

APPENDIX C

AGEAS BOWL REDEVELOPMENT, EASTLEIGH

BAT TECHNICAL NOTE

1 INTRODUCTION

This Technical Note presents the results of bat surveys undertaken within areas of suitable habitat across the Ageas Bowl site (hereafter referred to as 'the Site'), in Botley, Hampshire. Historic bat surveys at the Ageas Bowl site have been undertaken by Johns Associates and others, and are referred to where relevant in this Technical Note.

The aim of the current surveys was to update the historic baseline and confirm the bat species present and the levels of activity across the Site. The results of the survey will inform an Ecological Impact Assessment (EclA) of redevelopment proposals and any necessary mitigation and/or further enhancement measures that may be required for these species.

2 METHODOLOGY

2.1 BAT HABITAT SUITABILITY

A formal Phase 1 Habitat Survey of the site was completed on 7th May 2020 by a suitably qualified and experienced botanist from Johns Associates (Phase 1 Habitat Survey Report, Johns Associates, December 2019). Subsequent update habitat assessments were carried out on the 9th August 2021 by experienced botanist Kat Newbert BSc (Hons) MSc from Johns Associates Ltd. The weather was dry and sunny with good visibility.

The survey identified the habitat types currently present across the Site and in immediately adjacent areas. The survey followed the standardised system for classifying and mapping British Habitats Handbook for Phase 1 Habitat survey – a technique for environmental audit (Joint Nature Conservancy Council, 2010). The main output of this survey was an annotated habitat map and target notes together with descriptions of the recorded habitat types. All flora follow the nomenclature detailed in New Flora of the British Isles (4th Edition) (Stace, 2019).

During the course of the survey, available habitats were assessed for their suitability to support a range of bat species for roosting, commuting and foraging purposes. All bat surveys followed the professional survey guidance as detailed in Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust, 2016) and BS 42020:2013 Biodiversity – Code of practice for planning and development (British Standards Institute, 2013).

Survey results were then digitised into geographical information system mapping software (GIS) to facilitate the calculation of the extents of each habitat type.

2.1 BAT ROOST INSPECTION (BUILDINGS)

A Building Roost Inspection and Ground Level Trees Assessment survey was undertaken on the 9th August 2021 by experienced ecologist Kerry White BSc (Hons) ACIEEM from Johns Associates Ltd. The weather was dry and sunny with good visibility. The survey followed the professional survey guidance as detailed in Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust, 2016) and BS 42020:2013 Biodiversity – Code of practice for planning and development (British Standards Institute, 2013). Criteria for assessing suitability is summarised in Table 1.

Table 2: Guidelines for Assessing the Potential Suitability of Proposed Development Sites for Bats (Bat Conservation Trust, 2016)

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site 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 (a) and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential (b).	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitats. 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 their size, shelter, protection, conditions (a) and surrounding habitat but unlikely to support a roost of high importance/ value for the local bat population (c).	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 sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions (a) and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.
a. For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance. b. This system of categorization aligns with BS8596:2015 Surveying for bats in trees and woodland (BSI,2015). c. Assessment is made 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		

2.2 GROUND LEVEL TREE ASSESSMENT (GLTA)

All trees within the Site and survey area and listed in Section 3.1 of this report were visited and subject to a detailed Ground Level Tree Assessment (GLTA) survey by an experienced ecologist.

This survey was completed in accordance with the Bat Tree Habitat Key (Andrews, 2013). The trees were examined for potential roost features (PRFs) (see Table 2) from the ground using close focusing binoculars.

Table 2: Potential Roost Features

Decay PRF Key category	Damage PRF Key category
Woodpecker holes – Woodpecker-hollows	Hazard-beams – Longitudinal Split & Crevice
Squirrel holes	Frost-cracks – Rot-hollow, Longitudinal Split & Crevice
Knot-holes – Rot-hollows	Subsidence, Shearing & Helical Spits – Longitudinal Split & Crevice
Pruning-cuts – Rot-hollows	Lightning-strikes – Longitudinal Split & Crevice
Tear-outs – Rot-hollows	Impact-shatters – Longitudinal Split & Crevice
Compression-forks – Rot-hollows	Desiccation-fissures – Longitudinal Split & Crevice
Wounds & Cankers – Rot-hollows	Transverse-snaps – Transverse Crack
Butt Rots – Rot-hollows	Lifting bark – Loose bark
	Welds – Crevice
Associations Key category	Fluting Ivy Boxes

The individual location of each tree was recorded using a Trimble TDC600 and Juniper Systems Geode Multi-GNSS 1Hz Receiver, providing sub-metre accuracy. Individual trees recorded were assigned a unique identification number. Tree locations were then imported into ESRI ArcGIS to produce a range of maps that can be found in the Appendices to this Technical Note. Trees can also be re-located using the maps provided in this report and a range of software and GPS enabled devices.

The survey allows the trees to be categorised for their suitability/ potential to support roosting bats in accordance with Bat Surveys for Professional Ecologists (BCT, 2016) as set out in Table 2.

The assessment classified each PRF as having either:

- Low suitability – a tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
- Moderate suitability - a tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high importance/ value for the local bat population.
- High suitability – a tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.3 TREE CLIMBING INSPECTIONS

Tree climbing inspections for trees located in conflict with the development footprint were carried out on 29th September 2021 by Ben Mitchell BSc (Hons) MCIEEM, an experienced bat ecologist holding a Class 2 Natural England bat license and with considerable expertise in inspecting potential bat tree roosts at height. A safety climber was present. Key external and internal features associated with each PRF and tree were inspected, including tree structure and condition, evolution of PRF and external and internal evidence of the potential/actual use by bats. Inspection was made visually including the use of a video endoscope.

2.4 EMERGENCE/RE-ENTRY SURVEYS

A dawn re-entry survey of the Wellness Centre was carried out on the 16th September 2021 and a dusk emergence survey of the Greenkeepers Cottages was carried out on 21st September (see Table 3). Experienced surveyors were positioned to cover the potential bat access/roosting features identified. The dusk emergence surveys commenced 15 minutes before sunset and continued for at least one and-a-half hours after sunset. The dawn survey commenced 2 hours before dawn and concluded at dawn.

The surveys were undertaken during the optimal months for bats surveys (May to September) and were conducted in suitable weather conditions, in full compliance with Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust (BCT), 2016).

Elekon BatLogger M bat detectors were used. The Surveyors were positioned to ensure an unrestricted view of any features on the buildings identified as potential roost access points.

All bat activity observed during the survey period was recorded with particular attention being given to any emerging or re-entering bats and the point of entry or exit from the buildings. Bat detector recordings were analysed following the survey in order to confirm the identification of any bats observed exiting/re-entering during the surveys.

All calls were analysed using established methods and call parameters as detailed in (Barataud, 2016) (Middleton, Froud, & French, 2014) and (Russ, 2012).

Table 3: Emergence/re-entry Survey Details

Building	Survey Type	Number of Surveyors	Date	Start /End time	Weather	Surveyors
Greenkeepers Cottages	Emergence	3	21/09/21	18:50 – 20:45	Warm (18° C), calm and dry	Kerry White and survey assistants
Wellness Centre	Re-entry	2	16/09/21	04:42 - 06:42	Cool (13° C), calm and dry	Matt Johns and survey assistant

2.5 ACTIVITY TRANSECT SURVEYS

Surveys were designed to comply with current industry guidelines (Bat Conservation Trust, 2016).

The transect route covered the range of habitats present on Site, including amenity grassland, semi-improved neutral grassland, tall ruderal, scrub, hedgerow, scattered trees, woodland edge, standing water and running water (see Figure 1).

The route was surveyed on the dates detailed in Table 4 and was designed to sample all habitats present on Site with a focus on habitats identified as having moderate suitability for bats. Surveys were carried out in suitable weather conditions (above 15°C with no rain and light wind) and commenced at sunset and continued for 3 hours. Elekon, Batlogger M detectors were used for all surveys with GPS data for all bat recordings logged.

An appropriately qualified lead ecologist walked at a constant speed along the planned route. The start/end points were alternated on consecutive visits to reduce survey bias. All bat calls were recorded using an Elekon Batlogger M ultrasonic bat detector which provides high definition and GPS referenced recordings in combination with direct observations i.e. number of bats, flight direction, flight height and behaviour (e.g. commuting or foraging).

