8 Pine Marten

Methodology

Pre-existing data records

8.1 Pre-existing biological data records were sourced from GMRC, for the Study Area and a 2 km buffer. A large number of records were subsequently supplied, and were reduced to those dated within the last 10 years.

8.2 Pre-existing survey data from ecology surveys completed by Envirocentre[26] in 2017 were also reviewed.

Field survey

8.3 On 30 June 2021, 01 July 2021 and 22 July 2021, all areas within 250 m of the Site were searched for pine marten signs, primarily scats as a simple means of detecting pine marten presence. Particular attention was made to prominent rocks, tree stumps and other places where martens were likely to leave scats. In addition, potential den sites such as elevated tree cavities, large raptor nests, owl nest boxes, elevated rocky outcrops and large upturned root plates of fallen trees were searched for and recorded. All identified pine marten signs, both confirmed or potential, were noted and their locations were recorded using a hand-held GPS. Survey findings were subsequently digitised in GIS.

Survey limitations

8.4 Some of the woodland in the 250 m survey buffer for pine marten survey had areas of dense vegetation which impeded access. This included sections of woodland west of the A82 and areas of the Woodbank woodland within the Site which had sections of dense bamboo and rhododendron. However, these were only small sections of the overall Study Area and therefore any minor access limitations were not considered to be sufficient to affect the conclusions of the survey.

Results

Pre-existing data records

8.5 A single record for pine marten was contained within the results of the data search, namely a sighting dating from 2010 within Balloch Country Park, 600 m north of the Site on the opposite side of the River Leven. No signs of pine marten were identified during the surveys undertaken by Envirocentre in 2017.

[26] **Envirocentre (2018**) *West Riverside, Balloch – Protected Species Surveys*. Unpublished contract report for TSL Contractors Limited. February 2018.

Field survey

8.6 No signs of pine marten were found within the Site or Study Area. Additionally, no clips of pine marten were recorded on camera traps deployed in Drumkinnon Wood and the Woodbank woodland as part of red squirrel feeder box monitoring.

8.7 Drumkinnon Wood was considered to contain suitable foraging habitat for pine marten. However, this area of the Site was isolated and poorly connected to the wider area, as well as being heavily used by people and dog walkers, decreasing its suitability for the species. The woodland around Woodbank House contained a number of mature trees, but none had any obvious large cavities that could be used for pine marten denning. No scats were found within the woodland on features that pine marten would typically use to mark territories, such as large rocks or fallen trees. This section of woodland had limited connectivity with other areas of woodland to the north, but it bordered the busy A82 to the west.

8.8 Suitable pine marten foraging habitat was located within Balloch Country Park in the north-east of the Study Area with connectivity to more extensive woodland cover to the north. However, the area within the Study Area was again heavily used by visitors and dog walkers, and the River Leven presented a barrier for movement for pine marten from the eastern side of the river towards the Site. Extensive woodland cover in the south-west of the Study Area also provided opportunities for pine marten foraging and potential dens, where larger cavities may have been present in mature trees. This section of the Study Area was separated from the Site by the busy A82, which would potentially have acted as a barrier for pine marten regularly travelling east-west.

Discussion

Relevant legislation

8.9 Pine marten and its dens are protected by the Wildlife and Countryside Act 1981 (as amended) and by the Nature Conservation Act 2004. It is an offence to intentionally or recklessly:

- kill, injure or capture a pine marten;
- disturb a pine marten in a den;
- damage, destroy or obstruct access to a pine marten den[27].

8.10 NatureScot is responsible for issuing licences relating to pine marten for the purpose of development. For non-breeding dens, exclusion zones should be a minimum of 30 m; at least 100 m is necessary where dens are known or suspected of being used for breeding and works in the breeding season cannot be avoided (March-June inclusive). Where exclusion zones of the required size cannot be achieved, works will require a licence from NatureScot before they can proceed.

[27] The exception to this is when the den is in the roof space or other part of a house, where it is not an offence to discourage a pine marten from using the den, or to block access to the den, provided a pine marten is not in the den at the time the action is taken and does not have dependent young.

Pine marten at Lomond Banks

8.11 Although suitable habitat for pine marten was identified within the woodland in the west of the Site, no signs of the species were confirmed. Suitable habitat within the wider Study Area was also separated from the Site by the River Leven in the east and the A82 in the west, and located a considerable distance from the Site. Pine marten are shy creatures and not tolerant of disturbance. The level of disturbance caused by the volume of people and dogs that currently access the Site, combined with the isolated nature of the majority of woodland habitat in the Site, lack of signs found, and absence of any recent data records or road casualty data, means that pine marten are unlikely to be present within the Site.

8.12 For the purposes of the EcIA, pine marten is not considered to be an IEF needing to be included in the assessment. However, it is recommended that a watching brief for the occurrence of pine marten field signs is kept by the ECoW, who will advise regarding appropriate action should the species be found or suspected to be present during the works. General precautionary measures during construction will include:

- all trenches and excavations should be covered at the end of each working day, or will include ramps;
- stored pipes should be capped, to prevent entrapment of animals;
- if construction work is carried out during the hours of darkness, machinery and floodlights will be directed away from woodland edges.

9 Bats

Methodology

Pre-existing data records

9.1 Pre-existing information regarding the presence of bat roosts in the near vicinity of the Site was extracted from a range of data sources including:

- GMRC;
- Bat Conservation Trust (BCT): Colony Count Survey;
- mammal records from Britain from the Atlas of Mammals (1993), with some subsequent records;
- NatureScot: Bat Records for Scotland;
- National Waterway Survey;
- the BCT/MTUK Bats and Roadside Mammal Survey.

9.2 Pre-existing survey data from ecology surveys completed by Envirocentre[28] in 2017 were also reviewed.

Habitat assessment

9.3 A general appraisal of the landscape ecology value of the Site for foraging and commuting bats was made, based on the criteria provided in Collins (2016)[29] and Wray *et al*. (2010)[30].

Preliminary Roost Assessment of buildings

9.4 On 26 May 2021, a licensed bat ecologist carried out a PRA for the built structures at the Site. In accordance with current best practice survey guidance produced by the BCT (Collins, 2016 - see **Table 9.1**), the structures were carefully inspected externally for features which might typically provide access into their structures for roosting and/or hibernating bats. Binoculars were used (together with a high-powered Clulite torch where light conditions were poor or close access difficult) to inspect likely bat entry points such as lifted tiles, ill-fitting fascia boards, cladding and wall crevices. Well-used roosting bat entry/exit points can show signs of bat use, such as staining and scratch marks, as well as droppings below or adhering to nearby walls. Evidence of this kind was also searched for during the inspection.

9.5 Internal inspections were carried out where safe to do so, but were limited by the poor structural state of the ruined buildings.

[28] **Envirocentre (2018**) *West Riverside, Balloch – Bat Surveys*. Unpublished contract report for TSL Contractors Limited. February 2018.

[29] **Collins, J. (2016)** *Bat Surveys: Good Practice Guidelines, 3rd Edition*. Bat Conservation Trust.

[30] **Wray, S., Wells, D., Long, E. and Mitchell-Jones, A. (2010).** Valuing bats in Ecological Impact Assessment. *In Practice*, December 2010.

9.6 No formal PRA assessment was commissioned to be undertaken for the existing visitor information centre in the far south-east of the Site.

Table 9.1: Categories of habitat suitability for bats (after Collins, 2016).

Suitability	Description of roosting habitats	Description of commuting and foraging habitats
Negligible	Negligible roosting features likely to be used by roosting bats.	Negligible habitat features likely to be used by commuting or foraging bats.
Low	A 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 by larger numbers of bats (i.e., unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features, but with none seen from the ground, or the features seen have only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but is isolated i.e., not well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats, due to its size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting, such as lines of trees and scrub, or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging, such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost site(s) that is/are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to its/their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape which is likely to be used regularly by commuting bats, such as river valleys, streams, hedgerows, lines of trees and woodland edges. High-quality habitat that is well-connected to the wider landscape and which is likely to be used regularly by foraging bats, such as broad-leaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Limitations of the buildings PRA

9.7 The inspection of buildings for evidence of bats can be conducted at any time of the year. However, the chances of finding evidence of bats (e.g., their droppings) on external areas that are unprotected from rainfall may be restricted if undertaken outside the main bat-active season and/or after periods of wet weather, as any evidence of bat presence may have been washed away. It is important to note that visible signs are not always obvious at a roost site, even when bats are present. The survey described here was undertaken within the main bat active period and after a prolonged period of dry weather. The conditions were therefore optimal for the physical identification of bat presence.

9.8 A PRA would also usually require a survey to be undertaken internally as well as externally. However, the three structures inspected were all in an advanced state of ruin and comprised areas of collapsed and unstable stonework. Internal surveys were carried out throughout all the safely accessible areas, inspecting crevices for roosting bats or signs of bat use. The height of the stone/brick walls and unsafe access also prohibited a full inspection of all possible crevices but a general assessment of bat roost suitability (BRS) was possible based on the features visible from ground level.

9.9 As physical signs of bat occupancy can be absent even during the bat active period, if potentially suitable roost features were present, this would have formed the basis of the evaluation regardless of the presence or absence of confirmatory physical evidence of bats. Therefore, the minimal access restrictions were not considered to be a significant limitation to the study as recommendations regarding bat activity survey are not dependent on the need for conclusive physical evidence of bats, although both may result in caveats to the survey findings.

Preliminary roost assessment of trees

9.10 On 19, 25 and 26 January 2022, trees within the Site that had been identified as being potentially impacted by the Development were assessed for their BRS, in accordance with the protocol for visual inspection of trees due to be affected by arboricultural work (Collins, 2016) (see **Table 9.1**). Trees within the Woodbank woodland, the woodland south of the Ben Lomond Way roundabout, the southern end of Drumkinnon Wood and along the Riverside were the focus of the assessment, as these areas contained trees that were likely to be impacted by direct removal or disturbance as a result of the Development.

9.11 The trees were inspected from ground-level, using binoculars if necessary, for features considered to be suitable for bats, including cracked or flaking bark, split limbs or trunks, ivy cladding, knot holes, woodpecker holes and bird/bat boxes. A high-powered torch and an endoscope were also used to aid the survey where appropriate. Consideration was also made of the habitat context of a tree - its connectivity with and/or proximity to suitable bat commuting or foraging habitat, and accessibility for a flying bat.

Limitations of the PRA of trees

9.12 The inspection of trees for their suitability for bats can be conducted at any time of year, according to the best practice survey guidance produced by the BCT. However, finding evidence of bats (e.g. their droppings) on surfaces that are unprotected from rainfall may be restricted if undertaken outside the main bat active season (May to September) and/or after periods of wet weather. During the latter, evidence of bat presence may have been washed away. This survey was undertaken after a period of mixed colder weather and out with the main bat active season. However, the winter months often allow a clearer view of potential roost features (PRFs) due to the lack of vegetation cover, particularly within the types of woodland habitat surveyed at the Site.

9.13 Evidence of roosting bats in trees, such as droppings and staining, is often entirely absent, even when roosting bats are present. This, combined with the transitional nature of use of tree roosts by many species of bat, means that while survey work may confirm roost presence, it is unlikely to confirm conclusively absence.

9.14 The absence of leaves on the trees at the time of survey increased the visibility of PRFs. However, many of the trees were sufficiently large (25-30 m in height) that some features still may not have been visible from the ground. Similarly, PRFs on a number of the larger mature trees may have been obscured by ivy growth. In these cases, further aerial survey and/or precautionary methods of felling would normally be required, and therefore were not considered to be a limitation to the results of the survey.

9.15 Only the trees in the Woodbank area had been formally tagged as part of an arboricultural survey. This meant that the majority of trees in other areas had no tree tags to reference within this report. Trees within the Woodbank woodland contained tags with numbers over 1000 but these trees were not included within the arboricultural report appendix tables. Similarly, during the PRA some discrepancies were noted between the tree tag in the field and the descriptions within the appendices of the arboricultural report, such as the species and size of the tree identified.

Activity surveys of buildings

9.16 The emergence/return watch survey methods followed best practice guidance (Collins, 2016[31]). Surveys were carried out across a number of nights between July-September 2021, encompassing the peak maternity period and late summer/early autumn transitional phase, as summarised in **Table 9.2**. Due to the initial PRA rating of moderate suitability for Building A and B (see Results, below), two surveys were originally proposed here, but these were followed by a third survey for both these buildings due to bat roost locations being recorded during the first two surveys. Building C had an initial PRA rating of low suitability, and therefore only one activity survey was completed at this location. Five surveyor positions were used for Building A, five for Building B and two for Building C, as shown in **Figures 9.6** and **9.7**. Due to the complex facades of Building A and B, comprising collapsed internal areas that had exposed multiple potential roosting features, certain positions were placed within the internal footprint of both buildings to allow better vantage points of possible roosts within the internal façade.

9.17 For each dusk watch, surveyors were in position at least 30 mins before sunset and continued surveying until c. 90 mins after sunset. For the dawn surveys, surveyors were in position at least 1.5 hrs before sunrise and continued to survey until dawn or until no further bat activity was detected. The surveys were undertaken using handheld frequency division Pettersson D230 detectors paired with a Anabat Swift or SM2 static detector. The Anabat and SM2 recordings were made onto a memory card and later analysed to confirm species identification. All surveys were undertaken in relatively dry, calm weather conditions with temperatures at or greater than 7 ^{o}C.

9.18 Radio contact between surveyors was maintained throughout the surveys, to assist with determining whether bats had flown over/through the buildings being watched or emerged from the building itself. An infrared camera with additional infrared lights was also used at Buildings A and C in order to give more complete coverage of difficult viewsheds and to provide better visibility in the poor light levels.

[31] **Collins, J. (2016)** *Bat Surveys: Good Practice Guidelines, 3rd Edition*. Bat Conservation Trust.

Table 9.2: Summary of survey details.

Date	Building	Survey type	Sunset/ sunrise	Start/ finish times	Weather at start[32]	Weather at finish
01 July 2021	C	Dusk emergence	22:08	21:38/23:38	Rain: 0 Cloud cover: 7 Wind speed: 1 Temp: 19 °C	Rain: 0 Cloud cover: 8 Wind speed: 1 Temp: 17 °C
13 July 2021	B	Dusk emergence	21:57	21:30/23:26	Rain: 0 Cloud cover: 3 Wind speed: 1 Temp: 16 °C	Rain: 0 Cloud cover: 3 Wind speed: 0 Temp: 14 °C
14 July 2021	A	Dusk emergence	21:56	21:26/23:26	Rain: 1 Cloud cover: 8 Wind speed: 1 Temp: 17 °C	Rain: 0 Cloud cover: 8 Wind speed: 1 Temp: 15 °C
30 July 2021	A	Dawn return	05:18	03:18/05:25	Rain: 0 Cloud cover: 3 Wind speed: 1 Temp: 14 °C	Rain: 0 Cloud cover: 7 Wind speed: 1 Temp: 13 °C
03 August 2021	B	Dawn return	05:26	03:56/05:26	Rain: 0 Cloud cover: 1 Wind speed: 1 Temp: 12 °C	Rain: 0 Cloud cover: 8 Wind speed: 0 Temp: 10 °C
27 August 2021	B	Dusk emergence	20:25	19:55/22:00	Rain: 0 Cloud cover: 0 Wind speed: 0 Temp: 17 °C	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 13 °C
15 September 2021	A	Dusk emergence	19:37	19:07/21:07	Rain: 0 Cloud cover: 8 Wind speed: 0 Temp: 16 °C	Rain: 0 Cloud cover: 8 Wind speed: 1 Temp: 15 °C

Limitations of the building activity surveys

9.19 Light drizzle occurred throughout the dusk survey on 14 July 2021 at Building A. However, this did not progress to heavier rain and bats were recorded throughout the survey, including emerging from roosts, and therefore this was not considered to be a significant limitation.

9.20 The buildings were located within woodland and therefore light levels dropped quickly during the dusk surveys, and remained darker closer to dawn. This meant that some bats were heard on detectors but were not visible. The general direction these bats had come from could be determined via radio communication between surveyors. These passes were generally later (dusk survey visits) or earlier (dawn survey visits) in the survey sessions,

[32] Key to weather conditions summary: Rain = 0-4 (0 = dry); Cloud cover = (in eighths); Wind speed = - 0 (calm) – 12 (hurricane); Temp = Temperature (°C)

outwith the peak times of emergence or return for pipistrelle bats. Passes by *Myotis* spp. and brown long-eared (BLE) bats were harder to confirm visually.

9.21 Small bat roosts with one or two non-breeding bats can often be difficult to identify precisely at any time of the year, because bats utilise roosts on a transient basis. Unless bats are conclusively seen "dropping" from a roost location, caution should be exercised in the interpretation of the perceived distribution of the roosts recorded. If or where this limitation has implications for the Development, this is discussed below.

9.22 Caution is also required when interpreting bat calls recorded by static bat detectors. Each recorded call represents a pass of a bat within the range of the microphone. These data do not provide information about the actual number of bats present (a high number of passes could be a single bat repeatedly passing the microphone).

