

Welsh Government

M4 Corridor around Newport

December 2016 Environmental
Statement Supplement

Appendix SS10.3

Bat Roost Surveys of Buildings and
Structures 2016

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1 Introduction

- 1.1.1** RPS undertook external bat roost assessments and subsequent bat emergence and re-entry surveys of buildings and structures along the M4 Corridor around Newport (M4CaN) over the period May to September 2016.
- 1.1.2** This report describes the survey methods (Section 2), and the findings of the surveys (Section 3). A discussion of the survey findings is provided in Section 4.

2 2016 Survey Methods

2.1 Introduction

2.1.1 The bat roost assessment and subsequent bat emergence and re-entry surveys were conducted over the period May to September 2016, in accordance with the Bat Surveys: Good Practice Guidelines (Collins 2016).

2.1.2 Buildings and structures surveyed are shown in Figure 1. Buildings within the construction footprint of the new section of motorway consisted of:

- Barecroft House.
- Berryhill Farm.
- The Conifers.
- Undy House.
- San Remo.
- Berryhill Cottage.
- Myrtle House.
- Quarry Cottage.
- Dunline, Knollbury.
- The Glen.
- White Cottage.

2.1.3 Fair Orchard Farm was noted just outside of the southern boundary of the Scheme and anecdotal reports from the farmer indicated the potential presence of a bat roost within this farmstead. Therefore the buildings within this farm were subject to survey.

2.1.4 The following bridges were also surveyed:

- A48 (M) – M4 Overbridge (verge under bridge of M4 eastbound and westbound carriageways).
- Pound Hill – M4 Overbridge (verge under bridge of M4 eastbound and westbound carriageways).
- Park Farm footbridge.

2.2 Methodology

Bat Roost Assessment

2.2.1 An external inspection was conducted around all accessible sides of each building during May / June 2016 by an ecologist holding a Natural Resources Wales bat licence. Where possible the accessible aspects and external features were inspected using a torch and mechanic's mirror as appropriate. Full internal

inspections of each building were not possible due to health and safety constraints and access restrictions.

2.2.2 Features of potential value to bats were identified in order to focus the efforts of the emergence/re-entry surveys. These features included openings in soffit boxes/barge boards/soffit boards, raised roof and ridge tiles, openings in hanging tiles, expansion joints and any other cracks or gaps that could provide access opportunities for roosting bats.

2.2.3 External field signs indicating the use of the building/structure by bats, such as urine stains, grease stains, droppings, feeding remains and dead or living bats were also recorded.

2.2.4 Based on the location, age and type of building/structure, the potential features present and the indicative signs recorded, the structures were categorised using the assessment criteria in Table 4.1 of the 3rd edition of the BCT Guidelines (Collins 2016), as follows:

- Known or confirmed roost.
- High suitability: Building or structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitats.
- Moderate suitability: Building or structure with one or more potential roost sites that could be used by numbers of bats due to their size, shelter, protection, conditions and surrounding habitats, but unlikely to support a roost of high conservation concern.
- Low suitability: Building or structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).

Emergence / Re-entry Surveys

2.2.5 The survey methodology followed guidelines published by the Bat Conservation Trust (Collins 2016).

2.2.6 Dusk emergence and dawn re-entry surveys were undertaken between June and September 2016. The surveys focused on the sections of the buildings/structures where features were noted with the potential to support roosting bats.

2.2.7 All surveys were led by experienced surveyors holding relevant Natural Resources Wales or Natural England bat licences leading a team of ecologists experienced in undertaking bat surveys. Surveyor details are provided in Table 2.1 below.

Table 2.1: Emergence/ Re-entry Surveyors

Name	Position	Licence and licence number (if applicable)	Experience
Sean Flynn	Senior Ecologist	71624:OTH:CSAB:2016	11 years' experience surveying for bats and 3 years' experience co-ordinating bat surveys for teams of ecologists and undertaking dusk emergence and dawn re-entry bat surveys
Nicola Pyle	Consultant Ecologist	N/A	10 years' experience surveying for bats. Holder of Natural England Level 2 class licence: 2015-18259-CLS-CLS
Sarah Downing	Ecologist	N/A	9 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys
Ruth Holland	Assistant Ecologist	N/A	4 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys
Jay Allen	Ecologist	N/A	4 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys
Nathan Redman	Assistant Ecologist	N/A	4 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys
Marc Dino	Environmental Consultant	N/A	3 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys
Georgia Kelly	Assistant Ecologist	N/A	3 years' experience as surveyor undertaking dusk emergence and dawn re-entry bat surveys

2.2.8 The Bat Survey Guidelines (Collins 2016) state that emergence / re-entry surveys should be undertaken as follows, based on the initial Bat Roost Assessment:

- Low roost suitability – one survey from May to August. Either one dusk emergence or dawn re-entry survey.
- Moderate roost suitability – Two separate survey visits in May to September with at least one of surveys between May and August. One dusk emergence and a separate dawn re-entry survey.

- High roost suitability – Three separate survey visits in May to September with at least two of surveys between May and August. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn.

2.2.9 For roosts with low suitability an extra emergence or re-entry survey was undertaken to give further confidence in the results.

2.2.10 During the roost emergence and re-entry surveys in order to record bat calls for further analysis (see paragraph 2.2.12), surveyors were equipped with one of the following bat detectors:

- Anabat II.
- Anabat SD1.
- Anabat SD2.
- Elekon Batlogger M.
- Batbox Duet detector connected to an MP3 recorder.
- Wildlife Acoustics Echo Meter 3.
- Wildlife Acoustics Echometer Touch.
- Petterson D240x.

2.2.11 The locations of surveyors during the bat emergence/dawn surveys are illustrated in the plans at Figures 2 a-l.

2.2.12 The sonograms recorded using detectors outlined in 2.2.10 above were analysed using the following software:

- AnalookW version 3.3q (October 2006) for Anabats.
- BatExplorer Version 1.11.3.0 (2015).

2.2.13 This information was used alongside field notes from observations made during the surveys to inform the likelihood of each species. Species identification was made on the basis of the characteristics of the call including peak frequency, minimum and maximum frequency, call duration, slope, cycles and inter pulse interval using guidance on bat calls (Russ 2012). Observations of bat behaviour, size and the direction of the flight path were also noted where possible.

2.2.14 Surveyors noted all locations of the buildings/structures where bats were seen to emerge or re-enter, the numbers of bats associated with the feature and any associated behaviour, such as swarming. In addition, any bat foraging activity within the site and immediate surroundings was recorded on the detectors and corresponding field notes.

2.2.15 All the emergence surveys began at least 15 minutes before sunset and continued for 1.5 to 2 hours after sunset, until it was too dark to see emerging bats. The dawn re-entry surveys began 2 hours before dawn and extended for 15 minutes after sunrise. The survey timings and weather conditions are given in Table 2 2.

Table 2.2: Emergence / Re-entry Surveys Dates, Timings and Weather Conditions

Date	Building Surveyed	Start Time	Sunset /Sunrise	Survey End Time	Min. Temp (°C)	Weather Conditions
18/05/2016	Barecroft House	20:48	21:02	22:32	12	50% Cloud, Dry, Wind Beaufort Force 0
31/05/2016	Berryhill Farm	21:00	21:20	23:07	22	100% Cloud, Warm. Wind Beaufort Force 0
29/06/2016	The Conifers	21:20	21:33	22:33*	17	100% Cloud, Dry, Wind Beaufort Force 6
06/07/2016	Fair Orchard Farm	21:15	21:32	23:30	16	100% Cloud, Dry, Wind Beaufort Force 0
12/07/2016	San Remo	21:12	21:32	23:02	14	20% Cloud, Dry, Wind Beaufort Force 0
12/07/2016	White Cottage	21:12	21:27	22:57	12	0% Cloud, Dry, Wind Beaufort Force 0
13/07/2016	Dunline Knollbury	21:12	21:25	23:15	16	0% Cloud, Dry y, Wind Beaufort Force 0
19/07/2016	Fair Orchard Farm	21:00	21:15	23:20	22	70% Cloud, Dry, Wind Beaufort Force 2
20/07/2016	The Conifers	21:00	21:17	23:17	18	70% Cloud, Dry, Wind Beaufort Force 2-3
20/07/2016	Undy House	03:20	05:20	05:25	20	25% Cloud, Dry, Wind Beaufort Force 1
21/07/2016	Myrtle House	21:00	21:16	23:16	18	100% Cloud, Dry, Wind Beaufort Force 0
03/08/2016	Berryhill Farm	20:56	20:35	22:42	16	70% Cloud, Dry, Wind Beaufort Force 6-7
04/08/2016	Barecroft House	03:40	05:37	05:52	13	0% Cloud, Light rain, Beaufort Force 6
04/08/2016	Undy House	20:40	20:56	22:52	14	20% Cloud, Dry, Wind Beaufort Force 4
05/08/2016	Berry Hill Cottage	03:30	05:30	05:45	16	No Cloud, Dry, Wind Beaufort Force 4
09/08/2016	The Glen	20:25	20:45	22:45	15	25% Cloud, Dry, Wind Beaufort Force 4

Date	Building Surveyed	Start Time	Sunset /Sunrise	Survey End Time	Min. Temp (°C)	Weather Conditions
10/08/2016	Berryhill Cottage	20:29	20:44	22:44	17	100% Cloud, Dry, Wind
10/08/2016	Myrtle House	03:45	05:50	06:06	13	90% Cloud, Dry, Wind Beaufort Force 0
10/08/2016	Quarry Cottage	20:25	20:44	22:44	16	100% Cloud, Dry, Wind Beaufort Force 2
11/08/2016	Berryhill Farm	03:51	05:51	06:06	14	90% Cloud, Dry, Wind Beaufort Force 1
11/08/2016	The Conifers	20:30	20:44	22:44	16	100% Cloud, Dry, Wind Beaufort Force 0
16/08/2016	San Remo	20:37	20:32	22:32	16	0% Cloud, Dry, Wind Beaufort Force 1
16/08/2016	Quarry Cottage	20:17	20:32	22:32	16	0% Cloud, Dry, Wind Beaufort Force 0
17/08/2016	Barecroft House	08:15	08:30	10:30	26	70% Cloud, Dry, Light wind Beaufort Force 3
17/08/2016	Fair Orchard Farm	03:55	06:01	06:16	11	30% Cloud, Dry, Wind Beaufort 1
18/08/2016	Berryhill Cottage	04:00	06:02	06:17	18	100% Cloud, Light rain, Wind Beaufort 1-2
18/08/2016	San Remo	04:00	06:03	06:18	18	100% Cloud, Light drizzle to dry, Wind Beaufort 0
18/08/2016	White Cottage	20:10	20:28	22:29	18	80% Cloud, Dry, Wind Beaufort 0
07/09/2016	White Cottage	19:40	19:44	21:45	18	75% Cloud, Dry, Wind Beaufort 0
07/09/2016	Pound Hill M4 Overbridge (eastbound)	19:28	19:44	21:14	23	30% Cloud, Dry, Wind Beaufort 0-1
08/09/2016	The Conifers	04:30	06:36	06:51	15	90% Cloud, Dry, Wind Beaufort 1-2
14/09/2016	Pound Hill – M4 Overbridge (westbound M4)	19:13	19:28	20:58	12	10% Cloud, Dry, Wind Beaufort 2
21/09/2016	A48 (M) – M4 Overbridge (eastbound M4)	18:57	19:12	20:42	13	20% Cloud, Dry, Wind Beaufort 0-1
27/09/2016	A48 (M) – M4 Overbridge (westbound M4)	18:43	18:58	20:28	11	0% Cloud, Dry, Wind Beaufort 2

2.3 Valuation of Roosts

2.3.1 Valuation of roosts has been conducted in accordance with Table 2.3 (from Wray *et al*, 2010).

Table 2.3. Valuing bat roosts

Geographic scale of importance	Roost type
Local	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small numbers of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well used swarming sites Maternity sites (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rare/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting SSSI guidelines based on bats
International	SAC sites with bats as qualifying species

2.4 Limitations and exclusions

2.4.1 At least one of the surveys of each building was undertaken during the optimal time of year for identifying maternity roosts. However there were occasions where limitations and restrictions to survey were noted; see below.

