for advice and have suggested the following materials:

- Stamoid Light (300g m^2) – Polyester/PVC - Waterproof coating on one side - Easy to clean – Wide variety of colours
- Stamoid Smart 1 (280g m^2) – Polyester/PVC - Waterproof coating on one side – Breathability 50g/m^2/24h - Easy to clean – Variety of colours

- Stamoid Smart 2 (340g m²) – Polyester/PVC - Waterproof coating on both sides – Breathability 38g/m²/24h - Easy to Clean – Variety of colours
- Odyssey (220g m²) – Polyester coated fabric - Breathability 87g/m²/24h – Wide variety of colours – much lighter but may show damp patches over time

An option to stop the ceiling from drooping is to use wires with a fork terminal at one end and a bottle screw at the other.

The ceiling could potentially be a feature of the church with artwork being added to it and information boards explaining its purpose.

Based on the above rationales and also those in 5.4 it is proposed that the temporary ceiling is that which is most likely to be successful and cost-effective in reducing the impacts from the bats inside All Saints Church while maintaining the FCS of both resident bat species.

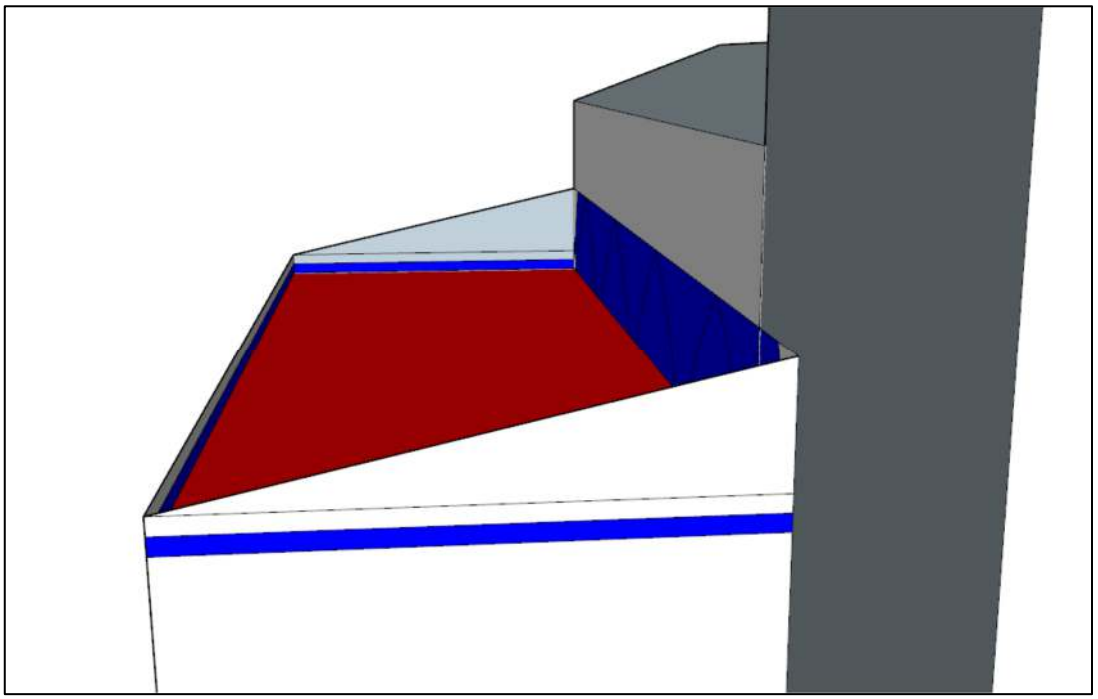


Figure 5. Plan of the north aisle (view to east) showing the temporary ceiling (red shading) and extent of the upright sections (blue shading)