9.23 It is not always possible to identify bat calls to species level, and the analysis of bat detector calls can be prone to some subjectivity. However, it was undertaken here by experienced analysts, following appropriate guidance and in consultation with other experts where necessary. It is often difficult to identify some *Pipistrellus*, *Myotis* and *Nyctalus* bats to species level. With regard to pipistrelles, where recordings peaked at 50 kHz, intermediate between common pipistrelle (45 kHz) and soprano pipistrelle (55 kHz), these passes were simply classified as "pipistrelle species".

Hibernation surveys

9.24 The PRA identified bat hibernation suitability within Buildings A and B, mostly associated with voids in window lintels and numerous deep stone crevices in both external and internal walls.

9.25 On 20 January 2022 and 04 February 2022, hibernacula inspections of the accessible areas of the buildings were carried out by an appropriately licensed bat worker, including features that had previously been identified as having potential to support hibernating bats. Full details of the survey visits are included in **Table 9.3** below. In accordance with current best practice survey guidance produced by the BCT (Collins, 2016), all safely accessible features which might typically provide suitable shelter for hibernating bats were checked systematically and carefully with the use of torch light, using an endoscope where the end of any crevices could be not be seen fully. Evidence of bat use, such as staining and scratch marks, as well as droppings below or adhering to nearby stonework was also searched for during the inspection.

9.26 Three static SM4+BAT detectors were also placed within areas of Building A and B between 14 December 2021 and 19 January 2022, in order to monitor any activity of bats which may have temporarily come out of hibernation to feed or drink on milder nights. Two detectors were used at Building A (Location 2 in the western sections, and Location 3 in eastern sections of the internal façade), and one detector was placed in the centre of Building B (Location 1).

9.27 A temperature and humidity logger was also placed within a deep stone crevice in Building A during the SM4 deployment. A ground level location for this was first checked to ensure it did not contain any hibernating bats, and selected so as to collect data regarding the typical conditions found in the many inaccessible but similar features on the building.

The temperature logger was placed within a deep stone crevice on the internal wall at the north side of Building A. Temperature and humidity readings were saved every six hours.

Table 9.3: Summary of hibernation survey details.

Date	Start/ finish times	Temperature on day before survey	Temperature on day of survey
20 January 2022	13:30/16:30	Day temp: 8 °C Night temp: 0 °C	Day temp: 5 °C Night temp: 3 °C
04 February 2022	09:30/13:30	Day temp: 2 °C Night temp: 1 °C	Day temp: 9 °C Night temp: 2 °C

Limitations of hibernation surveys

9.28 As described above, Buildings A and B were in a state of ruin and this meant that not all potential hibernation locations could be inspected due to health and safety concerns. Only a small number of features were accessible at lower levels on Building A, with the majority of the stone crevices on the external and internal walls at height or within collapsed sections of the building.

9.29 The winter period between December 2021 and early February 2022 was mild with very few periods of frost or wintery weather. Hibernation inspections are usually timed for periods of particularly cold weather but the only notable period of hard frost that occurred during the Christmas break was in late December. Planned submission dates meant that surveys could not be delayed until potentially colder weather later in February, and therefore, it was not possible to carry out hibernation inspections in optimum weather conditions. Due to the access limitations described above, and the need to consider hibernation suitability in the absence of physically finding hibernating bats, the milder conditions throughout the winter were not however judged to be a significant limitation to the overall conclusions of the survey.

9.30 Bat calls detected on the SM4 detectors could not be conclusively attributed to bats hibernating within the buildings, due to the likelihood of bats also being recorded around the exterior of the buildings on milder nights. The placement of the SM4 units for over a month aimed to collect enough recording data to estimate the likelihood of hibernation, when evaluated in the context of the clarity of the call, time and weather conditions at the time of recording.

9.31 For an unknown reason, all three static detectors recorded a large volume of noise files. At Location 2 this resulted in the 32 GB memory card becoming full by 06 January 2022 and the static not recording past this date. However, only a small number of bat calls were recorded here during the recording period and the absence of data beyond this date was not deemed to be a limitation. Location 1 recorded until 12 January 2022 before the batteries ran out (assumed to be due to the colder weather), and Location 3 recorded until 17 January 2022.

Walked transects

9.32 A manual transect route was walked on seven occasions between May and October 2021, as shown in **Figure 9.9** and summarised in **Table 9.4** below. This included a dusk transect in May, June, August, September and October, and a back to back dusk and dawn transect in July. Current guidance for high habitat suitability advises on two transect visits per month but it was judged that one visit per month would be appropriate for transects, with emphasis placed instead on a higher density of static detectors than that advised in current guidance. Transect surveys provide a narrow snapshot of how bats use a Site, and therefore a single transect a month allowed for an evaluation of how bats were using the habitats, when paired with the larger volume of data recorded by the static detectors.

Table 9.4: Summary of manual transects.

Date	Transect type	Sunset/ sunrise	Start/ finish times	Weather at start[33]	Weather at finish
25 May 2021	Dusk	21:42	21:42/00:11	Rain: 0 Cloud cover: 4 Wind speed: 1 Temp: 10 °C	Rain: 0 Cloud cover: 2 Wind speed: 1 Temp: 8 °C
14 June 2021	Dusk	22:06	22:12/00:50	Rain: 0 Cloud cover: 3 Wind speed: 2 Temp: 12 °C	Rain: 0 Cloud cover: 4 Wind speed: 1 Temp: 11 °C
15 July 2021	Dusk	21:55	22:09/00:35	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 18 °C	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 16 °C
16 July 2021	Dawn	04:54	02:19/04:29	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 16 °C	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 15 °C
10 August 2021	Dusk	21:08	21:13/23:26	Rain: 0 Cloud cover: 1 Wind speed: 1 Temp: 14 °C	Rain: 0 Cloud cover: 1 Wind speed: 1 Temp: 13 °C
02 September 2021	Dusk	20:11	20:09/22:23	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 15 °C	Rain: 0 Cloud cover: 0 Wind speed: 1 Temp: 13 °C
05 October 2021	Dusk	18:45	18:56/21:07	Rain: 0 Cloud cover: 6 Wind speed: 3 Temp: 11 °C	Rain: 0 Cloud cover: 2 Wind speed: 4 Temp: 10 °C

[33] Key to weather conditions summary: Rain = 0-4 (0 = dry); Cloud cover = (in eighths); Wind speed = - 0 (calm) – 12 (hurricane); Temp = Temperature (°C)

9.33 The transect route was devised to ensure good overall coverage of the majority of the Site, and its component habitats, while following path networks to allow easy navigation through woodland habitats in the dark.

9.34 The Woodbank area in the west of the Site was not included within the transect route. This area was mainly open grassland fields with a block of dense woodland, and two static detector locations were judged to be sufficient, located along the woodland edge which was the most likely area of sustained bat foraging activity. Similarly, the transect did not include the small outlying Boathouse area of the Site and one static detector was placed here instead.

9.35 Each dusk transect commenced at sunset or shortly after, and was typically completed within 2.5 hrs. The dawn transect in July was started 2.5 hrs before sunrise and finished within 30 mins of sunrise. The route had thirteen stopping points where timed point counts were made. The route was walked slowly between point count locations, and surveyors were stationary at each stopping point for 5 mins. Bat passes at each stopping point were recorded, along with species and type of activity, where these parameters could be determined. Similar information was recorded for any bat calls detected *en route* between the point count locations. The starting point and direction of the transect was switched frequently, to gather data on activity levels across the Site at various times after sunset.

9.36 Experienced surveyors carried out the manual transects, using Petterson D-230 frequency division detectors in tandem with a continually recording static Anabat Swift detector, carried in a backpack with its microphone mounted externally.

Limitations of the transect surveys

9.37 During the dawn transect in July, anti-social behaviour within the adjacent southern section of Loch Lomond Shores car park meant that the decision was made to abandon a section of the transect at c. 03:00 am, for health and safety reasons. The transect, which was being walked in reverse, was curtailed between the southern edge of Drumkinnon Wood and point count 9 (also omitting Point count 8) and recommenced from point count 7. Ten minute point counts were undertaken at P6, P5 and P4 to compensate, and to ensure the transect was not finished too early.

9.38 It was not always possible to see all bats recorded during the manual transects due to low light levels and/or separation distances between the surveyors and the bats; Pettersson D230 detectors are highly sensitive and can detect bats at quite a distance. In these instances, bats were recorded as “heard not seen”.

Static monitoring

9.39 Full spectrum SM4+BAT static detectors were installed at eight locations through the Site, as shown in **Figure 9.9**. A summary of the locations used is provided in **Table 9.5**.

9.40 The detectors were installed for six nights each month for six months between May and October 2021 inclusive. They were programmed to record from 30 mins before sunset each night, until 30 mins after sunrise the following morning. A summary of the number of nights sampled is provided in **Table 9.6** below.

ECOBAT

9.41 Following the call analysis, the SM4 data were entered into ECOBAT[34]. ECOBAT is a UK-wide database and analysis platform which enables temporal and spatial comparisons of bat activity recorded by static detectors, relative to reference datasets already entered into the platform.

9.42 In terms of classifying bat activity according to median percentile scores, the 2019 SNH (now 'NatureScot') wind farm guidance[35] uses the definitions presented in **Table 9.7**. These bands of values for specific activity median percentiles were also used in the analyses.

Table 9.5: Static detector locations.

Static location	Grid reference	Habitat description
1	238159 681766	Eastern edge of southern section of the Woodbank woodland adjacent to ruins of Woodbank House. Detector had to be hidden within vegetation to prevent theft.
2	238083 681914	Eastern edge of northern section of the Woodbank woodland.
3	238404 682363	Boathouse area of the Site within existing woodland/scrub woodland close to the shore.
4	238576 682366	Within broad-leaved plantation woodland at the Pierhead area of the Site, close to existing Lomond Shores. Detector had to be hidden within vegetation to prevent theft.
5	238914 682180	Within southern section of woodland strip along the River Leven in the Riverside section of the Site. Detector had to be hidden within vegetation to prevent theft.
6	238691 682135	Within eastern section of Drumkinnon Wood.
7	238511 681989	Within western section of Drumkinnon Wood.
8	238752 682411	Within northern section of woodland strip along the River Leven in the Riverside section of the Site. Detector had to be hidden within vegetation to prevent theft.

Table 9.6: Static detector deployment periods.

Recording period	Detector locations								Total nights
	1	2	3	4	5	6	7	8	
19 May – 25 May 2021	6	6	6	6	6	6	6	6	48
17 June – 23 June 2021	6	6	6	6	6	6	6	6	48
15 July – 21 July 2021	6	6	6	6	6	6	6	6	48
17 August– 23 August 2021	6	6	6	6	6	6	6	6	48
16 September – 22 September 2021	6	6	6	6	6	6	6	6	48
14 October – 20 October 2021	6	6	6	6	6	6	6	6	48
Total nights	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**36**	**288**

[34] http://www.ecobat.org.uk/ Accessed November 2020.

[35] **SNH (2019)** *Bats and Onshore Wind Turbines: Survey Assessment and Mitigation*. SNH, January 2019.

Table 9.7: Percentile scores and categorised level of bat activity (after NatureScot, 2019).

Percentile	Bat activity rating
81 to 100	High
61 to 80	Moderate to high
41 to 60	Moderate
21 to 40	Low to moderate
0 to 20	Low

Limitations of the static detector surveys

9.43 None of the static detectors malfunctioned, and all eight units recorded for the full six nights across all months.

9.44 During surveys in 2017, Envirocentre reported theft of some static detectors during their deployment. The Site was widely used by the public and the risk of theft remained high in 2021. In order to try and prevent this from occurring, detectors at the locations at the highest risk of theft had to be placed within vegetation to reduce the risk of the unit being visible (notably Locations 1, 4, 5 and 8). The microphone was extended up from ground level and attached up to 2 m above ground level on a tree to get the best recording position. However, the location of detectors within dense vegetation cover resulted in 'noisier' calls on analysis and this was likely to have reduced the distance at which the microphones recorded. Location 1 was particularly at risk given the anti-social behaviour and vandalism that was visible around Woodbank House. The hidden placement and cluttered vegetation at Location 1 was likely the reason for what appeared to be an anomaly of a low number of calls recorded here compared with that observed during the bat activity surveys at the buildings in this location. This potential limitation is discussed in more detail in the Results section of this chapter.

9.45 Overall, the potential limitations outlined above did not significantly impact the ability of detectors to record bat passes, with close to 75,000 passes recorded across all locations during the sampling periods. Furthermore, the combination of static deployments, manual transects and bat activity surveys of buildings allowed for detailed overview of how bats were using the Site, and any limitations outlined above were not considered to have impacted the conclusions drawn relating to bat activity at the Site.

9.46 Static detector surveys such as those reported here tend to provide just a snapshot view of bat activity in one place and over a relatively short period of time. Poor weather (rain, wind and/or low temperatures) can influence bat activity, and if sampling period(s) overlap with poor conditions, this can potentially skew the results. However, the 2016 BCT methodology for this sampling protocol aims to overcome some of these limitations through the use of a minimum number of survey nights, to increase the probability that a typical range of weather conditions will be encountered, and this protocol was followed in this study. Additionally, the use of ECOBAT to compare the results with other datasets allowed a qualitative and quantitative evaluation of their representativeness.

9.47 Caution is required when interpreting bat calls recorded by static bat detectors. Each recorded call represents a pass of a bat within the range of the microphone. These data do

not provide information about the actual number of bats present (a high number of passes could be a single bat repeatedly passing the microphone).

9.48 Additionally, it is not always possible to identify bat calls to species level, and the analysis of bat detector calls can be prone to some subjectivity. However, it was undertaken here by experienced analysts, following appropriate guidance and in consultation with other experts where necessary. It is often difficult to identify some *Pipistrellus*, *Myotis* and *Nyctalus* bats to species level. With regard to pipistrelles, where recordings peaked at 50 kHz, intermediate between common pipistrelle (45 kHz) and soprano pipistrelle (55 kHz), these passes were simply classified as "pipistrelle sp.". Where only the social call segment of a pipistrelle pass was recorded, these were also classified as "pipistrelle sp.".

9.49 Brown long-eared (BLE) are a quiet calling species and therefore it was considered likely that the activity for this species was higher than that recorded during the static monitoring.

Results

Pre-existing data records

9.50 Two records of bats were found within 2 km of the Site, both of which were NatureScot soprano pipistrelle roost records. Both were also for grid square NS3981, with one roost in a domestic dwelling with 87 bats recorded in 2014, and a second domestic dwelling roost with 80 bats recorded in 2015. The absence of any other records within closer proximity to the Site does not mean that bats are absent, being more likely a result of recording effort.

9.51 Buildings A and B were rated as having low bat roost suitability in 2017 by Envirocentre. A single activity survey was completed at each building at the end of August 2017 with no roosts found. In 2017, no activity survey was completed at Building C, and a selective endoscope inspection at this building did not confirm any roosting bats.

Habitat assessment

Roosting

9.52 Ancient woodland within the Site, both in Drumkinnon Wood and the Woodbank woodland, provided a network of trees that offered numerous roosting opportunities for bats. Roosting suitability of trees was formally identified as part of a PRA assessment at the Site, and the results of this are described in more detail below. The derelict structures associated with Woodbank House also displayed bat roost suitability and were the subject of dedicated PRA assessment and bat activity surveys. The façade of Woodbank House and adjacent outbuilding were both found to contain bat roosts, which is also described in more detail below.

Foraging

9.53 The mosaic of habitats within the Site created a mixture of attractive bat foraging and commuting areas. Abundant woodland tree cover occurred throughout the Site, with woodland edges offering particularly attractive bat foraging habitat, as well as clearings within the woodland canopy. Dark woodland corridors along the River Leven also offered opportunities for foraging below the canopy and over water, and this was replicated in north of the Site around the existing shoreline at the Pierhead and at the Boathouse section

of the Site. The woodland edges and existing tree lines provided attractive commuting routes, although this was somewhat fragmented by existing development and infrastructure which have introduced well-lit areas around Ben Lomond Way and the adjacent Loch Lomond Shores car park. The existing dark corridor along Pier Road allowed connectivity from the east of the Site and further west through Drumkinnon Wood. The Woodbank area in the west of the Site also had good connectivity to high quality habitats in the wider area to the north and west.

9.54 In accordance with the criteria provided in Wray *et al*. (2010), the habitat mosaic of the Site was initially considered to have at least **Local** value for foraging and/or commuting bats. The habitats present within the Site were judged to offer **High** habitat suitability for bats, based on the criteria provided by Collins *et al*. (2016).

Preliminary roost assessment of buildings

9.55 A plan of the general arrangement of the buildings inspected and suitability results of the PRA can be found in **Figure 9.1**. A description of each building and the roost suitability are shown in **Table 9.8**. Photographs of the buildings can be found in **Appendix E**.

Table 9.8: Description of bat roosting suitability recorded in the PRA of buildings.

