



Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

Environmental Statement

Volume 3

Appendix 20.10 - Bat (Roosting) Survey Report

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This report conforms to the British Standard 42020:2013 Biodiversity - Code of practice for planning and development.

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LIST OF ACRONYMS

BCT	Bat Conservation Trust
BRL	Bat Roost tree-Line
BRT	Bat Roost Tree
DCO	Development Consent Order
DEP	Dudgeon Offshore Wind Farm Extension Project
EIA	Environmental Impact Assessment
EP1HS	Extended Phase 1 Habitat Survey
EPS	European Protected Species
HDD	Horizontal Directional Drilling
LoNI	Letter of No Impediment
SEP	Sheringham Shoal Offshore Wind Farm Extension Project
SMZC	Song Meter Zero Cross bat detector
WFE	Wild Frontier Ecology Ltd.

GLOSSARY OF TERMS

Term	Definition
DCO boundary / Order Limits	The area subject to the application for development consent, including all permanent and temporary works for SEP and DEP.
Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
DEP onshore site	The Dudgeon Offshore Wind Farm Extension onshore area consisting of the DEP onshore substation site, onshore cable corridor, construction compounds, temporary working areas and onshore landfall area.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive. This includes candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas, and is defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the EIA and HRA for certain topics.
Expert Topic Group (ETG)	A forum for targeted engagement with regulators and interested stakeholders through the EPP.
Horizontal directional drilling (HDD) zones	The areas within the onshore cable route which would house HDD entry or exit points.
Jointing bays	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The point at the coastline at which the offshore export cables are brought onshore, connecting to the onshore cables at the transition joint bay above mean high water
Onshore cable corridor	The area between the landfall and the onshore substation sites, within which the onshore cable circuits will be installed along with other temporary works for construction.
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substation. 220 - 230kV.
Onshore Substation	Compound containing electrical equipment to enable connection to the National Grid.
PEIR boundary	The area subject to survey and preliminary impact assessment to inform the PEIR.
Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including all onshore and offshore infrastructure.
SEP onshore site	The Sheringham Shoal Wind Farm Extension onshore area consisting of the SEP onshore substation site, onshore cable corridor, construction compounds, temporary working areas and onshore landfall area.
Study area	Area where potential impacts from the project could occur, as defined for each individual Environmental Impact Assessment (EIA) topic.
The Applicant	Equinor New Energy Limited

EXECUTIVE SUMMARY

Wild Frontier Ecology Ltd. was commissioned by Equinor New Energy Ltd. to complete surveys for roosting bats on relevant trees within the Development Consent Order (DCO) boundary associated with the onshore cable corridor for the proposed Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (DEP).

The surveys were preceded by Extended Phase 1 Habitat Surveys (EP1HS) in 2020 and 2021, and a scoping exercise in July 2021, which identified trees with potential to support bat roosts that were likely to be impacted by the SEP and DEP. A total of 13 trees with Moderate bat roost potential were scoped in for nocturnal bat emergence/re-entry surveys to be undertaken in August and September 2021. These consisted of 12 oak trees and one ash tree. There were no trees with High bat roost potential within the DCO boundary which were likely to be impacted, and so no such trees were subject to nocturnal surveys.

The emergence/re-entry surveys recorded roosting bats in seven oak trees: trees referenced BRT0013, BRT0016J, BRL0003-02, BRL0005-01, BRL0005-02, BRL0010-04 and BRL0010-07. With the exception of BRT0013 and BRL0005-02, each bat roost tree was found to support a day roost of one common pipistrelle or soprano pipistrelle. BRT0013 was found to support up to three soprano pipistrelles and BRL0005-02 was found to support one barbastelle bat.

The two trees referenced BRT0016J and BRL0010-07 are at risk of removal, but the remaining five confirmed bat roost trees are due to be retained by refining the working corridor to avoid these trees or by using Horizontal Directional Drilling (HDD) methods to install the onshore cable in the vicinity of these trees.

The findings from the 2021 survey effort provides a snapshot of the bat roosting status in trees within the DCO boundary. However, tree removal associated with SEP and DEP is not expected to occur for perhaps three to four years. The potential for roosting bats in all trees within the DCO boundary will need to be reconsidered within the survey season (May to August/September) immediately preceding any tree removal. The updated surveys will ensure that any mitigation measures put in place reflect the bat roost status at that time, not necessarily at the time of the 2021 surveys. Trees to be removed must therefore be re-surveyed, comprising a ground-level appraisal of bat roost suitability/potential (possible at any time of year), followed by nocturnal emergence/re-entry surveys (possible between May and August/September) of any trees with High or Moderate bat roost potential. A European Protected Species (EPS) mitigation licence will be required to legally remove any trees which have been found to contain roosting bats. Mitigation and compensation secured through the licence will likely include the installation of compensatory bat boxes on nearby trees. Longer-term compensation will be provided through tree planting, although this is separate to EPS mitigation licensed obligations.

Natural England has been consulted to obtain a Letter of No Impediment (LoNI) for roosting bats which has confirmed that SEP and DEP could achieve an EPS mitigation licence based on the survey data and predicted impacts identified at this time.

1. Background

Equinor New Energy Limited (hereafter the Applicant) is proposing to extend the existing operational Sheringham Shoal Offshore Wind Farm and Dudgeon Offshore Wind Farm, named the Sheringham Shoal Offshore Wind Farm Extension Project (SEP) and Dudgeon Offshore Wind Farm Extension Project (hereafter SEP and DEP). SEP and DEP will consist of a number of offshore and onshore components including the offshore wind turbines, offshore export cables and offshore substation(s). The offshore export cables will connect to landfall west of Waybourne, with onshore infrastructure connecting the offshore wind farms to the National Grid, which will comprise underground onshore export cables from landfall to an onshore substation and National Grid connection at Norwich Main. A full description of SEP and DEP is provided within the **ES Chapter 4 Project Description** (document reference 6.1.4).

In 2021, WFE was commissioned by the Applicant to undertake surveys to establish the presence and/or likely absence of roosting bats in suitably appraised trees located within the DCO boundary for the onshore cable. Together with other protected species surveys, these results have informed an ecological impact assessment of the proposed onshore grid connection for the SEP and DEP. A map showing an overview of the trees surveyed is provided in **Figure 1** Figure 1. Location of trees subject to bat emergence/re-entry surveys, below.

This report outlines the aims, methods and results of the nocturnal emergence/re-entry surveys which have been completed in 2021. A separate report provides the results of other bat surveys completed in 2021 which did not involve trees such as transect and static bat detector surveys.

2. Relevant Policy and Legislation

All bat species are listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. Bats and their roosts also receive protection from disturbance from by the Wildlife and Countryside Act 1981 (as amended). This protection extends to both the species and roost sites. It is an offence to kill, injure, capture, possess or otherwise disturb bats. Bat roosts are protected at all times of the year (making it an offence to damage, destroy or obstruct access to bat roosts), regardless of whether bats are present at the time.

3. Survey Methods

3.1. Preliminary Ground Level Roost Assessment

Trees within the onshore cable corridor were appraised for their potential to support roosting and hibernating bats during the EP1HS carried out by WFE in 2020 and 2021. From 2020 to early 2021, this covered all trees within surveyed parts of the Preliminary Environmental Information Report (PEIR) boundary. In early 2021, the site selection process to define the Development Consent Order boundary started so surveys from that point onwards considered only trees within surveyed parts of the DCO boundary. Trees which had been previously surveyed within the PEIR boundary but which were, following the boundary refinement, outside the DCO boundary were removed from the survey scope as they were outside the impact zone.

All trees within the survey area were assessed from ground level in accordance with the criteria outlined in the Bat Conservation Trust (BCT) guidelines¹. Tree locations were marked on aerial imagery maps.

Individual trees identified as having potential to support roosting bats were assigned a unique reference starting with BRT (denoting Bat Roost Tree) followed by a number, for example BRT0013. As the site selection for DCO boundary continued, additional trees with bat potential were identified near to previously identified BRTs, letters were added to references, such as BRT0016J. Trees standing as part of a linear feature were given a reference starting with BRL (Bat Roost tree-Line) followed by a unique line reference number and then the individual tree's reference number, for example BRL0005-01.

Trees were classified as having Negligible, Low, Moderate or High potential to support roosting bats in accordance with BCT guidelines, as defined in **Table 1**.

Table 1. BCT Definitions of Bat Roost Potential

Bat Roost Tree Suitability Classification	Definition (as per BCT guidelines)
Negligible	Negligible habitat features likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain Potential Roost Features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (such as a maternity roost).
High	A tree 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 habitat.

3.2. Nocturnal Bat Emergence/Re-entry Surveys

The EP1HS identified hundreds of individual trees with Moderate or High bat roost potential. By summer 2021, most of these trees had been excluded from the onshore cable corridor as part of the site selection process which had narrowed the boundary from the PEIR boundary to the DCO boundary. Within the DCO boundary, many of the

trees with High or Moderate bat roost potential are geographically clustered in woodlands or on certain landholdings. Nocturnal emergence/re-entry surveys of most of these trees were not expected to be necessary given that engineering proposals indicate that most woodlands and certain tree-lines (especially where these align with other features such as rivers or major roads) will be avoided by adopting HDD installation at these locations. There is also scope in many places for sensitive micro-siting of construction works to avoid individual trees, particularly where trees are noted as being of particular ecological value (such as if it has High or Moderate bat roost potential). Therefore, emergence/re-entry surveys (completed in summer 2021) of all trees within the DCO boundary which were found to have High or Moderate bat roost potential were not completed because the site selection process ensured that impacts to the majority of these trees can be avoided. Similarly, any trees with High or Moderate bat roost potential which were in the PEIR boundary but outside the DCO boundary were also excluded from requiring further surveys because they were no longer due to be impacted.

In July 2021, the site selection process for the DCO boundary had started and a scoping exercise was undertaken to identify those trees within the preliminary DCO boundary that were at risk of being impacted (i.e. removed). Each tree with Moderate or High bat roost potential, which was also judged likely to be impacted based on projected engineering/construction plans, was identified and added to the scope of bat roost surveys. These 'screened-in' trees were each subject to two emergence/re-entry surveys at dusk/dawn. Surveys were conducted within the appropriate survey season (with one survey in August and the other in September), and surveys of each tree were completed at least two weeks apart from each other. All surveys were completed in accordance with the aforementioned BCT guidelines.

The surveys involved visual monitoring of each tree, during which any bats seen emerging (at dusk) or entering the tree and not immediately re-emerging (at dawn) were recorded; such bats are considered to be roosting within the tree. Surveys used ultrasonic bat detectors to record bats' echolocation registrations, which allowed subsequent identification of the species. Surveys also used thermal imaging recording cameras as a survey aide, where the location was considered suitable for the targeted tree. Specific survey equipment used in each survey is listed in **Table 2**, below.

Dusk surveys began 15 minutes before sunset and continued until at least 90 minutes after sunset. The only tree surveyed at dawn was not suitable for thermal imaging cameras due to surrounding constraints (livestock and a road, which could have disturbed/damaged a camera). The survey therefore commenced as soon as light levels were sufficient that unassisted surveyors (i.e. without cameras) could begin visually monitoring of the tree; in the case of tree BRT0075b surveyed at dawn on 9th September 2021, this was 69 minutes before sunrise.

Table 2, below, lists the 13 trees targeted for nocturnal emergence/re-entry surveys, the dates in which the first and second surveys were undertaken, sunset/sunrise times on the dates of the survey, survey start and end times, the surveyors and equipment used and weather conditions during each survey. Wind speed is given as a rating on the Beaufort Scale. **Figure 2** to **Figure 14** show the positions of all equipment and surveyors for each survey.



