Norwich Western Link

Environmental Statement

Chapter 4: Reasonable Alternatives Considered

Appendix 4.3: Review of OSR Conclusions in Light of 2022 Alignment Refinement

Sub Appendix A: Winter 2021-22 Bat Survey Report (Including Option B East Survey Area)

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Contents

Tables

Plates

1 Introduction

1.1 Project background

1.1.1 The planning application seeks permission for the development of up to 6 kilometres of the Norwich Western Link Road connecting the A1067 (Fakenham Road) with the new A47 North Tuddenham to Easton scheme (being developed by National Highways), including the construction of a new roundabout junction with the A1067 Fakenham Road, improvements to the A1067 Fakenham Road and the roundabout junction with the A1270 Broadland Northway. Structures include a new viaduct carrying the Norwich Western Link over the River Wensum, a new bridge of Ringland Lane, the provision of a green bridge carrying the Broadway over the Norwich Western Link, three further green bridges, wildlife crossings, and culverting of a tributary to the River Tud. Related works include the stopping up, diversions, improvement and provision of side roads, new walking cycling and horse-riding provision, the stopping up, replacement and provision of new private means of access, and ancillary landscaping, ecological mitigation, surface water drainage system, flood compensation, bunds, other environmental mitigation, diversion and protection of apparatus and temporary works to facilitate construction, and other ancillary works, and the change of use of Low Barn Farm as site offices (use class E3).

1.1.2 As part of a separate planned scheme, National Highways proposes to realign and dual the A47 from the existing roundabout at Easton to join the existing dual carriageway section at North Tuddenham. This scheme was consented in August 2022 and National Highways will construct the Honingham junction, with the Scheme as per section 1.1.2, connecting to the north-eastern side of that junction.

1.1.3 The Scheme will cross the River Wensum and its flood plain by means of a viaduct. In addition, at least six other structures are proposed to cross minor roads and to provide habitat connectivity. The Scheme will include ancillary works such as provision for non-motorised users, necessary realignment of the local road network, including the stopping up of some minor roads and the provision of environmental mitigation measures.

1.1.4 In July 2019 the Norfolk County Council (NCC) Cabinet decided on the preferred route for the Scheme. The decision making was informed by an Option Selection Report (OSR) which considered seven shortlisted route options.

1.1.5 The impact of each of the shortlisted options on biodiversity was presented in the OSR. The biodiversity assessment considered the likely impact on the River Wensum Special Area of Conservation (SAC), Barbastelle bats, other statutory designations, non-statutory designations, habitats, and other species. A constraints plan was used to inform the option selection process that included available baseline information for these features. Whilst the table items were not scored or weighted, likely impacts upon the SAC were influential in the decision-making process given the legal protection afforded to this internationally designated site.

1.1.6 As stated within Table 8.2 of the OSR, Options C and both variants of Option D were assessed to be the best performing, being identified as having a ‘large adverse’ impact on biodiversity and ecological features, compared to Option A and Option B. Options A and B were assessed to have a ‘very large adverse’ impact on biodiversity and ecological features. Option C was taken forward as the preferred route for the Scheme. Subsequently, a barbastelle bat roost within the northern woodlands elements of the Scheme was located through surveys in 2021. This led to the selection of an alignment refinement as reported in the July 2022 Report to NCC Cabinet .

1.1.7 To further inform this process, additional surveys of both the Scheme and the adjacent Option B East were commissioned by NCC. The two route option boundaries discussed in this report are shown in an accompanying figure, Figure A-1, in Appendix A.

1.2 Ecological background

1.2.1 WSP was commissioned in 2019 to complete baseline bat surveys to inform the route optioneering process (WSP UK Ltd, 2020a-c). This included ground level tree assessments, further bat roost surveys, bat activity surveys, bat radio-tracking and bat hibernation surveys.

1.2.2 Following selection of a preferred route (Option C) and further consultation, the methodology and survey area was refined to provide a complete data set to inform appropriate mitigation measures for the Scheme. Survey data from 2020 is reported in an interim bat survey report (WSP UK Ltd, 2021) and following further surveys completed during 2021, a set of three reports have been produced:

- 2021 Bat Roost Survey Report (WSP UK Ltd, 2022a);
- 2021 Bat Radio Tracking Survey Report (WSP UK Ltd, 2022b); and
- 2021 Bat Activity Report (WSP UK Ltd, 2022c).

1.2.3 In combination, these reports detail the baseline with respect to bat roosts and activity relevant to the Scheme.

1.2.4 Bat surveys have also been completed by third parties for the separate planned scheme to realign and dual the A47 to the south of the Scheme (Highways England, 2021a-c), and construction of the Northern Broadway to the north-east of the Scheme (Mott Macdonald, 2020 & 2021; BSG, 2010; Greena Ecological Consultancy, 2013a-b).

1.2.5 To supplement the baseline and enable comparison between the Scheme (as refined) and Option B East further bat surveys have been completed during winter 2021-2022 as detailed in this report.

1.3 Brief and objectives

1.3.1 WSP UK Ltd was commissioned by NCC to supplement the baseline and allow for comparison between the Scheme (as refined) and alternative options (specifically Option B East). NCC instructed WSP to undertake a suite of bat surveys included the following works for Winter 2021/2022:

- Complete Ground Level Tree Assessment (GLTA) surveys of trees within a defined survey buffer around route Option B East, to determine the suitability of trees to support roosting bats;
- Complete aerial inspections of trees graded as moderate to high suitability to support bat roosts, targeting new trees identified as a result of the above winter 2021/2022 GLTA surveys; and
- Winter automated detector surveys – to gain a representative sample of activity to assess the species assemblages and distribution of winter activity at multiple locations across route Option B East in comparison to the Scheme.

1.3.2 The objectives of previous bat surveys are detailed in the 2019, interim 2020 and 2021 bat reports (WSP, 2020; WSP, 2021; WSP, 2022c).

1.4 Survey areas

1.4.1 The areas covered by each of the survey types listed in Section 1.3 are hereafter referred to as the ‘Survey Areas’ and are defined below in Table 1-1.

Table 1-1 Summary of survey areas for roosting bat surveys completed in winter 2021/2022

Survey Type	Survey Area Definition
Ground Level Tree Assessments and Aerial inspections of trees	All trees within a 100m buffer of Option B East Route Alignment.
Automated detector surveys	Nine static detector locations were selected to monitor the species assemblages and winter bat activity across both route Option B East and the Scheme.

2 Methods

2.1 Overview

2.1.1 The methodology applied for all survey techniques described below was completed with reference to best practice guidance and industry standards. These are outlined by Collins (2016) in Bat Surveys for Professional Ecologists: Good Practice Guidelines, and Russ (2012) in British Bat Calls: A Guide to Species Identification.

2.2 Ground level tree assessments

2.2.1 This report presents the results of the Winter 2021/2022 GLTA surveys. All trees within a 100m buffer of the Option B East alignment, which had not been previously assessed, were subject to a GLTA in December 2021. All GLTA surveys were completed by ecologists competent in recognising potential features of suitability for tree roosting bats.

2.2.2 A visual inspection of the trees from ground level using binoculars and a high-powered torch was undertaken to search for features which provide potential roosting opportunities for bats such as:

- Woodpecker holes;
- Rot holes;

- Hazard beams;
- Cracks and splits (e.g., frost cracks);
- Knot holes;
- Cankers;
- Dense ivy; and
- Lifting/peeling bark.

2.2.3 Where potential roost features were identified, their location and a brief description were recorded, in order to aid further survey work as required. Where possible, each feature was visually inspected for evidence of use by roosting bats, including:

- Bat droppings in, around or below the potential roost feature;
- Urine staining below the potential roost feature;
- Scratch marks; and
- Characteristic staining (from fur oils).

