

A27 Arundel Bypass Bat Structures Baseline Survey

Appendix 8-7: Bat Structures Baseline Survey Report

06 August 2019

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Executive Summary

WSP was commissioned by Highways England to undertake preliminary roost assessment survey and emergence / re-entry surveys on structures within a Field Survey Area extending to 25m from the Scheme options in 2017 and to 100m from Option 5A for the A27 Arundel Bypass Scheme in 2018 to establish whether bat roosts are present. This report presents the findings of this work to date, as data collection in the field is on-going.

In total, 75 structures within the Field Survey Area were subject to preliminary roost assessment, and 30 were identified as having features suitable for roosting bats; ten were classed as having moderate suitability and 20 low suitability. The remaining 45 structures were not suitable for use by roosting bats. A further 31 structures were identified within the Field Survey Area but were not accessible for survey.

Seventeen of the structures that were suitable for roosting were accessed for emergence / re-entry surveys.

Bat roosts were confirmed within nine structures within the 2018 Field Survey Area Option 5A. Species observed emerging or re-entering during surveys were common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*.

Further surveys of structures should be undertaken where all required surveys could not be undertaken and roost characterisation surveys should be undertaken on structures where roosts were confirmed, in accordance with the Bat Conservation Trust guidelines.

Further preliminary roost assessment surveys are scheduled for 2019 to capture information on additional structures that could support roosting bats within the Field Survey Area.

1 Introduction

1.1 Project Background

1.1.1.1 The scope of the A27 Arundel Bypass scheme as described in the Road Investment Strategy ¹ is:

“The replacement of the existing single carriageway road with a dual carriageway bypass, linking together the two existing dual carriageway sections of the road”.

1.1.1.2 This corresponds to the six-kilometre section of the A27 from the A284 Crossbush junction (east of Arundel) to the west of Yapton Lane (west of Arundel). The A27 currently passes through the South Downs National Park and the town of Arundel passing over the River Arun and crossing the railway line.

1.1.1.3 The Scheme options taken forward to the Public Consultation were Options 1, Option 3 and Option 5A. These are briefly described individually below.

- **Option 1:** is a new dual carriageway from Crossbush junction south of the current A27 to the south-west of Arundel railway station, joining the A27 east of Ford Road, with a new bridge over the River Arun alongside the existing bridge. From Ford Road roundabout, which will be signalised, the existing A27 would be widened to dual carriageway
- **Option 3:** is an off-line route from the existing A27 alignment. Option 3 would consist of a new dual carriageway Option along its entire length. The proposed alignment will then be joined to the existing A27 via an extension of the existing infrastructure at Crossbush Junction. The alignment that runs westwards across the floodplain south of Tortington Priory and requires two new overbridges, firstly over the Arun Valley Railway Line, and secondly over the River Arun. Its alignment diverges north through the Binsted Woods, Tortington Common and South Downs National Park, re-joining the existing A27 at Havenwood Park. It requires four new underbridges at Old Scotland Lane, Binsted Lane, Tortington Lane and at Ford Road

¹ Road Investment Strategy: for the 2015/2016 – 2019/2020 Road Period, Department for Transport, March 2015

- **Option 5A:** is a new dual carriageway from Crossbush junction south of the current A27. The alignment crosses the Arun Valley Railway, continuing west across the floodplain, over Ford Road, running south of Tortington Priory Scheduled Monument before going north through the Binsted Wood Complex and the South Downs National Park, re-joining the existing A27 at a new junction near Yapton Lane.

- 1.1.1.4 When referring to the combined footprint of the Scheme (all options), the term 'Scheme options' is used in this report. When discussing the footprint of any single option, it is referred to by its number i.e. Option 1, Option 3 or Option 5A.
- 1.1.1.5 In October 2018, Highways England announced that a further, non-statutory public consultation would be undertaken on the Scheme (the Further Consultation) and that the Scheme would return to PCF Stage 2 (Option Selection). Through the additional studies and surveys, Highway's England came across new and important information. Highway's England wishes to ensure that forthcoming decision on the preferred route is made taking this new information into account and that consultees are given a fair opportunity to comment on the options on the basis of the information available. The further PCF Stage 2 work (Option Selection) (2018/2019) work included the identification of a suite of potential new Scheme options. The process for identifying and short-listing the new set of Scheme options for consideration in PCF Stage 2, is set out in **Chapter 3** of the Environmental Assessment Report.
- 1.1.1.6 Ecological field survey data is not available for the western sections of Options 4/5AV1 and 5BV1. This is because these sections were previously too far west of the study area to necessitate a survey. Additional survey work targeting these areas is ongoing in 2019 and will be reported on in winter 2019. The information collected for Options 1, Option 3 and Option 5A in 2017 and 2018 will be used to inform an assessment of the six Scheme options and Scheme option selection.

1.2 Ecological Background

- 1.2.1.1 The Field Survey Area (defined in **paragraph 2.1.1.1**) contains habitat considered to be of high suitability for bats², comprising continuous areas of suitable habitat that are connected to the wider landscape by numerous features such as river floodplains, tree-lined watercourses, hedgerows and areas of ancient woodland. These habitats are suitable to support a wide assemblage of bat species, including rare woodland bats that are atypical of less habitat-diverse sites.

² Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat

- 1.2.1.2 Structures such as dwellings, bridges, sheds and barns are present across the Field Survey Area, and these may be suitable for use by roosting bats for all or part of the year. Structures may be used as transitional roosts, hibernation or maternity roosts. Structural features used for roosting include roof spaces, boiler rooms and other dark spaces not in frequent use by people. Features also include the top of chimney breasts, roof beams, spaces between tiles and roof lining, gaps beneath flat felt roofs, the tops of gable end and spaces in mortise and tenon joints.
- 1.2.1.3 Two road bridges, one crossing the River Arun and one crossing the railway were also identified. Bridges often cross linear features and their verges provide commuting and foraging habitat for bats, whilst the bridges themselves can contain roosting features³ such as expansion joints, gaps at the corner of buttresses, cracks and crevices between stonework, brickwork where mortar has fallen out, drainage pipes and internal voids. Surveys of bridges were carried out using the same method as for other structures.
- 1.2.1.4 Surveys were undertaken where a structure that might support roosting bats could be affected by the Scheme options. Such structures include those that may be demolished or modified, or affected by indirect impacts such as removal of surrounding vegetation, increased exposure to lighting, or the construction of a new road in proximity.
- 1.2.1.5 WSP undertook the following bat surveys in addition to those included in this report:
- Bat activity transect surveys⁴
 - Bat static automated surveys³
 - Department for Environment, Food and Rural Affairs (Defra) Local Effects (or Crossing Point) surveys³
 - Defra Landscape Scale Effects surveys³
 - Radio-tracking surveys⁵.
- 1.2.1.6 These surveys provided a species list and confirmed roosting of the Annex II bat species Bechstein's bat *Myotis bechsteinii* and barbastelle *Barbastella barbastellus* and Alcathe bat *Myotis alcathe* close to and within the Field Survey Area. All of these roosts were located in trees.

Conservation Trust, London.

³ Mitchell-Jones, A.J., & McLeish, A.P. Ed., (2004), 3rd Edition Bat Workers' Manual. English Nature, Peterborough. ISBN 1 86107 558 8

⁴ WSP (2019) A27_ECO_04.1_BAT ACTIVITYDEFRA_ BASELINE_ISSUE01 and WSP (2019) A27_ECO_04.2_BAT ACTIVITYBCT_ BASELINE_ISSUE01

⁵ WSP (2019) A27_ECO_04.5_BAT RADIO-TRACKING_ BASELINE_ISSUE01

1.3 Aims and Objectives

- 1.3.1.1 The aim of this report is to collate baseline data on bat roosts in structures within the Field Survey Area by:
- Undertaking a detailed desk study relating to bat roosts only ⁶
 - Carrying out a preliminary roost assessment of the structures within the Field Survey Area to determine which may be suitable for roosting bats
 - Data collection of any evidence of bats roosting in any of the surveyed structures and the location (access and egress points) of any roosts present in the structures
 - Determination of the roost status, including the species and approximate numbers of bats present in any roosts identified and assessing the conservation significance of roosts in line with best practice guidelines ^{7,8},
 - Providing recommendations for further survey work to inform detailed mitigation design and for future European Protected Species Mitigation Licence application(s) should this be required.
- 1.3.1.2 The objectives of this study are to:
- Use the baseline dataset to determine the importance of the Field Survey Area (defined in **paragraph 2.1.1.1**) for roosting bats
 - Outline requirements for further survey work to inform detailed mitigation design and for future European Protected Species Mitigation Licence application(s) should this be required.
- 1.3.1.3 The results of this survey and subsequent recommendations, are included within this report. The contents of this report represent interim baseline survey findings collected at Project Control Framework (PCF) Stage 2 (Option selection).

⁶ Bat activity records and designated site data can be found within the WSP (2019) A27_ECO_04.1_BAT ACTIVITY_ BASELINE_ISSUE02 and WSP (2019) A27_ECO_04.5_BAT RADIO- TRACKING_ BASELINE_ISSUE02

⁷Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London. Section 3.7.

⁸ English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

2 Methodology

2.1 Study Area

2.1.1.1 The following study areas were used:

- Desk Study Area – bat records were obtained from the Sussex Biological Records within six kilometres of the Scheme options (hereafter the ‘Desk Study Area’). This distance was selected based on the furthest bat core sustenance zone (barbastelle bats have the largest zone at six kilometres⁹)
- The 2017 Field Survey Area is defined as a zone extending to 25 metres from the outer boundary of the Scheme options 1, 3 and 5A (hereafter the ‘2017 Field Survey Area’). This distance was selected as it incorporates any structures that might be subject to direct impacts from the Scheme
- The 2018 Field Survey Area is defined as a zone extending to 100 metres from the outer boundary of option 5A. 100 metres is considered the furthest distance over which noise and vibration, lighting or other indirect impacts is likely to affect bats. This area will hereafter be referred to as the ‘2018 Field Survey Area’.

2.2 Desk Study

2.2.1.1 Verified records of bats within the Desk Study Area were obtained from the Sussex Biological Records Centre¹⁰. The data supplied included records obtained from acoustic surveys, radio-tracking and inspection surveys, and information on roost type (e.g. hibernation, maternity or unspecified roosts) and species recorded.

2.2.1.2 This information was supplemented by a review of radio-tracking work undertaken for the Mid-Arun Valley Environmental Survey (MAVES), including the May 2016¹¹ and June 2017¹² (interim) reports. Data provided within an EIA prepared in 1991¹³ has also been used to provide background information on species presence and habitat quality.

⁹ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.). The Bat Conservation Trust, London. Section 3.7.

¹⁰ This includes records submitted by the Sussex Bat Group.

¹¹ Whitby, D. (2016) Bat Survey and Trapping Survey, Binsted Woods AEWC Ltd. Private publication.

¹² Whitby, D. (2017) Bat Survey, Trapping Survey Interim report of results Binsted Woods. AEWC Ltd. Private publication

¹³ Department of Transport (1991) A27 Arundel Bypass. Ecological Impact Assessment. Although this falls outside the 10 year cut off for consideration of data, this EIA describes the landscape of Arundel in 1991 and details the species assemblages that were present at the time. The purpose for review of this was to provide historical data on habitats and species within the wider environment and forms a background to the assessment, and was not used for inclusion with the desk study assessment

2.2.1.3 A review of the conservation status of bats present within the Desk Study Area, within the UK, and Sussex, was also undertaken to provide context to the discussion section of the report.

2.2.1.4 A review of granted European Protected Species (EPS) licences for bats was also undertaken using Natural England's MAGIC map application ¹⁴.

2.3 Field Survey

2.3.1 Preliminary Roost Assessment

2.3.1.1 Preliminary roost assessment is a detailed inspection of the exterior and interior of a structure to identify features that bats could use for roosting and to search for signs of bats. Both external and internal structure inspections were carried out where access was permitted. The method of these surveys is described below.

2.3.2 External Structure Inspection

2.3.2.1 All structures identified within the Field Survey Area were inspected, where access was permitted, to enable an assessment of their suitability to support roosting bats and to search for evidence indicating the current or historic use of the structure by roosting bats.

2.3.2.2 The method for surveying structures for bat roosts was undertaken with reference to current best practice guidance ¹⁵ and relevant sections of the Design Manual for Roads and Bridges^{16,17}

2.3.2.3 A systematic visual inspection of the exterior of the structure using binoculars was carried out to search for features which may provide potential roost features for bats. Where potential roost features were identified, their location and a brief description was recorded.

2.3.2.4 Where safe access was possible at ground-level, features were visually inspected for evidence of use by roosting bats such as droppings, urine staining, and scratch marks or characteristic staining (from fur oils).¹⁸

¹⁴ Natural England (2018) MAGIC map application, [Online] Available at: <https://magic.defra.gov.uk/magicmap.aspx> [Accessed 16/11/2018]

¹⁵ Collins, J. (ed) (2016) Bat Surveys for professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

¹⁶ Anon (1999) *Design Manual for Roads and Bridges, Volume 11: Environmental Assessment, Section 4: Assessment of Implications on European Sites*, Part 1 HD 44/09. Highways Agency.

¹⁷ Anon (1999) *Design Manual for Roads and Bridges, Volume 10: Environmental Design and Management, Section 4: Nature Conservation, Part 3 HA 80/99 Nature Conservation Advice in Relation to Bats*. Highways Agency.

¹⁸ However, it is important to note that bats often leave no visible signs of their presence on the outside of structures and that these can be removed by wet weather.

