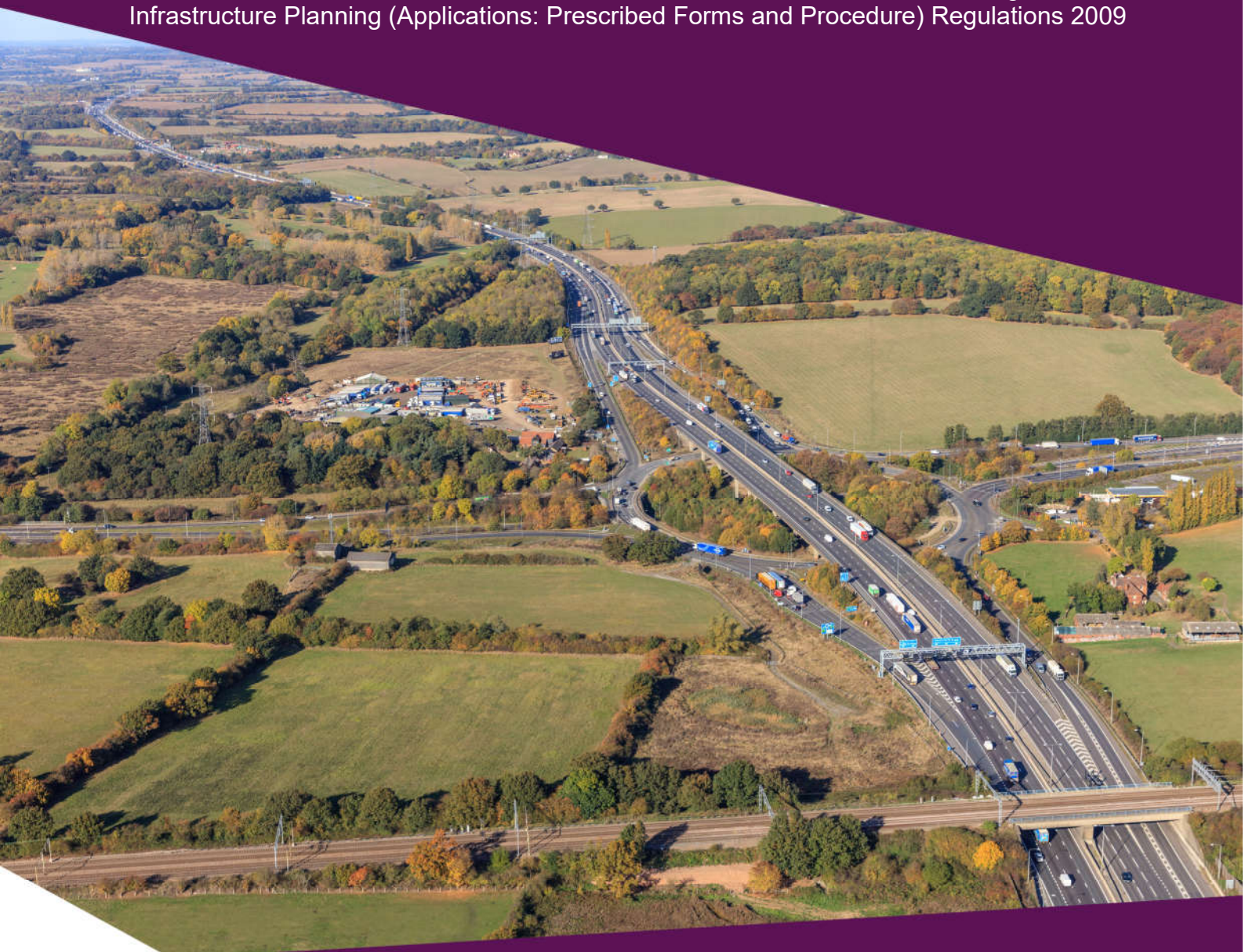
M25 junction 28 improvement scheme
TR010029
6.3 Environmental Statement
Appendix 7.12: Bat survey

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M25 junction 28 scheme
Development Consent Order 202[x]

6.3 ENVIRONMENTAL STATEMENT
7.12: BAT SURVEY

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Author:	M25 junction 28 improvement scheme project team, Highways England

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Appendix 7.12 Bat survey

Report

Bat Survey Report:
Junction 28 M25

Date: February 2020

Submitted to:

Atkins

Prepared by:

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Contents

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The information which ADAS has prepared and provided is true, and has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

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Revision History

Revision	Date	Amendment
[redacted]		

1 Introduction

1.1 Background and Survey Objectives

ADAS were commissioned by Atkins to undertake a suite of ecological surveys of an area of land adjacent to Junction 28 of the M25. The land is proposed to be re-developed as part of improvement works to the junction which Highways England will be undertaking. A range of surveys for bat species were undertaken of the survey area in 2017, March 2018 and 2019 and this report documents their findings. These surveys included ground level tree assessments for bat roosts, bat activity transects, installation of static detectors, emergence and re-entry surveys and climbing inspections of trees identified as having bat roost potential.

The objectives of this report are:

- *To identify the bat species utilising the site;*
- *To identify how bats utilise the site and any important areas for bat commuting and foraging;*
- *To make an ecological assessment of the value of the site for bats and the potential impact upon bats from development;*

1.2 Site Description

The land within the DCO boundary comprised c. 115ha and is located at Junction 28 (Grid reference: TQ 56759 92389), where the M25 links up to the A12, as shown in Figure 1 below. The Scheme is located within Greater London and Essex, Romford is to the west and Brentwood to the east.

The DCO Boundary contained two woodlands, Alder Wood and The Grove and intersected with the perimeter of the The Oaks woodland. A watercourse, Weald Brook, runs southwards, parallel with the M25 and along the western edge of Alder Wood and The Grove. Ingrebourne River runs parallel with the northern edge of the A12, joins Weald Brook, before culverting under the A12 (Grid reference: TQ 56456 92214), past Oak Farm and then westwards through Romford.

The survey area for bats focussed on the land within the DCO boundary subject to impacts during construction and operation of the Scheme. For this reason, survey was focused on the land which extends westwards from the M25 and north of the A12 where the new loop will be constructed and temporary construction works will take place. Outside of this area, there are temporary works associated with the gas main diversion south of the A12 (west of Junction 28). All other works within the DCO boundary are limited to the existing carriageway of the A12 and M25 (e.g. replacement of signs and existing gantries) and no potential impacts to bats were identified in these areas. The survey area incorporated Grove Farm, the eastern edge of Maylands Golf Club, and comprised a mosaic of habitats including woodlands, grasslands, ponds, hedgerows, scrub and a watercourse (Weald Brook). Connectivity across the M25 and

A12 was limited to the watercourses, which are culverted under the roads. The survey area also includes a block of trees around the Ingrebourne River east of Junction 28 where works were proposed but are now excluded from the Scheme.

Grove Farm was an active working site, comprising large sheds, storage containers and heavy machinery. A residential detached building with an associated garden was located to the north west of Junction 28. A large population of c.120 fallow deer (*Dama dama*) roamed the survey area and as a result the habitats were heavily grazed.

The wider area comprised a mix of agricultural land, residential, watercourses and pockets of deciduous woodland.

Figure 1. DCO boundary (indicated by red line boundary)

ADAS general mapping tool (2019)

2 Methodology

Surveyor competencies are provided in Annex 3.

2.1 Desk Study

Biological records for the DCO boundary were obtained from Greenspace Information for Greater London, Essex Wildlife Trust and Essex Field Club and Essex Bat Group in 2017 and updated in September 2019 to identify any bat species recorded within 2 km of the DCO boundary.

2.2 Preliminary Roost Assessment of Buildings – External Survey

An external inspection of all accessible buildings within the survey area was undertaken in July 2017 led by Surveyor 2 (Bat licence 2017-31685-CLS-CLS). Binoculars were used where appropriate to do so, however most external inspections were carried out visually, unaided by torches, binoculars and ladders.

Each building unit was given a bat potential rating of either high, medium, low or negligible based on the requirements in the Bat Conservation Trust Guidelines (Collins 2016). This scale of potential is detailed in the table below (Table 2). Ratings are subject to change once the buildings have been vacated and closer inspection including further external and full internal inspection or emergence survey is conducted.

Table 2: Building bat roost potential adapted from 'Bat Surveys for Professional Ecologists Good Practice Guidelines' (Collins 2016).

Potential	Site features	Survey requirements
High	A structure with one or more potential roost sites that that are obviously suitable for use by larger number of bats on a regular basis and potentially for longer periods of time due to their size, shelter, protection, appropriate conditions and/or suitable surrounding habitat.	3 separate surveys, at least one dusk and a separate dawn visit dawn. The third survey can be either dusk or dawn. Surveys should be separated by at least two weeks.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, appropriate conditions and/or suitable surrounding habitat but unlikely to support a roost of high conservation status.	2 surveys, dusk and a dawn. Surveys should be spaced at least 2 weeks apart.
Low	A structure with one or more potential roost sites that could be used opportunistically. However these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by a large number of bats.	1 survey either dusk or dawn.

2.3 Ground Level Tree Assessment

Trees within the Survey area were assessed for bat roosting potential led by Surveyor 2 on the 1st August 2017 and 21st of March 2018 by Surveyor 2 . Due to changes in the DCO boundary, initial GLTAs were also

carried out during updated Phase 1 surveys in 2019 to identify any additional trees requiring GLTA. Trees were inspected from ground level, using binoculars and torches where appropriate, to look for gaps, cracks, splits or woodpecker holes that could potentially be used by roosting bats. Evidence for roosting bats, including scratches, straining, droppings, fur etc. were also observed for. All identifiable features on trees with the potential to support roosting bats were catalogued and photographed, and inspected if possible. Photographs are present in Annex 1.

Each tree was assigned a bat roost category according to the scoring system shown in 'Bat Surveys for Professional Ecologists Good Practice Guidelines' (Collins 2016). Explanations of the tree classification categories stated above can be seen in Table 3 below.

Table 3: Categorisation of roost suitability.

Tree Category	Description
High	A tree with one or more potential roost sites that that are obviously suitable for use by larger number of bats on a regular basis and potentially for longer periods of time due to their size, shelter, protection, appropriate conditions and/or suitable surrounding habitat.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, appropriate conditions and/or suitable surrounding habitat but unlikely to support a roost of high conservation status.
Low	A tree of sufficient size or age to provide potential roost features but with none seen from the ground or features seen with only very limited roosting potential.
Negligible	Trees with no potential to support bats.

2.4 Emergence/re-entry Surveys of Buildings

The survey methodology followed that set out by the Bat Conservation Trust (Collins, 2016) with two surveys required for buildings of moderate suitability. Buildings 1 and 2 (moderate suitability) had emergence re-entry surveys in 2017, and Building 3 (low suitability) had a single emergence survey in 2019. The surveys focussed on the external features identified as having potential for roosting bats, with three experienced surveyors positioned at strategic locations to provide adequate coverage of the building. The location of surveyors for all of the surveys are shown on the figure in Annex 2.

Surveyors were equipped with suitable professional bat detectors. During the surveys, two Wildlife Acoustics EM3+ detectors and one Wildlife Acoustics EM Touch detector were utilised.

Bat sightings and behaviours were recorded, along with time, species and whether they emerged from or returned to the buildings. The dusk surveys began 15 minutes before dusk and ended 1.5 hrs after dusk. The dawn surveys commenced 1.5 hours before dawn and finished 15 minutes after. The table below provides details of all the surveys undertaken. Information on the surveyors experience is provided in Annex 3.

