

# Appendix A12.5

## Bats



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## 1. Introduction

- 1.1.1 This technical appendix details the findings of bat desk study, habitat suitability assessment and surveys undertaken between September 2015 and September 2016 to inform the DMRB Stage 3 Assessment for the Proposed Scheme.

## 2. Methodology

### 2.1 Desk study

- 2.1.1 The following organisations were contacted for bat records within 2km of the existing A9 on the dates indicated:
- Scottish Bat Conservation Trust (BCT) (January 2016)
  - The Highland Biological Recording Group (HBRG) (September 2015)
  - North East Scotland Biological Records Centre (NESBrec) (March 2016)
- 2.1.2 Due to the presence of the existing A9, 2km was considered to be a suitable search area for records. The existing road is already a barrier to movement, severing foraging, roosting and commuting habitats.
- 2.1.3 The NBN atlas Scotland website<sup>1</sup> was reviewed for bat records within 5km. No bat records were returned within the last 10 years.

### 2.2 Habitat Suitability Assessment

- 2.2.1 A habitat suitability assessment was undertaken as part of the DMRB Stage 2 Assessment in 2015. The assessment encompassed the Proposed Scheme and its associated land take, along with a 50m buffer. This is termed the Bat Study Area, and was agreed with Scottish Natural Heritage (SNH) through the A9 Environmental Steering Group. The Bat Study Area is shown in Figure 12.9a-k.
- 2.2.2 The habitat suitability assessment included a review of the Phase 1 habitat data gathered by CH2M (CH2M, 2015<sup>i</sup>), aerial photography and a walkover survey. The aim of the assessment was to identify habitat features of value to bats for roosting, commuting and foraging.
- 2.2.3 Potential roosting sites for bats within trees were assessed to identify suitable roosting features and evidence of bat use such as identification of droppings, feeding remains, gaps and potential access points, staining and bats. Trees were inspected externally, from the ground using torches to identify suitable features for use by bats (hazard beams, cracks and splits, raised bark, knot holes, rot holes and cankers, wood pecker holes and other hollows / cavities). Trees were assessed as per Table A2.1 below (classified in accordance with Collins. J (ed) (2016)<sup>ii</sup>). Given the extent of the Study Area and the large number of individual trees present, only trees with moderate potential and above were specifically recorded, and only trees with moderate and high potential were subject to detailed surveys at Stage 3, as following Collins. J (ed) (2016)<sup>iii</sup>. Where woodland blocks were present, the block as a whole was assessed for its suitability.

<sup>1</sup> NBN atlas Scotland - <http://www.als.scot/>

**Table A2.1: Assessment of Tree Suitability for Roosting Bats**

Category (potential to support roosting bats)	Description
Negligible	Tree contains limited features suitable for roosting bats. Usually young (sapling or semi-mature) trees with some ivy or some loose bark but no obvious cracks or fissures. No evidence of bats found (e.g. droppings / staining).
Low	A tree of sufficient size and age that it may contain suitable roosting features, but none seen from the ground, or features seen only have limited roosting potential. No evidence of bats found (e.g. droppings / staining).
Moderate	Tree contains one of more suitable roosting features that could be used by bats based on their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status. No evidence of bats found (e.g. droppings / staining).
High	A tree with one or more suitable roosting features that are suitable for use by larger numbers of bats on a more regular basis and potentially longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. No evidence of bats found (e.g. droppings / staining).
Confirmed Roost	Bats discovered roosting within the tree (during climb and inspect survey), or recorded emerging / entering the tree at dusk / dawn. Tree found to contain conclusive evidence of occupation by bats, such as bat droppings. A confirmed record (as supplied by an established source such as the local bat group) would also apply to this category.

2.2.4 A preliminary roost assessment of structures such as rock outcrops, bridges, culverts and buildings was undertaken in October 2015 within the Bat Study Area. Visual examinations of structures, including bridges, culverts and buildings and rock outcrops were undertaken from the ground, during daylight hours and were aided by the use of binoculars and a high-powered torch. The inspections involved looking for potential entry/ exit points for bats or other potential roost locations (e.g. holes in brickwork, cracks and gaps in masonry, lifted tiles etc.). It was not possible to inspect all of the suitable features identified within each structure due to the height of structures and bridge arches could not be safely accessed. Structures were assessed to identify suitable roosting features such as raised flashing, gaps underneath roof lining, gaps in beams, raised tiles, cavity walls and missing mortar and crevices in rock faces. No internal surveys of buildings were undertaken as no access was granted. The location of the features were identified using GPS and were assigned a Bat Roost Potential (BRP) category of confirmed roost, high, moderate, low or negligible potential (these categories were assigned following the descriptions in Table A2.2 and Table A2.3, classified in accordance with Collins. J (ed) (2016)<sup>ii</sup>). Features with low, moderate or high potential were subject to detailed bat survey where they were identified as being at risk of impact from the Proposed Scheme.

**Table A2.2: Assessment of Building Suitability for Roosting Bats**

Category (potential to support roosting bats)	Description
Negligible potential	Buildings with no features capable of supporting roosting bats. Often these buildings are of a 'sound' well-sealed nature, or have a single skin and no roof void. They tend to have high interior light-levels, and little or no insulation. Buildings without any roofs may also fall into this category.

Category (potential to support roosting bats)	Description
Low potential	Buildings with limited features for roosting bats (e.g. shallow crevices where mortar is missing between building blocks/bricks). They may have open locations which may be subject to large temperature fluctuations and bat-access points may be constrained. No evidence of bats found (e.g. droppings / staining). Buildings may be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found.
Moderate potential	Buildings with some features suitable for roosting bats. Buildings usually of brick or stone construction with a small number of features of potential value to roosting bats e.g. loose roof / ridge tiles, gaps in brickwork, gaps under fascia boards, and/or warm sealed roof-spaces with under-felt. These buildings may be used as occasional or transient roosts in the summer, but are unsuitable for large colonies. No evidence of bats found.
High potential	Buildings with a large number of features or extensive areas of obvious potential for roosting bats. Generally, they have sheltered locations, with a stable temperature regime and suitable bat-access points. Could be suitable for a maternity roost. No evidence of bats found.
Confirmed roost	Bats discovered roosting within the building, or recorded emerging / entering the building at dusk / dawn. Building found to contain conclusive evidence of occupation by bats, such as bat droppings. A confirmed record (as supplied by an established source such as the local bat group) would also apply to this category.

**Table A2.3: Assessment of Bridge and Culvert Suitability for Roosting Bats**

Category (Potential to support roosting bats)	Description
Negligible potential	Bridge/structure with no features capable of supporting roosting bats. Often these are modern or well maintained and/or of a 'sound' well-sealed nature, or consist of a solid structure, prefabricated steel or sheet materials with no voids or cavities present and no cracks or crevices present.
Low potential	Bridge/structure with limited features for roosting bats (e.g. gaps between joints, shallow crevices where mortar is missing between building blocks/bricks). They may have open locations and/or bat-access points may be constrained. No evidence of bats found (e.g. droppings / staining). May be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found.
Moderate potential	Bridge/structures with some features suitable for roosting bats. Usually of brick or stone construction with a small number of features of potential value to roosting bats e.g. gaps between brickwork (e.g. where mortar has fallen out, usually >100mm deep). These bridges/structures may be used as occasional or transient roosts in the summer, but are unsuitable for large colonies. No evidence of bats found.
High potential	Bridge/structure with a large number of features or extensive areas of obvious potential for roosting bats. Often poorly maintained and provide suitable sheltered access points for bats. Generally, in areas of high quality bat foraging/commuting habitat or over watercourses. Could be suitable for a maternity roost. No evidence of bats found.

Category (Potential to support roosting bats)	Description
Confirmed roost	Bats discovered roosting within the bridge/structure, or recorded emerging/entering the structure at dusk/dawn. Found to contain conclusive evidence of occupation by bats, such as bat droppings. A confirmed record (as supplied by an established source such as the local bat group) would also apply to this category.

- 2.2.5 In addition to roosts, the habitat suitability survey also identified suitable bat flight crossing points across the existing A9 corridor, for example where suitable commuting corridors are present either side of the road. The survey looked to identify potential commuting routes and foraging areas such as watercourses, woodland edges and ridges. The survey classified the suitability of commuting and foraging habitats in accordance with Collins. J (ed) (2016)<sup>ii</sup> as detailed in Table A2.4.
- 2.2.6 Only locations where habitat was assessed to be of moderate suitability or above were recorded as potential crossing locations to be subject to further detailed survey.
- 2.2.7 The Proposed Scheme design was reviewed in relation to potential effects on commuting and foraging habitat. This included a review of the Phase 1 habitat data and a walkover survey of the locations where habitat loss is predicted to be greatest and where new infrastructure may create a new severance effect (i.e. proposed junction locations).

**Table A2.4: Classification of Commuting and Foraging Habitats**

Suitability	Habitats
Negligible	Negligible habitat features on site that could be used by commuting or foraging bats, site open and exposed.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated burn, which is not well connected to other habitat features. Suitable, but isolated habitat that could be used by small numbers of bats such as a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape, such as a line of trees or a hedgerow. Habitat which is connected to the wider landscape which could be used for foraging, such as trees, scrub, grassland or water. Habitat close to areas which may contain roosts.
High	Continuous high quality habitat that is well connected to the wider landscape which is likely to be used by commuting bats, such as watercourses, hedges, woodland edges and tree lines. High quality habitat that is well connected to the wider landscape that is likely to be used by foraging bats, such as broadleaved woodland and tree lined watercourses. Site close to and connected to known roosts.

- 2.2.8 The findings of the Stage 2 suitability assessment were reviewed as part of the Stage 3 Assessment to determine which locations would be subject to detailed bat surveys and to identify the survey requirements for Stage 3, based on the Proposed Scheme. The following approach was taken to determine survey requirements:
- All trees identified with moderate or high bat roost potential to be subject to detailed survey.

- All woodland blocks classified with moderate or high bat roost potential to be subject to detailed survey.
- Buildings, bridges, culverts and rock outcrops identified with low, moderate and high potential were assessed in relation to the Proposed Scheme and likely risk of direct and indirect impacts to bats. All locations with the potential for direct impacts, for example demolition of buildings and modification of structures as part of the road construction, will be subject to detailed survey. Where occupied residential properties are present within the Bat Study Area there will be no direct impacts on these buildings (i.e. no properties are to be demolished).
- All features with the potential for indirect impacts, for example disturbance from noise or vibration during construction and operation will be subject to detailed survey. At occupied residential properties, the nature of the works was assessed to determine the level of risk of indirect disturbance to any bats that might be present. Standard noise controls will be adopted during the construction period in these locations to reduce impacts on residents thus reducing the risk of disturbance to bats during this period. Where these properties are located on minor side roads there are considered to be no operational impacts as road usage will be at similar levels to existing levels. Where properties are located adjacent to the A9, a risk of disturbance from operation was identified and these locations will be subject to detailed survey. This is due to the fact that, for any bats leaving such buildings and crossing the A9 to reach foraging habitat the widening of the road may increase the risk of collision for bats crossing the road.
- All locations identified as suitable commuting routes over or under the A9 to be subject to detailed survey.

2.2.9 Table A2.5 provides a summary of the features recorded during the Stage 2 suitability assessment and the number of features surveyed at Stage 3 following the screening process as detailed above. No confirmed roosts were located during Stage 2.

2.2.10 In addition to these features, at the proposed Tomatin grade separated junction an area of wet woodland adjacent to the A9 southbound carriageway and an area of mature Scots pine woodland adjacent to the northbound carriageway were identified for targeted detailed survey (transect survey). These habitats were assessed as being of high suitability for commuting and foraging bats

**Table A2.5: Summary of features recorded during the Stage 2 suitability assessment**

Feature	Negligible	Low	Moderate	High	No. of features surveyed at Stage 3
Trees	n/a	n/a	15	-	All surveyed
Woodland blocks	56	14	-	6	All woodland blocks assessed as high surveyed to identify individual trees within these for detailed survey.
Buildings	6	2	-	5	Two properties with high BRP surveyed. All other buildings ruled out following the criteria detailed above.
Bridges/ culverts	18	1	-	5	Five bridges and one culvert
Crossing points	n/a-	n/a	7	-	All surveyed
Rock face	-	-	-	1	All surveyed

## 2.3 Detailed Bat Surveys

- 2.3.1 It is noted that numbering of features originates from habitat suitability assessments across the Tomatin to Moy Scheme and the proposed A9 dualling between Dalraddy and Slochd. As such feature numbering is not sequential as relates to numbers automatically assigned through the use of the Collector App which was used on iPADS for data recording.

### Trees

- 2.3.2 Detailed tree inspections were undertaken in April 2016 by two surveyors; both were qualified tree climbers and SNH licensed bat workers. Trees were inspected from the ground and, where necessary, aerial inspection of potential roosting features was undertaken, looking for signs of usage by bats including droppings, staining and bats. A torch, endoscope (Ridgid Micro CA-100) and binoculars (10x42 magnification) were used to aid in the survey. All trees with potential roosting features were marked using a small round aluminium numbered tree tag nailed to the stem at 1.5m height. The location of the trees with potential roosting features was identified using GPS, and the trees were categorised in terms of low, moderate or high roost suitability after inspection (as per Collins, 2016)<sup>ii</sup>.
- 2.3.3 If trees could not be fully inspected during the inspection (e.g. a cavity was deeper than the endoscope could reach), or were unsafe to climb (e.g. the tree was dead), then emergence / re-entry surveys were undertaken. Because all trees were assessed as having moderate roosting suitability, two surveys of each tree (one dusk and one pre-dawn) were carried out during June and July 2016. No lone working was undertaken; a tree was surveyed by a single surveyor only when other members of the team were within close proximity. Dusk surveys commenced 20 minutes prior to sunset and continued until 120 minutes after sunset. Dawn surveys commenced 120 minutes before sunrise and ended 15 minutes after sunrise, exact start and end times are detailed in Table A3.1. Surveyors looked for bats exiting or entering suitable roosting features on the trees. Bat activity was recorded using frequency division bat detectors (Batbox Duet) and digital recorders (either Roland R-05 or Zoom H1) to allow later analysis with BatSound version 4.1.4 software.

### Buildings, Bridges and Culverts

- 2.3.4 Two dusk emergence and one dawn re-entry roost survey was undertaken for each building and bridge identified as having suitability for roosting bats (survey effort based on BCT guidelines for buildings and bridges with high bat roost potential). A total of two buildings (Building Numbers 151 and 149) and five bridges (Bridge Numbers 146, 124, 123, 135 and 381) were subject to these surveys. Surveys were undertaken between May and September 2016.
- 2.3.5 Two of these surveys were combined with the crossing point surveys (see below), on bridge no. 123 (Crossing Point 5) and bridge no. 381 (Crossing Point 6).
- 2.3.6 Experienced bat surveyors were used for surveys, generally one of the surveyors was a licenced SNH bat worker. The name of the surveyors with SNH Bat Roost Licence are provided below:
- David Dowse (SNH Bat Licence Number 36740)
  - Gareth Parry (SNH Bat Licence Number 76059)
  - Elaine Anderson (SNH Bat Licence Number 68122)
  - Aaron Middleton (SNH Bat Licence Number 52415)



- Laura Carter-Davis (SNH Bat Licence Number 88465)
- Rachel Tierney (SNH Bat Licence Number 39985)

- 2.3.7 Surveyors were in position c. 15 minutes before sunset for emergence surveys<sup>2</sup>, and the watch continued until at least 120 minutes after sunset. For re-entry surveys the surveyors were in position c. 120 minutes before sunrise, and the watch continued until 15 minutes after sunrise, exact start times are detailed in Table A3.1. Surveyors were positioned around structures (at ground level) to observe all visible aspects of the structure. These timings ensured that emergence/return times for all species that could potentially be found on the site were included. All surveys were undertaken between May and September 2016 and survey visits were spread across the survey period to detect seasonal changes in roost usage and activity levels.
- 2.3.8 An additional survey was undertaken for Bridge 123 consisting of an emergence and re-entry survey in September, as a roost was identified during the August survey. The additional survey was undertaken to identify species utilising the roost and detect any seasonal changes in roost usage and activity levels as bat activity levels substantially increased towards the end of the survey season with social calls heard.
- 2.3.9 Survey was undertaken using bat box duets, Anabat SD2 and Wildlife Acoustics Echo Meter 3 (EM3) bat detectors. Recordings were made using the Anabat SD2 detectors to allow for later analysis (using the Analook software) to assist in the identification of species.
- 2.3.10 A single culvert was assessed to have low bat roost potential. This was subject to a detailed endoscope survey by a licenced bat surveyor. All areas of the structure with suitability were fully inspected and as such no further surveys were required.
- 2.3.11 Due to changes in the Proposed Scheme design two additional structures were identified as requiring survey in 2017, these two railway culverts (Network Rail identification no. 280 and 281) were assessed on the 22 March 2017 to identify suitable roosting features and search for signs of bats. These structures are located at NH7801033097 and NH7796333176. Structures were assigned a value of confirmed roost, high, moderate, low or negligible potential Collins. J (ed) (2016)<sup>ii</sup>.

## Rock Faces

- 2.3.12 During the habitat suitability assessment, an area of exposed rock was identified at the northern extent of the Proposed Scheme, adjacent to the southbound carriageway, at NH 73567 34713. This was assessed to have high bat roosting potential due to the cracks and crevices within the face of the rock.
- 2.3.13 This rock face is adjacent to the A9 carriageway and the road verge in this location is very narrow (3-5m). Dusk and dawn surveys were therefore not possible due to the health and safety constraints of working in close proximity to the live carriageway at night.
- 2.3.14 To provide an indication of use of the rock face by roosting bats, six static monitoring bat detectors (Anabats SD2) were placed along the base of the rock face, located below the areas with greatest suitability for roosting bats. The microphone was placed facing the rock face. These were set to record for at least five nights per month beginning in early May, through to September 2016 (this deviates from guidance as surveys were not undertaken in April, see limitations section below). Detectors were set to record

<sup>2</sup> If bats were flying prior to the survey starting an additional 15 minutes was added to the dusk survey.

continuously for 30 minutes before dusk to 30 minutes after dawn. Table A2.6 details the locations of the static detectors.

**Table A2.6: Transect Survey - Static Detector Locations**

Static Reference	OS grid reference	Habitat Description
RF 1	NH73455 34729	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.
RF 2	NH73502 34727	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.
RF 3	NH73567 34713	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.
RF 4	NH73622 34709	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.
RF 5	NH73676 34707	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.
RF 6	NH73712 34709	Placed at base of rock face amongst small self-seeded conifers (c. 1m tall). The microphone was placed in a northerly direction towards the rock face.

2.3.15 In addition to the static detector surveys, the suitable roosting features on the rock face were inspected in the daytime using an endoscope. The rock face was accessed using rope climbing techniques. This survey was undertaken in August 2016. The survey was completed under Traffic Management on 22, 24 and 25 August 2016 by IRATA technicians/ SNH Licensed Bat Surveyor (licence number 36740).

2.3.16 All areas providing potentially suitable bat roost features (i.e. cracks, crevices) of the rock face were accessed by rope and inspected with torch and endoscope where necessary. The survey was completed in dry, warm conditions.

### Crossing Points

2.3.17 Seven locations were identified as having moderate suitability for bats to cross either over or under the existing A9. These locations (shown as crossing locations on Figure 12.9) were subject to monthly surveys between May and September 2016 to cover the active bat season (surveys were not undertaken in April 2016 as temperatures were too low, see details in limitations section below). Generally, surveyors stood on either side of the carriageway to watch for bats crossing the A9 at these various locations. The exception to this was at Crossing Point 6, which was only viewed from one side of the A9 due to health and safety constraints (as detailed in limitations section below). In addition to recording crossings over the A9, notes on species and behaviour were also recorded. In addition, where crossing locations also had suitability for roosting bats (e.g. culverts under the A9) any roosting activity observed was recorded. Where bats were heard but not observed crossing the road it has been assumed that they did not cross the road.

2.3.18 Surveyors were in position c. 15 minutes before sunset for dusk surveys<sup>2</sup>, and the watch continued until at least 120 minutes after sunset. For dawn surveys the surveyors were in position c. 120 minutes before sunrise, and the watched continued until 15 minutes

after sunrise. The surveys were timed over this period to capture the main commuting periods.

