THE CHURCH OF ST MARGARET, HARDWICK, NORFOLK

BAT SURVEY AND MITIGATION PROPOSALS IN RESPECT OF THE HLF BATS IN CHURCHES PROJECT

2021 UPDATE

Prepared by:
Philip Parker Associates
White Row Cottage
Leziate Drove
Pott Row
King's Lynn
Norfolk
PE32 1DB

Prepared for:
Natural England

Report ref: P2019-40 R3 2021 UPDATE

Date: 8th October 2021

CONTENTS

DOCUMENT HISTORY				
Project reference: 2019-40		**Document title: Ecological Assessment**		
Revision	**Status**	**Originated**	**Reviewed**	**Date**
Rev. 1	Draft 1	Philip Parker	Jenny Parker	9.10.19
Rev. 2	Draft 2	Philip Parker	Jenny Parker	12.12.19
Rev. 4	2020 Update	Lisa Gabriel	Philip Parker	26.02.21
Rev. 5	2021 Update	Rebecca Easter	Philip Parker	08.10.21

THE CHURCH OF ST MARGARET – HARDWICK, NORFOLK
BAT SURVEY AND MITIGATION PROPOSALS IN RESPECT OF HLF BATS IN CHURCH PROJECT

1.0 INTRODUCTION

1.1 GENERAL

Philip Parker Associates Ltd have been instructed to undertake bat surveys and provide advice for mitigation/management options at the Church of St Margaret, Hardwick, Norfolk as part of the Heritage Lottery funded project (HLF). This report provides a summary of the surveys undertaken and mitigation/ management options to be considered.

1.2 A meeting was held with the PCC to discuss the proposals on the 9th October 2019 and a subsequent report was issued for consideration. The PCC subsequently responded with a number of comments. This updated report includes consideration of those comments and also the results of the updated surveys that were undertaken over the summer of 2020 and into 2021.

1.3 The church of St Margaret, Hardwick, Norfolk is located at OS Map grid reference; TM 223 900.

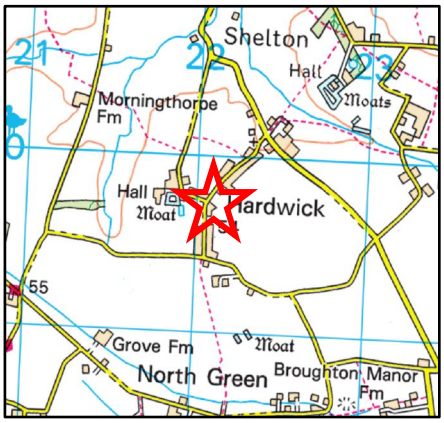


Figure 1 – Location plan
Crown Copyright and database rights 2021
Ordnance Survey

Figure 2 - Aerial photograph
Imagery © 2021 GeoEye, Getmapping plc, Infoterra Ltd & Bluesky

1.4 HISTORY OF BAT USE AT THE CHURCH OF ST MARGARET, HARDWICK

Surveys have been previously undertaken at the church in 2013-2014 to provide advice as part of the re-roofing project which covered the whole of the church. Initial surveys were undertaken by Anglian Ecology between the 29th May 2013 and 24th July 2013 and a subsequent survey was undertaken by Philip Parker Associates Ltd on 6th July 2014. A summary of the surveys is given in Table 1 below.

Table 1 A summary of surveys undertaken at the Church of St Margaret Hardwick 2013-2014

Date	Survey Type	Coverage	Species	Number and location
29th May 2013	Emergence	External and internal	Common pipistrelle	15 from N-W corner
30th May 2013	Re-entry	External and internal	Common pipistrelle	16 into N-W corner
11th June 2013	Emergence	External and internal	Common pipistrelle	24 into N-W corner
24th July 2013	Emergence	External and internal	Common pipistrelle	30 into N-W corner
6th July 2014	Emergence	External and internal	Common pipistrelle	33 (roosting at the eastern end of the nave, south side), 29 emerged N-W corner and 4 S-W corner

1.5 As part of these surveys, the access points were identified as the north-west and south-west corners of the church. The north-west access (over the wall painting) was the principal access.

1.6 The main roosting locations (as shown on Drawing D1) were at the eastern end of the nave and the south side pews (close to rood screen) and the south side of the chancel.

1.7 **PREVIOUS MITIGATION WORK AT THE CHURCH**

As part of the roof repair works undertaken in 2015, 4 bat boxes were installed at eaves level close to the identified principal bat access points in the north-west and south-west corners. These boxes had external access points but were blocked from the inside so that any bats using them would not be able to gain access to the inside of the church.

Figure 3 – 2 of the bat boxes that were installed during the roof repair works in 2015 (south side of the church)

1.8 **STATEMENT OF SIGNIFICANCE**

The Statement of Significance for the church was prepared by Richard Halsey following a site visit on the 1st February 2018.

1.9 Despite the loss of its round tower in 1770 and a restoration in 1882, St Margaret's remains a substantially medieval church within the small linear village of Hardwick. The nave is eleventh century (although unlikely to be pre-Conquest) with an interesting - if rather bodged - thirteenth century updating of the c.1140 south door. The chancel is early fourteenth century and the nave underwent a major reworking late that same century, with the windows, font and St Christopher wall painting of that time. The fine 6 arch-braced roof that runs right through from east to west was raised in the mid-late fifteenth century. Finally, the south porch, although restored, retains much fine later fifteenth century moulded brickwork retaining fragments of its lime mortar and Roman cement finish. The site and fabric therefore have **high architectural, archaeological, artistic and historic significance**.

1.10 The fifteenth century **rood screen** with its fascinating 1661 repairs is of **high significance** as is the Jacobean **family pew**, complete with its ceiling, now used as the vestry. Artistically modest, it is a rare survival. The St Christopher wall painting and adjacent medieval **font** are also of **high significance**, the fragmentary **medieval glass** and reused **altar rail balusters** of **moderate-high significance,** the **chest** of **moderate** significance**.**

1.11 The **brass** and two **table tombs** are of **moderate–high significance** as good examples of their type (and of great local historical value), the **ledgers** are of **moderate significance.** The **1882 furnishings, War Memorial** and rebuilt c.1810 **organ are of low-moderate significance,** the modern furniture is of **low significance.**

1.12 The impacts of the bats on some of these identified features can be found in Appendix A.

1.13 **ASSESSMENT OF IMPACT ON THE WALL PAINTINGS**

An assessment of the condition of the wall painting was undertaken by Dr Andrea Kerkham in August 2019 and a report was produced in October 2019.