In 2019 an additional emergence survey took place of Building 3 with the same methodology as the 2017 surveys. Two EM Touch detectors and a bat logger were used for this survey.

Table 4: Emergence/re-entry surveys.

Building number	Date and Time of Survey	Lead Surveyor (see Annex 3)	Weather Conditions
1&2	28.06.17 (21:05 – 22:50)	Surveyor 1 (Bat licence: 2015-11814-CLA-CLS)	14^{0}C, slight breeze, no rain
1&2	08.08.17 (04:03 – 05:48)	Surveyor 2	15^{0}C, slight breeze, no rain
3	22.08.19 (19:52 - 21:37)	Surveyor 3 (2018-38185-CLS-CLS)	22^{0}C, still, no rain.

2.5 Activity Transects

Six bat activity transect surveys were conducted across the survey area in 2017. Best Practice Survey Guidelines (Collins 2016) recommend that monthly activity surveys were conducted of a site with moderate suitability for bat species. These transects were led by Surveyor 2 using Echo Meter 3+ bat detector and Echo Meter Touch bat detector. The transect route is presented in Annex 4.

Surveyors walked the pre-determined transect route around the survey area. The route was designed to incorporate and represent all areas of the survey area and each of the habitats identified. The route included 16 static positions; c. 5 minutes was spent at each static position before moving on to the next position. Two static detectors were also put out each month at different points around the survey area and left to record monitor activity for at least five days. The locations of the static detectors are shown in Annex 5. Bat calls were noted in the field and recorded onto a memory card (EM3+ detector). Sonograms of bat calls were subsequently analysed using Analook software. Each call was tagged with the appropriate species for the entire survey data. A five minute label count of the data was then analysed in excel. It is recognised that the frequency of calls do not equal number of bats, as it may indicate the same bat foraging within the same area. Dusk transects began at sunset or soon after and lasted approximately 2 hours.

Habitats in the survey area did not change between 2017 and 2019 and repeated transect surveys over the season were not considered necessary. However, repeated static detector surveys were proposed to

in order to verify and update list of bat species using the survey area. Static detector surveys took place between August and October 2019. Due to land access restrictions (see limitations, section 2.7) static bat detectors could not be deployed earlier in the bat activity season and the deployment locations were restricted to certain locations.

The weather conditions for the activity transects are shown in Table 4 below.

Table 5: 2017 Activity transects weather conditions.

Date	Sunset / Sunrise Time	Start Temperature	Wind (Beaufort)	Rain
25.05.17	21.00	16^{0}C	2	No
21/22.06.17	21:20/04:41	14^{0}C	1	No
26.7.17	21.00	19^{0}C	2	No
24.8.17	20.03	19^{0}C	0	No
27.9.17	18.46	16^{0}C	0	No
26.10.17	17:52	9^{0}C	1	Light rain at the start

2.6 Climbing Inspections

The ground level tree assessments (GLTA) identified that 51 trees required a climbed tree inspection for bat roosts (following guidelines set out by the Bat Conservation Trust (Collins 2016)). Climbing inspections were led by Surveyor 6 (Accredited under bat licence 2015-12855-CLS-CLS) in August 2017, Surveyor 2 (Class 1 bat licence 2017-31685-CLS-CLS) and Surveyor 4 (Class 4 bat licence 2015-11968-CLS-CLS) in March 2018 and Surveyor 4 in October/November 2019. Where possible each tree was climbed and inspected using an endoscope and a high powered LED torch. Signs of bats were searched for and recorded. These signs included:

- *droppings;*
- *urine staining;*
- *dead bats; and*
- *scratches and oily deposits on feature entrances.*

The 2017 and 2018 GLTA and climbing inspections were used to inform the further survey requirements in 2019. Due to many of the trees identified being situated in woodland habitats it was decided that repeated climbing inspections would provide a higher level of confidence in the presence or absence of

roosting bats than emergence/ re-entry surveys[1]. Thus, the methods were adapted to increase confidence in the survey results.

It was proposed that trees with moderate or high potential for roosting bats would be climbed multiple times throughout the bat activity season (between July and September 2019). Trees with high potential would be visited three times and trees with moderate potential would be visited twice. Trees identified to have low potential in 2017 and 2018 would have no further surveys (as per Collins 2016). For trees that were are unsafe to climb, emergence/ re-entry surveys were proposed.

Due to access restrictions within the survey area (see limitations, section 2.7), it was not possible to complete the surveys as planned. Access was not possible until October 2019. A single climbing inspection of moderate and high potential trees was carried out in October and November 2019. A total of 46 trees were surveyed in 2019, 34 of which were trees identified with moderate and high roosting potential in 2017 and 2018, and 12 were new trees that had developed roosting features since the 2017 and 2018 surveys.. No emergence re-entry surveys of trees took place in 2019, due to the lateness in the season that safe access was possible to the survey area.

2.7 Limitations

In 2019, access to the survey area was restricted for health and safety reasons (shooting activity around woodland and grassland areas). This prevented access to the majority of the survey area until October 2019. Tree climbing surveys proposed in the activity season for 2019 were delayed until October/November 2019, outside of the core activity season. Four trees that had been identified in the GLTA as having potential roosting features were not considered safe to climb, these were trees: 17, 32, 35, 53. Emergence/return surveys of trees which were unsafe to climb were not possible in 2019 due to the timing of access outside of the core activity season.

Access restrictions also affected the 2019 static detector surveys. Static detectors could only be placed in areas considered to be safe between August and October 2019. The data that did come back from September was very limited, with a small number of overall recordings, which were all ambient noise, with no bats recorded. Taking into account the calls recorded in August and October, it is expected that an equipment software error occurred.

There were equipment issues with the static detectors in 2017. No data was recorded in May 2017, one static failed in June and July 2017 and the July 2017 static that did return data was very limited when compared to other months in the same location. It is expected that noise from the M25/A12 and heavy rain may have affected the results.

[1] The Bat Conservation Trust survey guidelines (Collins, 2016) recognise that emergence/ re-entry surveys for trees are unlikely to give confidence in a negative result.

Recorded calls of brown long-eared and grey long-eared bats are difficult to distinguish during data analysis unless high quality calls are recorded (e.g. where the bat passes within 5 m a few metres of the detector)[2]. Taking into account the geographical location of the Scheme and the rarity and known distribution of grey long-eared bats, all long-eared calls recorded during surveys are assumed to be calls of brown long-eared bats.

Certain bat species echolocate louder than others, for example, brown long-eared bats are particularly quiet. This has the potential to distort the data in relation to the proportions of different species present, due to the detectors picking up species such as pipistrelle from a greater range than brown long-eared.

The emergence survey of Building 3 in 2019 was potentially limited by the presence of security lighting from the house that was being surveyed. This lighting however, being a permanent feature of the house, affects the suitability of the house for roosting bats.

The surveys have taken place over multiple years. The overall condition and suitability of the survey area for bats is not considered to have changed during this time (see section 4 'conclusion').

3 Results

3.1 Desk Study

Records centres provided records of Noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus)* and common pipistrelle (*Pipistrellus pipistrellus*) within 1.2km of the DCO boundary. Lesser noctule (*Nyctalus leisleri*), Natterer's (*Myotis nattereri*) and brown long-eared (*Plecotus auritus*) records were returned from within 1.7km of the DCO boundary. Serotine (*Eptesicus serotinus*), Daubentons (*Myotis daubentonii*), Nathusius' pipistrelle (*Pipistrellus nathusii*) records were returned from within 2km of the DCO boundary.

Data received from Essex Bat Group included information about surveys carried out between 2010 and 2016 in and around Weald Country Park north east of the Scheme found that all 10 species of bat known to be resident in Essex were present. These species were; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared, noctule, Leisler's, serotine, Daubenton's Natterer's and barbastelle (*Barbastella barbastellus*).

These bats were recorded between 0.85km and 2km from the DCO boundary.

Furthermore the Essex bat group discovered six bat roosts between 0.9km and 1.5km from the DCO boundary. These were recorded between 2010 and 2017.

[2] Russ, J. (2012). British Bat Calls A Guide to Species Identification

MAGIC returned two record of European Protected Species Mitigation (EPSM) licences within 2km of the DCO boundary:

1. EPSM2012-4100 (Common pipistrelle) – 09/02/2012 to 01/03/2014 – c. 1km west.
2. 2015-9990-EPS-MIT (Common pipistrelle and brown long-eared) – 18/05/2015 to 31/07/2016 – c. 1.5km east.

No statutory sites designated for bats were located within 10km of the DCO boundary. No Special Areas of Conservation listing bats as a qualifying species are present within 30km of the DCO boundary.

3.2 Preliminary Building Roost Assessment – External Survey

There were 10 buildings on site identified as Building 1-10, the locations of which are shown in Annex 5. Building 1-3 were considered to provide features suitable for roosting bats.

Building 1 and 2 (Photograph 1) were adjoining timber barns with shiplap walls and a clay tiled roof. The interior appeared to be used for storage purposes although disturbance was considered to be minimal due to the absence of vehicles and machinery within the buildings. Although the roof exterior was in good condition, several holes within the shiplap boarding were identified on the northern side (Photograph 2). It was considered that the building may offer the potential to support bats and was therefore considered to hold moderate potential.

It was not possible to inspect Building 3 in detail during the 2017 surveys due to the property being located within a private residence. Access was granted in 2019. The building was a detached, two-storey property with a shiplap timber exterior and tiled roof. The building was not of modern construction and therefore wear to the exterior was present. As with Building 1, holes were present within the exterior timber which may offer potential access for bats. The building was within proximity to Junction 28, M25 which likely has a significant impact on foraging and commuting bats around the building due to noise. However, as it was not possible to ascertain the full extent of these holes and it was considered that a loft void was present, the building was considered to hold moderate potential for roosting bats. This was later downgraded to low during the bat emergence survey due to the extensive amount of permanent security lighting around the building.

Buildings 4-9 were large steel framed constructions subject with large open fronted entrances (Photograph 3-7). The interior lacked a wooden framed structure, typically needed to support roosting bats. All buildings were heavily disturbed due to the working nature of the site and all buildings had high powered external lighting. No features with the potential to support roosting bats were identified and therefore the buildings were considered to hold negligible potential.

Building 10 was an electrical substation (Photograph 8). No external features of note were identified externally and the building was therefore considered to hold negligible potential to support roosting bats.

3.3 GLTA and Climbing Inspection

3.3.1 2017 and 2018 Inspections

The survey area comprised a large number of trees many of which are contained in areas of semi-natural broad-leaved woodland. The majority of trees within the survey area were considered to hold either low or negligible potential. Due to the number of trees present within the survey area, negligible trees are not numbered unless they were initially categorised as low, moderate or high potential in GLTA surveys, and subsequently changed to negligible on closer inspection.

Current guidance set out by the Bat Conservation Trust (Collins 2016) states that these low potential trees do not require further survey work, trees of low potential were only considered further in relation to the proposed working area, where the trees would likely be felled. Refer to Table 2 for roost categorisation. The results were as follows:

- *Low potential - 2 trees;*
- *Moderate potential – 51 trees; and*
- *High potential – 11 trees.*

51 of these trees were then climbed to allow for further inspection of the features identified at ground level. The approximate location of the trees is provided in Annex 5. The key features identified within the majority of the survey area were woodpecker holes (Photograph 9).