Figure 1: Transect survey route



Figure 2: Automated detector locations

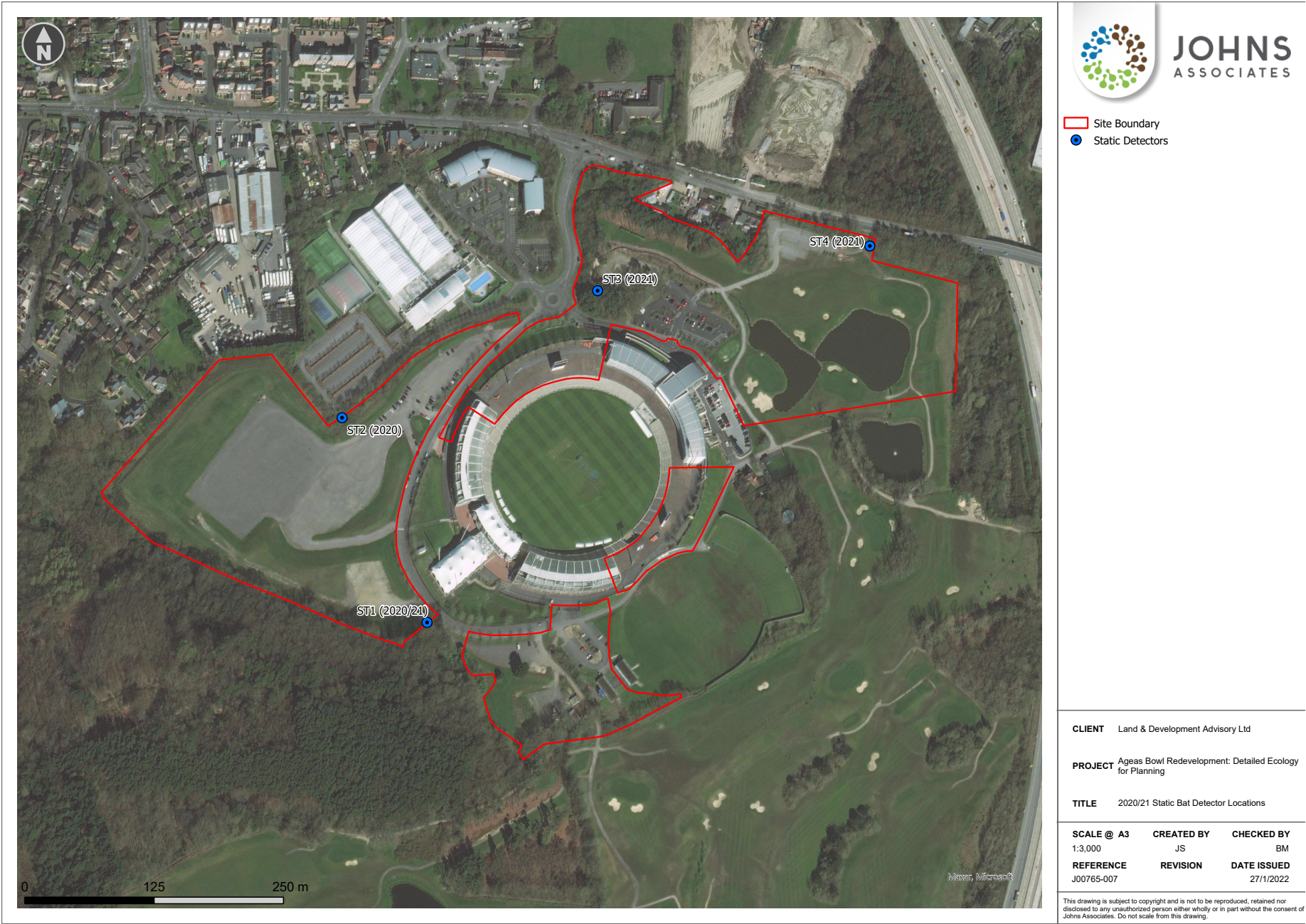


Table 4: Bat Activity Survey Dates

Survey Visit	Date	Dusk/Dawn	Lead Surveyor	Temperature start/end	Cloud Cover (0/8 – Oktas)	Wind (Beaufort Scale)	Rain (mm)
1	20/05/20	Dusk	MJ	18°C	1/8	0	0
2	17/06/20	Dusk	MJ	16°C	8/8	0 - 1	0
3	28/07/20	Dusk	MJ	16°C	0/8	0 - 1	0
4	23/06/21	Dusk	MJ	19°C	2/8	1	0

2.6 AUTOMATED DETECTOR SURVEYS

The Site was assessed as presenting moderate suitability for bats (Bat Conservation Trust, 2016) and as such, automated detector surveys were required to ensure suitable survey effort was distributed throughout the active season following the current industry guidelines (Table 5). The survey design considerations are described in Table 6 and the locations and habitat descriptions of the automated detectors are detailed in Table 7 and Figure 2.

Three Elekon Batlogger C high sensitivity omnidirectional automated ultrasonic detectors were deployed in a total of six locations across the Site and were monitored each month to obtain sufficient volume of data for each location. These units have been selected as they are extremely durable and reliable whilst displaying best in class sensitivity. This is of key importance on sites with known presence of bat species that are difficult to detect (e.g. long eared bats). Solar panels were used to supplement the power supply to ensure that there was a low likelihood of power failures.

Table 5: Guidelines on the number of bat activity surveys recommended (BCT, 2016)

Survey Type	Low suitability habitat for bats	Moderate suitability habitat for bats	High suitability habitat for bats
Activity	One survey visit per season (spring-April/May, summer-June/July August, autumn-September/October)	One survey visit per month (April to October) with at least one survey comprising of a dusk and pre-dawn within a 24hr period	Up to two surveys per month (April to October) with at least one survey comprising of a dusk and pre-dawn within a 24hr period
Automated/static bat detector surveys	One location per transect, data to be collected on five consecutive nights per season (spring-April/May, summer-June/July/August, autumn-September/October)	Two locations per transect, data to be collected on five consecutive nights per month (April to October)	Three locations per transect, data to be collected on five consecutive nights per month (April to October)

Table 6: Survey Design Considerations

Criteria	Requirement	Action
Focus of survey effort	Particular focus on linear features and areas of highest predicted impact	Detector locations chosen to target all key habitats. Microphone locations were designed to detect bats utilizing both sides of linear features by raising the microphone above the vegetation and selecting locations along linear features in breaks in the vegetation.
Number of automated Detectors	Number will respond to number of suitable linear features but the objective would be to sample each habitat component equally.	3 locations were identified to ensure sufficient sample of habitats suitable for commuting and foraging bats considered likely to be subject to negative impacts.
Spatial Distribution of detectors	Enough detectors should be deployed so that each location is monitored	The survey was designed to obtain a minimum of 5 valid recording nights per location per month.
Volume of survey effort	Period of deployment should aim to achieve a minimum of 35 nights (5 nights per month April – October) out of a possible 214 (~16%).	A total number of 5 to 7 recording nights per month was considered appropriate to allow for poor weather and provides a margin for technical faults and other constraints such as vandalism events that are inherent risks in the deployment of automated detectors. Over the survey period the aspiration was to obtain 50 nights of data to ensure that the minimum of 35 nights was achieved.
Temporal distribution of survey effort	35 days from April to October and would include at least one working week (interpreted as 5 days) in each of the months of April, May, August, September and October	Surveys were initiated at the earliest possible point within the survey period and continued through into October. Any shortfalls in a single month were to be mitigated by additional nights in subsequent months to ensure temporal cover.

Table 7: Automated Detector Locations

Location	Grid Reference	Location Description
ST1	ST 473131	Batlogger C detector placed in tree located on southern tree line. Microphone placed at 3m in height facing north.
ST2	ST 476139	Batlogger C detector placed in tree located on the northern site boundary. Microphone placed at 2.5m in height and facing north.
ST3	SU 477142	Batlogger C detector placed in tree located within the copse adjacent to the existing eastern car park. Microphone placed at 2.5m in height and facing north.
ST4	ST 475141	Batlogger C detector placed on pole in tree located on north eastern boundary tree line. Microphone placed at 3.5m in height and facing south.

The automated detectors were configured to record for a maximum of 15 seconds after being triggered and would cease to record in the absence of no further trigger events within this period. Pre-trigger and post trigger settings were designed to capture approach and exit phases of bat calls (see Table 8).