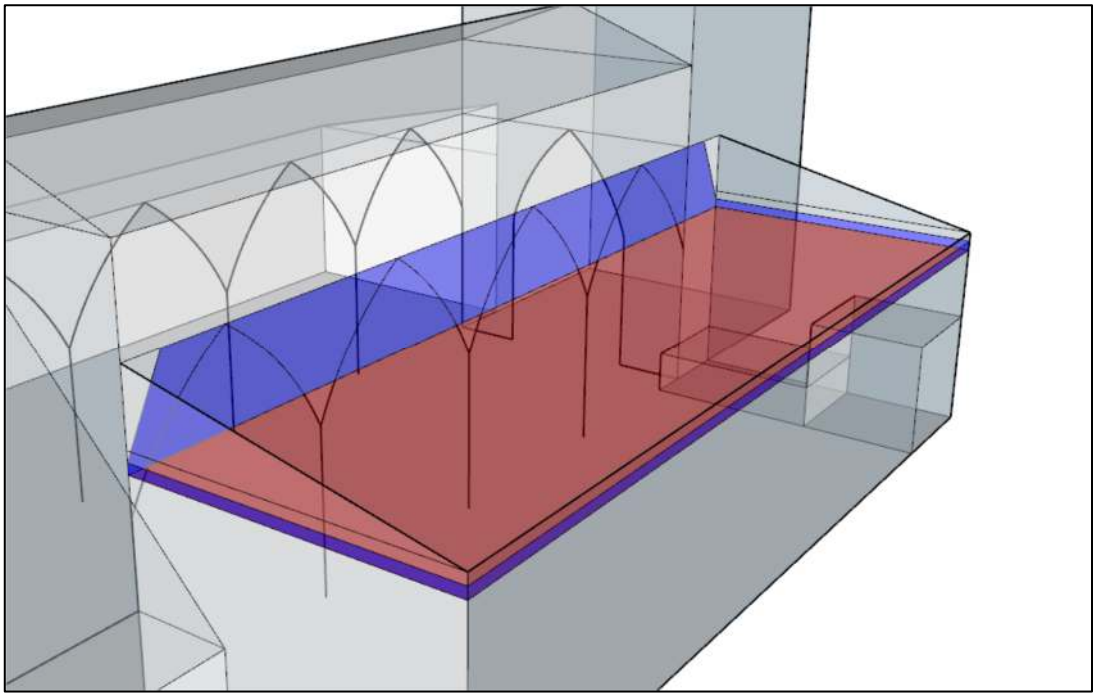
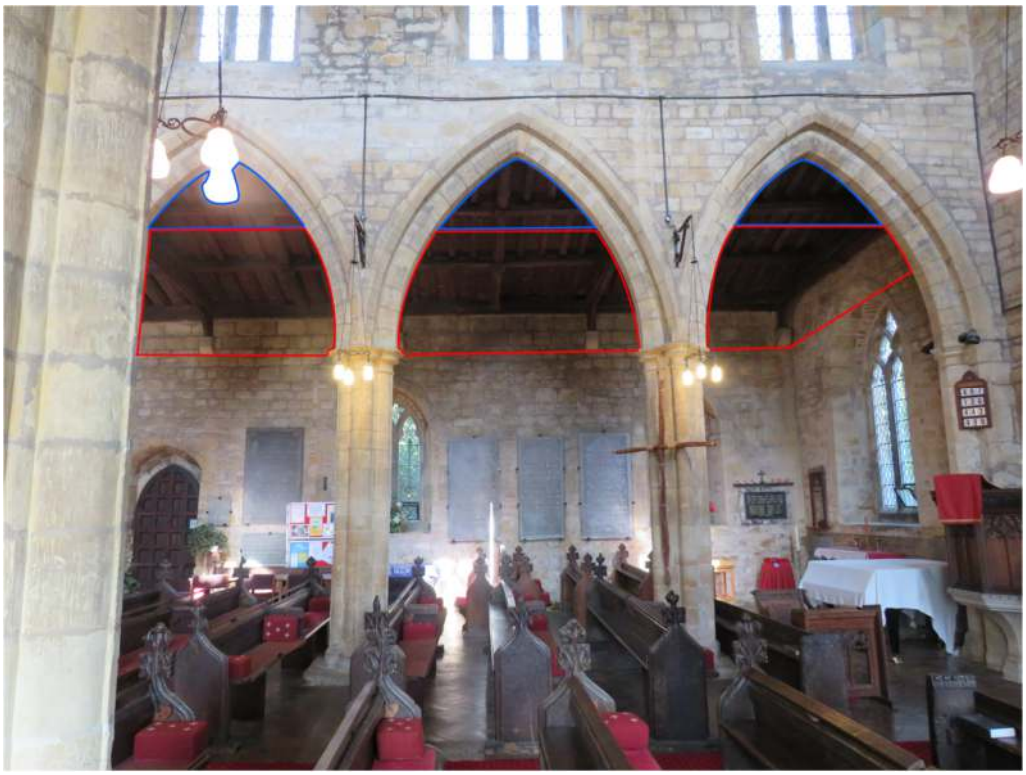