- 2.3.19 Survey was undertaken using both Batbox Duet and Anabat SD2 bat detectors. Recordings were made using the Anabat SD2 detectors to allow for later analysis (using the Analook software) to assist with accurate identification of species.
- 2.3.20 Vision at night (to confirm roost locations and crossings over the A9) was gained using an FLIR T640bx infra-red thermal camera helping to ensure that bats were not missed exiting or entering roosts or crossing over the road during the dark periods of the surveys.
- 2.3.21 With respect to crossing points where a culvert was the principal feature being observed, crossings were recorded if a bat entered the culvert from one side and exited out of sight/detector range on the opposite side, regardless of behaviour displayed between the initial entry and final exit (e.g. foraging within the culvert entrance).

### Transects

- 2.3.22 Following a review of the Proposed Scheme, one area of habitat with high suitability for commuting and foraging bats was identified as being at risk of severance from the Proposed Scheme and as such was subject to detailed surveys.
- 2.3.23 Transect surveys were therefore undertaken bi-monthly at this location between May and September 2016 (inclusive) (surveys were not undertaken in April 2016 as temperatures were too low, see details in limitations section below); these commenced immediately followed the crossing point surveys at the new Tomatin Grade Separated Junction (at Crossing Points 1 and 2 on Figure 12.9d).
- 2.3.24 Two transect routes, shown on Figure 12.9d, were devised so that a representative range of all suitable areas of habitat were covered on a monthly basis. All open habitats and edge habitats were included in the transect routes. The routes were walked at a constant, slow steady pace, with the surveyor carrying both a Batbox Duet and Anabat SD2 detector. The use of Anabat detectors provided additional recording capability either for use in cross-referencing species recorded using the Batbox Duet or recording species not identified using the Batbox Duet. The Anabat recorder was coupled with a Global Positioning System (GPS) device so that each record could be geo-referenced.
- 2.3.25 In addition to the transect routes, four Anabat SD2 detectors were positioned along the transect route, two on the southbound side and two on the northbound side, located as detailed in Table A2.7. These were left in place for a minimum of 7 nights, once a month between May and September (surveys were not undertaken in April 2016 as temperatures were too low, see details in limitations section below).

**Table A2.7: Transect Survey - Static Detector Locations**

Static Reference	OS grid reference	Habitat Description
TS1	NH 79870 29700	<b>Border habitat between semi improved grassland and coniferous plantation.</b>
TS2	NH 79773 29873	Edge habitat between small shrub and tree line on side of A9 and pasture. Detector located on the end of a defunct stone wall. Habitat in surrounding area is open grassland.
TS3	NH 80112 29764	Detector located 5m from small watercourse within broadleaved (birch) woodland.

Static Reference	OS grid reference	Habitat Description
TS1	NH 79870 29700	<b>Border habitat between semi improved grassland and coniferous plantation.</b>
TS4	NH 79847 29950	On the road embankment outwith fenced A9 corridor. Detector located in heath facing east towards broadleaved woodland.

## Other surveys

- 2.3.26 The methodologies within the DEFRA report WC1060 were reviewed to determine their applicability to the Scheme. This report details two types of survey approaches:
- 1) the landscape scale effects survey
  - 2) the effectiveness of mitigation/ local scale effects survey
- 2.3.27 The landscape scale effects survey does not provide data for impact assessment, but provides a baseline for pre, during and post construction monitoring to determine effects of upgrading roads (or new roads) on bat populations. The requirement for this survey has been reviewed following the collation of the 2015 and 2016 survey information. The crossing point surveys targeted the most suitable areas where bats could cross the road. Of the seven locations subject to survey, only two locations recorded more than two bats. The WC1060 requires a minimum of five transects, covering 1km perpendicular to the road. Given that none of the roost sites surveyed recorded more than two roosting bats and five of the seven crossing point surveys recorded two bats or fewer, it is considered unlikely that there is sufficient data to allow any meaningful statistical analysis to detect changes in overall bat activity or activity of the most common species (e.g. *Pipistrellus* species). Given this, the landscape scale effects survey is not considered appropriate for this Scheme.
- 2.3.28 The WC1060 methodology detailed for the effectiveness of mitigation recommends identifying potential bat commuting routes before construction, with two preliminary dusk and dawn surveys at any significant habitat feature or boundary feature. A review was undertaken of potential linear habitat features where severance effects have the potential to be greater than that of the existing A9 (as detailed above in Crossing Point methodology). Due to timescales all of the features identified were subject to detailed survey, rather than preliminary surveys being undertaken. The WC1060 methodology details that 6 x 60 minute surveys should be undertaken at each location. As a number of the locations identified for survey were also considered suitable to support roosting bats, the survey effort at each location was extended to meet with current roost survey guidelines (i.e. 120 mins post dusk/ dawn). This was done at all locations to allow consistency across the survey data and to ensure a clear and repeatable method was conducted. Due to weather conditions however only five surveys were undertaken at each location. The methodology followed at each of the crossing locations can be repeated during and post construction to provide comparable pre and post construction data to assess the effectiveness of mitigation.

## 2.4 Nature Conservation Evaluation

- 2.4.1 The level of importance for nature conservation for bats within the Study Area was determined based on the criteria set out in Table A2.8, as per the approach detailed in Chapter 12.



**Table A2.8: Importance Criteria**

Importance	Criteria
International	Species whose presence contributes to the maintenance of qualifying habitats, communities and assemblages that occur within internationally designated sites or within undesignated areas that meet the criteria for such designation.
National	Species whose presence contributes to: <ul style="list-style-type: none"> <li>the maintenance of qualifying habitats, communities and assemblages that occur within nationally designated sites or within undesignated areas that meet the criteria for such designation; or</li> <li>the maintenance and restoration of biodiversity and ecosystems at a national level, as defined in the Scottish Biodiversity Strategy (SBS) (Scottish Government, 2013, 2015).</li> </ul>
Regional	Species whose presence contributes to the maintenance and restoration of biodiversity and ecosystems at a regional level, as defined in the Highland BAP or CNAP.
Authority Area	Species whose presence contributes to the maintenance and restoration of biodiversity and ecosystems within a relevant area such as Inverness and Nairn Local BAP
Local	Species whose presence contributes to the maintenance and restoration of biodiversity and ecosystems at a local level.
Less than Local	Features that are considered to be absent or do not meet any of the above criteria.

## 2.5 Limitations and deviations

- 2.5.1 Ecological surveys are limited by factors which affect the presence of animals such as the time of year and behaviour. The absence of evidence of bats should not be taken as conclusive proof that this species is not present or that it will not be present in the future.
- 2.5.2 Specific limitations to surveys included the inability to safely access the northbound side of the A9 at Crossing Point 6 (bridge 381); access would either require crossing the railway or A9 during the hours of darkness which was not considered safe. At this location both surveyors stood on the southbound side of the A9. This restricted the views to the northbound side of the structure. Due to this limitation some bats may have been recorded more than once and some bats on the northbound side of the road may not have been recorded.
- 2.5.3 Hibernation surveys have not been undertaken. Where suitable hibernation habitat has been identified, in order to ensure that all likely significant effects of the Proposed Scheme are identified, a precautionary approach of assuming a 'reasonable worst-case' valuation has been adopted. Precautionary values have been assigned to both known receptors and potential receptors based on the best available information.
- 2.5.4 A detailed survey of tree 513 could not be undertaken as a woodpecker was nesting in the tree. Bats are unlikely to roost in a tree where a woodpecker nest is present due to the risk of predation. This tree will be subject to preconstruction surveys to check if it is used by bats in the future.
- 2.5.5 Surveys commenced in May, rather than April which is recommended within the survey guidance Collins. J (ed) (2016)<sup>ii</sup> as weather conditions during April 2016 were unseasonably cold, with night time temperatures below 5°C.

- 2.5.6 The final transect survey completed on the 29th September 2016 was undertaken in sub-optimal conditions with steady and heavy rain throughout the survey. This was the last survey of the survey season and therefore it was not possible to reschedule it within the optimum survey window. The survey visits undertaken between May and August were undertaken in suitable weather conditions and as such it is considered that the data provides sufficient information to allow an assessment of bat activity in this location to be made. Only two static detectors were positioned on each transect, this is a deviation from standard guidance of three detectors per transect for high quality habitat. Due to the short length of each transect only two detectors were considered necessary.
- 2.5.7 Analysis of all survey data collected by Anabat units was undertaken using the AnaloookW software for bat call analysis and was completed by experienced bat surveyors. During analysis it is not always possible to definitely attribute recorded bat calls to species. Registrations are defined as separate files produced by the recording device (Anabat unit) that contain bat echolocation<sup>3</sup>. Registrations containing very weak and/or very short call structures can sometimes be impossible to attribute to genus level. Where such registrations have been encountered they have simply been labelled 'unk' for unknown.
- 2.5.8 It is not possible to definitely attribute registrations with calls >49 and <51 kHz to either common pipistrelle *Pipistrellus pipistrellus* (typical characteristic frequency of 45 kHz) or soprano pipistrelle *Pipistrellus pygmaeus* (typical characteristic frequency of 55 kHz). Call sequences (registrations) within these parameters have thus been labelled as 'Upip' (*Pipistrellus* sp) for unknown pipistrelle.
- 2.5.9 It is not possible to definitely attribute the majority of *Myotis* calls to species level with absolute certainty. The species potentially present on site (Daubenton's bat *Myotis daubentonii* and Natterer's bat *Myotis nattereri*) have very similar call characteristics. Registrations from these species should only ever be described as possessing characteristics of call that are most typical of a specific species. For the purposes of clarity, all calls belonging to this genus have been attributed to *Myotis* sp.
- 2.5.10 As indicated in section on Rock Face methodology above, health and safety constraints at the rock face at NH 73567 34713 (Figure 12.9j) meant that static recorder surveys were undertaken in combination with inspection of the suitable roosting features on the rock face with an endoscope. These surveys deviated from guidance as it was not possible to undertake dusk and dawn surveys at this location in line with standard methods for roost detection. The methodology used for the static detector surveys followed the guidance for use of statics for assessing bat activity. As the rock face was assessed to be of high suitability for bats, the data was collected for at least five nights per month. Standard guidance details this should be undertaken between April and September, however due to low temperatures in April 2016 (nightly temperatures below 5°C) surveys commenced in May, with data being collected for a minimum of five nights a month as per guidance. The static detector surveys only provide details of bat activity around dusk and dawn rather than precise locations of the activity. This data may therefore be used as an indication of likely roost presence rather than positive confirmation. The call quality from the static recorders was generally quiet and most registrations recorded were brief. This is likely to be due to road noise and from bats on other side of A9 and the reflective nature of rock face.
- 2.5.11 No access was gained to properties for internal inspections. However, roosts were positively identified at all properties subject to surveys, which is considered to be sufficient information to undertake the impact assessment.

<sup>3</sup> i.e. species presence within a 15 second (s) [max.] file. Multiple passes/calls/pulses of the same species within a (maximum) 15 s file counts as a single registration - two species within the same 15 s file are counted as two registrations.

- 2.5.12 A common pipistrelle was identified roosting within a crevice during the rope access surveys at NH 73521 34723 (Roost 1, Figure 12.9j). Due to the location of the bat, located within the crevice, identification using an endoscope was necessary.
- 2.5.13 Following design changes the Lynebeg Left-in/Left-out (LILLO) junction is located within an area of high quality foraging habitat. This was not subject to survey in 2016, although trees within this area were subject to climb and inspect surveys and no roosts were located and the surveys at crossing point 7 at Lynebeg (Figure 12.9h) only recorded very low numbers of bats (maximum of two during surveys), thus indicating low bat activity in this area. However, taking a precautionary approach it is assumed that bats use this location to forage and this is considered within the impact assessment.
- 2.5.14 A full endoscope inspection could not be undertaken at rail culvert 281. A single feature located within the culvert could not be fully inspected, with the extent of the features unknown due to the shape and awkward location of the entrance. Dampness was also located below the feature. However as the weather was sunny and dry it was unclear if the feature would have been wet during rain and unsuitable for roosting bats.

### Crossing Point Surveys

- 2.5.15 With regard to the crossing point surveys, in particular where culverts are being monitored, it was often difficult to identify with certainty whether bats were using the structures solely for foraging, or whether bats were crossing through them. During surveys, foraging behaviour has been frequently observed within culverts, often by multiple bats and from both surveyor positions at either end of the culvert at the same time. Although high quality equipment was employed (FLIR thermal imaging systems) difficulties remain in identifying and following the flightpaths of small fast-moving animals performing rapid flight direction changes, particularly when multiple animals are present in the same airspace and when exhibiting foraging behaviour. When this was encountered and recorded as crossings/foraging on survey sheets, such behaviour has been included as crossings within the summary tables (i.e. potential crossing) in order to avoid under-counting of actual crossings.
- 2.5.16 To avoid the issue of double counting during the crossing point surveys, surveyors only recorded a crossing if the bat was observed crossing from their own side flying away towards the opposite side, i.e. outgoing not incoming. During the May and June 2016 crossing point surveys however, surveyors recorded all flights observed crossing over or under the A9. In these instances, the raw data sheets and sound files were reviewed and any double counts were removed (with the raw data sheets amended to reflect this change).
- 2.5.17 During the crossing point surveys, species were identified as best possible and noted on survey sheets. Analysis of corresponding sound files (based on recorded [synchronised] times) has then been completed to verify species records and where necessary amended by annotation on the raw data sheets.
- 2.5.18 It has not been possible to definitely attribute or verify a pipistrelle species (common or soprano) for all recordings. For example, both common pipistrelle and soprano pipistrelle have often been recorded by the recording device (e.g. Anabat SD2) at the same time as both species have been within the detectable range of the unit (and appear as such on the corresponding sound file). Therefore, the following approach has been taken:
- For single crossings where the species could not be identified in the field, the crossing has been marked as unknown pipistrelle if review of the corresponding sound files cannot definitively ascribe the record to either common pipistrelle or soprano pipistrelle.

- For double crossings (two bats observed), the crossings have been marked as one common pipistrelle and one soprano pipistrelle if recorded as such (or unknown) on the survey sheet and verified by sound files containing echolocation typical of both species.
- For multiple crossings (more than two bats observed) where both common pipistrelle and soprano pipistrelle have been identified and/or appear on the corresponding sound files, these crossings have been attributed to unknown pipistrelle, as it is not possible to accurately split the numbers of bats per species.

## 3. Survey Results

### 3.1 Tree survey results

- 3.1.1 Table A3.1 below details the results of the tree surveys. No bat roosts were located within any of the trees subject to survey.
- 3.1.2 All woodland blocks assessed as having high bat roost potential were subject to detailed survey to identify if any trees present within them had bat roost potential. Three trees were identified that were subject to survey, these are also detailed below in Table A3.1.





Table A3.1: Bat Roosts – Tree Survey Results

ID	OS grid reference	Tree Species	Description of tree and BRP	Surveys Conducted	Survey Date (DD/MM/YY) and sunset (SS)/ sunrise (SR) times	Start time; End time (24hr clock)	Weather Conditions				Survey Results Including Bat Roost Potential BRP)
							Temp (°C)	Cloud (0 – 8) <sup>4</sup>	Rain (0 – 5) <sup>5</sup>	Wind (0 – 12) <sup>6</sup>	
TN45	NH 77427 33800	Scots pine	Woodpecker holes and longitudinal split on south face of stem.	Ground assessment	26/04/2016						Tree could not be inspected aerially due to health and safety reasons (lack of safe anchor points). BRP – Moderate.
				Emergence and re-entry	15/06/2016 (SS 22:14)	21:54; 00:14	11	8	3	2	No bats were seen emerging from features within the tree. One commuting soprano pipistrelle was active in the vicinity at 22:23 (9 mins after sunset).
					13/07/2016 (SR 04:39)	02:35; 04:54	10	8	0	0	No bats were seen to enter any features within the tree. One commuting pipistrelle was recorded faintly, 97 mins before sunrise.
TN46	NH 77796 33397	Scots pine	Trunk cavity and hole where top of tree has fallen away.	Aerial inspection	26/04/2016					Fully inspected, no potential for use by bats as the feature was too shallow. BRP – Negligible.	
TN47	NH 76683 34006	Scots pine	Cavity on stem where stem has split.	Ground assessment	26/04/2016					Fully inspected, no potential for use by bats as cavity is too shallow. BRP – Negligible.	
TN49	NH 76686 34017	Scots pine	Co-dominant stem has ripped out and left a scar on the trunk.	Ground assessment	26/04/2016					The rip is clean and has not formed any cavities; no bat potential. BRP – Negligible.	
TN50	NH 77459 33761	Scots pine	Split on stem. Limb has ripped off and left a scar on the stem. It doesn't extend upwards and is unlikely to have rotted down.	Ground assessment	26/04/2016					The tree could not be climbed for health and safety reasons (lack of safe anchor points), but is highly unlikely to contain a bat roost because the feature doesn't extend upwards into the stem, and due to the rot pattern is unlikely to have rotted downwards. If it had, this feature would fill with water due to its angle, therefore no further surveys were required. BRP – Low.	
TN52	NH 76541 34279	Scots pine (dead)	Shallow crevice under peeling bark and crack on stem. Dead limb with possible feature below.	Ground assessment	26/04/2016						Tree could not be climbed for health and safety reasons (fungal decay). BRP – Moderate.
				Emergence and re-entry	15/06/2016 (SS 22:14)	21:54; 00:14	11	8	3	2	No bat activity was recorded throughout the survey.
					13/07/2016 (SR 04:39)	02:39; 04:54	8	8	0	1	No bats were observed entering any features on the tree. Only two pipistrelle bats were recorded during the survey, the latest being 24 mins before sunrise.
TN55	NH 79735 30017	Larch sp.	Snapped, hanging limb on east side, with potential crevices and hazard on south limb	Aerial assessment	27/04/2016					Crevices associated with the hanging limb are too shallow for bats; the cavity on the hazard beam was freshly created and blocked with moss to prevent future potential access. BRP – Negligible.	

<sup>4</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>5</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>6</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



ID	OS grid reference	Tree Species	Description of tree and BRP	Surveys Conducted	Survey Date (DD/MM/YY) and sunset (SS)/ sunrise (SR) times	Start time; End time (24hr clock)	Weather Conditions				Survey Results Including Bat Roost Potential BRP)
							Temp (°C)	Cloud (0 – 8) <sup>4</sup>	Rain (0 – 5) <sup>5</sup>	Wind (0 – 12) <sup>6</sup>	
TN57	NH 76717 34134	Scots pine	Trunk cavity; two features	Ground assessment	26/04/2016						The features were fully viewed from ground using a torch and binoculars; no potential for bats as the features were too shallow. BRP – Negligible.
TN58	NH 78001 33283	Scots pine	Trunk cavity; Knot hole present	Aerial inspection	26/04/2016						Feature very shallow; no potential for bats. BRP – Negligible.
TN60	NH 79870 29634	Sycamore	Large trunk cavity and smaller branch wound hole, both on west facing side	Ground inspection	26/04/2016						Large cavity does not lead anywhere; smaller hole could not be inspected; tree wasn't climbed as is in a private garden. BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SR 04:19)	02:22; 04:37	10	8	3	2	No bats seen to roost within tree. A small number of soprano and common pipistrelles were active during the survey although no activity occurred within 45 mins of sunrise.
				Emergence and re-entry	11/07/2016 (SS 22:04)	21:49; 00:04	11	8	0	1	No bats seen to emerge from features within the tree. The first bats flew from behind the surveyor from west to east.
TN61	NH 80101 29697	Scots pine	Woodpecker hole	Ground assessment	26/04/2016						Tree could not be climbed for health and safety reasons (lack of safe anchor points). BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SR 04:22)	02:22; 04:37	10	8	3	2	No bats recorded during the survey.
				Emergence and re-entry	11/07/2016 (SS 22:04)						Great spotted woodpecker seen in hole at start of survey so bat survey was not carried out as bats would not cohabit the feature with a woodpecker.
TN86	NH 76502 34101	Scots pine (dead)	Dead tree with woodpecker holes and loose bark	Ground assessment	26/04/2016						As the tree is dead it could not be climbed safely. BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SS 22:14)	21:54; 00:14	10	8	2	2	No bat activity recorded during survey.
				Emergence and re-entry	12/07/2016 (SR 04:38)	02:44; 04:53	14	8	0	1	No bats seen to roost within tree. Three bats recorded during survey, a commuting pipistrelle and two foraging common pipistrelle, one which circled overhead for around 14 mins until 25 mins before sunrise.
TN512	NH 76481 33994	Birch sp.	South facing woodpecker hole and trunk cavity.	Ground assessment	26/04/2016						Tree could not be climbed for health and safety reasons (lack of safe anchor points). BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SS 22:14)	21:54; 00:14	10	8	2	2	No bats seen to emerge from features within the tree. One common pipistrelle was heard commuting 73 mins after sunset.
				Emergence and re-entry	12/07/2016 (SR 04:38)	02:38; 04:53	14	8	0	1	No bats seen to roost within tree. Only three bat passes recorded, the latest being 33 mins before sunrise.
TN513	NH 76473 33942	Birch sp.	West facing woodpecker hole	Ground assessment	26/04/2016						Tree could not be climbed for health and safety reasons (lack of safe anchor points). BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SS 22:14)	21:54; 00:14	10	8	2	2	No bat activity recorded during survey.