2.2.4 Where features were present at a height possible for a GLTA to be safely undertaken (e.g., <2m high), this was completed by a Level 2 licensed bat surveyor using high powered torches and/or an endoscope. Trees were categorised in line with the descriptions in Table 2-1. Trees categorised as having negligible suitability to support roosting bats are not discussed further in this report, beyond those which were downgraded to negligible suitability following further inspection.

Table 2-1 Tree bat roost suitability classification (Collins, 2016)

Bat roosting suitability	Description of roosting behaviour
Confirmed	A tree with features confirmed to be used by roosting bats either by historic records or evidence recorded during survey.
High	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
Low	A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features with only very limited roosting potential.
Negligible	A tree with features of negligible value to tree-roosting bats.

2.3 Aerial inspections of trees

2.3.1 Any trees identified as being of moderate or high suitability for tree-roosting bats (or a confirmed roost) have been subject to a single follow-up aerial inspection survey as described in this section.

2.3.2 Negligible and low suitability trees did not receive a follow-up presence/likely absence survey in accordance with best practice survey guidance (Collins, 2016). Low suitability trees have been recorded on a plan and, if appropriate, will be considered as part of the bat mitigation strategy for the Scheme.

2.3.3 Aerial inspection surveys were undertaken by qualified tree-climbers holding a Level 2 Natural England bat licence (or were supervised by an ecologist holding a Natural England Level 2 licence). Aerial inspections took place during the hibernation period for bats.

2.3.4 Where possible, ladders were used to access features that were less than 3m high. Any features greater than 3m in height (or where ladder access was deemed unsafe) were subject to aerial climbing inspections. Surveyors undertook inspections with high powered torches, endoscopes, and mirrors. Information about the features were noted, for example, dimensions and exposure to cold, rain and light. After inspection, the suitability of the potential roost feature was re-evaluated depending on the suitability of the feature to support roosting bats, and re-categorised as appropriate (as low, moderate, or high).

Automated detector deployments

2.3.5 In addition to GLTAs and aerial inspections, winter automated detector surveys were undertaken to build upon information gained about bat activity from previous surveys and extend survey effort to Option B East.

2.3.6 Winter automated detector surveys were completed across Option B East and in three locations along the Scheme between November 2021 and March 2022 (inclusive). The detector locations were each attributed a label, and these are shown in Appendix A, Figure A-2. A summary of the detector deployments in winter 2021/2022 are shown in Table 2-2. Appendix B, Table B-1 details relevant weather information for each automated deployment week.

2.3.7 Song Meter 4 (SM4) (© Wildlife Acoustics, Inc) detectors were placed within habitat features considered likely to be used by commuting or foraging bats within proximity of the route options (such as woodland edges and within areas of woodland, hedgerows, and rivers). The microphones used were multi-directional, however, they were placed pointing along the feature under survey, at a height between 1.5 and 2m.

2.3.8 The 2021/2022 winter detector locations were selected with the following objectives:

- To monitor winter bat activity levels at a number of new and existing locations previously monitored in summer 2019, 2020 and 2021 to provide thorough coverage of habitats across the length of Option B East; and
- The automated detectors were set to commence recording at least 30 minutes before sunset and cease recording 30 minutes after sunrise for these winter deployments. Automated detectors recorded for five nights in each month surveyed. Full details of deployments are provided in Appendix A.

Table 2-2 Summary of winter automated detector locations

Year(s) of Survey	Total Number	Detector Locations
2021-22	9	C49, C70, C75, B1, B2, B3, B4, B5, B6.

2.3.9 Calls registered by the automated detectors were recorded for later analysis using the specialist computer software Kaleidoscope Pro, as detailed below.

2.4 Data Analysis

2.4.1 Once triggered by ultrasound, the SM4 detectors were programmed to record sound files with a duration of 15 seconds, which may contain a number of individual bat calls (or passes), or discrete groups of ultrasound ‘pulses’. The assessment of relative bat activity is based on the relative abundance of recorded bat calls of each species within each survey period.

2.4.2 It should be recognised that a series of separate sound files may represent a number of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g., bats making repeated foraging passes within the range of a detector).

2.4.3 Where possible, bat calls were identified to species level. However, species of the genus *Myotis* were only identified to genus level as their calls are similar in structure and have overlapping call parameters, making species identification problematic (Russ, 2012). Given the Scheme is outside the current known range of Grey Long-eared Bat *Plecotus austriacus*, each long-eared bat pass has been identified as Brown Long-eared Bat *Plecotus auritus* (JNCC, 2018).

2.4.4 Identification of the genus Nyctalus (Noctule *Nyctalus noctula* and Leisler's Bat *Nyctalus leisleri*) was based on the following parameters:

- Noctule <20 KHz;
- *Nyctalus* species (Noctule or Leisler's Bat) >20 KHz.

2.4.5 The following parameters were used to manually identify Pipistrellus species:

- Common Pipistrelle *Pipistrellus pipistrellus* ≥40 and ≤49KHz;
- Soprano Pipistrelle *Pipistrellus pygmaeus* >51KHz;
- Pipistrellus species ≥49 and <51KHz; and
- Nathusius' Pipistrelle *Pipistrellus nathusii* ≤39KHz.

2.4.6 The process for bat call analysis is summarised below:

- Bat calls were run through Kaleidoscope-Pro using the 'Auto-ID' function, which enables identification of species or species groups based on call parameters;
- All bat calls (other than Common and Soprano Pipistrelles for which Auto-ID has a high accuracy (Brabant, Laurent, Dolap, Degraer, & Poerink, 2018) were manually checked by ecologists competent in analysing bat calls and experienced in the use of Kaleidoscope software. Where the Auto-ID label was incorrect, the correct species label was attributed to the call;

- Any Common or Soprano Pipistrelle file with a Margin of accuracy less than 0.6 was also manually checked, as these files were deemed to have a lower AutoID accuracy than acceptable for reporting;
- Each file may contain calls of multiple bat species; however, the Auto-ID function is only capable of labelling one species. This was corrected during manual checks by duplicating the file and labelling each species separately;
- All files which were labelled as common or Soprano Pipistrelle in the Auto-ID process were manually checked for the presence of Barbastelle *Barbastella barbastellus* calls within the same file, to ensure that no Barbastelle were missed; and
- To allow standardisation and comparison of automated detector survey results, the average number of bat passes recorded per night (ppn) was used as explained below (Collins, 2016). These calculations were made as a location total ppn across the whole survey season and per month per location.

$$Bat\ ppn = \frac{Total\ bat\ passes\ recorded\ at\ a\ SM4\ location}{Number\ of\ nights\ SM4\ Surveyed}$$

2.4.7 No noise files were checked as part of the manual ID process. Noise files consist of any sound which has triggered the detector, but which has not been recognised as a bat call, such as crickets or rustling vegetation etc. Occasional bat calls may be present within these, although are usually short sections of calls, likely to have been further away from the detector therefore less relevant to the habitat feature under survey. Although slightly higher numbers of calls of all species may be recorded if the noise files were analysed, this would not alter the results in terms of habitat features with highest/lowest levels of bat activity.

2.4.8 The analysed sound files were subject to a quality assurance (QA) process. Ten percent of sound files which were identified as common or Soprano Pipistrelle and 20% (if more than 10 calls) or 100% (if less than 10 calls) of sound files identified as all other species were randomly selected for QA checks. This process was completed by a suitably competent analyst experienced in using Kaleidoscope software.

