



Bloch Wind Farm

Technical Appendix 7.2: Bat Surveys

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1 Introduction

- 1.1.1 This report presents the bat survey work that has been carried out for the proposed Bloch Wind Farm (the ‘proposed development’). The surveys were undertaken by Tom Lowe, Stuart Piner and Steve Percival, all highly experienced ecological surveyors with over 20 years ecological surveying for renewable energy projects each (including bats, exceeding CIEEM competency requirements).
- 1.1.2 The surveys were designed to take into account NatureScot (SNH et al. 2019) guidance on bat surveys for wind farms.

2 Study Area

- 2.1.1 The proposed development is located south of the B7068, approximately 5.5km south-west of Langholm in Dumfries and Galloway. The bat survey area was chosen to include all areas within the potential zone of ecological influence of the proposed development and a buffer around that to be contextual information on the site’s bat populations. The survey area covered a total area of 15.7km² (see Figure 1 of this document). It comprised predominantly upland moorland habitat, currently used mainly for grazing sheep, with the Solwaybank Wind Farm adjacent to the west. It lies mainly within the ‘Border Hills’ NatureScot Natural Heritage Zone (NHZ20), though the southern edge of the survey area is within the ‘West Southern Uplands and Inner Solway’ (NHZ19).

3 Bat Survey Methods

- 3.1.1 The bat survey programme was designed with reference to the recent SNH et al. (2019) guidance on ‘Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation’. The surveys comprised the following:
- Roost potential survey - to assess all potential roosts sites within the proposed development and its surrounds;
 - Ground-level activity surveys - one transect-based survey each month from April-September. Surveys were carried out during August (19, 22 and 23) and September (8, 9, 14 and 15) 2021, and in April (11-14), May (3,4 and 10), June (14-16), July (4-7) and August (9-11) 2022. Access was restricted to the parts of the site that could be accessed safely at night - the transect routes walked are shown in Figure 1;

- Automated surveys at ground level - static detectors were deployed at 14 locations across the survey area representative of the habitats available. Each location was sampled for a target minimum 20 nights during spring (April/May), summer (June/July) and autumn (August/September). A total of 1,164 bat-nights' coverage was obtained (mean 28 nights/season/location). The locations of the recorders are shown in Figure 1.

3.1.2 Surveys at height were considered unnecessary at this site, given the generally low-quality bat habitats present (predominantly open moorland).

4 Bat Survey Results

4.1 Bat Roost Site Assessment

4.1.1 The extended Phase 1 survey carried out on 27-29 July 2022 included an assessment of bat roost suitability. The results are summarised in Table 1, and the locations are shown in Figure 1. The large majority of the potential bat roost sites were located around the fringes of the survey area, with few within the proposed development itself (which was predominantly open moorland).

Table 1. Bat roost potential survey results (locations are shown in Figure 1).

Location Number	Potential	Notes
1	Low	Mature conifer plantation
2	Very low	Thicket conifer plantation
3	Medium	Isolated remnant alders
4	Medium	Isolated sycamore
5	Low	Isolate birch
6	Very low	Thicket conifer plantation
7	Low	Mature conifer plantation
8	Low	Birch trees on edge of conifer plantation
9	High	Mature trees around farm (mainly sycamore)
10	High	Farm buildings
11	High	Isolated beech trees, several dying back
12	High	Birch woodland with alder and rowan
13	Low	Mature conifer plantation
14	Very low	Thicket conifer plantation
15	Low	Scattered small/dead alders
16	Medium	Cottage and outbuildings
17	Low	Mature conifer plantation
18	Low	Mature conifer plantation

Location Number	Potential	Notes
19	High	Farm buildings
20	High	Mature trees around farm (including oak and alder)
21	High	Broad-leaved woodland (mainly alders) along burn
22	High	Alder woodland along burn
23	High	Alder woodland
24	High	Alder woodland along burn
25	High	Ash trees around old buildings
26	Medium	Cottage
27	Low	Mature conifer plantation
28	High	Alder woodland along burn

4.1.2 With regard to commuting/foraging habitat for bats, the main areas that would be likely to be used include the lower altitude parts of the survey area where there is more woodland and larger watercourses, and greater availability of potential roost sites.

4.2 Bat Walked Transects

4.2.1 The results of the bat walking transect surveys are summarised in Table 2, which gives the number of passes recorded of each species on each monthly survey carried out during August-September 2021 and April-August 2022. Eight species were recorded in total, with common pipistrelle the most frequently encountered.

Table 2. Number of bat-passes recorded during the walkover transect surveys, August-September 2021 and April-August 2022.

Species	Scientific name	Aug	Sep	April	May	June	July	Aug
Daubenton's bat	<i>Myotis daubentonii</i>	2	4	0	0	2	0	1
Whiskered bat	<i>Myotis mystacinus</i>	3	1	0	0	0	0	5
Natterer's bat	<i>Myotis nattereri</i>	0	0	0	4	0	0	0
Unidentified <i>Myotis</i> bat	<i>Myotis</i> sp	3	6	1	0	0	2	3
Noctule	<i>Nyctalus noctula</i>	14	0	0	2	0	1	7
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	0	1	0	3	0	11	0
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	109	158	25	48	33	144	86
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	117	77	10	20	19	38	107
Brown long-eared bat	<i>Plecotus auritus</i>	5	10	2	1	2	1	4

4.2.2 The distributions of bat records during these walkover surveys are plotted in Figure 2 (common pipistrelle), Figure 3 (soprano pipistrelle) and Figure 4 (other bat species). The numbers of locations are lower than the numbers of passes in Table 2 as a result of multiple passes being recorded at single locations. The highest concentration of bat records was on the lower ground on the northern edge of the survey area (along the Bigholms Burn), within/in proximity to wooded areas and to farm buildings, with fewer records on the open moorland habitat where the wind turbines would be located.