2.3.2.5 Structures were categorised according to the criteria shown in **Table 2-1**. The conservation significance¹⁹ of confirmed roosts was also stated where identified.

Table 2-1 - Roost suitability categorisation²⁰

Category	Description
Confirmed	Structure with features confirmed to be used by roosting bats either by historic records or evidence recorded during survey.
High	Structure with one or more highly suitable potential roost features capable of supporting larger roosts on a regular basis and potentially for long periods of time and/or multiple roost locations. Generally, these structures are located in proximity to highly suitable foraging and commuting habitat such that the presence of a roost is considered highly probable.
Moderate	Structure exhibiting one or more potential roost features, or multiple features with the potential to be used by individual or small numbers of bats but unlikely to support a roost of high conservation status. Surrounding area includes good quality foraging habitat for bats e.g. broadleaved woodland, tree-lined watercourses and grazed parkland, such that the presence of a roost is considered probable.
Low	Structure with one or more potential roost features capable of supporting individual or small numbers of bats opportunistically e.g. external roosting features such as fascia or soffit boards, in which bats are considered less likely to be present. Or, a greater number or variety of features located in sub-optimal habitat such that bats would be less likely to use it e.g. isolated from foraging or commuting habitats. These potential roost sites do not provide enough space, shelter, protection, appropriate conditions or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Negligible	Structure with no potential opportunities for roosting bats, or very few or minor features in an isolated or unsuitable location such that the presence of a roost is considered highly improbable. e.g. isolated from suitable foraging or commuting habitats.

¹⁹ English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

²⁰ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

2.3.3 Internal Structure Inspection

- 2.3.3.1 Structures within the Field Survey Area that were considered to be of low, moderate or high suitability for bat roosts based on external inspection were subject to internal inspection, where access was permitted and the structure was safe to enter.
- 2.3.3.2 A systematic visual inspection of the interior of the structure was made using visual observation, using a high-powered torch and an endoscope where necessary. A search was carried out for evidence including bats, droppings, urine splashes, fur-oil staining, feeding remains, squeaking noises or odour. Where potential roost features were identified, their location and a brief description were recorded.

2.4 Bat Emergence/Re-Entry Survey

- 2.4.1.1 Structures identified as being of low, medium or high suitability to support roosting bats were subject to further surveys to record bats emerging from or returning to roost. The level of survey effort was proportional to the level of suitability, as shown in **Table 2-2** below.
- 2.4.1.2 The dusk emergence surveys began 15 minutes before sunset and continued for at least 1.5 hours. The dawn return to roost surveys began a minimum of 1.5 hours before sunrise and continued until 15 minutes after sunrise.
- 2.4.1.3 The surveyors used a variety of bat detectors including: Batlogger M, Echometer touch and Petterson bat detectors to listen to and record bat echolocation calls. Surveyors mapped the flight-lines used by observed bats and noted features used to exit or enter structures. Records of bat activity not associated with emergence / re-entry were also recorded.

Table 2-2 - Recommended number of survey visits for presence/absence surveys²¹

Roost suitability	Recommended minimum number of survey visits
Low ²²	One survey visit. One dusk emergence or dawn re-entry.
Moderate	Two separate survey visits: dusk emergence and/or dawn re-entry survey to be determined on a case by case basis dependent on the features and location of the structure.
High	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. Third visit can be either dusk or dawn.

²¹ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

²² Due to the diverse ecology of bats and other factors that may influence bat presence (e.g. weather conditions at the time of survey), it is difficult to assume likely bat absence from structures categorised as low potential after one survey visit. Where applicable, internal survey has been recommended also in order further support a conclusion of likely absence.

2.5 Dates of Survey and Personnel

- 2.5.1.1 The external preliminary roost assessment surveys were undertaken by ecologists experienced in preliminary roost assessment. Internal preliminary roost assessment surveys were carried out by a licensed surveyor (Class 2, licence number: 2015-13110-CLS-CLS) whilst the emergence/re-entry surveys were undertaken by experienced bat surveyors and a licensed surveyor (Class 2). The dates of survey are shown in **Table 2-3**.
- 2.5.1.2 The preliminary roost assessment of the bridge over the River Arun was undertaken at the same time as hibernation surveys in January and February 2018 by experienced bat ecologists and a licensed surveyor.
- 2.5.1.3 A further 31 structures (one railway bridge and 30 unknown structure type) have been identified within the Field Survey Area but access permission was not granted for surveys. The location of all structures is shown in **Appendix B**²³.

²³ Structures which have not received any field surveys have been identified from aerial imagery only. Therefore, the quantity and precise location of structures may be inaccurate.

Table 2-3 - Survey dates and timing

Structure no.	Date - external preliminary roost assessment	Date - internal preliminary roost assessment	Date of bat dusk/dawn survey	Sunset / sunrise time	Start time	End time	No. of surveyors
1	19/07/2017	Not accessible	23/08/2017 30/08/2018	8:08pm 7:53pm	7:50pm 7:37pm	9:55pm 9:54pm	4
2	19/07/2017	N/A ²⁴	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
3	28/06/2017	Not accessible	24/08/2017	6:02am	4:14am	6:03am	3
4	28/06/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
5	19/07/2017	Not accessible	29/08/2017 09/08/2018 29/08/2018 ²⁵	7:55pm 05:40am 7:55pm	7:40pm 3:41am 7:40pm	9:25pm 5:56am 9:55pm	4
6	19/07/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
7	19/07/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
8	19/07/2017	Not accessible	29/08/2017	7:55pm	7:44pm	9:23pm	2
9	19/07/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
10	19/07/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
11	20/06/2017	27/09/2018	30/08/2017 ²⁶ 06/08/2018	6:12am 8:40pm	4:20am 8:25pm	6:14am 10:25pm	2
12	20/06/2017	27/09/2018	30/08/2017 ²⁷ 06/08/2018	6:12am 8:40pm	4:13am 8:25pm	6:10am 10:25pm	2

²⁴ Structure of negligible suitability or out of 2018 Field Survey Area, therefore no further survey was required

²⁵ An additional survey was completed on this structure due to droppings being identified on PRA but no emergence or re-entry during first two surveys. A third emergence/re-entry survey confirmed bat roost presence.

²⁶ Sub-optimal weather conditions during initial survey. Survey repeated to ensure accurate results.

²⁷ Sub-optimal weather conditions during initial survey. Survey repeated to ensure accurate results.

Structure no.	Date - external preliminary roost assessment	Date - internal preliminary roost assessment	Date of bat dusk/dawn survey	Sunset / sunrise time	Start time	End time	No. of surveyors
13	20/06/2017	27/09/2018	30/08/2017 ²⁸ 06/08/2018	6:12am 8:40pm	4:15am 8:25pm	6:15am 10:25pm	2
14	20/06/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
15	22/06/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
16	22/06/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
17	29/06/2017	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
18	22/01/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
20	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
21	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
22	03/05/2018	27/09/18	31/08/2018	7:49pm	7:34pm	9:50pm	2
23	27/09/2018	27/09/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
24	27/09/2018	27/09/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
25	24/07/2018	Not accessible	08/08/18	8:36pm	8:19pm	10:34pm	4
26	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
27	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
28	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
29	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
30	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
31	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
32	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible

²⁸ Sub-optimal weather conditions during initial survey. Survey repeated to ensure accurate results.

Structure no.	Date - external preliminary roost assessment	Date - internal preliminary roost assessment	Date of bat dusk/dawn survey	Sunset / sunrise time	Start time	End time	No. of surveyors
33	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
34	30/08/2018	Not accessible	30/08/2018	7:53pm	7:39pm	9:54pm	2
35	03/05/2018	Not accessible	Not accessible	Not accessible	Not applicable	Not applicable	Not applicable
36	24/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
37	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
38	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
39	03/05/2018	27/09/18	09/08/2018	5:40am	3:31am	5:56am	2
40	03/05/2018	27/09/18	09/08/2018 29/08/2018 18/09/2018	8:34pm 6:10am 7:09pm	8:18pm 4:10am 6:58pm	10:33pm 6:10am 9:13pm	3
41	03/05/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
42	04/05/2018	Not accessible	08/08/2018 28/08/2018 24/09/2018 ²⁹	5:38am 7:56pm 6:56pm	3:39am 5:42pm 6:41pm	5:54am 7:57pm 8:56pm	3
43	04/05/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
44	04/05/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
45	04/05/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
46	04/05/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
47	03/05/2018	Not accessible	09/08/2018 28/08/2018	5:40am 7:56pm	3:38am 7:42pm	5:53am 9:57pm	3
48	26/07/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible

Structure no.	Date - external preliminary roost assessment	Date - internal preliminary roost assessment	Date of bat dusk/dawn survey	Sunset / sunrise time	Start time	End time	No. of surveyors
49-62	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
63	24/07/2018	Not accessible	29/08/2018	6:10am	4:10am	6:25am	2
64	24/07/2018	Not accessible	29/08/2018	6:10am	4:11am	6:26am	2
65-70	24/07/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷
71	27/09/2018	27/09/2018	Not accessible	Not accessible	Not accessible	Not accessible	Not accessible
72-76	27/09/2018	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷	N/A ²⁷

2.6 Notes and Limitations

- 2.6.1.1 Weather during the dawn re-entry surveys of the three timber structures (structures 11, 12 and 13 respectively) was sub-optimal during survey on 30th August 2017. Surveyors described conditions as being very windy for the duration of the survey with intermittent rain throughout. These conditions are likely to reduce bat activity and may prevent bats from emerging or cause them to return to roost prematurely prior to the re-entry surveys. These surveys were therefore repeated in 2018 during optimal weather conditions and the updated results are provided within this report.
- 2.6.1.2 Due to access restrictions 31 structures were not subject to preliminary roost assessment within the 2018 Field Survey Area. Due to inconsistent access permissions, all recommended surveys could not be completed on 25 structures of the 75 structures which were subject to preliminary roost assessment. Surveys in 2018 were carried out within the 2018 Field Survey Area. Therefore, further survey is recommended in 2019 to complete all outstanding. All structures and their assessed roost suitability are listed in **Appendix B**.
- 2.6.1.3 Structures in urban areas within the Field Survey Area (defined as the area adjacent to the current A27 in Arundel) were not included in these surveys.

3 Results

3.1 Desk Study

3.1.1 Species Records

- 3.1.1.1 The desk study returned 564 bat records within the Desk Study Area, 162 of which were roost records, 56 of bat roosts in structures. All records are shown in **Appendix A**. Five additional roosts within structures that were identified during the radio-tracking study are discussed separately within the WSP bat radio-tracking report³⁰.
- 3.1.1.2 Sussex Biodiversity Records Centre data showed that bat roosts are widely distributed within the Desk Study Area, most around Slindon Common and Slindon Wood approximately one kilometre north-west of the Field Survey Area, and one kilometre to the north-east within the Arundel Wildfowl and Wetlands Trust reserve. Barbastelle roosts were recorded within Poling Copse and Slindon Common/Wood, approximately one kilometre east and west of the Field Survey Area respectively.
- 3.1.1.3 Bats recorded or likely to be present within the Desk Study Area are described in **Table 3-1**.

³⁰ WSP (2019) A27_ECO_04.5_BATRADIO-TRACKING_BASELINE_ISSUE01

Table 3-1 - Bats recorded or likely to be present within the Desk Study Area

Flight strategy	Species	Relative UK Distribution and Conservation Status	Local Distribution and Status
Cluttered habitat adapted species	Brown long-eared bat <i>Plecotus auritus</i>	Widespread, relatively common	Relatively abundant, widespread
	Whiskered bat <i>Myotis mystacinus</i>	Widespread, uncommon	Widespread, scarce
	Natterer's bat <i>Myotis nattereri</i>	Locally common	Widespread, scarce
	Daubenton's bat <i>Myotis daubentonii</i>	Relatively common, widespread	Fairly abundant, widespread
	Bechstein's bat	Very rare, (restricted to southern Wales and parts of southern England)	Very rare
	Alcathoe bat	Data deficient	Very rare - hardly known ³¹ 'Data deficient' on IUCN red list of threatened species ³² .
Edge habitat adapted species	Serotine	Uncommon, (largely restricted to the south)	Widespread, uncommon
	Common pipistrelle	Widespread, common	Widespread, abundant
	Nathusius' pipistrelle	Rare, but widespread, may be under recorded	Widespread, scarce
	Soprano pipistrelle	Widespread, common (England)	Widespread, fairly common
	Barbastelle	Very rare, widespread	Widespread, very rare
Open Habitat Adapted Species	Noctule	Widespread, relatively common	Widespread, uncommon

³¹ Bat Conservation trust (2010) http://www.bats.org.uk/pages/uk_bats.html#Alcathoe Accessed 13 September 2017.

³² Piraccini, R. (2016). *Barbastella barbastellus*. The IUCN Red List of Threatened Species 2016: e.T2553A22029285. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T2553A22029285.en>. Downloaded on 13 September 2017 and Paunović, M. 2016. *Myotis bechsteinii*. The IUCN Red List of Threatened Species 2016: e.T14123A22053752. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T14123A22053752.en>. Downloaded on 13 September 2017

- 3.1.1.4 Eighteen EPS licences have been issued within the Desk Study Area. These licences have predominantly been issued for brown long-eared bat, common pipistrelle and soprano pipistrelle with small numbers for whiskered bat, Brandt's bat, barbastelle, serotine and Natterer's bat. None of these EPS licences were for features within the Field Survey Area.