Table 2. Summary of Survey Times and Equipment

Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
BRT0013 Oak	24 th August 2021	20:05	19:50	21:35	Jenny Donelan BSc MSc	Anabat SD1, Pulsar Helion XQ19, Song Meter Mini	Start air temperature: 15°C End air temperature: 15°C Cloud cover: 80% Wind Speed: 2 (light breeze) Precipitation: None
	8 th September 2021	19:28	19:13	20:58	Alexander Lowe BSc MArborA	Anabat SD1, Pulsar Helion XP28F, Song Meter Mini	Start air temperature: 21°C End air temperature: 19°C Cloud cover: 10% Wind Speed: 0 (calm) Precipitation: None
BRT0016J Oak	24 th August 2021	20:05	19:50	21:35	A. Lowe	Anabat SD1, Anabat Express, Pulsar Helion XP28F	Start air temperature: 16°C End air temperature: 15°C Cloud cover: 100% Wind Speed: 2-3 (light-gentle breeze) Precipitation: Light from 20:15-20:30 and 20:50-21:35
	8 th September 2021	19:30	19:15	21:00	J. Donelan	Anabat SD1, Pulsar Helion XP28F, Song Meter Mini	Start air temperature: 23°C End air temperature: 19°C Cloud cover: 5% Wind Speed: 2 Precipitation: None
BRT0038 Oak	18 th August 2021	20:16	20:20	21:46	A. Lowe	Anabat SD1, Pulsar Helion XQ19, Anabat	Start air temperature: 17°C End air temperature: 16°C



Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
						Express	Cloud cover: 100% Wind Speed: 0-1 (calm to light air) Precipitation: None
	15 th September 2021	19:10	18:55	20:40	A. Lowe	Anabat SD1, Anabat Express, Pulsar Helion XP28F	Start air temperature: 15°C End air temperature: 14°C Cloud cover: 50% Wind Speed: 0 Precipitation: None
BRT0038c Oak	18 th August 2021	20:16	20:20	21:46	Alex Brighten BSc MSc	Anabat SD1, Pulsar Helion XQ19, Anabat Express	Start air temperature: 17°C End air temperature: 16°C Cloud cover: 100% Wind Speed: 0-1 Precipitation: None
	15 th September 2021	19:10	18:55	20:40	J. Donelan	Anabat SD1 x2, Pulsar Helion XP28F	Start air temperature: 15°C End air temperature: 14°C Cloud cover: 50% Wind Speed: 0 Precipitation: None
BRT0075b Oak	17 th August 2021	20:17	20:00	21:47	Susannah Dickinson BSc MCIEEM (Natural England bat survey class licence registration number 2016-22497-CLS- CLS), Alice Petherick	Anabat SD1 x 2	Start air temperature: 16°C End air temperature: 15°C Cloud cover: 100% Wind Speed: 1 Precipitation: Light rain



Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
					BA MA		
	9 th September 2021	06:19 (sunrise)	05:10	06:34	A. Petherick and Mary Goddard BSc MSc ACIEEM (Natural England bat survey licence 2019-43829-CLS-CLS)	Anabat SD1, Anabat Express, Bat Box Duet	Start air temperature: 16.9°C End air temperature: 16.2°C Cloud cover: 95% Wind Speed: 1 Precipitation: Very light rain at 05:45
BRL0003-02 Oak	31 st August 2021	19:45	19:29	21:47	William Riddett BA ACIEEM	Anabat SD1, Pulsar Helion XQ19, Song Meter Zero Cross (SMZC)	Start air temperature: 15.5°C End air temperature: 15°C Cloud cover: 90% Wind Speed: 0 Precipitation: None
	23 rd September 2021	18:52	18:37	20:22	A. Lowe & A. Brighten	Anabat SD1 x 2	Start air temperature: 19°C End air temperature: 17°C Cloud cover: 5% Wind Speed: 0 Precipitation: None
BRL0005-01 Oak	25 th August 2021	20:03	19:48	21:33	Ptolemy McKinnon BSc MSc	Anabat SD1, Pulsar Helion XP28F	Start air temperature: 15.2°C End air temperature: 14.8°C Cloud cover: 100% Wind Speed: 3-4 (gentle-moderate breeze)



Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
							Precipitation: Light
	15 th September 2021	19:10	18:55	20:40	P. McKinnon	Anabat SD1	Start air temperature: 16°C End air temperature: 15°C Cloud cover: 45%, 0% by end Wind Speed: 0 Precipitation: None
BRL0005-02 Oak	25 th August 2021	20:03	19:48	21:33	Duncan Cullingford FdSc	Pulsar Helion XP28F, Echometer Touch, Anabat Express	Start air temperature: 15.2°C End air temperature: 14.8°C Cloud cover: 100% Wind Speed: 3 Precipitation: Light
	15 th September 2021	19:10	18:55	20:40	A. Brighten	Anabat SD1, Pulsar Helion XQ19, Song Meter Mini	Start air temperature: 16°C End air temperature: 15°C Cloud cover: 45%, 0% by end Wind Speed: 0 Precipitation: None
BRL0005-04 Ash	25 th August 2021	20:03	19:48	21:33	Adam Stickler BSc MSc ACIEEM	Anabat SD1, Pulsar Helion XQ19	Start air temperature: 15.2°C End air temperature: 14.8°C Cloud cover: 100% Wind Speed: 3-4 Precipitation: Light

Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
	15 th September 2021	19:10	18:55	20:40	Graham Riley BSc ACIEEM	Anabat SD1, Pulsar Helion XQ19, Song Meter Mini	Start air temperature: 16°C End air temperature: 15°C Cloud cover: 45%, 0% by end Wind Speed: 0 Precipitation: None
BRL0010-01 Oak	18 th August 2021	20:15	20:00	21:50	M. Goddard	Pulsar Helion XP28F, Anabat SD1, Song Meter Mini	Start air temperature: 17.7°C End air temperature: 17°C Cloud cover: 100% Wind Speed: 3 Precipitation: None
	8 th September 2021	19:27	19:12	20:57	A. Stickler	Anabat SD1, FLIR Scion OTM366, Song Meter Mini	Start air temperature: 19°C End air temperature: 17°C Cloud cover: 15% Wind Speed: 1 Precipitation: None
BRL0010-02 Oak	18 th August 2021	20:15	20:00	21:50	M. Goddard	Pulsar Helion XQ19, Anabat SD1, SMZC	Start air temperature: 17.7°C End air temperature: 17°C Cloud cover: 100% Wind Speed: 3 Precipitation: None
	8 th September 2021	19:27	19:12	20:57	A. Stickler	Pulsar Helion XQ19, Anabat SD1, Song Meter Mini	Start air temperature: 19°C End temperature: 17°C Cloud cover: 15% Wind Speed: 1



Tree Reference	Date of Survey	Sunset Time (or Sunrise Time where specified)	Survey Start Time	Survey End Time	Surveyors	Equipment	Weather Conditions
							Precipitation: None
BRL0010-04 Oak	18 th August 2021	20:15	20:00	21:50	Emily Goddard BSc	Pulsar Helion XP28F, Anabat SD1, Song Meter Mini	Start air temperature: 17.7°C End air temperature: 17°C Cloud cover: 100% Wind Speed: 3 Precipitation: None
	8 th September 2021	19:27	19:12	20:57	Justin Parry	Pulsar Helion XQ19, Song Meter Mini, Anabat SD1	Start air temperature: 19°C End air temperature: 17°C Cloud cover: 15% Wind Speed: 1 Precipitation: None
BRL0010-07 Oak	17 th August 2021	20:17	20:00	21:40	W. Riddett	Pulsar Helion XQ19, Anabat Express, SMZC, Bat Box Duet	Start air temperature: 16°C End air temperature: 14.5°C Cloud cover: 100% Wind Speed: 0 Precipitation: Very light drizzle
	8 th September 2021	19:27	19:12	20:57	A. Brighten	Pulsar Helion XQ19, Song Meter Mini, Anabat SD1	Start air temperature: 19°C End air temperature: 17°C Cloud cover: 15% Wind Speed: 1 Precipitation: None

3.3. Thermal Imager Video Analysis

Where thermal imaging cameras were used as a survey aide, video footage was reviewed using VLC Media Player². Footage was reviewed for bat movements and emergences, reducing playback speed where necessary (i.e. reviewing the footage in slow-motion) to determine the points of origin of a given bat.

Thermal analysis was conducted by Elizabeth Maxim MBiochem, Philip Farndon BSc, Lorna Salmon BSc, Bella Stickler BA MA, and checked by S. Dickinson and W. Riddett. Use of thermal imaging cameras and the subsequent analysis of the data was in accordance with Fawcett Williams, 2021³.

3.4. Bat Survey Audio Recording Analysis

Audio analysis of frequency division and time expansion data was achieved by comparing sound characteristics and sonogram shapes and measurements (peak call frequency, call frequency range, and mode pulse interval) to reference measurements and/or recordings provided by Russ et al. (2012)⁴, Parsons and Jones (2000)⁵, the BCT (2008)⁶, Sowler (2010)⁷, and WFE's in-house call reference library.

Where emergences from, or re-entries into trees were recorded by surveyors or thermal cameras, sonograms from paired bat detectors were analysed from the same time period to determine the species of bat observed.

Audio analysis was conducted by S. Dickinson and W. Riddett.



4. Results

4.1. Nocturnal Bat Emergence/Re-entry Surveys

Of the 13 trees scoped in for survey and subsequently subject to nocturnal surveys, a total of seven trees were found to support roosting bats.

Table 3, below, summarises the results of the surveys, with trees identified as supporting a bat roost highlighted in **bold**. Figure 2 to Figure 14 also provide a visual representation of the results including timings of emergences.

Table 3. Summary of the 2021 Nocturnal Bat Emergence/Re-entry Survey Results

Tree Reference	Date of Survey	Confirmed Emerging/Re-entering Bats
BRT0013	24 th August 2021	Three soprano pipistrelle <i>Pipistrellus pygmaeus</i> emergences
	8 th September 2021	Two unknown bat emergences (not echolocating as they emerged - likely to be soprano pipistrelles)
BRT0016J	24 th August 2021	None
	8 th September 2021	One common pipistrelle <i>Pipistrellus pipistrellus</i> emergence
BRT0038	18 th August 2021	None
	15 th September 2021	None
BRT0038c	18 th August 2021	None
	15 th September 2021	None
BRT0075b	17 th August 2021	None
	9 th September 2021	None
BRL0003-02	31 st August 2021	One common pipistrelle emergence
	23 rd September 2021	One soprano pipistrelle emergence
BRL0005-01	25 th August 2021	One common pipistrelle emergence
	15 th September 2021	None
BRL0005-02	25 th August 2021	None
	15 th September 2021	One barbastelle <i>Barbastella barbastellus</i> emergence
BRL0005-04	25 th August 2021	None
	15 th September 2021	None
BRL0010-01	18 th August 2021	None
	8 th September 2021	None
BRL0010-02	18 th August 2021	None
	8 th September 2021	None
BRL0010-04	18 th August 2021	None
	8 th September 2021	One soprano pipistrelle emergence
BRL0010-07	17 th August 2021	None
	8 th September 2021	One soprano pipistrelle emergence



In addition to the emergences shown in **Table 3**, commuting and foraging bats of the following species were also recorded across many of the surveys: common pipistrelle, soprano pipistrelle, noctule *Nyctalus noctula* and *Myotis* sp. It should also be noted that WFE conducted separate transect surveys and put out static detectors in selected locations within the DCO boundary to gather data on bat commuting and foraging areas. These results can be seen in Technical Appendix 21.3 Bat Activity Survey Report.

The following seven trees are confirmed as supporting a bat roost: BRT0013, BRT0016J, BRL0003-02, BRL0005-01, BRL0005-02, BRL0010-04 and BRL0010-07.

4.2. Roost Type and Significance

With the exception of BRL0005-02, the remaining confirmed bat roost trees were found to support one bat (or in the case of BRT0013 up to three bats), of either a common pipistrelle or soprano pipistrelle. The BCT guidelines state that ‘pipistrelles are the commonest and most widespread of all British bat species...[and] the two commonest pipistrelle species found in the UK [are] the common and soprano pipistrelle’. It also states that, ‘populations of pipistrelles have declined dramatically in the last few decades’⁸.

As only a small number of pipistrelle bats were recorded emerging, the roosts are likely to be day roosts, defined by Natural England as ‘a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer’. Therefore, given the species present and the roost type, the application of Figure 4 of the English Nature Bat Mitigation Guidelines⁹ concludes that such roosts are of ‘low conservation significance’ for bats.

In contrast, BRL0005-02 supports a day roost of a barbastelle, an Annex II species. The BCT states that ‘the barbastelle is very rare, found in southern and central England and Wales’¹⁰. Given the species and roost type, the application of Figure 4 of the English Nature Bat Mitigation Guidelines⁹ concludes that the roost has low-medium conservation significance for bats.

It should be noted that none of the 13 trees subject to nocturnal emergence/re-entry surveys were considered to have significant hibernation roost potential. This was due to the nature of the features recorded, which during the preliminary ground level roost assessment, were not considered to be deep enough and/or too exposed given the open arable habitat surrounding the trees to provide an optimal microclimate for a hibernating bat. No hibernation surveys were therefore carried out.

Bats are highly mobile and opportunistic, using a wide range of roosting niches throughout the year, the use of tree roosts for transition or opportunistic roosting during mild weather in winter months cannot be ruled out.