2.5 Dates of survey and personnel

2.5.1 The dates of the surveys completed in 2021/2022 and details on the relevant personnel are provided below in Table 2-3.

Table 2-3 Dates of survey and personnel used

Trees or structures	Survey Type	Dates of survey	Personnel
Trees	Ground Level Tree Assessment	13, 15, 16 and 23 December 2021	GLTAs were completed by ecologists competent in recognising potential bat roosting features. Any inspection of features at ground level (e.g., using an endoscope) were coordinated and undertaken by a licenced bat ecologist.
Trees	Aerial Inspection	11, 12, 13, 24, 25, 26, 27, 28 January 2022	Aerial inspections were coordinated and undertaken by teams of two ecologists (at least one holding a Level 2 Natural England class licence for bats) qualified in tree climbing and aerial rescue.

Trees or structures	Survey Type	Dates of survey	Personnel
Trees	Automated Detector Surveys	Various dates ranging between November 2021 – March 2022. For a full list of dates, see Table B-2 in Appendix B.	Automated detector surveys were undertaken by surveyors with experience in conducting such surveys.

2.6 Notes and limitations

2.6.1 Every effort has been made to provide a comprehensive set of survey data. However, the following notes and limitations apply to the surveys described above:

General

- Due to the potential for bats to colonise potential roosting features over time, the results of the roosting bat surveys described in this report should be considered valid for up to 18 months in accordance with best practice guidelines (CIEEM, 2019). Should the submission of the planning application be delayed beyond this time, further surveys may be required to update the baseline data for the Scheme;

Roosting bats

- GLTA surveys can be undertaken at any time of year, but are optimal between November and April inclusive, as outside this period tree foliage may restrict visibility. All GLTA surveys conducted in 2021 and 2022 were completed within this optimal period;
- A number of trees identified during the GLTA surveys were considered unsafe to climb, and therefore potential roosting features within these trees were not subject to an aerial inspection. Dusk emergence/dawn re-entry surveys have been suggested as an alternative survey method

to determine presence or likely absence of roosting bats in these instances, therefore the lack of aerial inspections on unsafe trees is not considered a major limitation to survey effort; and

Additionally, some trees which were included within the scope for aerial inspections were subsequently found to be unsafe to climb. For these trees, a precautionary approach was taken whereby any tree not subjected to an aerial inspection survey but considered suitable to support a roost from the GLTA results, was therefore assumed to support a roost. In total, 16 of the 110 trees in the scope for aerial inspections were not climbed due to health and safety issues and impracticalities of climbing such trees. In addition, one tree was downgraded to negligible suitability during the aerial inspection visit.

3 Results

3.1 Ground level tree assessments

3.1.1 A total of 110 trees were identified as having bat roosting suitability within the Option B East Survey Area in 2021 and 2022. The total number of trees which fall under each category following the GLTA surveys are as follows:

- Low roosting suitability: 55 trees;
- Moderate roosting suitability: 45 trees; and
- High roosting suitability: 10 trees.

3.1.2 None of the trees surveyed in the 2021 to 2022 survey period were found to support roosting bats at the time of the GLTA survey.

3.1.3 The results of the GLTA surveys undertaken for Option B East are presented in Appendix C, including a full table of results and survey dates (Table C-1) and drawings showing the location of the trees (Figure C-1).

Further survey; aerial inspection

3.1.4 A total of 55 trees on the Option B East route were recommended for further surveys in January 2022. Of these, seven were fully surveyed from the ground, 32 were subject to aerial inspection and 16 could not be further surveyed as a result of health and safety issues (trees were unsuitable for climbing and had features too high to be surveyed from the ground) or presence of other wildlife (presence of Tawny Owl Strix aluco).

3.1.5 No roosts or evidence of bats were identified. However, a total16 trees could not be surveyed. Therefore, these trees have been considered to support a bat roost on a precautionary basis.

Suitability assessment

3.1.6 Of the 39 trees subject to aerial and ground inspection surveys on the Option B East route in 2022; 16 trees were downgraded in suitability and three trees were upgraded in suitability. The suitability of the remaining 20 trees suitability remained the same after further survey was undertaken. A summary of the trees reclassified in 2022 provided in Table C-1. The final bat roost suitability of all trees is shown on Figure C-2, in Appendix C.

3.1.7 Of the 110 trees suitable to support bat roosts in the Survey Area, the number of trees which fall under each category following the ground and aerial surveys are as follows:

- Negligible roosting suitability: 1 tree;
- Low roosting suitability: 66 trees;
- Moderate roosting suitability: 23 trees;
- High roosting suitability: 4 trees; and
- Precautionary roost: 16 trees.

3.2 Comparison of roost provision between Option B East and the Scheme

Roosting resource

3.2.1 Option B East was subject to GLTA and one aerial assessment in winter to assess suitability of trees to contain bat roosts. In comparison, trees along the Scheme were subject to a full suite of surveys as per BCT guidelines, including two winter aerial assessment surveys. The employment of further winter bat surveys in 2021-2022, as noted in paragraph 1.2.4, was to supplement the baseline and enable a level of comparison with route options. As a result, the difference in survey effort between route Option B East and the Scheme has been taken into account and acknowledged when drawing comparison between the two routes.

3.2.2 It is possible to robustly compare the roosting resource availability between the routes, as in both cases sufficient survey effort has been employed to record this and a comparable survey area has been covered (100m from the centre line of each route). This encompasses the number of trees identified in each of the two survey areas with high, moderate, and low roosting suitability.

3.2.3 Roosting resource availability is particularly important for roost-switching species such as Barbastelle. For instance, where there exists more roost resource availability, the habitat is of a higher value for roost-switching species because the number of roost locations that species can potentially switch between is higher.

3.2.4 The comparison of roost provision between Option B East and the Scheme has been undertaken from the point of divergence of the two routes in the north of the Scheme. The roosts mentioned in the comparison below, are those found for each route respectively, after they have diverged.

3.2.5 A suite of surveys, including GLTA, emergence/re-entry surveys and multiple climbing surveys, were undertaken on trees within the Scheme between 2019 and 2021. These surveys identified 77 trees, which have suitability for

roosting bats, the locations of these trees are shown on Figure C-3 and are summarised below:

- 12 confirmed roosts (including one Barbastelle roost identified during radiotracking);
- Four precautionary roosts;
- Five high suitability trees;
- 19 moderate suitability trees; and
- 37 low suitability trees.

3.2.6 Of the confirmed tree roosts within the Scheme, four were found to support hibernation roosts, six were found to support summer roosts, one was found to support both a summer and hibernation roost and one was found to support a Barbastelle roost (assumed maternity), which was identified during radiotracking.

3.2.7 Trees within Option B East were subject to a GLTA and one aerial inspection during the winter period. These surveys identified 109 trees with suitability for roosting bats. The locations of these are shown on Figure C-3 and summarised below:

- 16 precautionary roosts;
- Four high suitability trees;
- 23 moderate suitability trees; and
- 66 low suitability trees.

3.2.8 No confirmed roosts were identified within the route Option B East survey area.

4 Automated detector deployment survey

4.1 Survey results - overall

4.1.1 At least nine bat species were recorded using habitats within the Survey Area during the winter automated bat detector surveys. The following species and species groups were confirmed and will be discussed as follows:

- Barbastelle;
- Common Pipistrelle;
- Soprano Pipistrelle;
- Nathusius' Pipistrelle;
- *Myotis* species;
- Noctule;
- *Nyctalus* species (Noctule or Leisler's bat);
- Brown Long-eared Bat; and
- Serotine *Eptesicus serotinus*.