1.14 The wall painting was the historical feature within the church that was receiving the greatest level of impact from the presence of the bats as they exited the church directly over the painting.

1.15 This report provided details some conservation measures to stabilise the condition of the painting which included the removal of bat droppings. It concluded that a desirable outcome for the wall painting would be to exclude the bats from the church as other suggested measures (such as covering the painting with a curtain) are considered to be inappropriate.

2.0 SURVEY METHODOLOGY

2.1 GENERAL

Surveys during 2019 were carried out at the church by a team of experienced surveyors, on each occasion led by Philip Parker. Surveys were carried out as far as possible following the guidelines given in the Bats in Churches Class Licence.

2.2 This sets out the minimum number and timing of surveys required, as follows:

2.3 At least one dusk survey should be carried out in each of the survey periods identified below with each survey completed at least two weeks apart. In addition, one dawn survey should be carried out in the first period – this can be carried out immediately after the emergence survey.

- Survey 1 May to mid-June
- Survey 2 Mid-June to end July
- Survey 3 August to mid-September

2.4 Update surveys have been undertaken during 2020 and 2021. The original intention had been to undertake two updated surveys in 2020 to comply with the guidance for the Bats in Churches Class licence. The first survey was delayed due to the church being closed due to Covid-19 and therefore could only take place on 29th June 2020. The results of the first survey were very different to those undertaken in 2019 and therefore it was agreed with the Bats in Churches project that an extra survey could be undertaken in case these changes remained for the rest of the summer season. A licence application is now proposed for management works to take place in April 2022 and therefore further update surveys have been undertaken in 2021.

2.5 SURVEY EQUIPMENT

Surveys have been carried out through the use of the following equipment:

Table 2 Survey methodology for the 2019, 2020 and 2021 surveys

Equipment Type	Equipment specifics	Notes	Analysis
Infra-red cameras	**Infra-red cameras** Canon XA-10 (2019 - 2021) Canon XA-11 (2019 – 2021) Canon XA-30 (2019 – 2021) Canon XF-400 (2020 – 2021) **Thermal imaging camera** Guidetrack Pro 19	Attached to a rigid tripod for stability (various makes)	Files processed and saved in Photos for MAC programme and saved on 4TB external Western Digital Drives Videos analysed using Quick Time Player

Equipment Type	Equipment specifics	Notes	Analysis
Infra-red lights	A minimum of 2 no infra-red lights were used per camera (140 led)	Set as on brackets attached a rigid tripod (various makes)	
Additional lighting	Clulite CB2 (million candle power) with additional red filter	Used to provide additional illumination on the preliminary survey and on activity surveys where it is certain it would be an impact on the bats	
Hetrodyne detectors	Batbox Duet detector x 4 Batbox Griffin x 1	Each surveyor was equipped with one or other of these detectors to enable audible monitoring of the bats during the course of the survey	
Static detectors	Anabat Express detector	Each surveyor was equipped with an Anabat Express detector to enable later checking of any recorded data	Calls analysed using Analook or Insight
Camera	Olympus TG5 camera	Used to record images on the preliminary survey	
Binoculars	Leica 8 x 40	Used to inspect for evidence and roosting sites on both the preliminary and activity surveys	
Thermometer	ETI- Hygro - Thermo Pocket sized hygrometer	Used to provide accurate temperature and humidity readings	

2.6 **SURVEY METHODOLOGY**

Surveys have been undertaken on the following dates using the following surveyors (see Table 3).

2.7 Surveyors who took part in the surveys are listed below. Where the surveyors are licensed, their licence numbers are given.

- Philip Parker 2015-14467-CLS-CLS
- Ben Jervis 2016-25752-CLS-CLS
- Christine Hipperson 2015-16077-CLS-CLS
- Karl Charters 2015-13353-CLS-CLS
- Naomi Parker 2018-34600-CLS-CLS
- Kate Garner
- Lisa Gabriel
- Emily Parker
- Rebecca Easter
- Kerys Witton (Volunteer)

Table 3 Summary of surveys undertaken

Date	Survey Type	Surveyor	Start and finish time	Weather
23rd May 2019	Emergence survey	Philip Parker Ben Jervis Christine Hipperson Lisa Gabriel Kerys Witton **Static detectors:** Located at north-east and south-west corners	20:40 – 22:40	**Weather –** Dry, warm, still, 10% cc, BF5 **Start** Ex - Temp – 18c Ex - Humidity – 60% **Finish** Ex - Temp – 15c Ex - Humidity – 75%
6th June 2019	Physical survey	Philip Parker	20:00 – 21:00	N/A
6th June 2019	Emergence survey (internal only)	Philip Parker	21:00 – 24:00	14.4c 67%
7th June 2019	Re-entry survey	Philip Parker Karl Charters Kate Garner **Static detectors:** located to the north-east and south-west corners and internally	02:45 – 04:45	**Weather –** Dry, 100% cc, still, BF5 **Start** Ex - Temp – 9c Ex - Humidity –94% **Finish** Ex - Temp – 8.4c Ex - Humidity – 98%
10th July 2019	Emergence survey	Karl Charters Lisa Gabriel Kate Garner Kerys Witton **Static detectors:** located at the north-east and south-west corners and internally	21:05 – 23:10	**Weather –** Dry, 100% cc, still, BF4 **Start** Ex - Temp – 21.5c Ex - Humidity – 68% **Finish** Ex - Temp – 16.1c Ex - Humidity – 91%
13th August 2019	Wall painting	Philip Parker – meeting with wall painting expert Andrea Kerkham	N/A	N/A
15th August 2019	Emergence survey	Philip Parker Ben Jervis Christie Hipperson Lisa Gabriel **Static detectors:** located to the north-east and south-west corners and internally	20:05 – 22:15	**Weather –** Cool, still, dry, BF5 **Start** Ex - Temp – 15.5c Ex - Humidity – 61% **Finish** Ex - Temp – 9.3c Ex - Humidity – 97%
15th August to 17th August 2019	Static survey	Static detectors Left on top of the vestry, programmed to switch on at dusk and off at dawn.	N/A	N/A