3.2 Field Survey

- 3.2.1.1 A total of 106 structures were identified, 19 within the 2017 Field Survey Area and a further 87 within the extended 2018 Field Survey Area (see **Appendix B**). 75 of these structures were subject to preliminary roost assessment while 31 were not able to be accessed.

3.2.2 Preliminary Roost Assessment

- 3.2.2.1 In 2017, 18 structures identified within the 2017 Field Survey Area were subject to survey and eight were found to contain potential roost features.
- 3.2.2.2 In 2018, a further 57 structures identified within the 2018 Field Survey Area were subject to external preliminary roost assessment and 30 were found to contain potential roost features. Ten of these structures were subject to internal inspection.
- 3.2.2.3 Of the 75 structures subject to preliminary roost assessment during 2017 and 2018, ten were of moderate suitability for roosting bats and 20 were of low suitability. Potential roost features present included raised slate tiles, gaps between the brickwork and soffits, slipped wooden plank under soffit, and voids in bridge abutments. 45 structures were considered to have negligible roost suitability.
- 3.2.2.4 All structures with potential roost features are described in **Table 3-2** below. Full survey data is provided in **Appendix B**.

Table 3-2 - Preliminary roost assessment results

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
1	10550 - Dwelling house	Detached residential home. Two storey brick build.	Not internally inspected due to access restrictions	Several broken tiles and several gaps observed close to dormer window on west elevation.	Moderate
3	10900 - Dwelling house	Detached residential home. Two-storey brick-built with assumed loft conversion. Tiled roof with chimney stack.	Not internally inspected due to access restrictions	Multiple features are present ³³ .	Moderate
5	10375 - Dwelling house	Single storey brick built bungalow with 2m high walls and pitched roof to a height of 4m at ridge.	Large roof void extending throughout whole roof space i.e. one continuous interconnected void. Timber king post trusses, purlins, rafters, ridge board. Fully lined with bitumen felt. Low temperature. No discernible access points. No evidence of roosting bats observed.	Some raised slate tiles. Slipped wooden plank under soffit and Some gaps between brickwork and soffit.	Moderate
8	10375 - Shed on western side of small copse	Flat-roofed timber shed with timber weatherboarding to 2m in height.	Not internally inspected due to access restrictions	Gap between the timber face and roof on west side of the shed.	Low

³³ A data error occurred following PRA causing a full description of features to be unavailable for this structure. The suitability is considered to be sufficient in determining survey requirements and roost potential.

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
11	11235 - Timber-framed structure 1	A campsite toilet / wash area. A wooden structure. Timber-framed structure, timber weatherboarding with bitumen felt covered roof.	No internal void. Plasterboard lined roof, very high light ingress from windows. Timber flat roof. No features with bat roost potential. No evidence of roosting bats observed.	Few potential entry points in the form of slightly raised timber boarding and between walls and roof. Likely cold temperature and high light levels.	Low
12	11235 - Timber-framed structure 2	Timber framed campsite building with timber weatherboarding and roof.	No internal void, plywood lined roof. Timber frame pitched roof with queen post truss, purlins, rafters and ridge board. No light ingress. Open eaves, gaps at gable end at front elevation. No evidence of roosting bats observed.	Few potential entry points in the form of slightly raised timber boarding and between walls and roof. Likely to be cold temperature and high light levels.	Low
13	11235 - Timber-framed structure 3	Timber-framed structure, timber weatherboarding with corrugated metal roofing.	No internal void, unlined roof. Metal panels cladding roof exposed. High light ingress from windows. No features with bat roost potential. No evidence of roosting bats observed.	Few potential entry points in the form of slightly raised timber boarding and between walls and roof. Likely to be cold temperature and high light levels.	Low
18	Bridge over the River Arun	A concrete span bridge, crossing both a road and the River Arun. The bridge has concrete abutments, a concrete deck and multi girder centre arch.	Not internally inspected due to access restrictions	Both abutments have access to internal dark voids where there is a space which may offer roosting opportunities. Majority of voids are open and exposed.	Low

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
22	10350 – dwelling house	Semi-detached house with clay tiles and hip and valley roof. Structure generally in well-maintained condition	Large roof void extending throughout whole roof space. Roof void suitable to support roosting bats including maternity. No discernible access points but dividing wall has gaps into adjacent property roof void. No evidence of roosting bats observed.	Some loose tiles on gable and main roof. Small void visible beneath a wood panel beneath a drainage gutter.	Moderate
23	10323 – garage	Double garage of concrete block construction with pitched and hipped roof clad with slates. Timber frame roof lined with bitumen felt.	Roof void extends throughout whole roof space. No discernible access points internally. No evidence of roosting bats observed.	Some gaps at eaves where felt has come loose.	Moderate
24	10323 – dwelling house	Detached dwelling of brick and renders construction. Multi pitched roof over three adjoining sections. Roofs clad with roof slates and clay ridge and hip tiles. Timber soffits with eaves.	Very small and cluttered roof void around 1m in height. Very warm inside. Roof space lined with bitumen felt. No discernible access points internally; void too small to support maternity roost. No evidence of roosting bats observed.	Some external gaps at soffits where roof sections meet	Moderate
25	10324 – dwelling house	Brick, single storey old stable block with hipped then cat slide roof on the western elevation. Roof clad with slate and clay roof tiles with concrete ridge tiles.	Not internally inspected due to access restrictions	Some slight lifted tiles were visible on the western elevation. One slipped tile on the western elevation.	Low

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
26	10320 – Dwelling house	Predominantly a single storey dormer bungalow of brick and concrete breeze block construction with double pitched slate roof tiles and composite ridge tiles. An extension was being built on the southern elevation at the time of the survey	Not internally inspected due to access restrictions	Most of the features present were associated with extension area. Some lifted slate tiles on northern central/ eastern roof elevations	Low
30	10320 – Summer house	Timber summer house with timber and metal porch on east elevation, clad with timber weatherboarding. Double pitched plywood roof	Not internally inspected due to access restrictions	Crevices visible under metal ridge cap of roof and weather boarding with gap into roof void visible on eastern elevation.	Low
31	10320 – timber framed structure	Elevated timber tree house with timber steps to access. Unsafe to access due to fragile timbers.	Unsafe for internal inspection	Few small gaps where timber has rotted and broken away in places	Low
32	10320 – Dwelling house	Single storey brick gate house with a hipped roof clad with clay roof tiles.	Not internally inspected due to access restrictions	Cavities above the western window with bat roost potential. Internally the building is open to the apex and a large hole on the southern elevation	Low
33	13146 – Dwelling house	Single storey with roof windows. Flint and brick construction with a half-hipped gable end roof. Timber weather boarding on gable ends	Not internally inspected due to access restrictions	Crevices visible around the roof vent although appeared to be lined	Low
34	10550 – Static caravan	Single storey static caravan home with flat roof.	Not internally inspected due to access restrictions	Crevice visible beneath roof on northern elevation	Low

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
35	10455 – Stable block	Stable block with clay roof tiles and wooden panelling	Not internally inspected due to access restrictions	Some loose tiles, gaps under wood panelling and mortar missing in brickwork	Low
36	12575 – Dwelling house	Large two-storey yellow brick construction built in 2012. The house is clad with slate roof and ridge tiles.	Not internally inspected due to access restrictions	Small void under a lifted fresco. Five-six slipped tiles on the southern and western elevations	Low
39	12765 – Stable block	A disused breeze-block and timber frame stable block with tiled, plywood roof	No internal voids; three adjacent stables with chipboard lined roofs supported by ceiling joists and rafters. No evidence of roosting bats observed.	Several gaps between walls and roof of structure but open-style and cool temperature inside	Low
40	12765 – Dwelling house	Brick two-storey residential home with clay tiled, hip roof. Soffit boxes where roof meets brick walls and lead flashing around chimney base	Large roof void; extends throughout whole roof space. Timber; cluttered roof void due to truss construction. Lined with bitumen felt throughout. High light ingress due to window in gable. Low temperature. Approximately 300 bat droppings recorded.	Two crevices observed above – one above gutter and below tiling of the roof and one hole at the end of the soffit	Moderate
42	12688 – Dwelling house	Pebbledash walled, two-storey house. Hipped, tiled roof with an additional flat, metal-roofed extension. Lead flashing around base of chimney. Tiling around windows on south elevation. Tiled, tower-type structure on south west corner	Not internally inspected due to access restrictions	Multiple lifted tiles between first and second storey around windows suitable for individual bats. Several potential crevices under eaves. Most features on southern and western elevations. Surrounding habitat quality is good	Moderate

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
43	12670 - Garage	Modern concrete gable garage with pebbledash walls and corrugated roofing. Timber panelling on walls under roof	Not internally inspected due to access restrictions	A small crevice beneath wooden panelling	Low
44	12670 – Stable block	Timber clad stable block with corrugated roofing and open gable	Not internally inspected due to access restrictions	Small gaps between timber and roof	Low
47	10765 – out-building	Brick, clay-tiled, open-gable out-building with adjacent corrugated flat roof extension. In neglected condition.	Not internally inspected due to access restrictions	Some loose tiles and gaps between the ridge tiles suitable for individual bats. Crevices in brick walls and under corrugated roof.	Moderate
48	16210 – Road bridge over railway	Railway overbridge of brick construction with steel girder and concrete deck with metal braces beneath and metal parapets.	Not internally inspected due to access restrictions	Approximately five potential roost features of low suitability including areas where mortar is missing under the arches and concrete is missing from the under deck	Low
63	12735 – timber shed	Timber framed single storey building clad with timber weatherboarding. Timber soffit box around roof. Bitumen roofing felt with corrugated metal sheeting	Not internally inspected due to access restrictions	Gaps between corrugated sheeting and bitumen. Gap between 'little woods nursery' sign and timber boarding on south-western elevation	Low
64	12735 – timber shed	Timber framed and timber clad single storey storage room. Corrugated asbestos, overhanging pitched roof	Not internally inspected due to access restrictions	Large gaps between top of wall and roof under eaves on all elevations under asbestos sheeting. Some chicken wire present filling/plugging some of the gaps.	Low

Structure no.	Structure ref & type	External preliminary roost assessment description	Internal preliminary roost assessment description)	Features present	Suitability of roost features
71	12955 – Dwelling house	Brick semi-detached dwelling with pitched and gable end roof clad with clay tiles.	Large roof void extends throughout whole roof space. Fully lined with bitumen felt. No light ingress; low temperature. Large, uncluttered void suitable for maternity roost. No discernible access points. No evidence of roosting bats observed.	Hanging tiles at south and north elevations as first floor level.	Moderate

3.2.3 Bat Emergence/Re-Entry Survey

- 3.2.3.1 In 2017, eight structures were identified as requiring further surveys (low, moderate or high suitability from preliminary roost assessment) and seven were accessible for dusk emergence and dawn re-entry surveys ³⁴.
- 3.2.3.2 In 2018, a further 22 structures were identified as requiring further surveys (low, moderate or high suitability from preliminary roost assessment). Ten structures were accessible for dusk emergence and dawn re-entry surveys in 2018. A total of 17 structures were accessible and subject to emergence / re-entry surveys over 2017 and 2018, as shown in **Table 3-3**.
- 3.2.3.3 During 2017, bats were recorded roosting within one structure (Structure 1). During 2018, bats were recorded roosting within Structure 1 and a further eight structures: 5, 32, 34, 40, 42, 47, 63, 64. Detailed survey results are provided in **Table 3-3**. **Appendix C** shows the emergence or re-entry points within the respective structures where roosting bats were identified. Overview photographs of the structures can be seen in Appendix D.
- 3.2.3.4 Two structures (40 and 42) were confirmed roosts following multiple re-entries of bats observed during initial emergence/re-entry surveys. Suggesting the structures may support larger numbers of roosting bats or may support a maternity roost. These structures therefore received an additional emergence/re-entry survey to aid in roost characterisation line with best practice guidance.
- 3.2.3.5 No bats were recorded emerging from or returning to the other nine structures surveyed. The recommended number of emergence / re-entry surveys was carried out on five of these nine structures (11, 12, 13, 25 and 39) and therefore it is likely that bats do not roost within these structures.
- 3.2.3.6 Weather conditions at the start and end of the surveys is shown in **Appendix E**.

³⁴ Structure 18 received a PRA in January 2018 (included in this report), outside of the bat activity season and this structure subsequently fell outside the Field Survey Area for option 5A and therefore no presence/absence surveys are reported as part of this study for 2018 for this structure.

Table 3-3 - Emergence/re-entry survey summary

Structure No.	Year surveyed	Land parcel ref No.	Timing (Dusk emergence /Dawn re-entry survey)	Survey results
1	2017 and 2018	10550	Dusk emergence	<p>Survey 1 – Emergence, 2017:</p> <ul style="list-style-type: none"> A single soprano pipistrelle emerged from below the roof overhang between the door and window A single common pipistrelle emerged from a lifted ridge tile. Four additional bats emerged from the roof tiles, three of which were in the same area, close to the chimney stack. These bats were not echolocating but are believed to be pipistrelle species based on surveyor experience Soprano pipistrelle and common pipistrelle were recorded regularly throughout the survey. Soprano and common pipistrelles were recorded throughout survey around the house, garden and along the tree line <p>Survey 2 – Emergence, 2018:</p> <ul style="list-style-type: none"> At least six emergences recorded: three confirmed common pipistrelle and three non-echolocating bats which are believed to be <i>Pipistrellus</i> species due to the size and behaviour of the bats. All on the western elevation, with four from beneath a dormer window, one from the side of a skylight and one from a broken tile beneath a skylight. Constant common pipistrelle foraging and passing throughout the survey One <i>Myotis sp.</i> pass, ten <i>Plecotus sp.</i> passes. and one serotine pass recorded.
3	2017	10900	Dawn re-entry	<ul style="list-style-type: none"> No re-entry observed Four bat passes were recorded during the survey formed of one soprano pipistrelle and three bats with very brief or quiet calls which could not be identified.
5	2017 and 2018	10375	Dusk emergence	<p>Survey 1 – Emergence, 2017:</p> <ul style="list-style-type: none"> No bats seen emerging Total of 33 passes were recorded. Species were predominately common and soprano pipistrelle with one serotine pass, four noctule passes and one brown long eared pass Of the 33 passes, 22 were located close to the road and adjacent hedgerow suggesting use of this linear feature for commuting Foraging was recorded in the rear garden of the structure.