Building	Building description	Bat roost suitability
A (Woodbank House)	Remains of Woodbank House. Only the external façade remained partially standing. No roof coverings had survived. Internal areas were completely collapsed with only isolated sections of stone or brick dividing walls remaining. There appeared to be a basement area in the southern end of the building, although most of this had collapsed under the weight of rubble above. The ability to inspect fully the internal sections was limited by the unsafe conditions of the building. A small underground room was located immediately to the west of Woodbank House, under the previous walled garden with a row of ground level windows. This was accessed via a small stairwell on the south side of the existing wall. The internal area contained a narrow room that was tiled on the majority of the walls and ceiling. Where tiles had broken off, bare concrete render remained. The eastern internal wall had evidence of subsistence resulting in large cracks in the stone that was exposed behind the tiles.	**Summer roosting:** Opportunities for transient summer roosts for crevice dwelling pipistrelle species were scattered throughout the external and internal stone walls. This included exposed lintels and stone crevices. These spaces were judged unlikely to reach the thermal conditions preferred by larger maternity roosts of pipistrelles. Daubenton's bats are known to use stone structures in close proximity to water. There were therefore plentiful roost features suitable for this species, with Loch Lomond in accessible commuting distance via woodland cover. The building location within Ancient Woodland increased the likelihood of bats utilising features for roosts. The small underground room directly west of Woodbank House was not judged to offer any summer roosting suitability. The flight access to the internal areas was obscured somewhat by surrounding vegetation and there would be a lack of sunlight penetration. No bat droppings were found adhered to walls or on the floor areas. **Hibernation:** The majority of the stone crevices were judged to provide suitable depth and conditions to support hibernating bats. This included deep voids extending from where fireplaces once were located. Individual pipistrelle, *Myotis* and BLE bats could potentially make use of these features for hibernation roosts. The basement area also had direct flight access via two large openings on the north and south of the building at ground level. However, the footprint of the basement was largely filled with collapsed debris from above. The small underground room directly west of Woodbank House offered hibernation conditions within deep stone crevices in the eastern wall. The climate within the room was judged to offer a stable and consistent temperature and humidity.
B	Remains of second large house. Less of the external façade left standing than Woodbank House, although	**Summer roosting:** Opportunities for transient summer roosts for crevice dwelling pipistrelle species were scattered throughout the external and internal stone/brick walls. This

Building	Building description	Bat roost suitability
	some sections of the wings were in tact with ceilings. Staircase somewhat intact which theoretically allowed access to remaining walls of upper floor but access was not safe. Section of smaller building further north, in a more advanced state of ruin. There was a sheltered dark space under the stairway which was accessible for inspection.	included exposed lintels, gaps under plaster, and stone crevices. These spaces were judged unlikely to reach the thermal conditions preferred by larger maternity roosts of pipistrelles. Daubenton's bats are known to use stone structures in close proximity to water. There was therefore plentiful roost features suitable for this species, with Loch Lomond in accessible commuting distance via woodland cover. The building location within Ancient Woodland increased the likelihood of bats utilising features for roosts. **Hibernation:** The majority of the stone crevices were judged to provide suitable depth and conditions to support hibernating bats. This included deep voids extending from exposed lintels as well as masonry gaps. Sheltered crevices were also found within the area under the stairway that were particularly suitable for hibernation. Individual pipistrelle, Myotis and BLE bats could potentially make use of these features for hibernation roosts. The remaining section of building to the north was less suitable for roosting bats, with minimal features and would be much more exposed to the elements. Multiple active bird nests were confirmed, with wren, blue tit and song thrush all seen carrying food. Feral pigeon were confirmed nesting within the stone wall and blue tit also seen entering the stone wall. Corvid nests were located in the remaining chimney.
C	Ruined outbuilding. Single storey pitched building with tin/metal roof. The roof was mainly intact with only a few holes. Stone external walls with two gables. The southern gable had a large collapsed section and there were no remaining doors or windows. At the north of the building there was a collapsed lean to that was now a pile of rubble. Internally the roof was single lined and the underside of the sheeting was visible. Wooden rafters were all in place.	**Summer roosting:** The external stone walls were lacking in notable crevices. Similarly, internal mortar gaps were limited. The exception to this was the southern gable that had collapsed, exposing cavities within the chimney area but this was relatively exposed. The window lintels were all metal and did not have any gaps. The roof was judged unsuitable for day roosting, but would be suitable for a night feeding roost for BLE. No evidence of this was recorded but there was a substantial amount of debris from anti-social behaviour inside the building. **Hibernation:** The building was lacking in notable stone crevices that were visible on Building A and B. Therefore, no hibernation suitability was recorded.

Visitor Information Centre

9.56 No formal PRA was commissioned for the existing visitor information centre in the far south-east of the Site. This was due to the uncertainty over what renovations may be carried out on the building. However, the building was located adjacent to areas with high foraging activity recorded during the manual transect surveys within woodland along the River Leven. The construction of the building, with red sandstone external walls and slate roof with lead flashing, would be likely to provide summer roosting opportunities for bats. Further recommendations relating to this building are provided in the discussion below.

Preliminary roost assessment of trees

9.57 A summary of the assessment of trees within the Site is provided in **Appendix F** and **Figures 9.2-9.5,** with survey photographs in **Appendix G**.

9.58 The areas inspected were split into defined areas, comprising the Woodbank woodland, the Boathouse, the woodland south of the Ben Lomond Way roundabout (also referred to "Area 10"), Drumkinnon Wood car parking and Riverside. No PRA was required within the Pierhead section of the Site due to the young nature of trees here. Trees were included in the assessment if they were likely to be directly impacted by proposals (potential removal), or if they fell within a distance likely to be impacted by disturbance arising from noise, vibration of lighting (either during construction or operation).

9.59 In total, of the trees surveyed that potentially would be impacted by the Development, 87 were considered to have some degree of suitability for roosting bats due to their age and/or structure. Overall, 11 were considered to have **high** bat roost suitability based on the PRFs visible from ground level, 54 had **moderate** bat roosting suitability, and 22 had **low** roosting suitability. Trees with negligible suitability were not recorded formally as part of this assessment.

9.60 The majority of trees with potential roost features were recorded within the Woodbank area of the Site, where 59 trees displayed some level of bat roost suitability. There were a number of large mature specimens of oak and ash which offered high roosting suitability due to their age and structure. Mature oak trees were concentrated in the north-west corner of the Woodbank woodland, and many of these trees could not be fully inspected from ground level due to their size.

Activity surveys of buildings

9.61 Full details of the bat activity recorded during the activity surveys can be found in **Appendix H**. Photographs of the roost locations are included in **Appendix E**, and locations of the roosts are highlighted in **Figure 9.8**.

Building A

Dusk watch – 14 July 2021

9.62 A total of **three roosts** of individual pipistrelle bats were identified on Building A during the survey. The first emergence was recorded by both Surveyors 4 and 5, 13 mins before sunset, where a bat emerged from a gap in the brickwork of the existing chimney at the highest point of the building. A second pipistrelle bat was then seen by Surveyor 4 exiting a roost within a stone lintel on the northern side of the building shortly after sunset, before at bat (presumably the same one that emerged) returned to the same roost location a minute later. The third roost location was also on the northern external stone wall of the building, where a bat potentially returned to roost within a stone crevice, although light levels made this hard confirm with certainty.

9.63 In terms of bat activity levels, constant foraging and commuting bats were observed by all surveyors throughout the survey. Periods of intensive pipistrelle foraging were associated with the building, and *Myotis* sp. and BLE passes were also recorded. Bats appeared to be regularly flying through the structure as well as within the surrounding tree cover.

Dawn watch – 30 July 2021

9.64 A total of **two roosts** of individual pipistrelle species were identified on the building during the survey. Swarming activity was observed by two bats at sunrise, with one bat returning

to a roost within the internal stone lintel on the eastern side of the building, and a second bat returning to a stone crevice at the top of the stone wall next to Surveyor 1.

9.65 In terms of bat activity levels, constant foraging and commuting bats were again seen by all surveyors. This comprised intensive foraging by pipistrelle species in the trees surrounding the building, as well as social activity by pipistrelle bats displaying 'chasing' behaviour and loud social calls being heard on detectors. Passes by *Myotis* sp. and BLE bats were also picked up during the survey.

9.66 Tawny owl were heard calling throughout the survey from within the woodland.

Dusk watch – 15 September 2021

9.67 No roosts were identified within the building during the survey. However, the first bat pass was recorded 10 mins before sunset and was likely to have been a bat that had emerged close by. Lower levels of bat activity were observed overall compared to previous surveys but there were still periods of intensive foraging by pipistrelle species both within and surrounding the building. Pipistrelle bats were also witnessed 'chasing' each other through the internal areas of the building during parts of the survey, and this was potentially thought to be linked to males setting up territories in the area as bats transition away from summer roosts and approach the breeding season.

9.68 Tawny owl were again heard calling throughout the survey from within the woodland.

Building B

Dusk watch – 13 July 2021

9.69 **One roost** of an individual soprano pipistrelle bat was identified during the first survey on Building B. The bat emerged from a stone crevice on northern side of the building. Activity surrounding the building was lower than that recorded at Building A, but a number of commuting passes of both common and soprano pipistrelle, *Myotis* sp. and BLE were picked up in the general area, with short periods of foraging pipistrelle activity.

Dawn watch – 03 August 2021

9.70 No roosts were identified during the survey. Bat activity around the building was generally low, with brief periods of pipistrelle foraging observed by Surveyor 6, and a number of commuting passes of *Myotis* sp., BLE and common and soprano pipistrelle recorded by Surveyor 8. This included four pipistrelle bats commuting west into the woodland at sunrise, potentially returning to a tree roost nearby.

Dusk watch – 27 August 2021

9.71 No roosts were identified during the third survey. Bat activity surrounding the building was higher than in previous surveys with intermittent foraging passes of both common and soprano pipistrelles heard consistently through the survey, associated with bats foraging in the surrounding trees. The other small number of passes were limited to commuting common and soprano pipistrelle, *Myotis* sp. and BLE.

Building C

Building C dusk watch – 01 July 2021

9.72 No bat roosts were identified on the building.

9.73 High levels of soprano pipistrelle bat foraging were observed by both surveyors, particularly around position 1, associated with the woodland edge. This began 15 mins before sunset and occurred for prolonged periods throughout the survey session.

9.74 A small number of passes by BLE and *Myotis* sp. (suspected to be Natterer's) were also recorded.

9.75 A tawny owl perched within the roof beams of the building at the start of the survey and flew into the woodland when disturbed. For periods during the survey, a barn owl was also seen flying over the adjacent open field.

Summary

9.76 Across all surveys, a total of five roost locations of individual pipistrelle bats were identified for Building A, and one soprano pipistrelle roost of an individual bat was found on Building B. Soprano and common pipistrelle were observed foraging in the areas surrounding all three of the buildings surveyed, and later in the season these species displayed territorial behaviour at Building A. Passes by *Myotis* sp. and BLE bats were also noted across all surveys.

Hibernation surveys

Inspection visit – 20 January 2022

9.77 No hibernating bats were found in the limited number of crevices that could be inspected safely. The winter inspection revealed that Building B had a high volume of water ingress due to the lack of roof in many areas, and this made some features unsuitable. Suitable crevices that could be inspected in Building B included deep stone window lintels and gaps within stone under remaining stairwells. Building A was overall more suitable for hibernating bats than Building B, with an abundance of deep stone crevices both externally and internally. A number of these were judged likely to be subject to temperature fluctuation due to the lack of full cover. However, there were sufficiently deep sheltered areas in Building A for hibernating bats, including the internal areas of old fireplace flues and chimney stacks.

Inspection visit – 04 February 2022

9.78 No hibernating bats were found in the limited number of crevices that could be inspected safely.

SM4 recordings

9.79 Over the winter period of deployment, 52 bat calls were detected at Location 1 at Building B (35 common pipistrelle passes and 17 soprano pipistrelle), eight bat calls in the western end of Building A at Location 2 (five common pipistrelle and three soprano pipistrelle), and 33 calls at the eastern end of Building A at Location 3 (three common pipistrelle and 30 soprano pipistrelle). A full breakdown of activity is included in **Table 9.9** below.

9.80 The passes were generally small numbers of calls spread across the deployment period, with a few notable exceptions on nights where slighter higher activity was recorded (16 December 2021 and 11 January 2022). Both these nights were milder with minimum temperatures not falling below 6 ^{o}C. No consistent pattern of calls was evident that would

be suggestive of bats emerging and returning from roosts, but passes did occur close to sunrise on the morning of 12 January 2022 at Locations 1 and 3. Calls at all three locations generally occurred on the same selection of nights. The sonogram recordings at Locations 2 and 3 were extremely distorted, with no clear registrations across the deployment. Detectors here were placed within the internal walls of the building and therefore the sonograms were suggestive of bats that were foraging/commuting around the trees surrounding the exterior of the building, rather than internally. Recordings at Location 1 were clearer, but this would be expected given the absence of a roof across the majority of the building.

Table 9.9.: Hibernation static detector bat calls.

Night	Closest call to sunset	Closest call to sunrise	Species	Number of bat passes that night	Minimum temperature on night of recording (historical weather data)
Location 1 – Building B					
16 December 2021	01:12	07:32	Soprano pipistrelle	21	6 °C
17 December 2021	00:10	05:52	Common pipistrelle	12	4 °C
21 December 2021	01:59	-	Soprano pipistrelle	1	2 °C
24 December 2021	03:48	-	Soprano pipistrelle	2	2 °C
27 December 2021	01:22	-	Common pipistrelle	1	4 °C
28 December 2021	01:46	-	Soprano pipistrelle	3	2 °C
01 January 2022	01:59	-	Soprano pipistrelle	3	7 °C
03 January 2022	03:44	-	Soprano pipistrelle	2	-1 °C
04 January 2022	01:50	-	Soprano pipistrelle	1	2 °C
11 January 2022	00:56	00:39	Soprano pipistrelle	2	6 °C
12 January 2022	00:52	-	Soprano pipistrelle	4	8 °C
Location 2 - Building A					
17 December 2021	-	05:55	Common pipistrelle	1	4 °C
27 December 2021	01:18	-	Common pipistrelle	2	4 °C
01 January 2022	01:56	-	Soprano pipistrelle	3	7 °C
04 January 2022	01:47	-	Common pipistrelle	2	2 °C
Location 3 – Building A					
16 December 2021	00:47	07:35	Soprano pipistrelle	2	6 °C
17 December 2021	02:00	-	Common pipistrelle	1	4 °C
24 December 2021	03:39	-	Soprano pipistrelle	2	2 °C
25 December 2021	05:13	-	Soprano pipistrelle	1	1 °C
01 January 2022	05:16	-	Common pipistrelle	2	7 °C
03 January 2022	05:05	-	Soprano pipistrelle	2	-1 °C
11 January 2022	-	00:13	Soprano pipistrelle	13	6 °C
12 January 2022	01:30	-	Soprano pipistrelle	3	8 °C
14 January 2022	-	06:40	Soprano pipistrelle	6	4 °C
17 January 2022	-	05:19	Common pipistrelle	1	4 °C

9.81 The full dataset from the temperature and humidity logger can be found in **Appendix I**. The highest temperature recorded was 10 °C and the lowest was 1 °C. Although temperatures appeared to be relatively stable within each 24 hr period, there was notable fluctuation in temperatures overall, suggesting that the particular stone crevice selected did not maintain a consistent temperature. In comparison, humidity readings did remain relatively stable across the full deployment period.

Walked transects

9.82 A heat map highlighting the areas of highest bat activity recorded across the seven manual bat activity transect is provided in **Figure 9.10**. Full details are provided in **Appendix J**.

9.83 The majority of activity recorded during manual transects was from pipistrelle species, primarily soprano pipistrelle. Small numbers of *Myotis* sp. passes were also recorded, mostly associated with Point Count 5 by the shoreline, making it likely that these passes were by Daubenton's.

9.84 The spatial distribution of activity recorded across all transects was generally similar, although activity levels were lower in September and October which would be as expected later in the activity season. Key areas of bat foraging were consistent across visits, and included:

- Pipistrelle bats consistently observed foraging in high numbers along the dark path corridor between Point Counts 1-3 at the Riverside area of the Site. Bats were present here from early after sunset and often were flying up and down the path below the tree canopy, sometimes close to ground level. Bats were also observed foraging continuously above the tree canopy.
- Pipistrelle bats consistently recorded intensively foraging along the path by the shoreline at the Pierhead area of the Site between Point Counts 4 and 5. Multiple bats were often recorded, flying up and down the path at the edge of the block of the broad-leaved plantation woodland.
- Individual or small numbers of pipistrelle bats were consistently recorded within clearings in the eastern section of Drumkinnon Wood, recorded at Point Counts 6 and 12. Bats here were foraging high around adjacent trees, and social calls were often recorded in these areas later in the season.
- Foraging and commuting pipistrelle passes were often recorded between Point Counts 8 and 9, associated with the eastern and southern edges of the woodland block at this location. This included along the road access to the Loch Lomond Shores car park which had retained a dark corridor away from adjacent lighting, as well as along Old Luss Road.

Static monitoring

9.85 Summaries of the data recorded by the SM4 detectors are provided in **Figure 9.11-9.17**. A detailed breakdown of the average numbers of passes per night (ppn) per species location per month can be found in **Appendix K**. However, a summary table of average ppn per location can be found in **Table 9.10**.