ID	OS grid reference	Tree Species	Description of tree and BRP	Surveys Conducted	Survey Date (DD/MM/YY) and sunset (SS)/ sunrise (SR) times	Start time; End time (24hr clock)	Weather Conditions				Survey Results Including Bat Roost Potential BRP)
							Temp (°C)	Cloud (0 – 8) <sup>4</sup>	Rain (0 – 5) <sup>5</sup>	Wind (0 – 12) <sup>6</sup>	
					12/07/2016 (SR 04:38)	02:38; 04:53	14	8	0	1	No bats seen to roost within tree. A small number of commuting bats recorded, including two possible <i>Myotis</i> bats. The last pass was recorded 22 mins before sunrise.
TN702	NH 79939 29634	Scots pine	Branch wound hole on west facing stem	Ground assessment	27/04/2016						Tree could not be climbed for health and safety reasons; due to fungal fruiting bodies and lean of tree. BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SR 04:22)	02:22; 04:37	10	8	3	2	No bats seen to roost within tree. Moderate activity during the surveys from foraging and commuting common and soprano pipistrelle bats. The last bat, a soprano pipistrelle, was heard foraging for around 45 mins and then flew off (direction unknown) 3 mins after the sunrise.
					11/07/2016 (SS 22:04)	21:53; 00:04	12	8	0	2	No bats seen to emerge from features within the tree. The first bat (soprano pipistrelle) was recorded 11 mins before sunset. Soprano and common pipistrelles were active, foraging and commuting, for whole survey.
TN703	NH 79977 29604	Birch sp.	Two woodpecker holes on east face	Ground assessment	27/04/2016						Tree could not be climbed for health and safety reasons. Small tree and potential damage from woodpecker holes meant it unsafe to climb. BRP – Moderate.
				Emergence and re-entry	16/06/2016 (SR 04:19)	02:22; 04:37	10	8	3	2	No bats seen to roost within tree. Only one bat, a commuting soprano pipistrelle, was recorded during the survey (96 mins before sunrise).
					11/07/2016 (SS 22:04)	21:44; 00:04	12	8	0	1	No bats seen to emerge from features within the tree. Pipistrelles were active for the duration of the survey, the first being recorded 5 mins after sunset.
TN704	NH 79361 31131	Scots pine	Hazard beams on underside of three limbs	Aerial inspection	27/04/2016						All hazard beams inspected and all very open; crevices were blocked with vegetation to prevent future potential access. BRP – Negligible.



## 3.2 Buildings and Bridges and Culverts Results

- 3.2.1 Table A3.2 below provides detailed descriptions and photographs of the buildings and structures surveyed and survey results. Five bat roosts were recorded during the surveys (see Figure 12.9f-h):
- Building 149 - confirmed soprano pipistrelle roost
  - Building 151 - possible soprano pipistrelle roost, confirmed common pipistrelle roost and confirmed *Myotis* roost
  - Bridge 146 - confirmed soprano pipistrelle roost
  - Bridge 123 - confirmed common pipistrelle roost
  - Bridge 135 – confirmed soprano pipistrelle roost
- 3.2.2 Bridge 124 (Crossing Point 5) (Figure 12.9f) and Bridge 381 (Crossing Point 6) (Figure 12.9g) were surveyed during the crossing point surveys. Bridge 124 was assessed to have low roosting potential, whereas Bridge 381 was assessed to have high bat roosting potential, however, no bats were observed roosting within either structure.
- 3.2.3 Culvert 446 (Figure 12.h), was identified as having low bat roost potential. It is a corrugated metal culvert with stone walls, around and watercourse passing through the culvert. Some gaps are present in the stonework. These were fully inspected with an endoscope and no bat evidence was located.
- 3.2.4 The two additional culverts were identified as having low bat roosting potential. Structure 280 (Figure 12.9g) is a small culvert comprising of metal decking, concrete and stone supports. The stone section of the structure is well pointed. Gaps were located between the metal decking and the concrete support at the entrance/ egress of the culvert. These features may offer limited roosting opportunities for a small number of bats. However, the features were not in use at the time of survey and no bat evidence was found. The features identified within the culvert are unlikely to provide suitable hibernation opportunities for bats as they are likely to be subject to temperature fluctuations.
- 3.2.5 The second structure 281 is a small brick and stone culvert with a metal deck and concrete supports. Shallow gaps were identified within the brick work below the metal decking. However, these gaps are unlikely to provide suitable roosting opportunities for bats. Another gap was located where the metal structure meets the concrete supports, the full extent of the feature could not be inspected with an endoscope due to the shape and awkward location of the entrance of the feature. There was dampness noted below the feature. However, the entrance of the feature was dry. Gaps were located between the metal decking and the concrete support at the entrance/ egress of the culvert. These features may offer limited roosting opportunities for a small number of bats. However, the features were not in use at the time of survey and no bat evidence was found, it was possible to fully inspect all but one of the features. Generally the features identified within the culvert are unlikely to provide suitable hibernation opportunities for bats as they are likely to be subject to temperature fluctuations.





Table A3.2: Bat Roosts – Buildings/ Structures Survey Results

ID	OS grid reference	Description of Structure / Building Including Potential Roost Features (PRF)	Survey Date (DD/MM/YY) Sunset/ sunrise time (24hr clock)	Start time; End time (24hr clock)	Weather Conditions				Survey Results	Species confirmed / likely to be utilising roost and peak count	Type of Roost <sup>7</sup>
					Temp (°C)	Cloud (0 – 8) <sup>8</sup>	Rain (0 – 5) <sup>9</sup>	Wind (0 – 12) <sup>10</sup>			
Building 149	278720 832323	Two storey house with pebble dash and pitched roofing. A small patio has been built on the southern face of the building. The roof comprises tile and metal flashing, several skylights and two chimneys. The roof appears generally well sealed except for a number of gaps. PRF identified include gaps located below guttering and between the flashing and tiles surrounding skylights and chimneys. No internal inspection was undertaken. As the house will be heated all year round it is unlikely to provide hibernation potential.	23/05/2016 Sunset 21:47	21:16 23:47	10 9	7 7	0 0	1 1	No bats were observed emerging from the building. Common pipistrelle were recorded commuting and foraging around the building. A single soprano pipistrelle pass was recorded during the survey.  A single bat emerged from a roost at the south-west side of the building at 22:26. Exact location and species unconfirmed. It is likely that the bat was a pipistrelle bat, as emergence was recorded nine minutes after sunset.  Common pipistrelle bats were heard foraging and commuting throughout the survey, with a low number observed at the start of the survey. A single soprano pipistrelle pass and a single brown long-eared bat pass was also recorded during the survey.  A single soprano pipistrelle roost was located during the dawn re-entry survey. The bat was observed entering into the bottom of the south-west face by the gutter at 05:33. See Table A2.2. Both common and soprano pipistrelle were recorded mainly commuting during the survey. Foraging and social calls were also heard during the survey.	A single bat was observed exiting from the south-west face of the building on the 28th June 2016. Exact location and species could not be confirmed during this survey. However, a single soprano pipistrelle was observed entering into the structure during the dawn survey on the 25th August 2016, location shown in Table A2.2.  The roost is likely a small non-breeding roost.	Day roost
			28/06/2016 Sunset 22:17	21:47 00:17	12 8	8 6	2 0	1 2			
			25/08/2016 Sunrise 06:19	06:04 06:19	13.2 7.4	6 7	0 0	8 0-8			
Building 151	278426 832323	The building is currently disused. The building is comprised of brick and pebble dash overlay, wooden soffit, pitched slate roofing and ridge tiles. There is a small flat roofed entrance located at the southern end of the building. The building offers numerous PRF with raised tiles, gaps in the soffit, roof ridge and between the pane and wooden boarding over windows. The small windows are open offering access into the internal building. No internal inspection was undertaken.	17/05/2016 Sunset 21:34	21:00 23:30	10 9	7 6	0 0	1 0	A soprano pipistrelle possibly emerged from the roof, east pitch (see Table A2.2). A low number of bat passes were recorded during the survey, commuting and foraging was recorded. A single possible brown-long eared bat pass was also recorded.  No bats were observed emerging from the building. Two common pipistrelle passes were recorded during the survey.  Two roosts were identified during the dawn re-entry survey. A <i>Myotis</i> bat roost was identified on the east pitch of the roof at approx. 05:00 am. A single <i>Myotis</i> bat entered below the tiles. A separate common pipistrelle roost was identified; a single bat was observed entering into the building through a small window south aspect. Both roost locations are shown in Table A2.2. Common and soprano pipistrelle, brown long-eared and <i>Myotis</i> bats were recorded during this survey.	A possible soprano pipistrelle roost was identified on the 17 <sup>th</sup> May 2016. The bat likely emerged from below a roof tile on the east pitch of the roof.  Two confirmed roosts were identified on the 23rd August 2016, a <i>Myotis</i> roost and a common pipistrelle roost. A single <i>Myotis</i> bat was identified roosting below a roof tile on the east pitch. When analysed the call structure of the <i>Myotis</i> bat was indicative of a Natterer's bat. However, this could not be definitively confirmed.  A single common pipistrelle entered into the building through a small window south aspect.  All roosts are likely small non-breeding roosts, with individual bats recorded roosting. The	Day roost/ transitional roost
			28/06/2016 Sunrise 04:21	02:20 04:36	12.1 9.9	7 5	0 0	3 2			
			23/08/2016 Sunrise 05:56	03:58 06:10	15 8.9	8 6	0 0	1 0			

<sup>7</sup> Roost types are as follows: T = Transitional roost; M = Maternity roost; S = Satellite roost; H = Hibernation roost, D = Day roost; F = Feeding roost; MAT = Mating roost, N = Night roost. Definitions as provided in Hundt L (2012), Bat Surveys: Good Practice Guidelines 2nd edition, Bat Conservation Trust.

<sup>8</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>9</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>10</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



ID	OS grid reference	Description of Structure / Building Including Potential Roost Features (PRF)	Survey Date (DD/MM/YY) Sunset/ sunrise time (24hr clock)	Start time; End time (24hr clock)	Weather Conditions				Survey Results	Species confirmed / likely to be utilising roost and peak count	Type of Roost <sup>7</sup>	
					Temp (°C)	Cloud (0 – 8) <sup>8</sup>	Rain (0 – 5) <sup>9</sup>	Wind (0 – 12) <sup>10</sup>				
Bridge 146	278723 832134	Small stone arch over-bridge, single lane with a stone and brick barrel and stone wing walls. A limited number of PRF were identified from the ground. Due to the height of the structure the size and extent of any PRF could not be assessed. As such hibernation potential could not be determined. Crevices located on the inside walls where mortar is missing, a small gap was located on the eastern elevation of the bridge below a birch growing from within the wall.	10/05/2016	21:00	14	0	0	0	One soprano pipistrelle bat emerged from the apex of the bridge barrel at 21:47. Low number of pipistrelle bats observed foraging and commuting during the survey.	A single soprano pipistrelle bat was observed emerging from the apex of the bridge, shown in Table A2.2. This is likely a small non-breeding roost.	Day roost	
			Sunset 21:20	23:10	8	0	0	0				
			27/06/2016	21:50	12.5	3	0	4				No bats observed emerging from the structure. One bat was seen commuting high above railway towards the west at 22:33. Species could not be identified as echolocations could not be heard. A single <i>Myotis</i> bat pass was heard with no visual confirmation at 00:06.
			Sunset 22:17	00:17	9.2	5	0	4				
24/08/2016	03:56	15.1	8	1	1	No bats observed entering into the structure during the dawn survey. Low number of common and soprano bats heard commuting during the survey. However, no visual confirmation.						
Sunrise 05:58	06:13	12	5	0	1							
Bridge 123	278633 832206	Large stone arch over-bridge, with a single lane track and a watercourse flowing below the bridge. The barrel of the bridge is constructed from both stone and brick. Numerous PRF are located within the bridge with small and large gaps and crevices located throughout, due to degraded brick work and missing mortar. Due to the height of the structure the size and extent of any PRF could not be assessed. As such hibernation potential could not be determined. As the inspection was undertaken from the ground hibernation potential is unknown. However, if any of the gaps extend into the structure of the bridge it is possible that this bridge could offer hibernation potential.	17/05/2016	21:03	11	5	0	1	No bats were observed emerging from structure. Pipistrelle bats, unconfirmed species, were observed commuting and foraging along watercourse east to west and west to east from 22:31.	A common pipistrelle is likely roosting within the archway of the bridge. An exact location was confirmed on the dawn survey on the 15 <sup>th</sup> September 2016, location shown in Table A2.2. This roost is a small non-breeding roost.	Transitional roost	
			Sunset 21:33	23:33	10	5	0	-				
			29/06/2016	21:46	14.8	4	0	0				No bats observed emerging from structure. Two soprano pipistrelle bat passes at 00:09 and 00:15.
			Sunset 22:16	00:16	9.3	7	0	1				
			23/08/2016	20:15	15	1	8	3				A bat emerged from the archway. The bat emerged approximately 21:15 and an exact location could not be confirmed.  The first bat was observed after 21:10. After this time the activity during the survey was high with common and soprano pipistrelle heard foraging and commuting. Social calls were also recorded for both species of pipistrelle during the survey. Brown long-eared bats and <i>Myotis</i> bats were also heard during commuting during the survey.
			Sunset 20:41	22:41	12	1	8	0				
14/09/2016	19:20	14.6	8	0	1	A common pipistrelle emerged from the archway. The bat emerged approximately 20:14 and an exact location could not be confirmed.  Both common and soprano pipistrelle bats were observed foraging and commuting over the water, below the structure. No bats were observed after 20:40 due to nightfall/ no visibility. Common pipistrelle were also recorded social calling briefly. An unconfirmed species of bat was also recorded foraging at the end of the survey.						
Sunset 19:41	21:41	11.8	8	0	0							
15/09/2016	04:44	15.6	8	0	0	A bat was observed entering into the structure during the dawn survey, see Table A2.2. As the bat was not echolocating, the species could not be confirmed. However, it is likely that the bat was a common pipistrelle as this species has been identified possibly emerging from the structure during the dusk survey the previous night.						
Sunrise 04:44	07:00	10.5	5	0	0							




ID	OS grid reference	Description of Structure / Building Including Potential Roost Features (PRF)	Survey Date (DD/MM/YY) Sunset/ sunrise time (24hr clock)	Start time; End time (24hr clock)	Weather Conditions				Survey Results	Species confirmed / likely to be utilising roost and peak count	Type of Roost <sup>7</sup>
					Temp (°C)	Cloud (0 – 8) <sup>8</sup>	Rain (0 – 5) <sup>9</sup>	Wind (0 – 12) <sup>10</sup>			
									Both common and soprano pipistrelle bats were recorded foraging and commuting during the survey.		
Bridge 135	276980 834109	Single arched over-bridge above a single lane track. Overall stone construction with some brick work in the barrel. The structure appears in generally good condition, with some degradation in the barrel and missing mortar/ crevices below coping stones. Due to the height of the structure the size and extent of any PRF could not be assessed. As such hibernation potential could not be determined.	07/06/2016	20:40	18	8	0	1	A soprano pipistrelle emerged from below a coppice stone, on the west face of the bridge at 23:09. Both common and soprano pipistrelle were recorded during the survey.	A single soprano pipistrelle bat emerged from below a coppice stone, on the west face of the bridge on the 07th June 2016 location shown in Table A2.2. This is likely to be a small non-breeding roost.	Day roost
			Sunset 22:09	23:45	13.6	7	0	0			
			30/06/2016	02:23	12.8	7	0	1	No bats were observed entering the structure. The first bat passed north to south over the railway at 02:26, the bat was commuting and was likely a <i>Myotis</i> sp. Both common and soprano pipistrelle were observed foraging and commuting constantly during the survey.		
			Sunrise 04:23	04:38	7.7	2	0	0			
24/08/2016	20:15	15.9	7	0	7	No bats observed emerging from structure.					
			Sunset 20:38	22:38	11.4	2	0	2	Both soprano and common pipistrelle bats were heard commuting and foraging during the survey. Social calls were also heard towards the end of the survey.		
Bridge 381 (crossing point 6)	277932 833226	Railway bridge, where A9 crosses over the railway. Linear crack in wing wall at joint and possible gaps on underside of bridge. Good commuting and foraging habitat along railway line. Due to the height of the structure the size and extent of any PRF could not be assessed. As such hibernation potential could not be determined.	03 May 16	03:51	6	2	0	1	No bats recorded.	No roost recorded.	n/a
			Sunrise 05:15	05:51	5	3	0	1			
			13 Jun 16	22:01	13	6	0	0	Bats were observed foraging and commuting under the railway bridge. Others were observed foraging within the woodland surrounding the railway bridge. Twenty common pipistrelles and eight soprano pipistrelles were recorded with activity starting at 23.02 and ending at 00.00.		
			Sunset 22:16	00:16	10	6	0	0			
			12 Jul 16	02:31	9	8	0	1	Numerous bats (common and soprano pipistrelle) foraging under the bridge and in the woodland surrounding the railway track on the south bound side of the A9. Bats were also observed flying from over the bridge on the southbound woodland edge. A total of seven common pipistrelle and 32 soprano pipistrelles recorded commuting and foraging with activity starting at 02.31 and finishing at 03.55		
			Sunrise 04:38	04:53	8.7	8	0	0			
Bridge 124 (crossing point 5)	278737 832189	Concrete deck and wing walls. Stone wall running adjacent to road on either side. Low number of small crevices in stone walls.	04 May 16	03:18	7	6	0	1	No bats recorded.	No roosts recorded.	n/a
			Sunrise 05:18	05:30	8	7	0	1			
			14 Jun 16	22:02	11	8	2	1	Five common pipistrelles and six soprano pipistrelles recorded, most calls were brief. One bat was observed crossing following the Allt a Chul river the other was observed foraging at the mouth of the bridge.		
			Sunset 22:17	00:17	10	8	0	1			
			13 Jul 16	02:40	7	8	0	1	No bats recorded.		
Sunrise 04:40	04:55	8	8	0	1						

## Photographs

3.2.6 Table A3.3 below details the approximate location of the roosts found during the buildings and structures bat activity surveys.