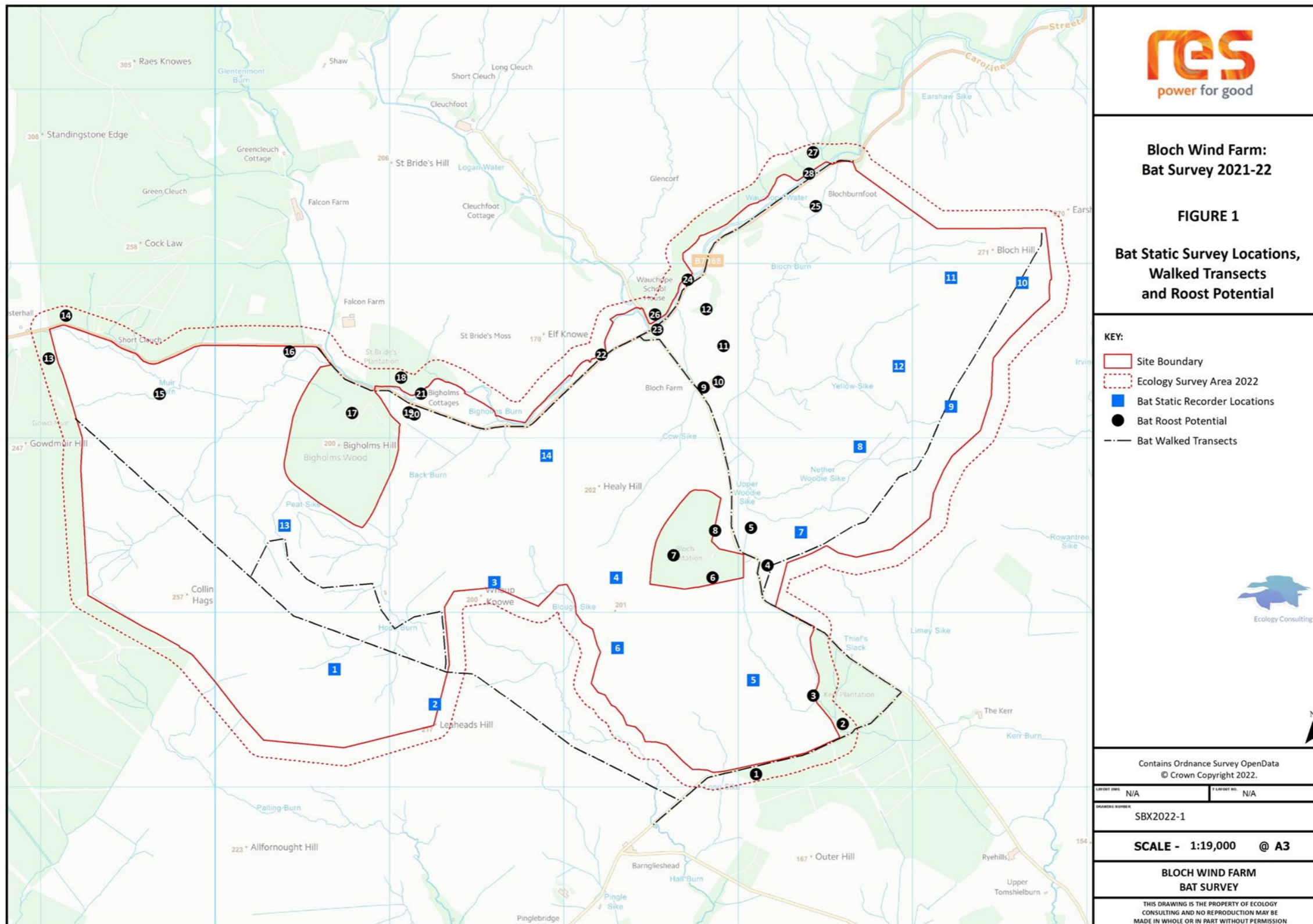
4.3 Bat Static Recorder Surveys

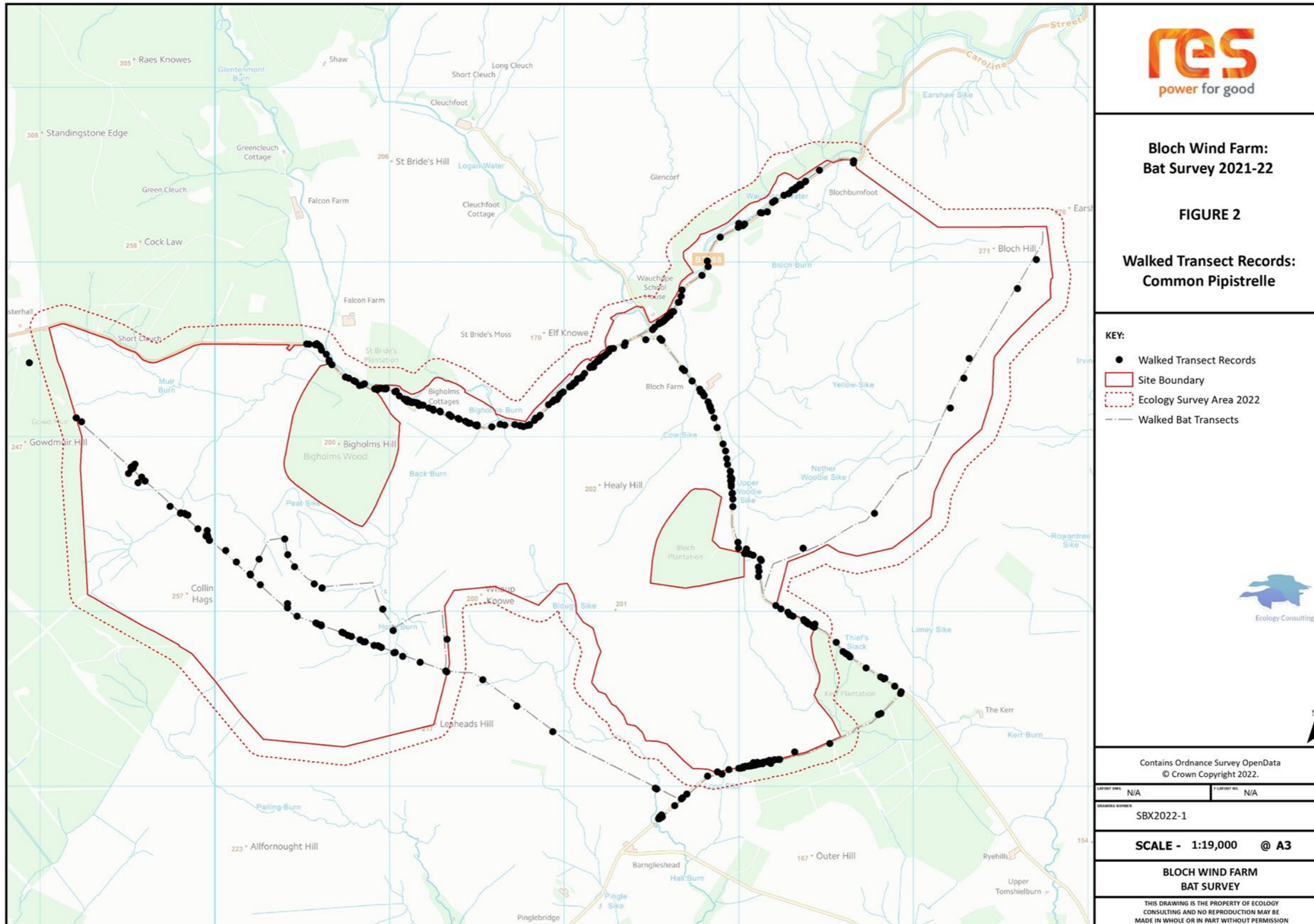
4.3.1 The number of records of each species at each survey location from the bat static surveys are summarised in Table 3.