9.86 Overall, a total of 74,873 passes were recorded during the six sampling sessions. A total of 74,233 of these were pipistrelle species (99 %) and within this 62,067 (83 %) were soprano

pipistrelle, 6,447 were common pipistrelle passes, 5,707 were labelled "pipistrelle sp." and 12 Nathusius pipistrelle passes were recorded. A total of 608 *Myotis* sp. passes were also identified, 30 BLE passes and two *Nyctalus* sp. passes. The total number of passes translated into an average ppn across the Site of almost 260. Within this dataset, ppn in June peaked at 401 and decreased to an average of 85 in October. All other months had an average ppn of between 170-358.

Table 9.10: Summary of passes per night (ppn) per location.

Location	May	June	July	August	September	October	Total average
1	93.83	19.83	5.33	18.67	63.50	3.83	34.17
2	141.17	245.00	84.50	85.00	83.83	94.50	122.33
3	479.17	1268.33	1008.00	981.83	299.17	136.83	695.56
4	945.50	479.50	711.00	331.00	284.33	8.00	459.89
5	29.00	152.50	356.17	135.33	91.33	93.00	142.89
6	221.50	228.17	140.83	46.00	271.00	174.67	180.36
7	142.50	371.00	178.50	149.67	211.67	93.83	191.19
8	115.33	443.50	380.00	433.50	72.33	75.83	253.42
All locations	271.00	400.98	358.04	272.63	172.15	85.06	259.98

Locational analysis

9.87 **Figures 9.11-9.17** show that in all sampling periods except May, the greatest amount of bat activity was recorded at Location 3, in the Boathouse area of the Site, adjacent to the Loch Lomond shoreline. Location 3 recorded the highest levels of activity in June, peaking at 1,268 ppn but activity also remained high in July and August, at 1,008 ppn and 981 ppn respectively, primarily representing pipistrelle activity. Location 4 at the Pierhead was the location with the second highest activity through all deployments, with an average ppn of 460, and Location 8 at Riverside had the third highest average ppn at 253. All three of these locations were located close to the shoreline of the River Leven and Loch Lomond. Locations 2, 5, 6 and 7 had an average ppn across all deployments ranging from 122 to 191.

9.88 Notably lower levels of activity were recorded at Location 1 with an average ppn across the deployment period of 34, peaking at 94 ppn in May. As outlined above, the location of the detector at Location 1, within dense vegetation to prevent theft, likely explains the lower levels of activity recorded here, at least in part. This data contradicts the activity observed in this area during activity surveys. Nevertheless, peaks in activity at this location occurred in the May and September transitional months, which is relevant when combined with the social behaviour observed by bats during the September activity surveys, near to Location 1. Similarly, Location 6 had a peak of 271 ppn in September, coinciding with the time when social behaviour by pipistrelles was recorded within Drumkinnon Wood.

ECOBAT analysis

9.89 **Figure 9.18** provides a summary of bat activity on the Site relative to other activity surveys carried out within 100 km^2 of the Site and within 30 days of the recording date (on a

DD/MM basis), as provided by the ECOBAT analysis. The data are displayed as being the percentage of the total number of recording nights that comprised each activity category for each species (or species group). The full ECOBAT tables detailing the number of nights for each activity category for each species (or species group) at each sampling location are provided in **Appendix L**.

9.90 **Figure 9.18** shows that across the deployments, 70 % of nights experienced high soprano pipistrelle activity nights. When moderate to high activity nights were added, this was 84 % of nights. Common pipistrelle had high activity on 13 % of nights, rising to a total of 40 % when moderate to high nights were included. This demonstrates the dominance of soprano pipistrelle activity across the Site. *Myotis* sp. had 6 % of moderate to high activity nights, 12 % of moderate activity nights, and 25 % of nights equalled low to mod or low activity. All nights of brown long-eared activity were low to moderate or low.

9.91 **Figure 9.19** shows how these activity levels varied at each location across the Site when considering all species. High activity was recorded at all locations during the survey period, and proportionally exceeded between 28 % and 35 % of sampling nights at Locations 3 to 8. A lower number of high activity nights was recorded at Location 1 (9 %) and Location 2 (21 %). When nights of moderate and moderate to high activity are also taken into consideration, between 37 % and 44 % of nights at Locations 3 to 8 fell within these categories, and for Location 2 the proportion was 34 %, and 19 % at Location 1.

First pass timing

9.92 Combining the time elapsed between sunset and the first recorded bat pass, with knowledge of the typical emergence times of individual bat species, provides an indication of proximity to a roost site. A summary of the minimum and average timings after sunset of recorded first passes is provided in **Tables 9.11** and **9.12**. The timings are given for each key species or species group recorded on the Site. Due to the small numbers of passes recorded, Nathusius pipistrelle and *Nyctalus* sp. have not been included in the tables below. Different species of bat emerge from their roosts at different average times after sunset. For pipistrelle bats, the key period is approximately 30 mins after sunset.

9.93 The recorded first pass times were highly suggestive of roost locations in close proximity, particularly for soprano pipistrelle, and were consistent for locations across the Site. Indeed, at Locations 6 and 7 within Drumkinnon Wood, the average first pass was 2 mins before sunset. Across all locations, first passes were on average no later than 28 mins after sunset, with the majority of locations having an average first pass within 20 mins of sunset. *Myotis* sp. and BLE are often referenced as later emerging species, but even for these species, average first pass timings at Locations 1, 5 and 6 were within 40 mins of sunset for *Myotis* sp. and at Location 7 for BLE. Last passes before sunrise were less indicative of bats returning to roosts, but this can be less reliable due to the variability in bats behaviour through the night. Nevertheless, the average last pass timing for soprano pipistrelle was still within 30 mins of sunset at Location 2, 3, 5 and 6. *Myotis* sp. often return to roost earlier than pipistrelles, sometimes up to 2 hrs before sunrise. The average last pass at Location 6 was 1 hr 13 mins before sunrise.

9.94 Overall, the first and last pass timings support the findings of the other assessments that bat roosting opportunities occur across the Site in the form of mature trees and derelict buildings. Throughout the manual transect surveys, foraging activity was observed from

close to sunset, indicating that habitats within the Site offered a key foraging resource earlier in the evening, and this is supported by the timings in **Table 9.12**. The Site was also in close proximity to a number of residential properties that could have supported roosting bats, which then commute into the Site for foraging shortly after sunset. The early first pass timings for *Myotis* sp. at Locations 1 and 6 could also indicate tree roosts within Drumkinnon Wood and the Woodbank woodland, most likely of Natterer's bats, based on the habitat context and activity observed during manual transects and activity surveys of buildings around Woodbank house.

Table 9.11: Minimum times for first pass after sunset hh:mm:ss).

Location	Common pipistrelle	Soprano pipistrelle	Pipistrelle sp.	*Myotis* sp.	BLE
1	0:24:00	0:21:57	1:07:20	0:34:00	-
2	0:32:50	0:03:03	0:40:54	1:00:30	1:04:00
3	0:32:04	0:10:51	0:36:38	1:05:43	1:47:20
4	0:50:39	0:28:35	0:34:36	0:45:00	0:52:00
5	0:53:35	0:09:37	0:44:02	0:39:05	-
6	0:22:17	**0:02:27**	0:49:05	0:38:14	-
7	0:18:42	**0:02:07**	0:46:07	0:55:27	0:31:40
8	1:00:37	0:19:45	0:37:36	0:54:50	0:42:00

Table 9.12: Minimum times for last pass before sunrise hh:mm:ss).

Location	Common pipistrelle	Soprano pipistrelle	Pipistrelle sp.	*Myotis* sp.	BLE
1	0:57:30	0:41:56	2:22:15	1:59:00	-
2	2:14:06	0:19:04	1:17:50	1:30:44	3:00:45
3	0:57:57	0:15:19	1:03:48	2:53:42	3:04:00
4	1:10:49	0:33:50	1:17:36	4:30:15	5:08:00
5	1:14:42	0:25:25	1:44:03	3:07:40	-
6	1:00:33	0:08:32	2:07:09	1:13:55	4:27:00
7	1:53:07	0:36:07	1:35:54	1:56:12	4:19:00
8	1:11:09	0:47:07	1:14:57	1:24:30	1:18:00

Discussion

Relevant legislation

9.95 All British bats are EPS, protected in Scotland by the Conservation (Natural Habitats &c.) Regulations (1994) as translated into domestic legislation post-Brexit, and the Wildlife and Countryside Act (1981, as amended). This legislation makes it an offence to capture, harass, injure or kill a bat; obstruct access to, damage or destroy a breeding or other resting place of a bat; disturb bats in such a way as is likely to affect their distribution or

abundance, or disturb bats in such a way as is likely to impair their ability to survive or breed. Each of these actions is considered to be an offence whether the action is deliberate or reckless, except in the case of damaging or destroying a breeding site or resting place which is a strict liability offence. A licence is required for all developments which will affect areas known to contain bat roosts.

9.96 A bat roost is defined as any structure or place which is used for shelter or protection, irrespective of whether or not bats are resident. Buildings and trees may be used by bats for a number of different purposes throughout the year including resting, sleeping, breeding, raising young and hibernating. Use depends on the age, sex, condition and species of bat as well as the external factors of season and weather conditions. A roost used during one season is therefore protected throughout the year and any proposed works that may result in disturbance to bats, or loss, obstruction of or damage to a roost are licensable.

Bats at Lomond Banks

Bat roosts within buildings

Summer roosting

9.97 Combining the data gathered during all of the survey sessions at the Site, a total of five roosts were identified. Four of these were within Building A (Woodbank House) and one was within Building B, all being individual pipistrelle bats utilising the abundance of stone crevices available within these structures. No same roost location was used twice across all of the surveys, suggesting that pipistrelle bats were using a number of roost locations across the building depending on factors such as weather and time of year.

9.98 Pipistrelle bats are included as a priority species within Dunbartonshire LBAP. As a **Council** level IEF, impacts on roosts of this species will need to be considered in full within the EcIA.

Winter hibernation

9.99 No confirmed evidence of hibernation was found during surveys over the winter of 2021/2022. There were however significant limitations to the survey due to the unsafe nature of the structures leading to an inability to inspect the majority of crevices, as well as the unusually mild weather during the winter survey period. The original PRA highlighted hibernation potential relating to thick stone walls, but during the hibernation surveys it was noted that there was a significant level of water ingress associated with Building B whereas Building A had more sheltered areas where internal stone walls had ceiling levels intact. However, recorded temperature data indicated that, at least in the crevice monitored, the stone walls were unable to maintain a consistent temperature that bat species such as BLEs and *Myotis* sp. prefer. Nevertheless, there were many areas of deep stone crevices that could not be inspected and therefore hibernation cannot be ruled out entirely.

9.100 Pipistrelle bats are often active for periods throughout the winter, when temperatures are milder and invertebrates are active. The milder winter weather would have been expected to result in pipistrelle activity, and this was reflected in the static monitoring data which showed pipistrelles to be active in areas around both Buildings A and B. There was no consistent pattern in the calls to indicate that these were pipistrelle bats returning or exiting roosts within buildings, but it is possible that roosts confirmed during summer

surveys could be used by pipistrelles through the winter months, relating more to transitionary periods of torpor rather than prolonged hibernation. It is therefore not possible to discount hibernation roosts within the derelict structures comprising Buildings A and B.

Licensing

9.101 The proposed renovation of Buildings A and B as part of the Development have the potential to disturb, obstruct, harm or kill bats, through blocking access to known roost locations or injuring bats during structural works. Therefore, the works will require appropriate licensing through NatureScot. The licence application will need to be supported by sufficient survey within the correct season(s), and a mitigation and method statement proportionate to the scale of the likely impact on bats. The licence application will need to state the measures which will be taken to ensure that bats will not be harmed and appropriate mitigation to ensure longevity of the conservation status of the local bat population.

9.102 It is unlikely that the bat roosting features within Buildings A and B could be retained as part of the Development, due to the need to make safe and then restore the buildings so that they can be brought back into use. The intention therefore will be to construct a building to act as a dedicated bat roost within the footprint of the Site, close to the existing Woodbank House. This will be designed so as to have provision for maternity roosting pipistrelles, but also a loft void that would be suitable for maternity colonies of BLE which are also known to be in the area and at present have no suitable roof voids within the existing derelict buildings. Hibernation provision will also be designed into the building via an underground chamber and/or deep crevice features suitable for use by bats in the winter months. Bat boxes will also be provided in trees and collectively it is considered likely that these would provide a long-term and sustainable compensation for the loss of confirmed summer pipistrelle roosts at the Site, as well as providing a form of enhancement as part of the Development.

9.103 The widespread nature of suitable roosting crevices on Building A and Building B, most of which were in unsafe areas, means the ability to rule out fully the presence of bats before structural works begin will be challenging. A Species Protection Plan (SPP) will be required to support the licence application required for these works, and this will need to state in detail the methods to be employed to ensure that bats are not present during the renovation works. These measures are likely to include:

- systematic searching/exclusion of crevices with the use of MEWP and/or scaffolds to cover as many features as possible. Where the full extent of a feature cannot be assessed, exclusion devices are likely to be required;
- a series of dusk/dawn watches proceeding planned works and throughout duration of initial works, primarily to cover features not able to be inspected. These must be undertaken immediately prior to the exact day on which the works are planned.

9.104 Due to the inability to rule out the presence of hibernating bats, works on buildings with known roosts will need to commence outwith the hibernation period (hibernation is usually considered to cover November-February). Outwith this time period, there would be no specific restrictions on the timing of the commencement of works as at present no maternity roosts have been recorded in the structures.

9.105 Activity survey data from the summer of 2021 will have a validity period of 18 months in order to be used to support a licence application. If works are planned beyond this time, the data will need to be reviewed and updated surveys may well be required.

Visitor Information Centre

9.106 As outlined previously, no formal PRA or activity survey was commissioned for the existing Visitor Information Centre in the south-east of the Site, within the Riverside section of the Development. If during detailed design renovations are proposed for this building, such as roof works and external repairs, then further survey will be required to determine if bat roosts are present within the building.

Roosting suitability of trees

9.107 The PRA of trees within the Site identified 87 trees that displayed bat roost suitability. Therefore, at the detailed design stage it is likely that further survey work will be necessary to establish whether or not any of the trees with bat roosting suitability do indeed support any bat roosts. Based on the results of the tree PRA, the highest impact on potential roosts in trees will likely to be within the Woodbank woodland. The results of the tree PRA and activity recorded during static monitoring, activity surveys, and hibernation monitoring, suggested that bats were highly active in and around the Woodbank woodland and it is likely therefore that bats will be utilising tree roosts in this part of the Site. The existing woodland habitats comprising the Site are generally unlit, and the Woodbank woodland is currently a considerable distance from any background disturbance. Therefore, trees needing further survey will not only include those directly impacted (through removal), but also those at risk from disturbance during the construction and operational phases, due to the changes that will occur as a result of the Development such as fragmentation of dark corridors through introduction of lighting, and noise disturbance from visitors.

9.108 Based on the above, for the purposes of the EcIA, and in the absence of any further survey data from aerial inspections, it should be assumed that the Development will have both direct and indirect impacts on tree roosts.

Reducing the number of trees to be impacted

9.109 It is understood that the Development will aim to design out direct impact on trees as far as is practicable.

9.110 Compensatory planting has already been incorporated into the design at Woodbank House. However, many of the trees that could be impacted within the woodland there were of a considerable height, and integral to the character of the ancient woodland and its biological functioning. Compensatory planting will take many years to provide comparable habitat and would not offer the types of features for bats that are presented by the existing mature trees. Therefore, it is recommended that options are explored in detailed design as to how the number of mature trees needing to be removed can be minimised.

Requirements for further survey

9.111 No physical evidence of roosting bats was found within any of the trees. However, the survey was not carried out during the bat active period, and roosting is rarely confirmed from ground level.

9.112 At present, at least 87 trees would require aerial inspection, which would be time-consuming and impractical. The assumption therefore is that the detailed design phase will aim to design out impacts on the trees identified as having bat roost suitability, because normal protocol is that works affecting trees identified as having low, moderate or high bat roosting suitability **should be avoided wherever possible**. However, if the design considerations described above cannot wholly discount potential effects on trees, then further survey will be necessary.

9.113 Where it is not practical to avoid impacts on PRFs in trees that have been classified as having high or moderate bat roosting suitability, works on these trees will require formal confirmation of their bat roosting status. The PRFs will need to be inspected at-height and endoscopically by an appropriately licensed bat worker (LBW). Where PRFs are located at-height, the checks will need to be carried out by an LBW who is also a qualified tree climber.

9.114 Formal surveys of these trees will confirm the presence or absence of roosting signs, and may result in the trees being downgraded to low suitability (if presence/absence is still not conclusive), or negligible suitability. If PRFs are still classed as having moderate or high suitability then this would require the features to be rechecked during the main bat active period (May-September). If roosting is confirmed, then a licence would be needed from NatureScot (see "Licensing" below).