Structure No.	Year surveyed	Land parcel ref No.	Timing (Dusk emergence /Dawn re-entry survey)	Survey results
				<p>Survey 2 – Re-entry, 2018:</p> <ul style="list-style-type: none"> No re-entry seen Six common pipistrelle passes were recorded. <p>Survey 3 – Emergence, 2018:</p> <ul style="list-style-type: none"> One common pipistrelle was observed emerging from the apex of the roof on the east elevation. Continuous foraging activity throughout the survey, predominately common pipistrelle and myotis species with several passes of soprano pipistrelle, three <i>Plecotus sp.</i> passes and one large bat (either Leisler's or noctule) that could not be fully identified.
8	2017	10375	Dusk emergence	<ul style="list-style-type: none"> No bats seen emerging Soprano pipistrelle, common pipistrelle and noctule recorded Soprano pipistrelles foraging in the clearing behind the structure continuously between 20:04 and 20:23. Flying at canopy height. Very little activity recorded later in the survey from 20:23 onwards.
11	2018 ³⁵	11235	Dawn re-entry	<ul style="list-style-type: none"> No re-entry seen Eight soprano pipistrelle passes, one noctule pass, four <i>Plecotus sp.</i> passes, one <i>Myotis sp.</i> and eight common pipistrelle passes.
12	2018 ³⁸	11235	Dawn re-entry	<ul style="list-style-type: none"> No re-entry seen Nine common pipistrelle passes, nine soprano pipistrelle passes, two <i>Plecotus sp.</i> passes, one serotine pass, one <i>Myotis sp.</i> pass and two noctule passes.
13	2018 ³⁸	11235	Dawn re-entry	<ul style="list-style-type: none"> No re-entry seen Four soprano pipistrelle passes and nine common pipistrelle passes.
22	2018	10350	Dusk emergence	<ul style="list-style-type: none"> No emergence seen Four bat passes consisting of two common pipistrelle passes and two soprano pipistrelle passes. One soprano pipistrelle was commuting with the other three passes heard but not seen.

³⁵ Structure surveyed during sub-optimal weather conditions in 2017. Survey repeated in 2018 during optimal weather conditions.

Structure No.	Year surveyed	Land parcel ref No.	Timing (Dusk emergence /Dawn re-entry survey)	Survey results
25	2018	10324	Dusk emergence	<ul style="list-style-type: none"> No emergence seen A total of 26 passes were recorded. Species were predominately common and soprano pipistrelle with three noctule, one serotine pass and three <i>Plecotus sp.</i> recorded.
32	2018	10320	Dusk emergence	<ul style="list-style-type: none"> One bat of unknown species seen emerging briefly from beneath overhanging roof edge on northern elevation.
34	2018	10550	Dusk emergence	<ul style="list-style-type: none"> One common pipistrelle seen emerging from northern elevation; precise feature not identified Soprano and common pipistrelles were recorded throughout survey, foraging close to the structure Thirteen brown long-eared passes, two <i>Myotis sp.</i> passes and one barbastelle pass recorded.
39	2018	12765	Dawn re-entry	<ul style="list-style-type: none"> No re-entry seen Two soprano pipistrelle passes toward the end of the survey.
40	2018	12765	1. Dusk emergence 2. Dawn re-entry 3. Dusk emergence	<p>Survey 1 - Emergence, 2018:</p> <ul style="list-style-type: none"> One emergence seen of an unknown (non-echolocating) species at the eastern gable end Soprano and common pipistrelle passes and foraging throughout the survey Two brown long-eared passes, two serotine passes, two <i>Myotis sp.</i> passes, one Nathusius' pipistrelle pass and one barbastelle pass. <p>Survey 2 – Re-entry, 2018:</p> <ul style="list-style-type: none"> Multiple re-entries observed of at least 23 soprano pipistrelle bats at the apex of the roof on both the east and west elevations and on the south elevation under a loose tile One <i>Myotis sp.</i> pass and one brown long-eared pass also recorded. <p>Survey 3 - Emergence, 2018:</p> <ul style="list-style-type: none"> No emergence seen. Constant foraging and passing soprano and common pipistrelle throughout the majority of the survey One noctule pass, one <i>Myotis sp.</i> pass.

Structure No.	Year surveyed	Land parcel ref No.	Timing (Dusk emergence /Dawn re-entry survey)	Survey results
42	2018	12688	1. Dawn re-entry 2. Dusk emergence 3. Dusk emergence	<p>Survey 1 – Re-entry, 2018:</p> <ul style="list-style-type: none"> At least eight re-entries observed: three common pipistrelle, one soprano pipistrelle and four unknown (non-echolocating) bats. Re-entries under fascia and eaves, under tiles between first and second storey, under tiles on ‘tower’ type portion of building and into roof apex. All on western, southern and eastern elevations Common and soprano pipistrelle passes throughout the survey. Two barbastelle passes, five <i>Myotis sp.</i> passes, two <i>Plecotus sp.</i>, passes. <p>Survey 2 - Emergence, 2018:</p> <ul style="list-style-type: none"> At least 15 emergences observed: two soprano pipistrelle, 15 common pipistrelle and four unknown (non-echolocating) bat species. Emergences from under fascia and eaves, under tiles between first and second storey and under tiles on ‘tower’ type portion of building. All on the western and southern elevations High level of common pipistrelle activity recorded including foraging passes throughout the survey. Also, several soprano pipistrelle foraging and passes. Pipistrelle sp. Social calls recorded Five <i>Myotis sp.</i> passes. <p>Survey 3 - Emergence, 2018:</p> <ul style="list-style-type: none"> At least four emergences of common pipistrelle recorded and one emergence of an unknown (non-echolocating) bat species. One emergence was recorded from the northern elevation and the remainder from the western elevation Moderate level of common pipistrelle and soprano pipistrelle foraging and commuting activity recorded Two barbastelle passes, five myotis passes, one serotine pass and three brown long-eared passes.
47	2018	10765	1. Dawn re-entry 2. Dusk emergence	<p>Survey 1- Re-entry, 2018:</p> <ul style="list-style-type: none"> At least one common pipistrelle observed re-entering beneath ridge tile on western elevation Multiple common pipistrelle passes, social calls and circling during the survey. No other species recorded. <p>Survey 2 - Emergence, 2018:</p>

Structure No.	Year surveyed	Land parcel ref No.	Timing (Dusk emergence /Dawn re-entry survey)	Survey results
				<ul style="list-style-type: none"> At least one common pipistrelle observed re-entering beneath ridge tile on western elevation, close to the location on previous survey Multiple common pipistrelle passes through the survey. three brown-long eared passes, two myotis pass, two soprano pipistrelle passes and one serotine pass.
63	2018	12735	Dawn re-entry	<ul style="list-style-type: none"> Re-entry of soprano pipistrelle observed behind a sign and timber boarding on south-western elevation Two soprano pipistrelle passes very close to buildings.
64	2018	12735	Dawn re-entry	<ul style="list-style-type: none"> One re-entry of soprano pipistrelle behind a sign on north-eastern elevation Two records of brown long-eared circling close to structures One soprano pipistrelle circling close to structures.

3.2.4 Results Summary

- 3.2.4.1 The 75 structures surveyed within the Field Survey Area comprise a combination of homes (13 structures), timber sheds (16 structures), other timber structures (19 structures), bridges (two structures), derelict farm buildings (three structures), brick outbuildings (one structure), dog kennels (one building), garages (three structures), metal containers (eight structures), stable blocks (five structures) and static caravans (four structures). A bridge crossing the railway within the Field Survey Area was not surveyed due to access restrictions and a further 30 structures of unknown type were identified within the Field Survey Area using aerial photography only (see **paragraph 2.5.1.3**). Structures are described in **Appendix B**.
- 3.2.4.2 Of the 75 structures which were subject to preliminary roost assessment survey, ten were of moderate roost suitability, 20 of low roost suitability and 45 of negligible roost suitability.
- 3.2.4.3 Dusk emergence and dawn re-entry surveys confirmed the likely absence of a roost from four structures (11, 12, 13, 39) and confirmed the presence of roosting bats in nine structures (1, 5, 32, 34, 40, 42, 47, 63, 64). Roosting species comprised soprano and common pipistrelles with several unidentified (non-echolocating) bats observed. High levels of emergence or re-entry activity were observed within structures 40 and 42, suggesting possible presence of maternity roosts in these structures.

4 Discussion and Recommendations

4.1 Discussion

- 4.1.1.1 Nine structures were confirmed as having a bat roost. At all of these, common and soprano pipistrelle were observed emerging and entering. These structures are therefore likely to be of low conservation significance³⁶. Large numbers of emerging or re-entering common and soprano pipistrelle were observed within structures 40 and 42 and these structures may therefore be maternity roosts of moderate conservation significance⁴⁰. No roosts were identified that are considered likely to be of high conservation significance⁴⁰.
- 4.1.1.2 Impacts on roosts may be direct, causing loss or disturbance of the roost, or indirect by the removal or degradation of foraging and commuting habitat around the roost or by increased lighting and noise. Where the Scheme is likely to affect a confirmed bat roost, it may be necessary to apply to Natural England for a European Protected Species Mitigation licence.
- 4.1.1.3 Structures 11, 12, 13, 25 and 39 have been shown not to support roosting bats. Further survey is required at 30 structures where a full set of surveys could not be completed and a further 31 structures that could not be accessed.
- 4.1.1.4 Urban and dense residential areas adjacent to the Scheme options were not surveyed. Due to the proximity of dwellings in the west of Arundel to woodland habitat (Stewards Copse, Tortington Common and Binsted Woods) it is likely that bat roosts will be present within these areas. It is therefore recommended that these areas are subject to survey where they fall within 100 metres of the Scheme options.
- 4.1.1.5 All surveys (external preliminary roost assessment, internal preliminary roost assessment and emergence/re-entry surveys) could be carried out on all structures because of access restrictions. Twenty-four structures were partially surveyed but at least one further survey or roost characterisation survey is required to conform to the guidance. 31 structures could not be accessed and preliminary roost assessment survey is required at each of these. Roost characterisation surveys should be carried out at all structures where a bat roost was confirmed during survey and impacts on that roost are possible.

4.2 Further Survey Recommendations

- 4.2.1.1 The following further survey work is recommended to inform the baseline assessment:

³⁶ English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough

- A preliminary roost assessment should be undertaken of all un-surveyed structures within 100m of all Scheme options, including the 31 structures identified within the 2018 Field Survey Area, to determine their suitability for roosting bats
- Further survey should be completed on the 25 structures which were partially surveyed in 2017 and 2018
- A roost characterisation survey should be carried out, following Scheme option selection, of confirmed roosts
- Preliminary roost assessment and further surveys should be carried out within urban areas and residential properties in Arundel within the 100 metres of the Scheme options.

4.2.1.2

The aim of further survey is to confirm whether bats are present (by direct field evidence) and/or to categorise structures in terms of their bat roost suitability. A summary of the results and further survey recommendations of structures identified as having low, moderate or high suitability to support roosting bats is provided in **Table 4-1**. Further survey is recommended only where potential roosts might be affected by the Scheme and hence the further survey recommendations identified may be subject to change after the selection of a preferred Scheme option.

Table 4-1 - Further survey recommendations

Structure No.	Suitability	Bat roost confirmed?	Further survey required & type of survey? ³⁷
1	Moderate	Yes	Yes – Internal preliminary roost assessment and roost characterisation surveys
3	Moderate	No	Yes – a second emergence survey to complete the two-survey requirement
5	Moderate	Yes	Yes – roost characterisation surveys
8	Low	No	Yes – internal preliminary roost assessment
11	Low	No	No – bat likely absence confirmed
12	Low	No	No – bat likely absence confirmed
13	Low	No	No – bat likely absence confirmed
18	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey

³⁷ See Section 4, Discussion and Recommendations for further details on additional survey requirements.