4.3. Constraints and Limitations of Surveys

The surveys for BRT0038 and BRT0038c on 18th August 2021 began four minutes after sunset (instead of 15 minutes before) due to unexpected traffic conditions which delayed the arrival one of the two surveyors and some survey equipment. Given that the second survey on 15th September 2021 began on time, it is considered that overall, the completed surveys provide acceptable evidence for the classification of the bat roost status of these two trees. It is considered very unlikely that any bats would have emerged from these trees, unnoticed by the one surveyor monitoring them, in the first 19 minutes of the survey during essentially daylight conditions. Indeed, the first bat



registered on the detectors used on this survey was at 20:29, approximately 13 minutes after sunset.

The main constraint to all the surveys is timing. All tree surveys were carried out between August and September, a time of year when maternity roosts of some species may have already come to an end and dispersed. Maternity roosts have a higher conservation significance than day roosts. Surveys earlier in the year were not possible due to landowner access restrictions and ongoing refinements to the DCO boundary which only made the scoping exercise possible in July 2021.

The BCT guidelines also acknowledge a number of inherent constraints to surveying bats in trees, these include:

- Many species that use trees for roosts exhibit roost switching behaviour, including barbastelle^{11,12,13};
- Inspection of potential roost features for droppings or to characterise roost types can be difficult if features are high up in the tree;
- Some tree-roosting bats echolocate very quietly (and sometimes not at all) and are therefore difficult to detect using bat detectors;
- Some tree roosting bats emerge from their roosts very late and return very early; and
- Restricted observation of the tree by surveyors and thermal cameras due to foliage or lack of light under the canopy.

The BCT guidelines concludes that ‘due to these limitations [listed above] and from what is known about the ecology of tree roosting bats, it is arguable that all trees with bat roosting potential should be considered part of a resource that will be used at one time or another by tree roosting bats in order to determine the extent of impacts. Survey work on individual trees may confirm presence but is unlikely to conclusively confirm absence’.

Nevertheless, the surveys completed between August and September 2021 have been undertaken in accordance with the BCT survey guidelines and are considered acceptable for classifying the bat roost status of the 13 trees with Moderate bat roost potential within the DCO boundary, both in terms of informing the DCO application itself and informing any EPS mitigation licensing requirements (but only within no more than 12 months of these surveys). The aforementioned constraints are mostly inherent and unavoidable, so the impact assessment and corresponding mitigation requirements sufficiently take account of the residual uncertainty associated with these constraints.

4.4. Expiry Dates, Further Survey Requirements, Mitigation/Licensing Options

The survey results should be regarded as valid for planning and licensing purposes until the next bat survey season.

Two trees with confirmed bat roosts are at risk of removal to facilitate installation of the onshore export cables. These are: BRT0016J and BRL0010-7. The remaining trees are not at risk of removal as they are due to be retained either by refining the working corridor to avoid these trees, or by using HDD methods of installation.

An EPS mitigation licence from Natural England will be required to legally permit felling of these two trees and destroy the bat roosts (if, when construction works occur, these trees do need to be removed). Tree felling to accommodate the construction works of SEP and DEP is not scheduled to take place before 2024, meaning the survey data from 2021 will not be suitable for use to inform the licence application. An EPS licence application will require two bat emergence/re-entry surveys from the most recent survey season to reconfirm the presence and nature of bat roosts at the time trees would be felled; for example, if trees are targeted for felling in November-December 2024, bat surveys to inform the EPS mitigation licence would need to take place between May and August/September 2024.

The EPS licence will stipulate the appropriate mitigation and compensation requirements, based on the most recent survey results. Mitigation and compensation measures are likely to include:

- Installation of suitable replacement roosts (bat boxes) on nearby trees. This will include demonstrating to Natural England that landowner permission has been obtained for the installation of the bat boxes. Monitoring of bat box usage after installation is not required as no maternity roosts are being lost, therefore landowner permission would not be required for repeated visits to the boxes.
- Provision of a briefing by a suitably qualified and Natural England-licensed ecologist to the tree surgeons who will be felling the relevant trees, to alert them to the presence of roosting bats and inform them of the course of action to be taken to fell the tree in accordance with the mitigation licence.
- Fitting of exclusion devices (which allow bats to vacate a roost but not re-enter it) for five consecutive days of suitable weather, covering any roost features at which the absence of roosting bats cannot be confirmed (e.g. deep crevices).
- Felling the trees when daytime temperatures are above freezing. If subsequent bat emergence/re-entry surveys find maternity or hibernation roosts, tree felling will need to take place outside of these seasons (i.e. felling will need to take place in October).
- Pre-removal inspection of roost features in order to remove any bats that may still be in situ and relocate them to the pre-installed artificial compensatory roost (i.e. the nearby bat box).

Longer-term compensation will be provided through tree planting, although this is separate to EPS mitigation licensed obligations. The Outline Ecology Management Plan (document number 9.19, states that trees to be removed will be replanted within the DCO boundary but outside the final permanent cable corridor easement. Where practicable, broad-leaved native trees will be planted along hedgerows.

Removal of BRL0016J and BRL0010-07 can only take place once Natural England has granted the EPS licence and any necessary compensatory bat boxes are installed.

The 2021 surveys provide a snapshot of the bat roosting status in trees within the DCO boundary. However, tree removal associated with SEP and DEP is not expected to occur for perhaps three to four years. The potential for roosting bats in all trees within the DCO boundary will need to be reconsidered within the survey season (May to August/September) immediately preceding tree removal. The updated surveys will ensure that any mitigation measures put in place reflect the bat roost status at that time, not necessarily at the time of the 2021 surveys, as bat roosting may have changed

in the intervening years. Trees to be removed must therefore be resurveyed, comprising a ground-level appraisal of bat roost suitability/potential (possible at any time of year), followed by bat roost emergence/re-entry surveys (possible between May and August/September) of any trees with High or Moderate bat roost potential and which are targeted for removal or otherwise due to be impacted. An EPS mitigation licence will be required to legally remove any found to contain bat roosts, and the detail of the mitigation permitted under this licence will be informed by the updated survey results.

If future surveys (e.g. in 2024) record no evidence of bats roosting in trees which have previously (in 2021) had roosting bats confirmed as present, these trees would still require an EPS mitigation licence to legally permit their removal. Bat roosting in trees is inherently changeable so a negative survey result (e.g. in 2024) should not generally override a positive survey result from the recent past. However, if updated surveys find there has been a significant change to the condition/bat roost status of a tree (for example, if a limb in which bats were found to be roosting in 2021 has fallen off the tree by 2024) then a negative result from updated surveys would override the earlier positive result.

Trees classified as having Low bat roost potential in accordance with the aforementioned BCT guidelines do not require targeted surveys, but rather the low risks of impacts to roosting bats can be addressed by adopting precautionary mitigation measures. The standard approach to be adopted for this classification of tree is to undertake an aerial inspection of any features to confirm the absence of roosting bats and then felling the tree normally, or 'soft-felling', whereby any features within the tree which have low bat roost potential will be severed, intact, from the tree and lowered gently to the ground. The intact feature will then be left facing sideways/upwards (not facing the ground) for 24 hours before then being removed. This will allow any bats which may be roosting within the feature to vacate it and move to an alternative roost. An example would be cutting out a section of trunk with loose bark (ensuring that cutting this section away from the tree does not sever/damage the feature), lowering this intact section to the ground using ropes and leaving it overnight with the loose bark facing sideways. All other parts of Low bat roost potential trees which do not have any roost potential can be felled without specific precautions.