Figure 6. Plan of the north aisle (view from north-east corner) showing the temporary ceiling (red shading) and extent of the upright sections (blue shading)

Photograph 26. The north aisle (view to west showing the edges of the temporary ceiling (red) and the extent of the raised edges (blue)



Photograph 27. The north aisle (view to north) showing the edges of the temporary ceiling (red) and the extent of the raised edges (blue)

5.6 The Preferred Bat Mitigation Strategy: Temporary ceiling

The bat mitigation strategy selected for All Saints Church is a temporary ceiling, resulting in an enclosed roof space, for the Daubenton's bat maternity roost within the north aisle where the majority of the roost sites and flying activity, plus all of the access points, are currently located.

Figures 5 and 6 and Photographs 26 and 27 provide a visual representation of where the ceiling will be located. The ceiling fabric will need to be close-fitting to the walls and closely shaped around the corbels and arcade trusses. In addition, the ends against the arcade will need to be tapered so as not to restrict the access under the existing roosts. Suspension of the ceiling will probably be from the corbels and end trusses or possibly by securing fixings into the mortar joints.

The common pipistrelles will also be excluded from the church interior and will be restricted to the enclosed roof void. The roof void contains numerous features suitable for roosting by this species and in addition the access created during re-roofing work into the existing ceiling/roof cavity provide suitable roosting habitats.

6 Bat Management Objectives

6.1 Objectives

The overall aim of the management plan and bat mitigation strategy for All Saints Church is to reduce the negative impacts from the resident bats while maintaining the FCS of both the Daubenton's bat maternity colony and common pipistrelle day roost.

Based on the information that has been gathered at the church there are three key bat management objectives for Years 1-4 within the scope of the BiC Project; these are provided below. The success (or otherwise) of this bat management plan can be measured against these objectives.

Objective 1
To carefully provide a long-term roosting areas for bats within the church that retains the majority of the roosting features and flying area as well as all of the currently used access points.

Objective 2
To reduce the usage of the church interior by the Daubenton's bat maternity colony and the common pipistrelle day roost to a level that is acceptable to the church users, including diminishing the depositions of droppings and urine on important wall paintings, fittings and memorials.

Objective 3
To monitor and maintain the status of the Daubenton's bat and common pipistrelle bat roosts within the church, and thereby ensure that the FCS of the local populations of these two species is also maintained.

6.2 Achieving the Objectives

Objective 1
Two temperature and humidity data loggers will be installed in the open roof void of the north aisle in the year preceding works commencing to cover the period when the bats are using the church. This will provide baseline data for comparison with future data.

To achieve Objective 1 HDSails (http://www.hdsails.com/) have been approached to design and manufacture the temporary ceiling and to provide advice on fixings (see 5.5).

The ceiling will be installed in Year 1 in March – prior to the breeding bats returning to the church the following April – under the direct guidance of the BiCCL RC. Two temperature and humidity data loggers will be installed in the open roof void.

Due to the nature and necessary timing of the work, there is a low risk that low numbers of bats could be disturbed, potentially including some hibernating individuals. In the event that bats are uncovered at any time during the licensed work, the work will cease until an assessment can be made by the RC as to the best course of action. As a precaution, a local bat carer will be on standby throughout the work on the church roofs in case of unexpected discoveries of bats. Any bat that is uncovered during the work will be taken into care and fed and watered as required, until a suitably mild night when it can safely be returned to the site.

In Year 1 the upright edges against the top of the arcade covering the open arches will be left open during the period that bats are present in the church, allowing them to fly freely through the church interior. This is so that the bats can gradually get used to the ceiling being in place by not restricting the available flying space too dramatically which may cause the bats to abandon the church entirely. The church will be made aware that there will continue to be a problem with droppings during this period, hopefully at a much reduced level, and that some of the bats may switch roost sites to other areas of the church – most likely the nave and south aisle. The use of the church will be monitored during this period to confirm that bats are continuing to use the access points and at least some of the roosting sites within the north aisle. It is possible that bats may use access points in other parts of the church while the arch covering is open and these will be noted and sealed in subsequent years depending on the success of the mitigation during Year 1.

The upper surface of the ceiling will be lowered and cleaned at the end of the period that bats use the church and put into storage (possibly on top of the toilet unit).