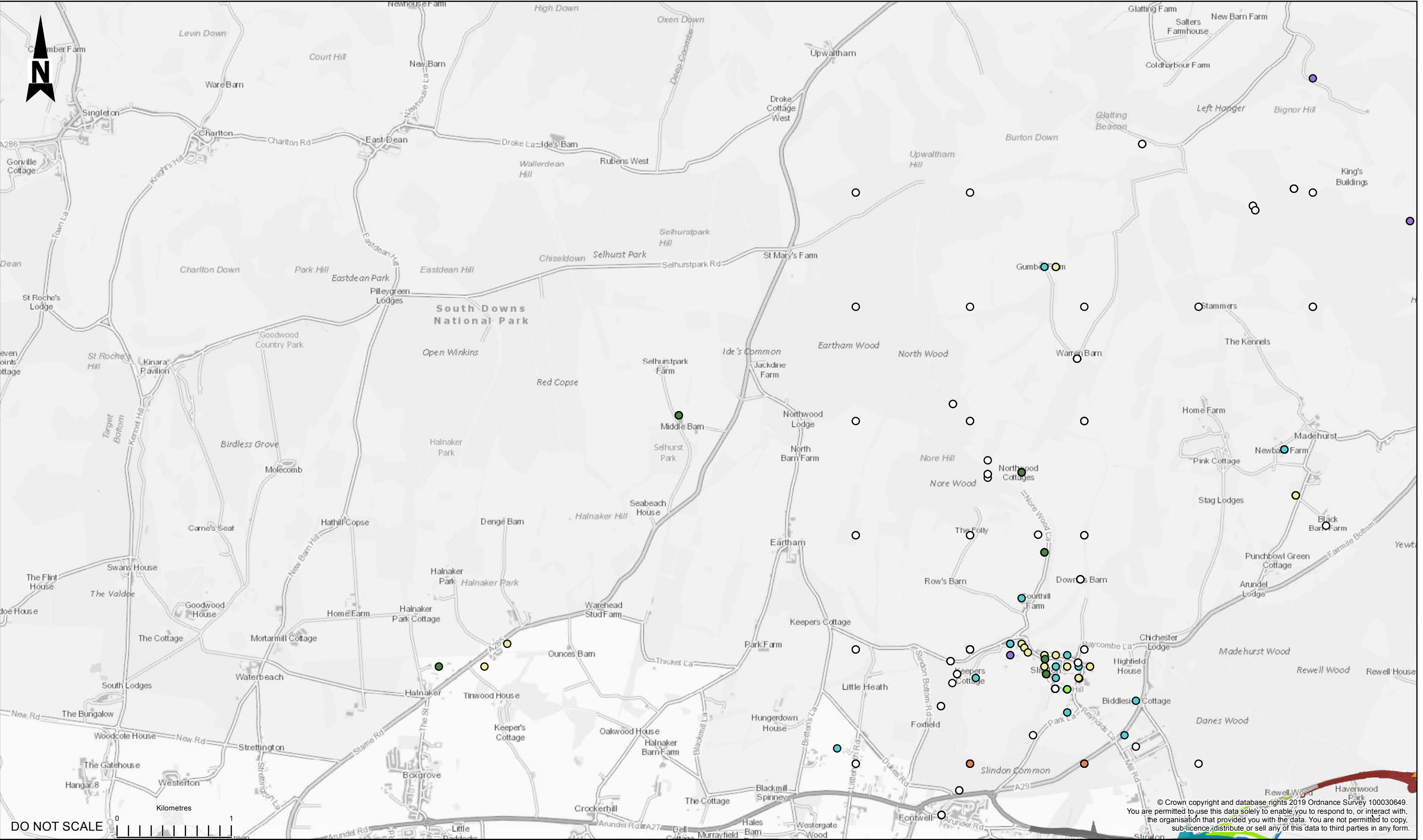
Structure No.	Suitability	Bat roost confirmed?	Further survey required & type of survey? ³⁷
22	Moderate	No	Yes – one emergence/re-entry survey
23	Moderate	No	Yes – two emergence/re-entry surveys
24	Moderate	No	Yes – two emergence/re-entry surveys
25	Low	No	Yes – internal preliminary roost assessment
26	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
30	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
31	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
32	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
33	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
34	Low	Yes	Yes – internal preliminary roost assessment and roost classification surveys
35	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
36	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
39	Low	No	No – bat likely absence confirmed
40	Moderate	Yes	Yes – maternity colony likely, further roost classification surveys recommended to confirm
42	Moderate	Yes	Yes – maternity colony likely, further roost classification surveys recommended to confirm

Structure No.	Suitability	Bat roost confirmed?	Further survey required & type of survey? ³⁷
43	Low	No	Yes – Internal preliminary roost assessment
44	Low	No	Yes – Internal preliminary roost assessment
47	Moderate	Yes	Yes – internal preliminary roost assessment and one emergence/re-entry survey
48	Low	No	Yes – internal preliminary roost assessment and one emergence/re-entry survey
63	Low	Yes	Yes – internal preliminary roost assessment and roost classification surveys
64	Low	Yes	Yes – internal preliminary roost assessment and roost classification surveys
71	Moderate	No	Yes – Two emergence/re-entry survey

4.2.1.3

In addition to the above, preliminary roost assessment surveys should be carried out at the 31 structures which could not be accessed for preliminary roost assessment.

Appendix A: Desk Study Data



KEY:

OPTION 1V5

OPTION 1V9

OPTION 3V1

OPTION 4/5AV1

OPTION 4/5AV2

OPTION 5BV1

MATERNITY ROOST

UNSPECIFIED ROOST

ROOSTTYPE

DROPPINGS

HIBERNACULA ROOST

MATERNITY ROOST

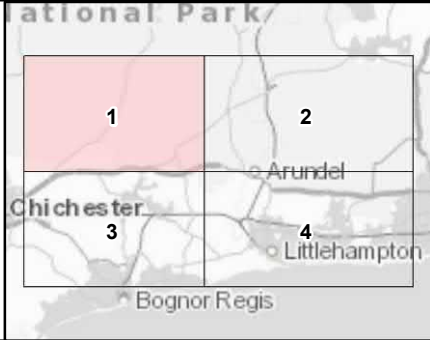
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MATERNITY ROOST; FEEDING ROOST

UNSPECIFIED ROOST

UNSPECIFIED ROOST; DROPPINGS

UNSPECIFIED RECORD



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON	
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Construction	
Maintenance / Cleaning	
Use	
Decomissioning / Demolition	

Rev.	Date	Description	By	Chkd	App'd
P01.1	--	--	--	--	--

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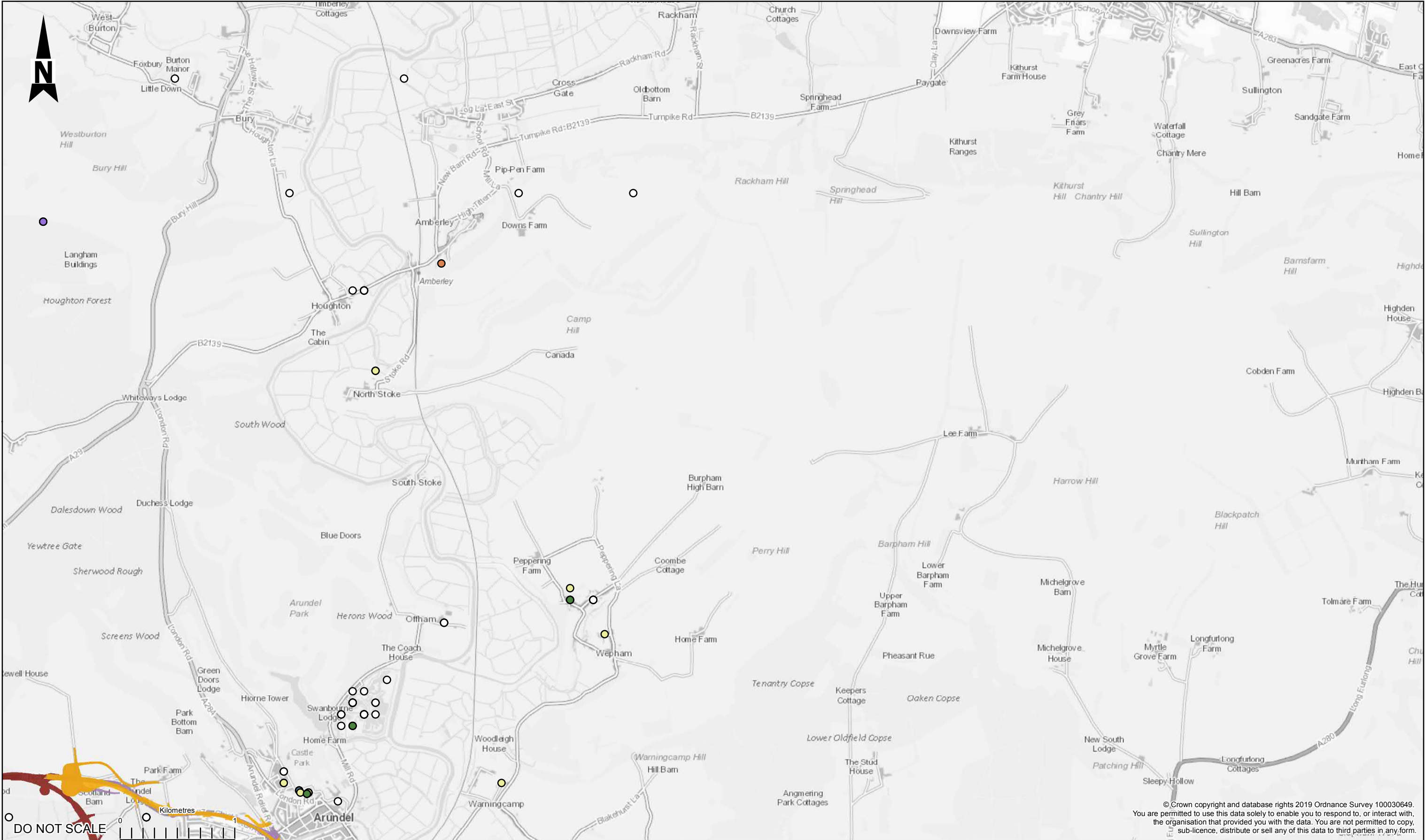
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Drawing Title		BAT STRUCTURES APPENDIX A: DESK STUDY RECORDS			
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Drawing Number		Project		Project Ref. No.	
HE551523-WSP-GEN-SWI-GI-DR-0565		Originator Volume		70052558	
Location		Type Role Number		Revision	
				P01	



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OPTION 1V9

OPTION 3V1

OPTION 4/5AV1

OPTION 4/5AV2

OPTION 5BV1

MAVES 2016-17

MATERNITY ROOST

UNSPECIFIED ROOST

ROOSTTYPE

DROPPINGS

HIBERNACULA ROOST

MATERNITY ROOST

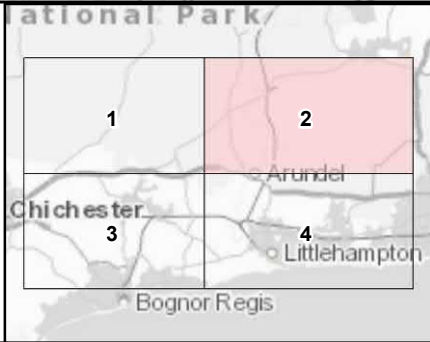
MATERNITY ROOST; DROPPINGS

MATERNITY ROOST; FEEDING ROOST

UNSPECIFIED ROOST

UNSPECIFIED ROOST; DROPPINGS

UNSPECIFIED RECORD



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON	
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Use	
Decomissioning / Demolition	

Rev.	Date	Description	By	Chk'd	App'd
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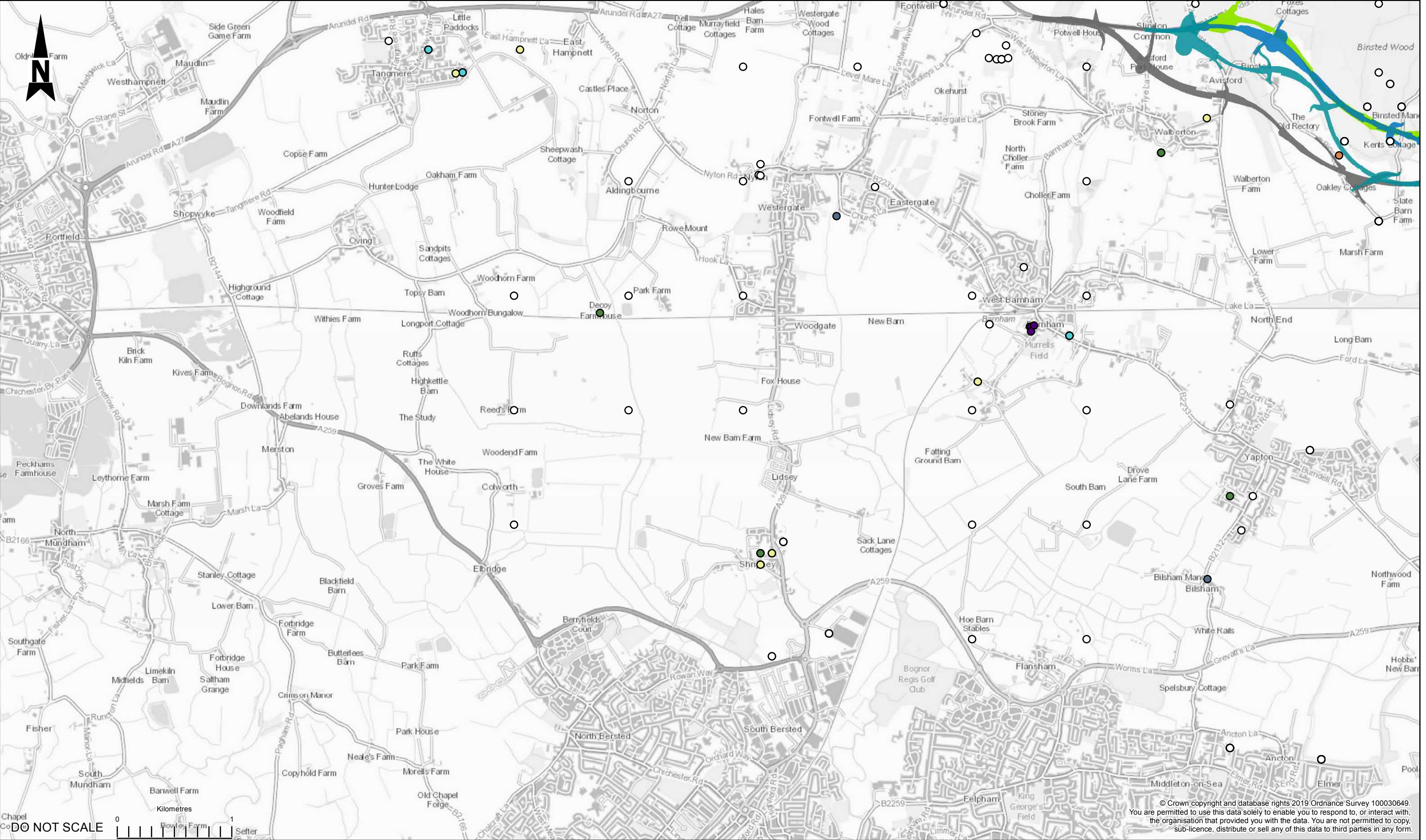
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HE551523-WSP-GEN-		Originator		Volume	
SWI-GI-DR-0565				70052558	
				Revision	
Location		Type		Role	
				Number	
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KEY:

OPTION 1V5

OPTION 1V9

OPTION 3V1

OPTION 4/5AV1

OPTION 4/5AV2

OPTION 5BV1

MATES 2016-17

MATERNITY ROOST

UNSPECIFIED ROOST

ROOSTTYPE

DROPPINGS

HIBERNACULA ROOST

MATERNITY ROOST

MATERNITY ROOST; DROPPINGS

MATERNITY ROOST; FEEDING ROOST

UNSPECIFIED ROOST

UNSPECIFIED ROOST; DROPPINGS

UNSPECIFIED RECORD

1

2

3

4

Arundel

Littlehampton

Bognor Regis

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BAT STRUCTURES

APPENDIX A:

DESK STUDY RECORDS

Scale

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PA

Original Size

A3

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Drawing Number

Project

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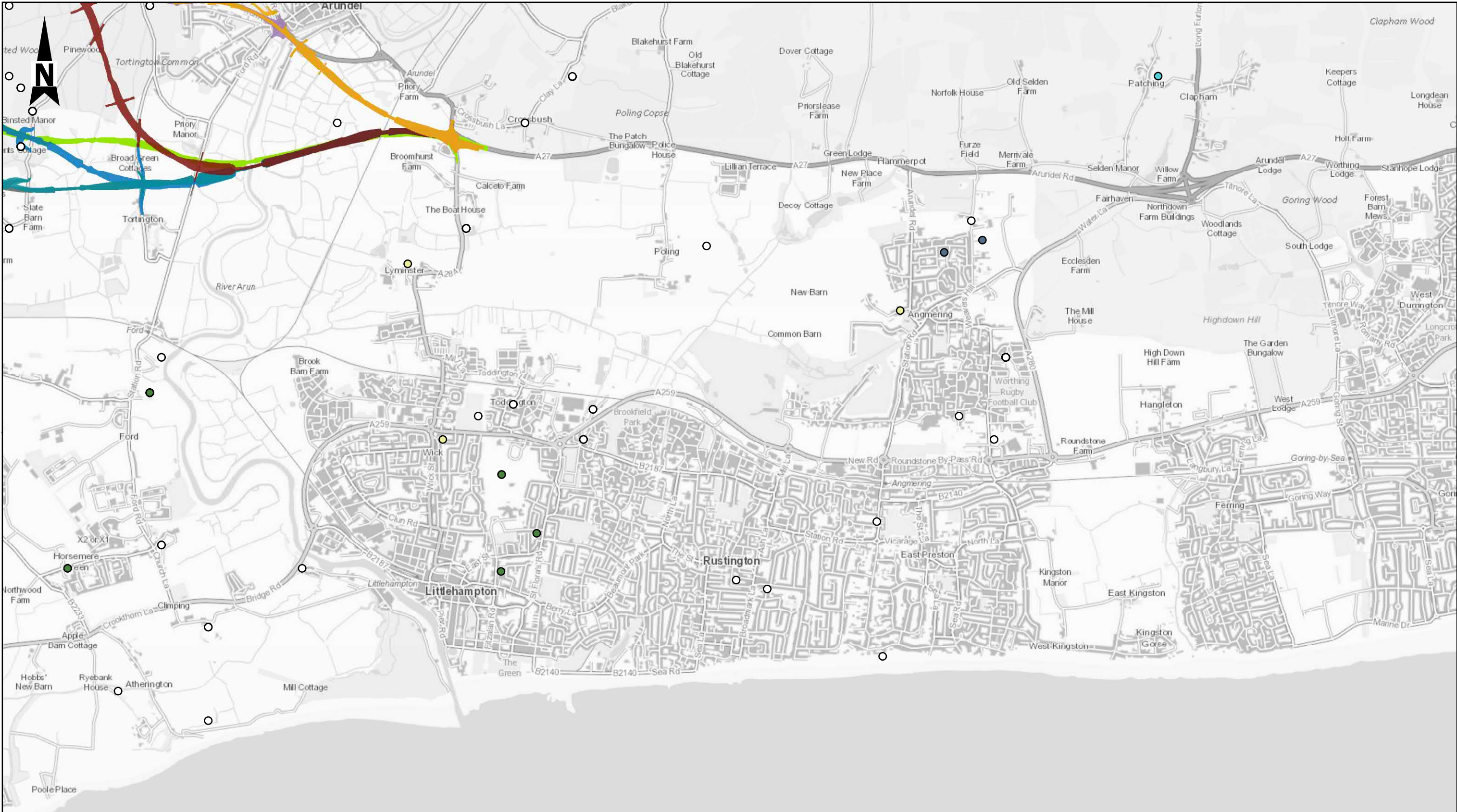
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Appendix B: Survey Data



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MODERATE

CORRIDOR 1

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MODERATE - CONFIRMED

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Drawing Title	BAT STRUCTURES APPENDIX B: SURVEY RESULTS
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Agreed	AB
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Date	15/08/19
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Date	15/08/19
Drawing Number	70052558
Project	WSP
Volume	70052558
A27 AR Location	-FI
Type	-GIS
Role	Number
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SURVEY RESULTS**

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A27 AR	-FI	-GIS	Revision
Location	Type	Role	Number
			P01



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● LOW

▲ LOW- CONFIRMED

● MODERATE

▲ MODERATE - CONFIRMED

● NEGLIGIBLE

■ CORRIDOR 1

■ CORRIDOR 3

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON	
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Maintenance / Cleaning	
Use	
Decomissioning / Demolition	

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Date	15/08/19
Drawing Number	70052558
Project	WSP
Volume	70052558
A27 AR	-FI
Location	-GIS
Type	Role
Number	Number

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MODERATE

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MODERATE - CONFIRMED

CORRIDOR 3

LOW- CONFIRMED

NEGLIGIBLE

OPTIONS_5A

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Construction	
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Use	
Decomissioning / Demolition	

Rev.	Date	Description	By	Chkd	App'd

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Type	-GIS
Role	Number
Revision	P01

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Appendix B: Table 1 – Detailed Structure Data

Structure number	Building Ref.	Surveys completed	Grid Reference	Description	Features present	BCT suitability ³⁸ and confirmed roost (if applicable)
1	10550 - Dwelling house	<ul style="list-style-type: none"> External PRA Two emergence surveys 	SU 98273 07254	Detached residential home. Two storey brick build. Building is located within high quality habitat	Several broken tiles on all elevations although majority on western elevation. Several gaps observed close to dormer window on west elevation.	Moderate - Confirmed roost
2	10550 – Dog kennel	<ul style="list-style-type: none"> External PRA 	SU 98275 07238	Small shelter appearing to be a dog kennel. Open and exposed internally.	No features suitable for roosting bats observed	Negligible
3	10900 - Dwelling house	<ul style="list-style-type: none"> External PRA 	SU 99758 07347	Detached residential home. Two storey brick build with assumed loft conversion. Tiled roof with chimney stack	Multiple access points for roosting bats ³⁹	Moderate
4	10900 - Shed/workshop	<ul style="list-style-type: none"> External PRA 	SU 99759 07324	<i>No description or photos due to data error.²</i>	No features suitable for roosting bats observed	Negligible

³⁸ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

³⁹ A data error occurred causing a full description of features to be unavailable for this structure. The suitability is considered to be sufficient in determining survey requirements and roost potential.

5	10375 - Dwelling house	<ul style="list-style-type: none"> External PRA Internal PRA One emergence and one re-entry survey 	SU 97096 06771	<p>Single storey brick built bungalow with 2m high walls and pitched roof to a height of 4m at ridge. Roof tiled with slate tiles and ridge and hip tiles were clay / concrete fibre. Brickwork, pointing and roof tiles all in good condition and well maintained. Closed wooden soffit box that was tight fitting. Ridge tiles and lead flashing tight fitting. Wooden bargeboards on east facing gable with closed wooden soffits. Small flat-roofed new extension with roofing felt present on eastern 'leg' of dwelling in good condition. No evidence of roosting bats observed.</p> <p>Building is located within high quality habitat.</p>	<ul style="list-style-type: none"> Some raised slate tiles on eastern elevation Slipped wooden plank under soffit on north-eastern corner that is a potential access point (no signs). Wooden bargeboard with closed soffit on northern elevation with some gaps between the brickwork and soffit. Raised roof tiles on other elevations, including adjacent to bargeboards. Gaps between soffit and brickwork on western elevation go up into internal soffit space. No droppings present. 	Moderate – Confirmed roost
6	10375 - Shed in garden	<ul style="list-style-type: none"> External PRA 	SU 97103 06737	Timber-framed garden shed, timber weatherboarding with bitumastic felt covered	No features suitable for roosting bats observed	Negligible

				pitched roof. Good condition		
7	10375 - Shed in garden next to boundary wall	<ul style="list-style-type: none"> External PRA 	SU 97071 06740	Timber-framed garden shed, timber weatherboarding with bitumastic felt covered pitched roof. Good condition	No features suitable for roosting bats observed	Negligible
8	10375 - Shed on western side of small copse	<ul style="list-style-type: none"> External PRA One emergence survey 	SU 97224 06752	Flat-roofed timber shed with timber weatherboarding to 2m in height	<ul style="list-style-type: none"> Gap between the timber face and roof on west side of the shed No other features observed 	Low
9	11250 - Garden shed 1	<ul style="list-style-type: none"> External PRA 	TQ 00586 05861	Timber-framed garden shed, timber weatherboarding with bitumastic felt covered pitched roof. Good condition	No features suitable for roosting bats observed	Negligible
10	11250 - Garden shed 2	<ul style="list-style-type: none"> External PRA 	TQ 00622 05831	Timber-framed garden shed, timber weatherboarding with bitumastic felt covered pitched roof. Good condition	No features suitable for roosting bats observed	Negligible
11	11235 - Timber-framed structure 1	<ul style="list-style-type: none"> External PRA 	TQ 00885 05765	A campsite toilet / wash area. A wooden structure. Timber-	Few potential entry points in the form of slightly raised timber	Low

		<ul style="list-style-type: none"> One emergence survey⁴⁰ 		framed structure, timber weatherboarding with bitumastic felt covered roof	boarding and between walls and roof. Likely to be cold temperature and high light levels.	
12	11235 - Timber-framed structure 2	<ul style="list-style-type: none"> External PRA One emergence survey³ 	TQ 00887 05717	Timber framed campsite building with timber weatherboarding and roof	Few potential entry points in the form of slightly raised timber boarding and between walls and roof. Likely to be cold temperature and high light levels.	Low
13	11235 - Timber-framed cabin 3	<ul style="list-style-type: none"> External PRA One emergence survey³ 	TQ 00893 05646	Timber-framed structure, timber weatherboarding with corrugated metal roofing	Few potential entry points in the form of slightly raised timber boarding and between walls and roof. Likely to be cold temperature and high light levels.	Low
14	11235 - Timber-framed outbuilding	<ul style="list-style-type: none"> External PRA 	TQ 00999 05715	Timber-framed garden shed, timber weatherboarding and roof. Good condition	No features suitable for roosting bats observed	Negligible
15	11765 – Derelict farm building 1	<ul style="list-style-type: none"> External PRA 	TQ 01678 06051	Derelict brick building. No roof	No features suitable for roosting bats observed	Negligible

⁴⁰ An emergence survey was originally completed in 2017 during sub-optimal weather conditions. The survey was repeated in 2018 during optimal survey conditions.