4.1.2 The passes per night recorded during the automated detector surveys for each location in each month are shown in Appendix D, Table D-1.

4.1.3 A total of 5,170 call registrations were recorded across both route options for the winter deployment period. Of these calls, the most commonly registered species were Soprano Pipistrelle and common Pipistrelle accounting for 59.40% and 23.38% of all total bat passes respectively. The least registered species was Nathusius' Pipistrelle, accounting for 0.02% of total bat passes.

4.1.4 Bat activity of non-Pipistrelle species (all species except Common and Soprano Pipistrelles) between the two routes were similar across the winder deployment period with the average passes per night consisting of 3.67ppn

for Option B East (average from six detector locations) and 4.52ppn (average from three detector locations) for the Scheme.

4.2 Barbastelle

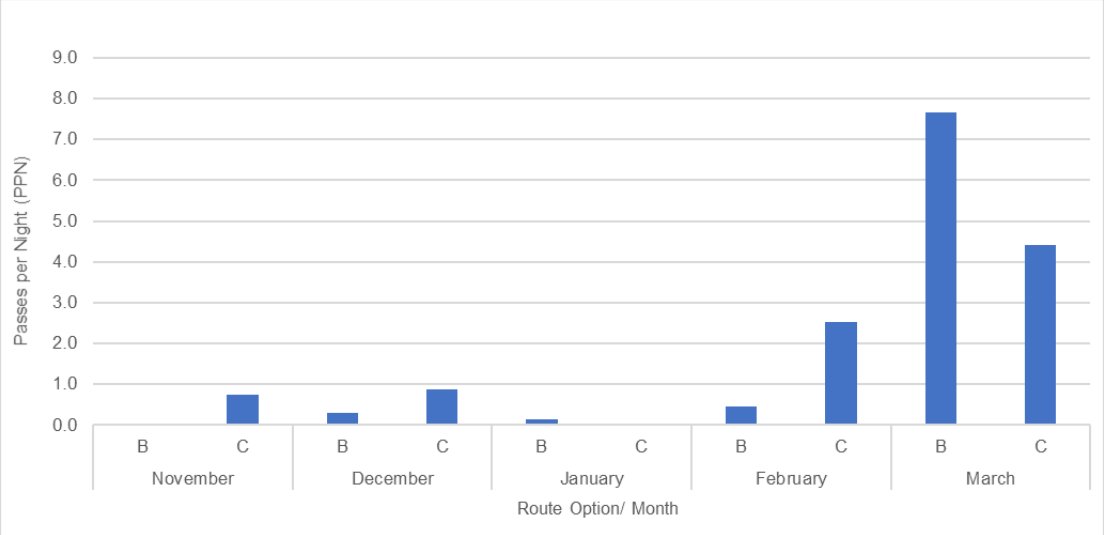
4.2.1 Detector locations across Option B East and the Scheme route alignments recorded similar activity for Barbastelle across the deployment period, recording on average 1.71ppn.

4.2.2 Detector locations along Option B East recorded lower Barbastelle activity than the Scheme locations from November to February, as shown on Plate 4-1.

4.2.3 A peak of activity was recorded in March for both Options; however, the Option B East locations recorded the largest peak of activity, recording 7.7ppn whilst the Scheme locations recorded 4.4ppn. For the remaining months, Option B East locations recorded a range of no passes in November to 0.5ppn in February, with small variations in between. The Scheme locations recorded a range of no passes in January to 2.5ppn in February.

4.2.4 Some users may not be able to access all technical details of this document. If you require this document in a more accessible format please contact norwichwesternlink@norfolk.gov.uk

Plate 4.1 Passes per night for Barbastelle per route option per month

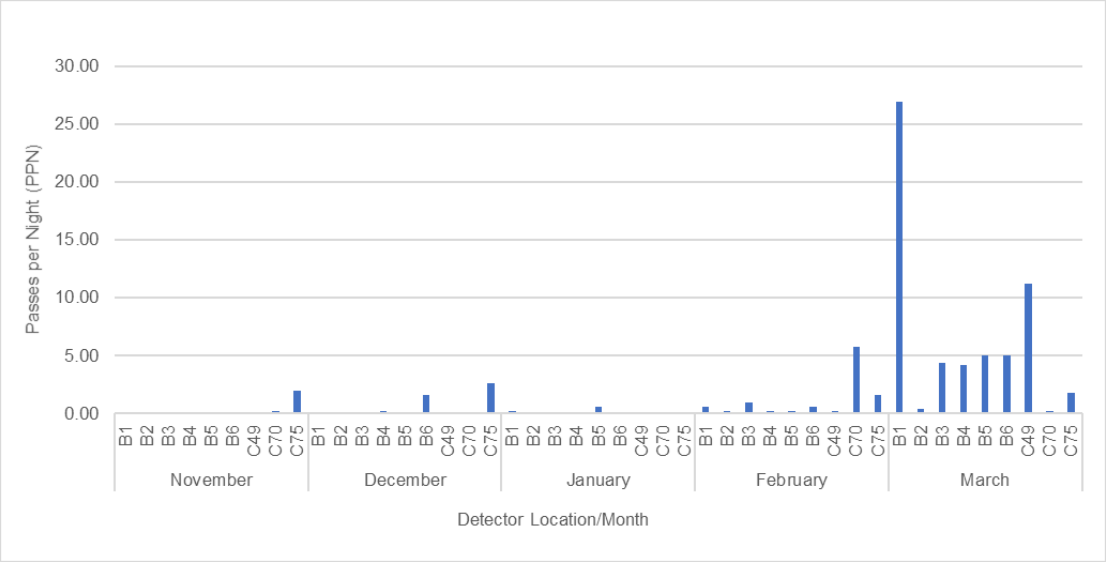


4.2.5 Monthly activity remained low at all detector locations from November to February, with activity remaining below 2.00ppn, as shown on

4.2.6 Plate 4-2. This is with the exception of C70 in February recording 5.60ppn, C75 recording 2.00ppn in September and 2.60ppn in December.

4.2.7 Location B1 recorded the highest peak of activity of all the detectors, recording a peak of 27.00ppn in March. The next highest peak was at C49 with 11.20ppn in March. Activity remained higher at the locations situated along the Option B East than at the Scheme.

Plate 4.2 Passes per night for Barbastelle per location per month



Habitats

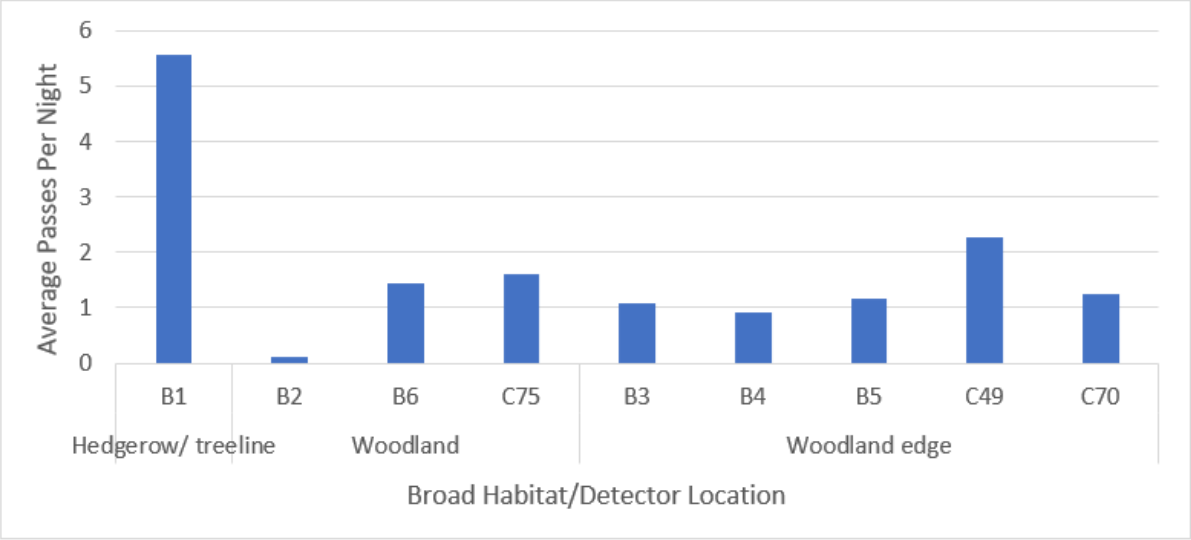
4.2.8 The graph showing the passes per night per broad habitat for Barbastelle is shown below on Plate 4-3.