Date	Survey Type	Surveyor	Start and finish time	Weather
		However, only recorded for 3 days		
7th October 2019	Physical survey	Philip Parker	12.30 – 13.30	N/A
29th June 2020	Emergence survey	Philip Parker Karl Charters Rebecca Easter Kate Garner Lisa Gabriel	21:10 -23:10	**Weather –** 100% cloud cover, dry, windy **Start** Ex - Temp – 16.8c Ex - Humidity – 57% **Finish** Ex - Temp – 14.6c Ex - Humidity – 63%
24th July 2020	Emergence survey	Philip Parker Karl Charters Rebecca Easter Kate Garner Lisa Gabriel	20:49 -22:49	**Weather –** Dry, light breeze **Start** Ex - Temp – 17.9c Ex - Humidity – 54% **Finish** Ex - Temp – 16.8c Ex - Humidity – 83%
26th August 2020	Emergence survey	Philip Parker Emily Parker Kate Garner Lisa Gabriel	19:41 -21:41	**Weather –** Dry, still, 40% cloud cover **Start** Ex - Temp – 14.3c Ex - Humidity – 86% **Finish** Ex - Temp – 12.1c Ex - Humidity – 98%
6th July 2021	Emergence survey	Naomi Parker Karl Charters Lisa Gabriel Emily Parker	21:03 – 23:03	**Weather –** Dry, moderate breeze 10% cloud cover **Start** Ex - Temp – 13.7c Ex - Humidity – 81% **Finish** Ex - Temp – 12.1c Ex - Humidity – 98%
19th August 2021	Emergence survey	Naomi Parker Philip Parker Kate Garner Rebecca Easter	20:01 – 22:01	**Weather** – Dry, still, 100% cloud cover **Start** Ex – Temp – 20.9c Ex – Humidity – 48% **Finish** Ex – Temp – 14.9c Ex – Humidity – 96%

2.8 During the surveys, surveyors were typically located as follows:

- One internally;
- One in the south-east corner covering the south-east side of the church, eastern gable and east side of the porch;
- One in the south-west corner covering the south-west corner, tower base and west side of the porch;
- One in the north-west corner covering the north-west corner and northern elevation of the church and north side of the tower base;
- One in the north-east corner covering the north-east end of the church.

2.9 Each surveyor used a Heterodyne detector to monitor bat use in real time and also had an Anabat Express static detector to allow calls to be checked. Each surveyor also used a Canon infra-red camera and lights and were in communication via two-way radios. The internal surveyor had the benefit of 2 infra red cameras, one located at the west end of the church and the other at the east end of the church so all sections of the church were covered. During the 2021 surveys, a Guidetrack Pro-19 thermal camera was also used.

2.10 On surveys where only 4 surveyors were used, the surveyor on the north-west corner was substituted with an infra-red camera only (this being the location where no bat emergences activity had been previously recorded).

3.0 SURVEY RESULTS (2019, 2020, 2021)

3.1 The results of the 2019, 2020 and 2021 surveys are summarised in the following table and illustrated on Drawing P2019-40 D1 and D2A.

Key to roosting species

CP Common pipistrelle SP Soprano pipistrelle
SER Serotine

Table 4 Survey results

Date	Type of survey	Species Roosting	Species, number and description
23rd May 2019	Emergence	**Common pipistrelle**	**INTERNAL** **Common pipistrelle** 2 CP emerged from the second principal rafter in the chancel at the ridge (north side) 21:13 and 21:15. 2 CP emerged, 1 went up to second principal rafter in the chancel at the ridge (north side) between 22:15 and 22:30. **EMERGENCE** **Common pipistrelle** 5 CP emerged beside eastern bat box on the northern elevation between 21:15 and 21:30 (A1). 1 CP emerged from the southern elevation of the nave close to the porch at 21:19 (A5) Other bats noted foraging around the church as follows: common pipistrelle, natterer's and barbastelle.
6th June 2019	Physical Survey	Pipistrelle spp	Scattered pipistrelle type droppings throughout the church on the floor and pews. The only concentrations of droppings were on the altar (x8) and on the front pew south side (x20). Scattered pipistrelle type droppings on the walls throughout the church with noticeable concentrations in the north-west corner near to the wall painting (where the main known access) has been recorded.
6th June 2019	Emergence (internal only - set up prior to re-entry survey 7th June 2019)	Common pipistrelle Serotine	**INTERNAL** **Common pipistrelle** Night roost (Single CP) at eaves near access A5 at 22:24.

Date	Type of survey	Species Roosting	Species, number and description
			Single CP out over north door at 22:27 (A2). Single CP out via the north-west access at 23:43 and 1 back in at 23:55 (A1). Still 2 CP flying around the church when the camera was switched off at 24:00. **Serotine** Single SER emerged from junction of purlin and 4th rafter from the west at 22:05 and emerged over north door at 22:07 (A2).
7th June 2019	Re-entry	Common pipistrelle	**INTERNAL** **Common pipistrelle** Single CP present when survey commenced at 03:00. 5 CP entered the church via the north-west access (see below) and went to roost in 3 locations at the eastern end of the chancel **RE-ENTRY** **Common pipistrelle** 5 CP re-entered eaves to east of bat boxes on the northern elevation between 04:01 and 04:17 (A1). No bats entered on the southern side of the church. Regular CP activity to the north, only occasional passes to the south.
10th July 2019	Emergence	Common pipistrelle	**INTERNAL** **Common pipistrelle** 8 CP emerged from three separate locations (2 in the nave and 1 in the chancel) **EXTERNAL** **Common pipistrelle** 8 CP emerged from the north-west access between 21:45 and 22:16 (A1). No bats recorded accessing from the southern elevation Bats recorded flying around the churchyard: CP, SER
15th August 2019	Emergence	Common pipistrelle Soprano pipistrelle	**INTERNAL** **Common pipistrelle** 3 CP emerged at the western end of church at 20:34 and had left by 20:38 (A1).

Date	Type of survey	Species Roosting	Species, number and description
			4 other CP were recorded emerging from different locations within the nave roof. These were concentrated along the ridge with the occasional emergence from the lower purlins. The first bat emerged at 20:40 and the last at 22:11. **EXTERNAL** **Common pipistrelle** 1 CP emerged from south nave eaves at 20:25 (A5). 1 SP emerged from beneath a roof tile on the south-west elevation of the porch (1/3 way up, centrally) at 20:33 (A4). 1 CP emerged from eaves on south-west elevation of porch at 20:36. A CP re-entered at 22.06 (A3). 7 CP emerged from the north-western access between 20.38 and 22.09. One re-entered at 21.56 (A1) Otherwise, frequent CP activity to the north, reduced activity to the south. Occasional passes of SP, natterer's and brown long-eared.
7th October 2019	Physical survey	Pipistrelle spp	Scattered pipistrelle type droppings throughout the church (it is not known when the church was last cleaned). There were no concentrations but there was an increase in the chancel where previous roosting locations have been noted.
29th June 2020	Emergence survey	Common pipistrelle	**INTERNAL** **Common pipistrelle** 15 CP emerged from within the chancel ridge. **EXTERNAL** **Common pipistrelle** 24 CP emerged from eaves level beside the south-eastern downpipe (A6) on the southern elevation between 21:31 and 21:43. These bats were not noted internally and therefore are presumed to have roosed externally above the eaves. A single common pipistrelle emerged from the southern eaves (centrally) at 21:44 (A7). 15 CP emerged from the eastern side of the north-western external eaves bat box (A1) between 21:32 and 22:28.