No evidence of bats was recorded during any of the tree inspections carried out in 2017 and 2018. Ten trees were not recommended for aerial inspection as they are were not considered to be impacted by the proposed development. Following the aerial inspection seven trees were downgraded to negligible potential and 21 trees were downgraded to low potential.

Results from the GLTA and aerial inspection can be located within Annex 6.

3.3.2 2019 inspections

The trees surveyed in 2017 and 2018 were re-surveyed in 2019 by Surveyor 4. Due to changes in the condition of the trees and the roosting features 16 trees were upgraded/downgraded in potential. Two trees were downgraded from high to low, 11 trees were downgraded from moderate to low, one tree was downgraded from high to moderate, one tree was upgraded from low to moderate and one tree was upgraded from moderate to high.

Additionally 12 new trees with potential bat roosting features were identified (labelled A-L). Of these:

- *Four trees had low bat roosting potential*
- *Seven trees had moderate roosting potential*

- *One tree had high roosting potential.*

Tree number 36 (see position in Annex 5) had a common pipistrelle roosting in a vertical hazard beam which was 4-6m from the base of the tree on the east/west side. The pipistrelle was 10cm from the top of the hazard beam.

The full results from the 2019 aerial inspections can be seen in Annex 6.

3.4 Emergence/re-entry Surveys

3.4.1 2017 surveys

No evidence of any bats entering or leaving Buildings 1 and 2 was recorded on any of the surveys. Buildings 1 and 2 were used for storage and security lights were left on internally and externally reducing the suitability of the structure to support bat species. Low numbers of common pipistrelle were recorded foraging in the garden around the buildings during the dusk survey.

3.4.2 2019 surveys

The 2019 emergence survey found no bats emerging from Building 3, and bat activity around the building was restricted to pipistrelle and noctule. Security lighting again was considered a significant negative factor.

3.5 Static Detector Surveys

3.5.1 2017 static surveys

A static detector was placed at different locations within the survey area from June to October (inclusive). The detector locations are shown on the figure in Annex 4.

It is recognised there is some bias based on seasonality (see transect data section 3.5.3 below).

3.5.1.1 June 2017 Static

The June static was located within the middle of the Alder Wood glade, c. 100m west of the M25. The glade was considered to hold good potential as a commuting feature between two large sections of wood. Alder wood was heavily deer grazed, allowing for a more open foraging area under the canopy, directly linked to the glade. This location supported six bat species which are shown in Figure 2 below.

Leisler's bat (*Nyctalus leisleri*) was dominant, comprising 55% of the calls recorded (114). Leisler's are naturally a forest species, typically roosting within holes in trees. Many woodpecker holes were located in trees within Alder Wood, which offered good potential to support Leisler's bat.

27% of the calls (57) were from common pipistrelle (*Pipistrellus pipistrellus*). This was not unexpected due to common pipistrelle being one of the two most common and widely distributed bats within the UK.

Other species calls recorded included brow long-eared (*Plecotus autritus*) (1), myotis (*Myotis* sp.)[3] (10), noctule (*Nyctalus noctule*) (14) and soprano pipistrelle (*Pipistrellus pygmaeus*) (12). The low number of calls from these species suggested that they are likely using the glade as a commuting route between foraging and roosting habitats either within the survey area or the local area.

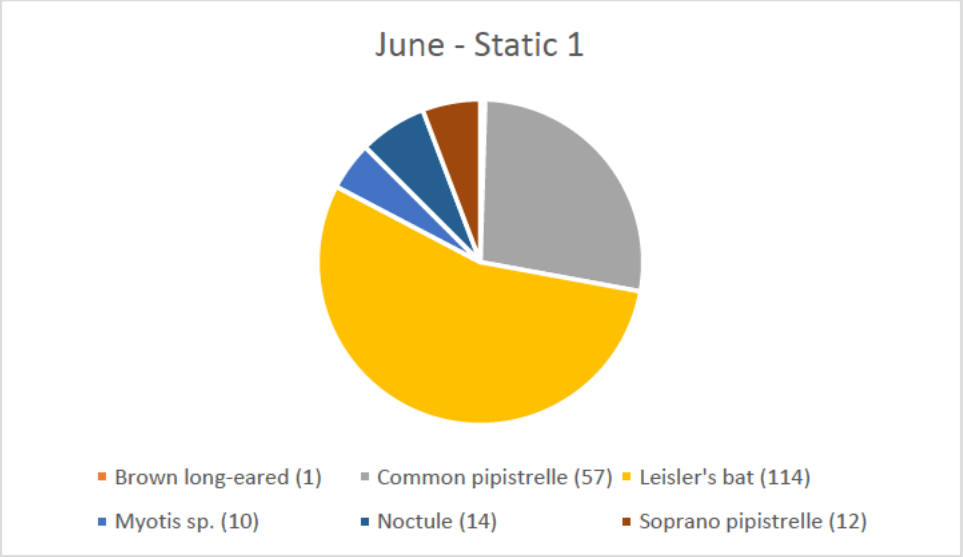


Figure 2: Species comparison data in June 2017– Static 1.

3.5.1.2 July 2017 Static

The July static was located on the western edge of Alder Wood, east of Weald Brook and c. 190m to the west of the M25. It was considered that this static survey was severely impacted by weather. The location supported habitats likely to support good numbers of bats, to the static being positioned on the edge of a woodland and within proximity to a water course. These habitats likely support good numbers of night flying invertebrates and as a result should attract foraging bats. Figure 3 below shows that only six common pipistrelle and two myotis calls were recorded, results that were much lower than expected.

[3] Provisionally some of the *Myotis* records were thought to be Brandt's bat. Further analysis of the data could not specifically identify the call to species level and hence *Myotis* was considered as the most appropriate record for these calls. The local bat group advised that Brandt's bat are not known to be present in the local area.

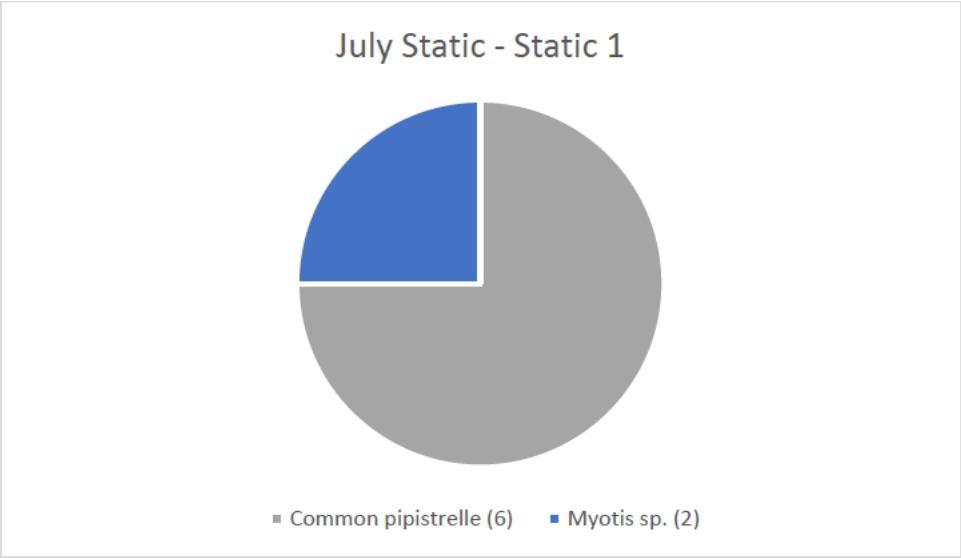


Figure 3: Species comparison data in July 2017– Static 1.

3.5.1.3 August 2017 Statics

August Static 1 was located on the southern edge of The Grove wood, c. 50m north of the A12. This static was placed between two large oak trees at the edge of the wood. The woodland edge comprised an area of semi-improved grassland and then a small water course that ran parallel with the A12. These were considered to be optimal habitats to support bat activity, although there is likely some impact from the A12 and M25 in terms of noise and lighting. Common pipistrelle activity was dominant with 614 calls recorded (Figure 4). This was expected due to this species being more susceptible to disturbance than other bat species. A low number of brown-long eared calls were recorded (18), a species that may have been foraging within the woodland. Noctule were likely recorded on commute, high above the survey area.

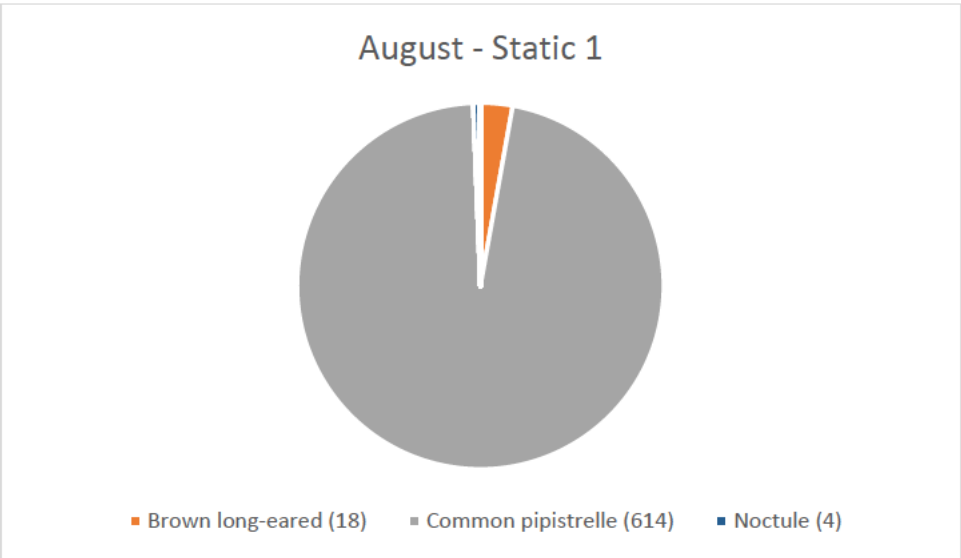


Figure 4: Species comparison data in August 2017– Static 1.

August Static 2 was located close to the same location of the July static, the western edge of Alder Wood. In comparison with Figure 3, August Static two recorded a significantly higher number of bat calls (Figure 5). 1579 common pipistrelle calls were recorded over five nights, suggesting that there were using this area frequently for foraging and likely roosted in a tree nearby. <2% of call comprised brown long-eared, noctule and soprano pipistrelle that were likely picked up whilst commuting along the woodland edge.

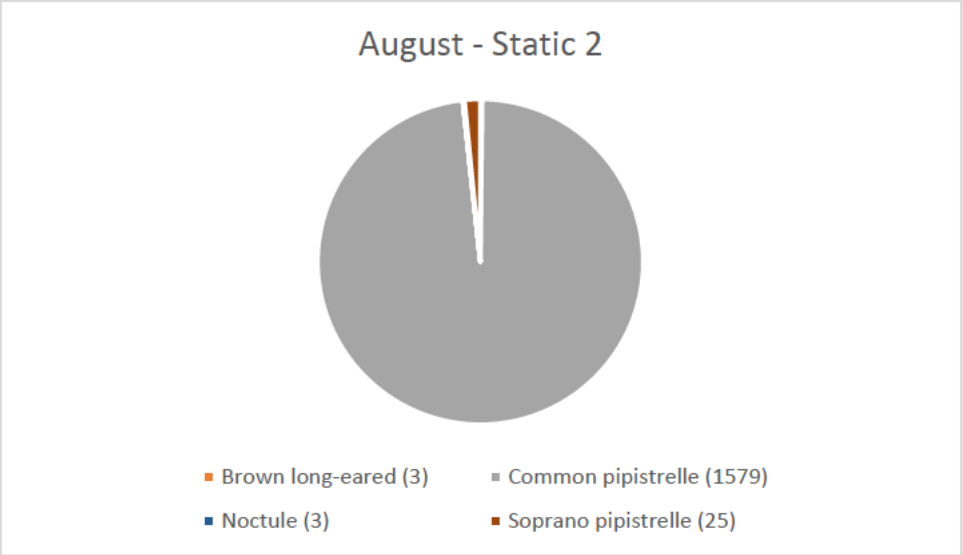


Figure 5: Species comparison data in August 2017– Static 2.