Figure 1. Location of trees subject to bat emergence/re-entry surveys

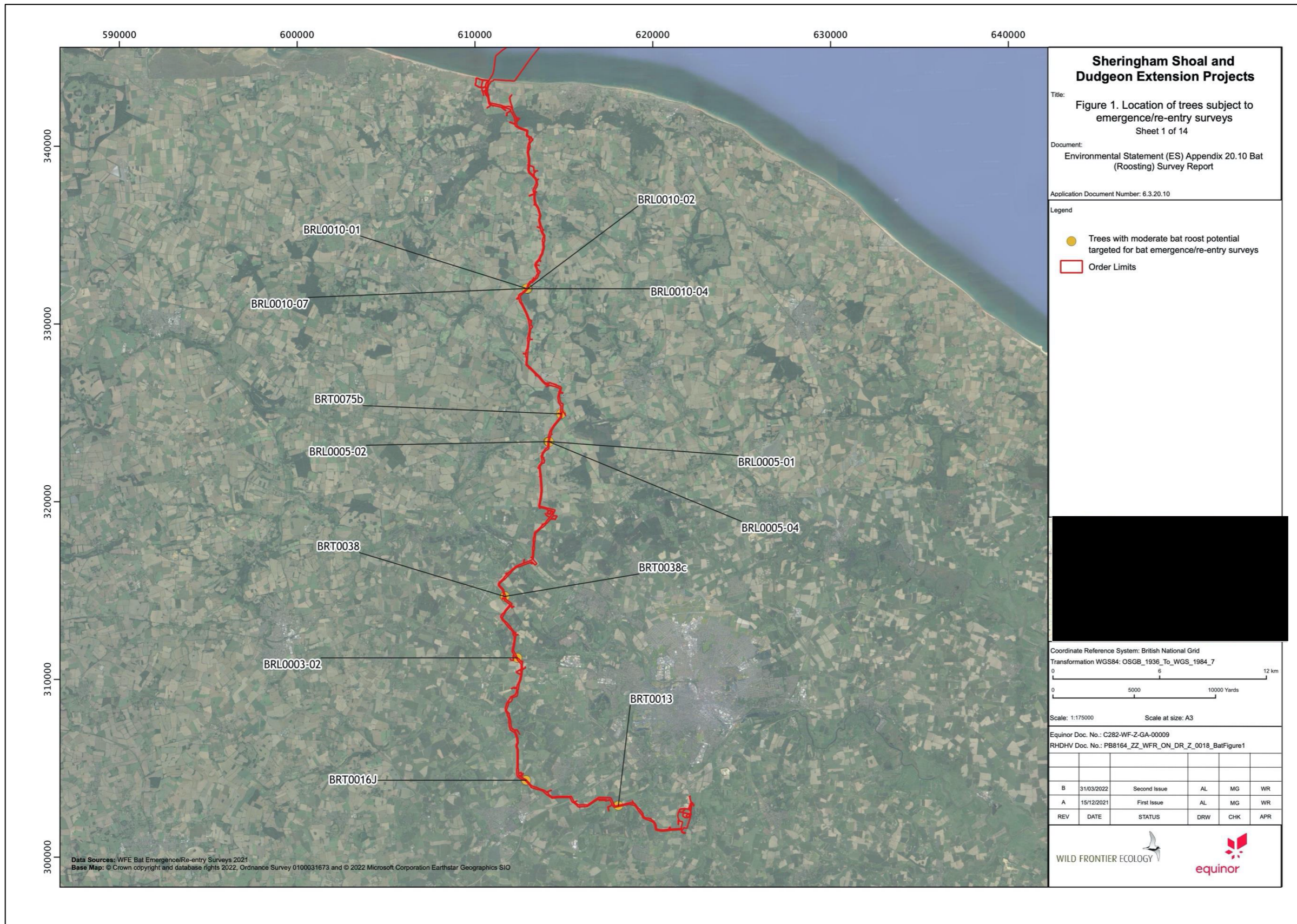


Figure 2. BRT0013 Survey Results

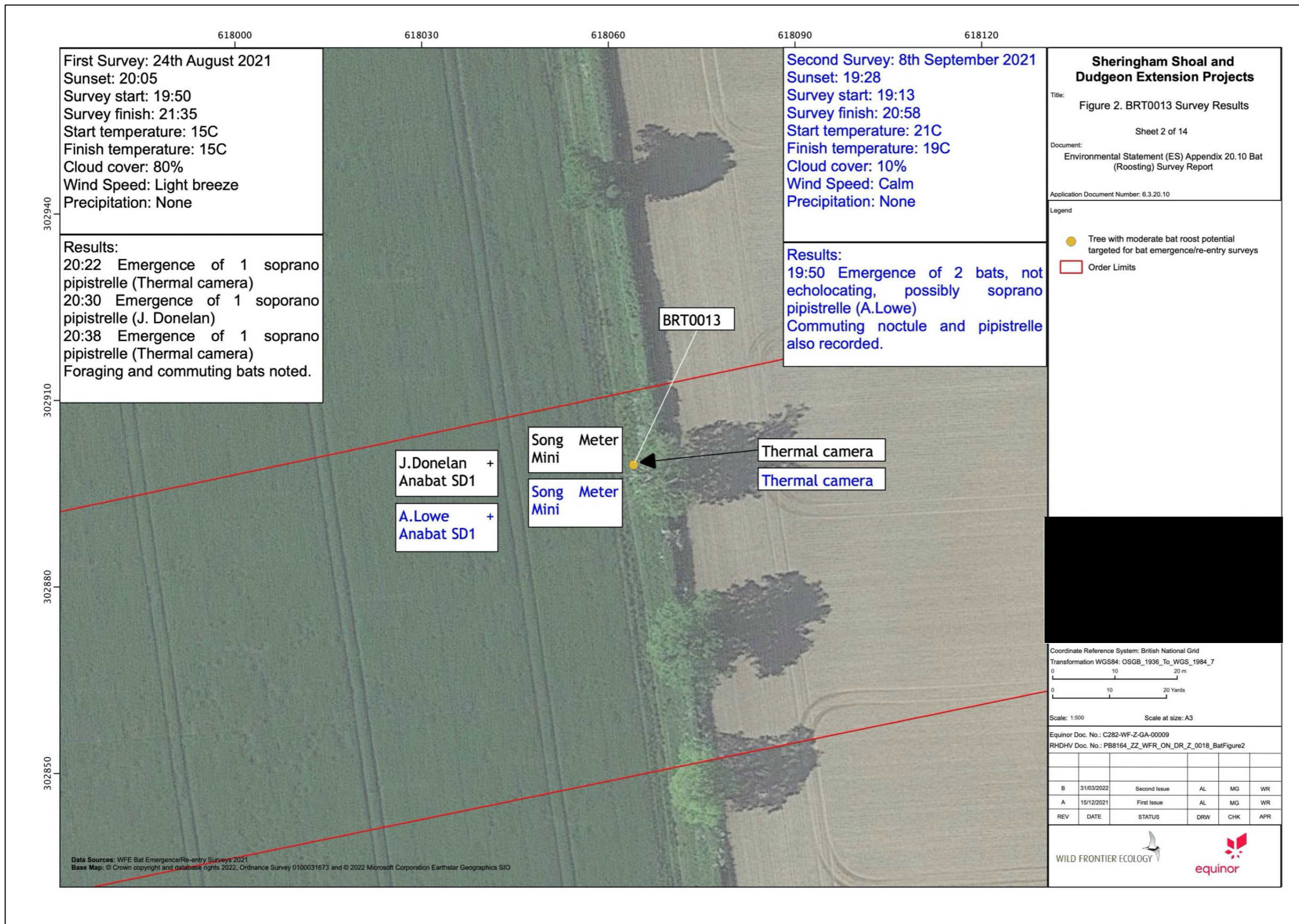


Figure 3. BRT0016J Survey Results

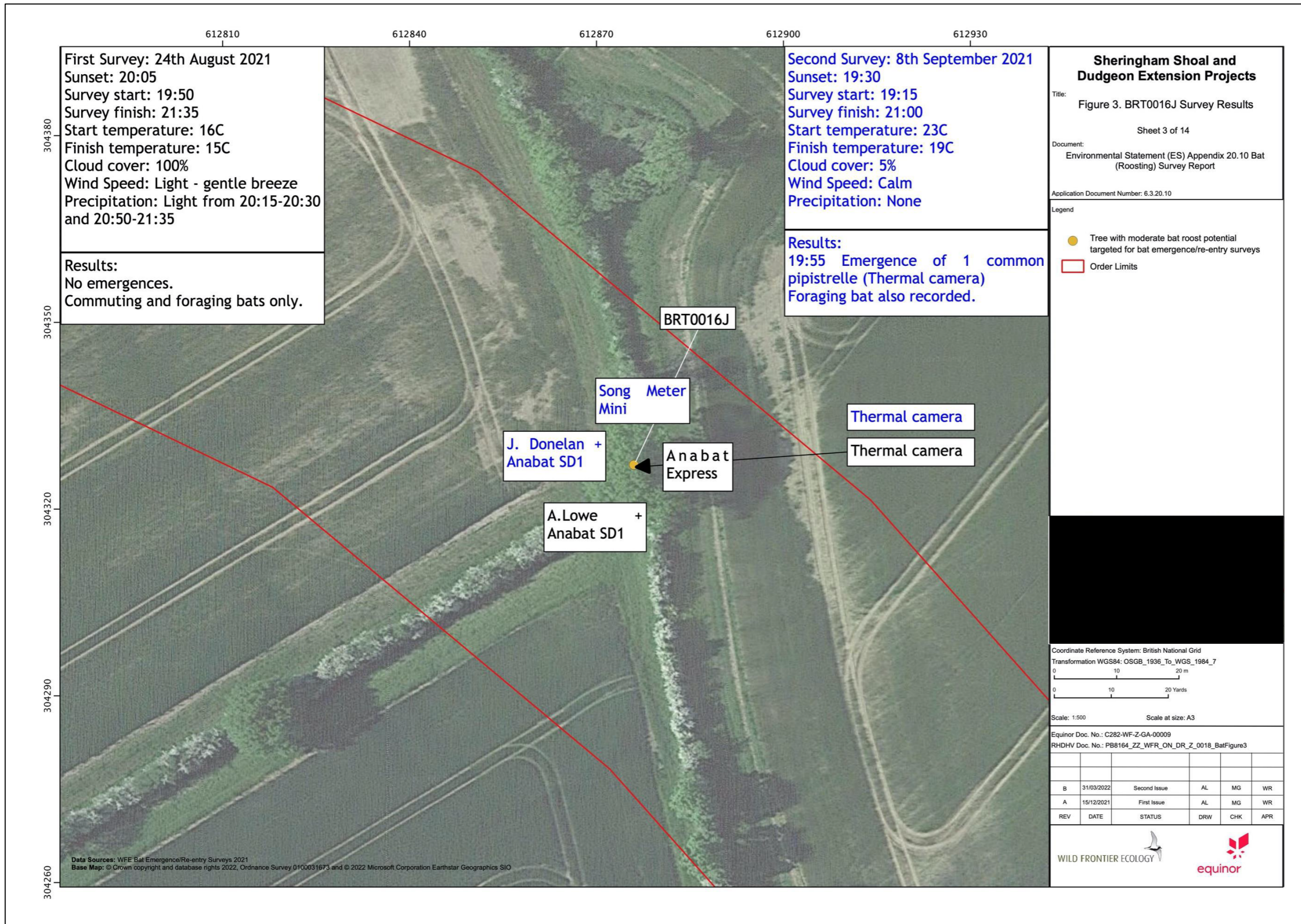


Figure 4. BRT0038 Survey Results

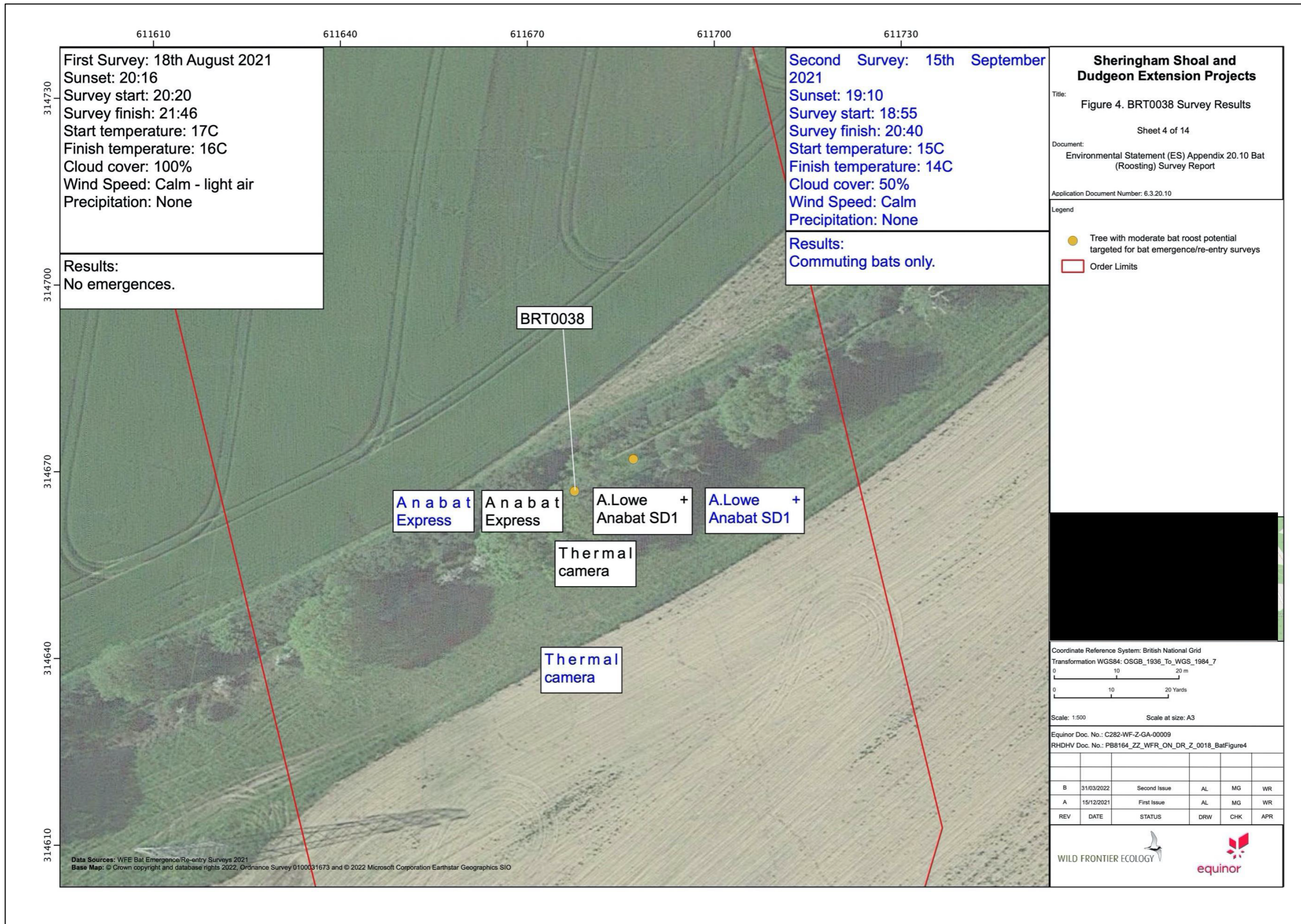


Figure 5. BRT0038c Survey Results

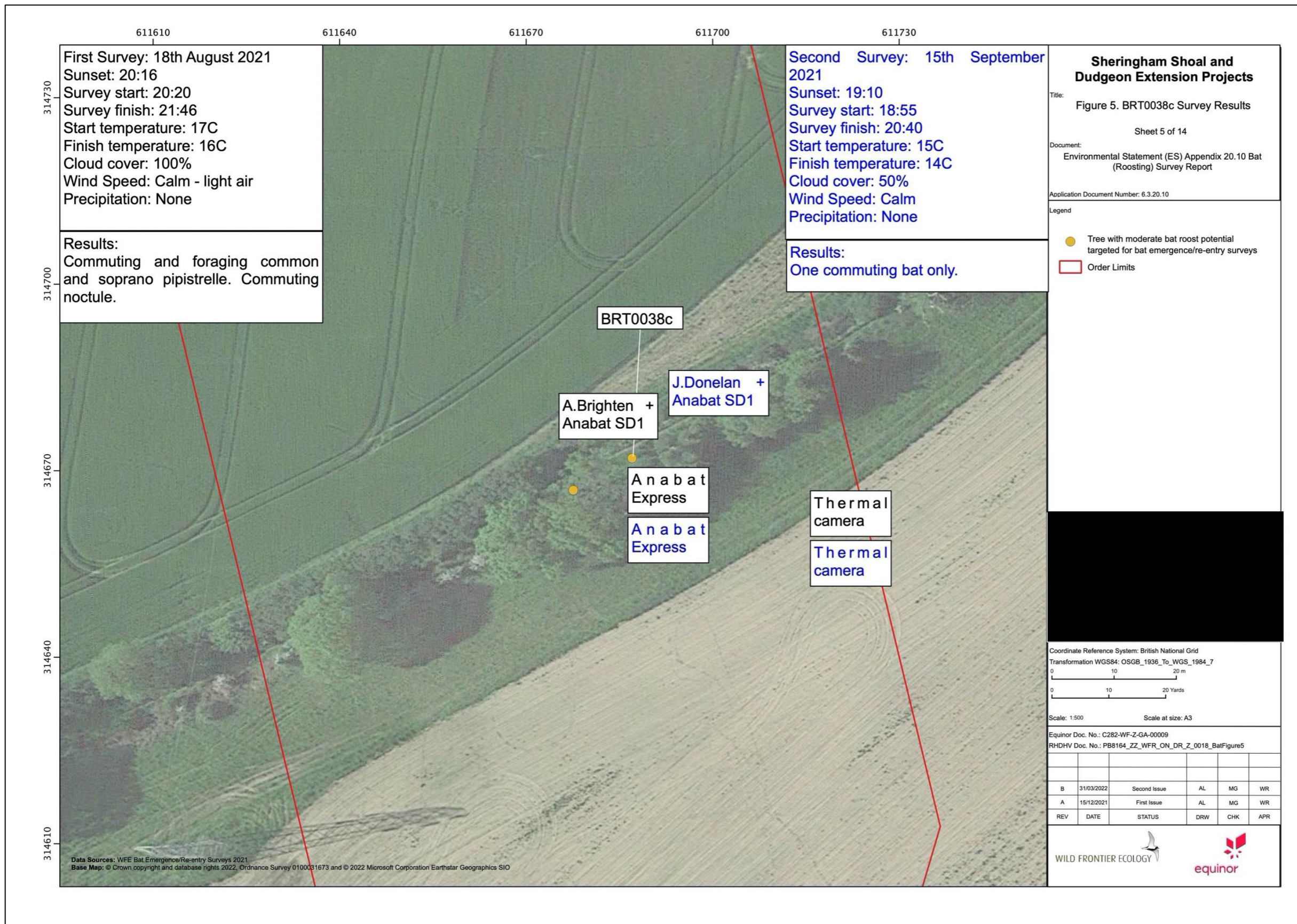


Figure 6. BRT0075b Survey Results

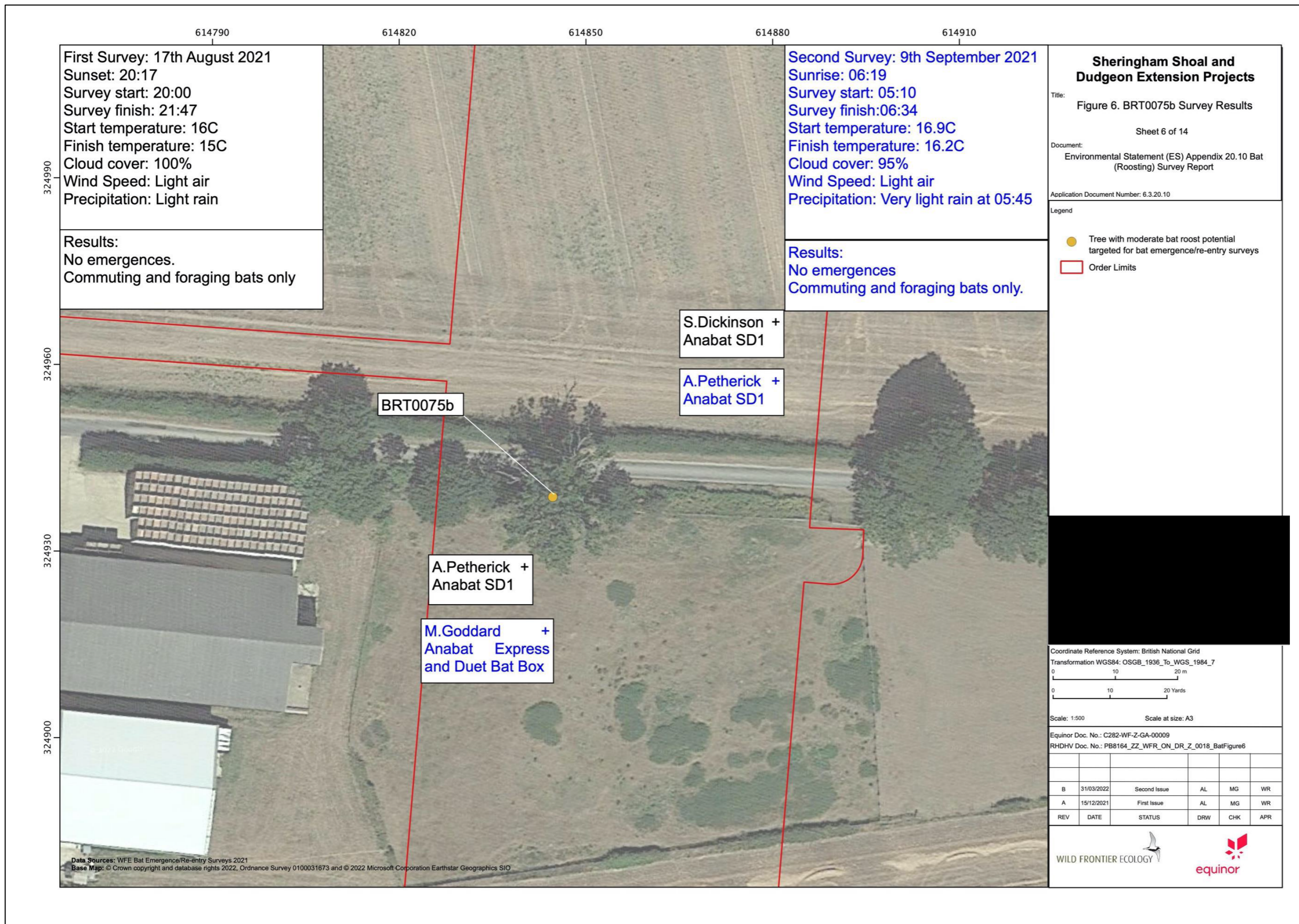


Figure 7. BRL0003-02 Survey Results