Date	Type of survey	Species Roosting	Species, number and description
			Otherwise, occasional CP and SP passes around the church plus single passes of NOC, NAT and BLE during the survey period.
24th July 2020	Emergence survey	Common pipistrelle	**INTERNAL** **Common pipistrelle** 3 CP emerged into the church from the chancel and one from the west end between 21:15 – 21:30. 1 CP emerged centrally from the nave between 21:30 – 21:45. 2 CP emerged from the east end of the chancel between 21:30 and 21:36. **EXTERNAL** **Common pipistrelle** 5 CP emerged from the eastern side of the northern-western external eaves bat box (A1) between 21:27 and 21:48. 1 re-entered (but not recorded in the church) at 22:32. Otherwise, occasional CP and SP passes were noted in the church yard, plus a occasional NAT passes and a single SER observed to the north of the church.
26th August 2020	Emergence survey	Common pipistrelle Pipistrelle species	**INTERNAL** **Common pipistrelle** 1 CP emerged at 19:58 from the ridge close to the chancel before re-entering at 19:59. A further 5 CP emerged into the church (location unknown) at 20:17. **EXTERNAL** **Common pipistrelle** 3 CP emerged from the south-east corner at eaves level (A6) (behind down pipe) between 20:32 and 20:41. These bats were noted to exit from internally on this survey. 3 CP emerged from the eaves next to the north-western eaves bat box (A1) between 20:24 and 20:29. Otherwise, occasional CP and SP passes were noted in the church yard.

Date	Type of survey	Species Roosting	Species, number and description
6th July 2021	Emergence	Common pipistrelle	**INTERNAL** **Common pipistrelle** 8 CP emerged from ridge of chancel between 21:38 and 22:11. **EXTERNAL** **Common pipistrelle** 8 CP emerged from the eaves next to the eastern eaves bat box (A1) between 21:47 and 22:11. 1 CP returned over the north door (A2) but did not enter the church at 22:56. Otherwise, occasional CP and SP passes were noted in the church yard.
19th August 2021	Emergence	Common pipistrelle	**INTERNAL** **Common pipistrelle** 7 CP emerged from nave roof towards the west between 20:14 and 20:40. 3 CP emerged from the chancel roof between 20:31 and 20:55. **EXTERNAL** **Common pipistrelle** 7 CP emerged from the western side of the north-western external eaves bat box (A1) between 20:22 and 20:40. 1 CP emerged from the eastern side of the north-western external eaves bat box (A1) at 20:33. 2 CP emerged from the south-east corner at eaves level (A6) (behind down pipe) between 20:42 and 20:56. Otherwise, frequent CP foraging around the church, notably to the north. BLE, SP and NAT were also recorded foraging occasionally towards during the latter half of the survey. A single pass of a SER was recorded to the south.

3.2 SUMMARY OF THE SURVEYS

The following table sets out a summary of roosts for each species.

Table 5 Summary of bat roosting by species

Species	Date	Summary
Common pipistrelle	23rd May 2019	4 emerged internally. 5 emerged via A1 on the north-west corner of the nave. 1 emerged from southern elevation of the nave near the porch (A5).
	6th June 2019	1 night roost at eaves near access A5. 1 emerged over northern door (A2). 1 emerged from A1 and re-entered. 2 flying internally at end of survey.

Species	Date	Summary
	7th June 2019	6 roosted internally of which 5 accessed via A1 and roosted in 3 locations within chancel.
	10th July 2019	8 emerged from A1 in total all of which roosted internally.
	15th August 2019	7 emerged via A1 (roosting internally). 1 emerged externally from A3. 1 emerged externally from A5.
	29th June 2020	15 emerged internally and exited the church via the north-west access A1. 24 emerged from the south-east eaves next to the down pipe (A6) at the south-eastern corner of the chancel. These bats were roosting externally. 1 emerged centrally from eaves level on the southern elevation of the nave (A7).
	24th July 2020	6 roosted internally and 5 were seen to emerge from the north-western eaves (A1), beside the eastern bat box. 1 re-entered but was not recorded within the church.
	26th August 2020	2 roosted internally. 3 emerged from the south-east corner of the chancel (A6) at eaves level beside the downpipe. 3 emerged from A1 next to the eastern bat box on the northern-western elevation.
	6th July 2021	8 roosted internally 8 emerged from the eaves next to the eastern eaves bat box (A1). 1 returned to the church over the north door (A2).
	19th August 2021	10 roosted internally. 7 emerged from the western side of the north-western external eaves bat box (A1). 1 emerged from the eastern side of the north-western external eaves bat box (A1). 2 emerged from the south-east corner of the chancel (A6) at eaves level beside the downpipe.
Soprano pipistrelle	15th August 2019	1 emerged from under a tile on the western elevation of the porch ((A4)).
Serotine	6th June 2019	1 roosted internally and emerged over the north door (A2).