3.5.1.4 September 2017 Statics

September Static 1 was located within approximately the same area as the July static and August Static 2, on the eastern edge of Alder Wood. Although common pipistrelle numbers were lower than in August, common pipistrelle still had the highest frequency of calls. Species diversity comprised five species. Leisler's bat (61), noctule (39) and soprano pipistrelle (15) were also recorded every night of the survey, compared with brown long-eared (4) that was only picked up over one night. Bats are typically more active in September due to it being the start of the mating season, where male bats will use social calls to attract a female.

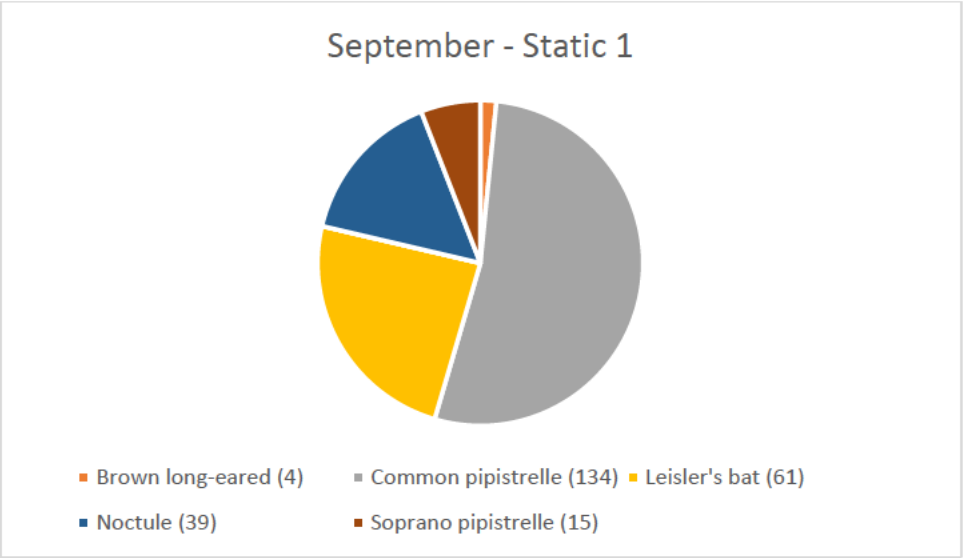


Figure 6: Species comparison data in September 2017– Static 1.

September Static 2 was located within the north-western section of Alder Wood. This location accounted for the highest diversity of bat calls within the survey area with seven species recorded. This area was dominated by soprano pipistrelle (157) and common pipistrelle (101), which made up for 83% of the data. It was likely that pipistrelle spp. roosts were present within the woodland. 39 Leisler's bat calls were also recorded, a species that has been recorded at all sections of Alder Wood. Low number of brown long-eared, myotis species and noctule were also recorded that were likely commuting along the edge of the woodland.

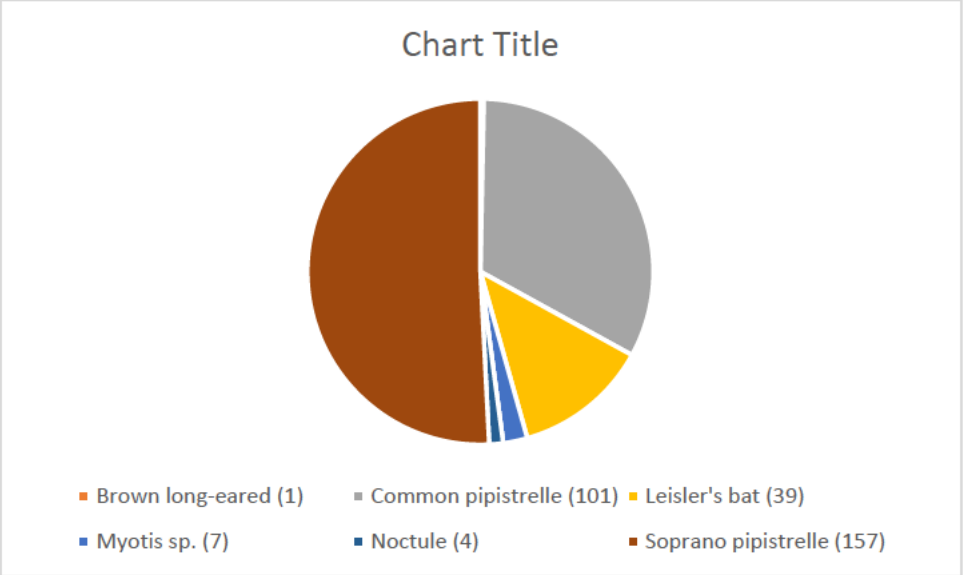


Figure 7: Species comparison data in September 2017– Static 2.

3.5.1.1 October 2017 Statics

October Static 1 was located to the north of the Alder Wood glade, c. 50m west of the M25. This location was likely subject to high disturbance from noise and lighting from the M25. Common pipistrelle were

dominant within the areas of the survey area with higher disturbance. 828 common and 195 soprano pipistrelle calls were recorded, making up approximately 90% of all activity. One Leisler's bat call was likely picked up from the lower down the glade where higher Leisler activity was recorded (Figure 2) and the four noctule calls were most likely on commute.

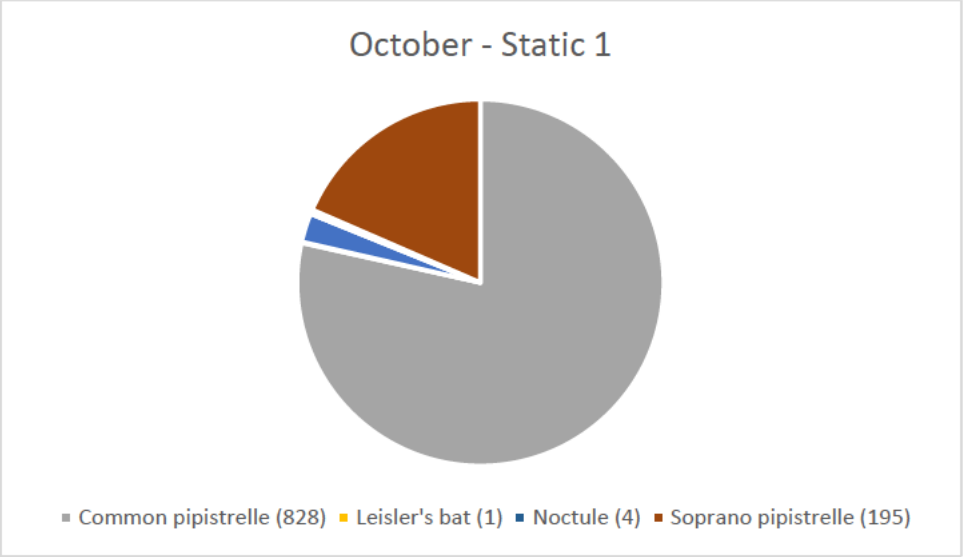


Figure 8: Species comparison data in October 2017– Static 1.

October Static 2 was located in approximately the same area as July static, August Static 2 and September Static 1, on the western edge of Alder Wood. Common pipistrelle again was the dominant species, accounting for 89 calls. Brown long-eared bats were also more frequent this month with 48 calls recorded. Nathusius' pipistrelle (*Pipistrellus nathusii*), a new species was also recorded that was potentially looking for a suitable hibernation site, given the time of year.

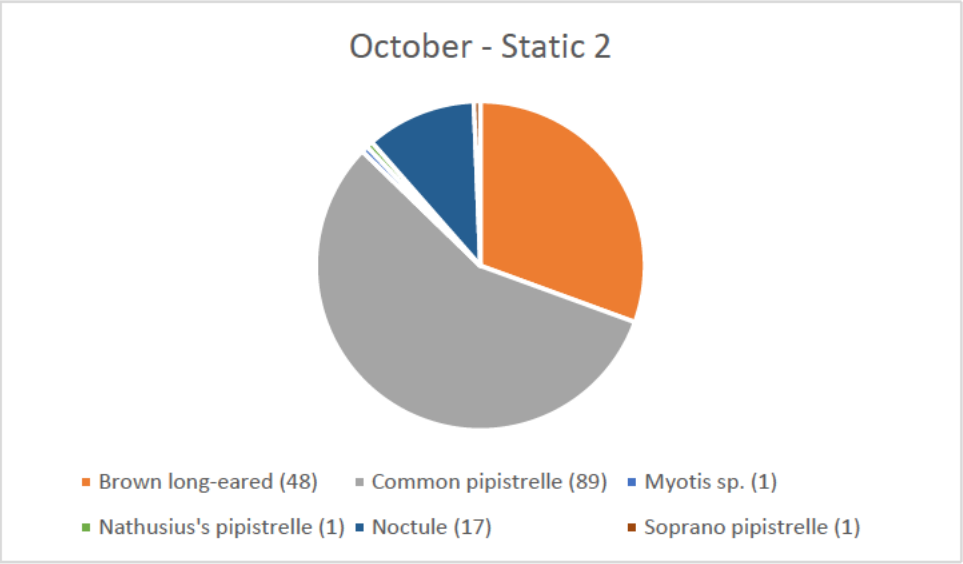


Figure 5: Species comparison data in October 2017– Static 2.

3.5.2 2019 static surveys

3.5.2.1 *August 2019 Statics*

August static 1 was located in the centre of the survey area near a site compound, on the perimeter of Alder Wood. Common pipistrelle were the dominant species present, comprising of 84% of the overall calls (109). Other species were noctule (39), brown long eared (6), Leisler's bat (3) and myotis sp. (3).

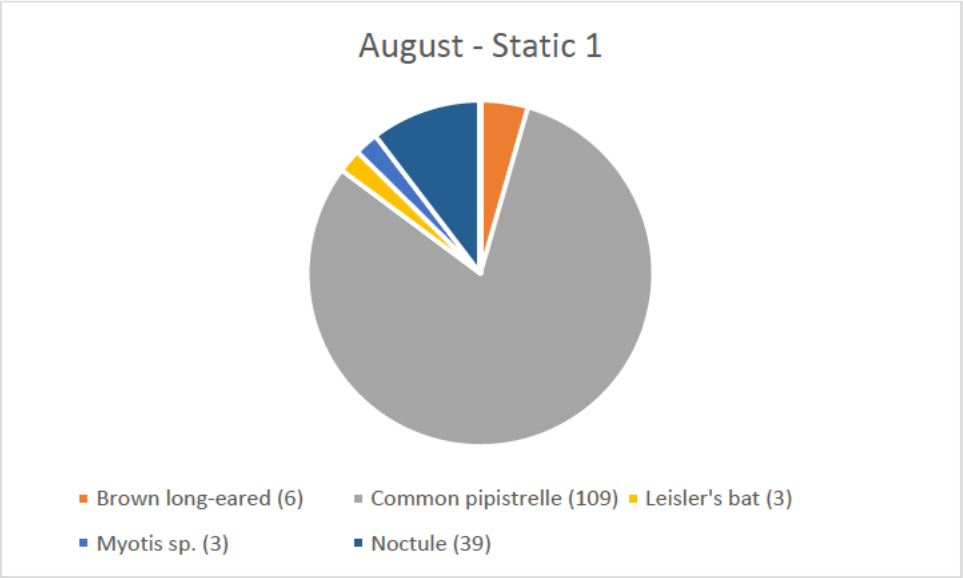


Figure 6: Species comparison data in August 2019– Static 1.