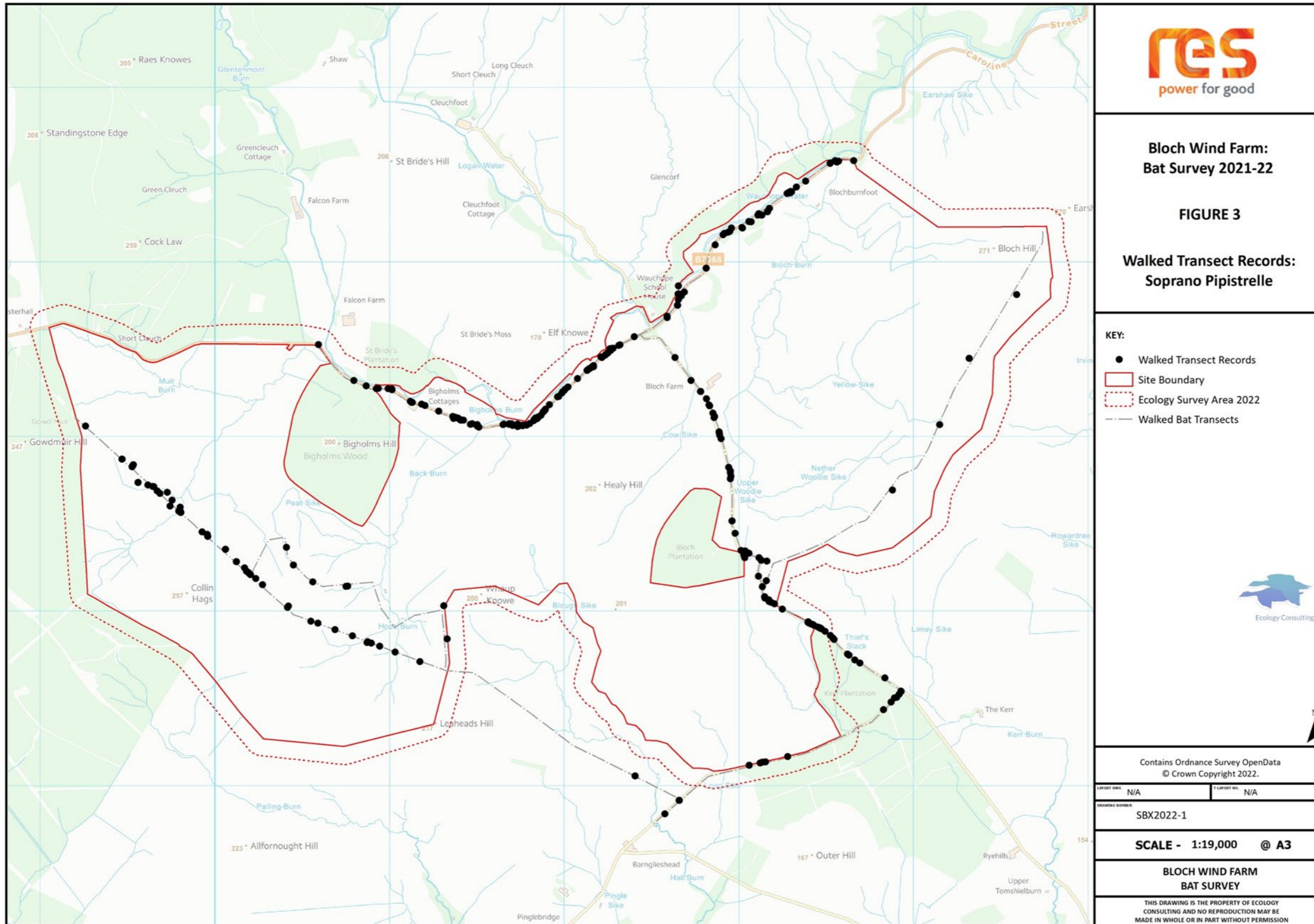
4.3.2 Bat pass rates for the two more abundant species, common and soprano pipistrelle, are shown in Figures 5 and 6 for each of the 14 survey locations. They are presented as medians, following Lintott et al. (2018). Whilst overall pass rates were low, common pipistrelle were recorded more frequently in summer than in spring or autumn, and highest pass rates were found in the eastern part of the survey area. There were more soprano pipistrelle passes recorded in autumn, evenly distributed across most of the static recorder survey area.

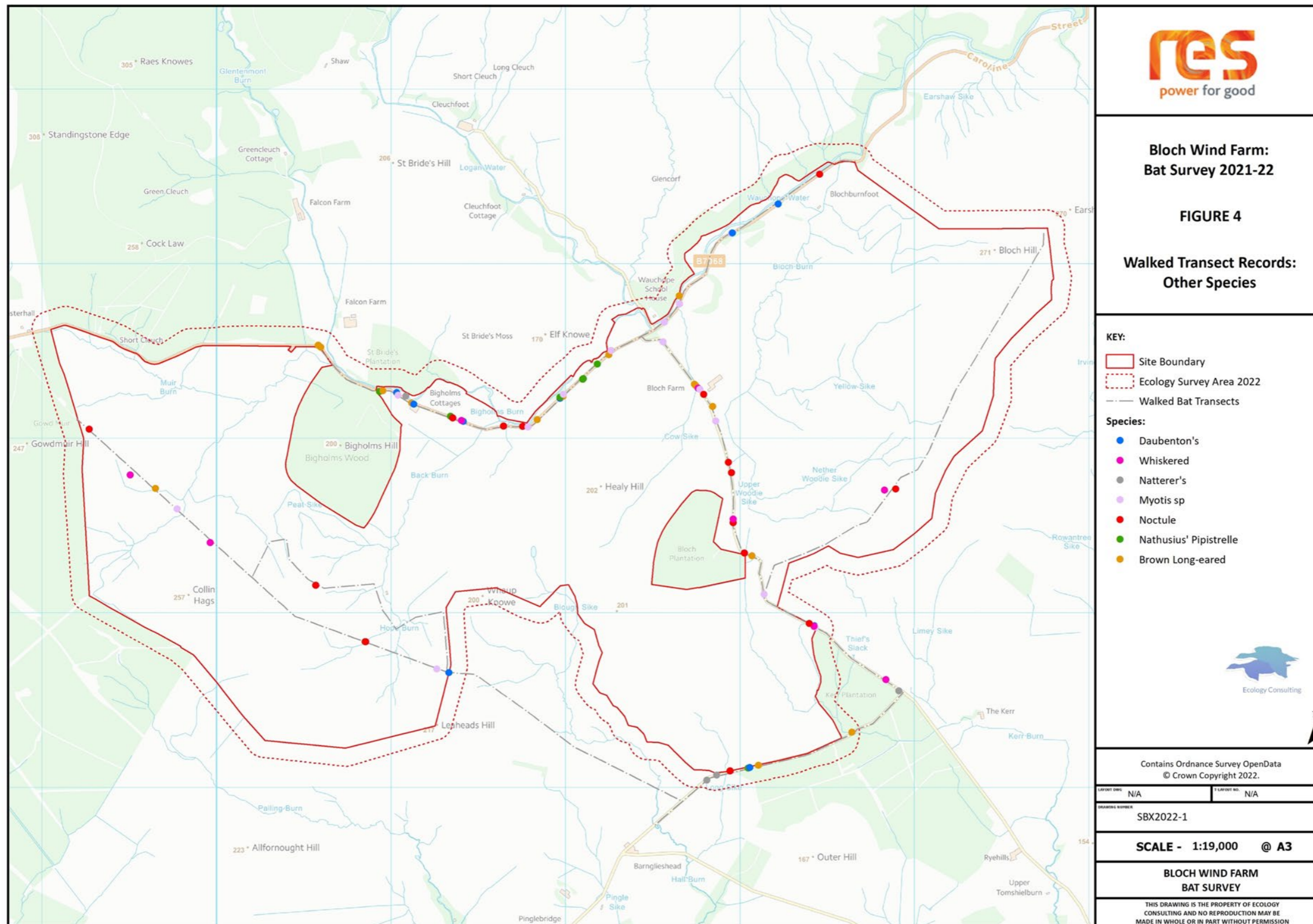
Table 3. Bat static recorder surveys, August-September 2021 and April-August 2022, showing the number of bat passes of each species at each location.