2.4.2 Survey of The Conifers on 29th July was cut short (one hour after sunset) due to heavy rain. Emergence data was collected and subsequently included with the survey data set; however, an additional survey was scheduled. In the same building on 8th September, a brief period of rain between 0555 and 0600 was not considered to have resulted in a significant constraint to survey as significant activity was noted either side of the rainfall event.

2.4.3 On 16th August surveyors started surveying San Remo five minutes after sunset as surveyors were delayed in arriving on site. Two further surveys were conducted at this building and each time bats emerged no sooner than 15 minutes after sunset. Consequently the delay in starting is not considered to have significantly affected the survey findings and conclusions for this building.

2.4.4 Dawn re-entry survey at Berryhill Cottage on 18th August was subject to fifteen minutes rain (0415 to 0430). Activity continued after 0430 and roost entries were noted. Therefore this rainfall was not considered to have significantly affected the results of the survey.

- 2.4.5** Access restrictions at Berryhill Cottage meant that all of the surveys were conducted over a short period (i.e., surveys on 5th August, 10th August, and 18th August) and not spread over the season as recommended in the BCT Bat Survey Guidelines (Collins 2016). However, August is considered to be in the optimal survey period for identifying maternity roosts.
- 2.4.6** There was no access to the northwest side of the garage at Dunline Knollbury, as this was within the adjoining residential property.
- 2.4.7** Surveys of bridges were undertaken in September. This is outside the optimal survey period for maternity roosts but in the optimal survey period for transitional roosts. As the bridges are not considered to provide the right conditions for breeding, this is not considered to be a limitation to the validity of the survey data.
- 2.4.8** A lime kiln building, located at the eastern end of the Scheme was identified as a bat roost during the bat tree surveys. All details of the building and surveys undertaken on the building are provided within Appendix SS10.2 Bat Survey 2016.

3 Results

3.1 Bat Roost Assessment

3.1.1 The findings of the bat roost assessment with full descriptions and photographs are provided in Annex A. The roost assessment summary takes into account the findings of the dusk emergence and dawn re-entry surveys described in Section 3.2. Table 3.1 summarises the findings

Table 3.1 Summary of Bat Roost Assessment

Building name	Roost Assessment Summary	Notes
Barecroft House	Confirmed roost within main building.	Common pipistrelle observed emerging from lead flashing and from under roof tiles and entering east side conservatory during surveys. Stables and small storage structure to east of main building with no roost potential for roosting bats
Fair Orchard Farm	Confirmed roost in whole of main building (i.e. B2, B3, B4, B5, B7) as may be interconnected. B1 - moderate potential B6 has moderate potential	Common pipistrelle dropping found stuck to north facing barn door of B7(confirmed by DNA analysis) B1 has potential for roosting bats within gaps in barge boards and within joists B6 has potential for roosting within bat boxes and wooden joists
Berry Hill Farm	Confirmed roost within B1, B2 and B4 B3 has high potential B5, B6 and B7 all provide negligible potential for roosting bats.	Common pipistrelle bat droppings found on floor of garage in building 2 (confirmed by DNA analysis). B3 has potential for roosting bats within openings into roof space through raised ridge and roof tiles; into open windows and doors; and within barge/fascia boards B5 – is a corrugated steel barn very open on all side with no suitable roost sites for bats B6 very 'tight' building with no

Building name	Roost Assessment Summary	Notes
		<p>potential roost sites noted.</p> <p>B7 is a corrugated steel container in use as storage shed. Access locations into internal space over door however steel construction provides poor roosting potential for bats due to daily temperature fluctuations.</p>
The Conifers	<p>Confirmed roost within main building.</p> <p>Garage to east and swimming pool within glass house provide negligible potential for roosting bats.</p>	<p>Small bat droppings (considered likely pipistrelle bats) found on window of west facing gable end of southern annex building.</p> <p>The garage was very tight building with no features noted suitable for roosting bats.</p> <p>The swimming pool is almost entirely glass with no suitable roosting features.</p>
Undy House	Confirmed roost	Common pipistrelle observed emerging / re-entering building during surveys.
San Remo	Confirmed roost	Common pipistrelle observed emerging / re-entering missing hanging tiles and gaps under tiles during surveys.
Berryhill Cottage	Confirmed roost	Common pipistrelle and soprano pipistrelle were observed emerging / re-entering gaps under barge / fascia boards during surveys.
White Cottage	High suitability	Openings into soffit box and openings into torn roof felt under eaves provide a wide number of roost sites with significant potential for numerous bats to utilise
Myrtle House	Low suitability	Opening in wood clad building provide opportunities for individual bats to roost opportunistically.
Quarry Cottage	Low suitability	Potential for individual bats to roost opportunistically were noted in small gap within ridge tile and within small gap under soffit box along western

Building name	Roost Assessment Summary	Notes
		elevation.
Dunline Knollbury	Low suitability	Small opening into fascia boards on northern aspect of building and gaps between hanging tiles along eaves provide opportunities for individual bats to roost opportunistically.
The Glen	Low / negligible suitability	Limited potential for individual bats to roost opportunistically at intersection between tiles and lead flashing within the valley between two pitched roofs
Pond Hill M4 Overbridge	Low suitability	Potential for roosting bats to utilise expansion joints in summer
A48 (M) Overbridge	Low suitability	Potential for roosting bats to utilise expansion joints in summer
New Park Farm Footbridge	Negligible suitability	No potential noted.

3.2 Emergence / Re-entry Surveys

3.2.1 The results of the emergence / re-entry surveys, including dates, locations of surveyors, emergence locations, times of emergence and species are shown in Figures 2 a-l.

Barecroft House

3.2.2 Surveys were undertaken of the main residential property at Barecroft House on the 18th May; 4th August and 17th August. On 18th May two common pipistrelles were seen to emerge from the southern aspect of the main house (from under a roof tile and lead flashing) at 2125 and 2126 respectively. During re-entry survey on the 4th August a single common pipistrelle was seen to enter into the conservatory roof at the east side of the main building at 0455. Emergence and re-entry locations are shown in Figure 2a. No bats were recorded on 17th August.

Berryhill Farm

3.2.3 Berryhill Farm was surveyed on the 31st May; 3rd August; and 11th August. Roosts were identified in building 1, building 2 and building 4 and are detailed in Table 3.2 below. All emergence and re-entry locations and timings are shown in Figure 2b.

Table 3.2 Emergence and re-entry results from Berry Hill Farm

Survey date	Type of survey	Notes
31/5/2016	Dusk emergence	Building 1 Between 2120 and 2150, 68 common pipistrelles emerged from under the barge boards at the west facing gable end extension (see Plate 15 in Annex 1).

Survey date	Type of survey	Notes
		<p>Building 2 One long-eared bat emerged from an open garage door at the west elevation of building at 2151 and flew south east. A single soprano pipistrelle emerged from the same open garage door at 2122.</p> <p>Building 4 One common pipistrelle emerged from a gap within the roof tiles at 2138.</p>
3/8/2016	Dusk emergence	<p>Building 1 Five common pipistrelles emerged from under the barge boards at the west facing gable end extension between 2122 and 2133</p> <p>Building 4 Two common pipistrelles emerged from the south side of the building at 2117 and 2122. One from a gap within the window edge and the other from a gap within the roof edge</p>
11/8/2016 (am)	Dawn re-entry	<p>Building 1 15 common pipistrelles entered under the fascia board near the ridge at the gable end of the south facing aspect between 0507 and 0535</p> <p>Building 2 Eight long-eared and one <i>Myotis</i> entered the open garage door into the west side of the building between 0507 and 0521</p>

The Conifers

3.2.4 The Conifers was surveyed on the 29th June; 20th July; 11th August; and 8th September 2016. Roosts exit / entry points were identified within the soffit, the barge / fascia boards and within hanging tiles within main building along the southern, eastern and western aspects of the building and are described in Table 3.3 below. All emergence and re-entry locations are shown in Figure 2c.

Table 3.3 Emergence and re-entry results from The Conifers

Survey date	Type of survey	Notes
29/6/2016 (heavy rain)	Dusk emergence	<p>Seven common pipistrelles emerged from gaps under the barge boards at the western facing gable end of the southern extension between 2153 and 2200.</p> <p>Two bats emerged from the eaves at the south</p>

Survey date	Type of survey	Notes
		<p>west corner of the main building at 2156 and 2207. These bats were seen but not heard and no calls were recorded. Given the flight style and size of bats observed, these were considered likely to be long-eared bats.</p> <p>Emergence of one common pipistrelle (at 2158) and one soprano pipistrelle (at 2202) from above the hanging tiles of the south facing gable end.</p>
20/7/2016	Dusk emergence	<p>43 common pipistrelles emerged from south facing gable end soffit box (see Plate 24 in Annex A). All bats emerged between 2134 and 2210.</p> <p>11 common pipistrelles emerged from south west side of the building between 2138 and 2201. Six of these bats were recorded commuting north west and the remaining five were recorded commuting south from the building.</p>
11/8/2016	Dusk emergence	<p>27 common pipistrelles emerged from three locations. Three common pipistrelles emerged from underneath the barge board on the eastern side of the building. 14 common pipistrelles emerged from the soffit box on the southern section of the building. 10 common pipistrelles emerged from under fascia/eaves on the western side of the building. All emergences occurred between 2145 and 2154.</p>
8/9/2016 (am)	Dawn re-entry	<p>Three long-eared bats entered the western aspect of the gable end porch at 0546. Five common pipistrelles entered the west facing gable of the southern annex building between 0552 and 0622. A single long-eared bat and two common pipistrelle bats re-entered the lower south facing gable end via the hanging tiles between 0606 and 0610.</p>

Undy House

3.2.5 Undy House was surveyed on the 20th July; 4th August; and 17th August 2016. Roosts for single common pipistrelle bats were found within the south western elevation of B1 and of the western aspect of B2 as described in Table 3.4 below. All emergence and re-entry locations are shown in Figure 2d.

Table 3.4 Emergence and re-entry results from Undy House

Survey date	Type of survey	Notes
20/7/2016 (am)	Dawn re-entry	Main building– Single common pipistrelles returned to eaves near flat roof at 0435. Old derelict building – Single common pipistrelle flew into ivy cladding on western elevation of building.
4/8/2016	Dusk emergence	No bats emerged from the buildings.
17/8/2016	Dusk emergence	No bats emerged from the buildings.