In Year 2 the ceiling will be installed in March in its entirety – i.e. with the upright edges against the top of the arcade covering the open arches in place to prevent bats from moving out of the temporary enclosed roof void. Two temperature and humidity data loggers will be installed in the open roof void. Again, monitoring will occur during the summer to confirm that bats have not been adversely affected by the mitigation measures. The ceiling will be lowered in July to gauge the quantity of droppings to determine how regularly cleaning will need to occur in the future. Ideally, it will be possible to leave the ceiling place for the entire duration of the period when bats are using the church with cleaning only occurring once at the end of this period. The use of the church will be again monitored throughout the summer.

An assessment of the condition of the temporary ceiling should form part of the Quinquinennial report.

Objective 2

If the temporary ceiling is successful in excluding all the bats from the interior of the church then the problem with droppings and urine should be eliminated. It is possible that small numbers of bats may enter the church via alternative access points but it should be relatively easy to provide suitable mitigation for this by either blocking up the access points under licence or tolerating the relatively small numbers of droppings within the church interior.

The success or otherwise of the proposed bat mitigation strategy in meeting Objective 2 will be formally evaluated in consultation with the regular church users at the end of each summer from Year 1 to Year 4, for example by annually revisiting and updating the 2021 findings. More information on the actions and expenditure required to achieve Objective 2 are provided in section 7 below.

Objective 3

In the first instance, monitoring is required during the early stages of implementing the bat management plan at All Saints Church to ensure that no bats are harmed, and to inform any remedial actions if the risks to bat welfare are higher than anticipated. In such a scenario, if monitoring confirms that the colonies of Daubenton's bats and common pipistrelles have not responded as predicted to the proposed activities, and risks to the bats have increased, an adaptive management plan will need to be devised and agreed with Natural England as a matter of urgency. It may be necessary to partially or completely remove the temporary ceiling.

Beyond this, monitoring is also critical at All Saints Church to allow a comprehensive appraisal of the success or otherwise of the proposed bat mitigation strategy and to establish whether the FCS of the local populations of Daubenton's bats and common pipistrelles are being maintained. Establishing this is imperative because the law that usually protects the bats and their roosts have been derogated on this basis – see 1.4.

To achieve Objective 3 the proposed bat mitigation measures must ensure that the primary ecological function of All Saints Church for the local populations of Daubenton's bats and common pipistrelles is maintained. The current primary ecological function of the church for both species is to provide suitable conditions for maternity roosts of adult female Daubenton's bats (*c*.100) and their young and common pipistrelles (*c*.5).

The adult female Dauebton's bats begin to congregate at All Saints Church in noticeable numbers in late April/May after the hibernation and spring flux periods, presumably because the church is of a suitable temperature, sizeable and sheltered enough to allow them to give birth mid-summer and to rear their pups largely undisturbed. Once the juvenile bats are weaned and volant most of the adults leave the church in July and early August followed by the juveniles in September and possibly as late as October.

The actions that are prescribed to accompany the above objectives at St John the Baptist Church are provided in Section 7 along with the associated costs. The following criteria will be used to evaluate whether Objective 3 has been achieved:

An initial favourable outcome in Year 1 will comprise the continual usage of the access points along the north wall and the use of at least some of the roost sites in the north aisle.

In Year 2, the mitigation will be considered a success if 80 or more adult Daubenton's bats occupy them during the pre-partum period (i.e. before the end of June) in any single summer from year 2 to Year 4 and usage continues through to September indicating that the juveniles continue to remain at the church after the adults have left. This figure allows for a *c*.20% reduction in the number of Daubenton's bats using the church since 2021. In this scenario it would be reasonable to assume that the reduction in the colony size was due to natural changes such as bats not surviving the winter months and/or using alternative maternity roosts.

A sub-optimal but still acceptable outcome would comprise *c*.60 Daubenton's bats using the church during the pre-partum period in any summer from Year 2 to Year 3. This would comprise a *c*.40% reduction in the number of Daubenton's bats using the church since 2021. It would be reasonable to assume that the overall FCS of the local population was still being maintained because the bats from the church colony were occupying alternative nearby roosts such as the nearby bridge roost.