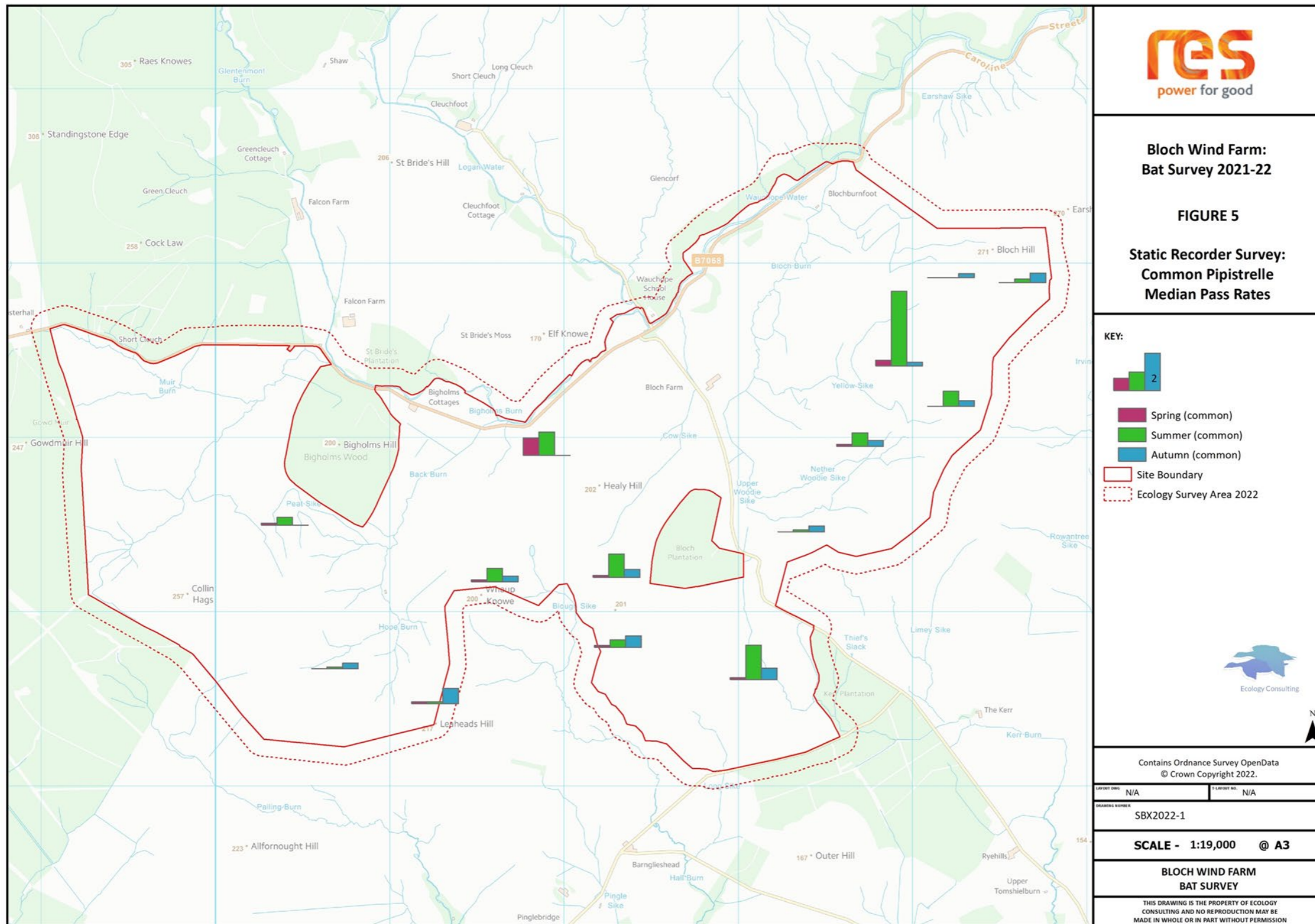
Row Labels	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
Brandt's bat	0	0	0	3	0	0	0	2	0	0	0	0	0	0	5
Daubenton's bat	48	72	12	74	41	21	35	326	10	8	21	127	6	3	804
Whiskered bat	0	2	0	5	3	3	0	1	0	1	0	0	0	0	15
Natterer's bat	7	18	4	8	11	7	2	19	2	1	7	67	4	0	157
Myotis sp.	45	81	17	82	68	43	46	129	9	10	25	161	9	4	729
Noctule	36	40	79	44	67	49	14	21	10	10	6	8	5	10	399
Nathusius' pipistrelle	1	4	1	3	6	2	0	3	1	1	1	2	1	3	29
Common pipistrelle	302	270	224	617	1025	437	329	526	228	222	115	863	77	252	5,487
Soprano pipistrelle	197	198	199	489	478	240	182	209	190	139	68	279	52	44	2,964
Brown long-eared bat	13	12	4	120	140	19	4	11	1	1	2	18	1	0	346