San Remo

3.2.6 San Remo was surveyed on the 12th July; 16th August; and 18th August 2016. Roosts were identified in gaps behind hanging tiles and lead flashing and are described in Table 3.5 below. All emergence and re-entry locations are shown in Figure 2e.

Table 3.5 Emergence and re-entry results from San Remo

Survey date	Type of survey	Notes
12/7/2016	Dusk emergence	A single common pipistrelle emerged from lead flashing under dormer window at 2140 and flew north.
16/8/2016	Dusk emergence	Five common pipistrelles emerged from a gap where a hanging tile was missing on the south eastern corner of the east facing dormer window of the building. One common pipistrelle emerged from the flat roof dormer window on the south western section of the building.
18/8/2016 (am)	Dawn re-entry	Eight common pipistrelles entered on the east side of the building (six around dormer window and two further re-entries at the top south corner of the dormer window frame) between 0554 and 0610.

Berryhill Cottage

3.2.7 Berryhill Cottage was surveyed on the 5th August; 10th August; and 18th August. Roosts were identified along the western aspect of the building and are described in Table 3.6 below. All emergence and re-entry locations are shown in Figure 2f.

Table 3.6 Emergence and re-entry results from Berryhill Cottage

Survey date	Type of survey	Notes
5/8/2016 (am)	Dawn re-entry	Two common pipistrelles were seen to enter at the barge board at two locations of the west facing aspect of the building at 0338 and 0520.

Survey date	Type of survey	Notes
10/8/2016	Dusk emergence	Three common pipistrelle bats emerged from gaps under the bargeboard on the western side of the building. All emerged between 2048 and 2054
18/8/2016	Dawn re-entry	Four common pipistrelles entered the western barge boards and soffit between 0450 and 0605 and one soprano pipistrelle entered the same location at 0554.

Fair Orchard Farm

3.2.8 Fair Orchard Farm was surveyed on the 6th July; 19th July; and 17th August 2016. Roosts were identified within buildings 2, 4 and 7 and are described in Table 3.7 below. Building numbers and emergence / re-entry locations are shown in Figure 2g.

3.2.9 A dropping found on the north facing barn door of building 4 (Figure 2) and a dropping found on the barn door were sent for DNA analysis and were confirmed as from common pipistrelle.

Table 3.7 Emergence and re-entry results from Fair Orchard Farm

Survey date	Type of survey	Notes
6/7/2016	Dusk emergence	Approximately eight common pipistrelles and one unidentified bat (likely to be common pipistrelle based to flight style and size) emerged from a large round open window on the north eastern side of building 2 (see Plate 4 in Annex A). All bats emerged between 2203 and 2236.
19/7/2016	Dusk emergence	Two common pipistrelles emerged from a large round open window on the north eastern side of building 2 at 2143 and 2146.
17/8/2016 (am)	Dawn re-entry	Five common pipistrelles entered the large round open window on the north eastern side of building 2 between 0414 and 0519. A single common pipistrelle entered building 4 through a gap above the door on the eastern side at 0539. A single common pipistrelle entered the north side of building 7 using the gap above the door at 0541.

White Cottage

- 3.2.10** White Cottage was surveyed on the 12th July; 8th August; and 7th September 2016. No bats were seen to leave or re-enter any of the buildings surveyed. Surveyor locations are shown in Figure 2h.

Myrtle House

- 3.2.11** Myrtle House was surveyed on the 21st July and 10th August 2016. No bats were seen to leave or re-enter any of the buildings surveyed. Surveyor locations are shown in Figure 2i.

Quarry Cottage

- 3.2.12** Quarry Cottage was surveyed on the 10th August; and 16th August 2016. No bats were seen to leave or re-enter any of the buildings surveyed. Surveyor locations are shown in Figure 2j.

Dunline Knollbury

- 3.2.13** Dunline Knollbury was surveyed on the 13th July; and 14th September 2016. No bats were seen to leave or re-enter any of the buildings surveyed. Surveyor locations are shown in Figure 2k.

The Glen

- 3.2.14** The Glen was surveyed on the 9th August 2016. No bats were seen to leave or re-enter any of the buildings surveyed. Surveyor locations are shown in Figure 2l.

Pound Hill – M4 Overbridge

- 3.2.15** The Pound Hill M4 Overbridge was surveyed on 7th September from the verge along the eastbound carriageway of the M4; and on 14th September from the verge along the eastbound carriageway of the M4. No bats were seen to leave or re-enter any features within the bridge.
- 3.2.16** Surveyors were positioned either side of the bridge for each survey event.

A48 (M) – M4 Overbridge

- 3.2.17** The A48 (M) – M4 Overbridge was surveyed on 21st September from the verge along the eastbound carriageway of the M4; and on 27th September from the verge along the eastbound carriageway of the M4. No bats were seen to leave or re-enter any features within the bridge.

Surveyors were positioned either side of the bridge for each survey event.

4 Assessment of Roosts

Barecroft House

- 4.1.1** Barecroft House is considered to be a summer day roost for a small number of common pipistrelle bats (up to two bats observed during surveys) and is of Local value in accordance with Table 2.3.
- 4.1.2** Barecroft House is connected to good quality foraging habitat along the railway line to the north and along a network of tall hedgerows and tree lines running into Gwent Levels reën, field ditch and wet grassland.

Berryhill Farm

- 4.1.3** Three bat species have been confirmed roosting at Berryhill Farm, as follows:
- Building 1 is considered to be a common pipistrelle maternity roost (up to 68 bats observed)
 - Building 2 is considered likely to be a long-eared maternity roost (up to eight bats observed) and a summer day roost for a single soprano pipistrelle bat and a single *Myotis* bat.
 - Building 4 is considered to be a summer day roost for common pipistrelle bats (up to two bats observed).
- 4.1.4** For the long-eared bats in B2, droppings were collected and were sent off for eDNA analysis; however, the results were returned inconclusive. Brown long-eared bats have been recorded in the study area and are much more common than grey long-eared bats, which have not been recorded from the study area. Therefore, it is extremely likely that the bats were brown long-eared.
- 4.1.5** The farm is surrounded by good foraging habitats including a contiguous mosaic of old orchards, tall dense hedgerows, semi-natural broadleaved woodland, mature trees and semi-improved pasture.
- 4.1.6** The roost complex at Berryhill Farm is of County value in accordance with Table 2.3.

The Conifers

- 4.1.7** Three bat species have been confirmed roosting at The Conifers, as follows:
- Common pipistrelle maternity roost (up to 55 bats observed).
 - Long-eared summer day roost (up to three bats observed).
 - Soprano pipistrelle summer day roost (one bat observed).
- 4.1.8** The Conifers is only 250m from the common pipistrelle maternity roost at Berryhill Farm and the bats using both buildings are extremely likely to be part of the same colony, which moves between the two roosts. This is a common habit of common pipistrelle bats (Altringham 2003).
- 4.1.9** As with Berryhill Farm the Conifers are connected to the same contiguous mosaic of old orchards, tall dense hedgerows, semi-natural broadleaved woodland, mature trees and semi-improved pasture.

4.1.10 The roost complex at The Conifers is of County value in accordance with Table 2.3.

Undy House

4.1.11 Both the main building and the derelict building to the north (buildings 1 and 2 respectively) are considered to be common pipistrelle summer day roosts (single bats observed from each building) and are of Local value in accordance with Table 2.3. Undy house is located within an old orchard and is surrounded by good foraging habitats in the north, east and west and bordered on the south by good foraging habitats in plantation woodland along the M4.

San Remo

4.1.12 San Remo is considered to be a common pipistrelle summer day roost (up to eight bats observed during surveys) and is of Local value in accordance with Table 2.3.

4.1.13 San Remo is connected to good quality foraging habitat along the southern edge of the A48(M) soft estate that provides continuous woodland foraging opportunities to the west.

Berryhill Cottage

4.1.14 Two bat species have been confirmed roosting at Berryhill Cottage, as follows:

- Common pipistrelle summer day roost (up to four bats observed).
- Soprano pipistrelle summer day roost (one bat observed).

4.1.15 Berryhill Cottage is located within woodland habitats that extend to the west and is a short distance from good foraging orchard, woodland, hedgerow and grassland habitats to the south of the A48 around Berryhill Farm.

4.1.16 The roosts at Berryhill Cottage are of Local value in accordance with Table 2.3.

Fair Orchard Farm

4.1.17 The main building at Fair Orchard Farm (including B2, B3, B4, B5 and B7) is a common pipistrelle summer day roost (up to eight bats) and is of Local value in accordance with Table 2.3. .

4.1.18 Fair Orchard Farm is connected to the wider landscape along interconnected hedgerows with occasional mature trees present. Wet grassland, reens and field ditches provide foraging habitats within an open, managed landscape.

Other Buildings

4.1.19 The other buildings surveyed are not considered to be used by roosting bats. These buildings were:

- Myrtle House.
- Quarry Cottage.
- Dunline Knollbury.
- The Glen.
- White Cottage.

References

Altringham J. (2003). British Bats. *The New Naturalist*.

Collins (2016). Bat Surveys: Good Practice Guidelines, 3rd Edition. Bat Conservation trust.

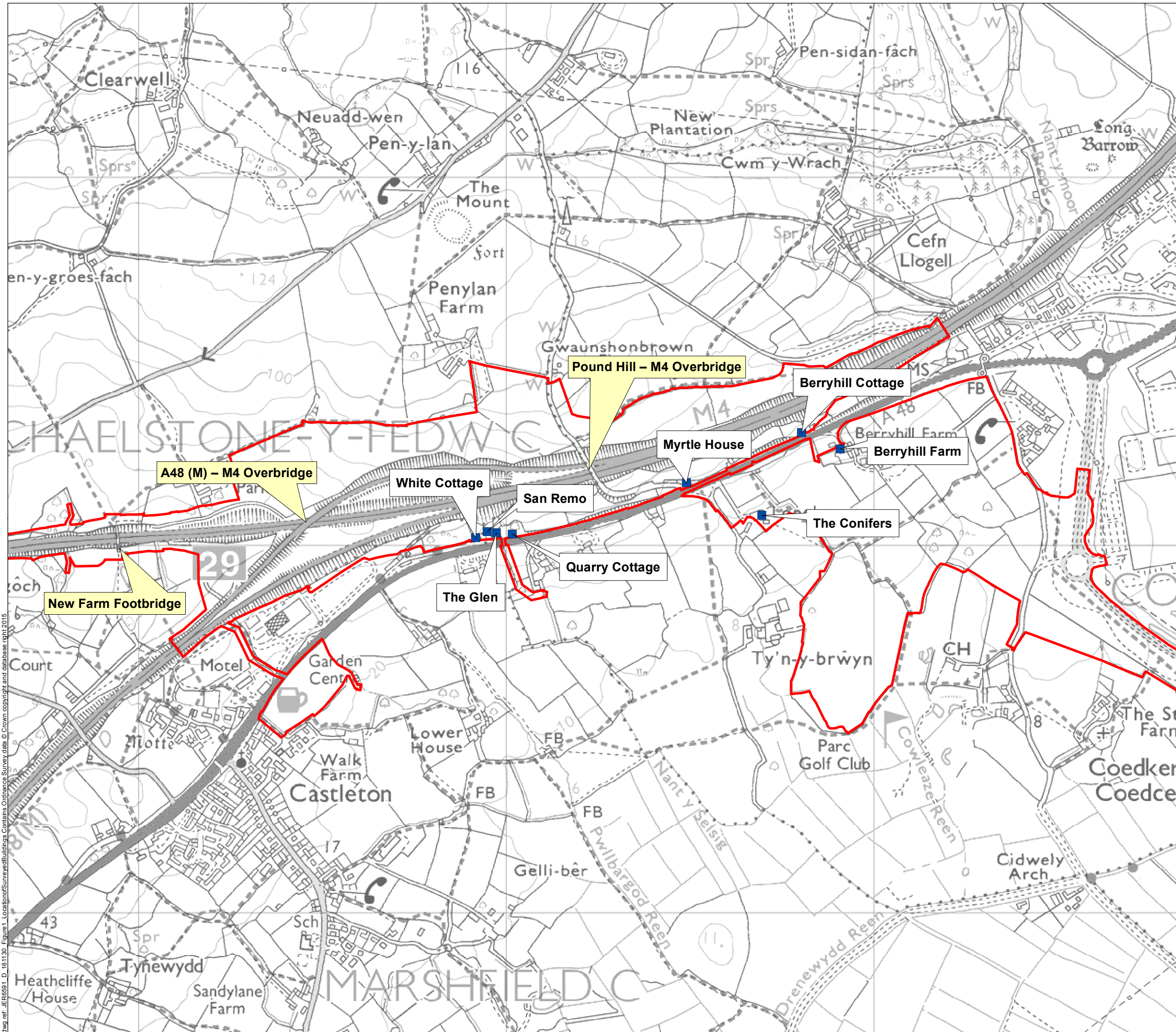
Russ J. (2012). British Bat Calls: A Guide to Species identification. Pelagic Publishing