Beyond the above, the proposed mitigation would be considered largely unsuccessful if *c*.40 or fewer adult female Daubenton's bats occupied the bat compartments during the pre-partum period in any summer from Year 2 to Year 3. This would comprise a *c*.60% reduction in the number of Daubenton's bats using the church since 2021. In such a scenario it would be important to establish whether most of the colony had moved to an alternative nearby maternity roost, to determine whether the FCS of the local Daubenton's bats population had been maintained despite the apparent failure of the proposed bat management plan for the church.

It is not anticipated that the proposed bat mitigation strategy will have any adverse effects on the small common pipistrelle bat colony that occupies the church. However, this will be monitored from Year 1 to Year 4.

Importantly, success will also be measured in terms of harm to, or the death of, individual bats during the intended work, and in this regard, the proposed mitigation may be considered unsuccessful if such events occur.

7 Prescribed Actions and Costings

7.1 Year 1

Temporary ceiling – Year 1

Estimated costings have been provided by HD Sails of Birmingham for the design and manufacture of the temporary ceiling at All Saints Church. Installation costs have been estimated.

In addition, it is recommended that a 25% contingency fund be set aside in case of unexpected costs during the manufacturing and fitting of the ceiling, or for any remediation required at a later point.

BiCCL Registered Consultant Fees – Year 1

In order to ensure that the temporary ceiling is manufactured and installed to the correct specification and according to the terms of the BiCCL, the RC will attend site during the key phase of this work. The RC will also check the ceiling is fit-for-purpose following its completion.

Bat Monitoring Costs – April to September Year 1

The bat monitoring at All Saints Church is critical to allow a comprehensive appraisal of the success or otherwise of the proposed bat mitigation strategy to ensure that the welfare of bats is not at risk and to establish whether the FCS of the local populations of Daubenton's bats and common pipistrelles are being maintained.

Following the installation of the temporary ceiling, the BiCCL RC will attend the site in April to inspect it and ensure that it is fit-for-purpose, before female bats begin to gather in numbers ahead of the main parturition period.

On the same April site visit the RC will also lead an early-season emergence survey (in suitable weather for bat activity) to identify any potential issues with the new bat roost habitat and to establish if there is any early-season occupancy.

From May to August in Year 1, when bats are typically more active and their numbers are most likely to peak at the church, the monitoring effort should reflect the detailed survey effort undertaken in 2021, i.e. that required as a minimum standard to register the church for a BiCCL. It is anticipated that the comprehensive survey effort and findings from 2021 will provide an important baseline against which the initial success or otherwise of the prescribed bat mitigation strategy can be measured.

The monitoring effort required at All Saints Hoby from May to August in Year 1 will therefore consist of four nocturnal bat activity surveys of the building as follows, to be conducted in suitable conditions for bat activity:

One dusk emergence and one pre-dawn re-entry survey within the pre-parturition period (i.e. mid-May to mid-June);

One dusk emergence survey in the parturition period (i.e. mid-June to mid-July); and,

One dusk emergence survey in the post-parturition period (i.e. mid-July to mid-August).

Bat Monitoring Costs – April to September Year 2

Following the installation of the ceiling including the upright section covering the top of the arches the BiCCL RC will attend the site in April to inspect it and ensure that it is fit-for-purpose, before female bats begin to gather in numbers ahead of the main parturition period.

On the same April site visit the RC will also lead an early-season emergence survey (in suitable weather for bat activity) to identify any potential issues with the new bat roost habitat and to establish if there is any early-season occupancy.

The monitoring effort required at All Saints Hoby from May to August in Year 2 will be the same as that for Year 1:

One dusk emergence and one pre-dawn re-entry survey within the pre-parturition period (i.e. mid-May to mid-June);

One dusk emergence survey in the parturition period (i.e. mid-June to mid-July); and,

One dusk emergence survey in the post-parturition period (i.e. mid-July to mid-August).

Contingencies – Year 1 to Year 4

It is important to have a contingency fund available for All Saints Church if remedial actions are required because the proposed bat mitigation measures present an unanticipated risk to the welfare of the bats. In such a scenario the RC (or an authorised agent) will need to attend site, and an adaptive management plan will need to be devised and agreed with Natural England as a matter of urgency. Both the RC and Natural England will then need to be satisfied that the impacts to the affected bats can be returned to the predicted range.

BiCCL Registered Consultant Reporting – Year 1

Once the bat mitigation work at All Saints Church has been completed a progress report will be provided by B.A.T. Ecological to Natural England and the church in late 2020. This report will comprise pertinent information on the work completed at the church in 2020 including, for example; information on works completed to date; summary results of bat surveys and monitoring; an appraisal of the success or otherwise of the prescribed bat mitigation measures; and any recommendations for Year 2 onwards.