**Table A3.3: Buildings and Structures Photographs and Roost Locations (shown in red)**

ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
Building 149	<p>A small soprano pipistrelle non-breeding bat roost is located within the building. The red arrow shows the entrance to the roost, at the gutter between the corner of the south-west face and the north face.</p> <p>Roost type – Small day roost</p>	 <p>The photograph shows the exterior of a light-colored building with a dark roof. A red arrow points to a small opening in the gutter where the roof meets the wall, indicating the location of the bat roost.</p>







ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
		
Building 151	<p>One possible and two confirmed roosts were located within this building. A soprano pipistrelle possibly emerged from below a slate on the east pitch of the building and a <i>Myotis</i> bat was also observed roosting below a slate within a similar location, approximate location of both roosts are delineated by the red box. A further roost (common pipistrelle) was identified, the bat was observed entering into the building through the open window, and the red arrow shows the location.</p> <p>Roost type - All roosts are likely small day/ transitional roosts.</p>	



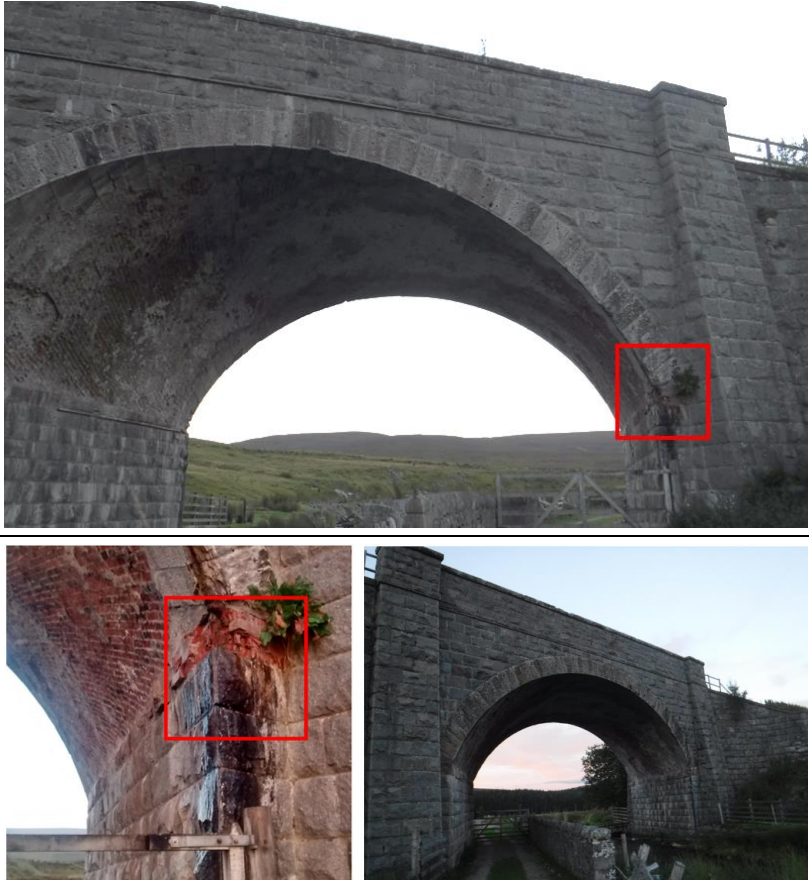
ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
		 A photograph of a white, single-story building with a gabled roof. A red arrow points to a small, rectangular opening in the gable end of the roofline. The building has a red door on the right side and a red downspout on the left. The background shows a grassy field under an overcast sky.



ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
Bridge 146	<p>A single soprano pipistrelle bat was observed emerging from the apex of the bridge barrel, this is likely a small non breeding roost.</p> <p>The photograph was taken facing the north east with the red arrow showing approximate roost location.</p> <p>Roost type – Small day roost</p>	
		








ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
Bridge 123	<p>A common pipistrelle roost was located during the surveys. The roost entrance is located between the leg of the bridge and the arch (southeast face), shown in the red box.</p> <p>Roost type – Small transitional roost.</p>	







ID	Description of Structure/ Building and Roost Location	Photographs of Structure/ Building
Bridge 135	<p>A small non breeding soprano pipistrelle roost was identified, the bat was observed emerging from below a coppice stone, on the west face of the bridge.</p> <p>Roost type – Small day roost.</p>	  







### 3.3 Rock Face Results

- 3.3.1 Table A3.4 provides detailed descriptions of the rock face survey results and includes photographs of the survey locations. During the survey, two bat roosts were identified (see Figure 12.9j); species were identified as common pipistrelle and soprano pipistrelle.
- 3.3.2 Species recorded around the rock face were typical of those found in the geographic area and habitats present, with no rarer species identified. Activity levels were slightly lower than could be typically expected which may have been due to height above sea level (possible impacts on foraging resource due to lower temperatures and higher wind speeds), lack of roost site availability (very few suitable structures/trees within the locality of the rock face) and uniformity in surrounding area of habitats generally considered to be of less quality for foraging bats (coniferous plantation and moorland).
- 3.3.3 The data gathered is considered to be indicative of low numbers of roosting bats, and the possible use of the rock face area for foraging/commuting/social interaction. However, little evidence of foraging (feeding buzzes) and few social calls were heard within the sound files. The most likely explanation is that the activity observed represents a commuting route between the roosts and foraging areas, and activity from low numbers of bats within the vicinity of rock face roosts.
- 3.3.4 Deeper cracks/crevices within the rock face (e.g. > c. 0.5m) are considered to provide some hibernation roost suitability, particularly at section NH 73438 34735 to NH 73489 34730 and at the location of Roost 1. Both these areas have relatively deep (0.5m to 1m) dry crevices with Roost location 1 being sheltered by overhanging rock. Areas of cracks and crevices within sections of frost-shattering on the rock face are by nature likely to be unsuitable for hibernation.







**Table A3.4: Rope Access Survey Results of Rock Face (NH 73567 34713)**

OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
<p>NH 73438 34735 to NH 73489 34730</p> <p>5m in length.</p>	<p>Western end of rock face. Self-seeded Scots pine over section of granite outcrops and loose unconsolidated material (boulders/rocks). PRF composed of cracks in larger outcrops and boulders scattered throughout section. Areas of good PRF suitability noted at NH 73454 34743 (refer Photograph) and NH 73467 346735. Both areas have large dry cracks between rock with cavities extending back c. 0.3 – 0.4m average and occasionally &gt; 1m.</p> <p>No evidence of roosting bats recorded within section.</p> <p>BRP Moderate</p>	
<p>NH 73489 34730 to NH 73509 34735</p> <p>20m in length.</p>	<p>Shallower section (with large amount of unconsolidated material and debris).</p> <p>No suitable PRF found within section.</p> <p>BRP Negligible</p>	







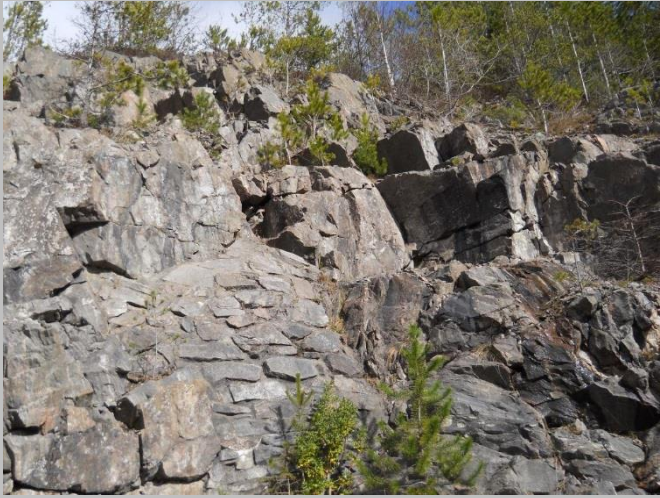


OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
<p>NH 73509 34735 to NH 73517 34717            12m in length</p>	<p>Granite outcrop provides steeper section with consolidated material although shattering and loose debris throughout. Several larger cracks noted to provide PRF within outcrop.            No evidence of roosting bats recorded.            BRP Moderate</p>	
<p>NH 73517 34717 to NH 73525 34729            10m in length</p>	<p>Section of steep granite outcrop with large and obvious overhang. Little vegetation on rock face within section. Good suitable PRF within large cracks within outcrop.            Two bat roosts found within section (see below).            Confirmed roost.            However, the overall rock face at this location has <i>moderate BRP</i>.</p>	







OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
NH 73521 34723	<p>Roost 1:</p> <p>Large crack at base of overhang at top of rockface. Crack provides suitable PRF c. 1m in length and c. 2 - 4cm wide. Appears to extend into rock &gt; 0.5 m although distance unknown as roosting pipistrelle present. Appeared to be common pipistrelle through endoscope (dark mask present and internarial ridge not visible). Accumulation of droppings (&gt;200) at base of crevice. Soprano pipistrelle droppings were found at the base of the crevice (The University of Warwick confirmed by DNA analysis).</p> <p>The evidence found during the visual examination of the roost suggests that both soprano pipistrelle and common pipistrelle use the crevice for roosting.</p> <p>The roost is also shown in the photograph below, identified as Roost 1.</p>	
NH 73524 34729	<p>Roost 2:</p> <p>Pipistrelle present within upward facing vertical crack c. 0.5m long and c. 4cm wide. From appearance through endoscope, most likely to be common pipistrelle although not possible to view head clearly due to position of animal. No droppings visible. Roost site would be exposed to rain.</p> <p>Both Roost 1 and Roost 2 are shown in the photograph.</p>	

OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
NH 73525 34729 to NH 73540 34722 20m in length	Shallower section with large amount of very loose material and debris. Very little suitability for PRF found within section: few cracks. No evidence of roosting bats recorded. Low roost suitability.	No photograph of this location
NH 73540 34722 to NH 73575 34728 35m in length	Steeper section (c. 35m in length) than previous although still with large amount of unconsolidated shattered material and debris. Little suitability for PRF present: occasional cracks. No evidence of roosting bats recorded. Low roost suitability.	No photograph of this location
NH 73575 34728 to NH 73586 34724  10m in length	Section is more consolidated than neighbouring and has suitable PRF within large cracks in outcrops, especially steeper section with less shattering. Cracks noted to extend into rock > 0.3m and dry within. Part of face built-up/mortared. No evidence of roosting bats recorded. Moderate roost suitability.	





OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
<p>NH 73586 34724 to NH 73606 34725</p> <p>20m in length</p>	<p>Little suitability for PRF noted in section; although steep, large amount of shattered rock and debris. Strata more vertical so cracks, if present, tending to be exposed.</p> <p>No evidence of roosting bats recorded.</p> <p>Low roost suitability.</p>	
<p>NH 73606 34725 to NH 73649 34717</p> <p>40m in length</p>	<p>Steepest section of rockface with large granite outcrop. Little unconsolidated material and debris present. Several cracks within outcrop face provides suitable PRF although only noted to extend into rock c. 0.3m.</p> <p>No evidence of roosting bats recorded.</p> <p>Moderate roost suitability.</p>	







OS grid references and approximate length of survey section	Description / Results Including Bat Roost Potential (BRP) and Potential Roost Features (PRF)	Photograph
NH 73649 34717 to NH 73672 34717  25m in length	Shallower section with heather and self-seeded Scots pine between small outcrops and boulders. No suitability for PRF noted. Negligible roost suitability.	
NH 73672 34717 to 73677 34715  5m in length	Eastern end of rock face. Several suitable PRF recorded at top of bank/boulder field where larger boulders/outcrops are present. No suitable PRF noted lower down slope. No evidence of roosting bats recorded. Moderate roost suitability.	





3.3.5 Six static detectors were deployed along the bottom of the rock face (see Figure 12.9j). The static detector survey results are detailed in Table A3.6. Graphs (Charts 1 to 7 below) have been produced to provide a summary of the data.

**Table A3.5: Rock Face (Static Detector) Monthly Activity in 2016**

Static	Recording Time	Number of registrations						Total registrations
		C.pip	S.pip	U.pip	Myt	BLE	Unk	
Point 1	95:00:00	4	5	1	0	0	0	10
Point 2	95:00:00	2	2	3	1	0	0	8
Point 3	46:30:00	8	7	0	0	0	0	15
Point 4	46:30:00	3	2	0	12	0	0	17
Point 5	95:00:00	17	4	0	0	0	0	21
Point 6	95:00:00	0	0	0	0	0	0	0
	Total Passes	34	20	4	13	0	0	71
Point 1	35:05:00	5	0	0	0	0	0	5
Point 2	66:40:00	0	0	0	0	0	0	0
Point 3	66:40:00	4	2	0	0	0	0	6
Point 4	66:40:00	9	1	0	2	0	2	14
Point 5	66:40:00	4	0	0	0	0	0	4
Point 6	66:40:00	5	1	0	0	0	2	8
	Total Passes	27	4	0	2	0	4	37
Point 1	48:00:00	5	2	0	0	0	0	7
Point 2	48:00:00	25	8	4	5	0	1	43
Point 3	48:00:00	19	8	0	0	0	0	27
Point 4	48:00:00	1	0	0	0	0	0	1
Point 5	48:00:00	9	0	0	0	0	0	9
Point 6	48:00:00	7	1	0	0	0	0	8
	Total Passes	66	19	4	5	0	1	95
Point 1	90:00:00	64	42	26	0	0	10	142
Point 2	90:00:00	93	41	23	0	0	21	178
Point 3	90:00:00	128	54	24	2	0	27	235
Point 4	90:00:00	116	28	19	0	0	14	177
Point 5	90:00:00	27	10	9	0	0	4	50
Point 6	90:00:00	17	0	12	0	0	1	30
	Total Passes	445	175	113	2	0	77	812
Point 1	68:50:00	73	36	15	0	0	3	127
Point 2	68:50:00	74	26	3	0	0	8	111
Point 3	68:50:00	161	33	2	0	0	9	205



Static	Recording Time	Number of registrations						Total registrations
		C.pip	S.pip	U.pip	Myt	BLE	Unk	
Point 4	68:50:00	2	1	1	0	0	1	5
Point 5	68:50:00	168	3	5	0	0	1	177
Point 6	68:50:00	82	10	5	0	0	0	97
	Total Passes	560	109	31	0	0	22	722

C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = *Myotis*; BLE = brown long-eared; Unk = unknown bat species.

**Table A3.6: Rock Face (Static Detector) Total Passive Monitoring Survey Results (May to September 2016)**

Static	Recording Time	Number of registrations <sup>11</sup>						Total registrations
		C.pip	S.pip	U.pip	Myt	BLE	Unk	
Point 1	336:55:00	151	85	42	0	0	13	291
Point 2	368:30:00	194	77	33	6	0	30	340
Point 3	320:00:00	320	104	26	2	0	36	488
Point 4	320:00:00	131	32	20	14	0	17	214
Point 5	368:30:00	225	17	14	0	0	5	261
Point 6	368:30:00	111	12	17	0	0	3	143
	Total Passes	1132	327	152	22	0	104	1737

C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = *Myotis*; BLE = brown long-eared; Unk = unknown bat species.

### 3.3.6

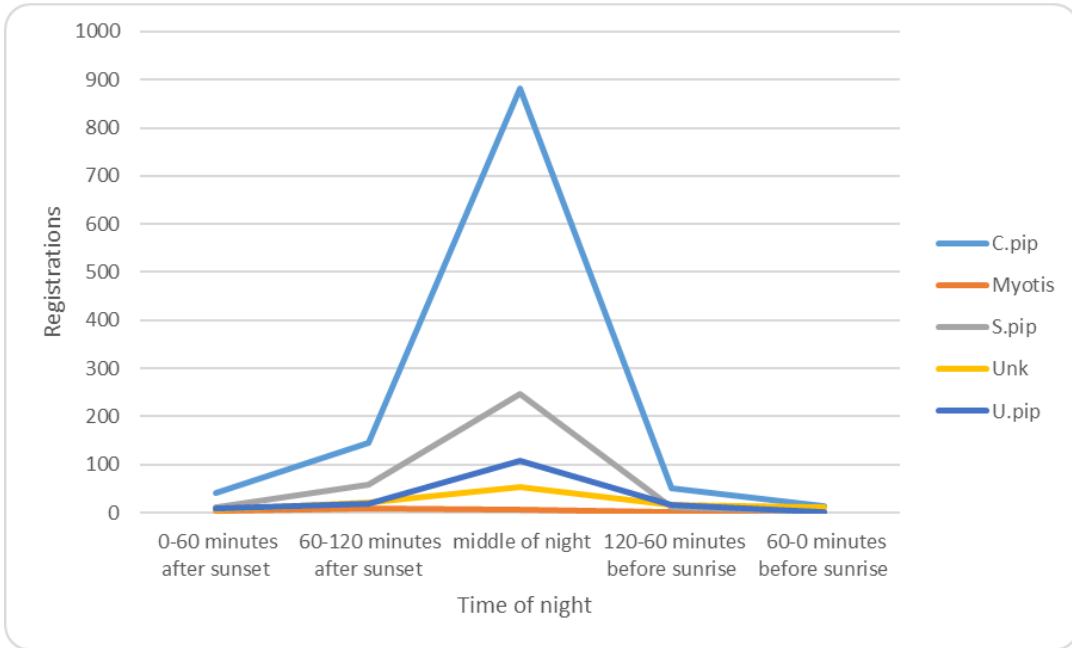
Chart 1 below shows all registrations<sup>12</sup> presented across the recording period (May-Sep 2016) against time relevant to sunrise/sunset for all static locations combined. Further break down is provided for each static location in Charts 2 to 7. The data shows obvious registrations peak within the middle parts of the night indicating higher activity outwith roost emergence/return times; therefore the activity appears more likely to be related to foraging/commuting behaviour rather than roosting. It should be noted that the 'middle of night' period is not an equal temporal period across the different months/dates of recording (for example more records could be expected from the middle of night period in September rather than June given the greater hours of darkness) and concomitantly the middle of night period (generally) comprises more hours than post-dusk and pre-dawn hour block periods used.

<sup>11</sup> i.e. species presence within a 15 second (s) [max.] file. Multiple passes/calls/pulses of the same species within a (maximum) 15 s file counts as a single registration - two species within the same 15 s file are counted as two registrations.

<sup>12</sup> i.e. species presence within a 15 second (s) [max.] file. Multiple passes/calls/pulses of the same species within a (maximum) 15 s file counts as a single registration - two species within the same 15 s file are counted as two registrations.

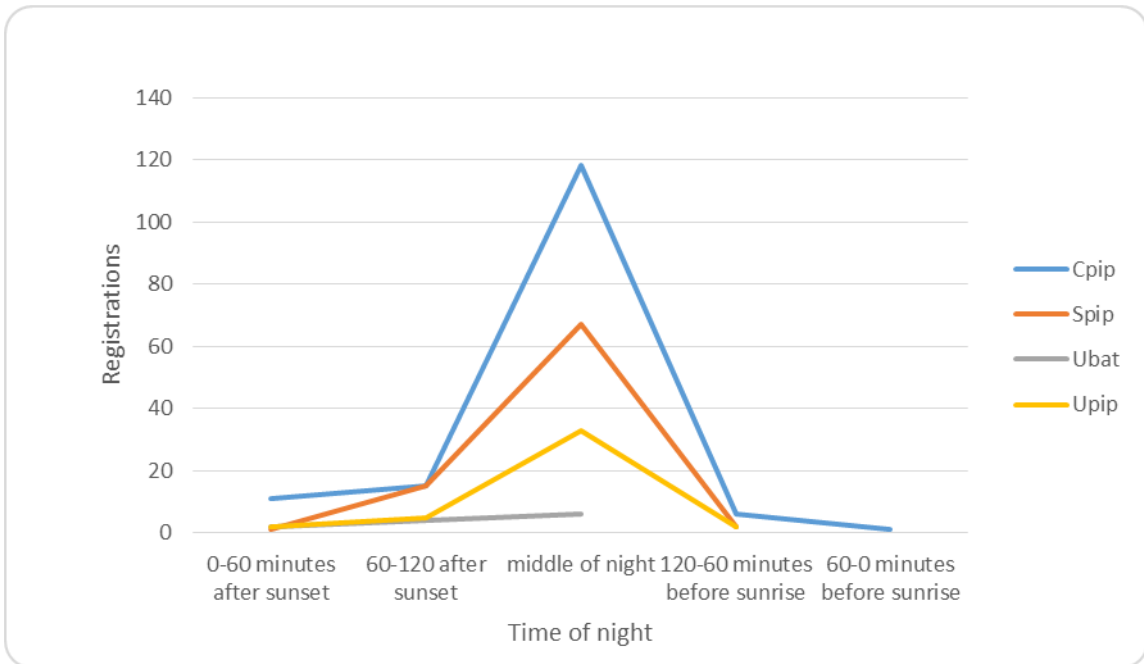


**Chart 1: Species registrations recorded against time of night (all records, all points, May – September 2016)**

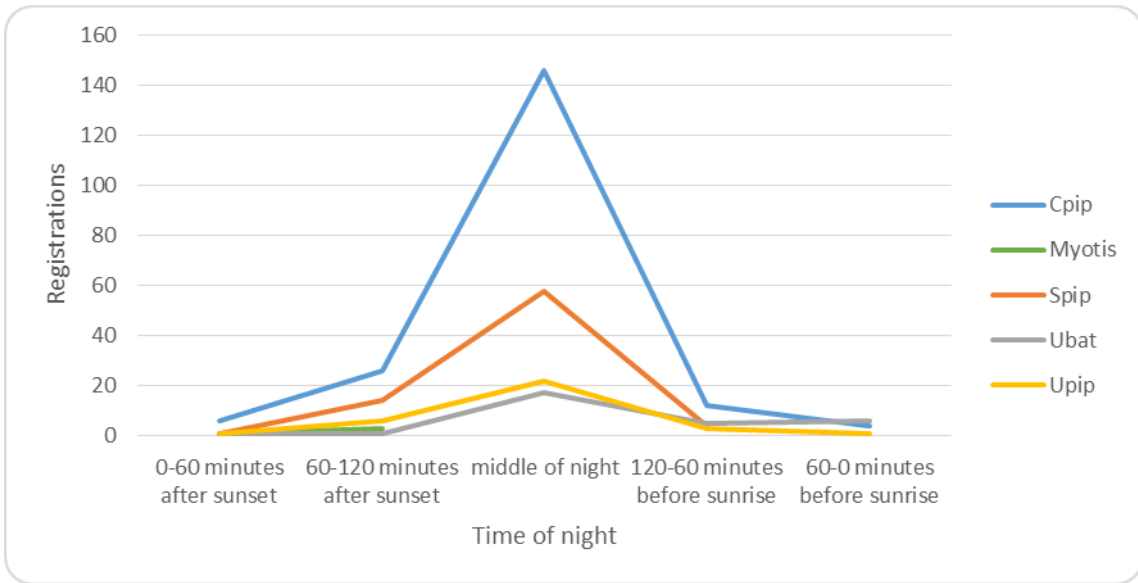


C.pip =Common pipistrelle, S.pip = Soprano pipistrelle, Unk = Unknown bat species, U.pip = Unidentified pipistrelle