The “SD” trigger was used to reduce the large volume of insect recordings typically recorded and thus preserve battery life and reduce the volume of noise files without compromising the detectability and recording of bat calls (as recommended by Elekon directly for UK species pers. comm.). This filter algorithm measures the periodicity of the waveform as it is received so that only sinusoidal waveforms (i.e. calls with an even periodicity such as those created using vocal chords) are recorded. These trigger parameters were those recommended by Elekon as a suitable compromise between low frequency sensitivity and increased insect noise recordings as shown in Table 8.

Detector deployment periods were designed to record a minimum of 7 consecutive nights of bat activity to allow for power failures etc, this ensured that the survey effort for that month qualifies (see Table 9).

Table 8: Automated Detector Parameters

Parameter	Description	Settings
AUTOTRIG_MAXTIME_MS	Maximal length for automatically triggered recordings in ms	15000
POSTTRIG_TIME_MS	Post-trigger length for automatically triggered recordings in ms	1000
PRETRIG_TIME_MS	Pre-trigger length in ms	500
TRIG_AUTOREC	Trigger event automatically starts recording and recording automatically stops when conditions are no longer met	Auto
TRIG_MODE	Automatic triggering with SD algorithm	SD
TRIG_PAR9	1 high sensitivity and 10 low sensitivity – parameter recommended by Elekon	5
TRIG_PAR7	Minimal frequency for trigger condition in KHz – parameter and setting recommended by Elekon	17KHz

2.6.1 Deployment Summary

The deployment period for the automated detector surveys is detailed in Table 9.

Table 9: Automated Detector Deployment Summary (Nights)

Location	May		June		July		August		September		October		Total Data Analysed		Delivery Against Target (35 nights)
	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	
ST1	6	0	6	6	10	13	9	7	9	6	8	7	48	39	+52
ST2	6	0	8	0	7	0	7	0	9	0	6	0	43	0	+8
ST3	0	0	0	6	0	6	0	7	0	6	0	7	0	32	-3
ST4	0	0	0	8	0	13	0	8	0	8	0	6	0	43	+8
TOTAL	12	0	14	20	17	32	16	22	18	20	14	20	91	114	

2.6.2 Limitations

With automated recording it is impossible to separate commuting bats from bats foraging within close proximity of the static bat detector. It is possible a high nightly pass rate could relate to one or two foraging bats as opposed to individual commuting bat passes. It is therefore very difficult to draw meaningful relationships between activity levels

recorded in terms of passes per night or the use of the site by specific bats for defined purposes (e.g. adult females foraging during the natal period).

ST3 delivered only 32 nights of data due to vandalism. However, this is not considered to be a significant constraint or to undermine the validity of the data.

Elekon Batlogger C automated detectors are extremely sensitive and are considered to be the best units available at this time. Despite this, a number of bats will not have been recorded (e.g. due to flight path, low call volume etc) the sample recorded is, however considered representative as this will only apply to calls of a low number of species (discussed further below) and the variability between locations is significantly reduced as these units were rotated between all locations, thus suitably reducing the variation of recording detection between locations to allow an accurate comparison.

Johns Associates was not commissioned until mid-May in 2020 and 2021 meaning that April survey data was not available. Due to Covid-19 access would not have been possible at this time in any event. This omission is not considered to result in any deterioration in the reliability of the baseline presented here, with a further static detector being added for August, September, and October surveys. Historic survey data is also available and will be drawn upon in any future impact assessment, should this be necessary.

2.7 BAT CALL ANALYSIS

2.7.1 Weather Screening

The data has not been screened for suitable weather, rather the sample only includes nights where bat activity was recorded to remove nights of automated detector effort during unsuitable weather conditions. This approach is considered to negate the requirement for weather screening as the presence of foraging bats has been taken as evidence of suitable weather conditions. Different species of bats are reported to have a varying degree of sensitivity to marginally suitable weather, although this information is anecdotal and not supported by research to date. As such, any inter species variation in terms of emerging from roosts to forage (i.e. potentially between common pipistrelle and brown long eared/myotis bats) is not considered to significantly affect this analysis. The frequency at which these species were recorded within the same night throughout the survey period broadly supports this assumption.

Whilst the prevailing weather clearly has an effect on the distribution of bats across the Site at any given moment given the susceptibility of their prey to wind speed and direction and precipitation, this survey has been designed to monitor suitable habitats in all weather conditions to capture the variation in relative importance of habitats for any given period of weather.

2.7.2 Recording Analysis

All echolocation calls were recorded and subsequently analysed to species/group (Table 10) if possible with a satisfactory level of confidence, using the established call parameters for UK bat species (Barataud, 2016) (Middleton, Froud, & French, 2014) (Russ, 2012) by suitably experienced ecologists. All recordings have been manually classified and verified and the auto identification function of Bat Explorer has been used to expedite manual classification only.

Where the identification of recordings has not been possible to species level, (e.g. single/low pulses recordings, clutter call structures, poor signal to noise ratio etc), recordings have been classified to genus/group level. Where the calls were clearly identifiable as having been emitted by a bat but the species cannot be confidently identified, the recordings have been classified as 'unknown'. Noise files have not been included in the classification and have been removed from the project files (but retained in a backup).

Species of the *Myotis* genus are impossible to conclusively identify to species with a sufficient level of confidence and have therefore been grouped together under the genus name. Additional acoustically similar groups have also been used where calls could not be robustly identified to species.

Grey long eared bats are considered extremely unlikely to be present on Site based on the absence of historic records. DNA analysis of dropping taken from long eared bat roosts present in buildings in the wider Site confirmed brown long eared as the only species present. However, the classification of *Plecotus* has been used on a precautionary basis for all long-eared bat recordings to acknowledge the cryptic nature of these calls and under recorded distribution of this species, as acoustic recordings cannot conclusively be allocated to a specific species.

The group Nyctaloid has also been used to identify calls belonging to “nyctalus like” bats that include serotine, noctule and Leisler’s bat species as there is considerable overlap in the known call parameters that prevents conclusive call identification in all but the most clear and characteristic calls.

Nyctalus genus has also been used where the recording can be confidently identified as either noctule or Leisler’s bat.

Table 10: Bat Species and Group Classification

Common Name	Scientific Name
Species level classification	
Common pipistrelle	<i>Pipistrellus pipistrellus</i>
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Serotine	<i>Eptesicus serotinus</i>
Lesser horseshoe	<i>Rhinolophus hipposideros</i>
Greater horseshoe	<i>Rhinolophus ferrumequinum</i>
Noctule	<i>Nyctalus noctula</i>
Genus Level classification	
Myotis	All species of Myotis bat excluding Greater Mouse Eared
Nyctalus species	Noctule and Leisler’s
Other	
Nyctaloid	Species included in this group of acoustically similar species include Noctule, Serotine and Leisler’s.

2.8 LIMITATIONS

Internal inspections of the buildings were not possible at the time of the survey due to the Covid 19 pandemic, therefore only external inspections were conducted, with further emergence/re-entry surveys conducted on a precautionary basis. Despite this limitation, the assessment of the buildings in terms of their suitability to support roosting bats is considered valid. Further surveys have been recommended to confirm the current status of both buildings in terms of use by bats.

The tree assessment survey was undertaken at ground level and supported by use of binoculars, torch and surveyor experience of identifying bat PRF and confirmed roosts. As such the suitability of a tree or feature stated in this assessment is precautionary, in the absence of being able to inspect PRF’s at height. Given the legal status of bats and their roosts, a precautionary approach is appropriate. A large number of trees supported dense ivy that prevented full inspection of the trunk/ limbs and a precautionary approach has also been taken with these trees.

The survey is not able to determine whether enclosed PRF with Low suitability could be used by hibernating bats – timing of work in winter therefore needs to take into account the potential for bats to be hibernating in trees.

Three hours was adopted as the activity transect survey duration to ensure all habitats across the Site could be adequately sampled in a repeatable manner.

During the July survey, additional lighting was in use in the northeast of the Site over the large stone car park in that area. This was associated with enhanced security associated with COVID-19 and Test Match Cricket biosecurity. Interestingly, there was a reasonable level of bat activity in this area on that occasion – exceeding that recorded previously on walking transect surveys in 2020.

Transect surveys inherently under record quiet calling and sensitive species. The deployment of automated detectors has been used to increase the effort with a focus on these species.

The transects in 2020 covered a wider extent of the golf course habitats than have been included in the current application. Whilst this does dilute the survey effort within the red line boundary for the 2020 data, it does provide valuable data and context. The single update transect in 2021 sought to account for this constraint by focussing on the application boundary.