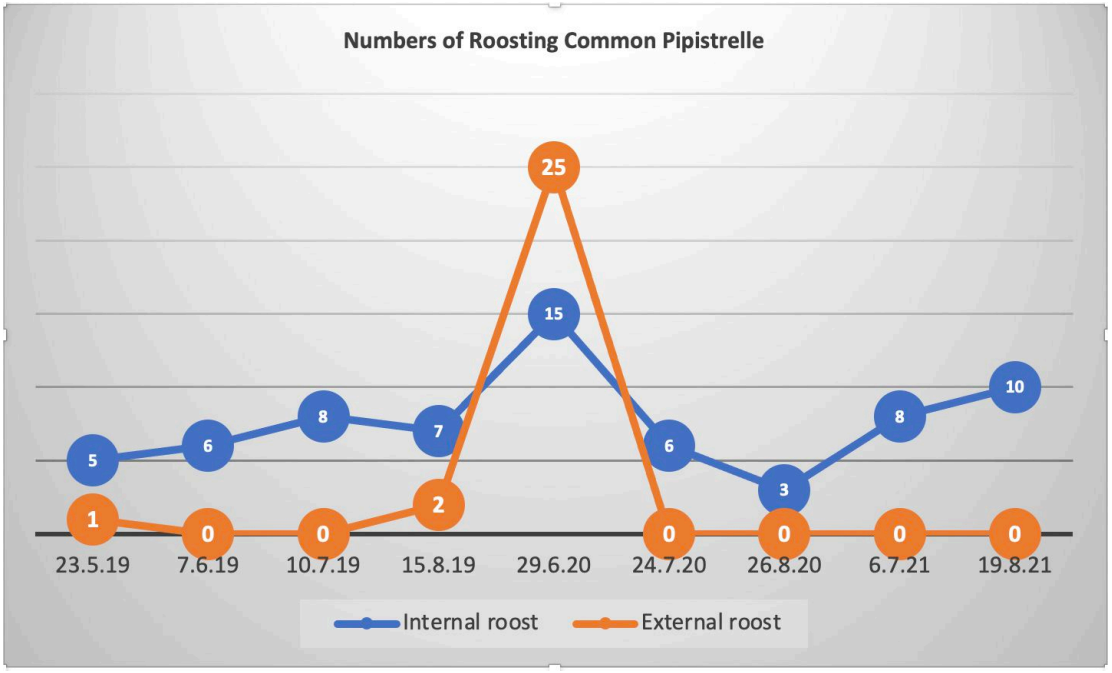


Figure 4 – Summary of common pipistrelle numbers

3.3 On all surveys, the roosting locations within the church were varied and bats emerged and returned to a number of locations within the church. This suggests that a maternity roost of common pipistrelle may no longer be present within the church – anecdotal evidence (per conv with Liam Pilgrim of the PCC) suggests that may be the case since the roof works were completed in 2015 (i.e. fewer bats than before the works were undertaken, despite access points being left open). The one exception was the survey on the 29th June 2021 when an increased number of bats were present within the church and an additional roost was recorded on the south-east corner of the chancel

3.4 No bats were noted to emerge from the northern or southern bat boxes on any of the surveys.

4.0 MITIGATION/MANAGEMENT RECOMMENDATIONS

4.1 It is not possible to safely access the southern access box from inside the church from a ladder due to the canopy present. Therefore, it is not certain whether the box has been used although no evidence has been noted on any of the surveys. The northern box has not been checked due to the proximity of the wall painting but again no bats have been recorded accessing on any of the surveys.

4.2 The numbers of bats using the church have never been significant compared to other churches (even in 2014 when a peak of 33 were recorded internally). The number of bats in the church during the 2019 – 2021 surveys are significantly lower (maximum 10) apart from the 29th June 2020 when 15 were recorded internally and 25 were recorded externally). However, this is a small church and the principal access is directly over the northern wall painting. Therefore, any perceived impacts will be more significant.

4.3 If the bats had been shown to utilise the southern box, the simplest option would be to block up the principal access points into the church and just allow access into the boxes. However, from the surveys undertaken, this does not appear to be the case. Mitigation options for consideration are therefore as follows:

4.4 **OPTION A**

Install a pole (6-7m high) in the churchyard (preferably on the northern side of the church where the main activity has been identified) but far enough from the church, so it is in full sun. Install 3 no multi chambered Kent type bat boxes which have been shown to be very effective in supporting pipistrelle roosts. A possible location and example of a bat pole is shown in figure 4 below. A meeting was held with members of the PCC on the 29th June 2020 prior to the start of the first emergence survey where the exact location of the pole was discussed and eventually agreed as per Figure 4.

Figure 5 – Possible location for pole mounted boxes

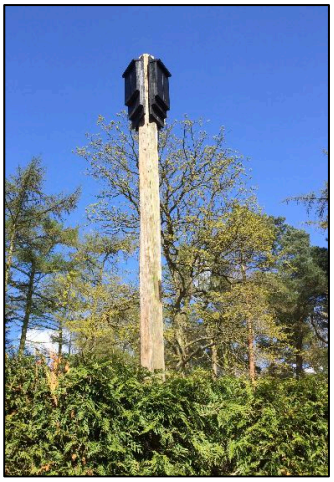


Figure 6 – Example of bat boxes erected on pole

4.5 OPTION B

Install an externally mounted triple slot Kent bat box suitable for a maternity colony on the southern elevation of the church where it would be naturally heated by the sun (positioned east of the south porch). A location close to the porch is proposed (see figure 9). The box can be stained to match the walls.

Liam – note that this is an extra proposal following the results of the 2020/21 surveys.

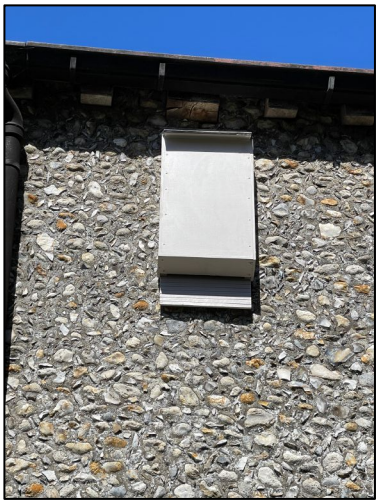


Figure 7 – Triple slot Kent Box installed on a south nave wall

4.6 OPTION C

Retain/enhance the gaps in the soffits where bats have been recorded emerging (south-east, south-west and north-west corner including the western elevation of the porch) – however, it cannot be certain that bats would not find their way into church from these locations (although

many other gaps not used by bats were blocked as part of the previous repair works) and gaps would therefore need to be blocked from the inside as part of the licence exclusion.

4.7 OPTION D

The European Protected Species Licence (EPS) mitigation guidance confirm that bat boxes are not suitable mitigation for serotine. However, discussion with Natural England on 4th October 2019 confirmed that if suitable bat boxes or roosting can be provided, given only a single bat has been recorded, this is likely to be licensable. An approach has been made to other bat workers on the Facebook group and Seth Lambiaise (Wild Frontier) confirmed that they have had serotine regularly using a Schweglar 2 FE bat box, as shown in Figure 6. It is therefore proposed that two of these box types are installed, one onto the southern elevation and one on the northern elevation, in the locations as shown on Drawing D3. Boxes can be stained to match the wall.