Wray S, Wells D, Long E, Mitchell-Jones T (December 2010) Valuing Bats in Ecological Impact Assessment, IEEM In-Practice p 23-25

Figures

Figure 1: Locations of Surveyed Buildings and Structures

Figure 2: Bat Survey Plans



Legend

- Permanent and Temporary Landtake
- Buildings Surveyed

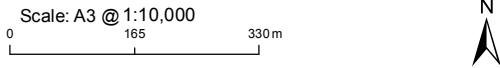


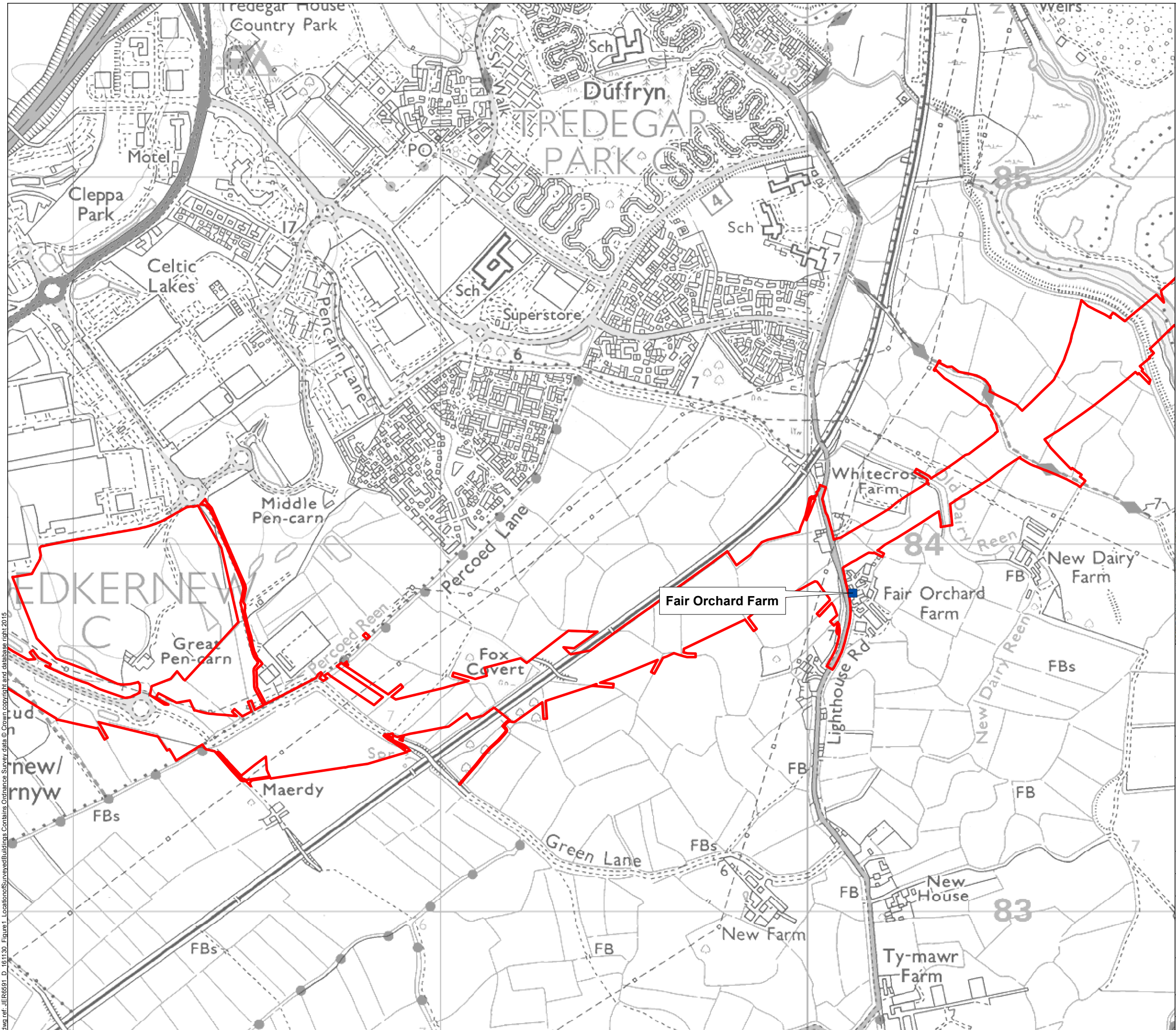
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Welsh Government

Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 1:Location of Surveyed Buildings and Structures

Figure: 1a	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW





Legend

- Permanent and Temporary Landtake
- Buildings Surveyed

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Welsh Government

Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 1:Location of Surveyed Buildings and Structures

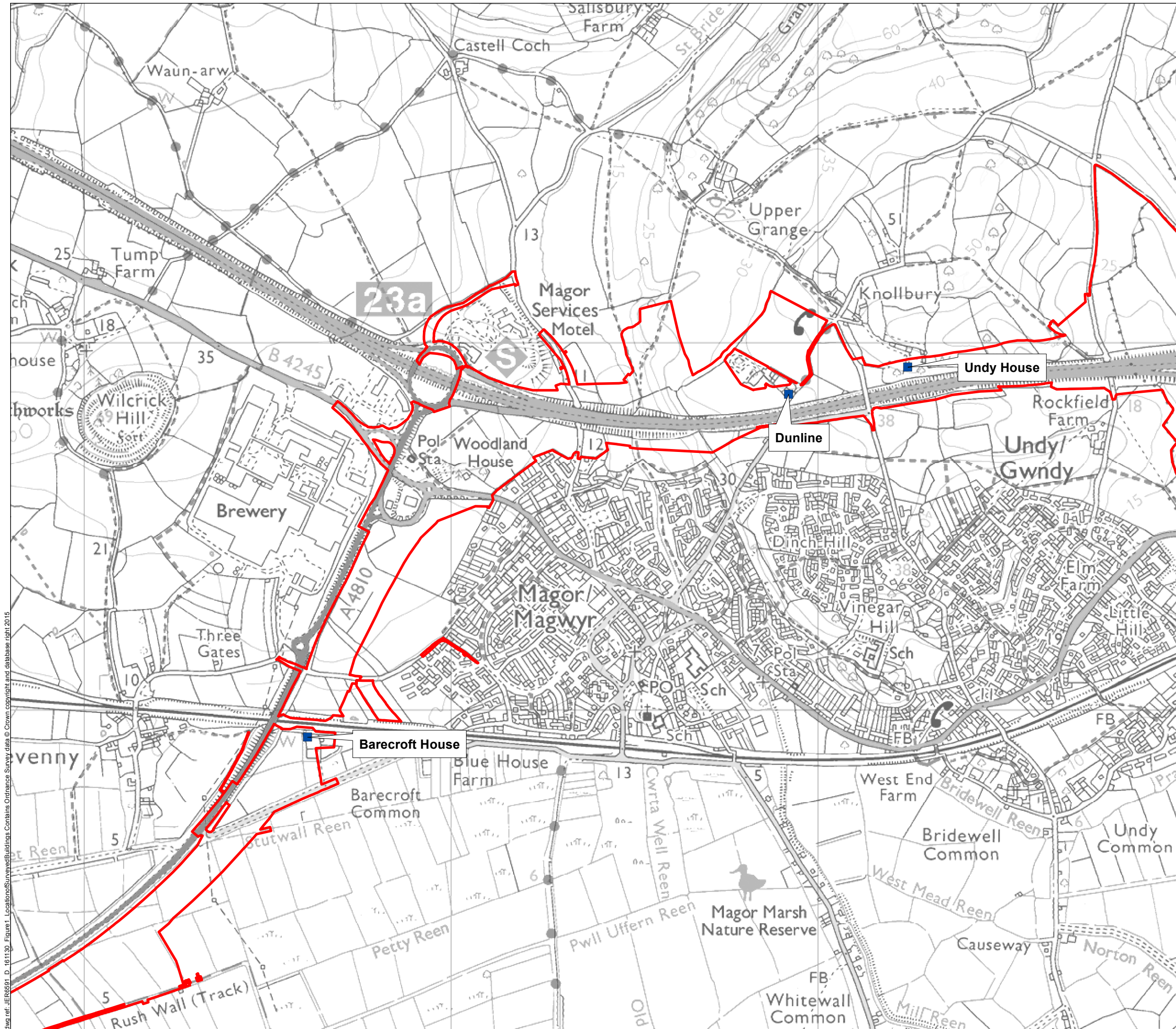
Figure: 1b	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:10,000

0 165 330 m

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dwg ref: JER6591_D_161130_Figure1_LocationofSurveyedBuildings



Legend

- Permanent and Temporary Landtake
- Buildings Surveyed



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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