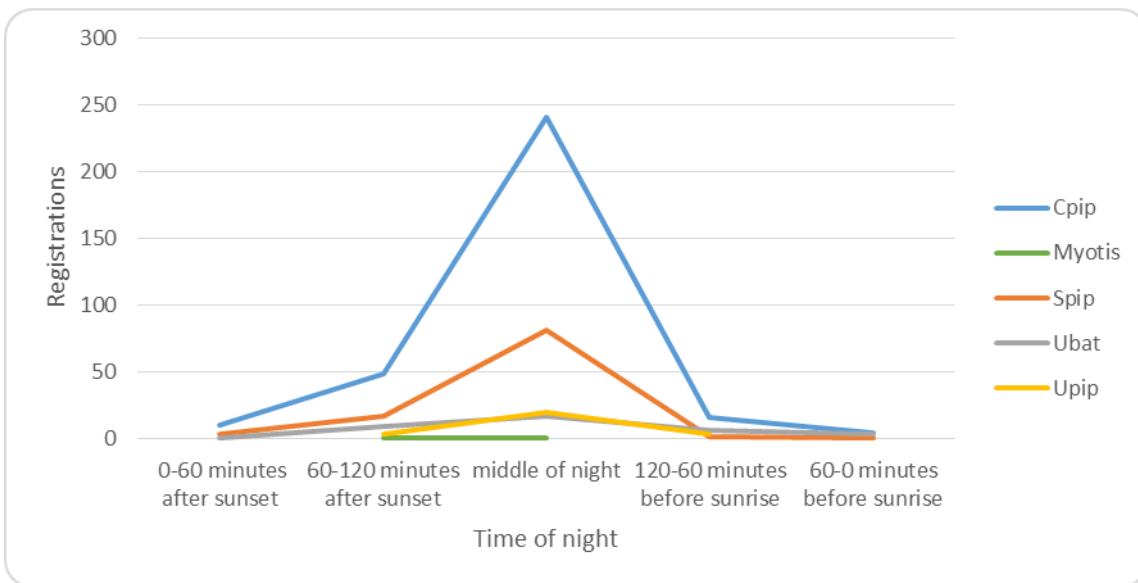
**Chart 2: Species registrations recorded against time of night (all records, Point 1, May – September 2016)**



**Chart 3: Species registrations recorded against time of night (all records, Point 2, May – September 2016)**

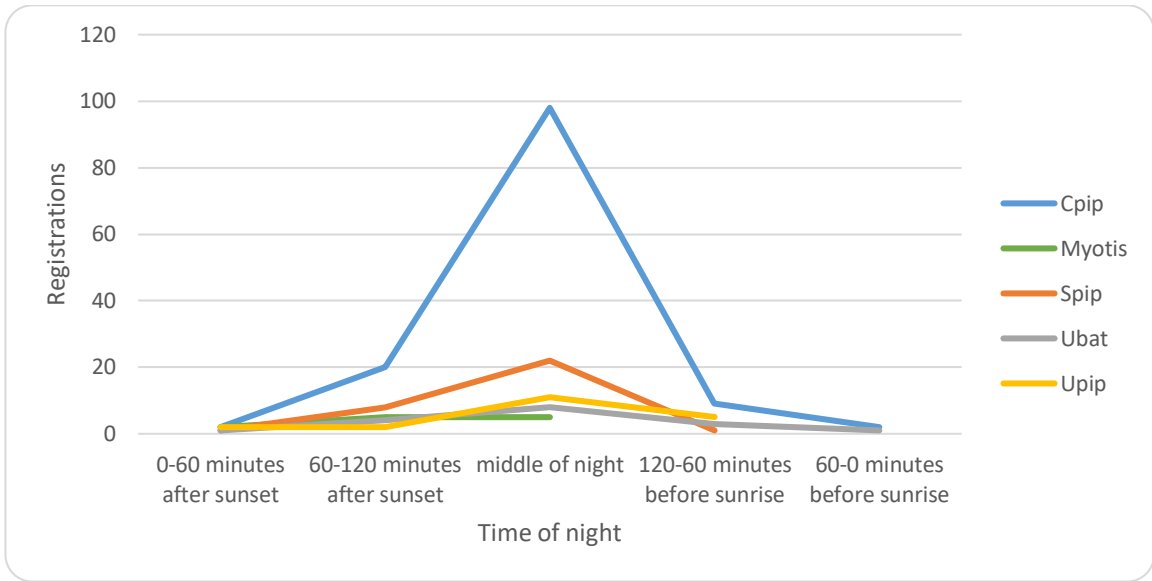


**Chart 4: Species registrations recorded against time of night (all records, Point 3, May – September 2016)**

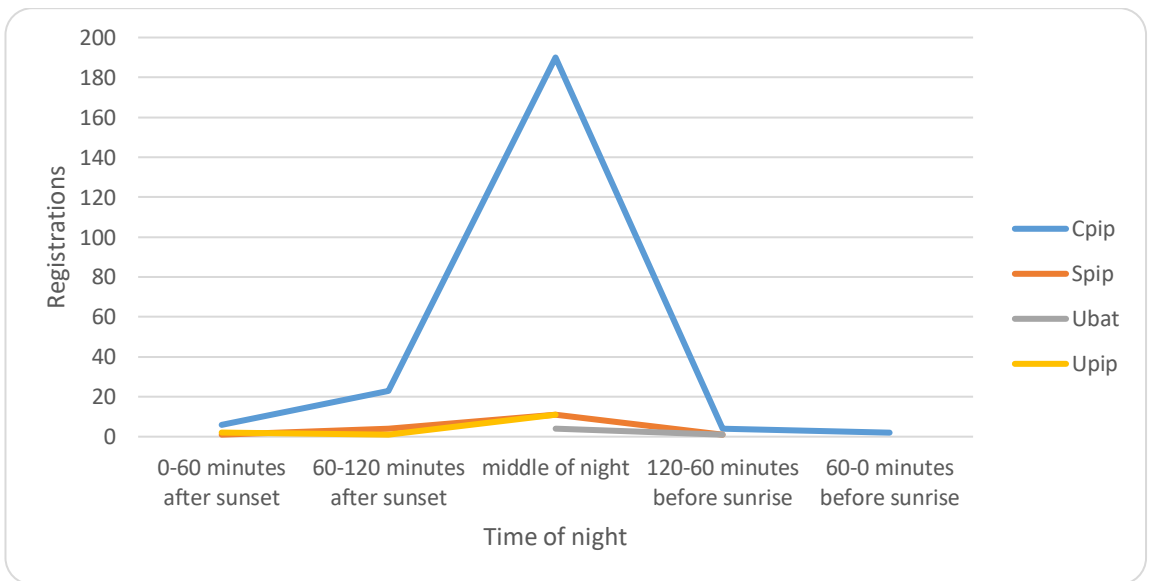




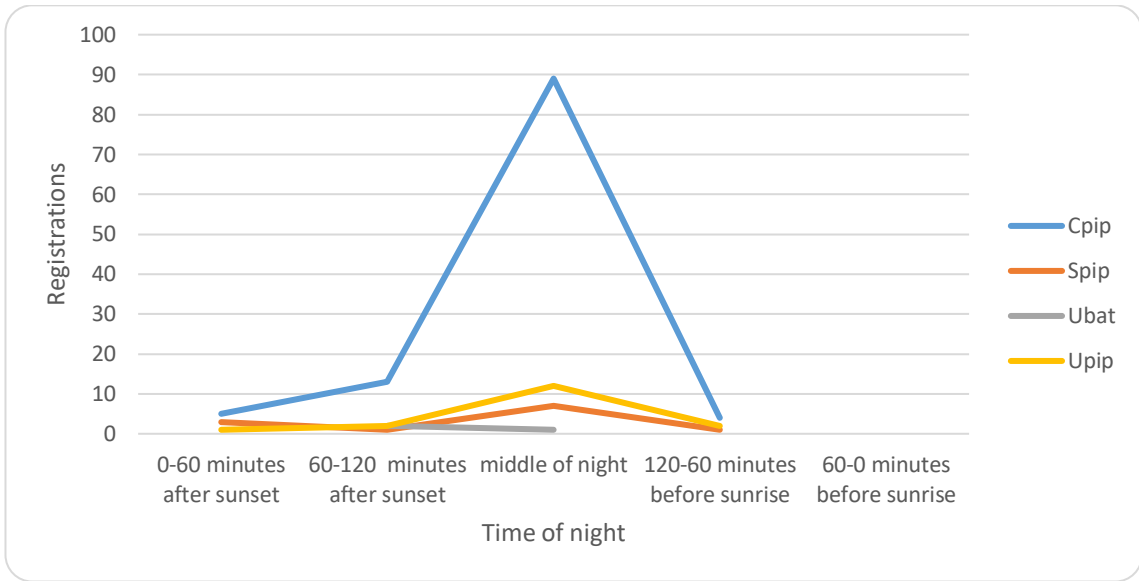
**Chart 5: Species registrations recorded against time of night (all records, Point 4, May – September 2016)**



**Chart 6: Species registrations recorded against time of night (all records, Point 5, May – September 2016)**



**Chart 7: Species registrations recorded against time of night (all records, Point 6, May – September 2016)**



3.3.7 As recording periods differed across the six static recording points and between months (in part due to occasional Anabat malfunction requiring redeployment), averages of species' registrations per point and per month are required for further comparative analysis. This is displayed in Table A3.7 to Table A3.9; Table A3.9 presents the average registrations per species (unknown and unknown pipistrelle omitted) per night. Chart 8 provides a visual interpretation of this information.

**Table A3.7: Nights Recording per Point per Month**

Point/Month	May	June	July	August	September
1	10	5	6	10	6
2	10	8	6	10	6
3	6	8	6	10	6
4	6	8	6	10	6
5	10	8	6	10	6
6	10	8	6	10	6

**Table A3.8: Registrations per Point per Month**

	Common pipistrelle	Myotis sp.	Soprano pipistrelle	Unknown spp.	Unknown pipistrelle spp.
<b>Point 1</b>					
May	4	0	5	0	1
June	5	0	0	0	0
July	5	0	2	0	0
August	64	0	42	10	26
September	73	0	36	3	15
<b>Point 2</b>					
May	2	1	2	0	3
June	0	0	0	0	0



	Common pipistrelle	Myotis sp.	Soprano pipistrelle	Unknown spp.	Unknown pipistrelle spp.
July	25	5	8	1	4
August	93	0	41	21	23
September	74	0	26	8	3
Point 3					
May	8	0	7	0	0
June	4	0	2	0	0
July	19	0	8	0	0
August	128	2	54	27	24
September	161	0	33	9	2
Point 4					
May	3	12	2	0	0
June	9	2	1	2	0
July	1	0	0	0	0
August	116	0	28	14	19
September	2	0	1	1	1
Point 5					
May	17	0	4	0	0
June	4	0	0	0	0
July	9	0	0	0	0
August	27	0	10	4	9
September	168	0	3	1	5
Point 6					
May	0	0	0	0	0
June	5	0	1	2	0
July	7	0	1	0	0
August	17	0	0	1	12
September	82	0	10	0	5

**Table A3.9: Averaged Species' Registrations per Night Recording**

Point	Common pipistrelle average/ night	Myotis sp. average/ night	Soprano pipistrelle average/ night
Point 1			
May	0.4	0	0.5
June	1	0	0
July	0.83	0	0.33
August	6.4	0	4.2
September	12.1	0	6
Point 2			
May	0.2	0.1	0.2





Point	Common pipistrelle average/ night	Myotis sp. average/ night	Soprano pipistrelle average/ night
June	0	0	0
July	4.17	0.83	1.33
August	9.3	0	4.1
September	12.33	0	4.33
Point 3			
May	1.33	0	1.17
June	0.5	0	0.25
July	3.17	0	1.33
August	12.8	0.2	5.4
September	26.8	0	5.5
Point 4			
May	0.5	2	0.33
June	1.13	0.25	0.125
July	0.17	0	0
August	11.6	0	2.8
September	0.33	0	0.17
Point 5			
May	1.7	0	0.4
June	0.5	0	0
July	1.5	0	0
August	2.7	0	1
September	28	0	0.5
Point 6			
May	0	0	0
June	0.5	0	0.1
July	1.17	0	0.17
August	1.7	0	0
September	13.6	0	1.67

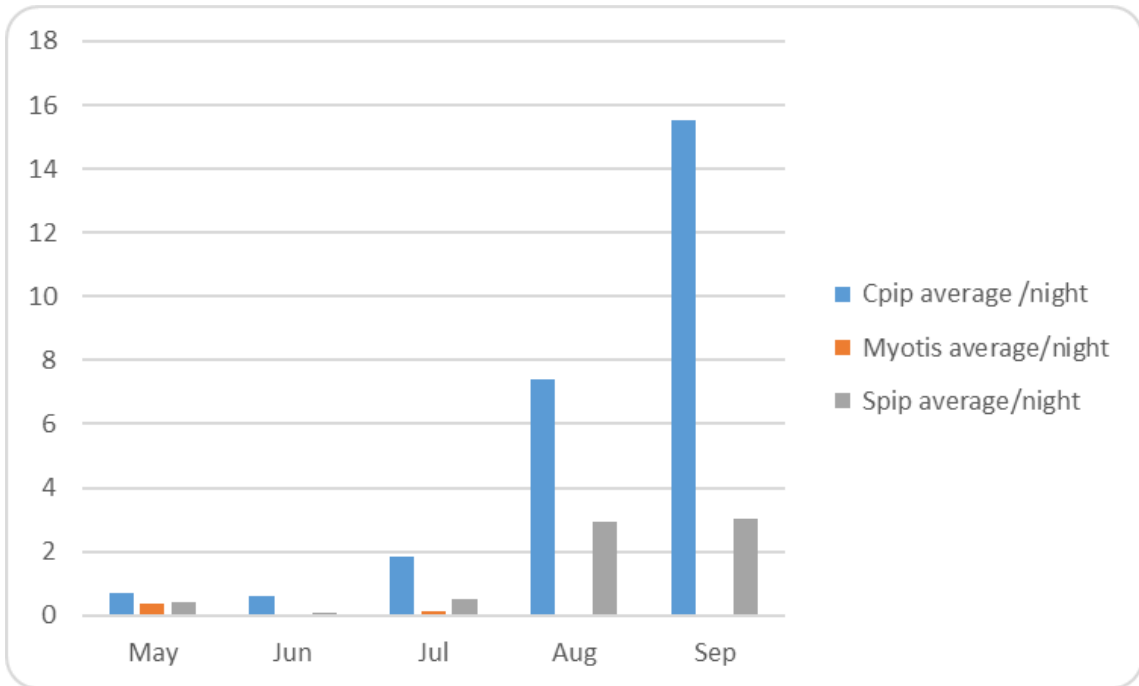
3.3.8 Chart 8 below shows an obvious increase in common pipistrelle and soprano pipistrelle registrations during August and September.

3.3.9 A nightly analysis of common pipistrelle is presented in Chart 9 below. This was conducted in order to detect any clear anomalies, i.e. where one particular date would skew these data through a significantly higher number of registrations, although this was not apparent. All detectors were operational for the same recording period in both months; thus the registration data is directly comparable. It is also recognised that a date (a night's data) contains midnight to dawn and dusk to midnight of that date, i.e. not the same night.

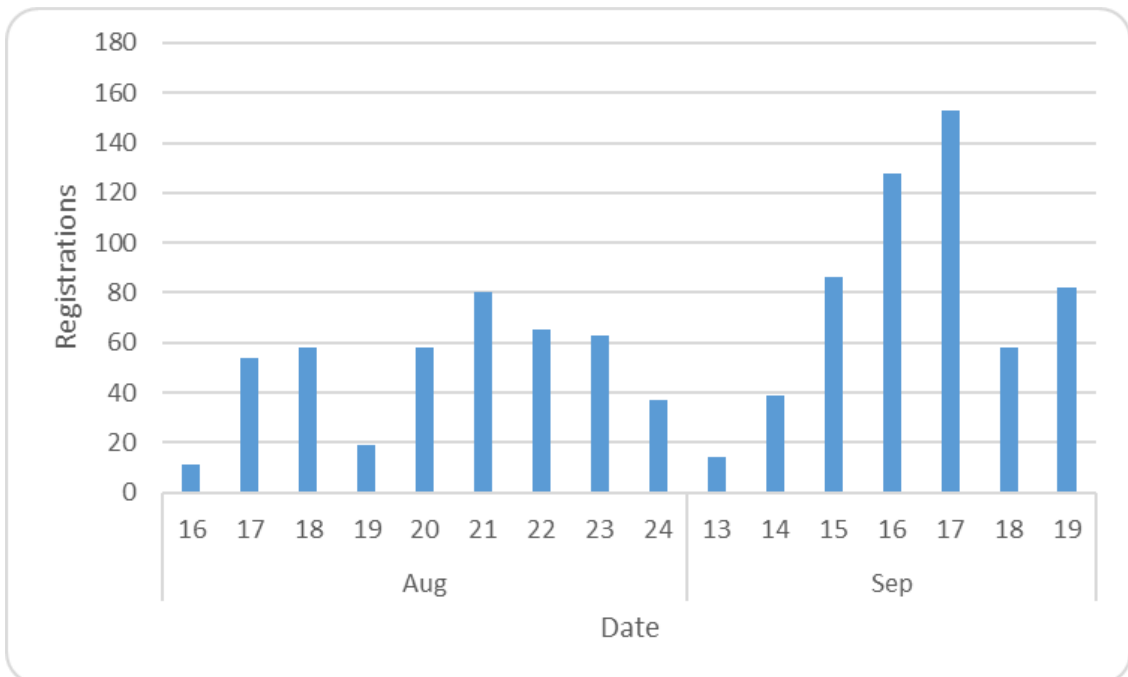




**Chart 8: Average Registration per Night (all points)**

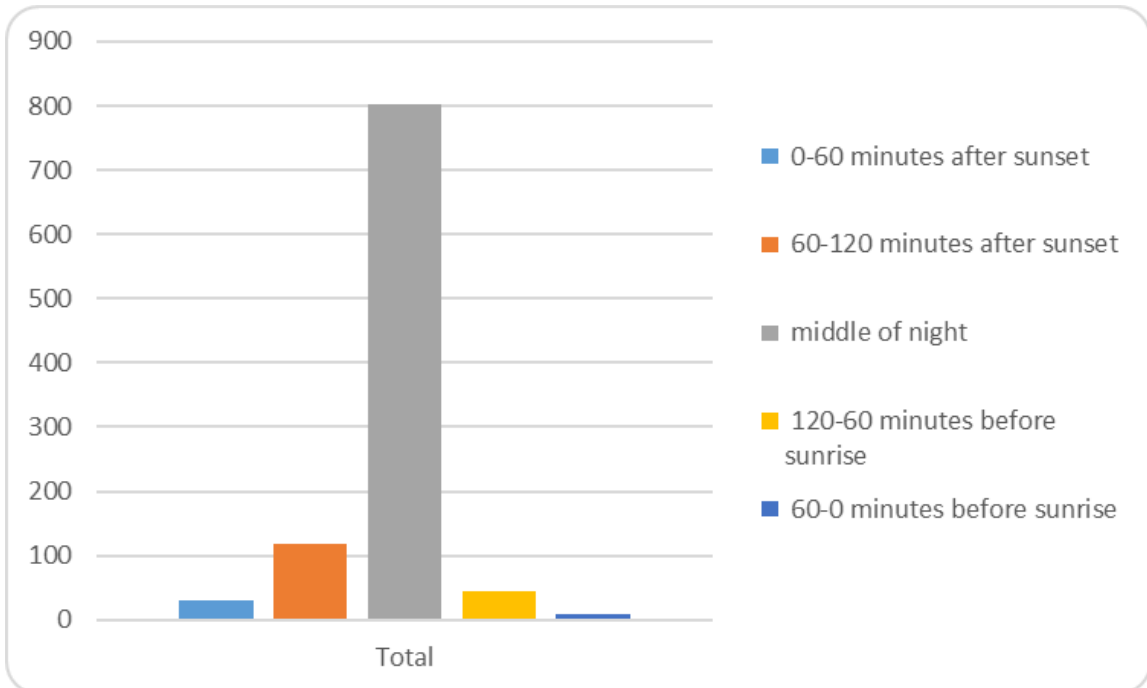


**Chart 9: Common pipistrelle registrations recorded during August and September (all points)**



3.3.10 Similarly to all other data (see Chart 1), common pipistrelle registrations recorded during August and September from all points are predominantly from the middle of night period (see Chart 10 below). Similarly to Chart 1, it should be noted that the 'middle of night' period is not an equal temporal period across the different months/dates of recording (for example more records could be expected from the middle of night period in September rather than June given the greater hours of darkness) and concomitantly the middle of night period (generally) comprises more hours than post-dusk and pre-dawn hour block periods used.