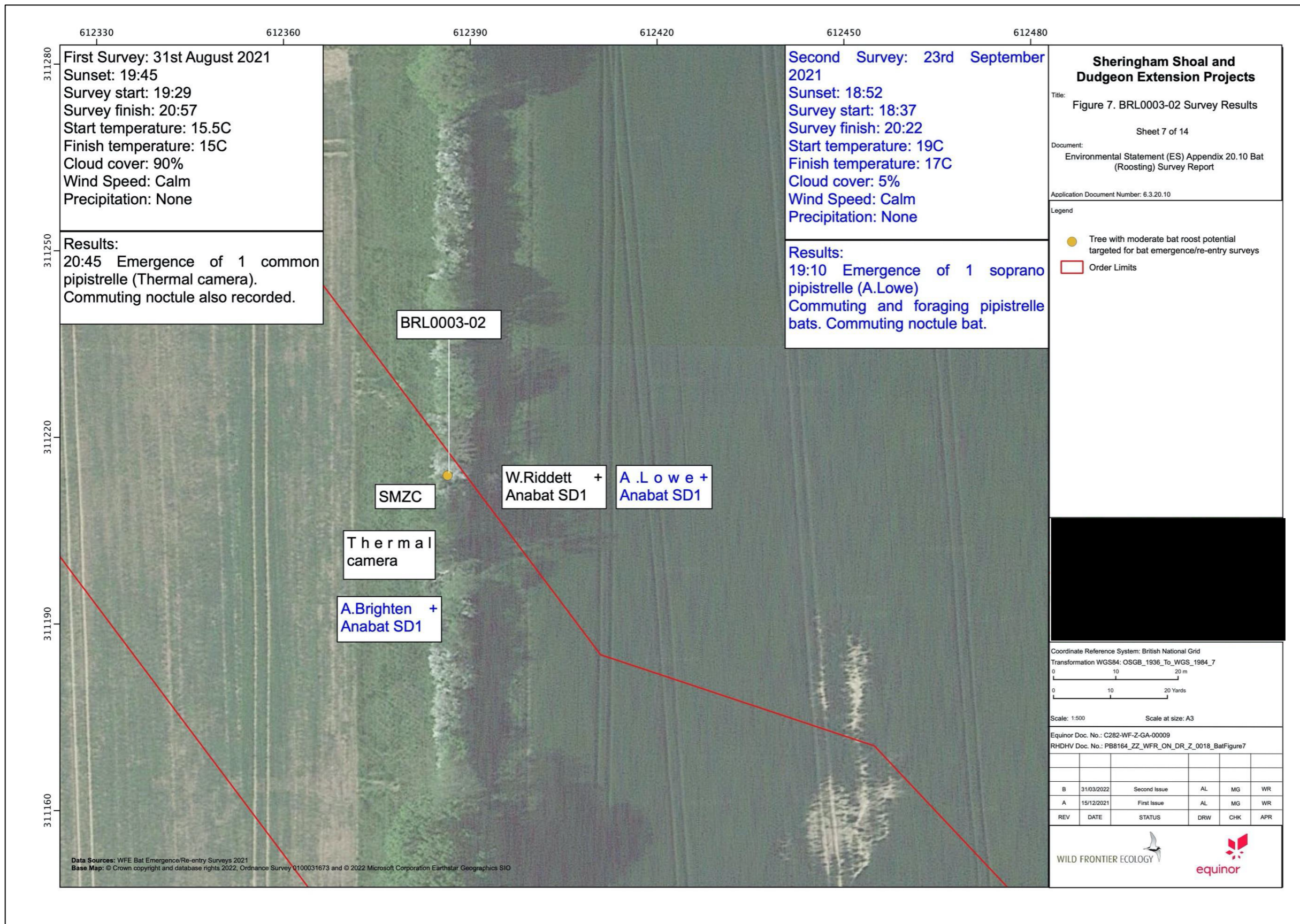


Figure 8. BRL0005-01 Survey Results

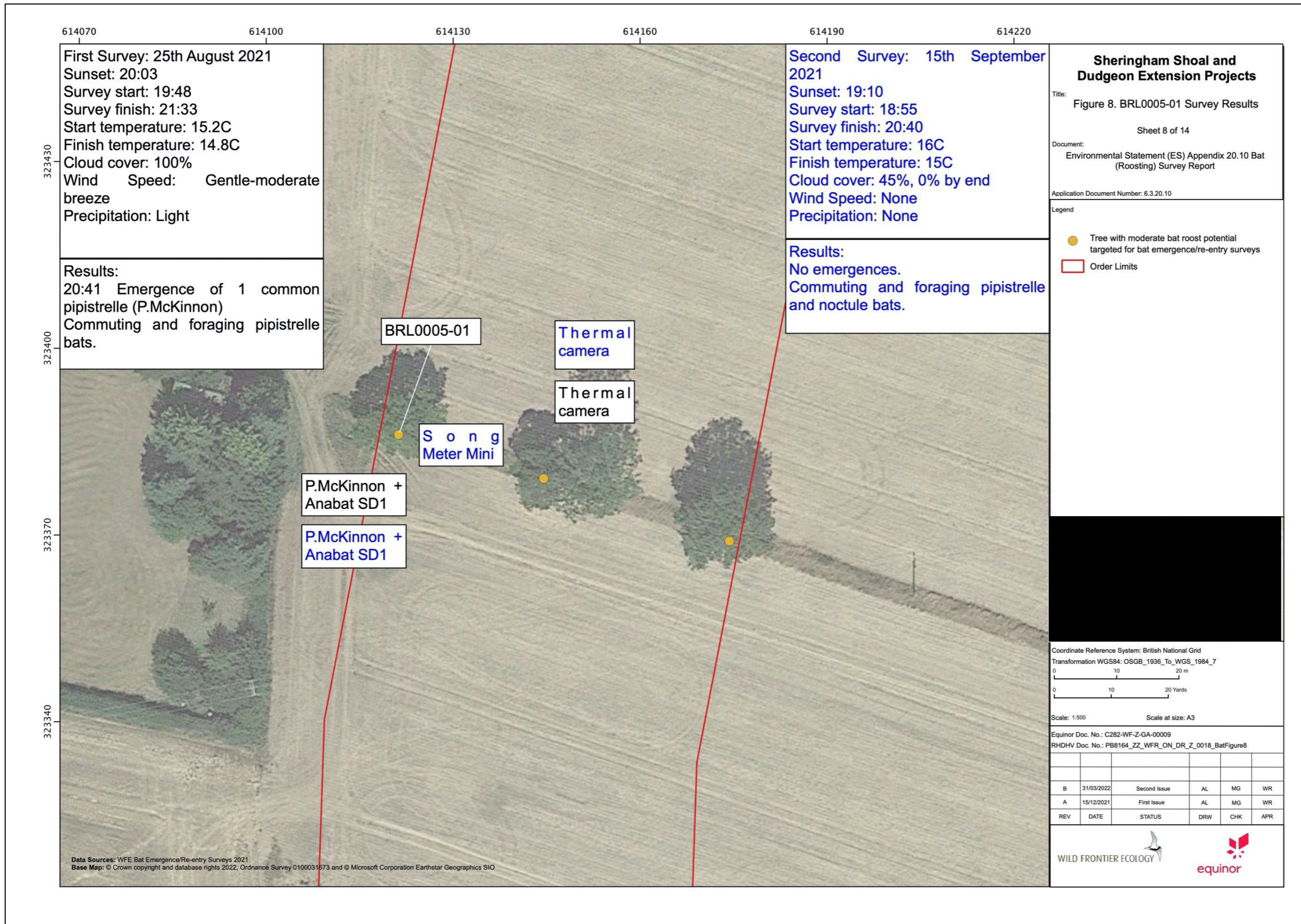


Figure 9. BRL0005-02 Survey Results

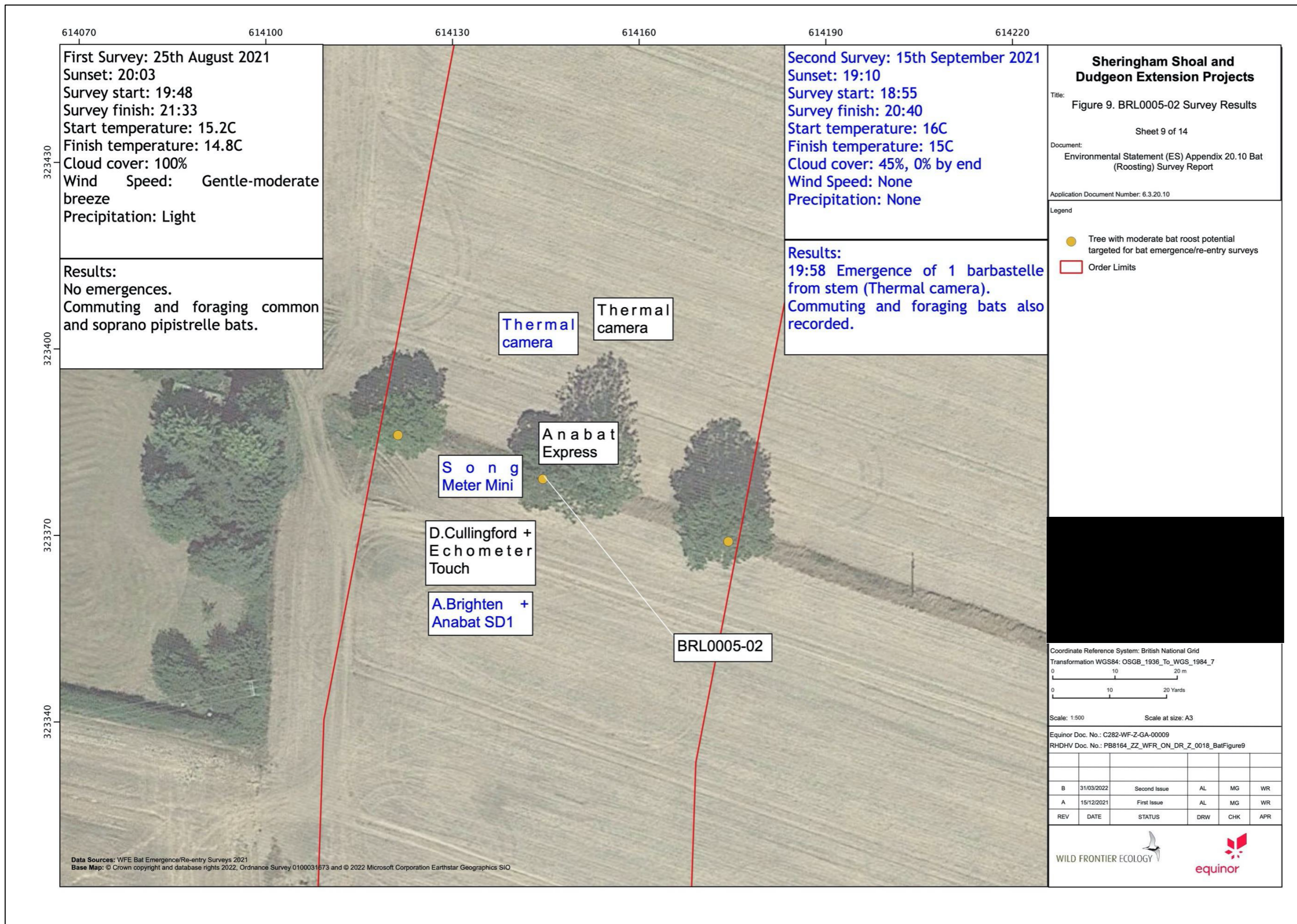


Figure 10. BRL0005-04 Survey Results

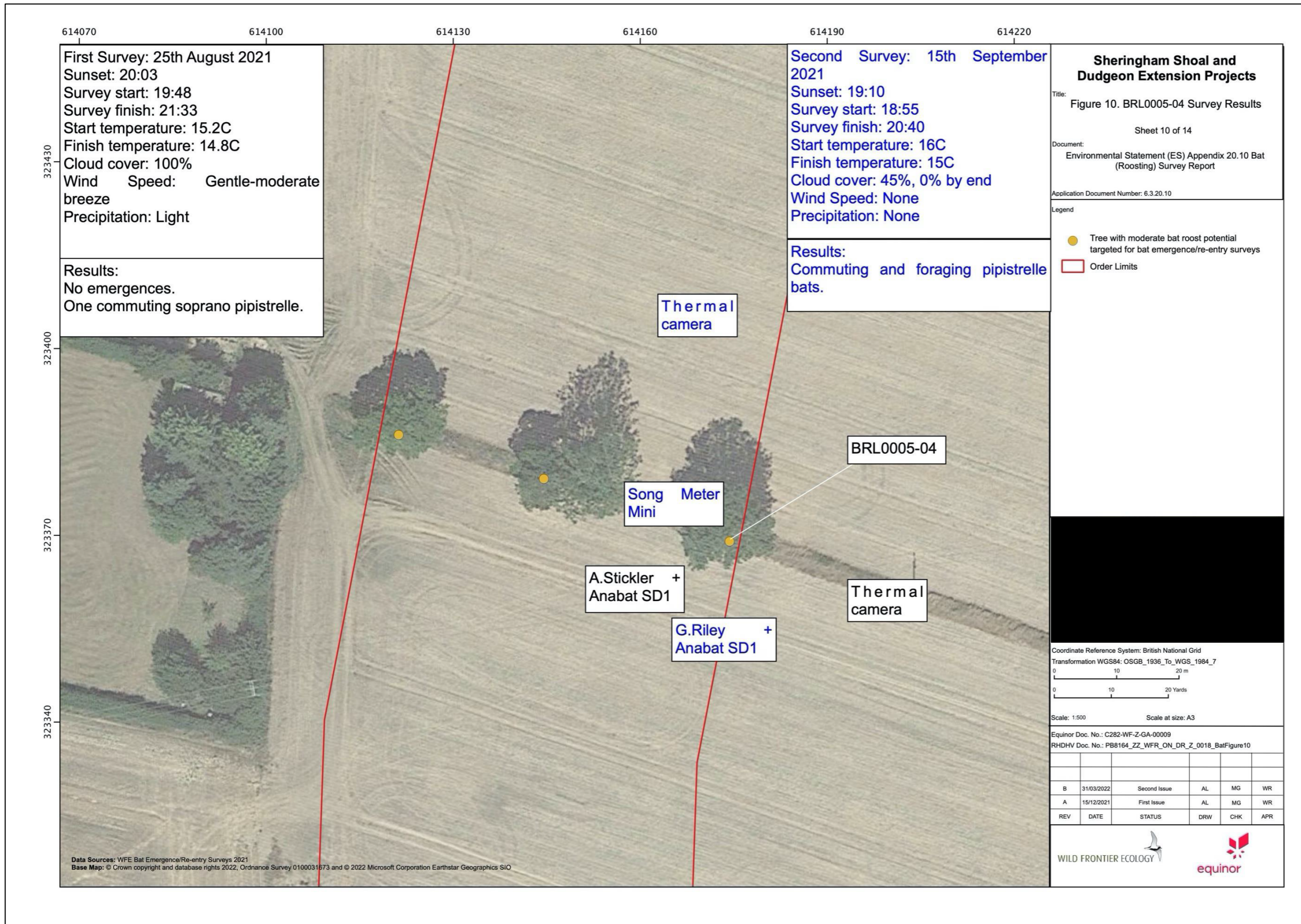


Figure 11. BRL0010-01 Survey Results

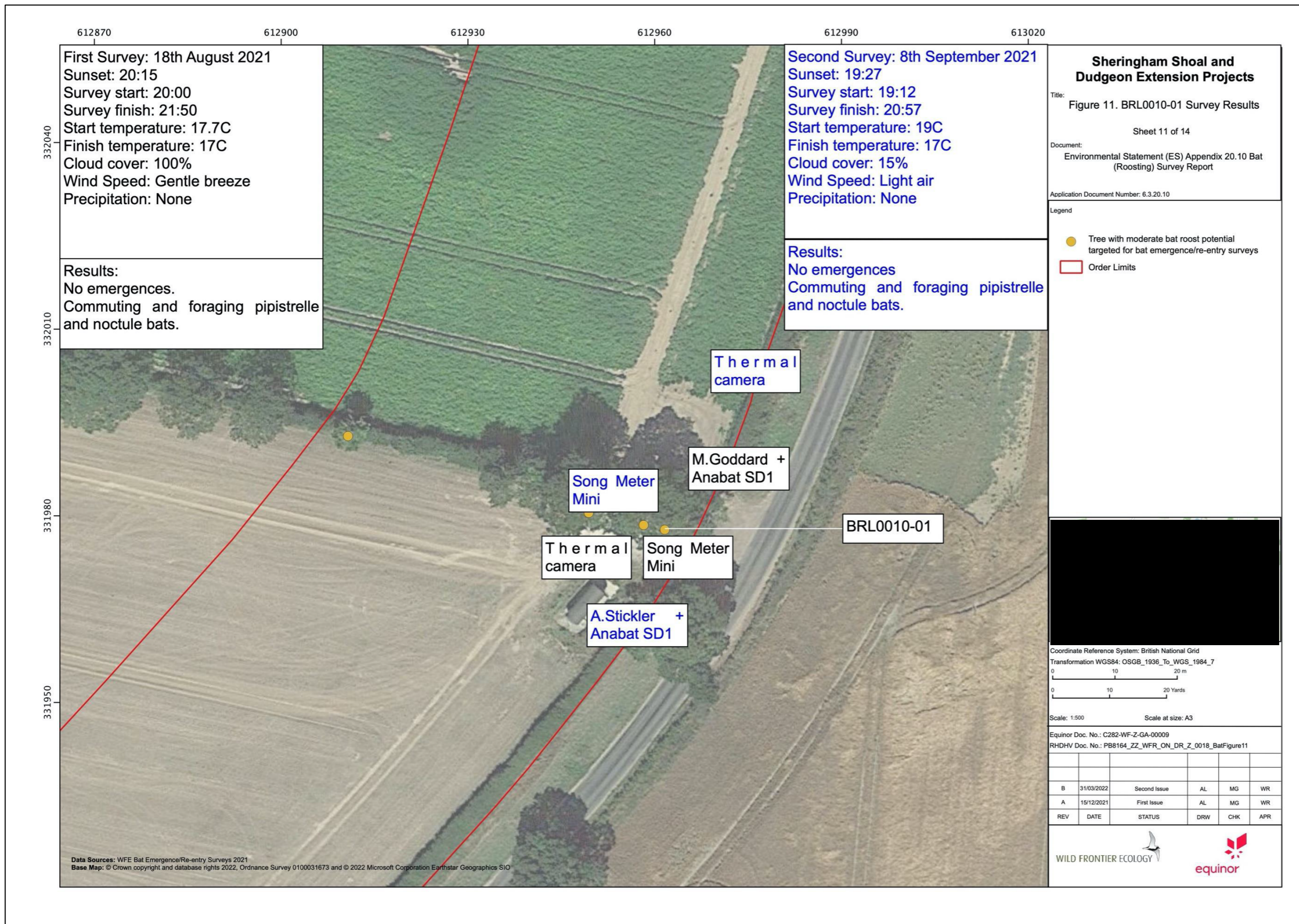


Figure 12. BRL0010-02 Survey Results

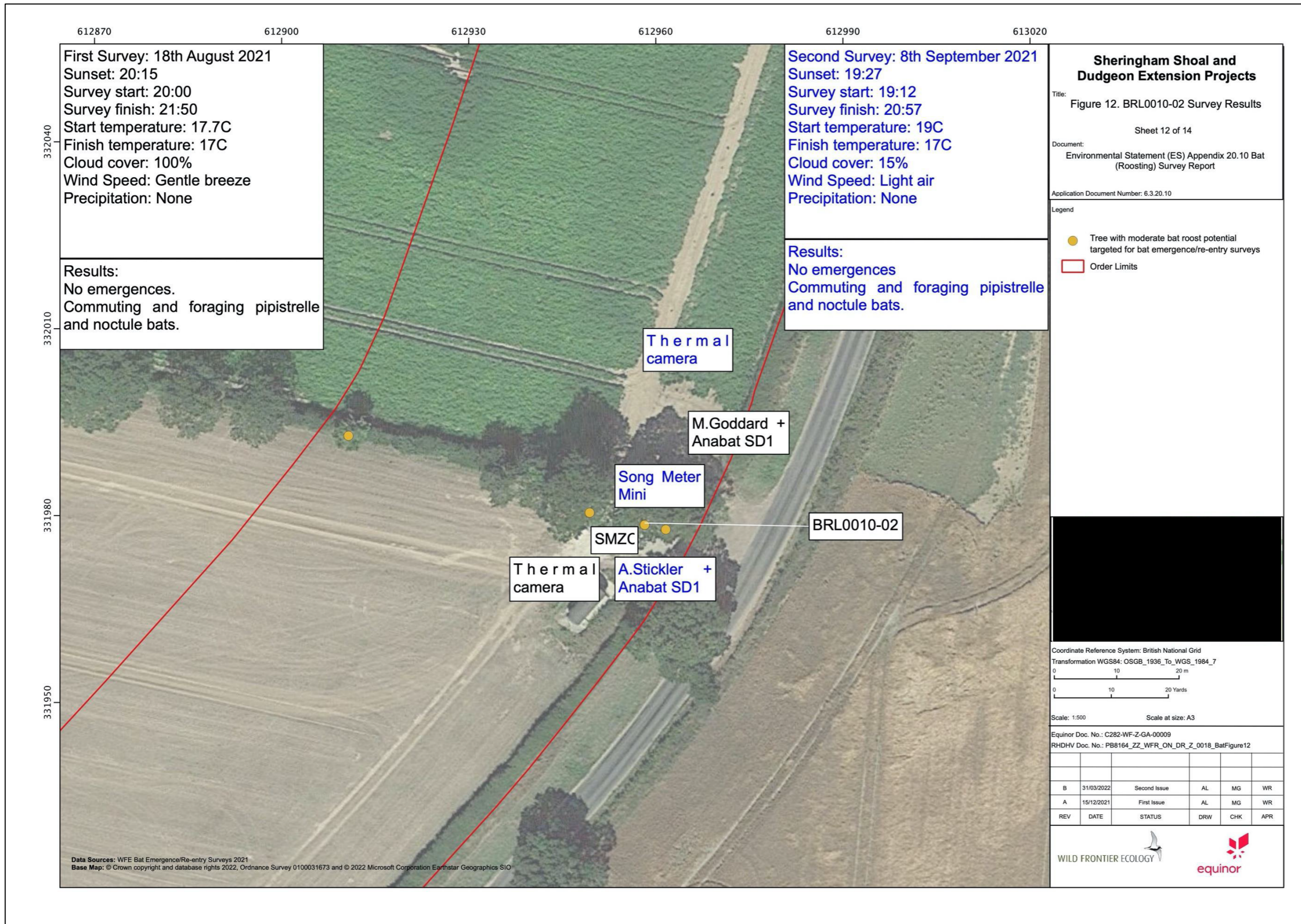


Figure 13. BRL0010-04 Survey Results

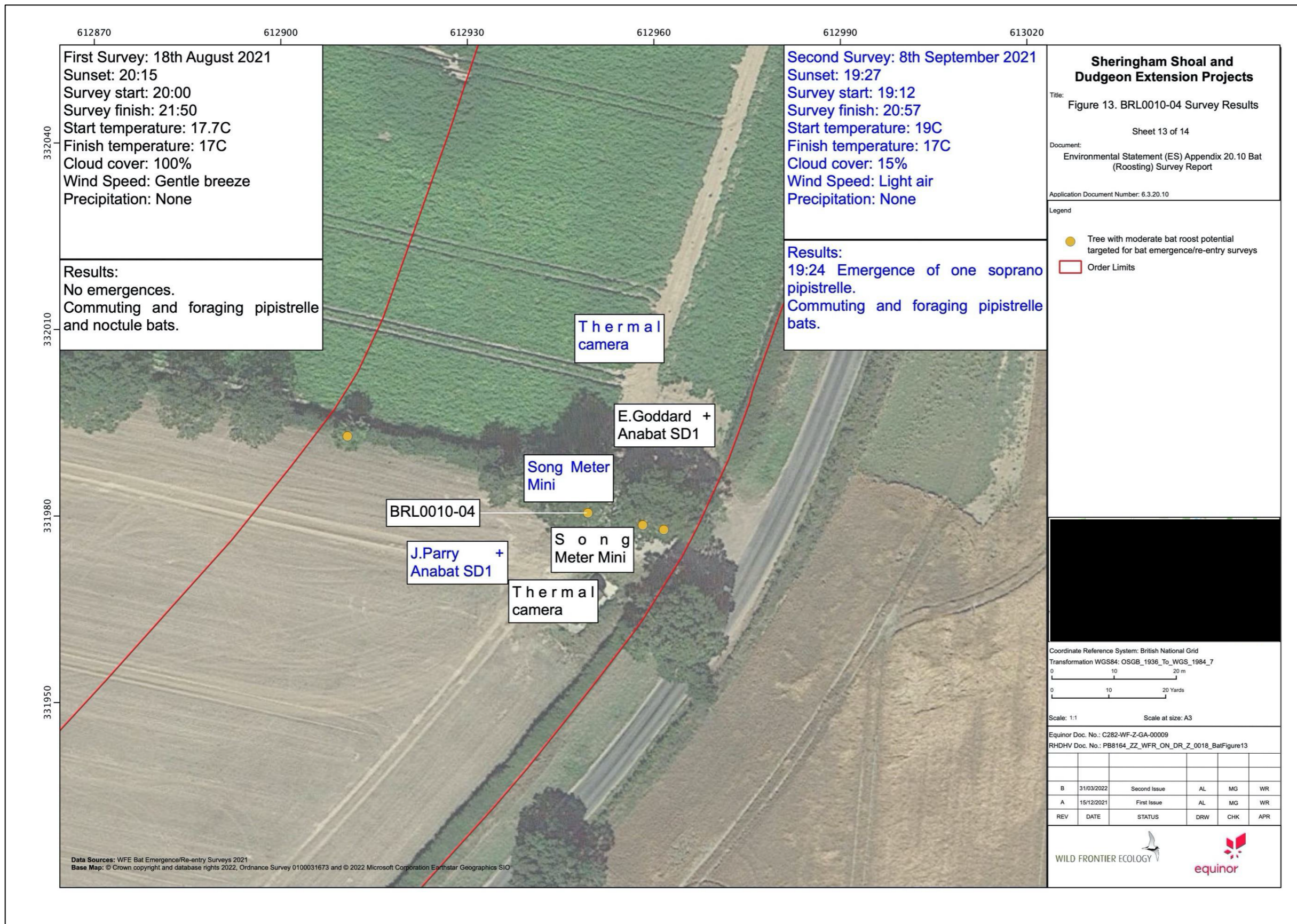