16	11765 – Open farm building	<ul style="list-style-type: none"> External PRA 	TQ 02163 06050	Derelict brick building used for sheep shelter. Metal roofing	No features suitable for roosting bats observed	Negligible
17	12275 – Derelict farm building	<ul style="list-style-type: none"> External PRA 	TQ 01787 06663	Stone building	No features suitable for roosting bats observed	Negligible
18	11221 - Bridge over River Arun	<ul style="list-style-type: none"> External PRA 	TW 01459 06795	The Arun Bridge is a concrete span bridge, crossing both a road and the River Arun. The bridge has concrete abutments, a concrete deck and multi girder centre arch. The bridge is well lit from above with street lights across the top along the road	<ul style="list-style-type: none"> No suitable roosting features were seen on the main bridge However, both abutments have access to internal dark voids where, whilst there are no crevices, there is a space which may be suitable for roosting and hibernating bats The open nature of the voids means that they are exposed to wind and rain meaning little thermal stability. No other suitable features were present due to crevices being too wide, open and damp 	Low

19	12730 - Railway Bridge	Not surveyed- no access permitted	TQ 02286 06069	Not surveyed- no access permitted	Not surveyed- no access permitted	Unknown
20	10375 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 97076 06736	Timber shed with bitumen roof and double doors. Appears intact and maintained. High light ingress through windows and attached lighting.	No features suitable for roosting bats observed	Negligible
21	10375 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 97081 06728	Small timber shed with large windows allowing high levels of light ingress. Bitumen felt roof.	No features suitable for roosting bats observed	Negligible
22	10350 - Dwelling house	<ul style="list-style-type: none"> External PRA Internal PRA One emergence survey 	SU 97034 06872	<p>Semi-detached house with clay tiles and hip and valley roof. Structure generally in well-maintained condition</p> <p>Large roof void extending throughout whole roof space. Simple timber frame roof with purlins, collar beams, struts, rafters and ridge board. Fully lined with bitumen felt.</p>	Some loose tiles on gable and main roof. Small void visible beneath a wood panel beneath a drainage gutter.	Moderate

				Roof void suitable to support roosting bats including maternity. No discernible access points but dividing wall has gaps into adjacent property roof void. No evidence of roosting bats observed.		
23	10323 -Garage	<ul style="list-style-type: none"> External PRA Internal PRA 	SU 97034 06930	<p>Double garage of concrete block construction with pitched and hipped roof clad with slates. Timber frame roof lined with bitumen felt.</p> <p>Roof void extends throughout whole roof space. No discernible access points internally. No evidence of roosting bats observed.</p>	Some gaps at eaves where felt has come loose.	Moderate
24	10323 - Dwelling house	<ul style="list-style-type: none"> External PRA Internal PRA 	SU 97029 06904	Detached dwelling of brick and renders construction. Multi pitched roof over three adjoining sections. Roofs clad with roof slates and clay ridge and	Some external gaps at soffits where roof sections meet	Moderate

				<p>hip tiles. Timber soffits with eaves.</p> <p>Very small and cluttered roof void around one metre in height. Very warm inside. Roof space lined with bitumen felt. No discernible access points internally; void too small to support maternity roost</p>		
25	10324 - Dwelling house	<ul style="list-style-type: none"> External PRA One emergence survey 	SU 97017 06888	Brick, single storey old stable block with hipped then cat slide roof on the western elevation. Roof clad with slate and clay roof tiles with concrete ridge tiles. Wooden fascia board present.	Some slight lifted tiles were visible on the western elevation. One slipped tile on the western elevation. Small voids were visible under tiles	Low
26	10320 - Dwelling house	<ul style="list-style-type: none"> External PRA 	SU 96981 06900	Appears to have been extended multiple times. Predominantly a single storey dormer bungalow of brick and concrete breeze block construction with double pitched slate roof tiles and composite ridge tiles. An extension was being built on the	The majority of the features present were associated with extension area. Some lifted slate tiles on northern central/ eastern roof elevations	Low

				southern elevation at the time of the survey		
27	10320 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 96979 06853	Timber framed out-building with clay roof tiles and single skin timber clad walls. The building was in a poor state of repair and was missing the northern elevation wall.	No features suitable for roosting bats observed	Negligible
28	10320 - Stable block	<ul style="list-style-type: none"> External PRA 	SU 96975 06888	Timber stable block with bitumen felt covered roof. Appears highly disturbed inside as used as a workshop with internal lighting	No features suitable for roosting bats observed	Negligible
29	10320 – Stable block	<ul style="list-style-type: none"> External PRA 	SU 96930 06864	Open-fronted timber stable block used for storage. No windows or doors and large hole in roof allowing significant light ingress and limited temperature regulation.	No features suitable for roosting bats observed	Negligible
30	10320 - Timber framed summer house	<ul style="list-style-type: none"> External PRA 	SU 96927 06884	Timber summer house with timber and metal porch on east elevation, clad with timber weatherboarding.	Crevices visible under metal ridge cap of roof and weather boarding with gap into roof void visible on eastern	Low

				Double pitched plywood roof	elevation. Good quality surrounding habitat	
31	10320 - Timber framed tree house	<ul style="list-style-type: none"> External PRA 	SU 96927 06884	Elevated timber tree house with timber steps to access. Unsafe to access due to fragile timbers.	Few small gaps where timber has rotted and broken away in places	Low
32	10320 - Dwelling house	<ul style="list-style-type: none"> External PRA 	SU 97052 06943	Single storey brick gate house with a hipped roof clad with clay roof tiles.	No glass present in the windows and holes in the roof. top half of the roof tiles are missing on the northern elevation. Cavities were visible above the western window with bat roost potential. Internally the building is open to the apex with high levels of light ingress. There is also a large gap on the southern elevation	Low – Confirmed Roost
33	13146 – Dwelling house		SU 97048 06922	Flint and brick construction with a half-hipped gable end roof. Single storey but with roof windows on the southern and western elevations. Timber weather boarding on	Minor crevices visible around the roof vent although appeared to be lined	Low

				gable end of southern elevation and western elevation gable ends		
34	10550 - Static Caravan	<ul style="list-style-type: none"> External PRA One emergence survey 	SU 98298 07266	Single storey static caravan home with flat roof.	Crevice visible beneath roof on northern elevation	Moderate – Confirmed roost
35	10455 - Stable block	<ul style="list-style-type: none"> External PRA 	SU 98256 07253	Stable block with clay roof tiles and wooden panelling	Some loose tiles, gaps under wood panelling and mortar missing in brickwork	Low
36	12575 - Dwelling house	<ul style="list-style-type: none"> External PRA 	SU 99219 06073	Large two-storey yellow brick construction built in 2012. The house is clad with slate roof and ridge tiles.	Small gap under a lifted fresco. The roof appears well sealed on all elevations with only 5/6 slipped tiles recorded on the western end of the southern elevation and on the western elevation	Low
37	12575 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 99206 06122	Metal container currently used for storage. Rubbish piled up along eastern and southern elevations. Weathered/ rusting at the corners but well-sealed	No features suitable for roosting bats observed	Negligible

38	12575 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 99237 06125	<p>Metal container currently used for storage. Rubbish piled up along eastern and southern elevations. Weathered/ rusting at the corners but well-sealed</p>	No features suitable for roosting bats observed	Negligible
39	12765 - Stable block	<ul style="list-style-type: none"> External PRA Internal PRA One emergence 	SU 99140 05793	<p>A disused breeze-block and timber frame stable block with tiled, plywood roof</p> <p>No internal voids; three adjacent stables with chipboard lined roofs supported by ceiling joists and rafters. No evidence of roosting bats observed.</p>	Several gaps between walls and roof of structure but open-style and cool temperature inside	Low
40	D12765 - welling house	<ul style="list-style-type: none"> External PRA Internal PRA Two emergence and one re-entry survey 	SU 99146 05821	<p>Brick two-storey residential home with clay tiled, hip roof. Soffit boxes where roof meets brick walls and lead flashing around chimney base.</p> <p>Large roof void; extends throughout whole roof space. Timber; modern trusses (Fink style),</p>	Two external crevices observed above – one above gutter and below tiling of the roof and one hole at the end of the soffit	Moderate – Confirmed Roost

				<p>cluttered roof void due to truss construction. Lined with bitumen felt throughout. High light ingress due to window in gable. Low temperature. Potential access point via gaps between gable walls and terminal rafters.</p> <p>Approximately 300 bat droppings recorded. Concentrated on gable with window.</p>		
41	12765 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 99143 05836	<p>Small timber construction. Timber panelling with bitumen felt flat roof. Lots of cobwebs observed. Structure appears to be intact with no crevices.</p>	No features suitable for roosting bats observed	Negligible
42	12688 - Dwelling house	<ul style="list-style-type: none"> External PRA Two emergence and one re-entry survey 	SU 99275 05800	<p>Pebbledash walled, two-storey house. Hipped, tiled roof with an additional flat, metal-roofed extension. Lead flashing around base of chimney. Tiling around windows on south elevation. Tiled, tower-</p>	<p>Multiple lifted tiles between first and second storey around windows suitable for individual bats. Several potential crevices under eaves. Most features on southern and western elevations.</p>	Moderate – confirmed roost

				type structure on south west corner. Surrounding habitat quality is good		
43	12670 - Garage	▪ External PRA	SU 99262 05820	Modern concrete gable garage with pebbledash walls and corrugated roofing. Timber panelling on walls under roof	A small crevice visible beneath wooden panelling	Low
44	12670 - Stable block	▪ External PRA	SU 99255 05833	Timber cladded stable block with corrugated roofing and open gable	Small gaps between timber and roof allow internal access so may be features internally	Low
45	12670 - Timber shed	▪ External PRA	SU 99270 05828	Timber shed in garden. Timber panelling with a bitumen felt, flat roof. Roof partially collapsed with plants visible growing internally. Inaccessible to bats due to dense bramble across structure walls.	No features suitable for roosting bats observed	Negligible
46	12670 - Timber shed	▪ External PRA	SU 99281 05825	Timber structure with corrugated, flat metal roofing on one half and bitumen felt roofing on the other half. Exposed	No features suitable for roosting bats observed	Negligible

				internally. Appears disused and an in partially collapsed state.		
47	10765 - Brick outbuilding	<ul style="list-style-type: none"> External PRA One emergence survey and one re-entry survey 	SU 99899 05791	Brick, clay-tiled, open-gable out-building with adjacent corrugated flat roof extension. In neglected condition.	Some loose tiles and gaps between the ridge tiles suitable for individual bats. Crevices in brick walls and under corrugated roof. Also one ivy covered wall with potential crevices behind.	Moderate – Confirmed roost
48	16210 - Bridge	<ul style="list-style-type: none"> External PRA 	TQ 02452 06428	Railway overbridge of brick construction with steel girder and concrete deck with metal braces beneath and metal parapets. The bridge is formed of two brick abutments and two brick piers in the centre to accommodate the two railway tracks. The piers have four low arches approximately 1.2m in height.	Approximately five potential roost features of low suitability including areas where mortar is missing under the arches and concrete is missing from the under deck	Low
49	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97549 06818	A timber framed and clad construction, dimensions approx.	No features suitable for roosting bats observed	Negligible

				1x1m covered with a corrugated metal roof		
50	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97549 06818	Timber framed and clad wood store shed with a flat corrugated metal roof and open elevations to the south with large gaps along the north and east elevations.	No features suitable for roosting bats observed	Negligible
51	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97549 06818	Timber-framed and clad storage unit with sections of corrugated Perspex on the eastern elevation and is clad with a corrugated metal flat roof.	No features suitable for roosting bats observed	Negligible
52	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97549 06818	Metal shipping container with no obvious features	No features suitable for roosting bats observed	Negligible
53	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97548 06808	Metal trailer/ storage unit with wire mesh along the lower half of the western elevation. Gaps present above the door on the western elevation, multiple holes throughout.	No features suitable for roosting bats observed	Negligible

54	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97548 06808	timber-framed and clad shed with corrugated asbestos roof laid over older roofing felt. Gaps around the door on the western elevation.	No features suitable for roosting bats observed	Negligible
55	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97548 06808	Timber-framed store with the west and east elevations open so that it comprises a canopy between 2 sheds. Corrugated metal roof.	No features suitable for roosting bats observed	Negligible
56	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97548 06808	Timber-framed and clad wood store shed, corrugated asbestos roof, openings at the windows and doors.	No features suitable for roosting bats observed	Negligible
57	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97520 06820	Scaffold frame structure with tarpaulin covering, open at the northern elevation with a corrugated asbestos roof. Used for storage.	No features suitable for roosting bats observed	Negligible
58	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97520 06820	Timber-framed shed, corrugated asbestos roof, plywood and timber	No features suitable for roosting bats observed	Negligible

				skin, gaps along top of wall into inside		
59	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97520 06820	Timber-framed corrugated metal clad (north) and timber/boarding (south east and west elevations) storage building. Large hole on northern elevation.	No features suitable for roosting bats observed	Negligible
60	12735 - Timber framed structure	<ul style="list-style-type: none"> External PRA 	SU 97559 06760	Timber framed pre-fabricated building. Derelict. Timber weatherboarding with bitumen roof lining underneath timber weatherboarding. Open to the elements along the entire western elevation. Corrugated asbestos roof. Open and damaged windows on west, east and south elevations. Large gaps to internal space between roof and top of walls. Opening at top of doorway into structure as well as gaps under the eaves of the asbestos roof giving access to the interior	No features suitable for roosting bats observed	Negligible

				space along the eastern elevation. Building sitting on concrete stilts. Wooden fascia on north and south elevations.		
61	12735 - Static caravan	<ul style="list-style-type: none"> External PRA 	SU 97565 06717	Corrugated metal framed and clad static caravan. Timber boarding along ground where caravan is lifted on stilts.	No features suitable for roosting bats observed	Negligible
62	12735 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 97618 06685	timber-framed and clad potting shed approximately 2.5x1.5m with a sloped bitumen felt lined roof. Gaps and open window present on the western elevation. Ivy covering and some warping of timber cladding.	No features suitable for roosting bats observed	Negligible
63	12735 - Timber shed	<ul style="list-style-type: none"> External PRA One emergence and one re-entry survey 	SU 97627 06658	Timber framed single storey building clad with timber weatherboarding. Timber soffit box around roof. Bitumen roofing felt with corrugated metal sheeting	Gaps between corrugated sheeting and bitumen. Gap between 'little woods nursery' sign and timber boarding on south-western elevation	Low – Confirmed roost