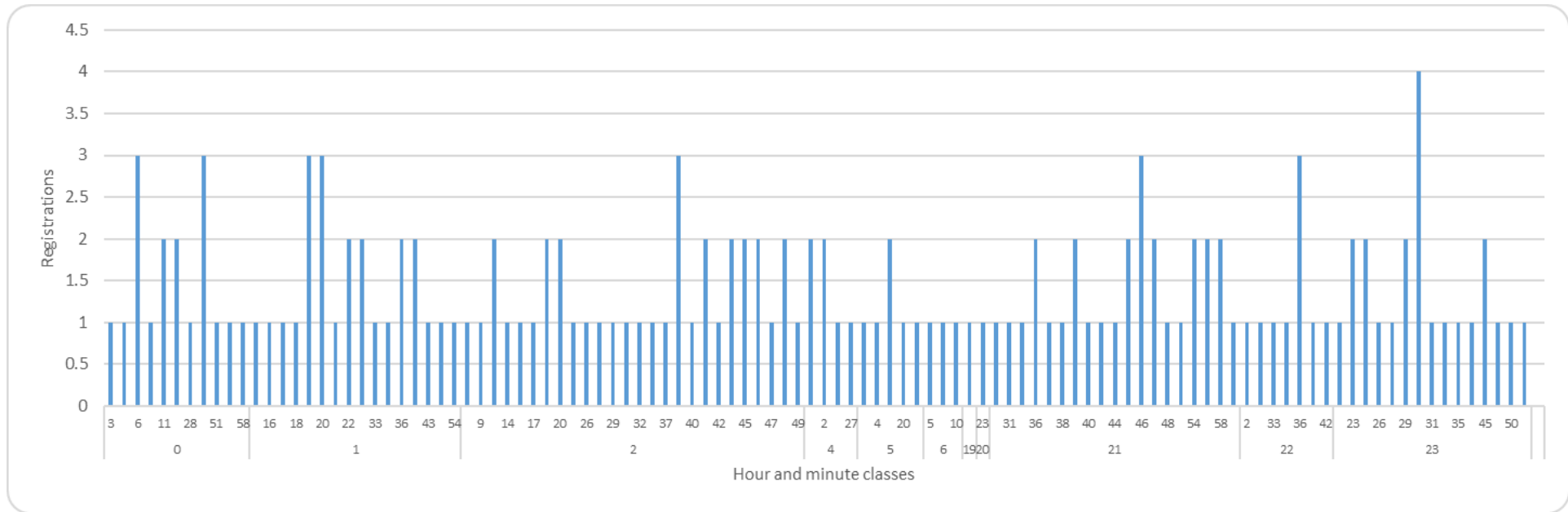
**Chart 10: Common pipistrelle Registrations Recorded against Time of Night (all points, Aug - Sep)**



3.3.11

The date with the highest number of common pipistrelle registrations recorded was on 17 September 2016. Minute analysis (see Chart 11 below) shows a relatively even spread of registrations recorded through the recording period (maximum of four registrations in one minute: 23.30). It should be noted that these data are displayed for all recording points also. It is considered that these data indicate that the encounter of multiple bats (common pipistrelle) at any one time is unlikely: given the proximity of detectors (x6 units evenly spaced along c. 350m length) it could be expected that more than one detector would record registrations at the same time (within the same minute) should multiple bats be present within the vicinity of the rock face. This does not appear to have occurred often; furthermore, the maximum of four registrations in one minute (23.30) was recorded from only two detectors and is therefore most likely from a maximum of two bats.

**Chart 11: Common pipistrelle Registrations per Minute on 17 September 2016 (all points)**



3.3.12 An activity level comparative analysis is provided below. Based on an activity database collated by HEL, as detailed in an unpublished paper by Dowse, Daisley and Parry<sup>iii</sup>. This paper has been peer reviewed by Neil Middleton (Echoes Ecology), Jonathan Fairbairn (FDM Ecology) and Paul Lintott (Exeter University). The database assigns activity levels into broad categories (high, typical and low) using an interquartile range approach. This database contains bat survey data collected from 301 locations across 10 x 100km grid squares across Scotland. Within the dataset typical activity levels for different bat species can be derived in relation to broad habitat type and for all habitats. By comparing a site's activity with the range of activity rates recorded in the dataset it is possible to begin to provide context for an evaluation of nature conservation importance and an assessment of impacts.

3.3.13 Table A3.10 provides a summary of the activity recorded at the rock face across of surveys, showing the average registrations per night across all points for all months. Table A3.11 shows the typical activity levels from the HEL data base according to species and habitat type.

**Table A3.10: Rock Face Activity Levels (Registrations/Night)**

Species	Registration/night (all points, all months)
Common pipistrelle	5.21
Soprano pipistrelle	1.4
Myotis	0.11

**Table A3.11: Typical Activity Levels (Registrations/Night) According to Species and Habitat Class (from HEL dataset)**

Species	Activity range for coniferous woodland edge	Activity range for all habitats (including broadleaved woodland, riparian, etc.)
Common pipistrelle	1.28 – 21.39	1.84 – 27.69
Soprano pipistrelle	1.61 – 28.39	2.44 – 21.95
Myotis	0.16 – 0.73	0.14 – 1.07

3.3.14 The activity recorded at the rock face fits best into the activity range for coniferous woodland edge (despite being on the A9 corridor) t (see Table A3.10). In terms of activity across a season, common pipistrelle falls within the typical activity band; both soprano pipistrelle and *Myotis* fall within the low activity band. Even in September, average common pipistrelle registrations/night of 15.53 still fall within typical activity levels (from reference data across all bat activity season, *ibid.*).

3.3.15 In summary the inspection surveys located two bat roosts, with two single bats observed and identified as common pipistrelle and soprano pipistrelle. The activity surveys at the rock face identified low levels of bat activity, mostly common and soprano pipistrelle with occasional *myotis* calls recorded. The data therefore indicated that the rock race is used by of low numbers of roosting bats, and the possible use of the rock face area for foraging/commuting/social interaction. However, little evidence of foraging (feeding buzzes) and few social calls were heard within the sound files.

## 3.4 Crossing Points Survey Results

- 3.4.1 Bats were recorded at all seven crossings shown on Figure 12.9a-k. Survey results are presented in Tables A3.12 to A3.18 below. Of the seven crossing point survey locations, only at two locations, 1 and 6, were more than 10 bat crossings recorded in total (over and under) during the whole survey period. A total (all surveys combined) of 77 crossings of common and soprano pipistrelle were identified at location 1, and 51 crossings of common and soprano pipistrelle at location 6. Locations 1 and 6 both comprise large underpasses (track and railway respectively) that provide a connection to good quality bat foraging habitat on either side. Being large underpasses, and as could be expected, more crossings were recorded through the feature (i.e. under the A9) than over the road (only one crossing was recorded over the road at location 1, and a total of 8 crossings over the road were recorded at location 6 across all surveys). Bat foraging behaviour within both underpasses was also observed; neither locations are lit and thus lighting is not having any effect on bat use. It is possible that roosts are present within nearby residential housing and trees at both crossing locations 1 and 6, thus accounting for the higher levels of activity recorded at these locations. From the data there is no correlation between direction of travel (bat crossings) and time of survey (dusk/dawn) at either location 1 or location 6 to provide an indication of likely roost location.
- 3.4.2 At Crossing 2 (Figure 12.9d), no bats were recorded flying through the culvert under the A9 or over the A9 at this location. Low numbers of bats were recorded during the survey, with the highest number of bats recorded during the September surveys when three common pipistrelle, nine soprano pipistrelle and one unknown bat were recorded on the southbound side of the A9 and 13 common pipistrelle and 11 soprano pipistrelle recorded on the northbound side. Bats were observed commuting and foraging.
- 3.4.3 At Crossing 3 (Figure 12.9e) a total of five bats were observed crossing over the A9 during the survey period, a single common pipistrelle in May, two common pipistrelle in July and one common pipistrelle and one soprano pipistrelle in August. Activity levels recorded were low, with the highest number of bats recorded during the August survey, totalling two common pipistrelle, five soprano pipistrelle and one *Myotis* on the northbound side of the A9 and three common pipistrelles and one *Myotis* bat on the southbound side. Bats were recorded foraging along the wayleave.
- 3.4.4 Crossing 4 (Figure 12.9e) was surveyed using a static detector, placed in the centre of the culvert. Although no bat crossings were recorded through the culvert, one bat (common pipistrelle) was observed crossing over the A9 above the culvert, viewed from Crossing 3.
- 3.4.5 At Crossing 5 (Figure 12.9f), a total of five bats were observed crossing over the A9 during the entire survey period, the highest number of bats observed crossing on anyone night of survey was two bats, with one common pipistrelle and one soprano pipistrelle in August and soprano one common and one unidentified pipistrelle in September.
- 3.4.6 At Crossing 7 (Figure 12.9h), a total of ten bats were recorded crossing over the A9, one common pipistrelle and two unknown bats in June, three common pipistrelle in July, one soprano pipistrelle in August and three soprano pipistrelle in September. In general activity levels on each side of the A9 were low, with the highest bat pass count recorded during the June and August surveys: 12 passes from common pipistrelle, soprano pipistrelle and unidentified bats at each side of the crossing point.
- 3.4.7 Species recorded (common pipistrelle, soprano pipistrelle and unidentified *Myotis*) during the crossing point surveys are typical of the geographic area and habitats present. With respect to the *Myotis* species, the call quality was poor. However, they





are likely to be either Daubenton's or Natterer's based on geographic distribution. No rarer species were identified.



Table A3.12: Crossing Location 1 - Survey Results

OS grid reference and Chainage: Tomatin to Moy Crossing 1 NH80039 29679 (Ch 500)										
Habitat Description: Corrugated metal track underpass with broadleaf and coniferous woodland bordering the track either side										
Date Sunset/Sunrise Time (24hr clock)	Start and End Times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak Count Crossings <sup>13</sup>
		Temp (°C)	Cloud (0 – 8) <sup>14</sup>	Rain (0 – 5) <sup>15</sup>	Wind (0 – 12) <sup>16</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
05 May 16 Sunrise 05:16	Start: 03:16	Start: 7	Start: 4	Start: 0	Start: 1	N/B	U.pip: 1	One brief U.pip pass heard behind the surveyor position.	The only activity recorded was at 04:47 (29 minutes before dawn).	Under: 0 Over: 0
	End: 05:31	End: 8	End: 5	End: 0	End: 1	S/B	U.pip: 3	Three brief U.pip passes heard during the survey.		
15 Jun 16 Sunset 22:17	Start: 22:02	Start: 7.5	Start: 8	Start: 2	Start: 0	N/B	C.pip: 18 S.pip: 4 U.pip: 9	C.pip and S.pip observed foraging within the culvert. Fourteen C.pip, three S.pip and nine U.pip observed crossing through the culvert.	Activity started at 22:02 (15 minutes before dusk) and finished at 00:07.	Under: 14 C.pip, 3 S.pip, 9 U.pip Over: 0
	End: 00:17	End: 8	End: 8	End: 1	End: 1	S/B	C.pip: 12 S.pip: 4 U.pip: 1	C.pip, S.pip and U.pip observed foraging within the culvert.		

<sup>13</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>14</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>15</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>16</sup> Wind speed score of 0-12 against Beaufort scale where 0 = Calm, 2 = Light breeze, 4 = Moderate breeze, 6 = Strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



**OS grid reference and Chainage: Tomatin to Moy Crossing 1 NH80039 29679 (Ch 500)**

**Habitat Description: Corrugated metal track underpass with broadleaf and coniferous woodland bordering the track either side**

Date Sunset/Sunrise Time (24hr clock)	Start and End Times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak Count Crossings <sup>13</sup>
		Temp (°C)	Cloud (0 – 8) <sup>14</sup>	Rain (0 – 5) <sup>15</sup>	Wind (0 – 12) <sup>16</sup>					
								Twelve C.pip three S.pip, and one U.pip observed crossing through the culvert.		1 U.pip Over: 0
14 Jul 16 Sunrise 04:41	Start: 02:41	Start: 12	Start: 8	Start: 0	Start: 0	N/B	C.pip: 18 S.pip: 7	C.pip and S.pip observed foraging within the culvert. Two S.pip and five C.pip observed crossing through the culvert. Numerous brief passes heard.	Activity started at 02:48 and finished at 04:20 (21 minutes before dawn).	Under: 5 C.pip, 2 S.pip Over: 0
	End: 04:56	End: 9	End: 8	End: 0	End: 0	S/B	C.pip: 16 S.pip: 5	C.pip and S.pip observed foraging within the culvert and along the treelines on the southbound side of the feature. Two S.pip and nine C.pip observed crossing through the culvert. One C.pip observed crossing over the culvert.	Activity started at 02:49 and finished at 04:19 (22 minutes before dawn).	Under: 9 C.pip, 2 S.pip Over: 1 C.pip
17 Aug 16 Sunset 20:53	Start: 20:38	Start: 15.5	Start: 0	Start: 0	Start: 0	NB	C.pip: 24 U.pip: 1	C.pip observed foraging within the culvert.	Activity started at 20:55 (two minutes after dusk) and finished at 22:45.	Under: 16 C.pip Over: 0





OS grid reference and Chainage: Tomatin to Moy Crossing 1 NH80039 29679 (Ch 500)										
Habitat Description: Corrugated metal track underpass with broadleaf and coniferous woodland bordering the track either side										
Date Sunset/Sunrise Time (24hr clock)	Start and End Times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak Count Crossings <sup>13</sup>
		Temp (°C)	Cloud (0 – 8) <sup>14</sup>	Rain (0 – 5) <sup>15</sup>	Wind (0 – 12) <sup>16</sup>					
	End: 22:53	End: 12.5	End: 0	End: 0	End: 0			16 C.pip crossing through the culvert.	Calls started soon after dusk. A large house is located on the southbound side of the A9, 200m down the track. This structure may provide bat roost potential. No other opportunities for roosting bats were identified.	
						SB	C.pip: 5 S.pip: 4 U.pip: 1 Unk: 1	C.pip observed foraging within the culvert. Five C.pip one S.pip and one Unk. bat observed crossing through the culvert.	Activity started at 21:06 (13 minutes after dusk) and finished at 22:58.	Under: 5 C.pip 1 S.pip 1 Unk Over: 0
15 Sep 16 Sunrise 06:48	Start: 04:48	Start: 10	Start: 5	Start: 0	Start: 0	NB	C.pip:1 S.pip: 6	S.pip were observed foraging along the treeline around the culvert entrance.	Activity started at 05:14 and finished at 06:12 (36 minutes before dawn).	Under: 0 Over: 0
	End: 07:03	End: 10	End: 6	End: 0	End: 0	SB	S.pip: 4	S.pip were observed foraging within the culvert. Four S.pip observed crossing through the culvert..	Activity started at 05:14 and finished at 06:14 (34 minutes before dawn).	Under: 4 S.pip Over: 0



Table A3.13: Crossing Location 2 - Survey Results

OS grid reference and Chainage: Tomatin to Moy Crossing 2 NH 79688 29998 (Ch 1000)										
Habitat Description: Corrugated metal river culvert. Coniferous plantation running along the A9 on the northbound side of the culvert and open grassland habitat on the southbound side										
Date sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>17</sup>
		Temp (°C)	Cloud (0 – 8) <sup>18</sup>	Rain (0 – 5) <sup>19</sup>	Wind (0 – 12) <sup>20</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
03 May 16 Sunset 21:08	Start: 20:53  End: 23:08	Start: 8  End: 7	Start: 5  End: 4	Start: 0  End: 0	Start: 1  End: 1	N/B	U.pip: 3	Three U.pip brief passes.	Activity started at 22:09(1 hour 1 minute after dusk) and finished at 22:34.	Under: 0 Over: 0
						S/B	S.pip: 6 U.pip: 4	Brief passes recorded together with foraging.	Activity started at 22:11 (1 hour 3 minutes after dusk) and finished at 22:57.	Under: 0 Over: 0
15 Jun 16 Sunrise 04:18	Start: 02:18  End: 04:33	Start: 11  End: 10	Start: 8  End: 8	Start: 4  End: 2	Start: 0  End: 1	N/B	S.pip: 1	Single pass heard but no bat seen.	The only activity recorded was at 03:33 (45 minutes before dawn).	Under: 0 Over: 0
						S/B	S.pip: 4	Brief pass heard and foraging in open area 30m from culvert.	Activity started at 03:11 and finished at 03:36 (42 minutes before dawn).	Under: 0 Over: 0

<sup>17</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>18</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>19</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>20</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



OS grid reference and Chainage: Tomatin to Moy Crossing 2 NH 79688 29998 (Ch 1000)										
Habitat Description: Corrugated metal river culvert. Coniferous plantation running along the A9 on the northbound side of the culvert and open grassland habitat on the southbound side										
Date sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>17</sup>
		Temp (°C)	Cloud (0 – 8) <sup>18</sup>	Rain (0 – 5) <sup>19</sup>	Wind (0 – 12) <sup>20</sup>					
<i>C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = Myotis; BLE = brown long-eared; Unk = unknown bat species</i>										
12 Jul 16 Sunset 22:04	Start: 21:49  End: 00:04	Start: 14  End: 10	Start: 6  End: 6	Start: 0  End: 0	Start: 1  End: 2	N/B	C.pip: 6 S.pip: 2	Majority of calls were brief passes and bats were not seen. One S.pip was observed commuting northbound along the treeline parallel with the A9.	Activity started at 22:50 (46 minutes after dusk) and finished at 23:57.	Under: 0 Over: 0
						S/B	C.pip: 3 S.pip: 4	S.pip observed using the mouth of the culvert to forage.	Activity started at 22:28 (24 minutes after dusk) and finished at 23:53.	Under: 0 Over: 0
17 Aug 16 Sunrise 05:47	Start: 03:47  End: 06:02	Start: 15  End: 12	Start: 0  End: 0	Start: 0  End: 0	Start: 0  End: 0	N/B	C.pip: 6 U.bat: 1	Majority of calls were brief passes and bats were not seen. Foraging heard behind trees around culvert.	Activity started at 03:49 and finished at 04:54 (53 minutes before dawn).	Under: 0 Over: 0
						S/B	C.pip: 2 S.pip: 1	Brief passes recorded with activity observed around trees at the mouth of the culvert.	Activity started at 04:27 and finished at 05:03 (44 minutes before dawn).	Under: 0 Over: 0
13 Sep 16 Sunset 19:40	Start: 19:25  End: 21:40	Start: 13  End: 12	Start: 8  End: 8	Start: 0  End: 1	Start: 1  End: 1	N/B	C.pip: 13 S.pip: 11 U.pip: 1	Some foraging and commuting observed near the culvert entrance, although many of the passes were brief.	Activity started at 19:50 (10 minutes after dusk) and finished at 21:30.	Under: 0 Over: 0



**OS grid reference and Chainage: Tomatin to Moy Crossing 2 NH 79688 29998 (Ch 1000)**

**Habitat Description: Corrugated metal river culvert. Coniferous plantation running along the A9 on the northbound side of the culvert and open grassland habitat on the southbound side**