3 RESULTS

3.1 DESK STUDY

3.1.1 Summary Of Historic Surveys

Previous surveys conducted by Matt Johns of Johns Associates in 2007 (when at Entec UK Ltd) confirmed the following:

*"Five species of bat were recorded foraging within/ immediately adjacent to and/ or commuting over the site during the bat activity surveys. The species recorded were common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), serotine (*Eptesicus serotinus*), noctule (*Nyctalus noctula*) and an unknown species of *Myotis* bat. Bat activity was associated mainly with the woodland edge and semi-natural grassland of the long rough of the golf course. Activity was also detected at other habitats such as an area of swamp and open water (former and existing motorway lagoons) adjacent to hedgerows and along tracks; such areas are likely to be more prey-species rich and sheltered, and in addition, the woodland edge forms a suitable linear feature for the bats to follow. There was little or no activity in the vicinity of the Rose Bowl stadium, [now Ageas Bowl stadium] access roads and car parks."*

Surveys of land to the south of the Site associated with Thorneydown Farm (now being incorporated into the golf course), recorded the following:

"The majority of foraging activity was recorded in the NW corner of the Site along the edge of the small western copse. Foraging was also observed along the northern defunct hedgerow and at a lower frequency in the NE corner of the Site. The majority of species recorded during the transect were common and soprano pipistrelle. Unknown myotis species were also frequently recorded in the NW corner of the Site."

Bat activity was recorded along the southern boundary. However, only common pipistrelle bats were recorded foraging under the streetlights along Charles Watts Way during the transect surveys."

Information from static detector surveys was also reported. *"In total over 30 nights of recording during June, July, September and October 2017, 1,700 bat passes were recorded. The vast majority of these were of common pipistrelle, but four additional species were also frequently recorded: soprano pipistrelle, noctule, long-eared bat and unknown myotis species."*

*Barbastelle bat (*Barbastella barbastellus*) was also recorded on Site during the October deployment of the static detector surveys. In total three barbastelle passes were recorded: 1 pass at 04:29 on 06/10 and 2 passes at 21:38 and 21:38 on 07/10 in the NW corner of the Site adjacent to the small western copse. Due to the timing of these recordings, (close to dawn and to dusk), it is possible that a Barbastelle bat roosted close by."*

3.1.2 Statutory Designated Sites of Nature Conservation Importance

The site does not lie within 5km of any statutorily designated site of nature conservation importance specifically associated with bats.

3.1.3 HBIC Results

The desk study data provided by HBIC in July 2021 (reported separately – see Appendix A) is summarised in Table 11). Three of the noctule records were from field records of noctules flying to the north of Telegraph Woods.

No records of horseshoe bats within a 5km radius of the Site were returned.

Table 11: Bat Records within 2km of the Site

Mammals - Bats											
<i>Barbastella barbastellus</i>	Western barbastelle	X	X	X	CI	X			SU474133	3 recordings. One recorded on site.	
<i>Eptesicus serotinus</i>	Serotine	X	X	X		X			SU472141	7 recordings. Closest record 110m west of site.	
<i>Myotis nattereri</i>	Natterer's bat	X	X	X					SU480147	1 record, 400m north of site.	
<i>Myotis species</i>	Myotis sp.	X	X	X	CI	X			SU472141	8 recordings. Closest record 110m west of site.	
<i>Nyctalus noctula</i>	Noctule	X	X	X					SU472141	12 recordings. Closest record 110m west of site.	
<i>Pipistrelle nathusii</i>	Nathusius's pipistrelle	X	X			X			SU471151	1 record, 1km northwest of site.	
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	X	X						SU472141	32 recordings. Closest record 110m west of site	
<i>Pipistrellus pygmaeus</i>	Soprano Pipistrelle	X	X	X					SU472141	20 recordings. Closest record 110m west of site.	
<i>Plecotus auritus</i>	Brown long-eared	X	X	X	CI	X			SU493145	3 recordings. Closest record 1.2km east of site	
<i>Plecotus species</i>	Plecotus sp.	X	X	X	CI	X			SU478134	8 recordings. One recorded on site.	

3.1.4 European Protected Species Licences (EPS) for Bats

Eleven Natural England European Protected Species (EPS) licences have been issued for sites within 5km of the Ageas Bowl. Three of these licences are from within 2km of the Site. Details of these are provided in Table 12.

Table 12: Natural England European Protected Species Licences

Latin name	Common name	Licence impact	Licence dates	Location relevant to site boundary
<i>Pipistrellus pipistrellus</i> , <i>Plecotus auritus</i>	Common pipistrelle, Brown long-eared bat	Damage and destruction of resting place	17/05/2016 – 17/05/2026	280m northwest
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	Destruction of resting place	25/04/2013 – 01/04/2015	500m east
<i>Pipistrellus pipistrellus</i> , <i>Pipistrellus pygmaeus</i> , <i>Plecotus auritus</i>	Common pipistrelle, Soprano pipistrelle, Brown long-eared bat	Destruction of resting place	11/04/2016 – 30/04/2020	1.32km north

3.2 BAT HABITAT SUITAIBILITY

Habitats within the Site have been assessed as presenting moderate suitability for bats. Positive/promoting features included semi-improved grassland, wooded copses, tree lined boundaries and waterbodies. Negative/limiting factors included large areas of intensively mown golf playing surfaces and the cricket stadium/hotel, car parking, roads and lighting that dominate key areas of the Site.

No potential roost features have been identified on any building associated with the Site.

Certain trees within the mature woodlands and the woodland perimeter include Potential Roost Features (PRFs).

3.3 BAT ROOST INSPECTION (BUILDINGS)

3.3.1 Greenkeepers Cottages

The greenkeepers cottages consist of two semi-detached residential dwellings constructed of red brick with clay tiled roofs. Gable ends were present at the northern and southern elevations with decorative wooden fascia boards. Wooden soffit boxes were present at all elevations. All windows and doors were wooden framed. Two similarly constructed garages were present at the rear of the dwellings. Both had wooden fascia boards at each elevation.

Plate 1: Greenkeepers cottages



Plate 2: Garages at rear of greenkeepers cottages



The building has the following features that could support roosting bats or could lead to internal potential roost features (PRFs):

- Missing mortar at corners or roof and soffit boxes
- Lifted roof tiles
- Gaps behind wooden fascia boards

No evidence of bats was observed during the survey, such as droppings or staining near external features.

3.3.2 Wellbeing Centre

This was a single storey, flat roofed building constructed of wooden cladding and steel with wooden window and door frames.

Plate 3: Wellbeing Centre



The building has the following features that could support roosting bats or could lead to internal potential roost features (PRFs):

- Warped wooden cladding
- Gaps under wooden window frames

No evidence of bats was observed during the survey, such as droppings or staining near external features.

3.4 GROUND LEVEL TREE ASSESSMENT (GLTA)

3.4.1 Trees within the Development Footprint

A total of twenty trees within the development footprint supported PRFs, of which seven were classified as having Low suitability, three Moderate suitability and ten High suitability. Further information on this and additional survey requirements is provided in Table 3 and Figure 3.

Table 13 provides a summary of the seven trees supporting Potential Roost Features with low suitability. All trees were mature oak species with extensive ivy growth concealing the trunk.

Table 13: Trees with Low Suitability PRF

Tree ID	PRF Class	Further Requirements
9	Precautionary Low	Climbing inspection and re-check for PRF
10	Precautionary Low	Climbing inspection and re-check for PRF
11	Precautionary Low	Climbing inspection and re-check for PRF
13	Precautionary Low	Climbing inspection and re-check for PRF
15	Precautionary Low	Climbing inspection and re-check for PRF
17	Precautionary Low	Climbing inspection and re-check for PRF
37	Precautionary Low	Climbing inspection and re-check for PRF

Table 14 provides a summary of three trees supporting Potential Roost Features with moderate suitability. Two trees are located along the northeastern boundary feature and appear to be retained when cross referencing with the current design masterplan.

Table 14: Trees with Moderate Suitability PRF

Tree ID	PRF Class	Further Requirements
5	Moderate	None. No impact from development
6	Moderate	None. No impact from development
12	Moderate	Two emergence/re-entry surveys using 1 surveyor, 1 infra-red camera or climbing surveys

Table 15 provides a summary of the ten trees supporting Potential Roost Features with High suitability. One tree is located along the northeastern boundary feature and appears to be retained when cross referencing with the current design masterplan.