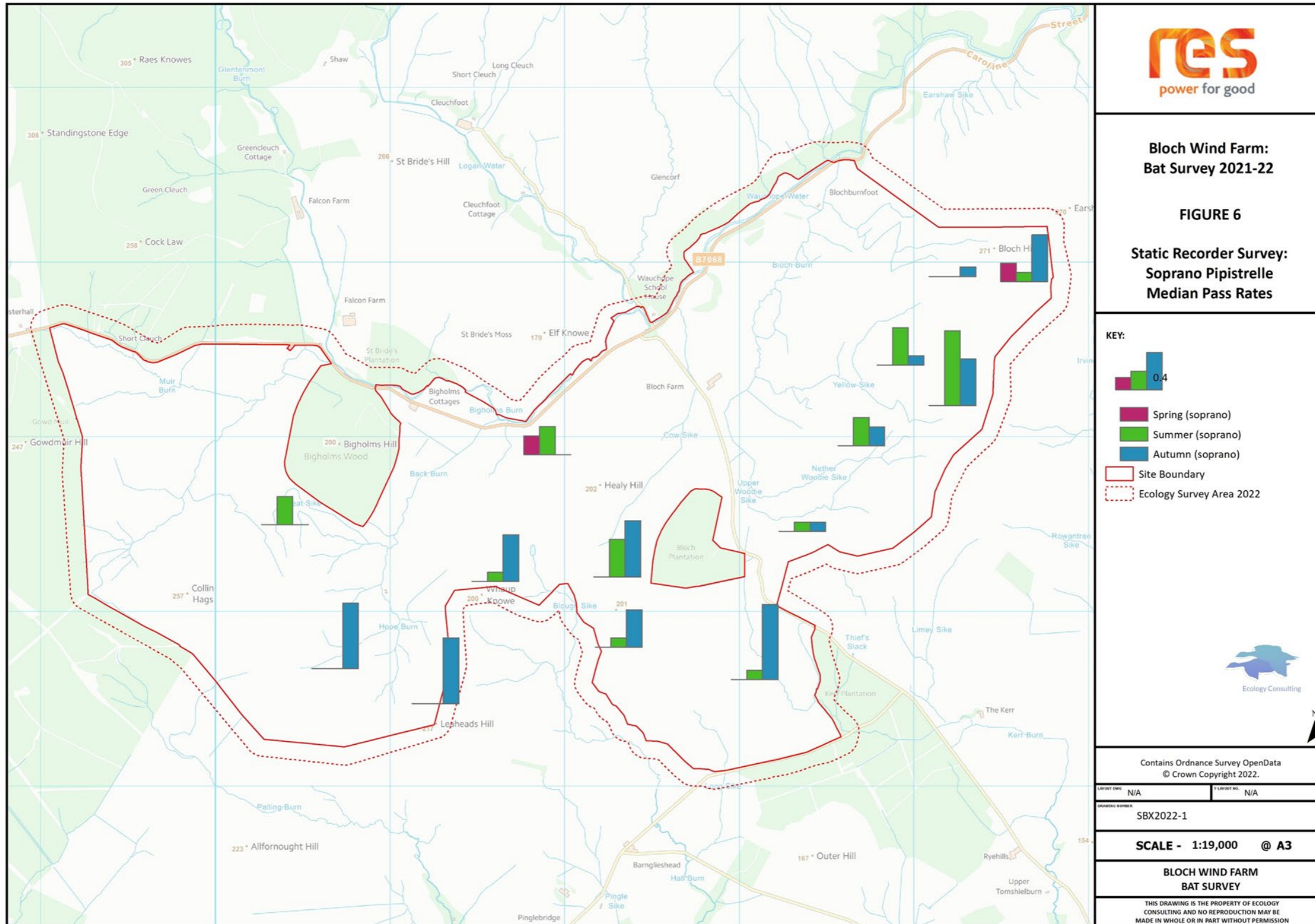












4.3.3 The static bat recorder data also provided information on the likelihood of any important bat roost being located within or in proximity to the site. If bats were roosting on or near to the site, then there would likely be records of bat contacts at, or soon after, the typical emergence times. Noctules can emerge before sunset whereas common pipistrelles and soprano pipistrelles tend to emerge within the first 10-30 minutes after sunset. Myotis bats will typically emerge later than pipistrelles, with Daubenton's bats emerging up to an hour after sunset. ECOBAT (Lintott et al. 2018) was used to analyse the times of bat records comparing them to published emergence times for each species (Russ 2012). Occurrence of bat passes recorded during roost emergence time was as follows:

- Location 1 - low numbers of Daubenton's bats.
- Location 2 - low numbers of Daubenton's, Myotis sp., soprano pipistrelle and common pipistrelle.
- Location 3 - occasional noctules, low numbers of Daubenton's, Myotis sp., soprano pipistrelle and common pipistrelle.
- Location 4 - low numbers of Myotis sp, brown long-eared and common pipistrelle.
- Location 5 - low numbers of Myotis sp., noctule and common pipistrelle.
- Location 6 - low numbers of Myotis sp. and common pipistrelle.
- Location 7-12 - low numbers of common and soprano pipistrelle.
- Location 13-14 - none.

4.3.4 Overall, the number of bat passes recorded during roost emergence time was low, indicating that there were not likely to be any important roosts located within/in proximity to the proposed development.

4.3.5 Recent SNH et al. (2019) guidance recommends the use of ECOBAT (Lintott et al. 2018) to standardise the determination of the relative importance of the site for its bat populations. This software tool uses percentiles to assign a bat activity comparing with data from other sites collected within the same season (within 30 days of the surveys) and within 100km of the site:

- High - above 80% percentile
- Moderate/high - 60-80%
- Moderate - 40-60%
- Low/moderate - 20-40%