August static 2 was located south of The Grove woodland. Common pipistrelle were dominant making 62% of calls. Other species recorded were noctule (32), soprano pipistrelle (24) and brown long eared bat (4).

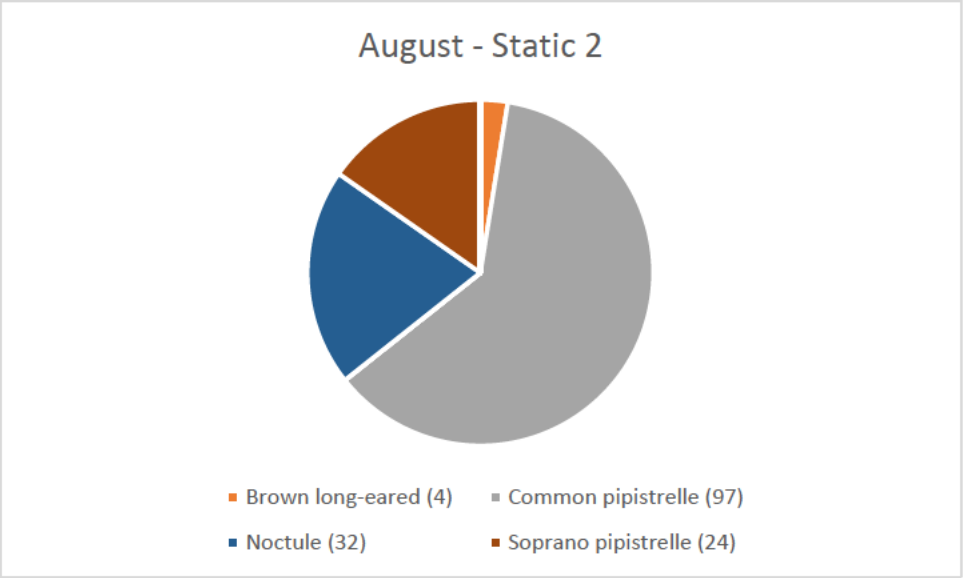


Figure 7: Species comparison data in August 2019– Static 2.

August static 3 was located off the A12 in the south west of the survey area. Common pipistrelle was dominant with 246 recordings making up 81% of the overall recordings. Other species recorded were soprano pipistrelle (32), brown-long eared (12), noctule (10) and myotis sp. (4).

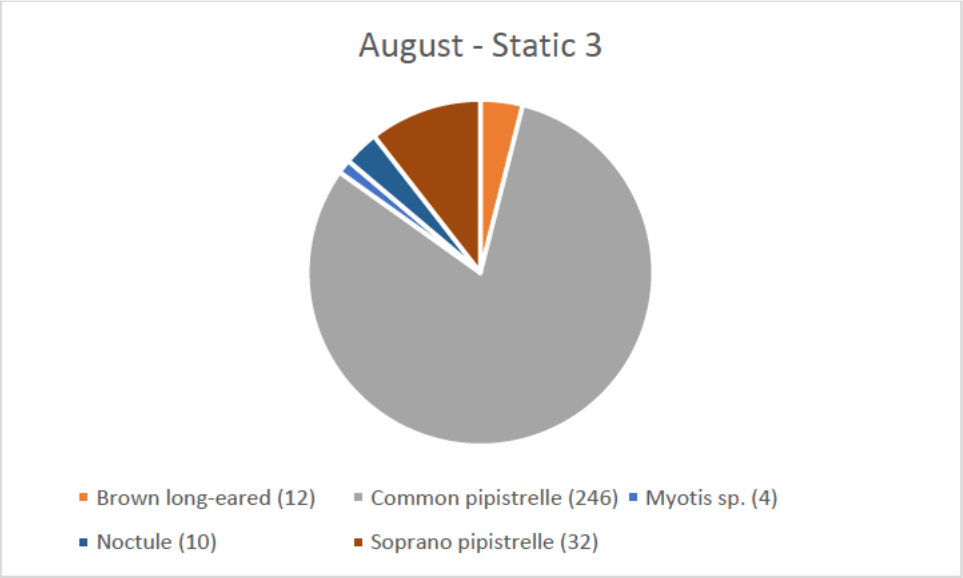


Figure 8: Species comparison data in August 2019– Static 3.

3.5.2.2 September 2019 Statics

Due to access limitations (see limitations, section 2.7) only static 3 static was deployed in September (see Annex 4). Very few sound files were returned from this survey. Those files that were returned were all ambient noise. Due to the difference in results from this survey to the high numbers of calls that were recorded in the same location in August and October, it is expected that the lack of calls was a result of a software malfunction and not a lack of bat presence (see limitations, section 2.7).

3.5.2.3 October 2019 Statics

In October Static 1 was located in the same position as August, in the centre of the survey area near the Osbourn compound, on the perimeter of Alder Wood. Soprano pipistrelle were the dominant species in this survey, making up 48% of the overall recordings (10). Other species recorded were common pipistrelle (7), and noctule (4). This survey had fewer species present and fewer overall recordings, however this is to be expected.

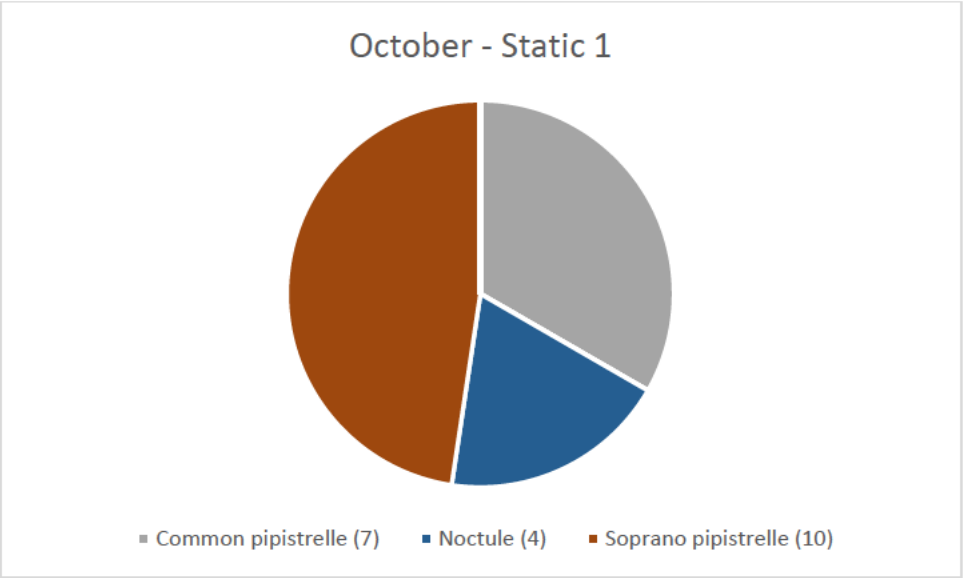


Figure 9: Species comparison data in October 2019– Static 1.

In October Static 2 was located in the same position as August, south of The Grove woodland. The dominant species was common pipistrelle, making up 67% of the overall recordings (16). Other species present were noctule (6) and soprano pipistrelle (2). This static had fewer recordings and fewer species than August, however that is to be anticipated so late in the bat survey season.

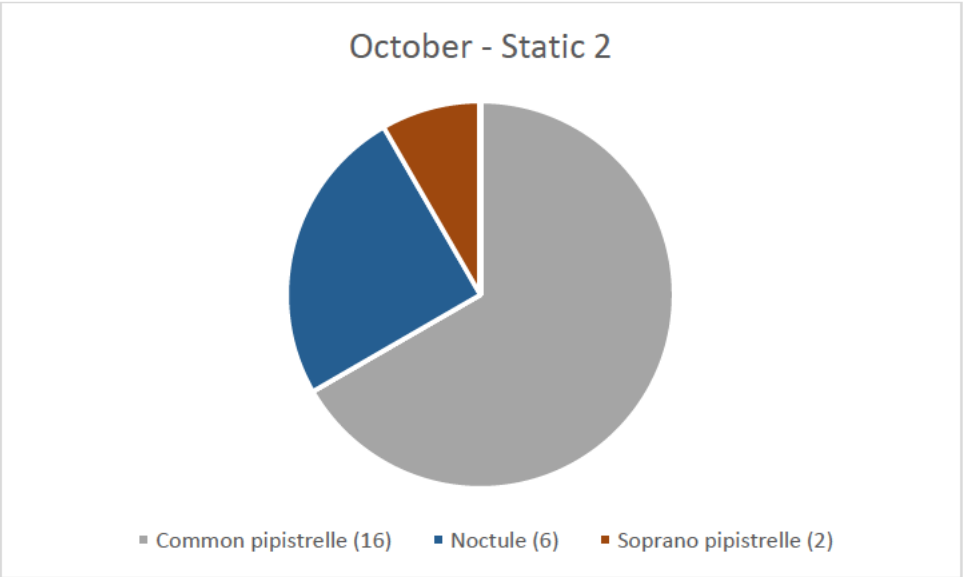


Figure 10: Species comparison data in October 2019– Static 2.

October static 3 was located in the same position as August, off the A12 in the south west of the survey area. This survey was dominated by common pipistrelle, making up 82% of calls (1078). Other species were noctule (3) and soprano (226). The number of species in October declined in the same pattern as

the other two static locations from August, however the number of common and soprano pipistrelle considerably increased. This was not anticipated due to the time of year, and could have been fewer bats foraging around the detector for longer periods of time, increasing the number of recordings.

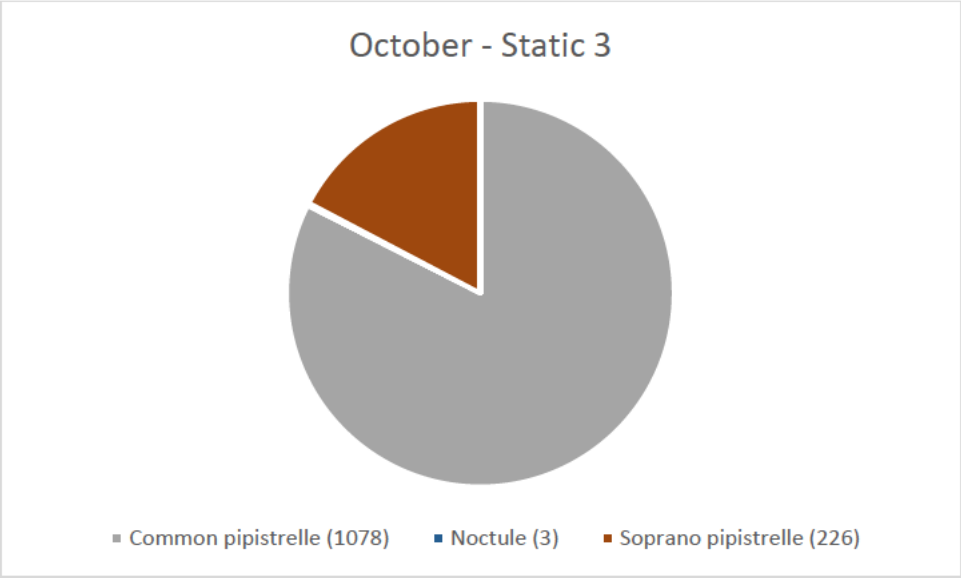


Figure 11: Species comparison data in October 2019– Static 3.