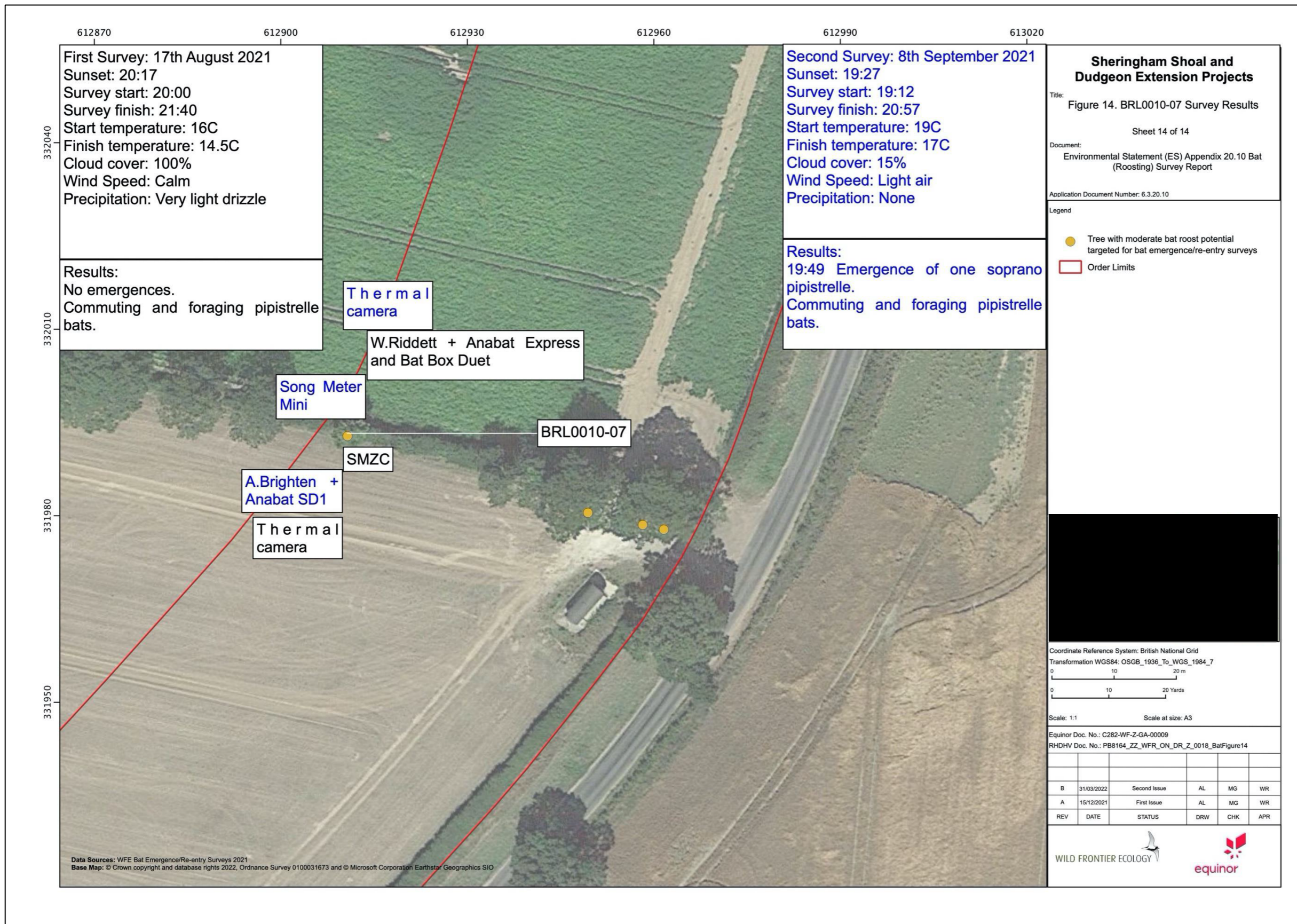


Figure 14. BRL0010-07 Survey Results



5. Conclusions

The nocturnal emergence/re-entry surveys carried out in 2021 have confirmed the presence of seven oak trees with bat roosts, two of which are at risk of being impacted based on current projected engineering/construction plans. The other five trees are expected to be retained by adopting avoidance measures in the vicinity of these trees.

Removal of trees supporting roosting bats, and consequent destruction of roosts, can only legally be undertaken once an EPS licence is obtained from Natural England. The licence will specify appropriate mitigation and compensation measures, which are likely to include the installation of compensatory bat boxes on nearby trees and removal of the trees when day temperatures are above freezing. Updated surveys will be required to inform the EPS mitigation licence application, and these surveys will need to take place within the survey season immediately preceding the period when trees would be felled.