4.2.9 Detectors that were situated within the hedgerow-treeline habitat recorded the highest activity across the Survey Area, averaging 5.56ppn across the deployment period. Location B1 was the only detector in this habitat type.

4.2.10 Woodland edge habitat recorded an average of 1.34ppn across the deployment period. Location C49 recorded the highest activity within this habitat at 2.28ppn. For the remaining detectors, activity ranged from 0.92ppn for B4 and 1.24ppn for C70.

4.2.11 Woodland habitats recorded the least amount of activity, with an average of 1.05ppn for across the deployment period. Location C75 recorded the highest activity within the woodland habitats at 1.60ppn. Location B2 had the lowest activity level for woodland habitats at 0.12ppn.

Plate 4.3 Passes per night for Barbastelle per broad habitat type



4.3 Common Pipistrelle

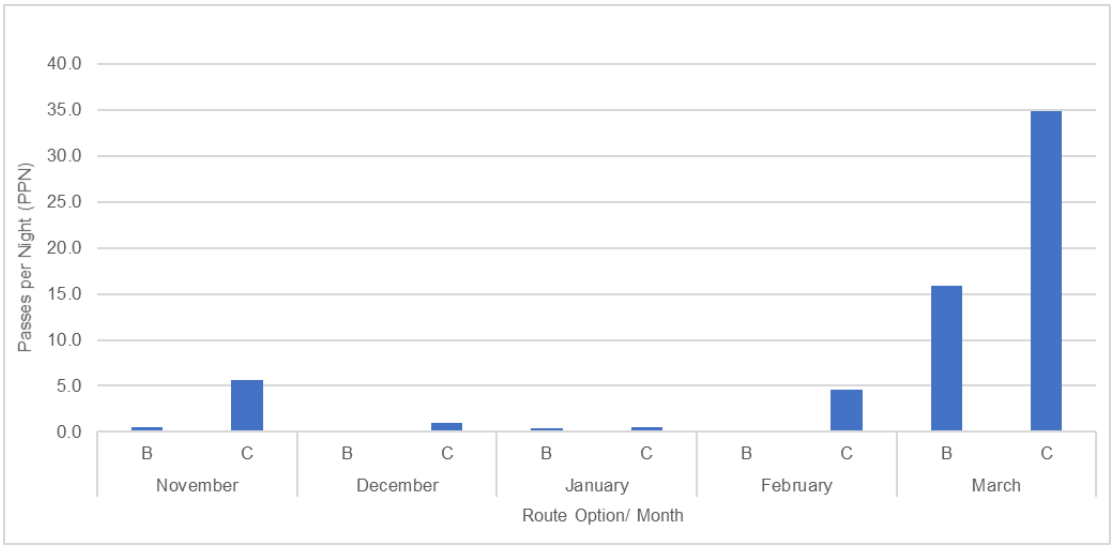
4.3.1 Detector locations along the Scheme recorded higher average Common Pipistrelle activity than Option B East during the deployment period, November to March. Locations across Option B East recorded on average 3.41ppn whilst locations across the Scheme recorded on average 9.29ppn.

4.3.2 A peak of activity was recorded in March for both options; however the Scheme locations recorded the largest peak of activity, recording 34.80ppn whilst Option B East locations recorded 15.90ppn.

4.3.3 For the remaining months, average monthly activity at locations along Option B East mostly remained below 1.00ppn between December and February, as shown on Plate 4-4.

4.3.4 The Scheme also recorded low activity in December and January, below 1.00ppn, but recorded much higher activity in November and February, ranging from 5.70ppn in November to 4.50ppn in February.

Plate 4.4 Passes per night for Common Pipistrelle per route option per month



4.3.5 Monthly activity, shown on Plate 4-5, remained low at all detector locations from November to February, with activity remaining below 2.50ppn, with the exception of C75 in November, recording 15.60ppn and C70, recording 12.60ppn in September and 2.60ppn in December.

4.3.6 Location C75 recorded the highest peak of activity of all the detectors, recording a peak of 70.60ppn in March. The next highest peaks were at B5 and B6 in March with both detectors recording 33.40ppn.

Habitats

4.3.7 The graph showing the passes per night per broad habitat for Common Pipistrelle is shown below on Plate 4-6.

4.3.8 Woodland habitats recorded the highest levels of activity, recording an average of 9.65ppn across deployment period. Location C75 had the highest activity levels at 17.68ppn. Location B2 had the lowest activity levels at 3.80pp.

4.3.9 Woodland edge habitat recorded an average of 3.58ppn across the deployment period. Location B5 showed the highest levels of activity at

6.68ppn, whilst for the remaining detector locations, activity levels ranged from 0.48ppn for B3 to 6.08ppn for C49.