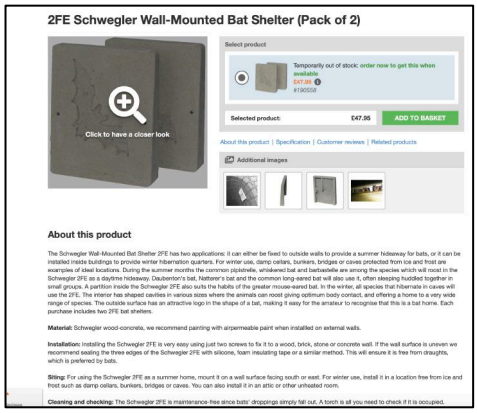


Figure 8 – Schweglar 2FE boxes (stained to match the church wall) have successfully supported roosting serotine at another mitigation site in Norfolk (small numbers)

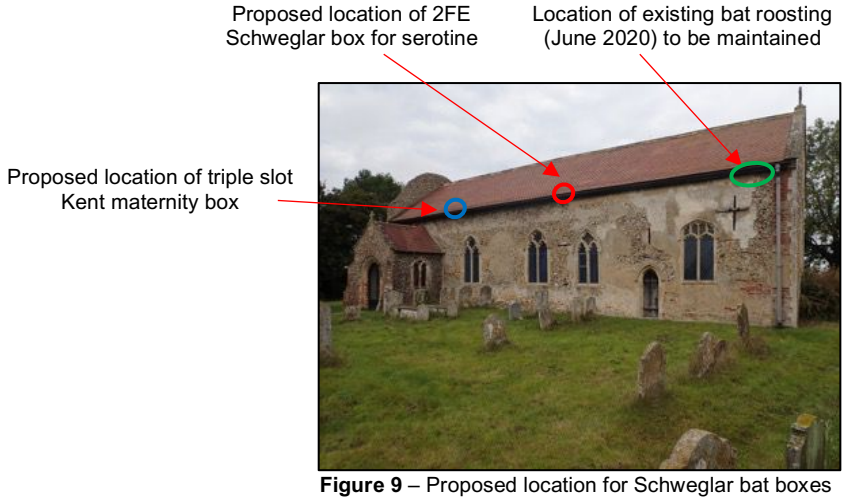


Figure 9 – Proposed location for Schweglar bat boxes

4.8 Natural England have also raised the issue that if bats are known to overwinter in the church and they are being excluded, alternative hibernation arrangements must be made with the tower being an option. Clearly this will not be possible at Hardwick (there being no tower). However, monitoring undertaken by Philip Parker Associates at Mintlyn crematorium (King's Lynn) has shown that pipistrelles will use oak Kent boxes (as proposed for the pole) throughout the winter, so it is hoped this will be acceptable to Natural England.

4.9 **EXCLUSION**

In each of the above cases, it will be necessary to exclude the bats from the principal access points (north and south) into the church as the bats are unlikely to utilise the new roosting areas if their current access points are still available. However, even if the principal access points are blocked, this does not mean that bats will be unable to access in other locations that they currently do not use, and further exclusion may be required. This will be ascertained from long term monitoring of bat evidence within the church by the PCC and the results of the monitoring surveys for up to 5 years post exclusion. It is proposed that the exclusion of the internal eaves (apart from the principle accesses) is undertaken in April 2022 (subject to licence) to give the bats a full summer season to find and hopefully start using the additional provided boxes. The exclusion of the principle access points would be undertaken in October 2022.

4.10 **PCC POSITION**

'A meeting was held on 9th October 2019 with the Rector and two other PCC members, along with the PCC's then Building Administrator and his intended successor, to discuss the potential measures described above, noting that, at that stage, the detail of Option D was not yet available. Diana Spencer, the Church of England's Bats in Churches Engagement Officer for the Eastern Region, was also present. At that meeting it was agreed that:

a) for the pipistrelle bats, Option A (the bat pole) was the preferred option;
b) for the single serotine bat recorded, further consultation would be held with Natural England about the potential arrangements
c) the PCC would regard the proposed monitoring and further exclusion as essential to its aim of protecting the church interior.

A meeting of the PCC on 10 October 2019 endorsed the above.

4.11 Subsequently, on [date to be inserted] the PCC has considered and endorsed the detailed proposal for the additional maternity box and serotine bat roost as referred to in Option B and D above. In has also confirmed again its support for Option A and for the proposed monitoring and exclusion measures. Liam – this can be updated with the additional information if approved

4.12 **FACULTY AND PLANNING**

Discussion with the Norwich DAC confirms that the installation of bat boxes as part of a bat management programme does not need a faculty approval but given the prominent location on the south wall of the church, the proposed bat boxes will require an Archdeacons Licence. (List B).

4.13 It has been confirmed that the installation of the proposed bat pole (Option A) will require planning permission and a Faculty.

4.14 In addition, the location in the churchyard may need some input from an archaeologist due to the location of graves etc.