Table 15: Trees with High Suitability PRF

Tree ID	PRF Class	Further Requirements
1	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
4	High	None. No impact from development
7	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
8	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
14	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
16	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
18	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
19	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
38	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys
39	High	Three emergence/re-entry surveys using 2 surveyor, 2 infra-red cameras or climbing surveys

3.4.2 Trees Adjacent to Development Footprint

A total of eighteen trees adjacent to the development footprint supported PRFs. If the trees are to be retained, no further surveys are required. Further information on these trees is listed in Table 16 and additional requirements are detailed in section 4.2.3.

Table 16: Trees with Low/Moderate/High Suitability PRF

Tree ID	PRF Class	Further Requirements
22	Low	No further surveys if trees are to be retained. Lighting strategy required.
23	Low	No further surveys if trees are to be retained. Lighting strategy required.
24	Low	No further surveys if trees are to be retained. Lighting strategy required.
25	Low	No further surveys if trees are to be retained. Lighting strategy required.
26	Low	No further surveys if trees are to be retained. Lighting strategy required.
27	Low	No further surveys if trees are to be retained. Lighting strategy required.
37	Low	No further surveys if trees are to be retained. Lighting strategy required.
2	Moderate	No further surveys if trees are to be retained. Lighting strategy required.
3	Moderate	No further surveys if trees are to be retained. Lighting strategy required.
21	Moderate	No further surveys if trees are to be retained. Lighting strategy required.
30	Moderate	No further surveys if trees are to be retained. Lighting strategy required.
28	High	No further surveys if trees are to be retained. Lighting strategy required.
29	High	No further surveys if trees are to be retained. Lighting strategy required.
31	High	No further surveys if trees are to be retained. Lighting strategy required.
32	High	No further surveys if trees are to be retained. Lighting strategy required.
33	High	No further surveys if trees are to be retained. Lighting strategy required.
34	High	No further surveys if trees are to be retained. Lighting strategy required.
35	High	No further surveys if trees are to be retained. Lighting strategy required.

3.5 TREE CLIMBING INSPECTIONS

The tree climbing inspections allowed further consideration and clarification of the PRF status of trees. The revised and final PRF status of relevant trees is shown in Table 17. Residual trees with PRF features confirmed after the further GLTA and climbing inspection and potentially in conflict with the development proposals are shown on Figure 3.

Table 17: Final PRF Status of trees within development footprint

Tree	Co-ordinates		Species	PRF Type	Stem or Limb?	PRF Orientation	PRF Height	Ivy present	PRF Status
T1	-1.3194823	50.924358	Oak	Multiple features	Stem/limb – rot present			No	Negligible
T7	-1.3183312	50.9260777	Oak	Multiple features				Yes	Negligible
T8	-1.3183312	50.9260777	Oak	Low vertical dead stem crack	Stem	NW	6m	Yes	Low
T13	-1.319093902	50.92632835	Oak	Rot hole	Limb	North	10m	No	Negligible
T14	-1.320004343	50.92598666	Oak	Multiple features	Limbs			No	Negligible
T15	-1.320089492	50.9260286	Oak	Unknown				Yes - partial	Negligible
T16	-1.321401088	50.92640468	Sweet chestnut	Unknown				No	Negligible
T17	-1.321401088	50.92640468	Oak	Unknown				Yes	Negligible
T18	-1.321604232	50.92635974	Sweet chestnut	Woodpecker holes domed roof (squirrel and slugs present)	Stem	South	6m	No	High
T19	-1.321766072	50.92630946	Sweet chestnut	Woodpecker holes x 3	Stem	South	4 & 5m	No	Negligible
T37	SU 47825 14234		Oak					Yes	Negligible
T38	SU 47824 14234		Ash	Hazard beam in low grounded limb	Stem	SW	1-2m	No	Low
T39	SU 47806 14254		Wild cherry	Woodpecker holes x 2	Stem	E	5m	No	High
				Woodpecker hole	Stem	SW	5m		
				Rot hole	Stem	S	8m		

This concludes that T8 (low suitability), T18 (high suitability), T38 (low suitability) and T39 (high suitability) have viable PRF and are located within the development footprint.

It is likely that the design can be adapted to enable the retention of trees T8, T38 and T39.

Further consideration of the feasibility of retaining T18 will be given. If this cannot be retained, further surveys will be required in 2022 prior to determination of the planning application for the Mixed Use Development.

Figure 3: GLTA - Trees Assessed within site boundary

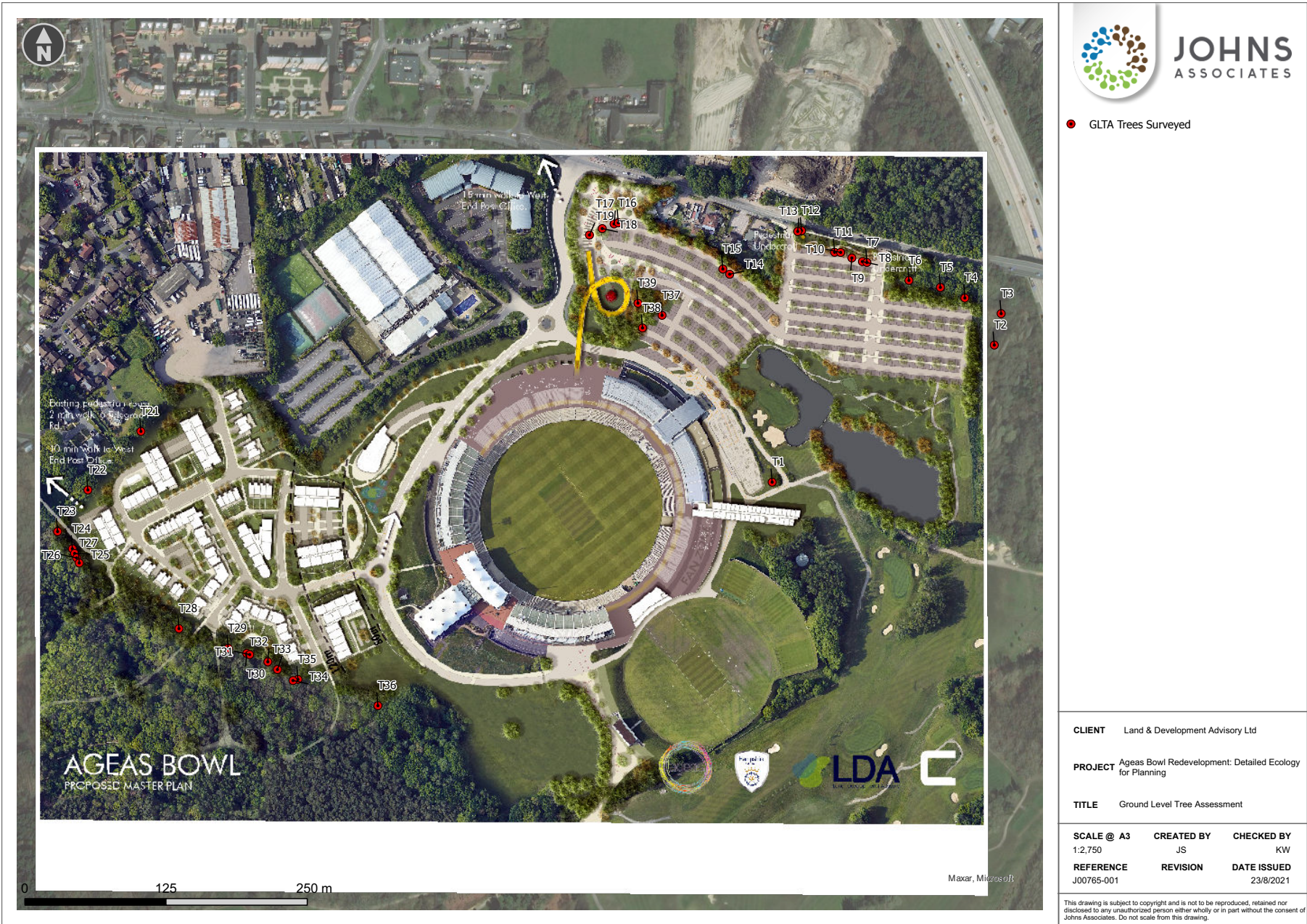
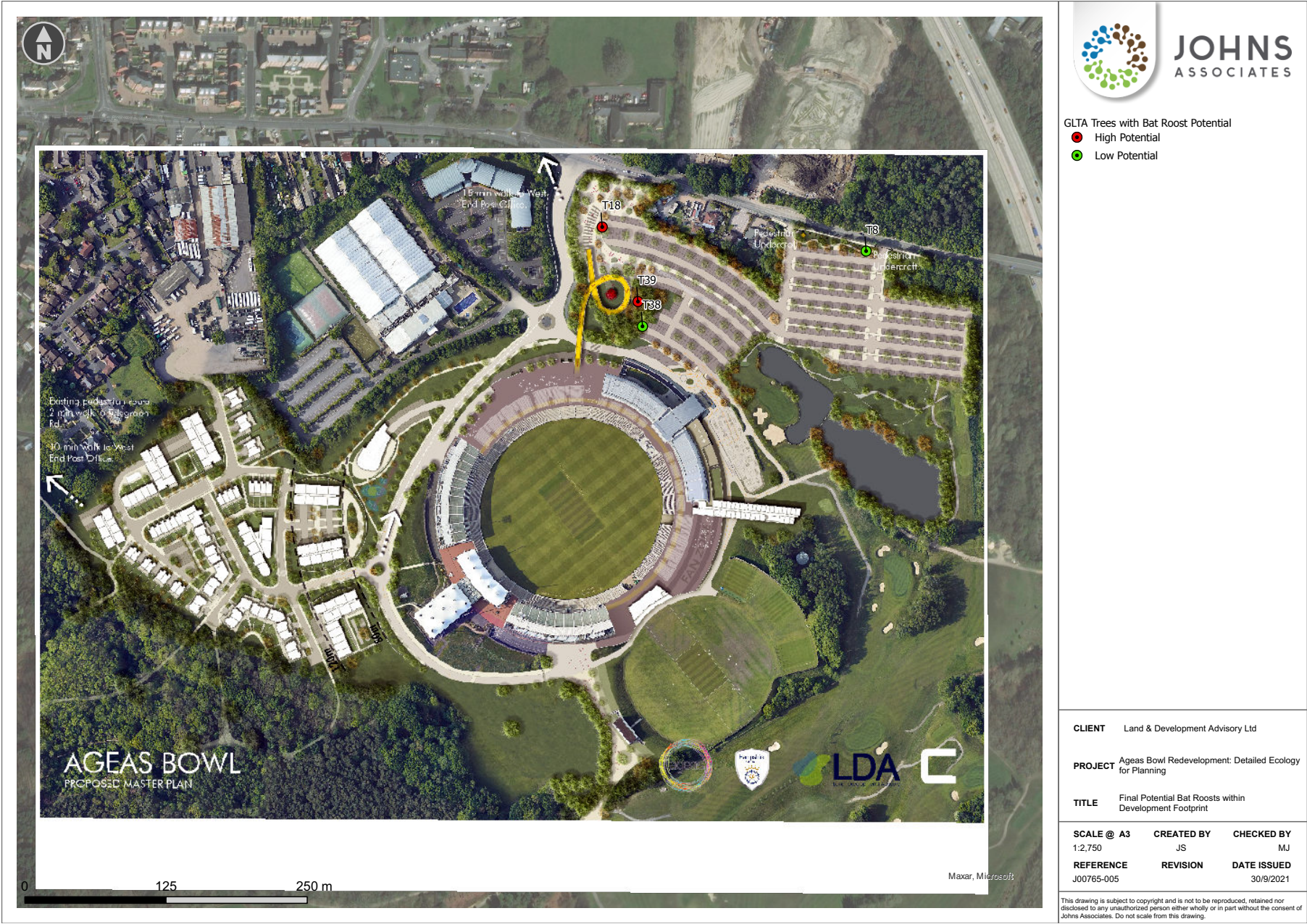