In addition to the above, the BiCCL annual report for All Saints Church will also be completed and submitted by the RC to Natural England in December of Year 1.

7.2 Proposed Costings – Year 1

The costs below are estimated to implement and monitor the bat mitigation strategy at All Saints Church in Year 1 as described above. Unless otherwise stated all costs stated exclude VAT where this is applicable.

Temporary Ceiling – Year 1

The costs in Table 4 have been provided by HD Sails for the design and manufacture of the temporary ceiling. Installation costs have been estimated. A 25% contingency fund has been included.

Table 4. Costs to manufacture and fit the temporary ceiling at All Saints Church

Temporary ceiling – January/March - Year 1					
Item	Description	Cost 1	Cost 2	Cost 3	Cost 4
1	HD Sails on site measuring @ £40 p/h + travel	£400	£400	£400	£400
2a	*Design and manufacture (Stamoid Light)	£2,500			
2b	*Design and manufacture (Stamoid Smart 1)		£3,540		
2c	*Design and manufacture (Stamoid Smart 2)			£4,100	
2d	*Design and manufacture (Odyssey)				£2,775
3	Support wires (Optional) – est. 8 wires required @£80 per wire	£640	£640	£640	£640
4	Installation including scaffold tower	£2,200	£2,200	£2,200	£2,200
	Total without contingency	**£5,740**	**£6,780**	**£7,340**	**£6,015**
	Total with contingency	**£7,175**	**£8,475**	**£9,175**	**£7,518**

*Note that if a printed/painted pattern is required the design and manufacture costs will be roughly double the estimated price.

BiCCL Registered Consultant Fees and Bat Monitoring Costs – Year 1

The proposed costs for bat consultancy and monitoring at All Saints Hoby are provided in Table 5. These are based on the rates and fees provided by B.A.T. Ecological Ltd. to Natural England when tendering for Phase 1 of the work at this church. Note that volunteers from the Leicestershire and Rutland Bat Group could be approached to replace some of the professional ecoligists during monitoring surveys to reduce costs.

Table 5. BiCCL RC fees and bat monitoring costs for All Saints Hoby in Year 1

BiCCL RC Fees and Bat Monitoring Costs – Year 1			
Item	Description	Timescale	Fees
1	BiC RC attendance onsite	Jan-March	£400
2	2 x Temperature/humidity loggers	Jan-March	£100
3	Daytime inspection	April	£150
4	Early-season emergence survey	April 2020	£1,115
5	Nocturnal bat surveys x 4	May to August 2020	£6,300
6	BiCCL RC reporting	December 2020	£600
	Total without contingencies:		**£8,665**
	Total with contingencies:		**£10,831**

7.3 Proposed Costings – Year 2

BiCCL Registered Consultant Fees and Bat Monitoring Costs – Year 1

The proposed costs for bat consultancy and monitoring at All Saints Hoby are provided in Table 6. These are based on the rates and fees provided by B.A.T. Ecological Ltd. to Natural England when tendering for Phase 1 of the work at this church. Note that volunteers from the Leicestershire and Rutland Bat Group could be approached to replace some of the professional ecologists during monitoring surveys to reduce costs.

Table 6. BiCCL RC fees and bat monitoring costs for All Saints Hoby in Year 2

BiCCL RC Fees and Bat Monitoring Costs – Year 2			
Item	Description	Timescale	Fees
1	BiC RC attendance onsite	Jan-March	£400
2	Daytime inspection	April	£150
3	Early-season emergence survey	April 2020	£1,115
4	Nocturnal bat surveys x 4	May to August 2020	£6,300
7	BiCCL RC reporting	December 2020	£600
	Total without contingencies:		**£8,565**
	Total with contingencies:		£10,706

7.4 Proposed Costings – Year 3 and 4

The costs at All Saints Church in Year 3 and Year 4 principally comprise those for monitoring and reporting the conservation status of the resident bats following the implementation of the prescribed mitigation measures.