4.15 **INTERPRETATION**

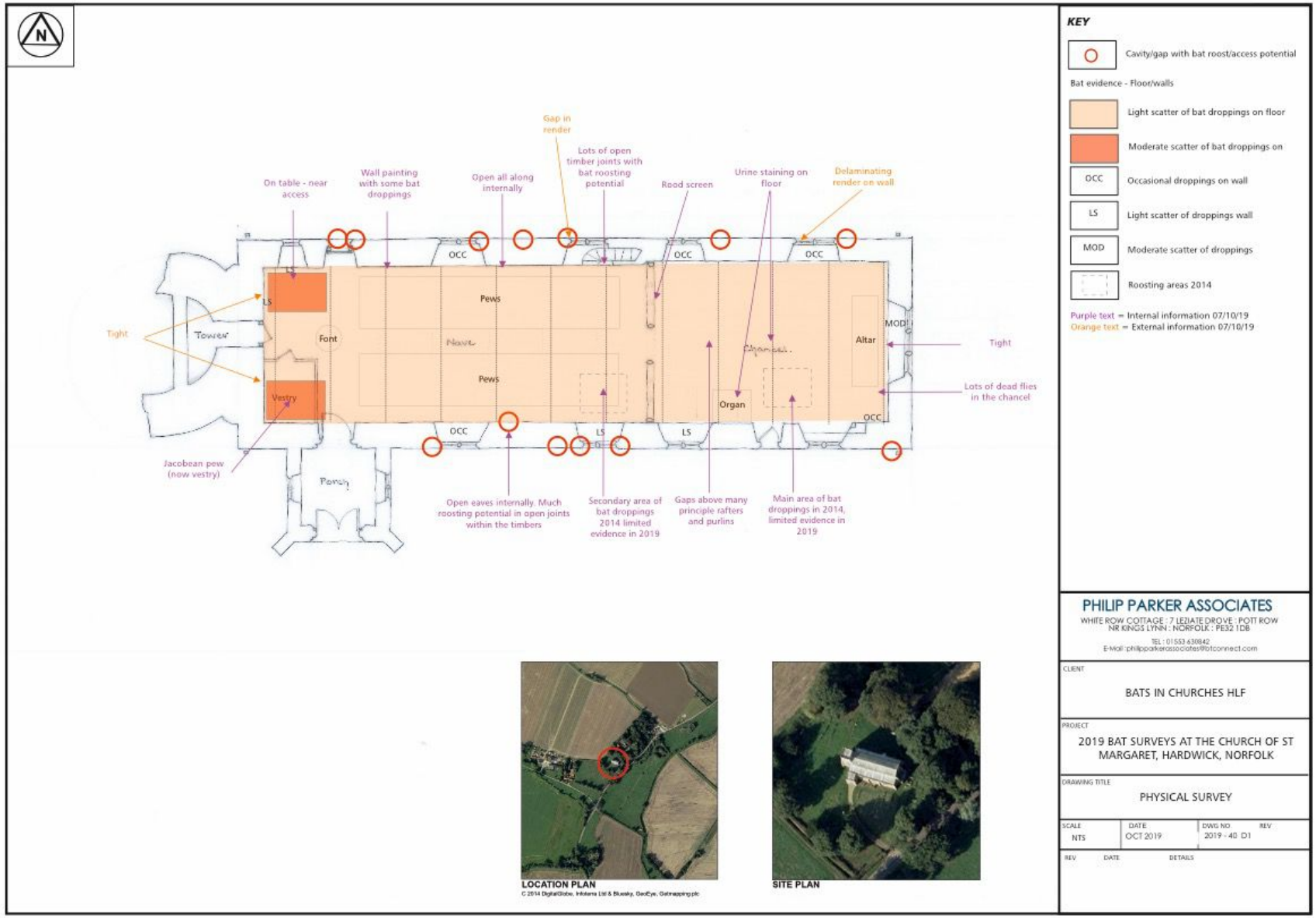
The idea of interpretation material was discussed at the meeting with the PCC. It was agreed to be a good idea to incorporate a poster in the church informing visitors of the bats present and the measure being taken to mitigate their effects on the fabric of the church. An example of a poster currently installed in a small number of other churches in Norfolk can be found in Appendix B.

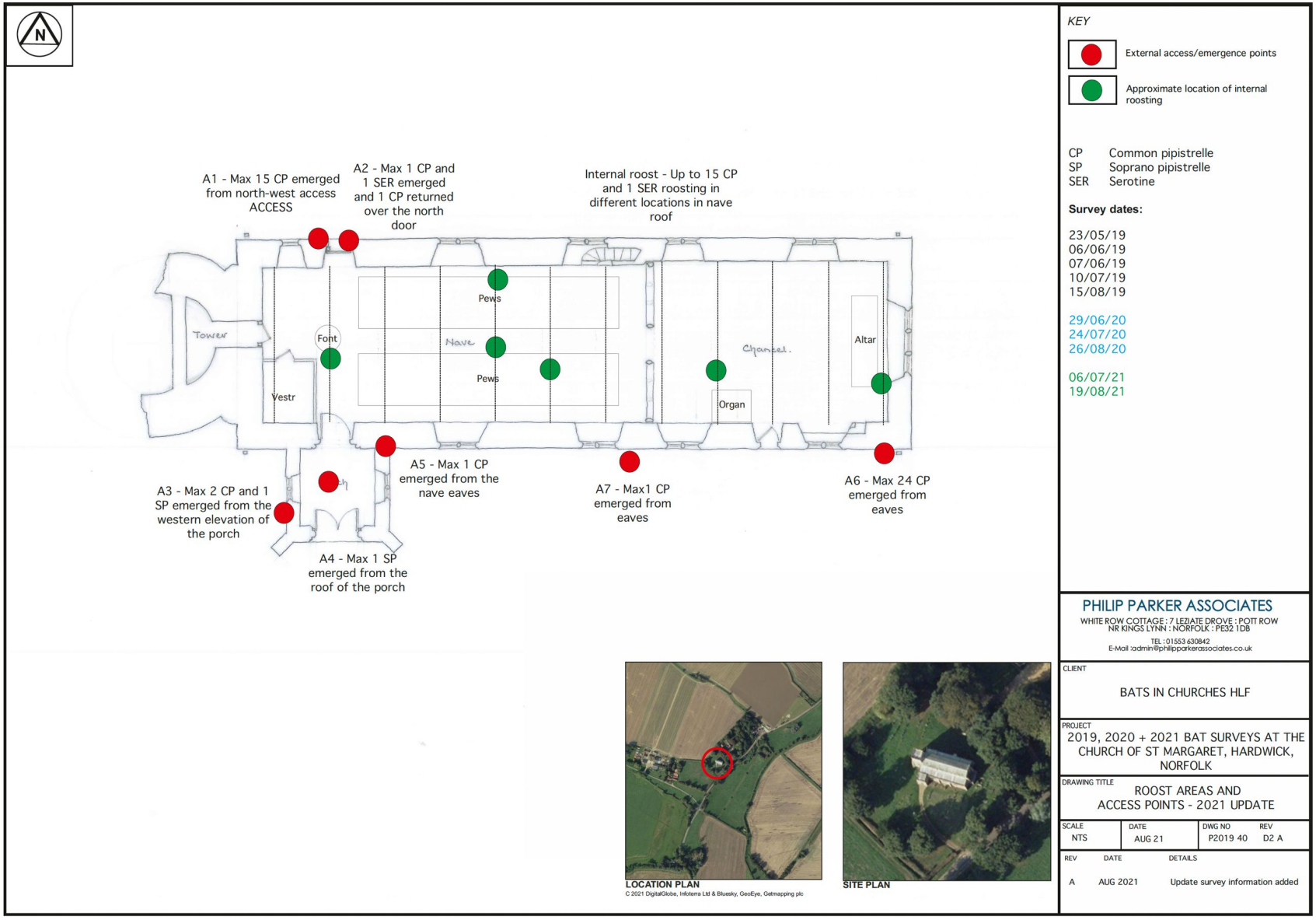
5.0 WORK SCHEDULE

5.1 The updated timescales for the various mitigation operations, staffing and approximate costings are shown in the following table. Costs are approximate (including scaffolding where appropriate) and need confirmation from architects/contractors. An estimate of long-term monitoring costs is also given.