Date sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>17</sup>
		Temp (°C)	Cloud (0 – 8) <sup>18</sup>	Rain (0 – 5) <sup>19</sup>	Wind (0 – 12) <sup>20</sup>					
<i>C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = Myotis; BLE = brown long-eared; Unk = unknown bat species</i>										
						S/B	C.pip: 3 S.pip: 9 U.bat: 1	Majority of calls were brief passes with a single S.pip seen foraging above watercourse. One Unk. bat observed commuting northbound parallel with the road at 19:59.	Activity started at 19:59 (19 minutes after dusk) and finished at 21:31.	Under: 0 Over: 0



Table A3.14: Crossing Location 3 - Survey Results

OS grid reference and Chainage: Tomatin to Moy Crossing 3 NH 79397 30455 (Ch. 1500)										
Habitat Description: Wayleave through coniferous plantation bisected by A9 close to Crossing 4										
Date Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>21</sup>
		Temp (°C)	Cloud (0 – 8) <sup>22</sup>	Rain (0 – 5) <sup>23</sup>	Wind (0 – 12) <sup>24</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
04 May 16 Sunset 21:10	Start: 20:55  End: 23:10	Start: 10	Start: 7	Start: 0	Start: 2	N/B	S.pip: 1 U.pip: 3	Brief passes heard.	Activity started at 22:08 (58 minutes after dusk) and finished at 23:08.	Over: 0
		End: 8	End: 8	End: 0	End: 1	S/B	S.pip: 1 C.pip: 3	Brief passes heard with a single C.pip recorded crossing over A9 10 m above road.	Activity started. Activity started at 21:19 (nine minutes after dusk) and finished at 23:00.	Over: 1 C.pip
16 Jun 16 Sunrise 04:18	Start: 02:18  End: 04:20	Start: 8	Start: 8	Start: 2	Start: 1-2	N/B	No bats recorded.	N/A	N/A	Over: 0
		End: 8	End: 8	End: 1-2	End: 2	S/B	No bats recorded.	N/A	N/A	Over: 0
13 Jul 16 Sunset 22:03	Start: 21:48	Start: 14  End: 13	Start: 8  End: 8	Start: 0  End: 1	Start: 0  End: 0	N/B	C.pip: 3	Two C. pip were observed crossing over A9.	Activity started at 22:34 (31 minutes after dusk) and finished at 23:36.	Over: 2 C.pip

<sup>21</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>22</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>23</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>24</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



OS grid reference and Chainage: Tomatin to Moy Crossing 3 NH 79397 30455 (Ch. 1500)										
Habitat Description: Wayleave through coniferous plantation bisected by A9 close to Crossing 4										
Date Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>21</sup>
		Temp (°C)	Cloud (0 – 8) <sup>22</sup>	Rain (0 – 5) <sup>23</sup>	Wind (0 – 12) <sup>24</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
	End: 00:03					S/B	S.pip: 5	No crossings observed with most recordings as brief passes only – one S.pip seen foraging.	Activity started at dusk (22:03) and finished at 22:38.	Over: 0
18 Aug 16 Sunrise 05:49	Start: 02:49  End: 06:04	Start: 12  End: 11	Start: 3  End: 2	Start: 0  End: 0	Start: 0  End: 0	N/B	C.pip: 2 S.pip: 6 Myt: 1	Majority of bats identified were recorded as brief passes only. One S.pip observed crossing the road from northbound to southbound.	Activity started at 03:43 and finished at 05:10 (39 minutes before dawn).	Over: 1 S.pip
						S/B	C.pip: 3 Myt: 1	Three brief passes recorded and a single C.pip observed crossing over A9.	Activity started at 04:14 and finished at 04:45 (1 hour 4 minutes before dawn).	Over: 1 C.pip
14 Sep 16 Sunset 19:37	Start: 19:22  End: 21:37	Start: 12  End: 13	Start: 8  End: 8	Start: 0  End: 0	Start: 1  End: 0	N/B	C.pip: 2 U.pip: 2	One C.pip was observed following the wayleave then commuting northbound along the A9 verge.	Activity started at 19:47 (10 minutes after dusk) and finished at 21:21.	Over: 0
						S/B	C.pip: 2 S.pip: 4 Myt: 1 U.pip: 1	One S.pip was observed following the A9 verge northbound. Other calls were brief passes.	Activity started at 20:00 (23 minutes after dusk) and finished at 21:29.	Over: 0



Table A3.15: Crossing Location 4 - Survey Results

OS grid reference and Chainage: Tomatin to Moy Crossing 4 NH 79377 30527 (Ch. 1600)										
Habitat Description: A9 corrugated metal river culvert (next to Crossing 3)										
Date and sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>25</sup>
		Temp (°C)	Cloud (0 – 8) <sup>26</sup>	Rain (0 – 5) <sup>27</sup>	Wind (0 – 12) <sup>28</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
04 May 16 Sunset 21:10	Start: 20:55  End: 23:10	Start: 10  End: 8	Start: 7  End: 8	Start: 0  End: 0	Start: 2  End: 1	Within culvert (static Anabat).	C.pip: 1 (see comments).	No bats recorded from static detector within culvert. One C.pip identified crossing over A9 at Crossing 4 from Crossing 3 survey, and is included within Crossing 3 data.		Under: 0 Over: 0
16 Jun 16 Sunrise 04:18	Start: 02:18  End: 04:33	Start: 8  End: 8	Start: 8  End: 8	Start: 2  End: 1-2	Start: 1-2  End: 2	Within culvert (static Anabat).	No bats recorded.	N/A	N/A	Under: 0
13 Jul 16 Sunset 22:03	Start: 21:48  End: 00:03	Start: 14  End: 13	Start: 8  End: 8	Start: 0  End: 1	Start: 0  End: 0	Within culvert (static Anabat).	No bats recorded.	N/A	N/A	Under: 0
18 Aug 16 Sunrise 05.49	Start: 03:49	Start: 12	Start: 3	Start: 0	Start: 0	Within culvert	No bats recorded.	N/A	N/A	Under: 0

<sup>25</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>26</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>27</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>28</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.





OS grid reference and Chainage: Tomatin to Moy Crossing 4 NH 79377 30527 (Ch. 1600)

Habitat Description: A9 corrugated metal river culvert (next to Crossing 3)

Date and sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>25</sup>
		Temp (°C)	Cloud (0 – 8) <sup>26</sup>	Rain (0 – 5) <sup>27</sup>	Wind (0 – 12) <sup>28</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = Myotis; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
	End: 06:04	End: 11	End: 2	End: 0	End: 0	(static Anabat).				
14 Sep 16 Sunset 19.37	Start: 19:22  End: 21:37	Start: 12  End: 13	Start: 8  End: 8	Start: 0  End: 0	Start: 1  End: 0	Within culvert (static Anabat).	No bats recorded.	N/A	N/A	Under: 0



**Table A3.16: Crossing Location 5 (Bridge 124) - Survey Results**

OS grid reference and Chainage: Tomatin to Moy Crossing 5 NH 78739 32187 (Bridge 124) (Ch. 3500)										
Habitat Description: A9 river crossing over Dalmagarry Burn										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>29</sup>
		Temp (°C)	Cloud (0 – 8) <sup>30</sup>	Rain (0 – 5) <sup>31</sup>	Wind (0 – 12) <sup>32</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
04 May 16 Sunrise 05:18	Start: 03:18  End: 05:33	Start: 7  End: 8	Start: 6  End: 7	Start: 0  End: 0	Start: 1  End: 1	N/B S/B	No bats recorded.	N/A	N/A	Under: 0 Over: 0
14 Jun 16 Sunset 22:17	Start: 22:02  End: 00:17	Start: 11  End: 10	Start: 8  End: 8	Start: 2  End: 0	Start: 1  End: 1	N/B	C.pip: 2 S.pip: 2	Two records consisted of brief passes and were not observed. One S.pip observed crossing over A9 following the Allt a Chul river.	Activity started at 23:31 (1 hour 14 minutes after dusk) and finished at 00:03.	Under: 0 Over: 1 S.pip
						S/B	C.pip: 3 S.pip: 5 U.pip: 1	All calls were brief passes and not observed.	Activity started at 23:39 (1 hour 22 minutes after dusk) and finished at 00:02.	Under: 0 Over: 0
13 Jul 16 Sunrise 04:40	Start: 02:40	Start: 7	Start: 8	Start: 0	Start: 1	N/B S/B	No bats recorded.	N/A	N/A	Under: 0 Over: 0

<sup>29</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>30</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>31</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>32</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



**OS grid reference and Chainage: Tomatin to Moy Crossing 5 NH 78739 32187 (Bridge 124) (Ch. 3500)**

**Habitat Description: A9 river crossing over Dalmagarry Burn**

Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>29</sup>
		Temp (°C)	Cloud (0 – 8) <sup>30</sup>	Rain (0 – 5) <sup>31</sup>	Wind (0 – 12) <sup>32</sup>					
<i>C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = Myotis; BLE = brown long-eared; Unk = unknown bat species</i>										
	End: 04:55	End: 8	End: 8	End: 0	End: 1					
16 Aug 16 Sunset 20:56	Start: 20:41	Start: 21	Start: 2	Start: 0	Start: 1	N/B	C.pip: 5 S.pip: 2	One S.pip observed crossing over the A9. Other calls were brief with only a single bat observed.	Activity started at 22:07 (1 hour 11 minutes after dusk) and finished at 22:52.	Under: 0 Over: 1 S.pip
	End: 22:56	End: 17	End: 2	End: 0	End: 1	S/B	C.pip: 6 S.pip: 1	One C.pip observed crossing over the A9. Majority of calls were brief passes. Some of the bats were foraging along the river on the south bound section.	Activity started at 22:08 (1 hour 12 minutes after dusk) and finished at 22:38.	Under: 0 Over: 1 C.pip
14 Sep 16 Sunrise 06:46	Start: 04:46	Start: 10	Start: 8	Start: 0	Start: 0	N/B	C.pip: 3 Myt: 1 U.pip: 1	Majority of recordings were brief passes. One U.pip was observed crossing over the A9 following the River Allt a Chul.	Activity started at 05:28 and finished at 06:05 (41 minutes before dawn).	Under: 0 Over: 1 U.pip
	End: 07:01	End: 10	End: 8	End: 0	End: 0	S/B	C.pip: 2 Myt: 1	One C.pip was observed crossing over the A9 10 m above the road. Other records were brief passes.	Activity started at 05:01 and finished at 05:50 (56 minutes before dawn).	Under: 0 Over: 1 C.pip



**Table A3.17: Crossing Location 6 (Bridge 381) - Survey Results**

OS grid reference and Chainage: Tomatin to Moy Crossing 6 NH 77932 33226 (Bridge 381) (Ch. 4800)										
Habitat Description: A9 concrete bridge over railway surrounded by coniferous plantation. Only accessed from the southbound side										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on Ttmings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>33</sup>
		Temp (°C)	Cloud (0 – 8) <sup>34</sup>	Rain (0 – 5) <sup>35</sup>	Wind (0 – 12) <sup>36</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
03 May 16 Sunrise 05:15	Start: 03:15 End: 05:51	Start: 6 End: 5	Start: 2 End: 3	Start: 0 End: 0	Start: 1 End: 1	S/B	No bats recorded.	N/A	N/A	Under: 0 Over: 0
13 Jun 16 Sunset 22:16	Start: 22:01 End: 00:16	Start: 13 End: 10	Start: 6 End: 6	Start: 0 End: 0	Start: 0 End: 0	S/B	C.pip: 18 S.pip: 9 Unk: 4	C.pip, S.pip and Unk. bat were observed commuting under the railway bridge.	Activity started at 23:02 (46 minutes after dusk) and finished at 00:00.	Under: 16 C.pip, 3 S.pip 3 Unk. Over: 0
12 Jul 16 Sunrise 04:38	Start: 02:31 End: 04:53	Start: 9 End: 8.7	Start: 8 End: 8	Start: 0 End: 0	Start: 1 End: 0	S/B	C.pip: 6 S.pip: 18	C.pip and S.pip foraging under the bridge and in the woodland surrounding the railway track on the southbound side of the A9. One S.pip and one C.pip were also observed flying back over the bridge after crossing	Activity started at 02:31 and finished at 03:55 (43 minutes before dawn).	Under: 4 C.pip, 9 S.pip Over: 2 C.pip, 5 S.pip

<sup>33</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>34</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>35</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>36</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.

OS grid reference and Chainage: Tomatin to Moy Crossing 6 NH 77932 33226 (Bridge 381) (Ch. 4800)										
Habitat Description: A9 concrete bridge over railway surrounded by coniferous plantation. Only accessed from the southbound side										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (Passes)	Comments on behaviour	Comments on Ttmings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>33</sup>
		Temp (°C)	Cloud (0 – 8) <sup>34</sup>	Rain (0 – 5) <sup>35</sup>	Wind (0 – 12) <sup>36</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
								beneath the A9 (counted as two crossings each).		
15 Aug 16 Sunset 20:58	Start: 20:43  End: 22:58	Start: 18  End: 14	Start: 1  End: 1	Start: 0  End: 0	Start: 0  End: 0	S/B	C.pip: 6 S.pip: 15	C.pip and S.pip observed crossing under the bridge.	Activity started at 21:30 (32 minutes after dusk) and finished at 22:56.	Under: 1 C.pip, 9 S.pip Over: 0
13 Sep 16 Sunrise 06:44	Start: 04:44  End: 06:59	Start: 13  End: 14	Start: 8  End: 8	Start: 1  End: 1	Start: 0  End: 1	S/B	C.pip: 4 S.pip: 5	Majority of records were brief passes. One C.pip observed crossing the A9 under the bridge. One C.pip observed crossing over the road flying adjacent to the woodland and towards the observation point.	Activity started at 05:25 and finished at 05:48 (56 minutes before dawn).	Under: 1 C.pip Over: 1 C.pip



Table A3.18: Crossing Location 7 - Survey Results

OS grid reference and Chainage: Tomatin to Moy Crossing 7 NH 76819 34047 (Ch. 6200)										
Habitat Description: Road accesses either side of A9 at Lynebeg junction. Predominantly coniferous plantation either side of access roads and A9										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>37</sup>
		Temp (°C)	Cloud (0 – 8) <sup>38</sup>	Rain (0 – 5) <sup>39</sup>	Wind (0 – 12) <sup>40</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
02 May 16 Sunset 21:08	Start: 20:53	Start: 6	Start: 7	Start: 0	Start: 1	N/B	No bats recorded.	N/A	N/A	Under: 0 Over: 0
	End: 23:08	End: 5	End: 8	End: 0	End: 2	S/B	No bats recorded.	N/A	N/A	Under: 0 Over: 0
14 Jun 16 Sunrise 04:18	Start: 02:18	Start: 5	Start: 0	Start: 0	Start: 0	N/B	C.pip: 2 Unk: 2	Low number of bats heard: 2 Unk. bat seen crossing A9, one either side of viewpoint.	Activity started at 02:45 and finished at 03:22 (56 minutes before dawn).	Under: 0 Over: 1 C.pip 2 Unk
	End: 04:33	End: 5	End: 0	End: 0	End: 0-1	S/B	C pip: 5 U.pip: 2 Unk: 1	Mainly brief passes. Two C.pip and one U.pip observed commuting E to NW parallel with the road.	Activity started at 02:21 and finished at 03:44 (34 minutes before dawn).	Over: 0
11 Jul 16 Sunset 22:06	Start: 21:51	Start: 14	Start: 8 End: 8	Start: 0	Start: 2	N/B	C.pip: 3	Three C.pip recorded during survey: two crossing the A9 and one	Activity started at 22:23 (17 minutes after dusk) and finished at 22:50.	Over: 2 C.pip

<sup>37</sup> The peak count represents the total number of bats seen crossing over or under the road. Where a bat has been recorded by surveyors on either side of the carriageway and the timings indicate that this is the same bat, then this is counted as one crossing. Where a bat is recorded crossing the carriageway by one surveyor, but not seen on the other side of the carriageway this is recorded as one crossing as the bat may have crossed using a non-direct flight line.

<sup>38</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>39</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>40</sup> Wind speed score of 0-12 against Beaufort scale where 0 = calm, 2 = light breeze, 4 = Moderate breeze, 6 = strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.

OS grid reference and Chainage: Tomatin to Moy Crossing 7 NH 76819 34047 (Ch. 6200)										
Habitat Description: Road accesses either side of A9 at Lynebeg junction. Predominantly coniferous plantation either side of access roads and A9										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>37</sup>
		Temp (°C)	Cloud (0 – 8) <sup>38</sup>	Rain (0 – 5) <sup>39</sup>	Wind (0 – 12) <sup>40</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
	End: 00:06	End: 10		End: 0	End: 1			commuting/foraging on northbound side.		
						S/B	C.pip: 5	C.pip recorded as brief passes, as foraging, commuting along treeline towards railbridge and as crossing the A9..	Activity started at 22:08 (two minutes after dusk) and finished at 23:20.	Over: 1 C.pip
16 Aug 16 Sunrise 05:45	Start: 03:44 End: 06:00	Start: 8 End: 7	Start: 0 End: 1	Start: 0 End: 0	Start: 0-1 End: 0	N/B	C.pip: 1 S.pip: 3	One S.pip crossed over the road. All other calls were brief passes.	Activity started at 03:58 and finished at 04:41 (1 hour 4 minutes before dawn).	Over: 1 S.pip
						S/B	C.pip: 5 S.pip: 2 Unk: 1	Majority of records consisted of brief passes. One S.pip was identified commuting northbound along the A9 treeline.	Activity started at 03:56 and finished at 05:01 (44 minutes before dawn).	Over: 0
12 Sep 16 Sunset 19:43	Start: 19:27 End: 21:43	Start: 15 End: 14	Start: 8 End: 8	Start: 2 End: 0	Start: 0 End: 0	N/B	S.pip: 1	One S.pip observed crossing the A9.	The only activity recorded was at 20:15 (32 minutes after dusk).	Over: 1 S.pip
						S/B	C.pip: 1 S.pip: 7 Unk: 1	Two S.pip were observed crossing the A9. One S.pip attempted crossing but appeared to turn to avoid traffic.	Activity started at 20:08 (25 minutes after dusk) and finished at 21:35.	Over: 2 S.pip

OS grid reference and Chainage: Tomatin to Moy Crossing 7 NH 76819 34047 (Ch. 6200)										
Habitat Description: Road accesses either side of A9 at Lynebeg junction. Predominantly coniferous plantation either side of access roads and A9										
Date and Sunset/sunrise time (24hr clock)	Start and end times (24hr clock)	Weather Conditions				Location either side of A9 northbound (N/B) southbound (S/B)	Species results (passes)	Comments on behaviour	Comments on timings (e.g. mins before/after dusk/dawn)	Peak count crossings <sup>37</sup>
		Temp (°C)	Cloud (0 – 8) <sup>38</sup>	Rain (0 – 5) <sup>39</sup>	Wind (0 – 12) <sup>40</sup>					
<i>C.pip</i> = common pipistrelle; <i>S.pip</i> = soprano pipistrelle; <i>U.pip</i> = unknown pipistrelle; <i>Myt</i> = <i>Myotis</i> ; <i>BLE</i> = brown long-eared; <i>Unk</i> = unknown bat species										
								One <i>S.pip</i> commuted southbound along A9 treeline.		

### 3.5 Transect Survey Results

- 3.5.1 Two transect survey routes were undertaken, one each side of the A9, located as detailed in Table A3.. Figure 12.9d shows the mapped transect routes and locations of bats encountered during surveys (derived through combination of observed/audible records and those geo-referenced to a file created by a detector recording).
- 3.5.2 Records of bats (predominantly common and soprano pipistrelle) are strongly associated with the woodland and riparian habitats covered by the transect routes. These habitats are generally accepted as offering higher quality foraging habitat (e.g. greater abundance and diversity of insect fauna) than the open improved pasture and heath habitats also present within the transect survey routes. In general the surveys recorded low numbers of bats, with only common species recorded. All surveys with the exception of Transect 1 on the 29<sup>th</sup> June recorded less than 10 bat passes. Transect 1 on the 29<sup>th</sup> June recorded slightly higher numbers, with 12 bat passes recorded.