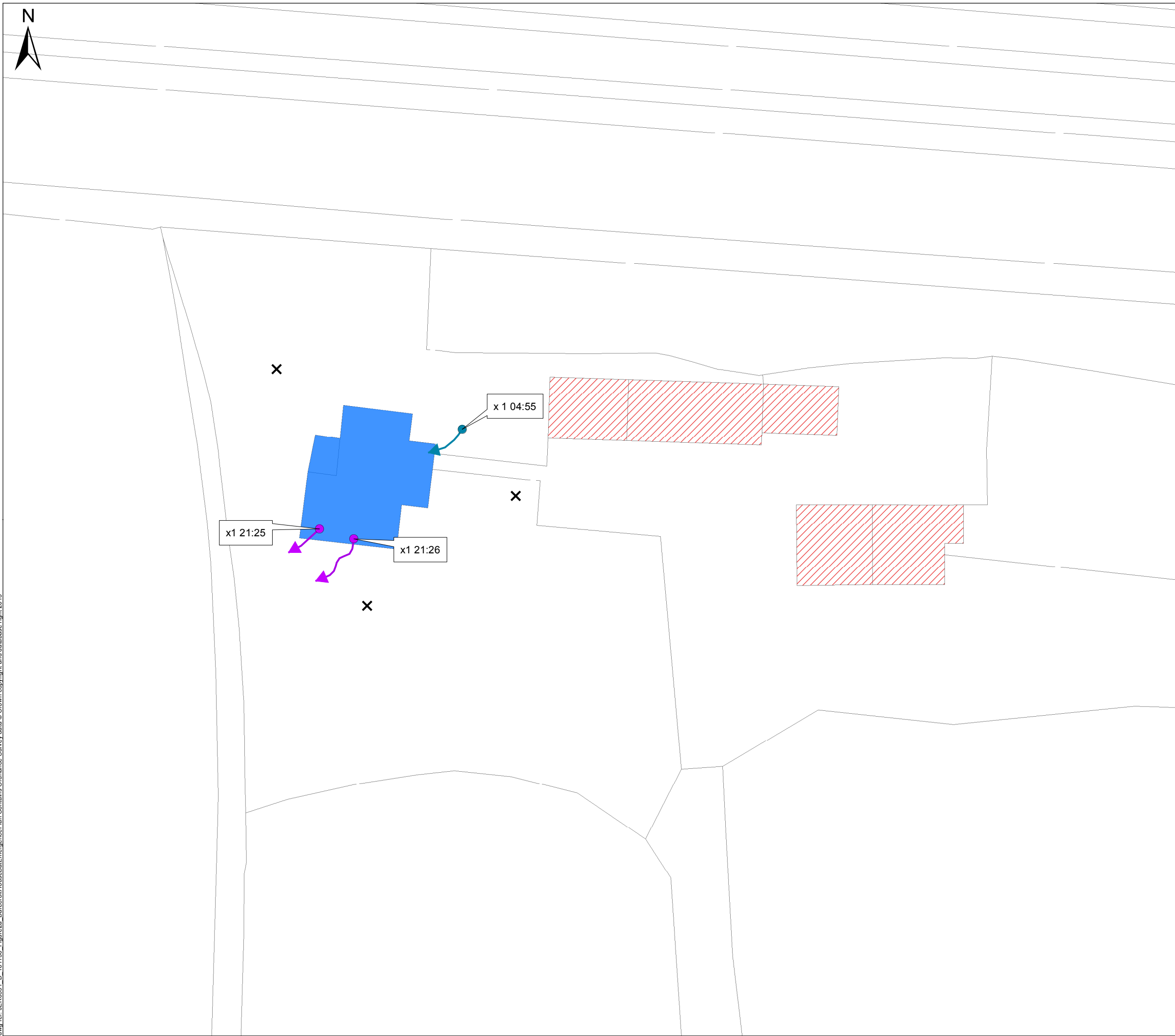
Figure 1:Location of Surveyed Buildings and Structures

Figure: 1c	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:10,000
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dwg ref: JER6591_D_161130_Figure2a_BarecroftHouseBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- Summer Day Roost
- Not Suitable
- Bat Surveyor Location

Bat Species

18th May

- Common Pipistrelle

4th August

- Common Pipistrelle

Bat Flight Lines

- 18th May
- 4th August

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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: Barecroft House Bat Survey Plan

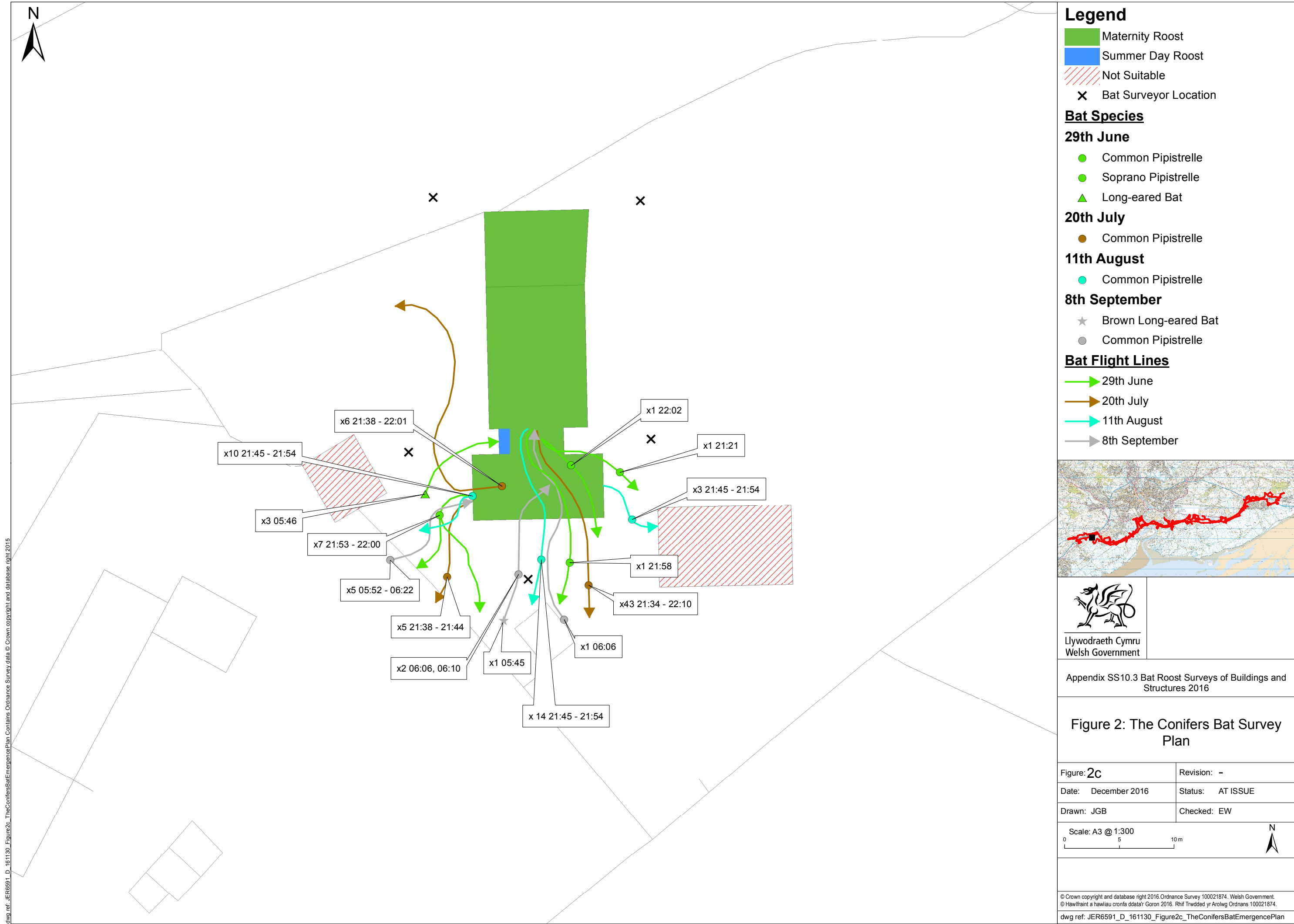
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Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

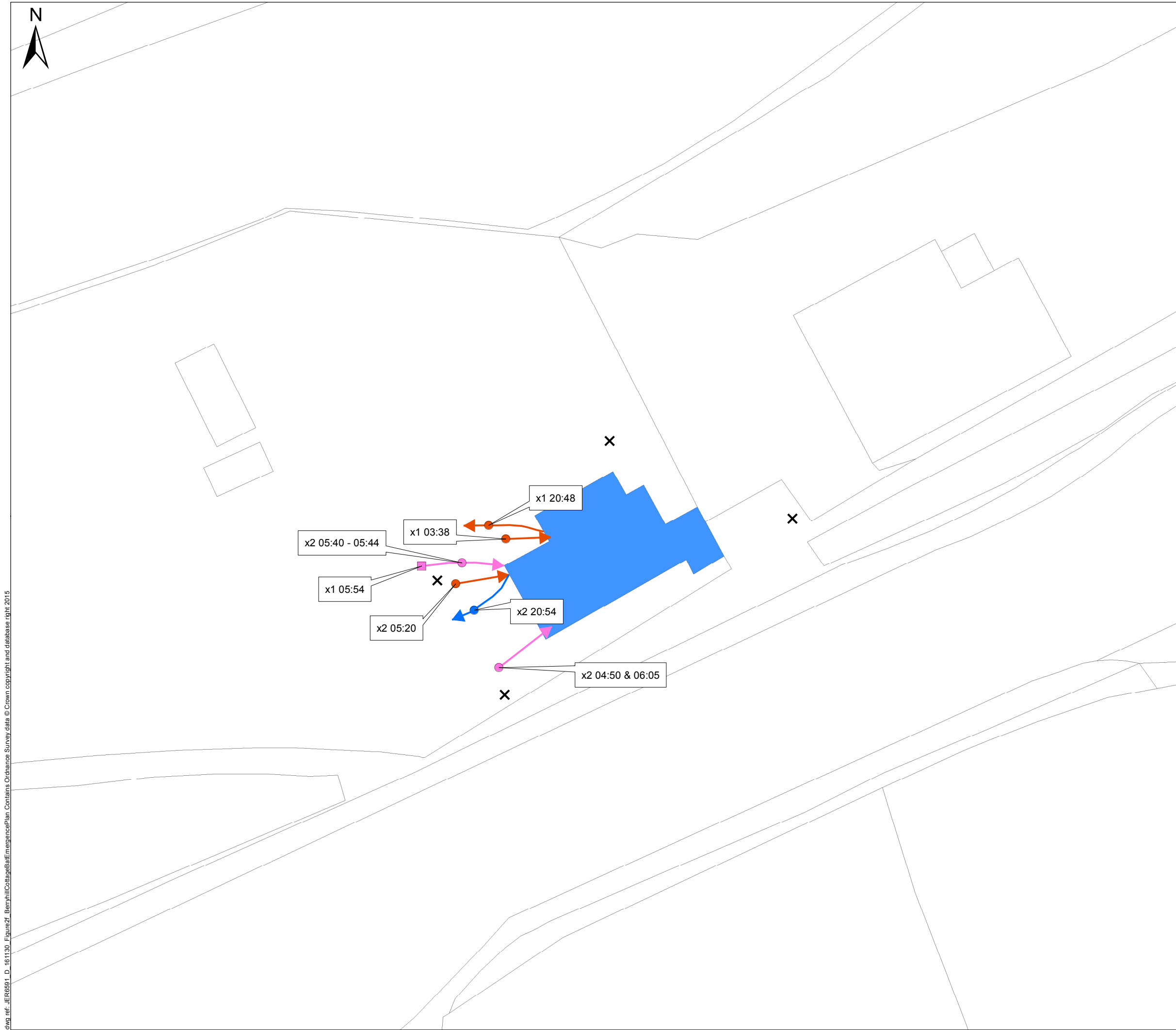
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dwg ref: JER6591_D_161130_Figure2a_BarecroftHouseBatEmergencePlan





Legend

Summer Day Roost

X Bat Surveyor Location

Bat Species

5th August

Common Pipistrelle

10th August

Common Pipistrelle

18th August

Common Pipistrelle

Soprano Pipistrelle

Bat Flight Lines

5th August

10th August

18th August



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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: Berryhill Cottage Bat Survey Plan