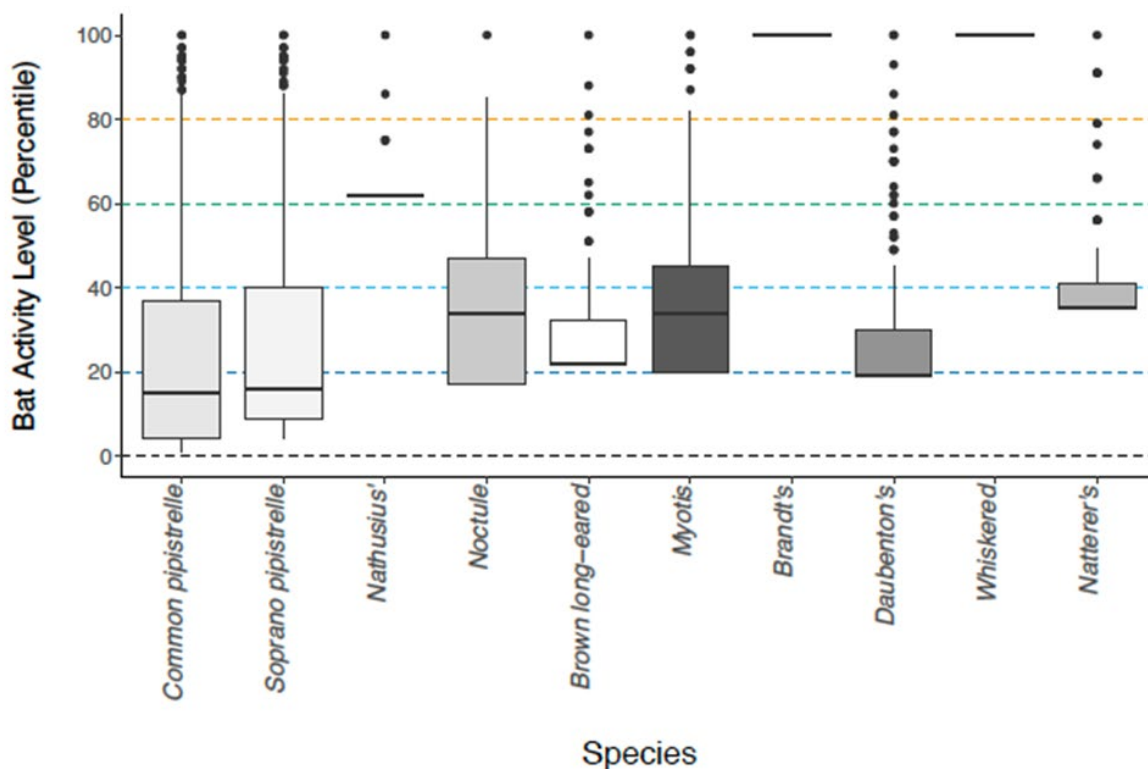
- Low - 0-20%
- Nil - no records.

4.3.6 The results of the overall whole site ECOBAT analysis are summarised in Figure 7. This presents the median activity level percentile (solid horizontal line), the interquartile range (box plot) and the spread of any outliers. Overall activity was classed as follows:

- High: no species
- Moderate/high: no species
- Moderate: no species
- Low/moderate: noctule, brown long-eared bat, *Myotis* sp. and natterer's bats.
- Low: common pipistrelle, soprano pipistrelle and Daubenton's bat.

4.3.7 There were insufficient data from both the regional baseline and the site records (i.e. too few numerically were recorded) to give a reliable activity level comparison for Nathusius' pipistrelle, Brandt's, and whiskered bats.

Figure 7. ECOBAT site activity analysis: bat activity level (percentile) recorded across each night of the bat survey for the whole site.



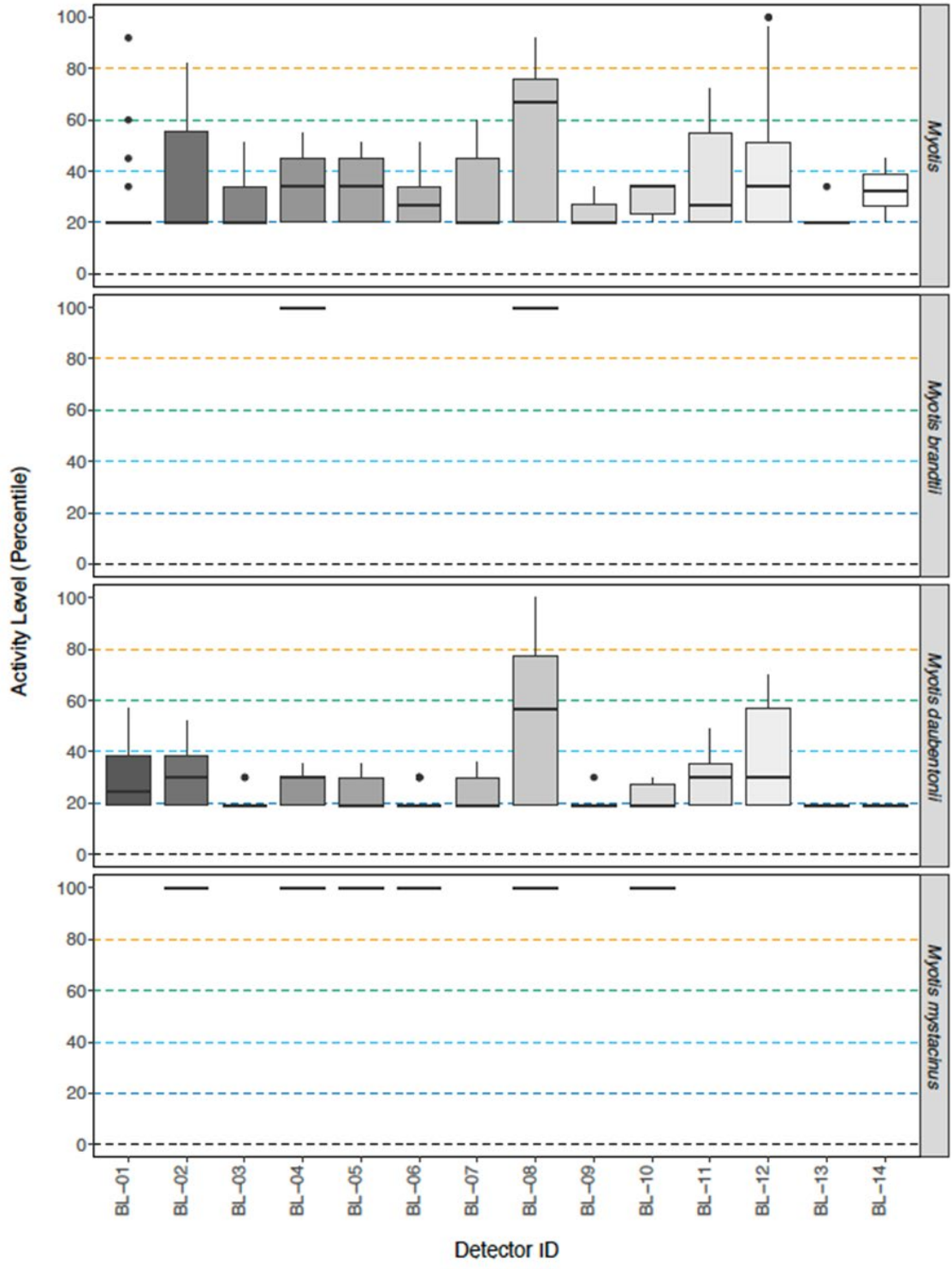
4.3.8 Figure 8 shows the activity levels of these species over the whole survey period at each of the 14 survey locations. As for the whole site analysis presented above, these are plotted as percentiles of activity levels recorded each night, and show the relative abundance of each species at each location in comparison with the ECOBAT reference data set. Overall, it shows further the generally low levels of bat activity across the site, though higher levels of some species were recorded at some locations:

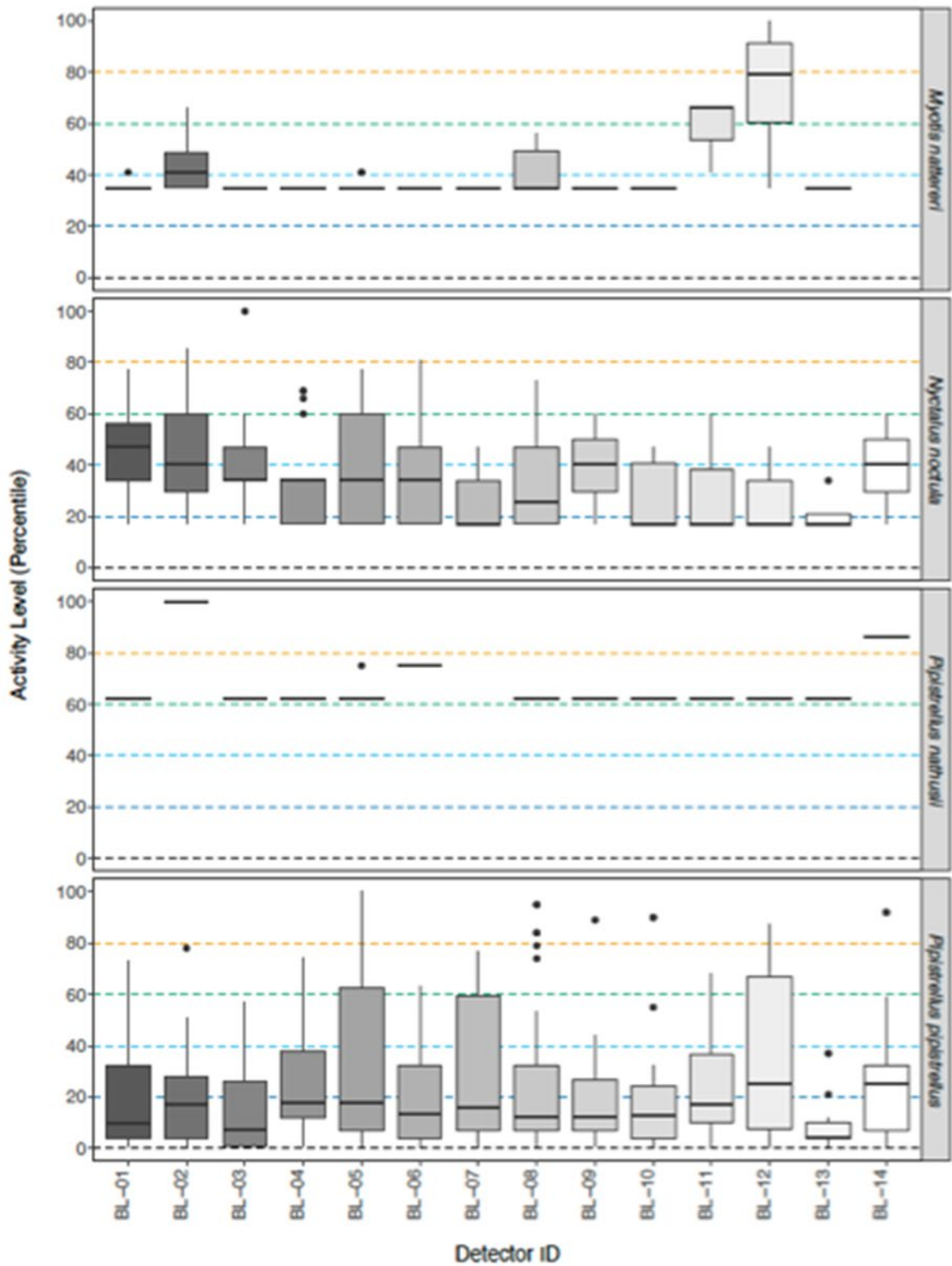
- Daubenton's bat/Myotis sp - low/moderate activity levels across all locations apart from location 8 which supported moderate/high levels of activity.
- Natterer's bat - moderate/high activity levels at locations 12 and 13., and low/moderate activity at the other locations.
- Noctule - moderate activity levels at locations 1, 2, 9 and 14, low/moderate elsewhere.
- Common pipistrelle - low activity levels across all locations apart from 12 and 14 which were low/moderate.

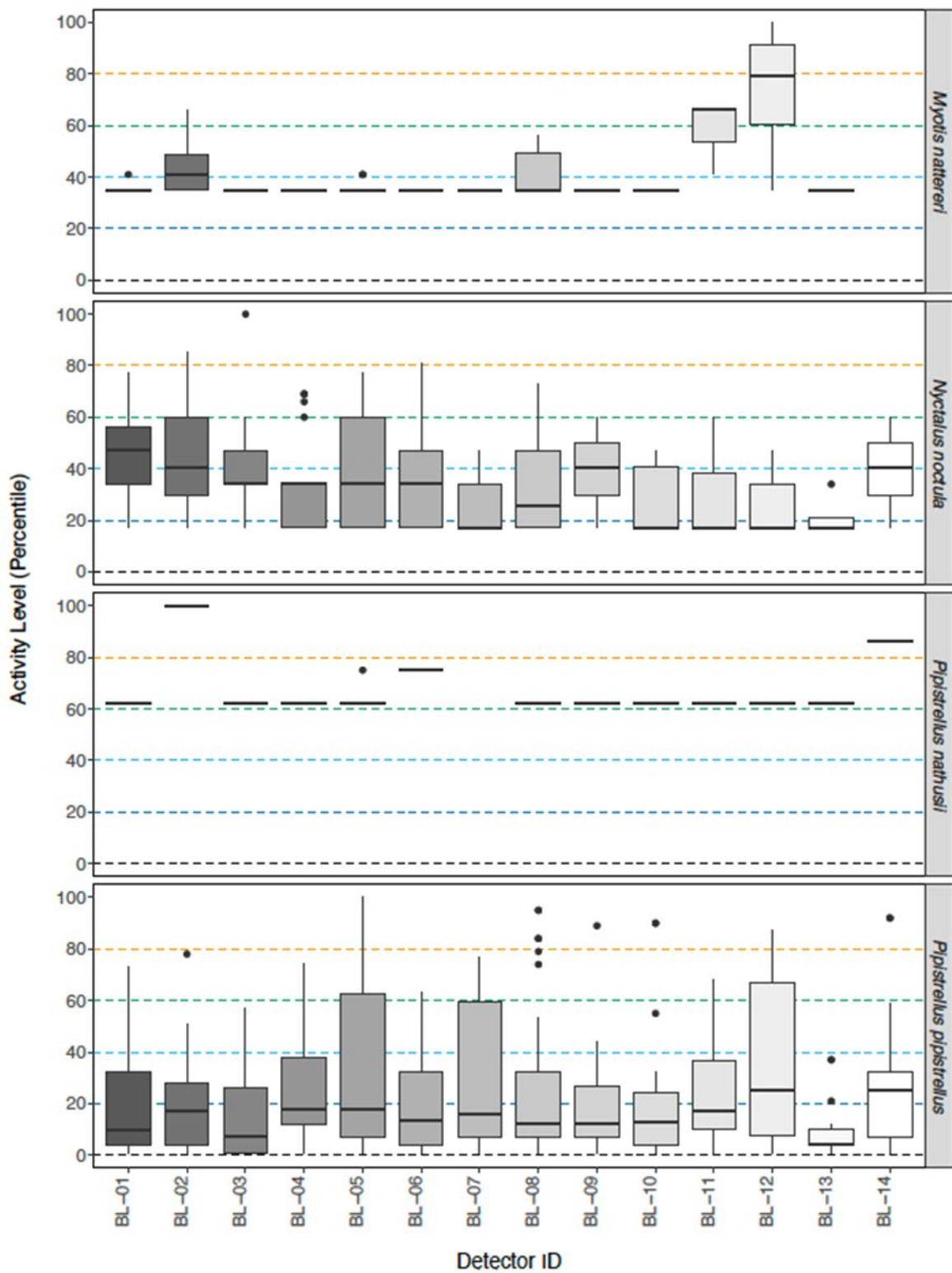
- Soprano pipistrelle - low activity levels apart from low/moderate at locations 3, 5 and 9.
- Brown long-eared bat - low/moderate activity at all locations.