64	12735 - Timber shed	<ul style="list-style-type: none"> External PRA One re-entry survey 	SU 97636 06637	Timber framed and timber clad single storey storage room. Corrugated asbestos, overhanging pitched roof	Large gaps between top of wall and roof under eaves on all elevations under asbestos sheeting. Some chicken wire present filling/plugging some of the gaps	Low – Confirmed roost
65	12735 - Timber shed	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Timber garden shed with bitumen roofing felt and Perspex windows on western elevation.	No features suitable for roosting bats observed	Negligible
66	12735 - Static caravan	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Metal construction, soffit and some gaps around the edge. PVC windows present on north and west elevations. Appearing to be used for storage. Appears intact.	No features suitable for roosting bats observed	Negligible
67	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Large live-in horse trailer with no visible crevices.	No features suitable for roosting bats observed	Negligible
68	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Large live-in horse trailer with no visible crevices.	No features suitable for roosting bats observed	Negligible
69	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Metal shipping container with flat roof and no visible crevices.	No features suitable for roosting bats observed	Negligible

70	12735 - Metal container	<ul style="list-style-type: none"> External PRA 	SU 97644 06624	Metal shipping container with flat roof and no visible crevices.	No features suitable for roosting bats observed	Negligible
71	12955 - Dwelling house	<ul style="list-style-type: none"> External PRA Internal PRA 	TQ 02843 05649	<p>Brick semi-detached dwelling with pitched and gable end roof clad with clay tiles.</p> <p>Large roof void extends throughout whole roof space. Simple timber frame roof with purlins, rafters, and ridgeboard. Fully lined with bitumen felt. No light ingress; low temperature. Large, uncluttered void suitable for maternity roost. No discernible access points. No evidence of roosting bats observed.</p>	Few entry/ exit points observed. Hanging tiles at south and north elevations as first floor level.	Moderate
72	12955 - Timber-framed structure	<ul style="list-style-type: none"> External PRA 	TQ 02848 05660	Timber structure with some corrugated metal panelled walls and partially boarded windows. Flat, bitumen covered roof.	No features suitable for roosting bats observed	Negligible

73	12955 - Timber-framed structure	▪ External PRA	TQ 02857 05659	Metal and timber walled structure with flat, corrugated metal roof. Large gaps in walls.	No features suitable for roosting bats observed	Negligible
74	12955 - Timber-framed structure	▪ External PRA	TQ 02862 05657	Timber and corrugated metal walls with flat corrugated metal roof. Windows allowing light ingress	No features suitable for roosting bats observed	Negligible
75	12955 - Timber-framed structure	▪ External PRA	TQ 02863 05647	Timber framed structure with corrugated metal pitched roof. No visible crevices.	No features suitable for roosting bats observed	Negligible
76	12955 - Garage	▪ External PRA	TQ 02855 05638	Concrete block construction, pitched and gable roof clad with bitumen felt. Intact and modern.	No features suitable for roosting bats observed	Negligible
77	10280 – type unconfirmed	▪ External PRA	SU 97016 06743	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
78	10280 – type unconfirmed	▪ External PRA	SU 97011 06755	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
79	10280 – type unconfirmed	▪ External PRA	SU 97008 06791	Not surveyed – no access permission	Not surveyed – no access permission	Unknown

80	10280 – type unconfirmed	▪ External PRA	SU 97025 06712	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
81	10351 – type unconfirmed	▪ External PRA	SU 97049 06872	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
82	10351 – type unconfirmed	▪ External PRA	SU 97074 06879	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
83	10326 – type unconfirmed	▪ External PRA	SU 97049 06872	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
84	10321 – type unconfirmed	▪ External PRA	SU 97015 06924	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
85	10322 – type unconfirmed	▪ External PRA	SU 97040 06926	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
86	13015 – type unconfirmed	▪ External PRA	SU 97140 06921	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
87	13040 – type unconfirmed	▪ External PRA	SU 97361 06949	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
88	13040 – type unconfirmed	▪ External PRA	SU 97299 06940	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
89	13040 – type unconfirmed	▪ External PRA	SU 97340 06914	Not surveyed – no access permission	Not surveyed – no access permission	Unknown

90	13040 – type unconfirmed	▪ External PRA	SU 97309 06916	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
91	13155 – type unconfirmed	▪ External PRA	SU 97383 06910	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
92	13005 – type unconfirmed	▪ External PRA	SU 97446 06939	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
93	13008 – type unconfirmed	▪ External PRA	SU 97433 06976	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
94	13006 – type unconfirmed	▪ External PRA	SU 97495 06986	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
95	13007 – type unconfirmed	▪ External PRA	SU 97430 07022	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
96	12734 – type unconfirmed	▪ External PRA	SU 97486 06781	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
97	12390 – type unconfirmed	▪ External PRA	TQ 02674 05824	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
98	12400 – type unconfirmed	▪ External PRA	TQ 02793 05819	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
99	12395 – type unconfirmed	▪ External PRA	TQ 02722 05872	Not surveyed – no access permission	Not surveyed – no access permission	Unknown

100	13215 – type unconfirmed	▪ External PRA	TQ 02928 06067	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
101	13145 – type unconfirmed	▪ External PRA	TQ 02905 06122	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
102	12420 – type unconfirmed	▪ External PRA	TQ 03030 05966	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
103	12430 – type unconfirmed	▪ External PRA	TQ 02896 05633	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
104	12430 – type unconfirmed	▪ External PRA	TQ 02919 05612	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
105	12430 – type unconfirmed	▪ External PRA	TQ 02935 05663	Not surveyed – no access permission	Not surveyed – no access permission	Unknown
106	12375 – type unconfirmed	▪ External PRA	TQ 02818 05655	Not surveyed – no access permission	Not surveyed – no access permission	Unknown

Appendix C: Emergence and Re-entry Locations

Table 1 – Bat emergence locations and flight paths from structures with confirmed roosts

Photograph Description	Photograph
Structure 1:	
Aerial image of Structure 1, showing egress points and flight lines of bats observed	 <p>An aerial photograph of a building with a complex roofline. Red stars are placed on the roof to indicate egress points, and red arrows show the flight paths of bats emerging from these points. The building is surrounded by greenery and a road is visible in the foreground.</p>
Egress points – loose ridge tiles on west elevation	 <p>A ground-level photograph of a house with a brown tiled roof and white walls. Red stars are placed on the roof to indicate egress points. A brick wall and a car are visible in the foreground.</p>

Egress point
close to
chimney
stack on
north east
elevation



Egress point
on south
elevation



Structure 5:

Aerial image of Structure 5, showing the flight line from the egress point



Egress point beneath apex roof on eastern elevation



Structure 32:

Aerial image of Structure 32, showing the flight line from the egress point



Egress point at edge of overhanging roof on northern elevation



Structure 34:

<p>Aerial image of Structure 34, showing the flight line from the egress point</p>	
<p>Egress point of common pipistrelle on the northern elevation</p>	<p>No image available</p>
<p>Structure 40:</p>	
<p>Aerial image of Structure 40, showing the flight line from the egress point</p>	

Egress and re-entry points on the southern gable end. Soprano pipistrelle observed entering and emerging



Re-entry points of soprano pipistrelle on northern elevation near apex of roof



Re-entry point
on eastern
elevation
where
multiple
soprano
pipistrelle
were
observed
entering
under a tile



Structure 42:

Aerial image
of Structure
42, showing
the flight line
from the
egress and
entry points



Re-entry points of soprano and common pipistrelle on southern and western elevations



re-entry points of common pipistrelle on southern and eastern elevations



Egress point
at base of
chimney on
northern
elevation



Structure 47:

Aerial image
of Structure
47, showing
the flight line
from the
egress and
entry points



Re-entry and emergence points of common pipistrelle on the south elevation in location of missing tile at approximately the fourth apex tile and under seventh apex tile from right in image



Structure 63:

Aerial image of Structure 63, showing the flight line from the entry point



Entry point of
a soprano
pipistrelle on
the south-
western
elevation



Structure 64:

Aerial image
of Structure
64, showing
the flight line
from the entry
point











Entry point of
soprano
pipistrelle
behind a sign
on the north-
eastern
elevation











Appendix D: Images of Structures Surveyed




Table 1 – Images of structures surveyed

Structure number	Structure reference and type	Plate
1	10550 - Dwelling house	
2	10550 – Dog kennel	
3	10900 - Dwelling house	 (from google maps)
4	10900 - Shed/workshop	 (from google maps)





5	10375 - Dwelling house	
6	10375 - Shed in garden	
7	10375 - Shed in garden next to boundary wall	
8	10375 - Shed on western side of small copse near field.	




9	11250 - Garden shed 1		
10	11250 - Garden shed 2		
11	11235 - Timber-framed structure 1		
12	11235 - Timber-framed structure 2		





13	11235 - Timber-framed cabin	
14	11235 - Timber-framed outbuilding	
15	11765 – Derelict farm building 1	
16	11765 – Open farm building 2	No photograph available
17	12275 – Derelict farm building	No photograph available
18	11221 One of the two bridge abutments that require a further survey. Dark void behind the corrugated sheet.	





	<p>Void inside abutment which may provide roosting opportunity</p> <p>Entrance to abutment void</p>	
20	10375 – timber shed	
21	10375 - timber shed	





22	10350 - longs corner house	
23	10323 - Garage	
24	10323 – dwelling house	

25	10324 – dwelling house	
26	10320 – dwelling house	
27	10320 – timber shed	
28	10320 – timber shed	




29	10320 - stable block	
30	10320 – timber framed structure	
31	10320 – timber framed structure	

32	10320 – dwelling house	
33	13146 – dwelling house	
34	10550 – static caravan	
35	10455 – stable block	

36	12575 – dwelling house	
37	12575 – static caravan	
38	12575 – metal container	
39	12765 – stable block	





40	12765 – dwelling house	
41	12765 – timber shed	
42	12688 – dwelling house	
43	12670 - garage	





44	12670 – stable block	
45	12670 – timber shed	
46	12670 – timber shed	
47	10765 – brick outbuilding	





48	16210 - bridge	
49	12735 – timber framed structure	
50	12735– timber framed structure	





51	12735– timber framed structure	
52	12735 – metal container	
53	12735 – metal container	




54	12735 – timber framed structure	
55	12735 – timber framed structure	
56	12735 – timber framed structure	
57	12735 – metal container	

58	12735 – timber framed structure	
59	12735 – timber framed structure	
60	12735 – timber framed structure	
61	12735 – static caravan	

62	12735 – timber shed	
63	12735 – timber shed	
64	12735 – timber shed	
65	12735 – timber shed	

66	12735 – static caravan	
67	12735 – metal container	
68	12735 – metal container	
69	12735 – metal container	

70	12735 – metal container	
71	12955 – dwelling house	
72	12955 – timber framed structure	
73	12955 – timber framed structure	

74	12955 – timber framed structure	
75	12955 – timber framed structure	
76	12955 - garage	

Appendix E: Weather Conditions During Emergence and Re-entry Surveys

Structure number	Survey date	Temp (°C)		Cloud cover (Oktas)		Wind		Precipitation	
		Start	End	Start	Start	End	Start	Start	End
1	23.08.18	20	18	4	1	4	3	0	0
	30.08.18	19	15	7	2	1	1	0	0
3	24.08.18	17	16	0	6	0	0	0	0
5	29.08.17	24	22	7	7	0	2	0	0
	09.08.18	17	17	8	8	1	1	1	1
	29.08.18	18	18	1	6	1	1	0	0
8	29.08.17	26	21	6	4	0	1	0	0
11	06.08.18	21	17	1	1	1	1	0	0
12	06.08.18	21	17	1	1	1	1	0	0
13	06.08.18	21	17	1	1	1	1	0	0
22	31.08.18	20	18	6	6	1	1	0	0

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Structure number	Survey date	Temp (°C)		Cloud cover (Oktas)		Wind		Precipitation	
		Start	End	Start	Start	End	Start	Start	End
25	08.08.18	21	19	7	8	1	1	0	0
32	07.08.18	22	Survey cancelled after 15 minutes due to landowner access refusal	8	Survey cancelled after 15 minutes due to landowner access refusal	0	Survey cancelled after 15 minutes due to landowner access refusal	1	Survey cancelled after 15 minutes due to landowner access refusal
34	30.08.18	19	15	7	2	1	1	0	0
39	09.08.18	16	17	7	8	1	1	1	1
40	09.08.2018	17	13	1	1	1	1	0	0
	29.08.18	17	16	8	8	1	1	0	0
	18.09.18	20	20	2	7	2	4	0	0
42	08.08.18	17	13	0	0	1	1	0	0
	18.08.18	19	16	1	1	1	1	0	0
	18.09.2018	20	20	2	7	2	4	0	0
47	07.08.18	18	14	0	0	1	1	0	0
	28.08.18	19	16	1	1	1	1	0	0

Structure number	Survey date	Temp (°C)		Cloud cover (Oktas)		Wind		Precipitation	
		Start	End	Start	Start	End	Start	Start	End
63	29.08.18	13	13	8	8	1	2	0	0
	20.09.18	20	20	10	10	6	5	0	0
64	29.08.18	13	14	8	8	2	3	0	0