9.115 Trees with low bat roosting suitability could be soft-felled and checked on the ground by a licensed bat worker. However, as aerial inspections will be required for all of the trees with moderate suitability, it is recommended that these low suitability features are simply included in the at-height work. It is then possible that the low suitability features can be downgraded to a negligible rating, and that full felling can take place without further restrictions.

Licensing

9.116 If further survey work identifies the presence of a bat roost in trees which are scheduled to be removed or indirectly impacted, it will be necessary to apply to NatureScot for a derogation licence, to allow the proposals to proceed legally. The licence will need to be supported by sufficient survey information recorded at an appropriate time of year, and details regarding proposed methods of working and mitigation, commensurate with the predicted impacts on the Site's bat population.

Foraging and commuting

9.117 The survey data collected throughout 2021 via static detectors, manual transects and activity surveys, showed that the Site was well-used by a range of bat species, the majority of which were soprano and common pipistrelles, along with BLE and *Myotis* sp.. Intense foraging behaviour by multiple bats was witnessed during manual transects along existing dark corridors in the Riverside and Pierhead areas of the Site. Static monitoring confirmed regular, high volume foraging activity across the Site, but particularly at the Boathouse area of the Site and at the Pierhead. Observations during activity surveys on buildings at Woodbank confirmed roosts within the buildings, as well as bats using the woodland edges and tree canopies for foraging and socialising.

9.118 It is considered likely that changes to artificial night lighting across the Site will introduce barriers for bats which currently use dark areas to move freely across the Site, unless a bat-friendly lighting strategy is incorporated into the design. This is particularly relevant to any lighting proposed along roads or walkways, as well as lighting linked to parking areas and new buildings. The lighting strategy should therefore accommodate the following recommendations:

- if night lighting is needed during construction, then tree canopies and watercourses/water edges must remain unlit;
- operational phase lighting will need to ensure that existing dark corridors are retained where possible;
- where lighting is required, this should be low level pillar lighting, directional and if possible, on timers. Light spill into woodland and tree canopies should be avoided entirely;
- where there is a requirement to light a larger area that may represent a significant barrier to commuting or foraging bats, higher wavelength lighting may be needed rather than standard white lights[36]. The BCT provides a range of information sources relating to bats and lighting[37] which should be consulted be the lighting designers.

[36] https://www.lighting.philips.com/main/support/connect/lighting-technology/integrations/light-sensitive-bats
[37] http://www.bats.org.uk/pages/bats_and_lighting.html

Lomond Banks

Building PRA Results

Site boundary

Bat roost suitability:

Low

Moderate

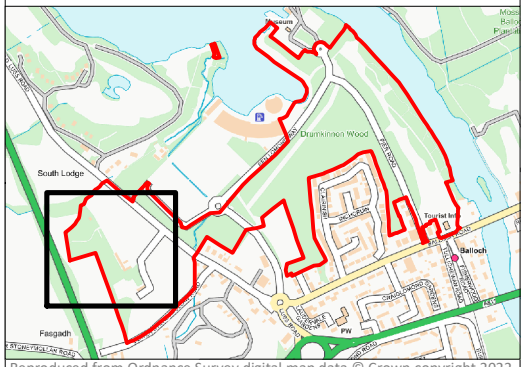

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Figure 9.1

Map Scale @ A4: 1:1,500

Surveyed by: AEL	
Survey date: May 2021	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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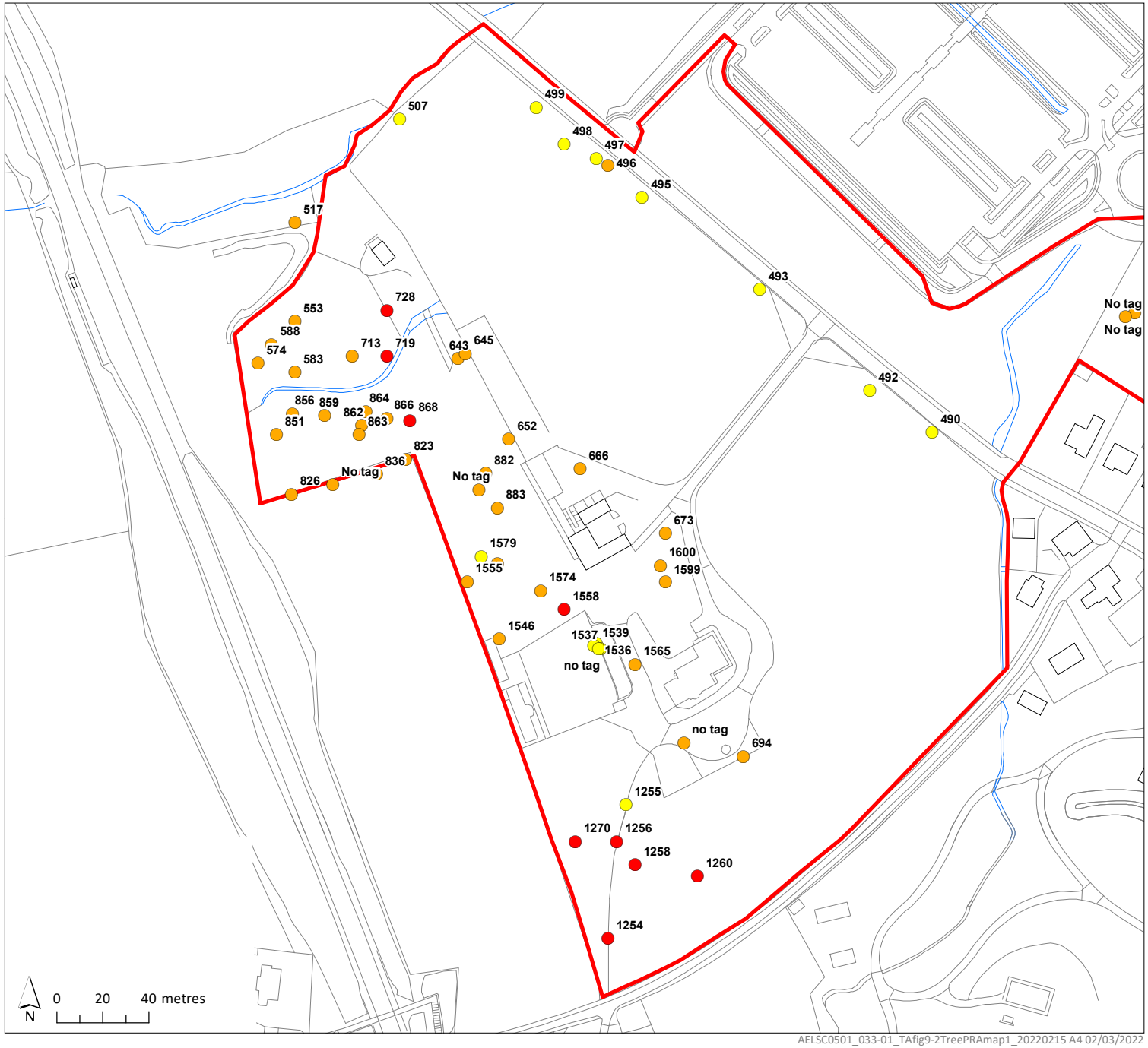

AELSC0501_033-01_TAfig9-2TreePRAmap1_20220215 A4 02/03/2022

Lomond Banks

Tree PRA Results - Map 1/4

Site boundary

Bat roost suitability:

- High
- Moderate
- Low

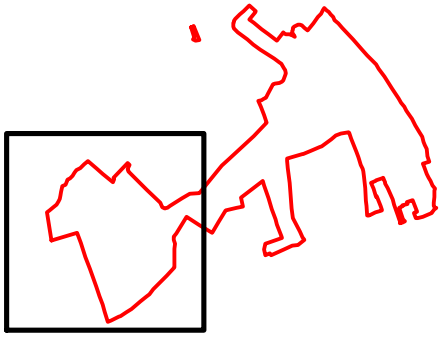

Figure 9.2

Map Scale @ A4: 1:2,500

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Survey date: January 2022	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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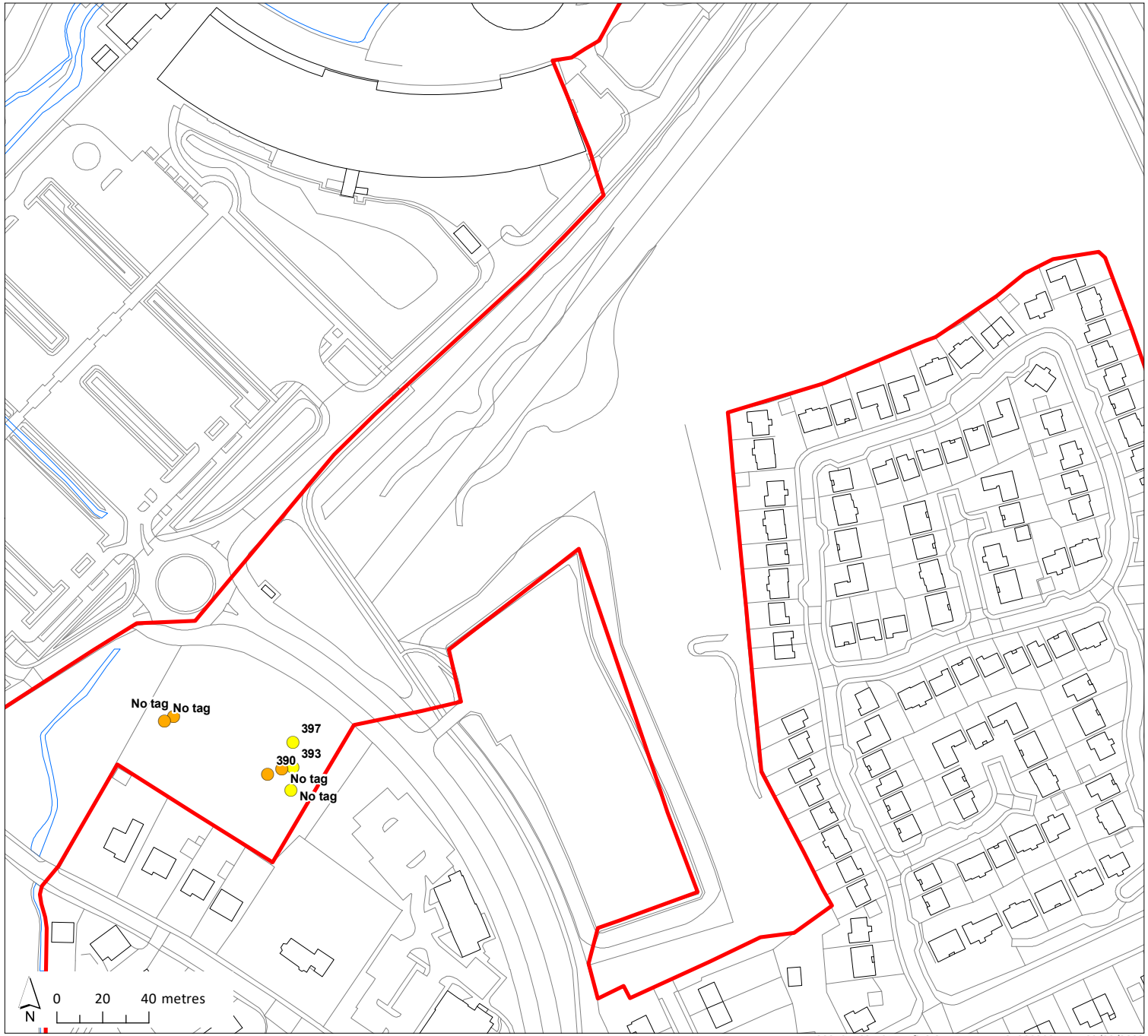

AELSC0501_034-01_TAfig9-3TreePRAmap2_20220215 A4 02/03/2022

Lomond Banks

Tree PRA Results - Map 2/4

Site boundary

Bat roost suitability:

- High
- Moderate
- Low

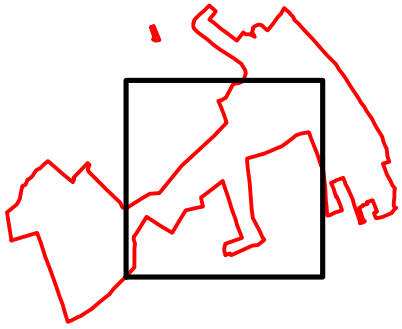

Figure 9.3

Map Scale @ A4: 1:2,500

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Survey date: January 2022	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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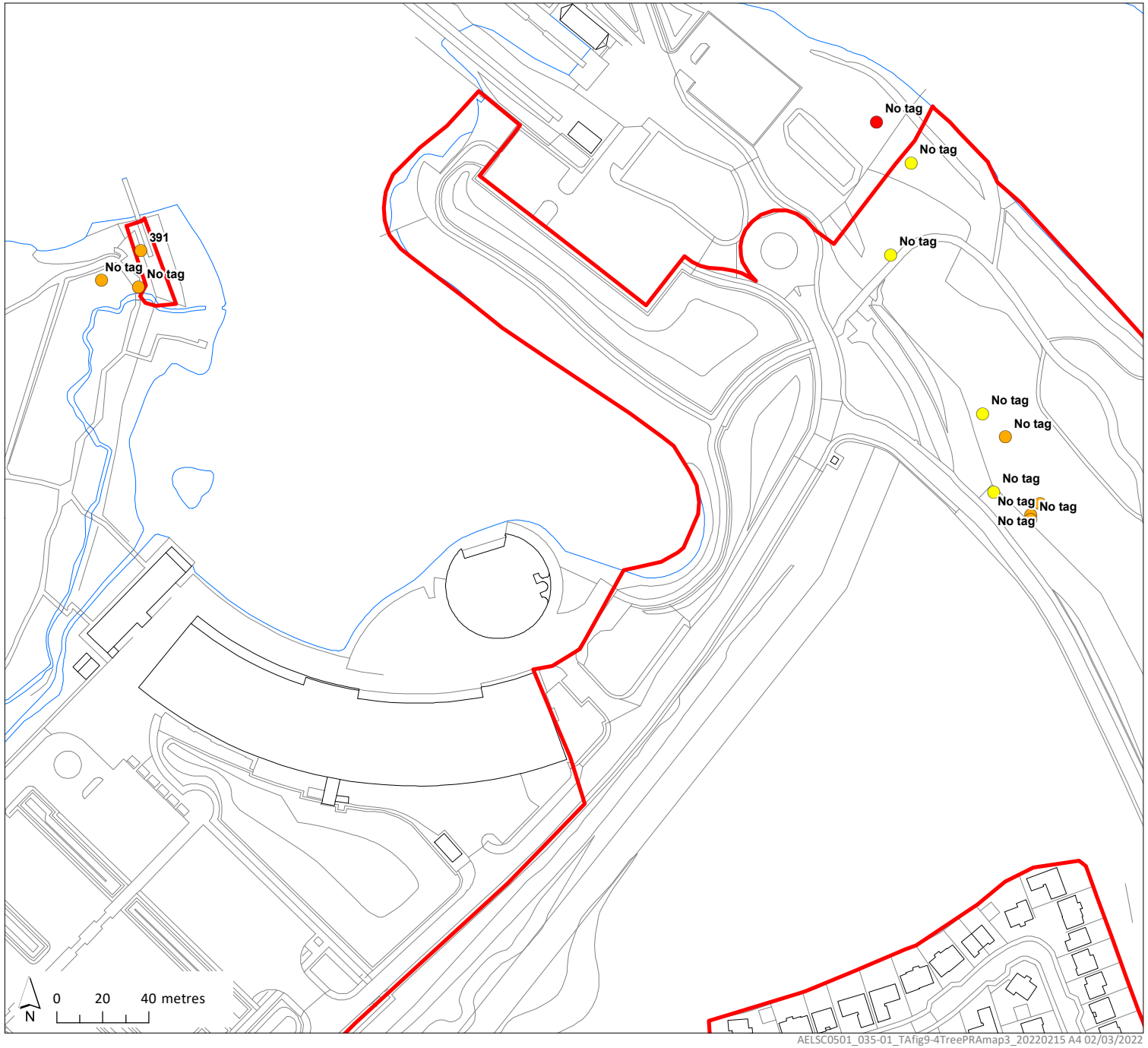

Lomond Banks

Tree PRA Results - Map 3/4

Site boundary

Bat roost suitability:

- High
- Moderate
- Low

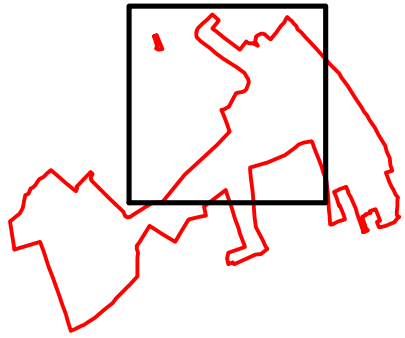

Figure 9.4

Map Scale @ A4: 1:2,500

Surveyed by: DS	
Survey date: January 2022	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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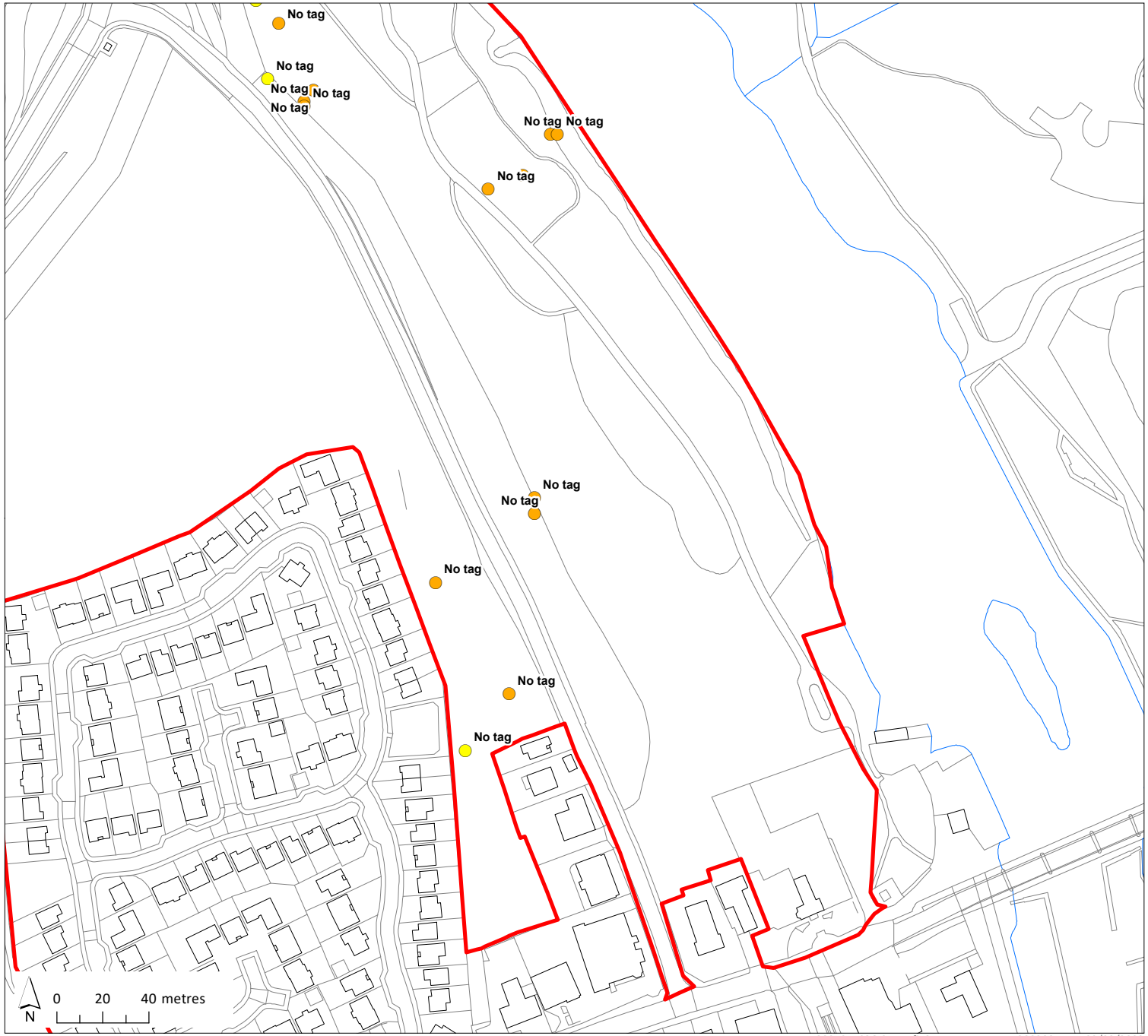
AELSC0501_035-01_TAfig9-4TreePRAmap3_20220215 A4 02/03/2022



Lomond Banks

Tree PRA Results - Map 4/4

Site boundary

Bat roost suitability:

- High
- Moderate
- Low

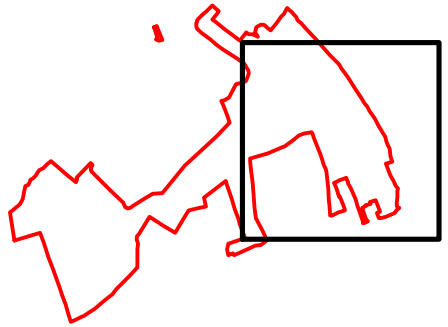


Figure 9.5

Map Scale @ A4: 1:2,500

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Survey date: January 2022	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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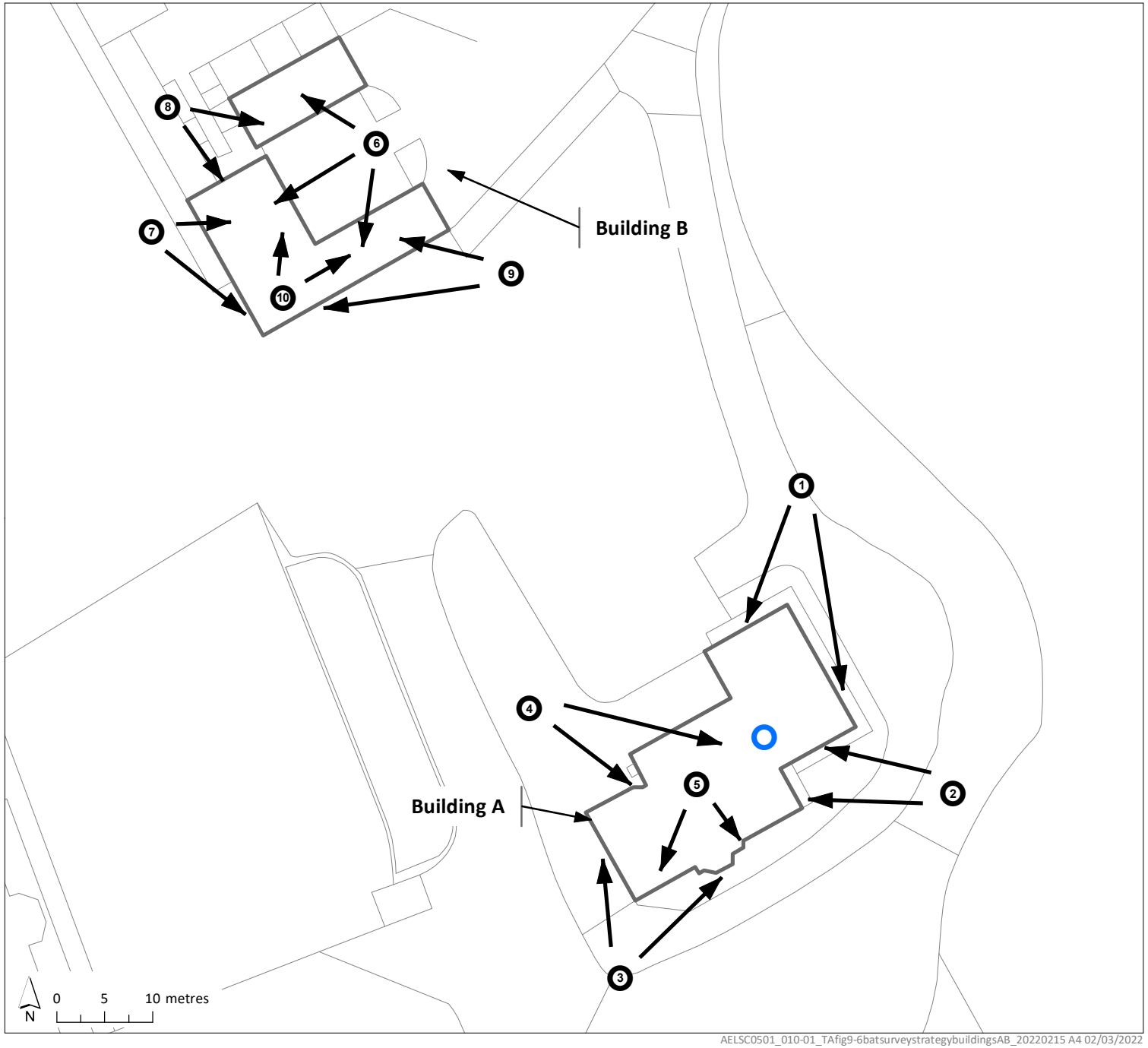
AELSC0501_036-01_TAfig9-5TreePRAmap4_20220215 A4 02/03/2022



Lomond Banks

Bat Activity Survey Strategy - Buildings A and B

Site boundary

Buildings surveyed

Surveyor position

IR camera position

Figure 9.6

Map Scale @ A4: 1:600

Surveyed by: AEL	
Survey date: July - September 2021	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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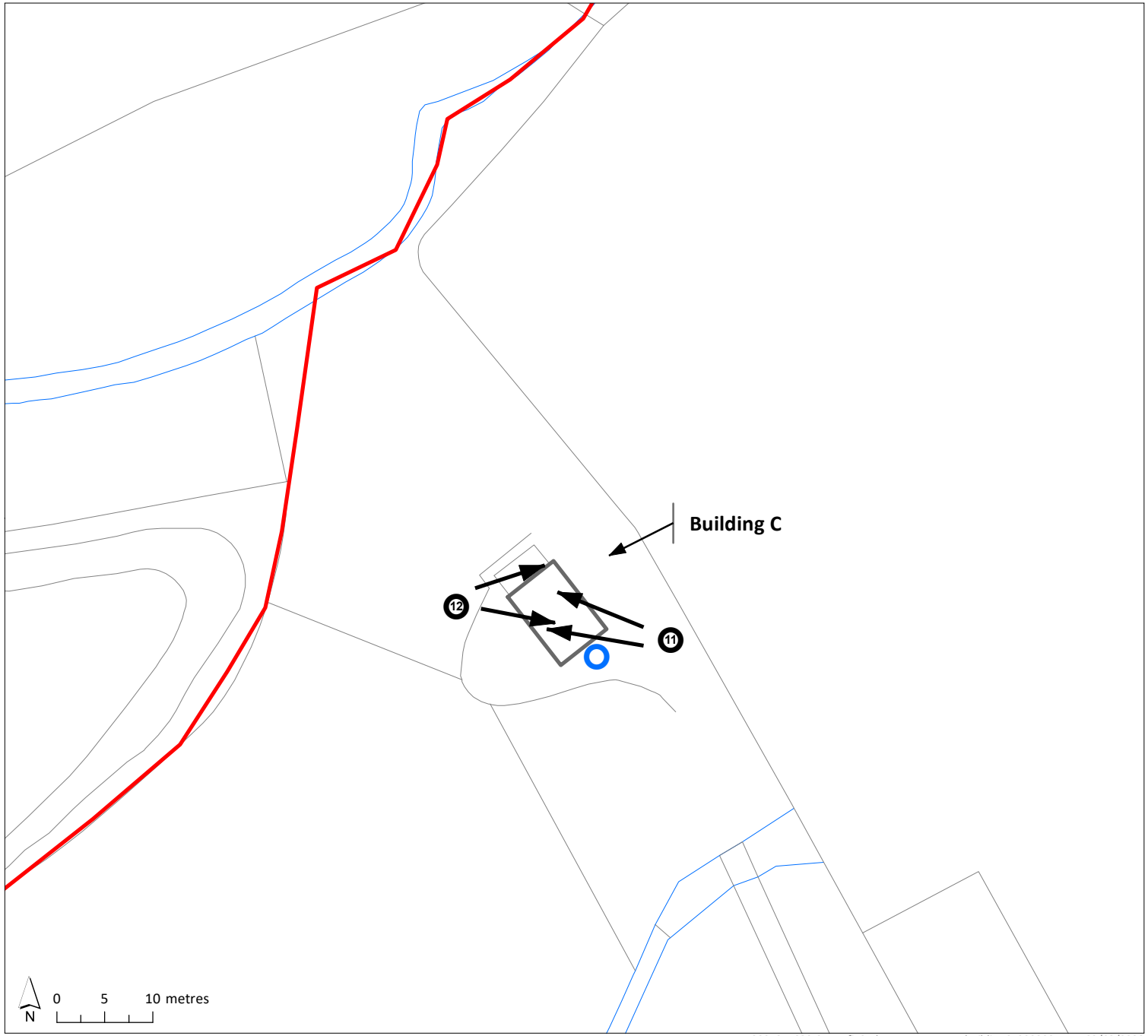
AELSC0501_010-01_TAfig9-6batsurveystrategybuildingsAB_20220215 A4 02/03/2022



AELSC0501_032-01_TAfig9-7batsurveystrategybuildingC_20220215 A4 02/03/2022

Lomond Banks

Bat Activity Survey Strategy - Building C

Site boundary

Buildings surveyed

Surveyor position

IR camera position

Figure 9.7

Map Scale @ A4: 1:600

Surveyed by: AEL	
Survey date: July 2021	
Drawn by: DS	
Checked by: RAH	
Status: Final	

Lomond Banks

Roost Locations

Site boundary

Buildings surveyed

Roost location

Figure 9.8

Map Scale @ A4: 1:600

Surveyed by: AEL	
Survey date: July - September 2021	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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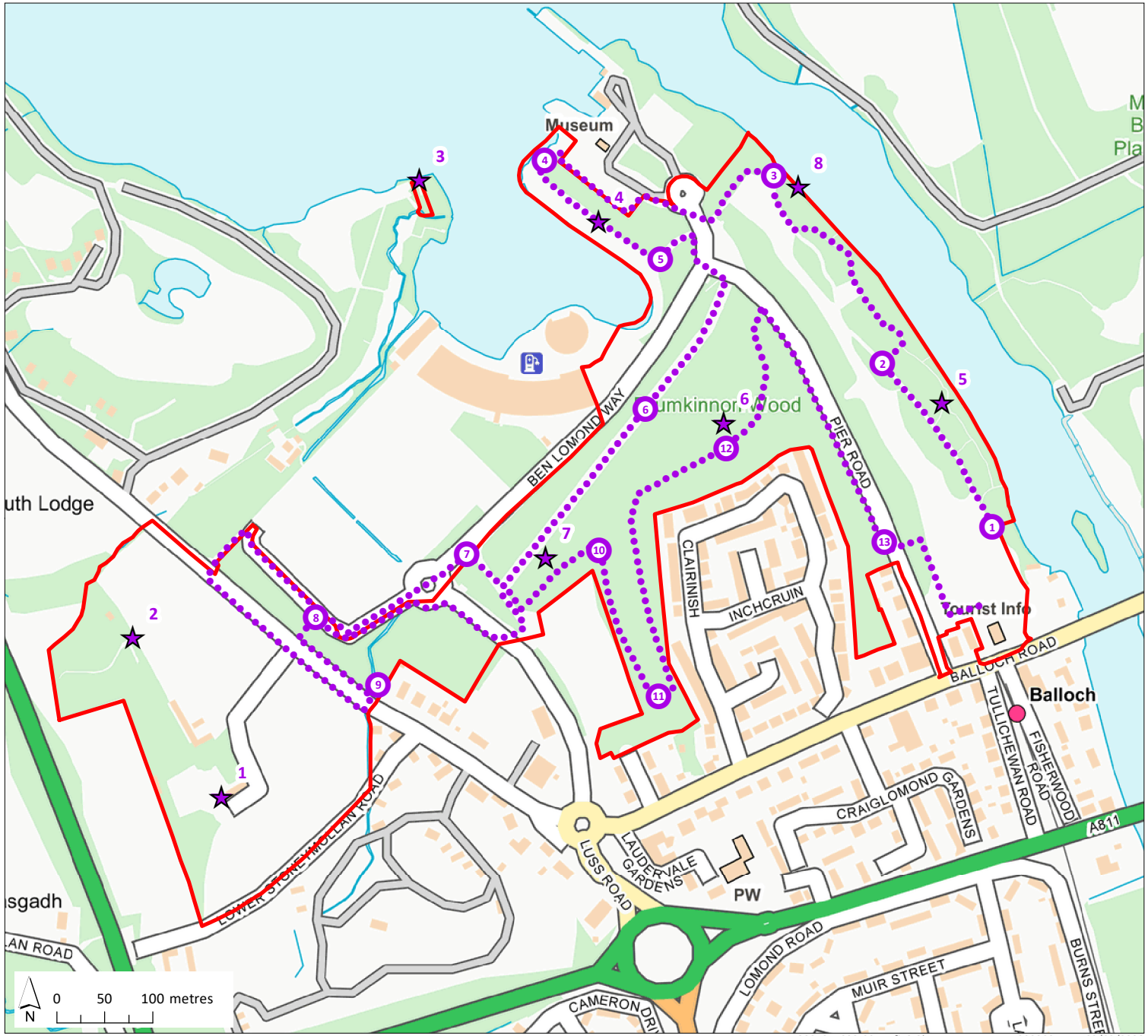
AELSC0501_017-01_TAfig9-8roostlocations_20220215 A4 02/03/2022



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AELSC0501_002-02_TAfig9-9batsurveystrategy_20220215 A4 02/03/2022

Lomond Banks

Bat Survey Strategy - Static Monitoring/Walked Transects

- Site boundary
- Bat transect
- Transect stopping points
- SM4 location

Figure 9.9

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: May - October 2021	
Drawn by: DS	
Checked by: RAH	
Status: Final	