Figure: 2f	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:300

0

5

10 m

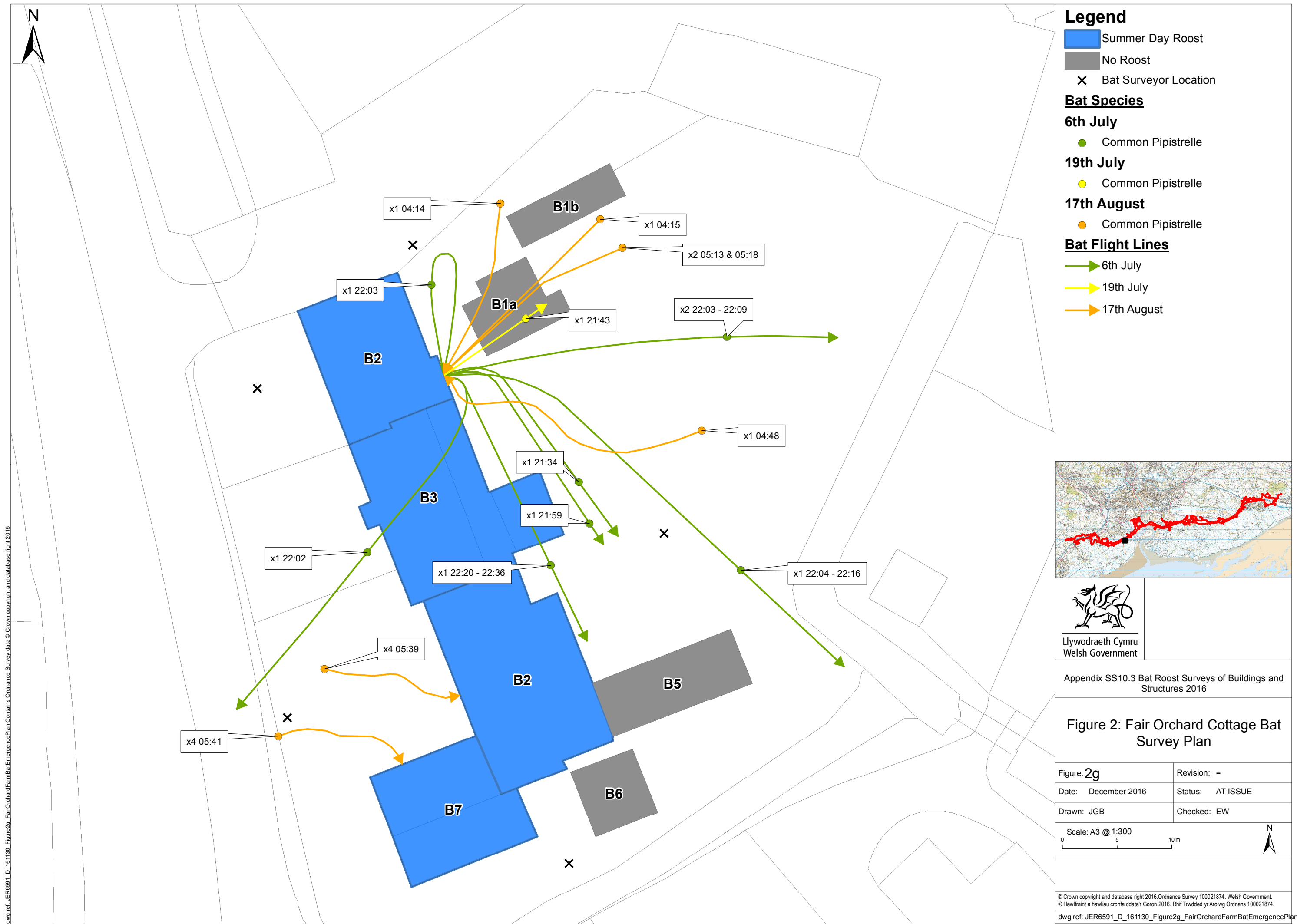
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dwg ref: JER6591_D_161130_Figure2f_BerryhillCottageBatEmergencePlan

dwg ref: JER6591_D_161130_Figure2g_FairOrchardFarmBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015





dwg ref: JER6591_D_161130_Figure2h_WhiteCottageBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- No Roost
- X Bat Surveyor Location





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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: White Cottage Bat Survey Plan

Figure: 2h	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:300

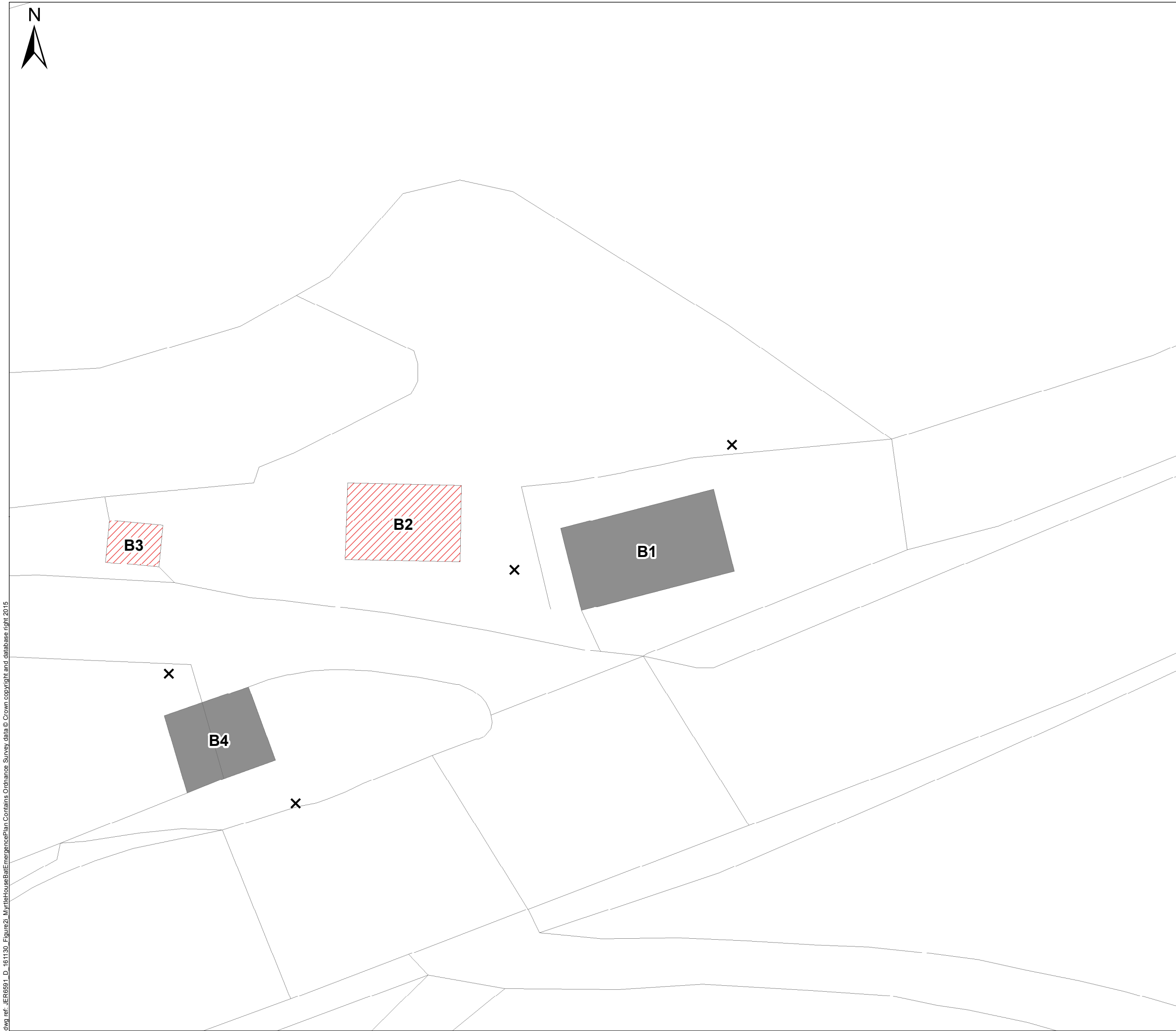
0510m



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dwg ref: JER6591_D_161130_Figure2h_WhiteCottageBatEmergencePlan

dwg ref: JER6591_D_161130_Figure2i_MyrtleHouseBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- No Roost
- Not Suitable
- Bat Surveyor Location

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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: Myrtle House Bat Survey Plan

Figure: 2i	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:300

0510m

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dwg ref: JER6591_D_161130_Figure2i_MyrtleHouseBatEmergencePlan



Legend

- No Roost
- Bat Surveyor Location

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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: Quarry Cottage Bat Survey Plan

Figure: 2j	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

Scale: A3 @ 1:300

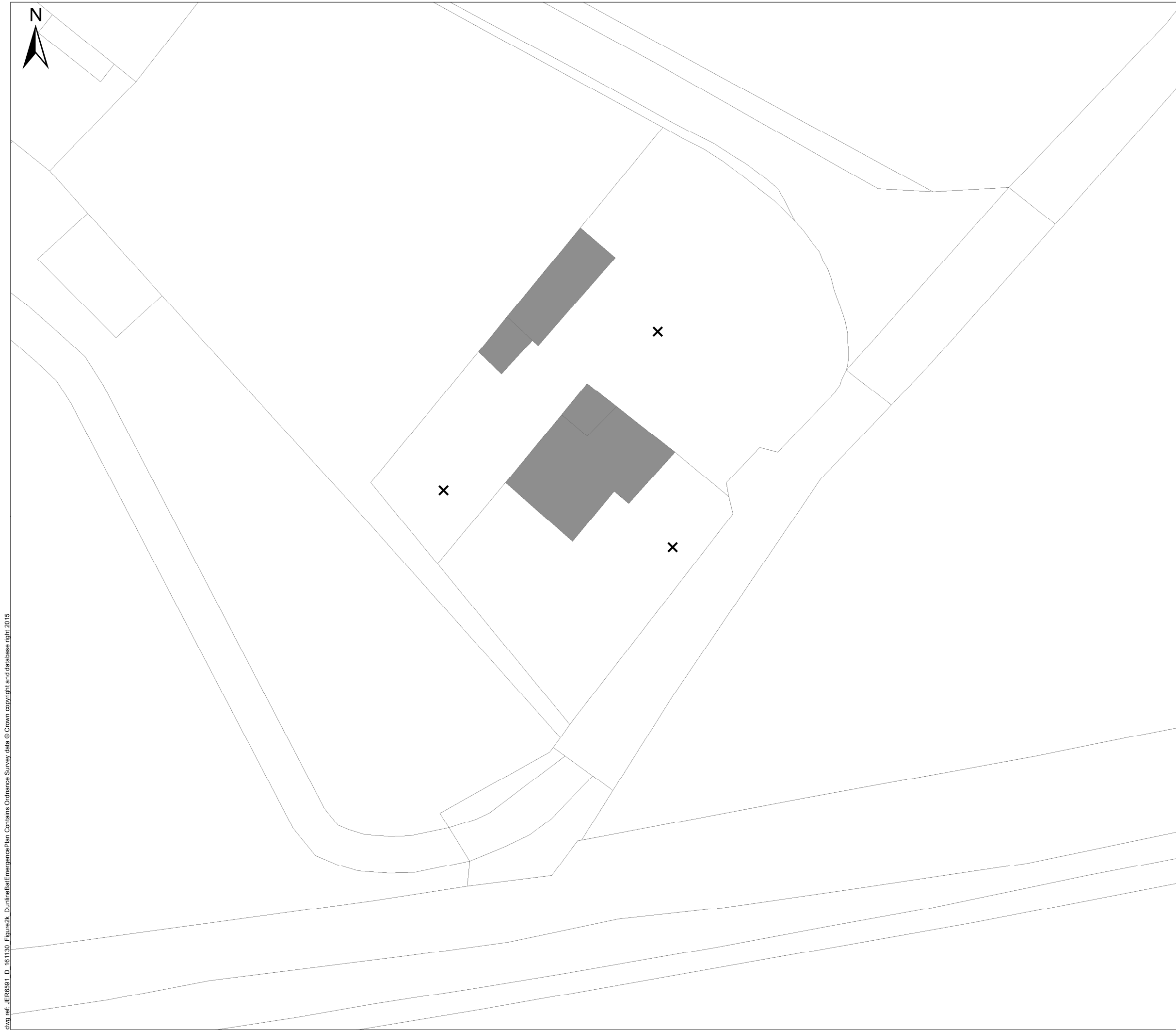
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dwg ref: JER6591_D_163011_Figure2j_QuarryCottageBatEmergencePlan

dwg ref: JER6591_D_161130_Figure2k_DunlineBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- No Roost
- Bat Surveyor Location