Figure 4: Trees supporting potential roost features within application boundary



3.6 EMERGENCE/RE-ENTRY SURVEYS

One re-entry survey of the Wellness Centre was carried out on the 16th September 2021 and a dusk emergence survey of the Greenkeepers Cottages was carried out on 21st September. Experienced surveyors were positioned to cover all potential bat access/roosting features identified. The dusk emergence survey commenced 15 minutes before sunset and continued for at least one and-a-half hours after sunset. The dawn survey commenced 2 hours before dawn and concluded at dawn.

The surveys were undertaken during the optimal months for conducting bats surveys and were conducted in suitable weather conditions; in full compliance with Bat Survey Guidelines for Professional Ecologists: Good Practice Guidelines (Bat Conservation Trust (BCT), 2016).

Elekon BatLogger M bat detectors were used. The surveyors were positioned in order to have an unrestricted view of all features on the buildings identified as potential roost access points.

All bat activity observed during the survey period was recorded with particular attention being given to any emerging or re-entering bats and the point of entry or exit from the buildings. Bat detector recordings were analysed following the survey in order to confirm the identification of any bats observed exiting/re-entering during the surveys.

All calls were analysed using established methods and call parameters as detailed in (Barataud, 2016) (Middleton, Froud, & French, 2014) and (Russ, 2012).

Table 18: Emergence Survey Details

Building	Survey Type	Number of Surveyors	Date	Start /End time	Weather	Surveyors
Greenkeepers Cottages	Emergence	3	21/09/21	18:50 – 20:45	Warm (18°C), calm and dry	Kerry White and two survey assistants
Wellness Centre	Re-entry	2	16/09/21	04:42-06:42	Cool (13°C), calm and dry	Matt Johns and one survey assistant

3.7 ACTIVITY TRANSECT SURVEYS

For the transect route including locations of listening points and results see Figure 5 and Figure 6.

The transect route covered all habitat types present across the Site.

In total six species were recorded during the activity transect surveys. Typically, common pipistrelle was the most common species recorded accounting for 70% of the total recordings, the second being noctule at 20% of the total. The full species assemblage, number and percentage of total calls recorded per species is shown in Table 19.

Table 19: Results of the Transect Surveys

Species	Total records	Percentage of Total Records
Common pipistrelle	623	69.98
Noctule	176	20
Soprano pipistrelle	64	7
Myotis sp.	27	3
Serotine	7	0.01
Plecotus sp.	6	0.01

Within the application area, activity was highest around boundary habitats, particularly those containing mature trees and water features. A high level of activity by Noctule bats was recorded within the woodland habitat to the west of the Site during the July activity transect. These were likely to be foraging over the tree canopy.

The areas of broadleaved woodland, scrub, tall ruderal habitats and areas of standing water recorded the largest amount of bat activity. This is typical as these habitat types are darker, provide more protection, and usually attract a greater assemblage of invertebrate prey species. The amenity grassland and hard standing areas recorded relatively low levels of activity which is not surprising considering these areas are open and are relatively poor with regards to plant species assemblage, however local pockets of activity were observed, particularly for noctule and common pipistrelle foraging on invertebrates attracted to the lighting around the parking areas.

Overall, activity of bats across the Site was as predicted on the basis of activity being concentrated in areas of suitable habitat. The species composition is also indicative of urban areas in this locale. However, fewer bats were recorded during the June transect when compared to the May and July transects. Activity was recorded within the woodland to the west, woodland edges across the Site, tall ruderal habitat to the north and in the vicinity of the standing waterbodies.

The records of light-sensitive species were very limited within the application boundary and almost entirely restricted to Myotis bats (likely to be Daubenton's or Natterer's) foraging over the waterbodies in the east.