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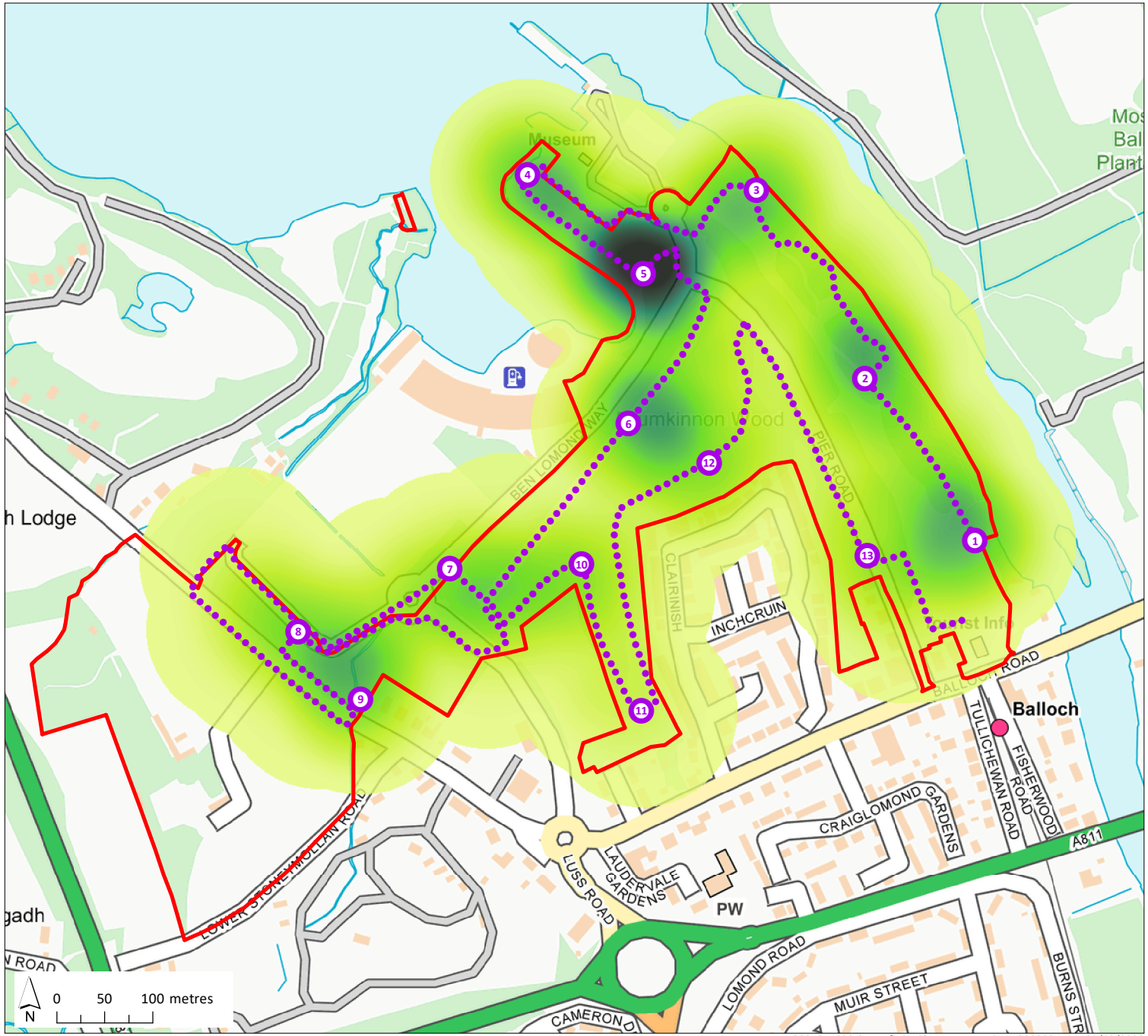

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AELSC0501_029-01_TAfig9-10battransectpoints_20220215 A4 02/03/2022

Lomond Banks

Key Areas of Bat Activity Recorded During Transect Surveys (May-October 2021)

- Site boundary
- Bat transect
- Transect stopping points

Number of bats recorded on transects:

High : 20

Low : 0

Figure 9.10

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: May - October 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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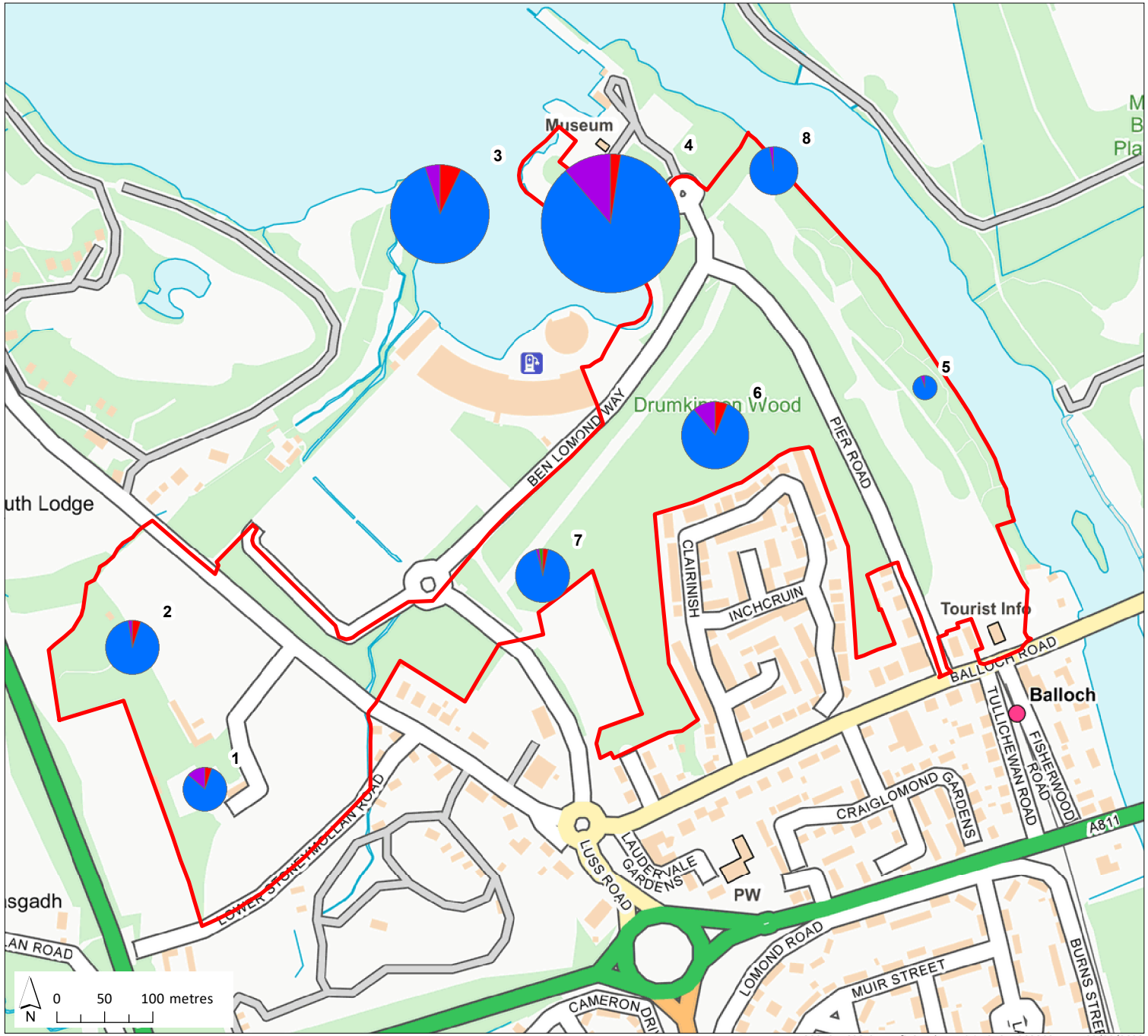

Lomond Banks

Static Detector Survey Results - May 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.11

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: May 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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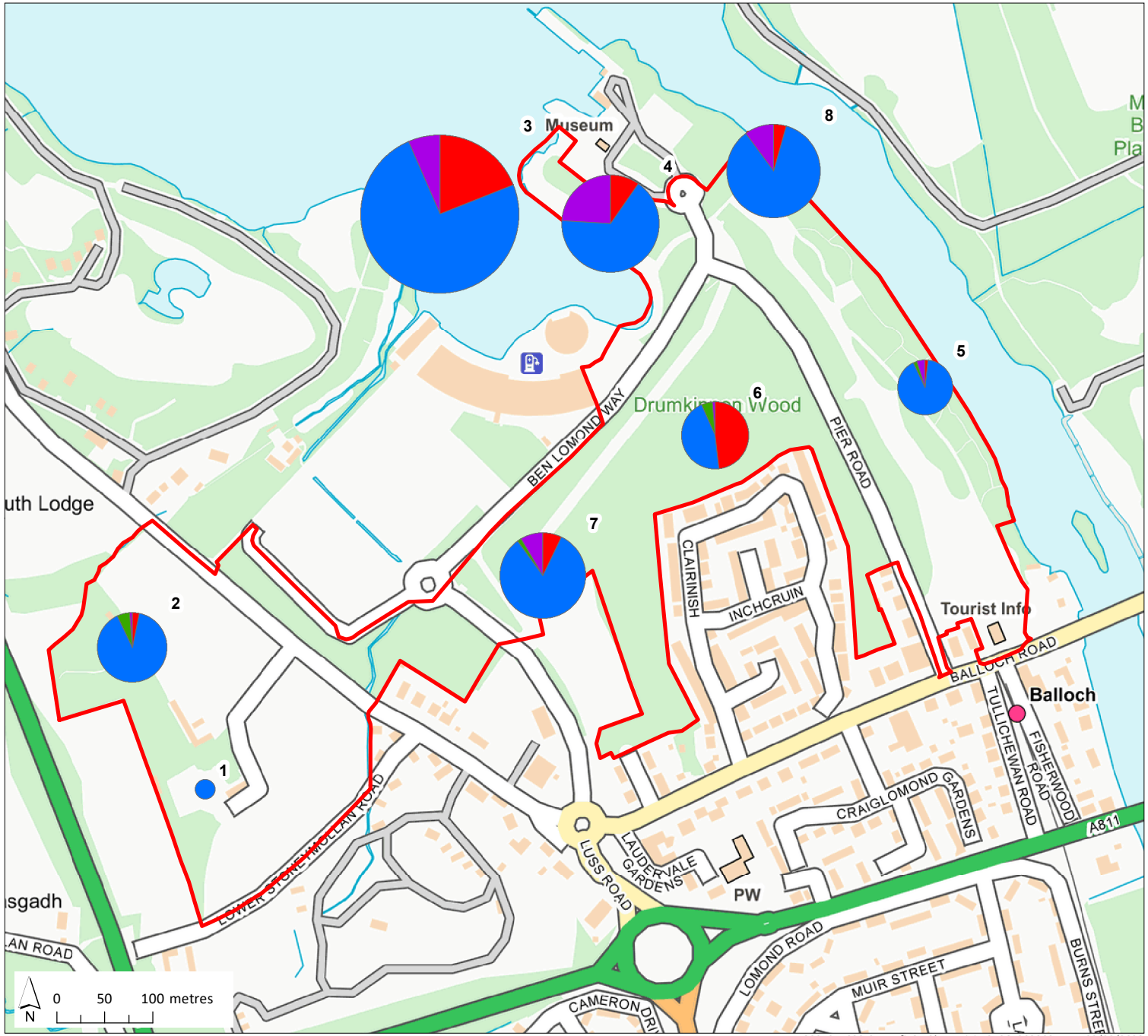

Lomond Banks

Static Detector Survey Results - June 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.12

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: June 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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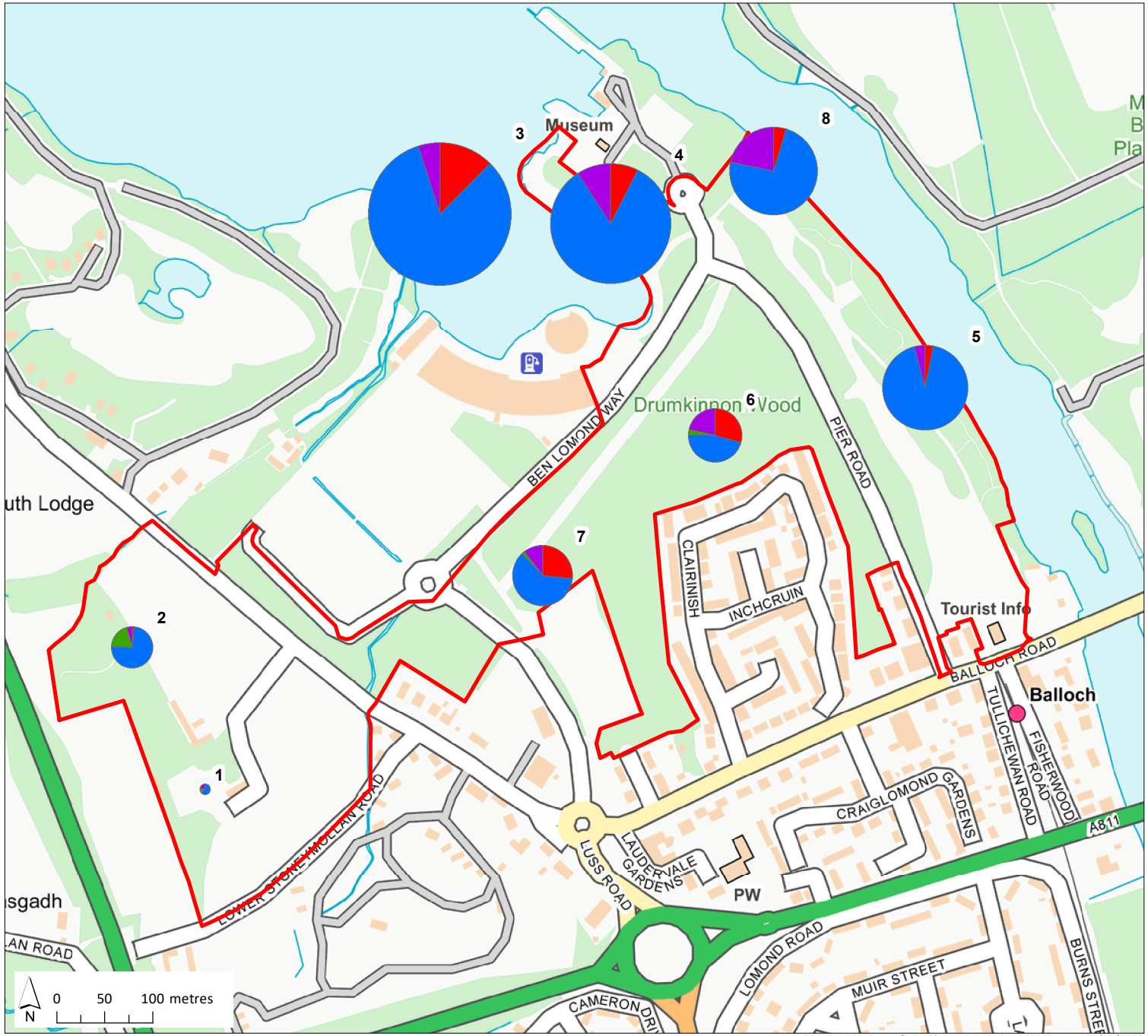
AELSC0501_023-01_TAfig9-12batactivity2106_20220215 A4 02/03/2022



Lomond Banks

Static Detector Survey Results - July 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.13