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Annex 1. Tree Photographs

Photo 1. BRT0013 Oak

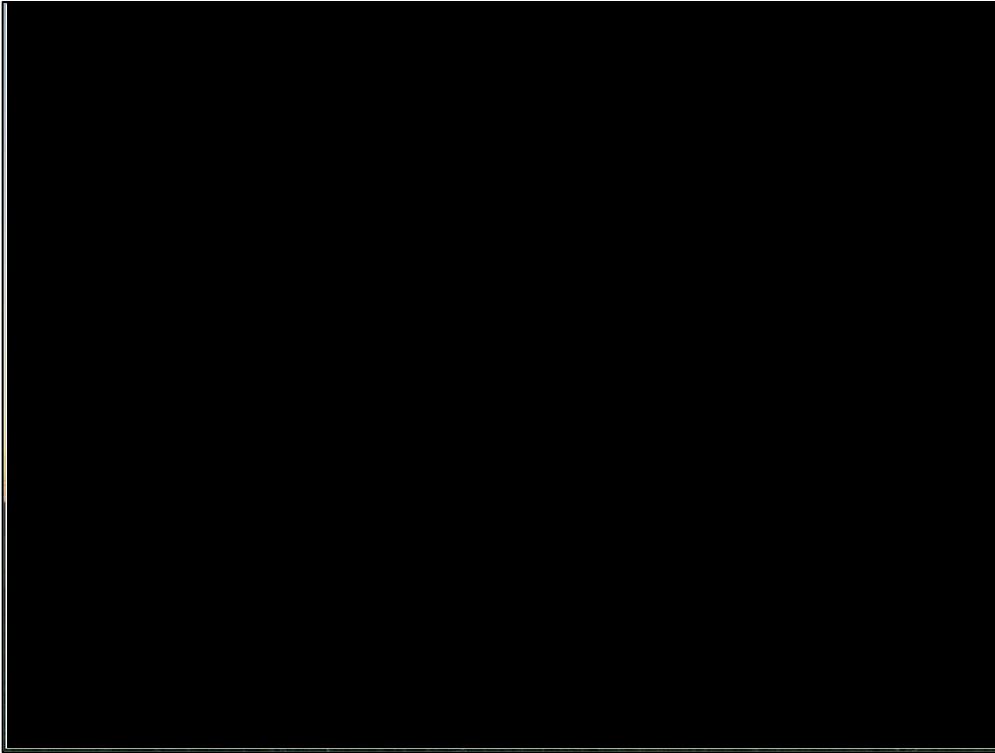


Photo 2. BRT0016J Oak

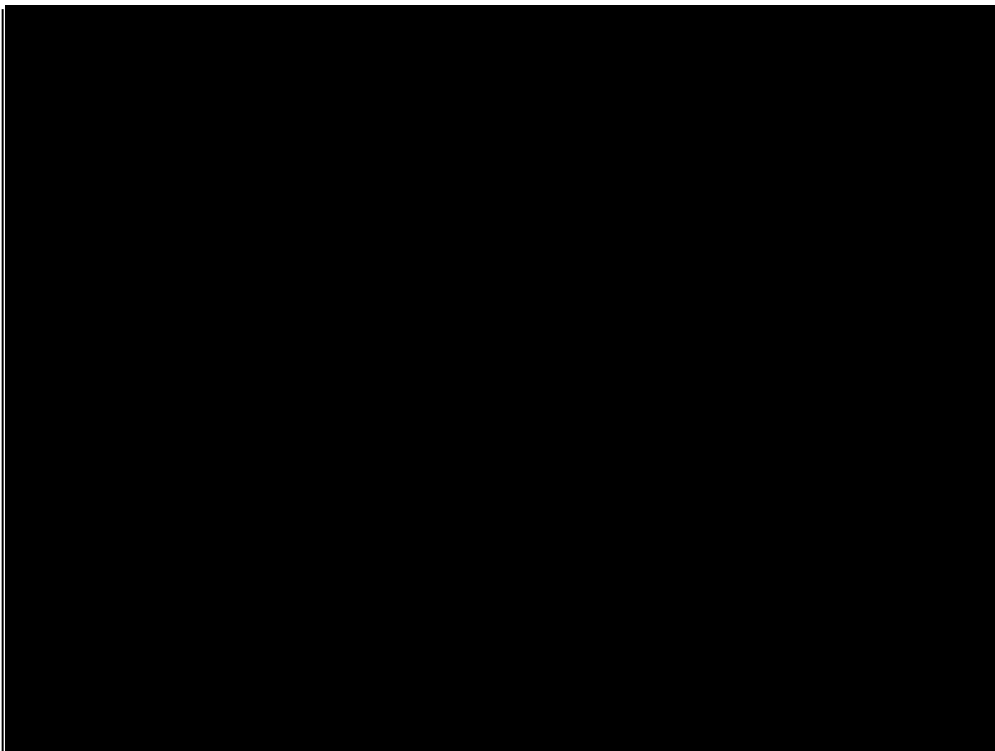




Photo 3. BRT0038 Oak Potential Roost Features



Photo 4. BRT0038c Oak Potential Roost Features

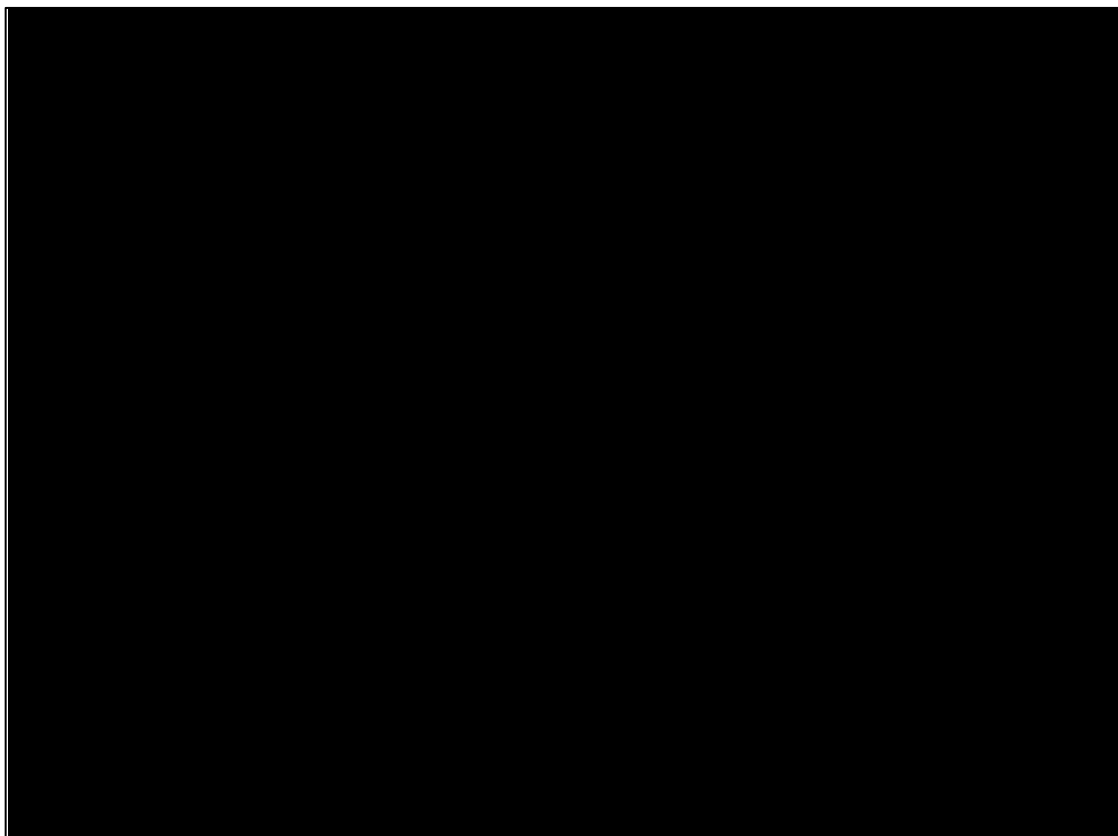




Photo 5. BRT0075b Oak



Photo 6. BRL0003-02 Oak

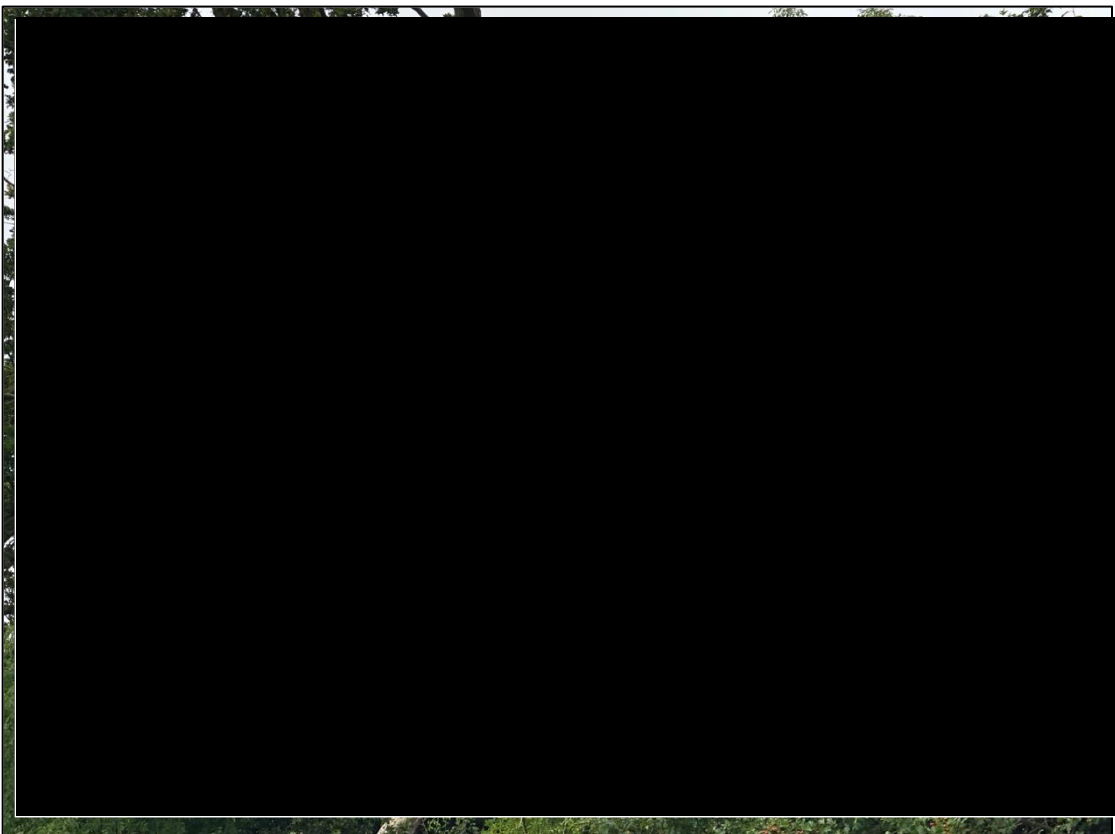




Photo 7. BRL0005-01 Oak, BRL0005-02 Oak and BRL0005-04 Ash

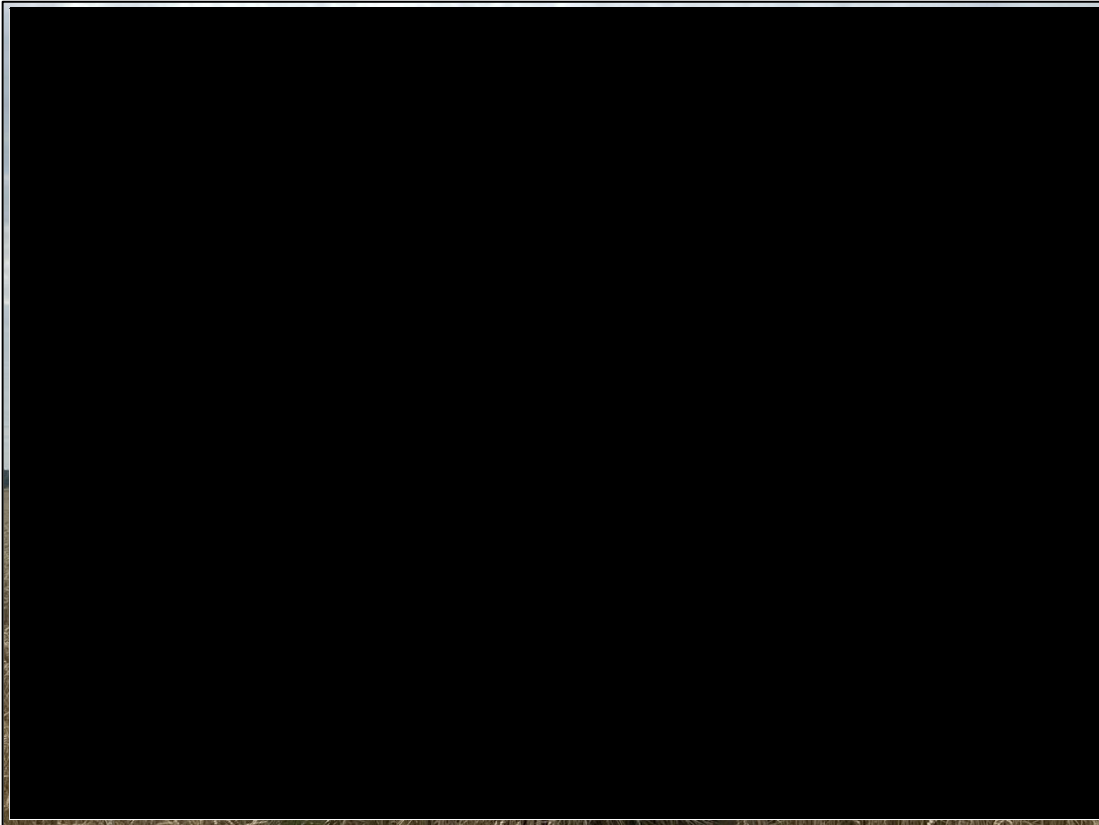


Photo 10. BRL0010 Oaks