Table A3.19: Transect Survey Results

Transect 1 location: OS grid reference			Start <sup>41</sup> : NH 80047 29711 NH 79538 30199 End: NH 80047 29711 NH 80062 29695				Habitat Description: Transect crosses areas of mixed woodland, heath and riparian habitats								
Transect 2 location: OS grid reference			Start: NH 79518 80165 NH 80020 29669 End: NH 80020 29669 NH 80020 29669				Habitat Description: Transect crosses improved grassland, riparian and coniferous plantation habitats								
Date	Transect	Start time/ End time	Weather Conditions				Total species passes during transect survey						Summary of behaviour (where pass visually observed)	Total passes	
			Temp (°C)	Cloud (0 – 8) <sup>42</sup>	Rain (0 – 5) <sup>43</sup>	Wind (0 – 12) <sup>44</sup>	C.pip	S.pip	U.pip	Myt	BLE	Unk			
03 May 16	T1	2311	7	5	0	1	0	0	2	0	0	0	Brief pass recorded	2	
	T2	2345	7	5	0	1	1	0	0	0	0	0	Brief pass recorded	1	
05 May 16	T1	0225	7	4	0	1	0	0	0	0	0	0	Brief pass recorded	0	
	T2	0250	7	4	0	1	0	0	0	0	0	0	No bats recorded	0	
15 June 16	T1	0120	11	8	2	0	0	0	0	0	0	0	No bats recorded	0	
	T2	0150	11	8	3	0	0	0	0	0	0	0	No bats recorded	0	
29 June 16	T1	2210	14	7	0	0	6	5	0	1	0	0	Not observed.	12	
	T2	2318	14	7	0	0	2	5	0	0	0	0	C. Pips – Foraging S. Pips – no visual	7	
14 July 16	T1	0200	14	8	1	1	2	0	0	0	0	0	Not observed.	2	
	T2	0230	14	8	1	1	3	0	0	0	0	0	Not observed.	3	

<sup>41</sup> Direction of transect routes were alternated clockwise and counter-clockwise on a monthly rotation.

<sup>42</sup> Cloud cover on a scale of 0-8 where 0 = Sky completely clear, 4 = Sky half cloudy, 8 = Sky completely cloudy.

<sup>43</sup> Precipitation intensity on scale of 0-5 where 0 = Dry, 1 = Light drizzle, 2 = Light rain, 3 = Moderate rain, 4 = Heavy rain, 5 = Torrential rain.

<sup>44</sup> Wind speed score of 0-12 against Beaufort scale where 0 = Calm, 2 = Light breeze, 4 = Moderate breeze, 6 = Strong breeze, 7 = High wind, 9 = Strong gale, 12 = Hurricane.



Transect 1 location: OS grid reference			Start <sup>41</sup> : NH 80047 29711 NH 79538 30199 End: NH 80047 29711 NH 80062 29695				Habitat Description: Transect crosses areas of mixed woodland, heath and riparian habitats								
Transect 2 location: OS grid reference			Start: NH 79518 80165 NH 80020 29669 End: NH 80020 29669 NH 80020 29669				Habitat Description: Transect crosses improved grassland, riparian and coniferous plantation habitats								
Date	Transect	Start time/ End time	Weather Conditions				Total species passes during transect survey						Summary of behaviour (where pass visually observed)	Total passes	
			Temp (°C)	Cloud (0 – 8) <sup>42</sup>	Rain (0 – 5) <sup>43</sup>	Wind (0 – 12) <sup>44</sup>	C.pip	S.pip	U.pip	Myt	BLE	Unk			
27 July 16	T1	0030	11	3	0	1	3	0	0	1	0	0	Not observed.	4	
	T2	0100	11	3	0	1	2	0	0	0	0	0	Not observed.	2	
17 August 16	T1	0250	12	0	0	0	1	0	0	0	0	0	Brief passes	1	
	T2	0330	12	0	0	1	2	3	1	0	0	0	Brief passes	6	
31 August 16	T1	2325	14	8	0	1	0	0	0	0	0	0	No bats recorded	0	
	T2	0001	13	6	0	2	2	3	0	0	0	0	Brief pass	5	
13 Sept 16	T1	2140	12	8	1	1	0	1	0	1	0	0	Brief passes	2	
	T2	2210	12	8	1	1	0	1	0	0	0	0	Brief passes	1	
29 Sept 16	T1	0412	8	6	3	4	0	0	0	0	0	0	No bats recorded	0	
	T2	0450	7.5	6	4	4	0	0	0	0	0	0	No bats recorded	0	

C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = Myotis; BLE = brown long-eared; Unk = unknown bat species.





3.5.3 Four static detectors were deployed along the transect routes. The survey results are given in Table A3.20 and Table A3.21.

**Table A3.20: Bat Passive Monitoring (Static Detector) - Total Activity from May to September 2016**

Static	Recording Time	Number of passes						Total passes	BAI
		C.pip	S.pip	U.pip	Myt	BLE	Unk		
TS1	290:30:00	732	440	13	80	0	10	1275	4.389
TS2	370:30:00	128	138	3	22	0	0	291	0.785
TS3	370:30:00	1278	421	37	44	0	5	1785	4.818
TS4	370:30:00	1047	612	102	72	0	10	1843	4.974
	Total Passes	3185	1611	155	218	0	25	5194	3.705

C.pip = common pipistrelle; S.pip = soprano pipistrelle; U.pip = unknown pipistrelle; Myt = Myotis; BLE = brown long-eared; Unk = unknown bat species.

**Table A3.21: Bat Passive Monitoring - (Static Detector) Monthly Activity May to September 2016**

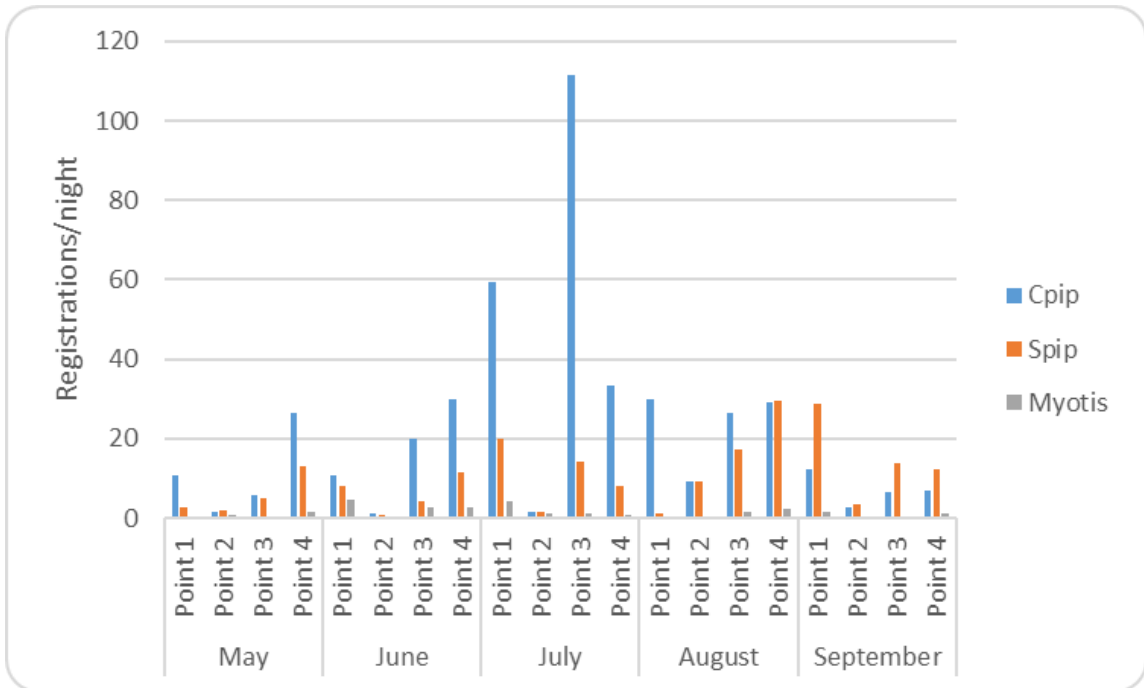
Static	Recording Time	Number of passes						Total passes	BAI
		C.pip	S.pip	U.pip	Myt	BLE	Unk		
May: Dates – 02/05/16 to 12/05/16									
Summary of weather conditions across the period: Maximum temperature of 15°C minimum temperature of 7°C very little precipitation during the recording period.									
T1RF	95:00:00	106	26	3	0	0	0	135	1.421
T2	95:00:00	15	20	0	7	0	0	42	0.442
T3	95:00:00	58	49	1	0	0	0	108	1.136
T4	95:00:00	263	130	3	15	0	0	441	4.642
	Total Passes	442	225	7	22	0	0	696	7.326
June: Dates – 13/06/16 to 21/06/16									
Summary of weather conditions across the period: Maximum temperature of 18°C minimum temperature of 8°C very little precipitation during the recording period									
T1	66:40:00	95	73	8	40	0	7	223	3.345
T2	66:40:00	11	8	3	2	0	0	24	0.360
T3	66:40:00	180	39	19	23	0	3	264	3.960
T4	66:40:00	268	104	41	25	0	3	441	6.615
	Total Passes	554	224	71	90	0	13	952	3.570
July: Dates – Dates – 11/07/16 to 18/07/16									

Static	Recording Time	Number of passes						Total passes	BAI
		C.pip	S.pip	U.pip	Myt	BLE	Unk		
Summary of weather conditions across the period: Maximum temperature of 20°C minimum temperature of 9°C very little precipitation during the recording period									
T1	56:00:00	415	140	2	30	0	0	587	10.482
T2	56:00:00	11	12	0	8	0	0	31	0.554
T3	56:00:00	781	98	4	9	0	0	892	15.929
T4	56:00:00	234	56	3	5	0	0	298	5.321
	Total Passes	1441	306	9	52	0	0	1808	8.071
August: Dates – 16/08/16 to 26/08/16 <sup>45</sup>									
Summary of weather conditions across the period: Maximum temperature of 24°C minimum temperature of 5°C little precipitation during the recording period									
T1	10:00:00	30	1	0	0	0	0	31	3.100
T2	90:00:00	73	74	0	4	0	0	151	1.678
T3	90:00:00	213	139	13	11	0	2	378	4.200
T4	90:00:00	234	235	55	18	0	7	549	6.100
	Total Passes	550	449	68	33	0	9	1109	3.961
September: Dates – 13/09/16 to 19/09/16									
Summary of weather conditions across the period: Maximum temperature of 17°C minimum temperature of 5°C little precipitation during the recording period									
T1	62:50:00	86	200	3	10	0	0	299	4.759
T2	62:50:00	18	24	0	1	0	0	43	0.684
T3	62:50:00	46	96	0	1	0	0	143	2.276
T4	62:50:00	48	87	0	9	0	0	144	2.292
	Total Passes	198	407	3	21	0	0	629	1.668

3.5.4 The data has been analysed and in summary, common pipistrelle bats were the most commonly recorded species followed by soprano pipistrelle, which is in line with the rest of the 2016 survey data (see Chart 12) Common pipistrelle numbers peaked in July, particularly at TS3, with the data showing a uniform level of activity across the recording period. Soprano pipistrelle numbers peaked in September.

<sup>45</sup> T1 failed after the first night.

**Chart 12: Average Species' Registration per Night Recording**



**Table A3.22: Average Species' Registrations per Night Recording (All Months)**

Static	C.pip registration/night	S.pip registration/night	Myotis registration/night
<b>TS1</b>	<b>21.53</b>	<b>12.94</b>	<b>2.35</b>
TS2	3.12	3.37	0.54
TS3	31.17	10.27	1.07
TS4	25.54	14.93	1.76

3.5.5 An activity level comparative analysis is provided below. This uses an activity database collated by HEL<sup>iv</sup> and assignment of activity levels into broad categories (high, typical and low) using an interquartile range approach (refer to Table A3.23).

3.5.6 The levels of activity recorded at the four different passive monitoring points are considered to best fit the following habitat types within the HEL dataset:

- TS1: Coniferous plantation edge (bordering pasture)
- TS2: Improved grassland
- TS3: Broadleaved woodland
- TS4: Broadleaved woodland (on edge of small area heath adjacent to A9)

**Table A3.23: Typical Activity Levels (Registrations/Night) According to Species and Habitats Class (from HEL dataset)**

Species	Broadleaved woodland	Coniferous woodland	Improved grassland	Moorland
<b>Common pipistrelle</b>	<b>3.27 – 107.70</b>	<b>1.28 – 21.39</b>	<b>3.20 – 8.29</b>	<b>0.46 – 3.81</b>
Soprano pipistrelle	6.90 – 46.35	1.61 – 28.39	2.80 – 6.86	0.25 – 6.03

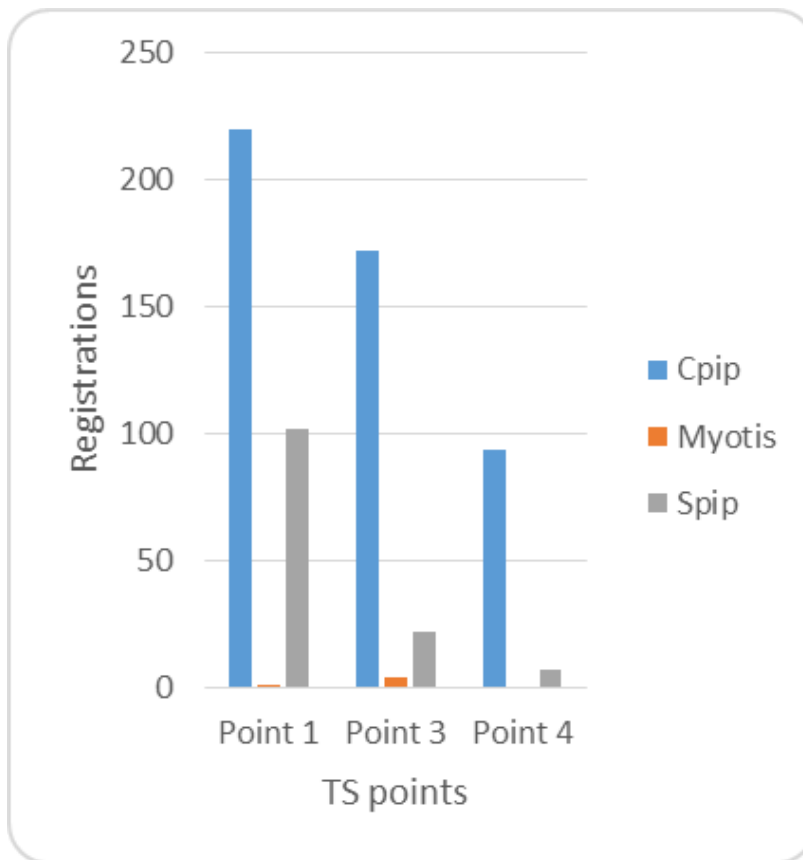
Species	Broadleaved woodland	Coniferous woodland	Improved grassland	Moorland
<b>Common pipistrelle</b>	<b>3.27 – 107.70</b>	<b>1.28 – 21.39</b>	<b>3.20 – 8.29</b>	<b>0.46 – 3.81</b>
Total <i>Myotis</i> (including unidentified)	~	0.16 – 1.73	~	0.09 – 0.60

Blank value fields do not have enough supporting data to be considered statistically valid.

- 3.5.7 In terms of activity across a season, common pipistrelle falls within the high activity band at TS1, low activity band at TS2 and typical activity band at TS3 and TS4. Soprano pipistrelle activity is considered typical at all points. Although *Myotis* activity falls within the high activity band at TS1, there is not enough comparable data within the HEL dataset for the remaining passive monitoring points to draw any conclusions. The habitat at the TS2 location is of lower quality in terms of suitability for foraging which is likely to account for the reduced activity at this location.
- 3.5.8 The species recorded were typical of the wider geographic area and habitats present. No rarer species were identified. Activity levels for common pipistrelle are slightly higher than could be typically expected (based on HEL research) but this is possibly due to generally good quality foraging habitats within the surrounds (River Findhorn corridor) and possible presence of roosts nearby (properties within Tomatin) and their proximity to foraging grounds.
- 3.5.9 The highest number of registrations was recorded between the 11 July 2016 and 17 July 2016, with a total of 622 registrations (the majority, 486 of which were common pipistrelle) recorded across TS1, TS3 and TS4 (no bats were recorded at TS2) in the hour 22.00 to 22.59. The number of registrations of the three species recorded at TS1, TS3 and TS4 are displayed in Chart 13 for this time period. Local sunset times for the dates of this recording are between 22.08 and 21.59. Given that there are often peaks of bat activity immediately after emergence times (e.g. sunset – 45 minutes after for pipistrelle species)<sup>46</sup> it is therefore considered extremely likely that a common pipistrelle roost (and probably soprano pipistrelle roost) is present within close proximity to the Study Area. No roost records were received for this area from the desk study and as such the location of a possible roost is unknown.

<sup>46</sup> Collins, J. (2016) Bat Survey for Professional Ecologists Good Practice Guidelines, 3<sup>rd</sup> Edition. Bat Conservation Trust. & Harris, S. & Yalden, D. W. (2008) Mammals of the British Isles: Handbook, 4<sup>th</sup> Edition. The Mammal Society.

**Chart 13: Registrations Recorded during July Surveys between Time Period: 22.00 – 22.59**  
(Cpip = Common pipistrelle, Spip = Soprano pipistrelle)



C.pip = common pipistrelle; S.pip = soprano pipistrelle; Myt = Myotis;



## 4. Evaluation

4.1.1 The bat roosts that have been recorded within the Bat Study Area have been valued as detailed in Table A4.1.

**Table A4.1: Valuation of Bat Roosts**

Roost location	Valuation	Rational for valuation
Building 149	Local Level	Roosts recorded within these structures supported very low numbers of common bat species and were assessed to be day or transient roosts. The roosts are not maternity, breeding or hibernating roosts and as such are unlikely to represent key features for bat populations at an Authority level.
Building 151		
Bridge 381		
Culvert 281	Local	No bat evidence was recorded at this structure, however not all suitable gaps could be fully inspected. The structure was not considered likely to support a hibernation roost. Following the precautionary principle this structure is assessed to be of Local importance as it may be used by small numbers of bats. Based on the findings of surveys within the Study Area only common species were recorded so it is considered unlikely to be used by any rare species.
Rock face	Authority Level	Two roosts were located within the rock face, with only single pipistrelle species recorded at each location. Whilst the rock face is unlikely to represent a key feature for bat populations, its use by hibernating bats is unknown. A small number of potential features were identified that extended into the rock face which may provide suitability for hibernation. Taking account of this potential use and following the precautionary principle the rock face is assessed to be of Authority Level importance.
Bridge 135	Authority Level	All of these bridges contained very small roosts, with a single bat recorded roosting at each structure. Common species were recorded, soprano pipistrelle at 135 and 146 and common pipistrelle at 146. Whilst it is unlikely that these structures represent key features for bats, given the small numbers recorded, their use by hibernating bats is unknown. A small number of potential features were identified that extended into the bridges which may provide suitability for hibernation. Taking account of this potential use and following the precautionary principle these are assessed to be of Authority Level importance.
Bridge 123		
Bridge 146		

4.1.2 From the levels of bat activity recorded across the crossing point and the transect surveys, the suitable habitats identified at the location of the proposed Tomatin Grade Separated junction, and at crossing points 1 and 6 are assessed to be of Local importance to bats. These locations were used by low numbers of common bat species across the active season. They are considered to be of Local value given the levels of bat use and the abundance of similarly suitable habitats within the wider area. All other areas across the bat Study Area that were surveyed provide some suitable habitat for bats. However, the survey results indicate that they are used by very low numbers of bats and they are assessed to be of less than local value for bats.

## 5. References

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- <sup>i</sup> CH2MHill (2015) Preliminary Ecological Appraisal. North Scheme – Dalraddy to Moy
- <sup>ii</sup> Collins. J (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.
- <sup>iii</sup> Dowse, Daisley and Parry (undated) A Technique for Assessing Bat Activity for Ecological Impact Assessment - [http://heritage-environmental.co.uk/site/assets/files/1106/paper\\_website\\_version\\_19102015.pdf](http://heritage-environmental.co.uk/site/assets/files/1106/paper_website_version_19102015.pdf)
- <sup>iv</sup> Dowse, Daisley and Parry (undated) A Technique for Assessing Bat Activity for Ecological Impact Assessment - [http://heritage-environmental.co.uk/site/assets/files/1106/paper\\_website\\_version\\_19102015.pdf](http://heritage-environmental.co.uk/site/assets/files/1106/paper_website_version_19102015.pdf)