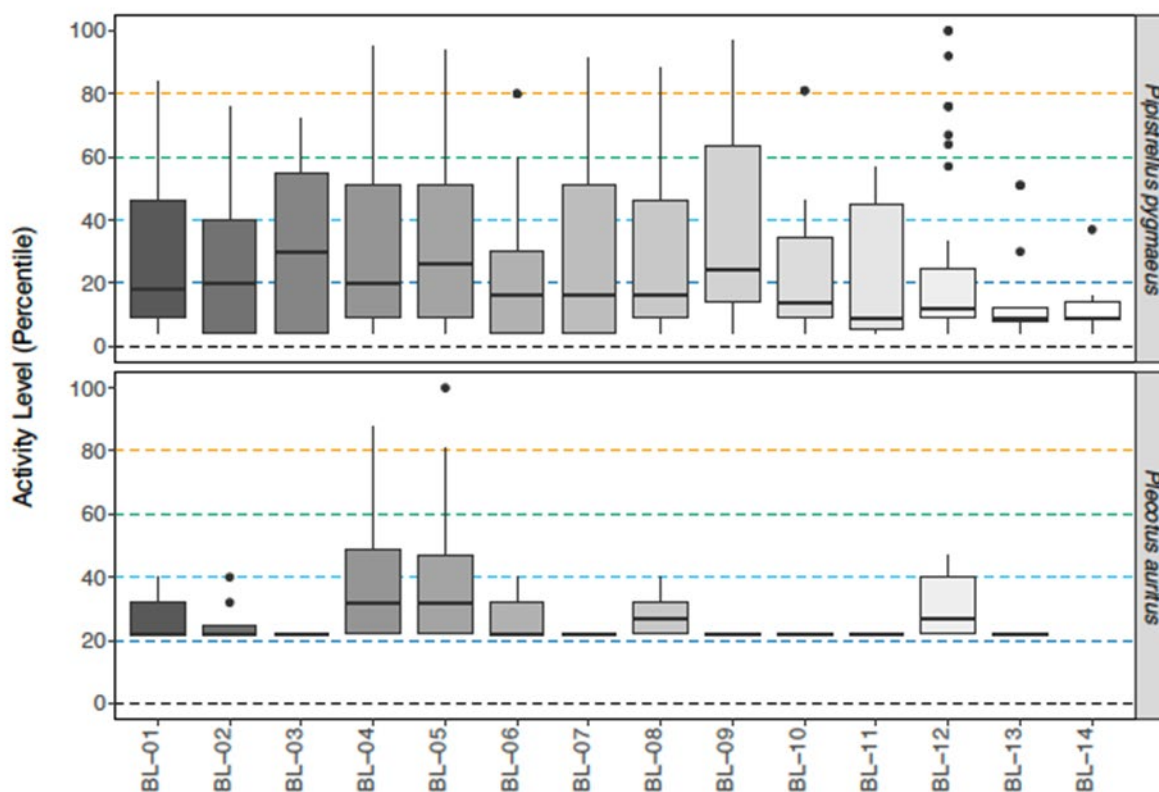
4.3.9 There were insufficient data from both the regional baseline and the site records to give a reliable activity level comparison for Nathusius' pipistrelle, Brandt's, and whiskered bats.

Figure 8. ECOBAT activity analysis by recorder location: bat activity level (percentile) recorded across each night of the bat survey for each of the 14 survey locations (BL01-14) (see Figure 1).









5 Conclusions

- 5.1.1 The baseline bat surveys have shown the survey area to hold generally low levels of bat activity. Nine species of bat were recorded in total during the surveys. Common pipistrelle was the most frequently recorded species, with soprano pipistrelle, Daubenton’s bat and brown long-eared also frequently encountered, particularly during the autumn surveys. Other less abundant species comprised: Nathusius’ pipistrelle, whiskered bat, Brandt’s bat, natterer’s bat and noctule.
- 5.1.2 Noctule, brown long-eared bat, *Myotis sp.* and natterer’s bats were all recorded at low/moderate activity levels across the survey area as a whole, with low activity levels of common pipistrelle, soprano pipistrelle and Daubenton’s bat. There were insufficient data from both the regional baseline and the site records to give a reliable activity level comparison for Nathusius’ pipistrelle, Brandt’s and whiskered bats.
- 5.1.3 Locations with higher bat activity levels included location 8 (which supported moderate/high levels of activity of Daubenton’s bat/*Myotis sp.*),

locations 12 and 13 moderate/high activity levels of natterer's bat, locations 1, 2, 9 and 14 (moderate activity levels of noctule).

- 5.1.4 The bat numbers recorded within the proposed development were generally low, reflecting the low-quality bat habitat across the survey area. The proposed development would not affect any bat roosting habitat, and habitat loss would be minimal, so effects on bats should be negligible.

6 References

- 6.1.1 Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.
- 6.1.2 Lintott, P. R., Davison, S., van Breda, J., Kubasiewicz, L., Dowse, D., Daisley, J., Haddy, E. and Mathews, F. (2018). Ecobat: An online resource to facilitate transparent, evidence-based interpretation of bat activity data. *Ecology and evolution*, 8: 935-941.
- 6.1.3 Russ, J. (2012) British bat calls: a guide to species identification: Pelagic publishing.
- 6.1.4 SNH et al. (2019). Guidance on 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation'.