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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: Dunline Bat Survey Plan

Figure: 2k	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW

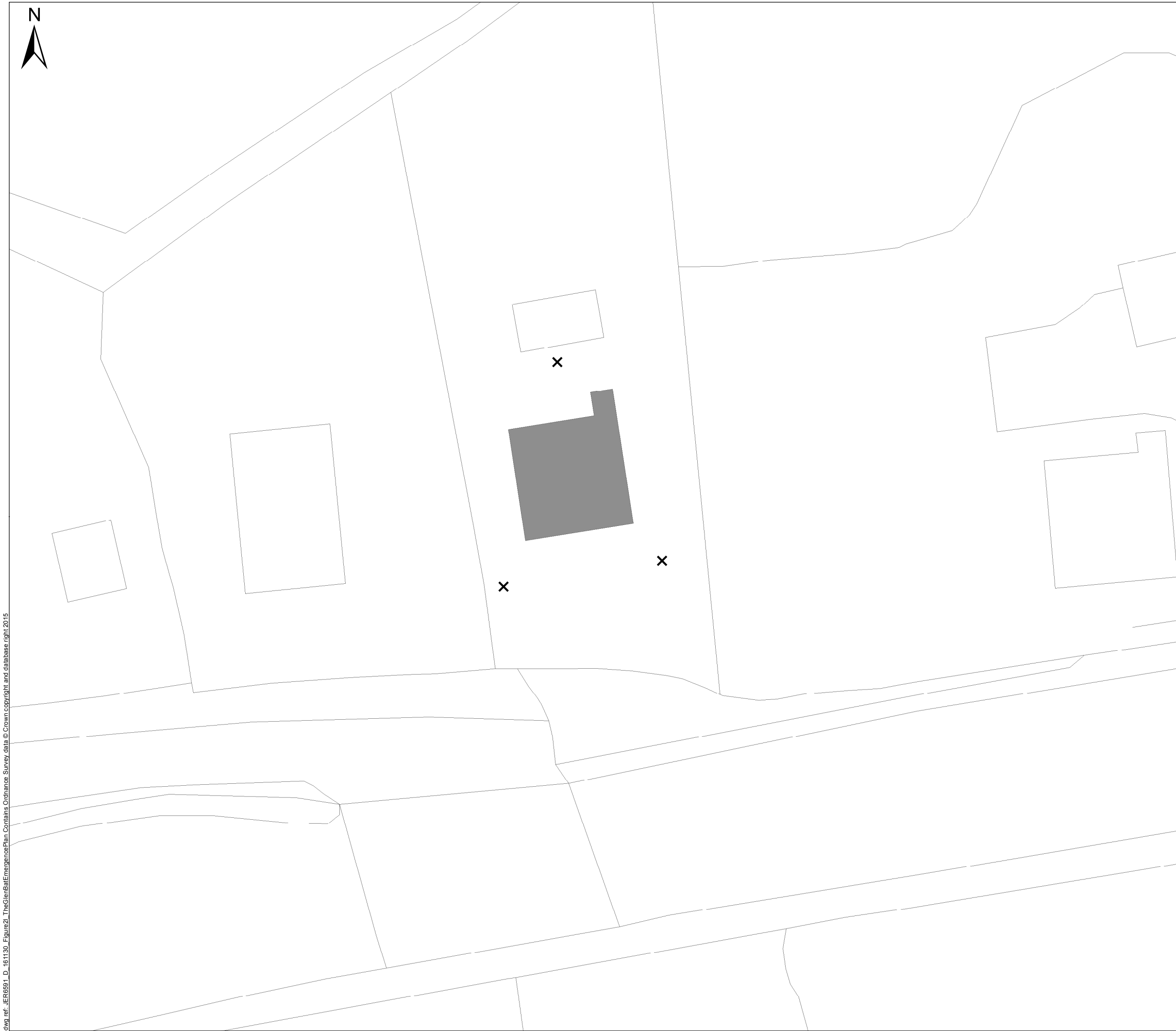
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0510m

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dwg ref: JER6591_D_161130_Figure21_TheGlenBatEmergencePlan Contains Ordnance Survey data © Crown copyright and database right 2015



Legend

- No Roost
- Bat Surveyor Location

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Appendix SS10.3 Bat Roost Surveys of Buildings and Structures 2016

Figure 2: The Glen Bat Survey Plan

Figure: 21	Revision: -
Date: December 2016	Status: AT ISSUE
Drawn: JGB	Checked: EW







Scale: A3 @ 1:300







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dwg ref: JER6591_D_161130_Figure21_TheGlenBatEmergencePlan







Annexes







Annex A – Bat Roost Assessment




Building Name	Roost assessment	Notes	Photographs	
Barecroft House	Confirmed roost Common pipistrelle summer day roost (up to two bats)	Residential house (<i>Plate 1</i>). Generally tight fitting roof tiles and modern plastic soffit boxes affording a limited number of potential roost locations for bats. Potential roost locations were noted under lead flashing adjacent to south facing dormer windows (<i>Plate 2</i>) and gaps between roof tiles along the east facing roof edge (<i>Plate 1</i>).	<i>Plate 1 – eastern elevation</i> 	<i>Plate 2 at south facing elevation</i> 
Fair Orchard Farm	Confirmed roost The main building at Fair Orchard Farm (including B2, B3, B4, B5 and B7) is a common pipistrelle summer day roost (up to eight bats).	<u><i>Building 1a and 1b</i></u> Two farm sheds with no loft space. Gaps under barge boards suitable for bats to access (<i>Plate 3</i>). <u><i>Building 2 - confirmed roost</i></u> This is the northern section of the main building complex. An open circular window on the east-facing gable end provides access into the building (<i>Plate 4</i>). An open door used by nesting birds (swallow) also allows access for bats into a small side room of the building. There is no apparent access into the main building from the small side room. Gaps under barge boards and lead flashing provide potential roosts. Deteriorating brick work at the top of wall to west side of building (<i>Plate 5</i>) provides cracks and potential access under soffit box. Gaps above a large door also provide potential access for bats into the main building (<i>Plate 6</i>). Occasional raised tiles provide potential bat roosts/access. <u><i>Building 3 – confirmed roost</i></u> This is the residential section of the main building complex (<i>Plate 7</i>) and forms the middle part of the main farm building complex. Relatively recent renovations, including new brick work, roof, windows and soffit box provide few potential roost locations. <u><i>Building 4 – confirmed roost</i></u> To the south of the residential section there is a series of apparently interconnected stables and sheds (<i>Plate 8</i>). Potential access for bats is available over a door, through open windows and broken and damaged	<i>Plate 3 – south facing elevation</i> 	<i>Plate 4 – east facing elevation of B2</i> 
			<i>Plate 5 north facing gable end and west facing wall of B2</i> 	<i>Plate 6 top of door and gaps within fascia boards of B2</i> 




Building Name	Roost assessment	Notes	Photographs
		<p>brickwork.</p> <p><u>Building 5</u> These are roofed storage sheds with no surrounding walls. Negligible potential for roosting bats within these structures.</p> <p><u>Building 6</u> Dilapidated stone shed covered in climbing vegetation with open doors and windows to north and south (<i>Plate 9</i>). Two wooden bat boxes were present in the building (<i>Plate 10</i>), both boxes were examined and no signs of use (i.e. presence of bats, dropping or urine staining) was noted. Potential roosts are present in gaps between purlins and supporting beams (<i>Plate 11</i>).</p> <p><u>Building 7 – confirmed roost</u> Interconnected sheds to south of main building complex (<i>Plate 12</i>). 3 no. common pipistrelle (DNA analysis confirmed) droppings (<i>Plate 13</i>) were found on stable door with 100mm gaps above. Barge boards over west facing gable end provide gaps to top of brick work (<i>Plate 14</i>) that contained a house sparrow colony including up to six nests.</p> <p><u>Building 8</u> Large, modern industrial shed open to roof. Very few external features were noted suitable for roosting bats, however internal structures may provide roost potential..</p> <p>The owner did not allow access to buildings to the south and east of the main complex therefore no assessment was made.</p>	<p><i>Plate 7 west facing elevation of B3</i></p>  <p><i>Plate 8 east facing elevation of B4</i></p>  <p><i>Plate 9 open door to north of B6</i></p>  <p><i>Plate 10 bat boxes inside B6</i></p>  <p><i>Plate 11 showing roof of B6</i></p>  <p><i>Plate 11 western elevation of B4 and northern elevation of B7</i></p> 




Building Name	Roost assessment	Notes	Photographs
			<div><div><p><i>Plate 13 droppings on north facing barn door of B7</i></p></div><div><p>Plate 14 west facing elevation of B7</p></div></div>