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: July 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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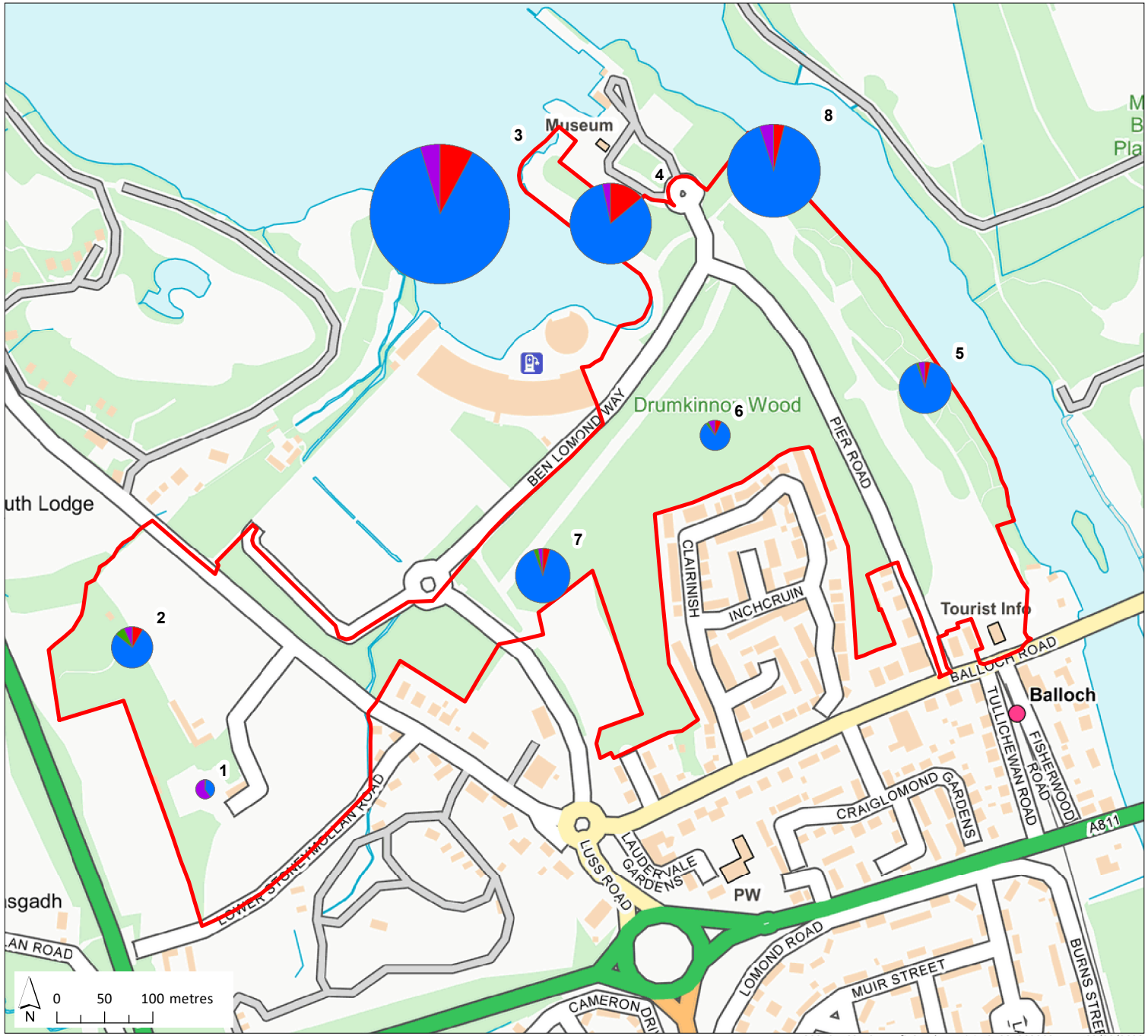

Lomond Banks

Static Detector Survey Results - August 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.14

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: August 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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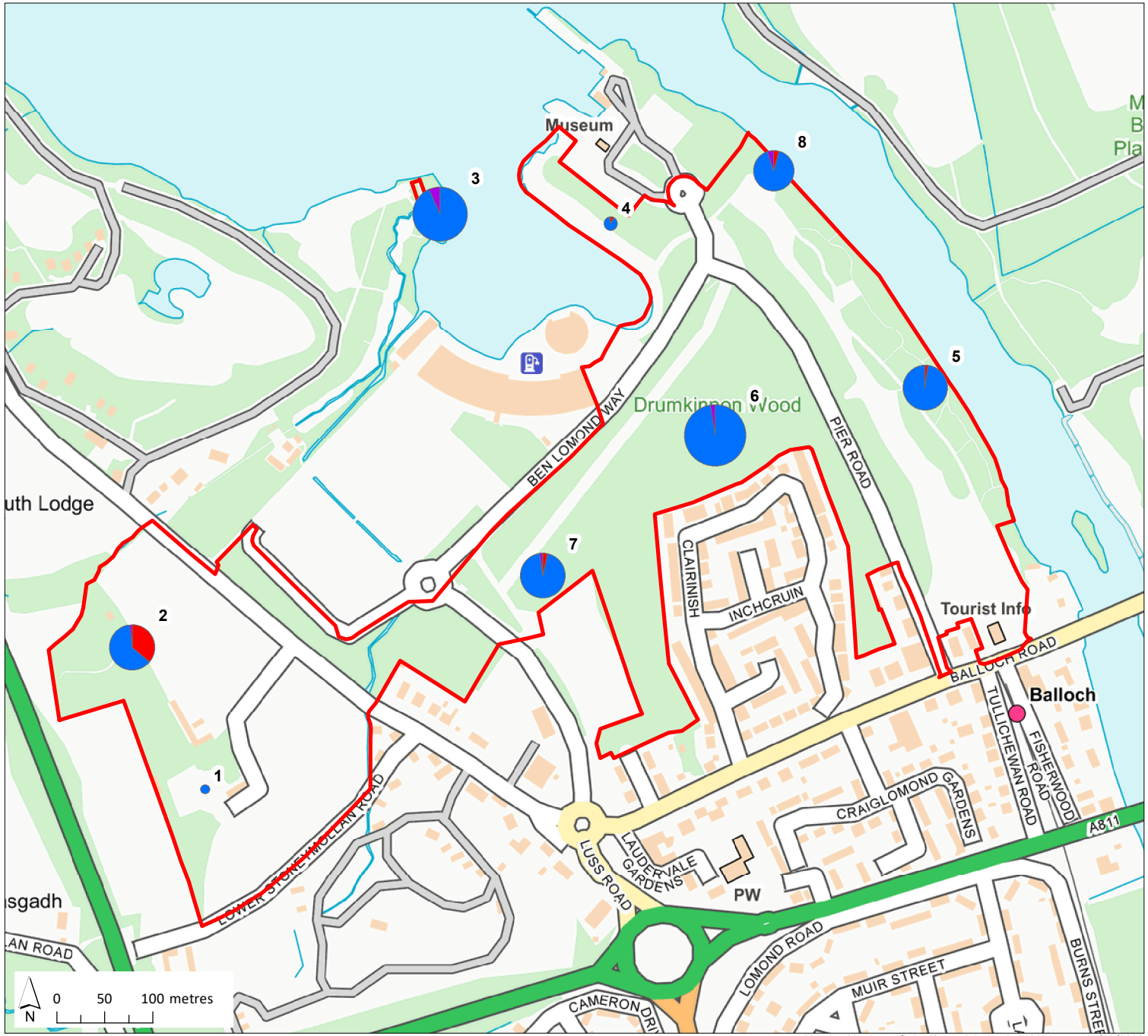

Lomond Banks

Static Detector Survey Results - October 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.16

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: October 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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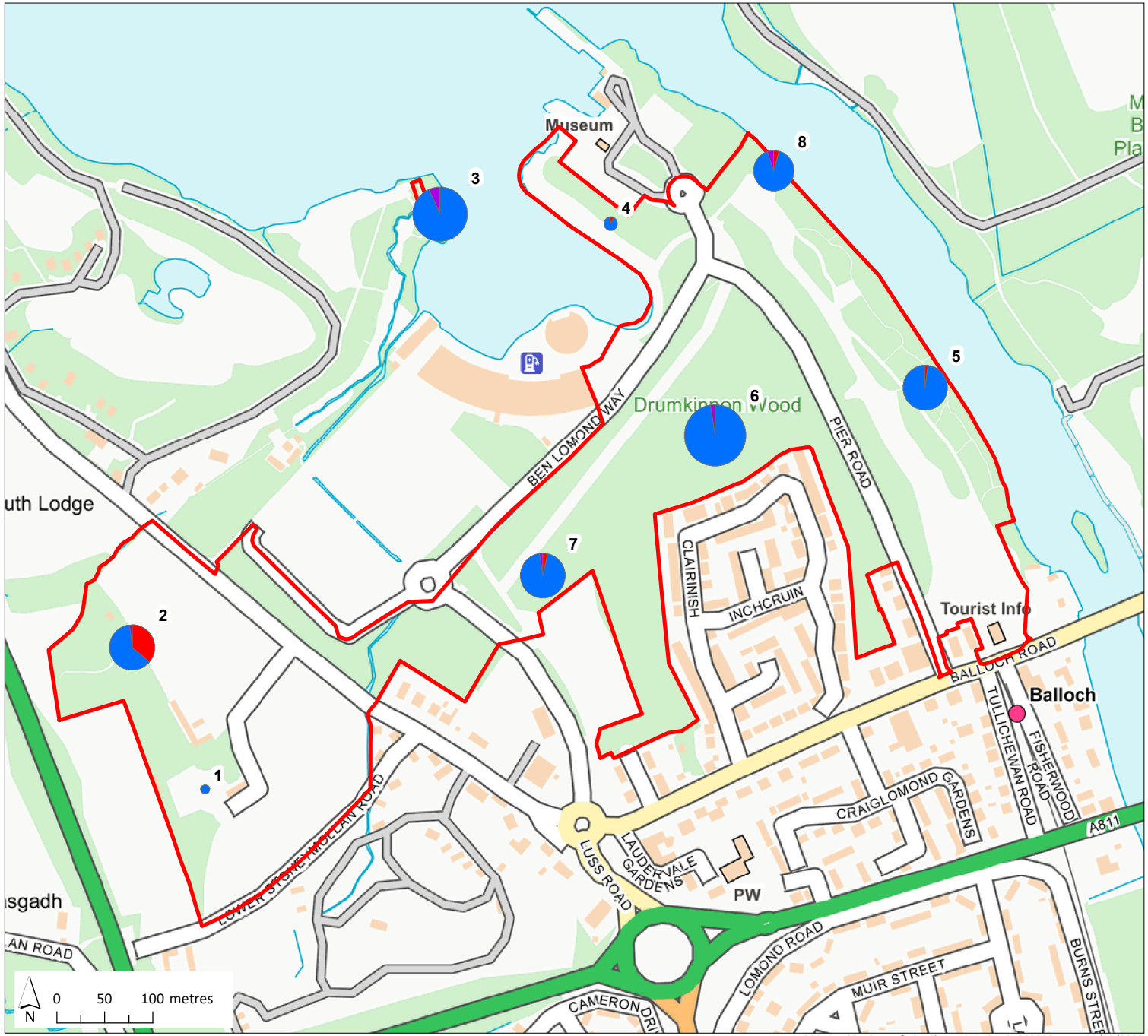

Lomond Banks

Static Detector Survey Results - October 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total of 210 ppn.

- Common pipistrelle
- Soprano pipistrelle
- Nathusius pipistrelle
- Pipistrelle sp.
- Brown long-eared
- Myotis sp.
- Nyctalus sp.

Figure 9.16

Map Scale @ A4: 1:6,000

Surveyed by: AEL	
Survey date: October 2021	
Drawn by: RAH	
Checked by: DS	
Status: Final	

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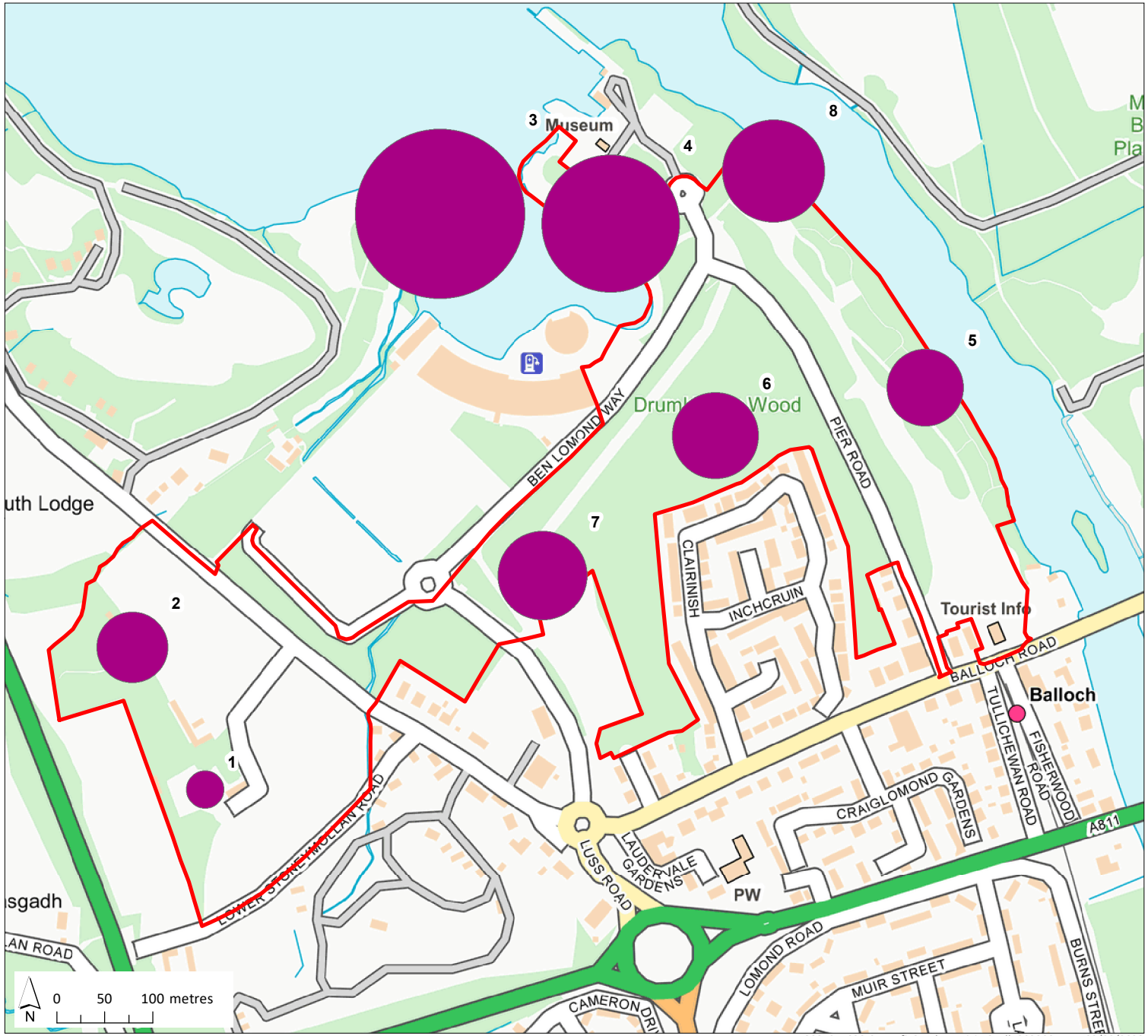

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AELSC0501_028-01_TAfig9-17batactivity21all_20220215 A4 02/03/2022

Lomond Banks

Static Detector Survey Results May-October 2021

Site boundary

Mean passes per night (ppn)

The radius of each disc shown on the map is proportional to the total ppn for all species in the displayed sampling session. The radius of the disc shown here in the legend represents a total average of 100 ppn over the season.

Figure 9.17

Map Scale @ A4: 1:6,000

Surveyed by:	AEL
Survey date:	May-October 2021
Drawn by:	RAH
Checked by:	DS
Status:	Final

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Figure 9.18: Summary categorisation of sampling nights for each species or species group, according to local levels of bat activity.

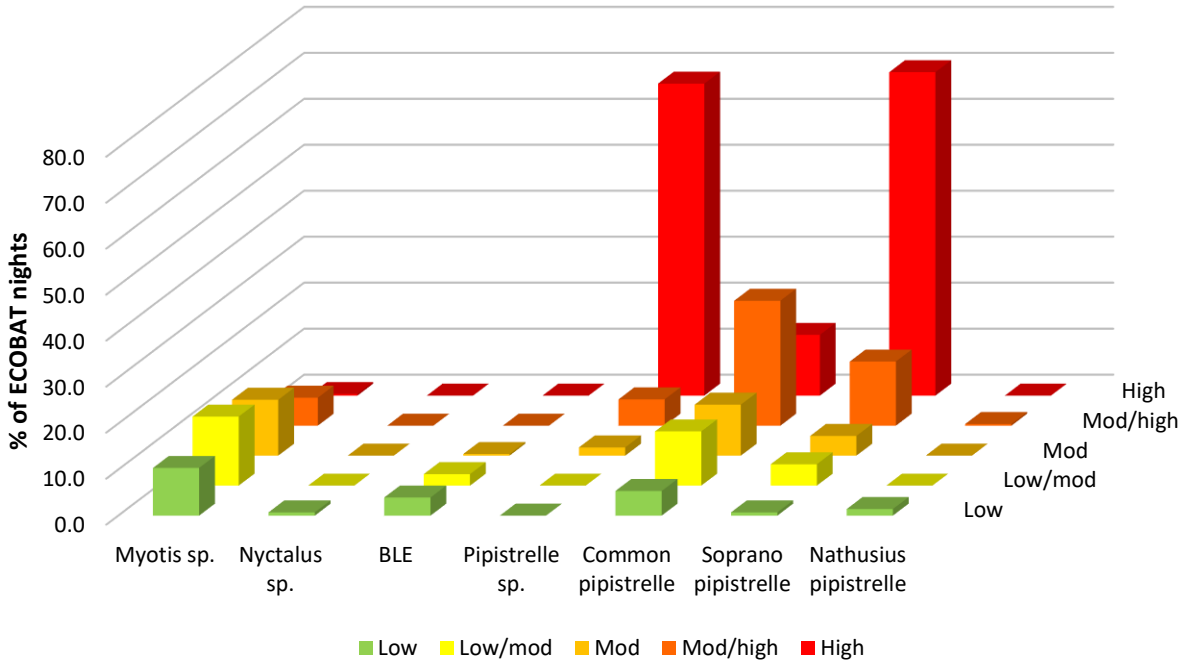

Figure 9.19: Summary categorisation of sampling nights at each sampling location, according to local levels of bat activity.