Figure 5: Transect survey results - all species

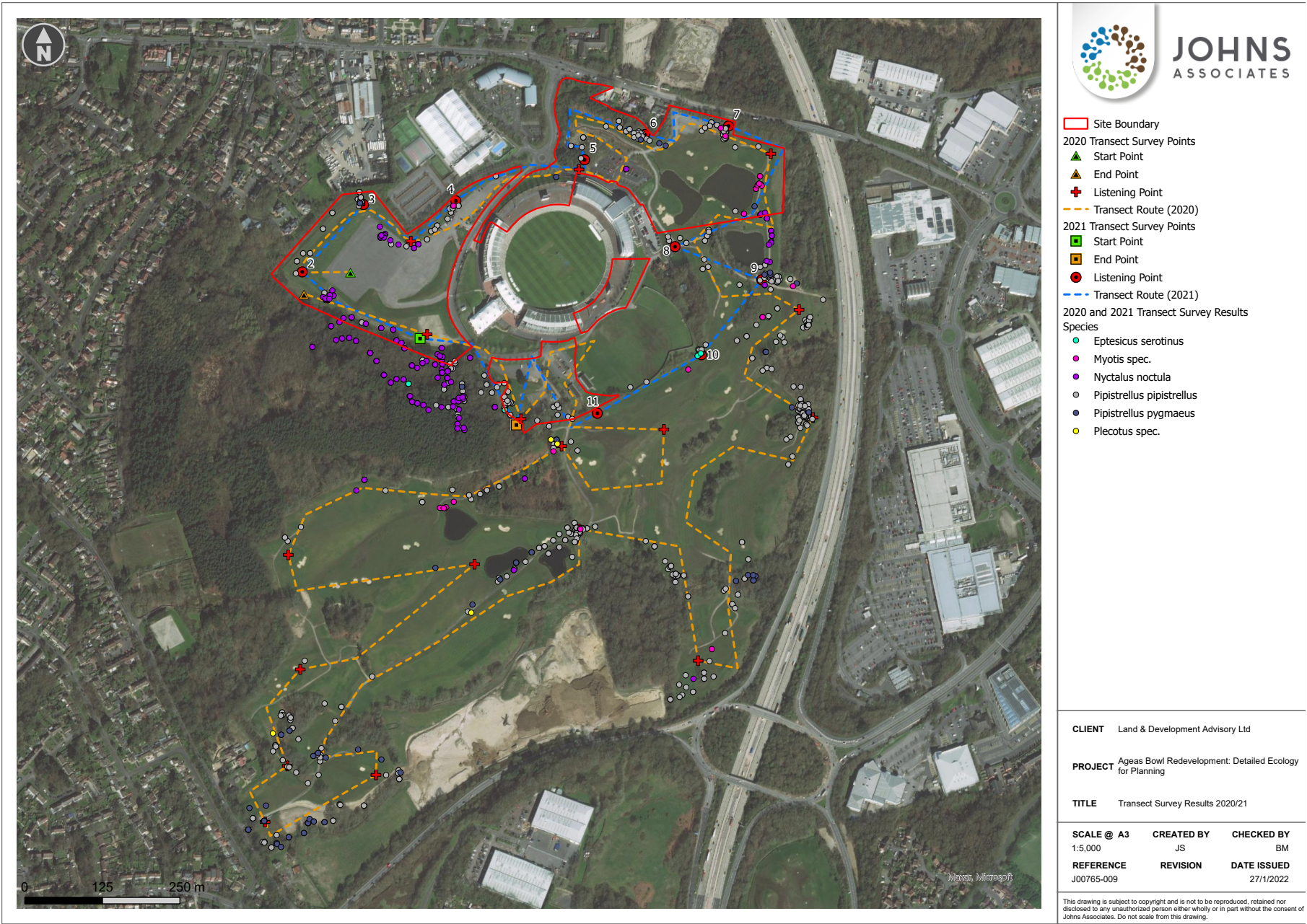
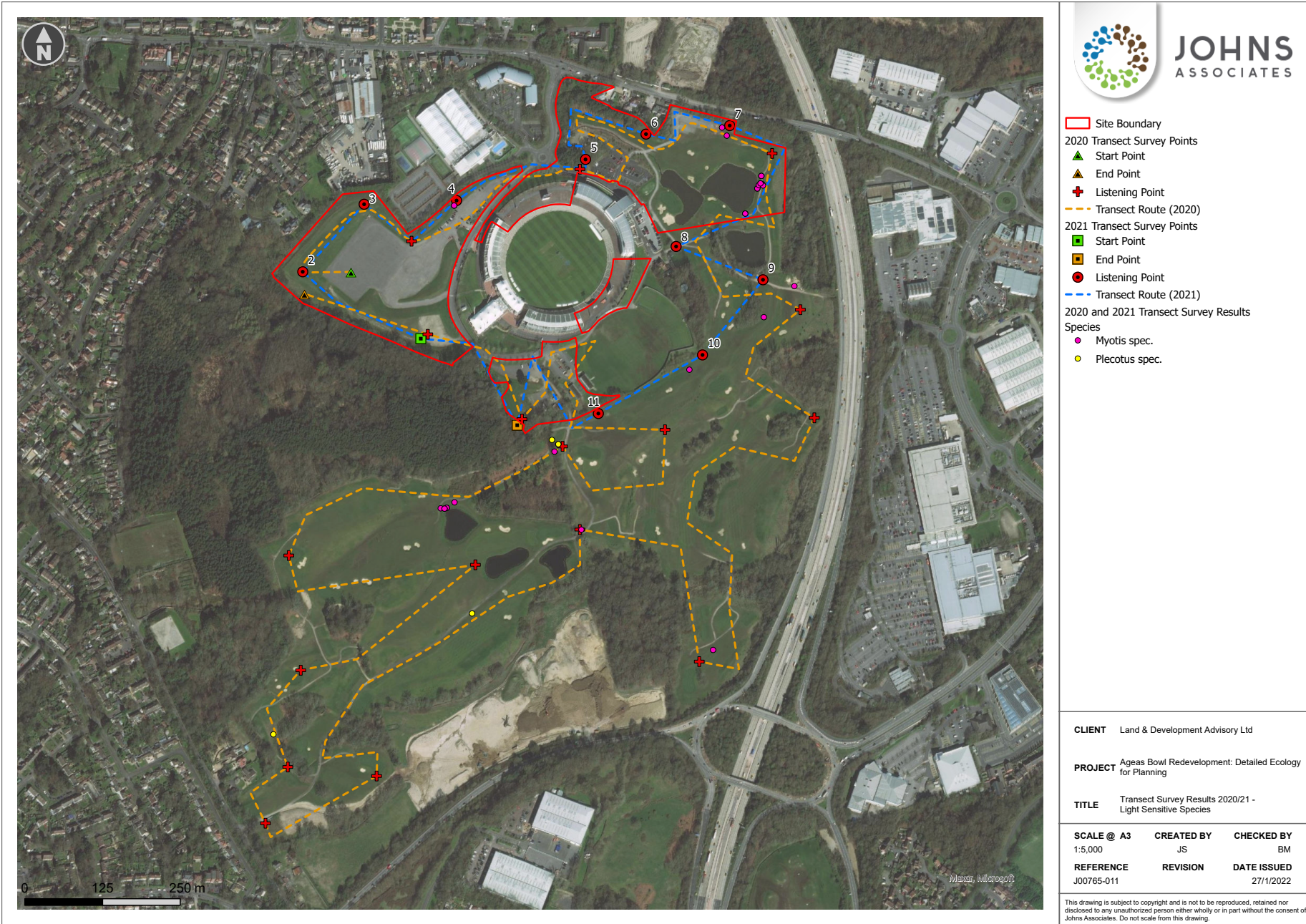


Figure 6: Transect survey results - light sensitive species only



3.8 AUTOMATED DETECTOR SURVEYS

A total of 102,451 recordings were collated into a single dataset for the Site and were analysed using R Studio: the full results of this analysis are presented in Section **Error! Reference source not found.: Error! Reference source not found..** R Studio is an open-source software package which utilises the R language and environment for statistical computing and graphics. This was chosen for its ability to provide well-designed and high-quality visualisations of complex data.

The survey recorded a total of 9 species on Site (see Table 20)

Table 20: Automated detector - summary species results

Species	Total records	Percentage of Total Records
Common pipistrelle	70626	68.94
Noctule	25751	25.13
Soprano pipistrelle	5413	5.28
Myotis sp.	124	0.12
Serotine	449	0.44
Plecotus sp.	38	0.04
Leisler's	23	0.02
Nathusius pipistrelle	18	0.01
Barbastelle	7	0.01
Nyctalus spp	2	0.01

For full assessment of the automated detector results please refer to Section **Error! Reference source not found..** For technical details on the software settings, packages, and processes carried out please refer to the References listed in Section **Error! Reference source not found..**

4 SPECIES RESULTS

4.1 GENERALIST EDGE ADAPTED SPECIES

4.1.1 Common Pipistrelle

All detector locations show that for the period of their individual deployments, the majority of recorded nights show high activity levels for common pipistrelles.

The pass rate for all detectors shows an increase of common pipistrelle passes from May to July, with peaks of 9205 passes at ST3 in September and 8,402 passes at ST2 in July. This is considered to be the characteristic pattern of activity levels throughout any given year for British bats in general as the number of bats in flight increases dramatically as juveniles take flight in June/July and then disperse more widely in August/September and October.

Common pipistrelle activity is distributed widely through the emergence time range at all locations and is not restricted to the emergence window, with passes both before and after. This would suggest that features are used for both commuting and foraging purposes.