The annual bat monitoring at the church in Year 3 and 4 will be based on the minimum level of monitoring effort required to comply with the BiCCL survey standards for site registration (BiC ITT Annex 2). This comprises two bat activity surveys of the whole building: one in the pre-maternity period (i.e. mid-May to mid-June) and one in the post-maternity period (i.e. mid-July to mid-August). The fees for these two monitoring surveys are based on the rates and fees provided by B.A.T. Ecological to Natural England when tendering for the initial work at this church.

In addition to the above, an inspection of the temporary ceiling will be completed each Spring by the BiCCL RC to ensure that it remains fit-for-purpose ahead of the summer period of bat activity.

Following the above, the initial report provided in 2021 by Ridgeway Ecology Ltd will be updated each December to include the results of the annual monitoring, and the annual BiCCL report will also be sent to Natural England at this time.

It is not anticipated that any further funds will be required beyond those described above. However, as a precaution, it is recommended that any unused contingency funds from previous years (see above) be ring-fenced for All Saints Church until at least the end of Year 4 in case of unforeseen circumstances.

Note that volunteers from the Leicestershire and Rutland Bat Group could be approached to replace some of the professional ecologists during monitoring surveys to reduce costs.

Table 7. Estimated costs for the annual bat roost monitoring and maintenance at All Saints Church in Years 3 and 4.

Annual Bat Roost Monitoring – Years 3 and 4			
Item	Description	Timescale	Cost
1	Annual 'fit-for-purpose' inspection of temporary ceiling and roosts	March / April	£200
2	Bat monitoring (two bat activity surveys)	May to August	£3,150
3	BiCCL RC reporting	December	£600
	Total annual costs:		£3,950

Finally, from Year 4 members of the local bat conservation group will be encouraged to assist with the monitoring at the church with a view to them continuing this voluntarily beyond Year 4 in cooperation with the churchwarden.

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9 Appendix

Natural England BiCCL Annex B – Minimum Survey Standards for Site Registration

1. The following survey standard describes the minimum survey effort required to enable registration of a place of worship for this licence (WML-CL32).

2. High-quality survey data, accurately reflecting the usage of the building by bats, must be presented representing at least one full active season.

3. Places of worship will vary considerably in size and structural complexity so methods, techniques and frequency of surveys used must be appropriate and adjusted to suit each situation. Survey methods chosen should maximise collection of information. Surveys should continue until the relevant level of information has been collected.

4. At least four surveys, comprising three dusk and one pre-dawn survey, and one thorough physical inspection, must have been completed for each place of worship applying to be registered in the season prior to starting licensable works. Larger and more complex buildings might require a greater survey effort both in terms of numbers of surveys and numbers of surveyors involved.

5. Surveys should be undertaken in the optimum period for bats (as stated in the BCT Good Practice Guidelines) between May-August. At least one dusk activity survey must be presented from each of the following periods and each survey must be conducted at least two weeks apart:
    a. May to mid-June;
    b. Mid-June to end July; and
    c. August to mid-September.

6. Survey data must be presented from the most recent active season prior to the start of works. If licensed works are planned to begin post-maternity period and before the following spring, and a full suite of surveys was conducted the previous year, an update survey will be required during early or mid-maternity period in the year that work is to commence.

7. If surveys meeting the requirements were not undertaken in the active season preceding the intended start of works, but were undertaken within 3 years, a reduced survey effort will be acceptable. In these cases a minimum of two update surveys (one of which must be a dusk survey) will be required. Update surveys should be undertaken between May and August but both may be undertaken earlier in the year i.e. pre or during the maternity period, to allow work to take place immediately prior to or after the maternity season.
8. The mandatory pre-dawn survey must be conducted during the early survey period between May and mid-June. It may be timed to take place directly after an emergence survey.

9. A surveyor must be present inside the building during a pre-dawn survey to identify internal access points.

10. If during the update surveys it is identified that usage of the building by bats has changed significantly, any pre- agreed approach to mitigation must be re-appraised.

11. All major entry and exit points for bats on the exterior of the building *must* be identified. Entry and exit points on the interior of the building *should* be identified.

12. Surveys must identify species of bat and approximate numbers of bats of each species using the building. If breeding roosts are present, this will include a clear understanding of where nursery clusters form and how these and all other roost sites within the building are accessed.

13. Special attention should be given to establishing if access to the interior void of the building is required to access roosting locations or if these locations can be accessed by bats directly from the exterior.

14. Where bats are present in the active season, it should usually be assumed that they also use the building or structure for hibernation, unless the Consultant provides evidence or reasoning to the contrary.

END OF REPORT

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