Building Name	Roost assessment	Notes	Photographs	
Berryhill Farm	<p>Confirmed roost</p> <p>Building 1 is considered to be a common pipistrelle maternity roost (up to 68 bats observed); Building 2 is considered to likely to be a long eared maternity roost (up to nine bats observed) and a summer day roost for a small number of soprano pipistrelle bats (one bat observed); Building 4 is considered to be a summer day roost for common pipistrelle bats (up to two bats observed).</p>	<p><u>Building 1 – confirmed roost</u> According to the owner this large residential property is approximately 400 years old. A common pipistrelle maternity roost is present within the roof of a southern extension of the main building and bats were known by the owner to emerge from gaps under the barge boards of the west facing gable end (<i>Plate 15</i>).</p> <p><u>Building 2 – confirmed roost</u> Building containing domestic utilities (southern) and garage (northern part) (<i>Plate 16</i>). Permanently open garage door to west side of building affords access into the building with numerous potential roost sites including above the southern wall and between large wooden beams (<i>Plate 17</i>). The skeleton of a dead bat was found (DNA result brown long eared), feeding remains (red underwing moth and painted lady butterfly) and a small number of scattered single droppings (DNA testing confirmed common pipistrelle) were found.</p> <p><u>Building 3 – confirmed roost</u> Owner stated building is an old ‘calf’ shed and about the same age as main building (<i>Plate 18</i>). Numerous access locations were noted including raised/missing roof and ridge tiles; open windows; open stable doors; gaps above doors; missing sky light; and under barge/fascia boards around all of building.</p> <p><u>Building 4 – confirmed roost</u> Old shed currently used for making cider with numerous potential roost locations (<i>Plate 19</i>). Potential roost locations were noted including openings around gable end upper level opening; behind broken barge boards; raised/missing roof tiles and ridge tiles; under barge/fascia boards around all of building; and through open window.</p> <p><u>Building 5</u> Corrugated steel barn open to the north. Provides negligible potential for roosting bats.</p> <p><u>Building 6</u> Single storey shop building and attached ‘lean-to’ shed. Roof, fascia, barge boards, lintels and above doors inspected all around building and found to be very tight with no potential access locations.</p> <p><u>Building 7</u> Corrugated steel container in use as storage shed (<i>Plate 20</i>). Access locations into internal space over door however steel construction provides poor roosting potential for bats due to daily temperature fluctuations.</p>	<p><i>Plate 15 west facing gable end of annex (maternity colony of common pipistrelle)</i></p>  <p><i>Plate 16 west and south facing elevations of B2</i></p>  <p><i>Plate 17 roof inside garage of B2</i></p>  <p><i>Plate 18 east facing elevation of B4</i></p>  <p><i>Plate 19 south and west facing elevations of B4</i></p>  <p><i>Plate 20 steel storage shed</i></p> 	







Building Name	Roost assessment	Notes	Photographs	
The Conifers	<p>Confirmed roost</p> <p>Common pipistrelle maternity roost (up to 55 bats observed);</p> <p>Brown long-eared summer day roost (up to three bats observed)</p> <p>Soprano pipistrelle summer day roost (for a single bat observed).</p>	<p><u>Building 1 – confirmed roost</u> This two storey house has a high pitched roof and associated more recent stone clad extension to the south side (<i>Plate 21</i>). The main building is fairly tight with potential access provided under the eaves on the south west corner of the building and a large potential access into the south facing gable end soffit box where the underside of the soffit has come away from the main structure (<i>Plate 22</i>). The southern extension provides a wide range of potential roost features including</p> <ul style="list-style-type: none">- gaps at the top of the wall above the stone wall and window on the west facing gable end (<i>Plate 23</i>);- gaps between barge boards and hanging tiles to the doorway porch (<i>Plate 23</i>);- gaps within the south facing gable end (<i>Plate 24</i>). <p>Other potential bat roost features include raised tiles; lifted lead flashing; and an opening into the soffit box above the east facing ground floor door.</p> <p><u>Building 2</u> Garage with open garage door. This building is very tight throughout and affords little potential for roosting bats (<i>Plate 25</i>).</p> <p><u>Building 3</u> Framed glass structure with swimming pool. This building offers no potential for roosting bats (<i>Plate 26</i>).</p>	<p><i>Plate 21 west facing elevation of main building and southern extension</i></p>	<p><i>Plate 22 open soffit box on south facing elevation of main building</i></p>
				
			<p><i>Plate 23 west facing elevation of southern extension</i></p>	<p><i>Plate 24 hanging tiles and gaps into fascia on south facing gable end of southern extension</i></p>
				
			<p><i>Plate 25 garage to west of main building</i></p>	<p><i>Plate 26 glass clad swimming pool</i></p>
				




Building Name	Roost assessment	Notes	Photographs	
Undy House	<p>Confirmed roost</p> <p>Common pipistrelle summer day roosts (single bats observed from each building).</p>	<p><u>Building 1 - confirmed roost</u> Building boarded up with metal window covers to prevent access (<i>Plate 27</i>). Generally all features around building were noted as tight with the only potential roost features noted being broken tiles on west side of roof. Southern extension to building was noted as having no roof and protected with plastic sheets therefore potential features may have been present between this section and the main building (<i>Plate 28</i>).</p> <p><u>Building 2 – confirmed roost</u> Old derelict building surrounded by shrubs and collapsed to the north side (<i>Plate 29</i>) (showing southern elevation). Significant sagging of the roof provides potential roost features. The windows are missing allowing access into the main building, which is likely to contain a variety of features suitable for both crevice dwelling and hanging bats.</p>	<p><i>Plate 27 west facing elevation of B1</i></p> 	<p><i>Plate 28 south eastern elevation of B1</i></p> 
			<p><i>Plate 29 southern elevation of B2</i></p> 	




Building Name	Roost assessment	Notes	Photographs
San Remo	<p>Confirmed roost</p> <p>Common pipistrelle summer day roost (up to eight bats observed during surveys)</p>	<p>Residential property disused at time of survey (<i>Plate 30</i>). Roof tiles are generally tight with little access potential, however missing hanging tiles and lead flashing around both the east and west dormers are features that provide potential for roosting bats. Other features on this building included openings (through wood rot) into soffit box on both north and south sides; under plastic fascia; and into open door on west side that allow access into space between roof tiles and lining (<i>Plate 31 / Plate 32</i>).</p>	<div><p><i>Plate 30 southern elevation</i></p></div> <div><p><i>Plate 31 in lean to at western side of building</i></p></div> <div><p><i>Plate 32 in lean to at western side of building</i></p></div>







Building Name	Roost assessment	Notes	Photographs
Berryhill Cottage	<p>Confirmed roost</p> <p>Common pipistrelle summer day roost (up to four bats observed);</p> <p>Soprano pipistrelle summer day roost (one bat observed)</p>	<p>Building under renovation following long term neglect (<i>Plate 33</i>). During 2015 roof tiles were reportedly stolen causing significant rain damage within the building that has subsequently been fully gutted by the owner. During early 2016 the tiles were recently replaced however soffit and barge boards have not been fitted allowing access throughout building (<i>Plate 34</i>). Soffit box on north west side of building has partially collapsed provide access into roof lining and tiles through eaves. Other potential bat roost features were numerous including openings into soffit box on northwest side (<i>Plate 35</i>); broken and raised tiles; and gaps between eaves and supporting walls.</p>	<div><p><i>Plate 33 northern elevation</i></p></div> <div><p><i>Plate 34 eastern elevation</i></p></div> <div><p><i>Plate 35 open soffit box and gaps into barge boards at northern and eastern elevations</i></p></div>

Building Name	Roost assessment	Notes	Photographs	
White Cottage	High suitability	<p><u>Main residential building</u></p> <p>The empty building had tightly fitting roof tiles on both north (<i>Plate 36</i>) and south elevations (<i>Plate 37</i>). Openings into soffit box on the north side are features with high potential for roosting bats (<i>Plate 38</i>) with good connectivity to mosaic of woodland and grassland habitats within the gardens to the north.</p> <p><u>Garage</u></p> <p>This garage (<i>Plate 39</i>) adjacent to the east side of the main building has tears within the roof lining along both the north and south elevations that provide suitable roost features for bats (<i>Plate 40</i>).</p>	<p><i>Plate 36 northern aspect of main building</i></p>  <p><i>Plate 37 southern aspect of main building</i></p>  <p><i>Plate 38 opening into soffit box at western elevation</i></p>  <p><i>Plate 39 southern elevation of garage</i></p>  <p><i>Plate 40 opening into roofing felt under eaves of garage</i></p> 	

Building Name	Roost assessment	Notes	Photographs	
Myrtle House	Low suitability	<p><u>Building 1</u> Main residential property (<i>Plate 41</i>) was generally tight all around with few discernible potential bat roost features. Some raised lead flashing was noted that provides potential for individual crevice dwelling bats to roost.</p> <p><u>Building 2</u> Shed with series of interconnected rooms (<i>Plate 42</i>). Generally limited potential however cracks in brickwork and at top of walls provide some possible roosting locations (<i>Plate 43</i>).</p> <p><u>Building 3</u> Series of small sheds with negligible potential for roosting bats.</p> <p><u>Building 4</u> Disused garage with corrugated sheet roof and wood cladding (<i>Plate 44</i>). Owner opened garage door revealing internal space full of dense cobwebs suggesting no use by bats (<i>Plate 45</i>). Gaps within wood cladding offer numerous potential roosting features and access into wooden walls of the structure (<i>Plate 46</i>).</p>	<p><i>Plate 41 north and eastern elevation of B1</i></p>  <p><i>Plate 43 internal of B2</i></p>  <p><i>Plate 45 dense cobwebs with B4</i></p> 	<p><i>Plate 42 western elevation of B2</i></p>  <p><i>Plate 44 northern aspect of B4</i></p>  <p><i>Plate 46 southern aspect of B4</i></p> 

Building Name	Roost assessment	Notes	Photographs	
Quarry Cottage	Low suitability	<p><u>Building 1</u></p> <p>Main residential building generally tight (<i>Plate 47</i>). Potential roost features were noted under raised ridge tile (<i>Plate 48</i>) and within small gaps under soffit box along western elevation (<i>Plate 49</i>).</p>	<p><i>Plate 47 northern and eastern elevation</i></p> 	<p><i>Plate 48 raised ridge tile</i></p>  <p><i>Plate 49 gap into soffit box on eastern elevation</i></p> 

Building Name	Roost assessment	Notes	Photographs
Dunline Knollbury	Low suitability	<p><u>Building 1</u> Main building was found to be tight on all sides with recently renovated soffit and eaves (<i>Plate 50</i>). Roof tiles were generally very tight with the exception of small gaps under fascia boards above windows on the western elevation (<i>Plate 51</i>).</p> <p><u>Building 2</u> Shed adjacent to the main building (<i>Plate 52</i>). Potential roost features under gaps between hanging tiles along eaves and small cracks in brickwork to the south.</p>	<div><p><i>Plate 50 southern elevation of B1</i></p></div> <div><p><i>Plate 41 fascia boards above windows on the western elevation</i></p></div> <div><p><i>Plate 52 Shed adjacent to the main building</i></p></div>

Building Name	Roost assessment	Notes	Photographs	
The Glen	Low suitability	Modern bungalow (<i>Plate 53</i>). Very tight with modern eaves and fascia providing no internal access (<i>Plate 54</i>). Features with potential for roosting bats were noted on the north side at the intersection between tiles and lead flashing within the valley between two pitched roofs.	<p><i>Plate 53 southern and eastern elevation</i></p> 	<p><i>Plate 54 tight barge boards and fascia around south facing</i></p> 
Pound Hill M4 Overbridge	Low suitability	Concrete motorway bridge. Potential roost features noted within expansion joints (<i>Plate 55</i>) (showing gaps from above) that although were open to the road section were filled with debris providing gaps with shelter either side. Very noisy and subject to constant vibration.	<p><i>Plate 55 gaps into expansion crack from surface of Pound Lane</i></p> 	<p><i>Plate 56 expansion crack</i></p> 
A48 (M)bridge over M4	Low suitability	Concrete motorway bridge. Potential roost features noted within expansion joints (<i>Plate 57</i>) that although were open to the road section were filled with debris providing gaps with shelter either side. Very noisy and subject to constant vibration.	<p><i>Plate 57 expansion joints</i></p> 	<p><i>Plate 58 expansion joints</i></p> 

Building Name	Roost assessment	Notes	Photographs
New Farm Footbridge	Negligible suitability	Concrete footbridge with no opening noted suitable for roosting bats.	<p><i>Plate 59 New Farm Footbridge</i></p> 