3.5.3 Bat Activity Transect 2017

All bats recorded during the activity transects are presented on a plan in Annex 4. The woodland and scrub edges were being utilised by bats the most for both foraging and commuting. The key features included:

Alder Wood

The glade running from north to south through the middle of the wood is currently managed for the power lines. This management has created a good linear feature through the wood that was being utilised by bats as a commuting route. The transect surveys recorded common pipistrelle, soprano pipistrelle, brown long-eared and most notably Leisler's bat using this feature for either commuting or foraging.

Weald Brook and Surrounding Scrub

Frequent bat activity was recorded along Weald Brook where seven species were identified. Species included brown long-eared, common pipistrelle, Leisler's bat, myotis, noctule and soprano pipistrelle. This habitat comprised running water, scrub, mature trees, log piles and tall ruderal. The mosaic of habitats likely supported a good number of night flying invertebrates to support foraging bats. As a result activity within the site was primarily focused around the brook, where a good numbers and a diverse range of bats were recorded.

The edge of the brook ran southwards from the golf course, parallel with the M25 until it joined the A12. This linear feature not only supported good numbers of foraging bats but lent itself as a commuting corridor for bats within the local area.

Edge Habitat between Weald Brook, River Ingrebourne and The Grove

An area of semi-improved grassland was located between The Grove and the two watercourses. This habitat was bordered by both scrub and woodland edges and ran westwards from Junction 28, parallel with the A12 and then northwards, following Weald Brook. The scrub surrounding the River Ingrebourne screens some of the lighting impact from the A12, allowing for this area to support both foraging and commuting bats. The scrub edge provided good connectivity between Building 1, 2 and 3, The Grove and the rest of the survey area (north-west of Junction 28).

Industrial Yard and Buildings

Low numbers of common pipistrelle were recorded within the industrial yard, predominantly foraging over pockets of tall ruderal. A Leisler's bat and Myotis were recorded commuting around the eastern edge of The Grove, adjacent to the buildings.

4 Conclusion

No evidence of bats was recorded utilising any of the features identified the buildings within the survey area in 2017 and 2019. Following climbing inspections a total of 70 trees within the survey area held either low, moderate or high potential for supporting bat roosts. Furthermore a common pipistrelle was found roosting inside one of the trees (tree no. 36) in November 2019.

The 2017 static detector and bat transect surveys identified seven species of bat using the survey area (common pipistrelle, soprano pipistrelle, brown long-eared, Myotis sp., Leisler's bats, Nathusius' pipistrelle). Noctule were not recorded using the habitats within the survey area and were observed commuting high above across the survey area.

Bat activity was primarily focused on the woodland and scrub edge habitat with linear features Weald Brook and the western edge and glade of Alder Wood supporting the main commuting activity through the survey area. Common pipistrelle was the species most frequently recorded within the survey area, predominantly utilising these habitats. Although soprano pipistrelle activity was slightly less frequent, the habitat utilisation was similar, primarily using the woodland and scrub edges for foraging and commuting.

Leisler's bat activity was predominantly focused around Alder Wood, particularly along the glade. Most of this data was returned from the statics, returning 114 calls in June. This activity was likely down to foraging Leisler, utilising the woodland.

Low numbers of Myotis, brown long-eared and Nathusius' pipistrelle were also recorded along the western edge of Alder Wood and Weald Brook. These species were picked up infrequently and were considered to be using the linear features for commuting throughout the survey area and the wider landscape. The 2019 static surveys provided limited data but identified six species of bats utilising the survey area, none of which were additional to those species identified in 2017. These species were common pipistrelle, soprano pipistrelle, Myotis sp., Leisler's bat, noctule and brown long-eared bat. Nathusius' pipistrelle was not recorded in 2019. The habitats and conditions within the survey area have not changed since the 2017 surveys. Whilst the data collected is limited, the mix of species recorded has not changed and it is expected that bats are using the same habitats and features within the survey area as was discovered in 2017.

5 References

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

Chartered Institute of Ecology and Environmental Management (2015). *Guidelines for Ecological Report Writing*. Technical Guidance Series. www.cieem.net

JNCC (2004). *Bat Workers Manual.* 3rd Edition.

Annex 1: Photographs 2017

Photograph 1: Building 1

Photograph 2: Gaps under the shiplap boarding within Building 1.

Photograph 3: Building 4

Photograph 4: Building 5

Photograph 5: Building 6

Photograph 6: Building 7

Photograph 7: Building 8 (background on right) and 9 (behind Geest sign)

Photograph 8: Electrical substation.

Photograph 9: Woodpeckers holes within a tree in Alder Wood.

Annex 2: Location of Surveyors – Building 1, 2 & 3

Figure shows Building 1, 2 & 3 and the locations of the three surveyors and the direction they were facing (marked by white box/arrow).

Annex 3: Surveyor Experience

Surveyor 1 (lead surveyor 2017)

Surveyor 1 is an ecologist who has held a Level 2 bat license (2015-11814-CLA-CLS) for over 7 years. He is also a Natural England Volunteer Bat roost visitor and has extensive experience of dawn, dusk emergence surveys, plus radio tracking, harp trapping, and hand netting.

Surveyor 2 (lead surveyor 2017)

Surveyor 2 holds a Level 1 bat licence (2017-31685-CLS-CLS) and has over three years' experience working in ecology as a full time ecologist. He has undertaken ecological surveys across the southeast and east midlands for a range of development projects. His bat worker experience has included preliminary roost inspections (including several known roost sites), undertaking emergence/re-entry surveys, carrying out activity transects and analysing bat sonograms.

Surveyor 3 (lead surveyor 2019)

Surveyor 3 holds a Level 2 bat licence (2018-38185-CLS-CLS) and has over four years' experience working as a bat surveyor. She also has over 6 months experience of being a full time assistant ecologist. She has undertaken a range of ecological surveys across the southeast and west midlands for a range of development projects. Her bat worker experience has included preliminary roost inspections (including several known roost sites), undertaking emergence/re-entry surveys, carrying out activity transects and analysing bat sonograms, along with handling and caring for bats.

Surveyor 4 (lead surveyor 2019)

Surveyor 4 holds a level 4 bat licence (2016-11967/8-CLS-CLS) with 10 years' experience of tree climbing and searching for potential roost features. In the last 10 years the surveyor has climbed hundreds of trees and found roosts of 7 UK bat species. **Surveyor 5**

Surveyor 5 has over three years' experience working in ecology and has been a full time ecologist for two years. He has undertaken ecological surveys across the southeast and northwest for both small and large development projects. His bat worker experience has included assisting licensed ecologists with bat inspections, undertaking emergence/re-entry surveys and carrying out activity transects.

Surveyor 6 (Lead surveyor 2017)

Surveyor 6 is accredited agent under accredited under Level 2 bat license (2015-12855-CLS-CLS). Surveyor 6 has over three years' experience working in consultancy as a full time ecologist, prior to this he worked as a freelance ecologist and on a volunteer placement scheme with the Avon Wildlife Trust. His professional bat work experience includes preliminary roost inspections, ground bat roost tree inspections, activity transects, emergence/re-entry surveys and analysing bat sonograms. Whilst

volunteering with local bat groups surveyor 6 has undertaken numerous bat trapping surveys and roost inspections, predominantly bat box checks. Surveyor 6 is a qualified tree climber and has undertaken aerial tree surveys on a wide variety of trees and roosting features whilst partnered with other licensed surveyors.

Surveyor 7

Surveyor 7 is a professional Arboriculturist with over 9 years' of industry experience. He has extensive experience assisting licenced ecologists with inspections, undertaking emergence/re-entry surveys and carrying out tree climbing inspections for potential bat roost features. Surveyor 7 is qualified to undertake tree climbing and aerial rescue.

Surveyor 8

Surveyor 8 is a CIEEM Chartered Ecologist (CEcol) who has undertaken extensive array of bat survey and mitigation work over the past ten years. This has ranged from Bat box checks with the Derbyshire Bat Group, emergent surveys including the identification of a number of maternity roosts in respect to development, design and construction of mitigation on buildings for EPS licences. Surveyor 8 has also attended formal training - Bats & Bat Surveys: a Foundation Course for Environmental Consultants' – FSC (2006). Surveyor 8 is currently a member of the Cambridgeshire bat group and has recently been involved in the national Nathusius' pipistrelle bat project.

Surveyor 9

Surveyor 9 is a professional ecologist with over 10 years' experience in the ecological and educational field. She has assisted with numerous emergence and re-entry bat surveys.

Surveyor 10

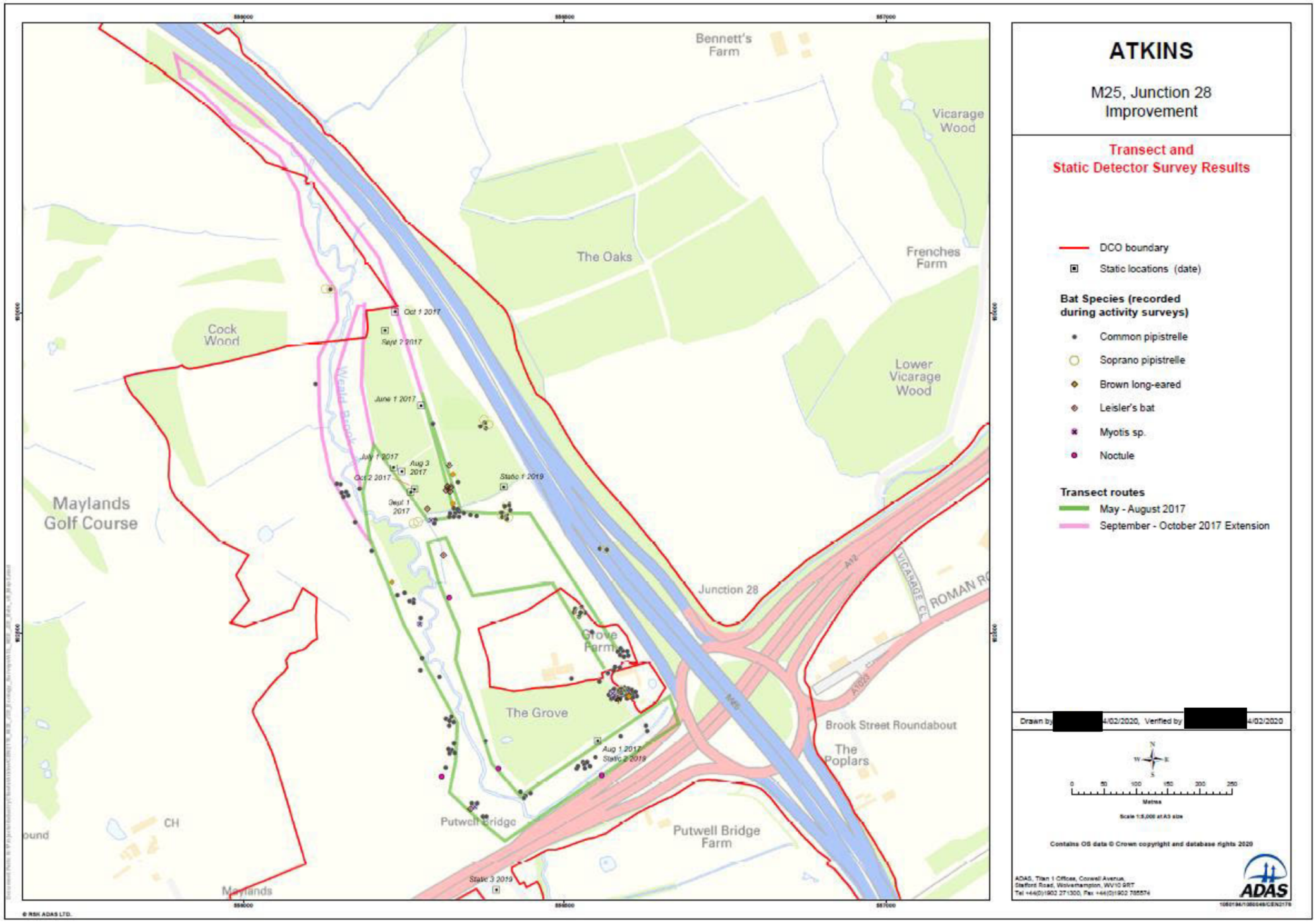
Surveyor 10 is a Seasonal Ecological consultant who has assisted with a number of bat emergence/re-entry surveys between May-August 2017. Surveyor 10 has an MRes in Ecology.