Table 6 Draft Work Schedule

Mitigation Option	Description	Who	When	Cost (plus VAT)	Faculty	Planning permission	Long term maintenance requirements
General	Faculty/planning	PCC	Pre pole installation		Check fees	Check fees	-
	NE Licence	PPA	February/ March 2022	£500	-	-	-
	Planning permission	Fee	As part of application	£234? SNDC	-	-	-
	Monitoring	PPA	2022-2023	Up to £3000 per annum	-	-	-
		PPA/Bat Group	2024-2027	TBC (using volunteers as appropriate			
	Licence returns	PPA	2022-2027	£400 per annum			
Roost option A	Pole mounted bat boxes	PPA Contractor	April 2022	£1500 (including pole and labour)	Yes	yes	Low
Roost Option B	Kent Triple slot	PPA/ contractor	April 2022	£200 plus erection	List B	No	Low
Roost option C	Exclusion internally/ enhancement externally	April 2022	PPA/ Contractor	TBC			Low
	Close up the main access	October 2022	PP/ Contractor	TBC			
Roost option D	Schweglar 2FE boxes	PPA contractor	April 2022	£60 plus erection	List B	No	Low
Exclusion	Enhancement of eaves and internal exclusion	PPA Contractor	October 2022	TBC	No	No	Low


Gap in render
Lots of open timber joints with bat roosting potential
On table - near access
Wall painting with some bat droppings
Open all along internally
Rood screen
Urine staining on floor
Delaminating render on wall
OCC
LS
Pews
Tight
Tower
Font
Nave
Chancel
Altar
MOD
Tight
Vestry
Organ
Lots of dead flies in the chancel
Jacobean pew (now vestry)
Porch
Open eaves internally. Much roosting potential in open joints within the timbers
Secondary area of bat droppings 2014 limited evidence in 2019
Gaps above many principle rafters and purlins
Main area of bat droppings in 2014, limited evidence in 2019
KEY
Cavity/gap with bat roost/access potential
Bat evidence - Floor/walls
Light scatter of bat droppings on floor
Moderate scatter of bat droppings on
Occasional droppings on wall
Light scatter of droppings wall
Moderate scatter of droppings
Roosting areas 2014
Purple text = Internal information 07/10/19
Orange text = External information 07/10/19
LOCATION PLAN
SITE PLAN
PHILIP PARKER ASSOCIATES
WHITE ROW COTTAGE : 7 LEZIATE DROVE : POTT ROW
NR KINGS LYNN : NORFOLK : PE32 1DB
TEL : 01553 630842
E-Mail: philipparkerassociates@btconnect.com
CLIENT
BATS IN CHURCHES HLF
PROJECT
2019 BAT SURVEYS AT THE CHURCH OF ST MARGARET, HARDWICK, NORFOLK
DRAWING TITLE
PHYSICAL SURVEY
SCALE
NTS
DATE
OCT 2019
DWG NO
2019 - 40 D1
REV
REV
DATE
DETAILS


A1 - Max 15 CP emerged from north-west access ACCESS
A2 - Max 1 CP and 1 SER emerged and 1 CP returned over the north door
Internal roost - Up to 15 CP and 1 SER roosting in different locations in nave roof
Tower
Font
Nave
Pews
Pews
Chancel
Altar
Vestr
Organ
A3 - Max 2 CP and 1 SP emerged from the western elevation of the porch
A4 - Max 1 SP emerged from the roof of the porch
A5 - Max 1 CP emerged from the nave eaves
A7 - Max1 CP emerged from eaves
A6 - Max 24 CP emerged from eaves
KEY
External access/emergence points
Approximate location of internal roosting
CP Common pipistrelle
SP Soprano pipistrelle
SER Serotine
Survey dates:
23/05/19
06/06/19
07/06/19
10/07/19
15/08/19
29/06/20
24/07/20
26/08/20
06/07/21
19/08/21
LOCATION PLAN
© 2021 DigitalGlobe, Infoterra Ltd & Bluesky, GeoEye, Getmapping plc
SITE PLAN
PHILIP PARKER ASSOCIATES
WHITE ROW COTTAGE : 7 LEZIATE DROVE : POTT ROW
NR KINGS LYNN : NORFOLK : PE32 1DB
TEL : 01553 630842
E-Mail :admin@philipparkerassociates.co.uk
CLIENT
BATS IN CHURCHES HLF
PROJECT
2019, 2020 + 2021 BAT SURVEYS AT THE CHURCH OF ST MARGARET, HARDWICK, NORFOLK
DRAWING TITLE
ROOST AREAS AND ACCESS POINTS - 2021 UPDATE
SCALE NTS
DATE AUG 21
DWG NO P2019 40
REV D2 A
REV DATE DETAILS
A AUG 2021 Update survey information added

Drawing D3 – Plan of the church showing proposed location of bat boxes

APPENDIX A ILLUSTRATIVE PHOTOGRAPHS (taken 7th October 2019)

Figure 9 – View of the church from the south-east

Figure 10 – South nave soffit, previous access point noted to the west in red

Figure 11 – View of the porch showing various identified roosting locations in 2019

Figure 12 – Detail of porch eaves roosting location A3 for up to 2 common pipistrelles

Figure 13 – Location of bat boxes and principal access A1 (red) in the north-west corner of the church

Figure 14 – View of the nave roof and the top of the rood screen. The common pipistrelle's roost in various locations within the nave roof structure

Figure 15 – Detail of the rood screen

Figure 16 – Wall painting in the north-west corner of the church, close to the principal access A1. Some bat droppings were present on the wall painting, but most were aged when inspected from scaffolding with Dr Andrew Kerkham on the 13th August 2019

Figure 17 –Bat boxes on the north-western elevation (green) and principle access area (red) A1

Figure 18 – Curtain over the north door over which the serotine and a common pipistrelle exited in June 2019 (A2)

Figure 19 – North door access (externally) showing gap over

Figure 20 – One of many internal eaves details which have bat roosting potential via open joints and cavities

Figure 21 – Roof structure with the roosting area where the common pipistrelle roost was present in June 2014

Figure 22 – Old urine staining on the chancel tiles below the previously identified main roost site 2014

Figure 23 – Urine staining on floor tombs (mostly old but some fresh)

Figure 24 – Scattered pipistrelle droppings and dead flies on the altar