Across the deployment time, a large number of recordings from ST1 and ST2 fall within the common pipistrelle emergence time range. Given this and the high activity levels it is considered highly likely that there are common pipistrelle roost(s) within close proximity to the Site or on-Site. The emergence surveys of the structures and trees

within the application boundary did not record any bat roosts so this roost is likely to lie just outside the application boundary.

Given the high levels of activity at ST2 and ST3 during the early maternity periods of June and July, it is considered likely that there is a common pipistrelle maternity roost within close proximity to this location and the Site lies within a core sustenance zone for this common pipistrelle roost. The exact location of the roost is unknown, however, the range of a core sustenance zone for this species is stated as a 2km radius, although confidence in this figure is considered to be low (BCT, 2012).

4.1.2 Soprano Pipistrelle

Soprano pipistrelle had significantly fewer passes at all locations compared to that of common pipistrelle. Given the significantly larger size of maternity roosts for this species when compared to common pipistrelles, it is considered very unlikely that the habitat features of the static locations lie within a core sustenance zone of a maternity roost as the recorded activity levels are extremely low throughout the deployment period.

The only location with significant levels of activity for this species was ST3 and this was limited to late season in September and October. The reasons for the elevated activity levels are not obvious in this location but are considered likely to reflect a seasonal abundance of prey in the sheltered copse and car park edge.

Across the deployment time, a large number of recordings at ST1 fall close to within the emergence time range for the species. Given this, it is considered highly likely that there is a soprano pipistrelle roost(s) within close proximity to the Site or on-Site.

No significant peaks at any of the detector locations were evident during the early maternity months of June and July so it is considered that none of the locations lie within close proximity to a maternity roost for this species.

4.2 OPEN AIR FORAGING SPECIES

Species included within this group are characterised by high wing loading, fast flying and agility in open space but lacking the ability to negotiate cluttered environments. These bats fly at a range of heights between 2m and 40m with Noctule scouting flights recorded up to 300m (O'Mara, 2019). This group includes the following species/acoustically similar species of noctule, serotine and Leisler's bats.

4.2.1 Noctule

Noctule bats were the second most frequently detected species across the Site. A total of 25751 passes (25%) were recorded from all detectors.

The pass rate for all detectors shows an increase of Noctule passes from July to September, with peaks of 10465 in August. The highest levels of activity were recorded at ST1 and ST2 within this period.

Noctule activity is distributed widely through the emergence time range at all locations and is not restricted to the emergence window, with passes both before and after. This would imply that all features are used for both commuting and foraging purposes but with a strong preference for ST1 and ST2. The median nightly hourly pass rate at ST2 was 18.28 passes per hour with 9.13 passes per hour recorded at ST1. These figures are considered high and imply that the site is used frequently as a foraging habitat for this species. As this species is very loud and easy to detect, this elevated activity level is likely to represent a relatively low number of bats, however this remains a significant level of activity.

Across the deployment period, 53 recordings from location ST2 fall within the Noctule emergence time range. Given this and the relatively high activity levels it is considered highly likely that there are Noctule roost(s) within close proximity to the Site or on-Site. However, this is a fast, direct flying species and therefore, this range could be up to 5km from the Site.

With a noticeable increase of Noctule passes at ST1 (5087) during the maternity month of July, it is considered likely that there are Noctule maternity roosts within close proximity to this location and the location lies within a core sustenance zone for a Noctule roost.

4.2.2 Serotine

Serotines bats were recorded by all the detectors during the deployment period. A total of 449 passes (0.44%) were recorded with the majority of these recorded at locations ST1 and ST3.

An increase in Serotine passes was observed in June and July, with a peak of 144 passes at in July at ST1. A peak of 99 serotine passes was also observed at ST3 in July.

For a common bat species this is a relatively low to moderate level of bat activity, which implies the majority of the Site is of little importance for the species.

4.3 WOODLAND/CLUTTER FORAGING SPECIES

4.3.1 Myotis Species

The total figure for the *Myotis* genus comprises 6 species and therefore this assessment accounts for all these species combined and is not directly comparable to other single species figures. These species are considered to be light sensitive and exhibit broadly similar sensitivities in terms of negative effects of development.

As it is not possible to confidently distinguish this group using echolocation calls, any meaningful assessment of individual species is fundamentally problematic.

A total of 124 passes (0.12%) were recorded from all detectors with the highest level of activity being recorded at ST1.

A small number of recordings from ST1 fall within the *Myotis* sp. roost emergence time range suggesting there may be a roost within close proximity to the Site but that this is unlikely to be a maternity roost given the absence of records during the maternity period.

The activity levels of *Myotis* species are limited to the Site boundaries.

4.3.2 Long-Eared Species

The low relative number of *Plecotus* bats is typical of automated detector surveys due to the limited detection range of the echolocation calls of these species. These results are considered to be an underestimation of the activity levels of these species. As grey long eared bats (*Plecotus austriacus*) are a relatively recent addition to Britain, they are considered to be under recorded as they cannot be distinguished from brown long eared bats (*Plecotus auritus*) by their calls and can be difficult to identify in the hand. However, there are no records of roosts within 3km of the Site and it is therefore considered unlikely that bats recorded on site are grey long eared species and that the habitats present on Site are unsuitable for this species.

A total of 38 passes (0.12%) were recorded with the highest level of activity being recorded at location ST1.

With no correlation between bat passes and roost emergence times for this species it is considered unlikely that a roost is located within close proximity of the static locations and the level of activity indicates the species are using the habitat features for commuting and foraging.

No significant peaks at this location were evident during the early maternity months of June and July so it is considered that this location does not lie within close proximity to a maternity roost.

4.3.3 Barbastelle

A total of 7 passes (0.01%) were recorded at ST1 in July (6) and September (1).

With no correlation between bat passes and roost emergence times for this species it is considered to be unlikely that a roost is located within close proximity of the static locations and that the level of activity indicates the species are using the habitat features for commuting and foraging.

No significant peaks at this location were evident during the early maternity months of June and July so it is considered that this location does not lie within close proximity to a maternity roost.

5 SUMMARY CONCLUSIONS

It is considered that the woodland habitat located across the Site are of value to bats as it provides a foraging resource and commuting corridors to the small pockets of scrub and tall ruderal habitat which also provide this function and contribute to the availability of invertebrate prey species.

5.1 BAT ROOSTS

No bat roosts have been recorded on Site despite significant targeted effort in accordance with industry guidelines (Bat Conservation Trust, 2016).

The building assessment confirms low suitability of two buildings, the greenkeepers cottages and wellbeing centre, requiring a single bat survey of each building in September 2021. The associated surveys confirmed no bats emerged/re-entered and as such it is considered reasonable to conclude these buildings are not bat roosts.

The ground level and tree climbing assessments identified a total of four trees (T8, T18, T38 and T39) within the development footprint that support bat PRFs, with two having low suitability and two having high suitability. It is possible that these trees can be retained and incorporated into the Site landscaping design, (as is currently the case being located within car parking/golf tee). Should it be concluded that these trees need to be removed, further surveys may be required.

The trees on the perimeter of the residential development are unlikely to be affected by construction and lighting can be managed successfully through appropriate design.

5.2 GENERALIST EDGE ADAPTED SPECIES

Both common and soprano pipistrelle were recorded during the transect and static detector surveys although common pipistrelle activity was significantly higher.

A large number of common pipistrelle bat passes were recorded across the roost emergence time window suggesting that it is highly likely that ST1 lies within close proximity to a roost for this species and is likely to be used as a commuting route associated with a significant roost.

The high level of activity recorded from the transect and detector surveys would suggest the woodland habitat features across the site are considered to be important for common pipistrelle.

A low level of soprano pipistrelle activity recorded from the transect and detector surveys would suggest the habitat features on Site are not important for this species.

5.3 OPEN AIR FORAGING SPECIES

Noctule were recorded in high numbers at ST1 and ST2 during July - September and foraging over the woodland to the west of the Site during the July activity transect suggesting the presence of a maternity roost located within close proximity to these locations.

Serotine recordings are outside the estimated roost emergence times suggesting that they are using the habitat types present for foraging and commuting.

5.4 WOODLAND/CLUTTER SPECIES

Myotis species were recorded in very low numbers during the transect and static detector surveys and the habitat features are considered to be of no significant importance for the species.

Plecotus species were recorded in very low numbers during the transect and static detector surveys and the habitat features are considered to be of no significant importance for the species.

Barbastelle bats were recorded during the static detector surveys only. Static detector at ST1 passes throughout in July and September. A total of only 7 passes were recorded, suggesting that this is not an important Site for this species.

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