Surveyor 11

Surveyor 11 is a professional ecologist with over two years' experience of ecological work. Surveyor 11 has been involved in bat surveys for two seasons, assisting licenced ecologists with external and internal building inspections and emergence/re-entry surveys and activity transects.

Annex 4: Bat Survey Map

See following page.



ATKINS

M25, Junction 28 Improvement

Transect and Static Detector Survey Results

- DCO boundary
- Static locations (date)

Bat Species (recorded during activity surveys)

- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared
- Leisler's bat
- Myotis sp.
- Noctule

Transect routes

- May - August 2017
- September - October 2017 Extension

Drawn by [redacted] 4/02/2020, Verified by [redacted] 4/02/2020

N W E S

0 50 100 150 200 250

Metres

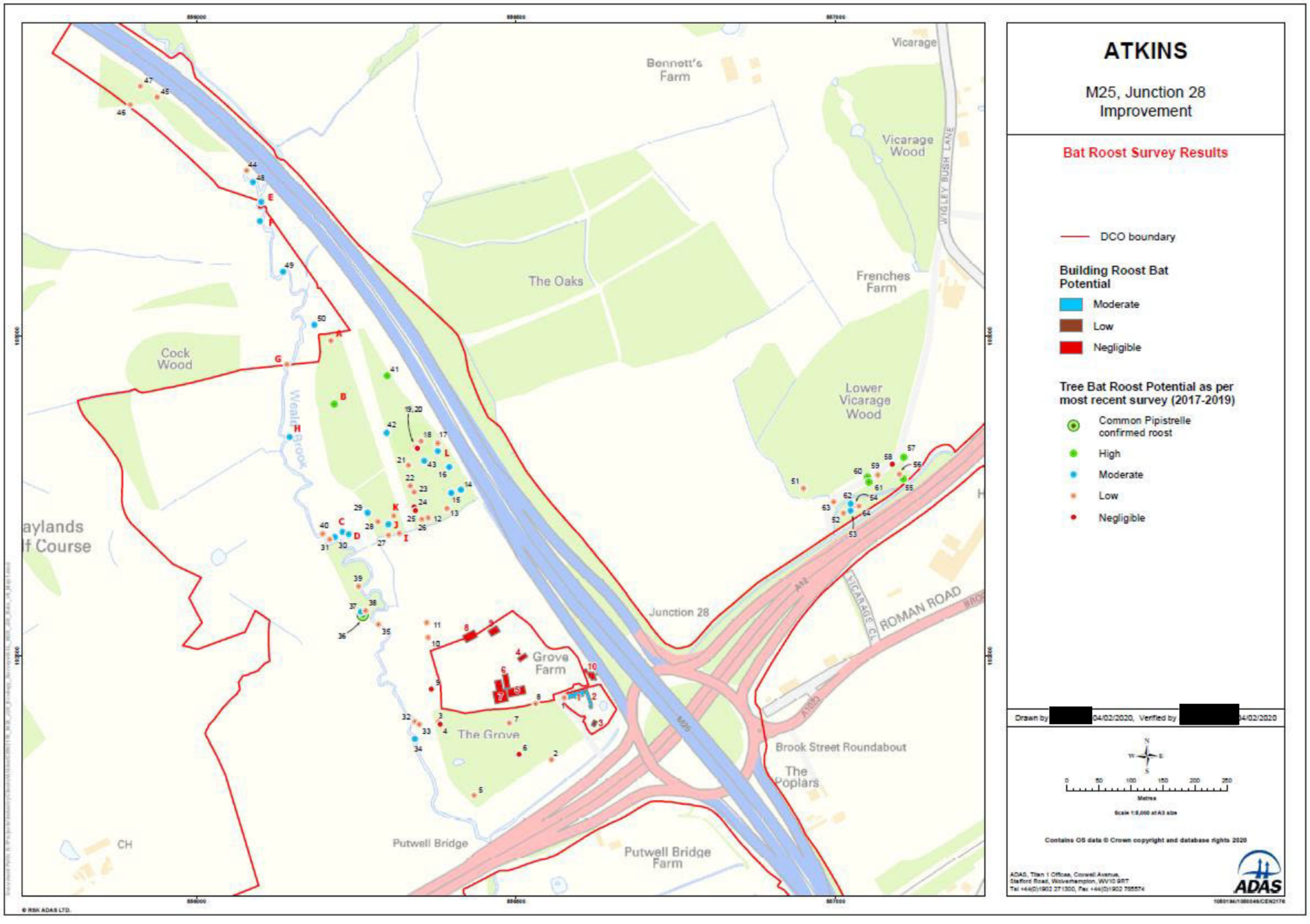
Scale 1:5,000 at A3 size

ADAS, Titan 1 Offices, Cornwall Avenue, Stafford Road, Wolverhampton, WV10 6RT
Tel +44(0)1902 271300, Fax +44(0)1902 785574

ADAS

Annex 5: Bat Tree and Building Map

See following page.



ATKINS

M25, Junction 28 Improvement

Bat Roost Survey Results

DCO boundary

Building Roost Bat Potential

- Moderate
- Low
- Negligible

Tree Bat Roost Potential as per most recent survey (2017-2019)

- Common Pipistrelle confirmed roost
- High
- Moderate
- Low
- Negligible

Drawn by [redacted] 04/02/2020, Verified by [redacted] 04/02/2020

0 50 100 150 200 250

Metres

Scale 1:5,000 at A3 size

ADAS, Titan 1 Office, Cowell Avenue, Stafford Road, Wolverhampton, WV10 6RT
Tel +44(0)1902 27 1300, Fax +44(0)1902 785574

ADAS

Annex 6: Results from GLTA and Aerial Inspections 2017-2019

See following page

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
1	T004	TQ 56576 92435	Pedunculate oak	Moderate	✓		✓	Low	5m from base of tree, roost feature had a 7cm diameter and was on the west side of tree facing east. The entrance hole goes into a cavity that is open at top and is filled with leaves.
2	T021A	TQ 56556 92338	Pedunculate oak	Moderate	✓			Low	Crack along branch, shallow cavity. Branch relatively dead with shallow cavity.
3	W032	TQ 56379 92397	Pedunculate oak	Moderate	✓			Low	Dry smooth cavity goes up 10cm.
4	W032	TQ 56382 92393	Pedunculate oak	Moderate	✓			Negligible	Bark lifted from tree, no cavity. Wet black sap under bark.
5	T026 (418)	TQ 56435 92282	Pedunculate oak	Moderate	✓		✓	Low	Hazard beam approximately 1.5m long, 5 metres from base of tree on the south west side of tree facing south east/north west. An additional split 8m from base of tree on the north west side facing north west. This was 50cm long and 2cm wide near the top of the main stem. There was a final low potential feature that was an area of dead wood 4-5m

[4] See Arboricultural Impact Assessment, Appendix 7.7, for tree survey reference numbers. Where reference number starts with a 'T', this refers to an individual tree. There reference number starts with a 'G', this refers to a group of multiple trees. Where reference number starts with a 'W' this refers to an area of woodland containing multiple trees.

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
									from base of tree on the northern side of tree facing north providing with small cavities providing
6	W031	TQ 56505 92346	Wild cherry	Moderate	✓			Negligible	Numerous superficial cavities, likely foraging woodpecker.
7	W032	TQ 56490 92395	Wild cherry	Moderate	✓		✓	Low	Vertical split occluding with bark in front which goes up 10cm. Cavity doesn't go up and has a bird nest in the bottom.
8	W032	TQ 56531 92425	Ash	Moderate	✓			Low	15cm clean hollow in trunk. Hole with birds nest. Wet and rough within cavity.
9	T069	TQ 56368 92448	Pedunculate oak	Moderate	✓			Negligible	Woodpecker foraging hole. Damp exposed bark.
10	T065	TQ 56363 92529	Pedunculate oak	Moderate	✓		✓	Low	Wound 2m-3m from base of tree on the south west side facing south west. Wound was very large and open and had a cavity that went up 0.5m. It was dry, dusty and dirty inside.

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
11	T064 (415)	TQ 56361 92552	Pedunculate oak	Moderate	✓		✓	Low	Lifted bark 2-6m from base of tree, on main stem and limbs. The feature was only superficial.
12	W088	TQ 56361 92552	Ash	Moderate	✓			Low	Dry woodpecker hole that does extend in any direction.
13	W088	TQ 56363 92716	Ash	Moderate	✓			Low	Extends downwards to bird nest. Two woodpecker holes that do not extend in any direction.
14	W088	TQ 56414 92760	European ash	Moderate	✓		✓	Moderate	Knot hole, 4m from base of tree, on the west side of tree facing west. Feature was a vertical cavity split into two 70 cm cavities with a rough wedge shape inside.
15	W088	TQ 56399 92755	European ash	Moderate	✓			Moderate	Hole extends downwards 10cm to bird nest.
16	W088	TQ 56396 92795	European ash	Moderate	✓		✓	Moderate	Woodpecker hole 6m from base of tree on the south west side facing south west. Additional woodpecker hole 4.5 m from base of tree on the south west side facing south west.
17	W088	TQ 56378 92833	Ash	Low	✓		Unsafe	Low	Unsafe to climb. Notes from GLTA: Crack from the ground on the SW, leads to two

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
									holes, then another crack, then a third hole at 5m
18	W089	TQ 56352 92836	Ash	Moderate	✓			Low	Dome shaped crack, heavily cobwebbed.
19	W089	TQ 56343 92827	Ash	Moderate	✓			Low	Heartwood decay, rough with cobwebs. Superficial cavities.
20	W090	TQ 56346 92825	Ash	Moderate	✓			Negligible	Two woodpecker holes that do not extend in any direction.
21	W088	TQ 56332 92798	Ash	Moderate	✓			Low	Bird nest at base of hole. Full of fresh leaves in base. Hole extends downwards.
22	G085	TQ 56335 92766	Ash	Moderate	✓			Low	Tree almost all dead. Inspected with ladder and holes appeared to be from foraging woodpecker.
23	W088	TQ 56341 92756	Ash	Moderate	✓			Low	Cavity extends 5cm up and down with bird nest at bottom.
24	G085	TQ 56341 92733	Ash	Moderate	✓			Negligible	Very damp hole – full of slugs.