Plate 4.5 Passes per night for Common Pipistrelle per location per month

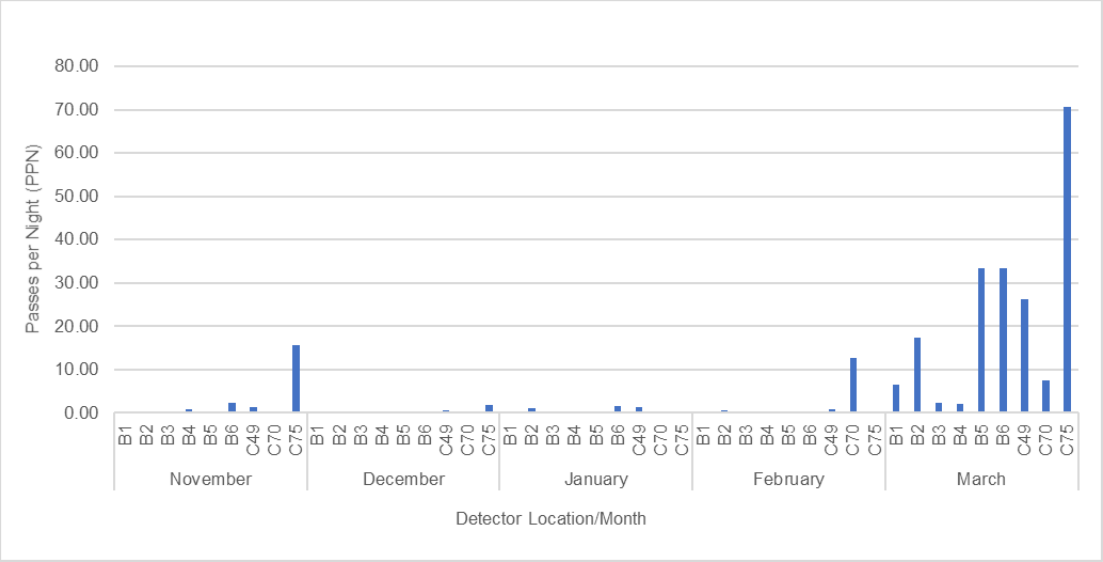
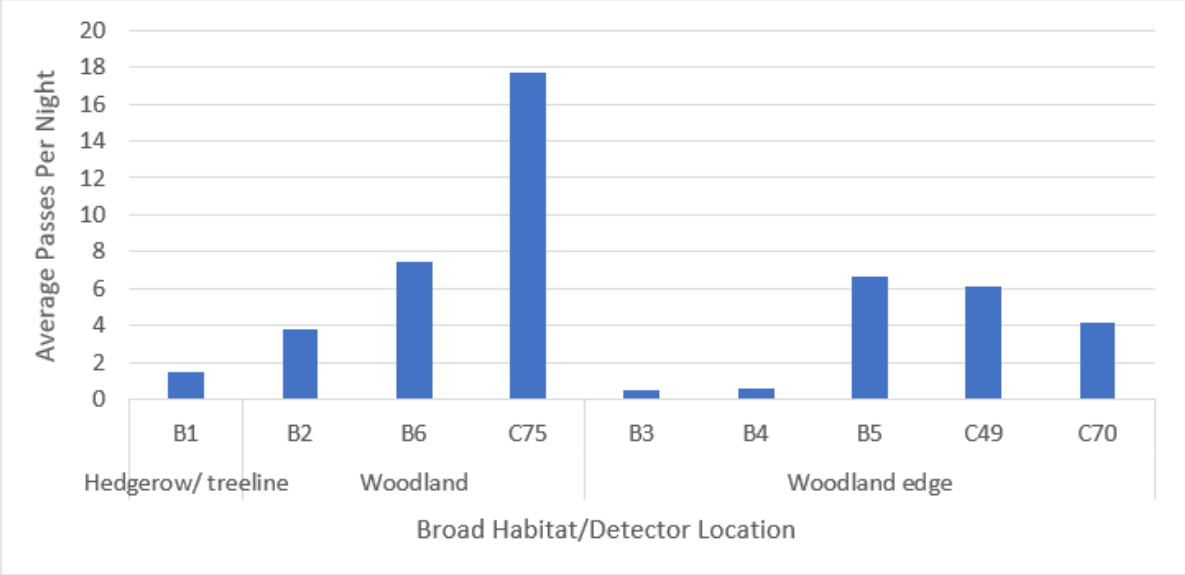


Plate 4.6 Passes per night for Common Pipistrelle per broad habitat type



4.3.10 Hedgerow-treeline habitats recorded the least amount of activity, with an average of 1.48ppn across the deployment period. B1 was the only detector deployed in this habitat type.

4.4 Soprano Pipistrelle

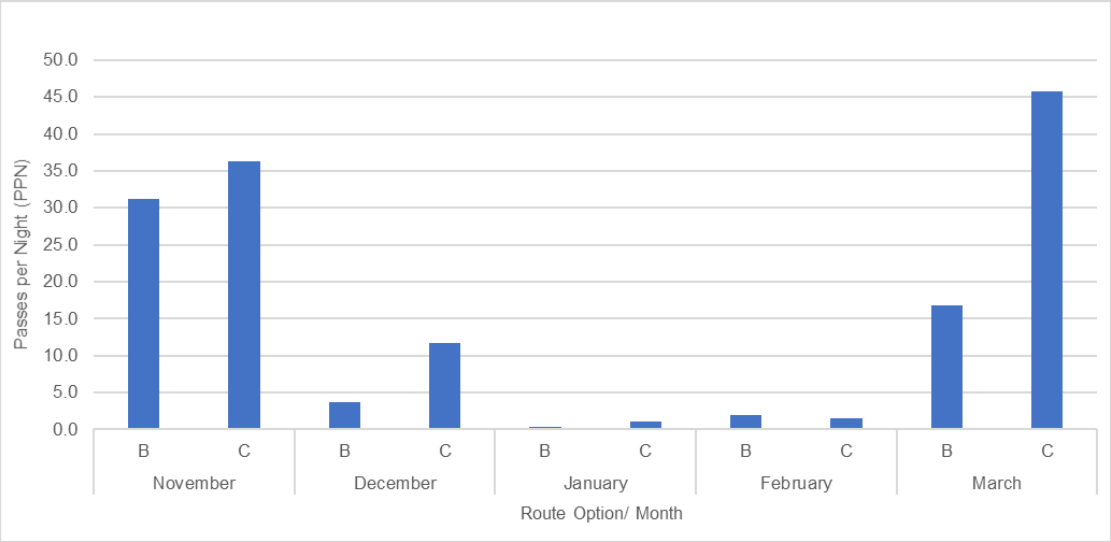
4.4.1 Detector locations along the Scheme recorded higher average Soprano Pipistrelle activity than Option B East during the deployment period, November to March. Locations across Option B East recorded on average 10.84ppn whilst locations across the Scheme recorded on average 19.27ppn.

4.4.2 Option B recorded the highest average activity in November, recording 31.20ppn. In comparison, the Scheme recorded an average of 36.30ppn in November. The Scheme recorded the highest activity in March, recording an average of 45.6ppn, compared to Option B which recorded an average of 16.90ppn.

4.4.3 Average monthly activity was higher at locations along the Scheme than at locations along Options B East in December, November, and March, as shown on Plate 4-7.

4.4.4 For the remaining months, activity remained low, below 2.0ppn and at similar levels for both route options.

Plate 4.7 Passes per night for Soprano Pipistrelle per route option per month

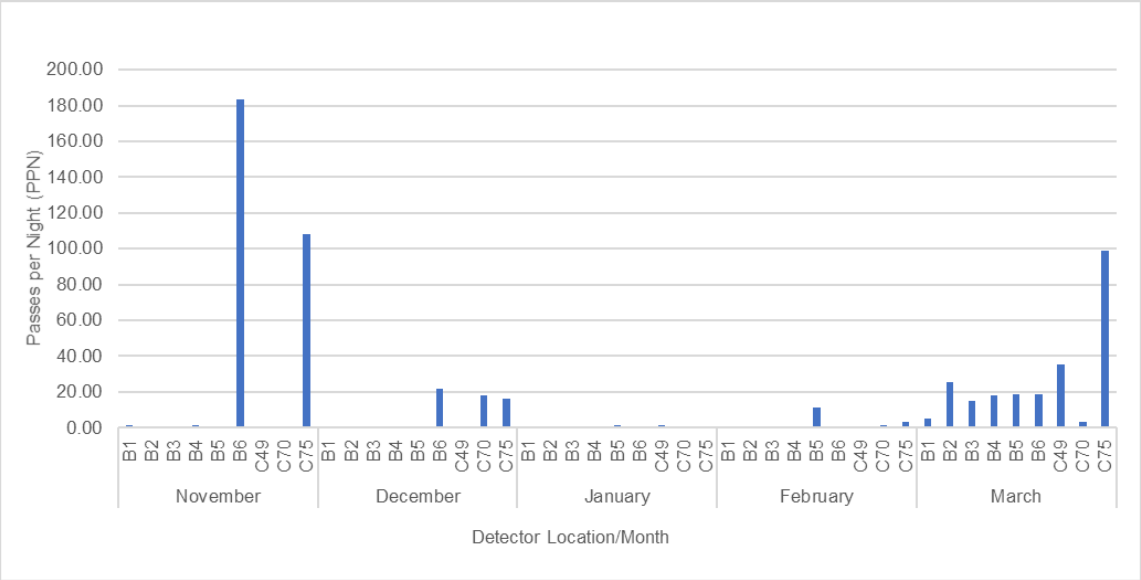


4.4.5 Activity at most of the detector locations remained low, below 5.00ppn between November and February, as shown on Plate 4-8. Locations B6, C70 and C75 in December and Location B5 in February recorded higher activity,

between 11.00ppn and 22.00ppn. Location B6 recorded the peak of Soprano Pipistrelle activity in November with 183.60ppn and Location C75 recorded the second highest activity in November of 108.00ppn.