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
25	G085	TQ 56343 92727	Ash	Moderate	✓			Negligible	Two holes from foraging woodpecker.
26	G085	TQ 56353 92714	Ash	Moderate	✓			Low	Hole extends 10cm downwards.
27	T080	TQ 56301 92689	Pedunculate oak	Moderate	✓			Low	Tree snapped in half since ground survey. Only cavity now filled in mulch.
28	W082-A	TQ 56284 92710	Ash	Moderate	✓			Low	Only one cavity extended downwards. Bird nest at base.
29	T075	TQ 56268 92724	European ash	High	✓		✓	Moderate	Large wound on north north east side of tree, facing north north east. Feature was 4m from base of tree. Wound travelled up western edge of tree for 50cm. Bees present in cavity.
30	T055	TQ 56217 92686	Crack willow	Moderate	✓		✓	Moderate	Knot hole 4.5 metres from base of tree on northern side of tree facing north west. Feature extended into cavity that extended down. Additional feature present in the form of wound in stem 5m from base of tree on the northern side of tree facing north. Goes down tree 5cm.
31	T056	TQ 56209 92682	European ash	Moderate	✓		✓	Low	Cavity on NE side facing NE 6m from base of tree.

Tree Reference	Arboriculture tree survey reference[4]	Grid reference	Species	Status Following GLTA	Date Climbing Inspection			Status Following most recent Aerial /Climbing Inspection	Roost Features
					August 2017	March 2018	Oct / Nov 2019		
32	T045	TQ 56342 92397	Field maple	Moderate	✓			N/A	Dense ivy cover-not possible to climb 2019. Ivy provided feature.
33	T044	TQ 56349 92393	Crack willow	High	✓		✓	Low	All cavities extend downwards and very damp.
34	G043-A	TQ 56342 92370	Crack willow	Moderate	✓		✓	Moderate	Woodpecker hole 2.5m from base of tree on the east side of the tree facing east. Hole goes down 25cm, and there is a birds nest inside.
35	T184	TQ 56285 92549	Alder	Moderate	✓		Unsafe	Moderate	Dense ivy cover-not possible to climb. Ivy provided feature.
36	G183	TQ 56261 92567	European ash	Moderate	✓		✓	Confirmed roost	Common pipistrelle in vertical hazard beam which was 4-6m from base of tree on the east/west side. The pipistrelle was 10cm from the top of the hazard beam. Additionally there were 4 woodpecker holes of low bat roosting potential on the south and south west side of tree facing south and south west. These were between 6m and 8m from the base of the tree.
37	G183	TQ 56258 92569	European ash	High	✓		✓	Moderate	There was a vertical hazard beam 2-6m from base of tree on the southwest/northeast side. The cavity was dry inside and had a wedge at the top. There was an additional

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									roosting feature of low potential which was a woodpecker hole 6m from the base of the tree.
38	G183	TQ 56263 92569	Ash	Moderate	✓			Low	Hole extends downwards 20cm to leaf litter.
39	G182	TQ 56254 92609	Pedunculate oak	Moderate	✓			Low	Multiple holes and cracks all superficial only extending a few cm deep.
40	G141	TQ 56198 92691	European ash	Moderate	✓			Low	Cracks and flakes in the bark c. 15m up on the south-west side.
41	W089	TQ 56299 92938	European ash	High	✓		✓	High	Wound in stem, 4m from base of tree, 10cm diameter
42	G085	TQ 56298 92849	Field maple	Moderate	✓		✓	Moderate	Canker on eastern side of stem facing east, 1.5m from base of tree. Cavity is 12cm by 10cm. Feature was wet.
43	W088	TQ 56357 92805	European ash	High	✓		Not found	Moderate	Heavily cobwebbed, endoscope reached limit. Cavity was clear. Not found in 2019.
44	T101	TQ 56079 93259	Crack willow	Moderate	✓			Low	Dense ivy cover-not possible to climb. Ivy provided feature.
45	N/A	TQ 55939 93374	Pedunculate oak	Low	✓			Low	Not safe to climb. GLTA identified cracks in tree providing possible features.

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46	N/A	TQ 55897 93391	Sycamore	Moderate	✓		✓	Low	Wound 3m from base of tree on the northern side facing north. Wound was 25cm x 15cm and was dry inside and filled with dead leaves. Wound extended up 1m.
47	N/A	TQ 55913 93362	European ash	Moderate	✓		✓	Low	Wound 8m from base of tree 1m out from stem, on the eastern side of stem facing east. Wound was 30cm in diameter and was 150cm deep. There was a birds nest inside.
48	T100	TQ 56089 93241	Pedunculate oak	Moderate	✓		✓	Moderate	Hazard beam 8m from base of tree on the southern side of tree facing east and west. Feature goes in 30cm, it is dry and has been used by birds.
49	T104	TQ 56136 93101	European ash	Moderate	✓		✓	Moderate	Knot hole on north east side of tree facing north west, 9.5m from base of tree. Feature goes in and splits into two. Additional squirrel hole 8.5m from base of tree on north east side of tree facing north east. Feature goes into tree 25cm and down 30 cm, and it has an 8cm diameter.
50	G108B	TQ 56185 93018	Pedunculate oak	Moderate	✓		✓	Moderate	Wound 6m from base of tree on the northern side of tree facing north and 4 metres out from tree. Additional tear 3m from base of tree on the eastern side of tree facing east. Cavity was 30cm deep, clean and polished.

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									Additional wound 6m from base of tree 4m out from stem on the eastern side facing south. Cavity had a nest inside.
51	N/A	TQ 56950 92762	Poplar	High		✓	✓	Low	Cavity/wound 3.5m from base of tree, facing south. Cavity was filled with twigs, it had a jackdaws nest in.
52	G162	TQ 57013 92723	Poplar	High		✓	✓	Low	Cavity/wound did not extend anywhere.
53	G162	TQ 57024 92727	Pedunculate oak	Moderate		Unsafe		Unsafe	Not subject to detailed survey- tree unsafe to climb.
54	G162	TQ 57032 92735	Pedunculate oak	Moderate	✓	✓		Low	Hole 1m above ground with cavity – full of invertebrates
55	T147	TQ 57106 92777	Pedunculate oak	High		✓	✓	High	Cavity/wound 1.5m from base of tree 10cmx14cm. Cavity went up 50cm and tapered off. Cavity was dusty with cobwebs present.
56	W178	TQ 57100 92784	Pedunculate oak	Moderate	✓	✓		Low	Hole only extends a couple of inches into the tree.
57	W178	TQ57107 92811	Pedunculate oak	High	✓		Unsafe	High	2017 survey identified cavity on north side – 1m upwards, full of insects. Additional hole 8m high, extends 1m on north side. Unsafe to

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									climb in 2019, only feature identified from the ground split in branch 12m from base of tree.
58	N/A	TQ 57699 92800	Pedunculate oak	Moderate		✓		Negligible	Woodpecker feeding hole.
59	W178	TQ 57107 92811	Pedunculate oak	Moderate		✓	✓	Low	Woodpecker holes covered tree, they were all feeding holes.
60	W178	TQ 57050 92780	Pedunculate oak	High		✓	✓	High	Woodpecker holes, one extended down to birds nest, one extended up. An additional cavity which was a moderate suitability roosting feature, that was 1m from base of tree. Cavity was on the south southwest side of tree facing south southwest and went up 40cm.
61	W178	TQ 57052 92772	Pedunculate oak	High		✓	✓	Low	5 woodpecker feeding holes, they were all dry and dusty.
62	G162	TQ 57024 92738	Pedunculate oak	Moderate		✓	✓	Moderate	Basal cavity on the north side facing north. Cavity extended up from base and split into two. Cavity was wet inside.
63	W178	TQ 57006 92732	Pedunculate oak	Moderate		✓		Low	Hole extended downwards to birds nest.

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64	G162	TQ 57034 92735	Pedunculate oak	Moderate		✓		Low	Hole extended downwards to birds nest.
A	W082-B	TQ 56211 92993	European ash	N/A (combined with aerial inspection)			✓	Low	A hole 6.5m from base of tree and 2m out from stem. On the eastern side of tree facing south.
B	W082-B	TQ 56216 92894	Field maple	N/A (combined with aerial inspection)			✓	High	Wound in stem 5m up from base of tree. Wound is on the western side of tree facing west and is 6cm in diameter. It tapers off towards the top and had woodlice in.
C	T054	TQ 56229 92694	Crack willow	N/A (combined with aerial inspection)			✓	Moderate	Wound in stem 3.5m from base of tree on the south east side facing south east. Wound is 16cm by 7 cm and goes in 38cm.
D	T053	TQ 56239 92690	Crack willow	N/A (combined with aerial inspection)			✓	Moderate	Knot hole 4.5 metres from base of tree on northern side of tree facing north west. Feature extended into cavity that extended down. Additional feature present in the form of wound in stem 5m from base of tree on the northern side of tree facing north. Goes down tree 5cm.

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E	G098-A	TQ 56102 93210	Alder	N/A (combined with aerial inspection)			✓	Moderate	Wound in stem 1m from base of tree 90cm out from stem and on the southern side of tree facing south. Cavity was 1m deep and had cobwebs inside.
F	G103	TQ 5610 9318	Crack willow	N/A (combined with aerial inspection)			✓	Moderate	3 knot holes on tree1.5-2m from base of tree, 6m out from stem on the western side of tree facing west. Features were 15cm in diameter.
G	G219	TQ 56142 92956	Alder	N/A (combined with aerial inspection)			✓	Low	3 woodpecker holes in trunk of tree, 1-3.5m up from base of tree. On eastern side of tree facing east.
H	N/A	TQ 56146 92842	European ash	N/A (combined with aerial inspection)			✓	Moderate	Wound underneath weld on tree. 2.5m from base of tree. Feature on the South east side of tree facing south east, and was wet with woodlice and slugs inside. Feature was 20cm by 10 cm and went in 25cm.
I	W082A	TQ 56318 92692	Field maple	N/A (combined with aerial inspection)			✓	Low	Wound on trunk of tree 0.7m from base of tree. Feature was on the west side of tree facing west and went up 20cm before splitting into two cavities. Second cavity went in 40cm and had a birds nest inside.

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J	W082A	TQ 56301 92706	European ash	N/A (combined with aerial inspection)			✓	Moderate	Woodpecker hole 6m from base of tree on the east/south east side facing east/south east. Hole went in 15 cm and down 20cm.
K	W082A	TQ 56309 92719	European ash	N/A (combined with aerial inspection)			✓	Low	Canker 2m from base of tree on the south west side facing south west. Cavity was 8cm by 2 cm and went in vertically 30cm.
L nr 17	W088	TQ 56378 92820	European ash	N/A (combined with aerial inspection)			✓	Moderate	Woodpecker hole on tree trunk 4.5m from base of tree on the south/south west side facing south/south west. Large cavity that went up 90cm and down 10 cm, entrance was 7cm by 7cm.

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