4.4.6 Activity in March was higher at all locations, ranging from 3.20ppn at C70 to 98.90ppn at C75.

Plate 4.8 Plate 4-8 Passes per night for Soprano Pipistrelle per location per month



Habitats

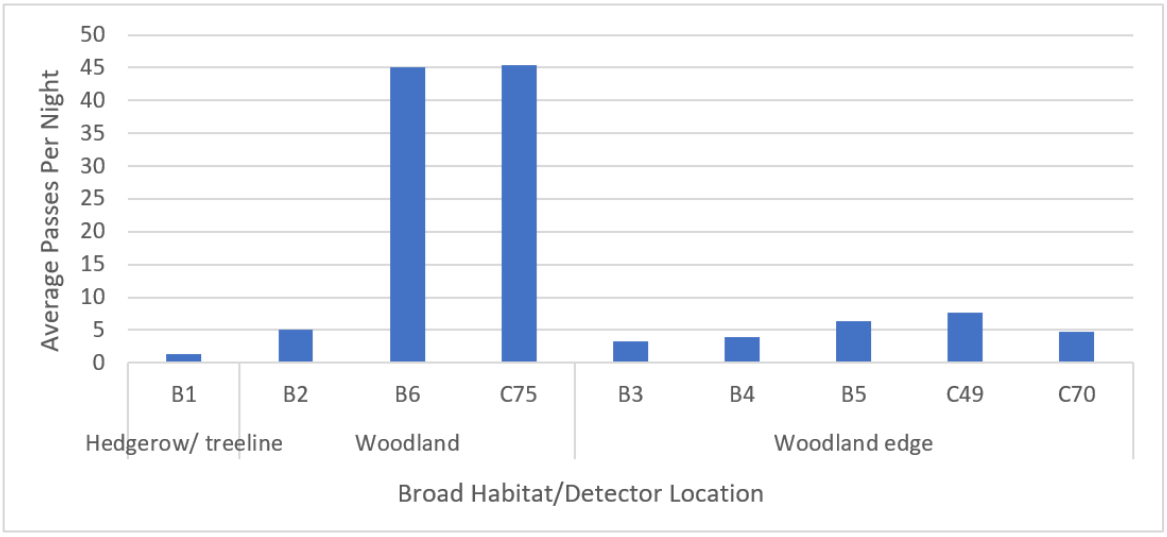
4.4.7 The graph showing the passes per night per broad habitat for Soprano Pipistrelle is shown below on Plate 4-9.

4.4.8 Detectors that were deployed within woodland habitats recorded the highest activity throughout the Survey Area, recording an average of 31.84ppn across deployment period. Location C75 within this habitat recorded the highest activity with an average of 45.36ppn, closely followed by B6 with 45.08ppn. The lowest average activity levels were at location B2 with 5.08ppn.

4.4.9 Woodland edge habitat recorded an average of 5.21ppn across the deployment period. Location C49 showed the highest activity levels at 7.72ppn. For the remaining detectors, activity levels ranged from 3.28ppn for B3, to 6.40ppn for B5.

4.4.10 Hedgerow-treeline habitats recorded the least amount of activity, with an average of 1.28ppn across the deployment period. B1 was the only detector deployed within this habitat type.

Plate 4.9 Passes per night for Soprano Pipistrelle per broad habitat type



4.5 Nathusius' Pipistrelle

4.5.1 Nathusius' Pipistrelle displayed the least activity across all detectors in all months. Passes were only recorded in January at location B3, recording 0.20ppn.

Habitats

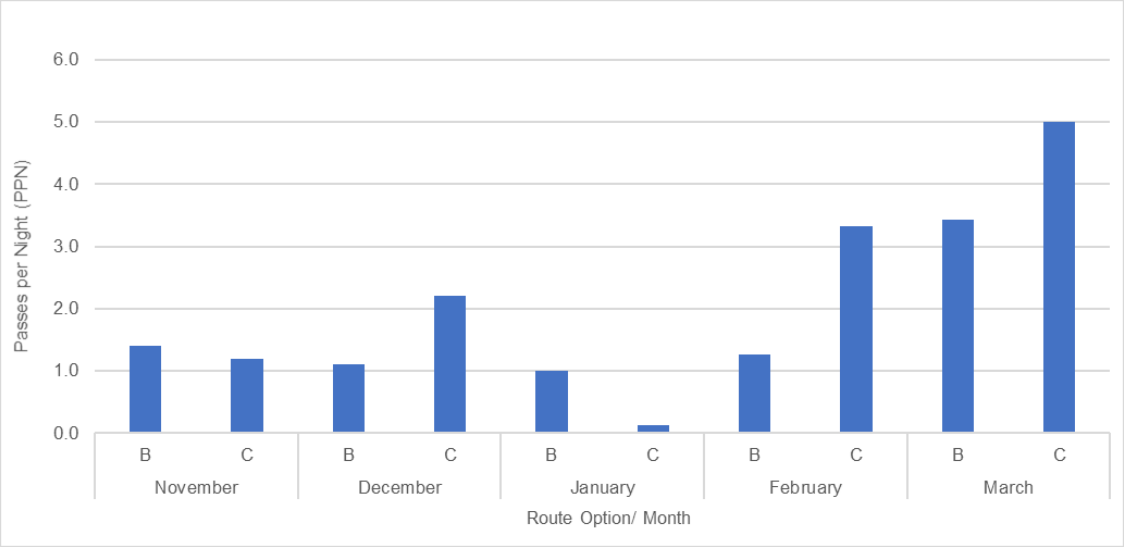
4.5.2 Throughout the winter survey months, Nathusius' Pipistrelle displayed the least activity across all detectors in all months. Species passes were only recorded by detector B3 located within the woodland edge habitat which detected an average of 0.01ppn.

4.6 *Myotis* species

4.6.1 Detector locations along the Scheme recorded higher average Myotis species activity than Option B East during the deployment period, November to March. Locations across Option B East recorded on average 2.37ppn whilst locations across the Scheme recorded on average 1.64ppn.

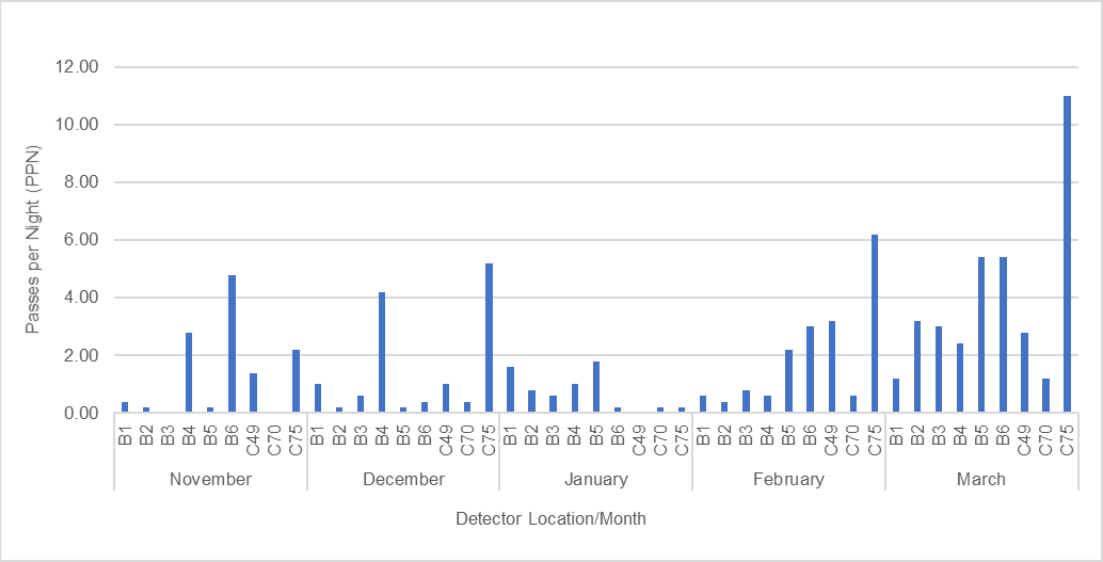
4.6.2 For December, February and March, average monthly activity was higher at locations along the Scheme than at locations along Options B East, as shown on Plate 4-10. Average monthly activity was higher at locations along Option B East than at locations along the Scheme for the remaining months, November, and January. Both route options recorded peaks of activity in March, with 3.40ppn for Option B East and 5.00ppn for the Scheme.

Plate 4.10 Passes per night for Myotis species per route option per month



4.6.3 Location C75 recorded a peak of activity in March, recording 11.00ppn, as shown on Plate 4-11. This location also recorded the highest activity in December and February with 5.20ppn and 6.20ppn respectively. Location B5 and B6 in March recorded the next highest activities in March with both locations recording 5.40ppn Locations B6 in November and B4 in December also recorded higher activity with 4.80ppn and 4.20ppn respectively.

Plate 4.11 Passes per night for Myotis species per location per month



Habitats

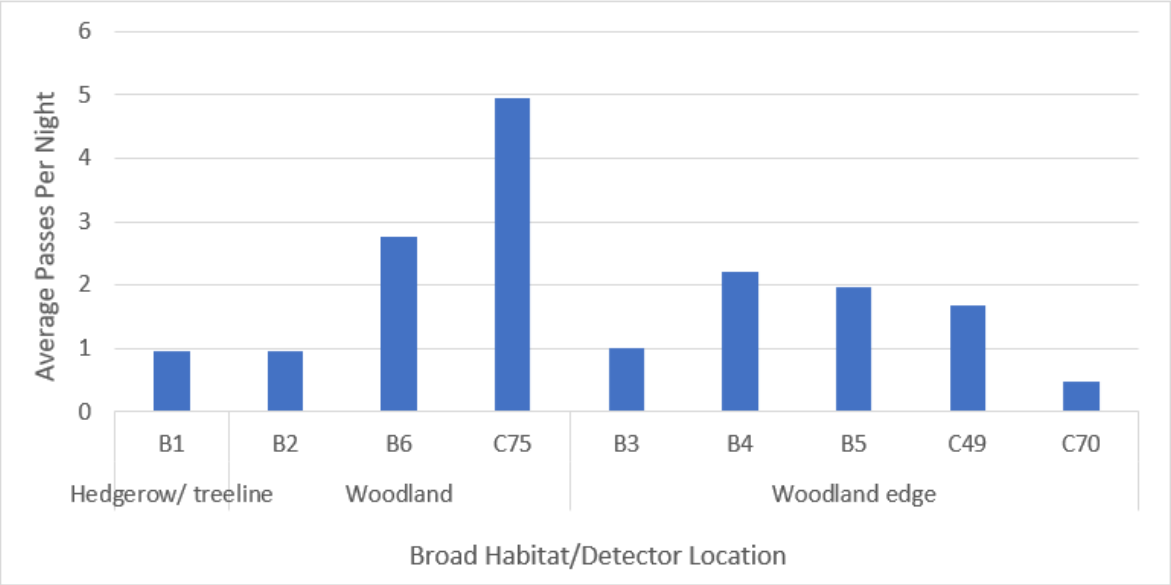
4.6.4 Passes per night per broad habitat for Myotis species is shown below on Plate 4-12.

4.6.5 Detectors that were deployed within woodland habitats recorded the highest activity throughout the Survey Area, recording an average of 2.89ppn across the deployment period. Location C75 within this habitat recorded the highest activity with an average of 4.96ppn, whilst the lowest activity within woodland habitat was B2 with 0.96ppn.

4.6.6 Woodland edge habitat recorded an average of 1.46ppn across the deployment period. Location B4 recorded the highest average activity levels within this habitat, at 2.20ppn. For the remaining locations, average activity levels were 0.48ppn for C70 and 1.96ppn for B5.

4.6.7 Hedgerow-treeline habitats recorded the least amount of activity, with an average of 0.96ppn across the deployment period. B1 was the only detector deployed within this habitat type.

Plate 4.12 Passes per night for *Myotis* species per broad habitat type



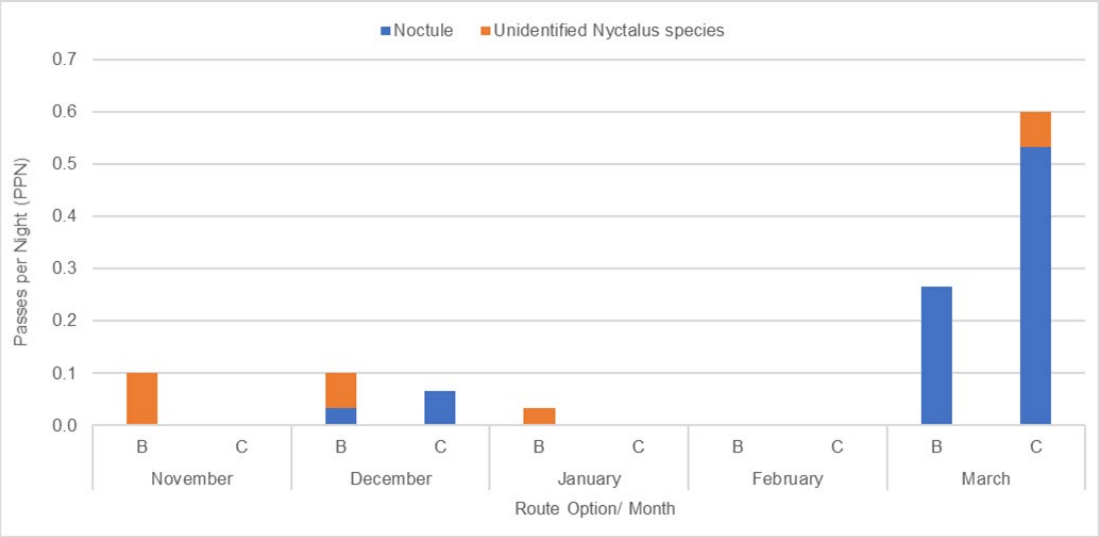
4.7 Noctule and Leisler's (*Nyctalus* species)

4.7.1 Detector locations along the Scheme and Option B East recorded similar *Nyctalus* species activity during the deployment period, November to March. Locations across Option B East recorded a combined average of 0.10ppn (Noctule 0.06ppn, unidentified *Nyctalus* species 0.04ppn) whilst locations across the Scheme recorded a combined average of 0.13ppn (Noctule 0.12ppn, unidentified *Nyctalus* species 0.01ppn).

4.7.2 For November, December and January, average monthly activity was higher at locations along Option B East than at locations along the Scheme, as shown on Plate 4-13.

4.7.3 Both route options recorded peaks of activity in March, with the Scheme recording the highest activity with a combined average of 0.60ppn (Noctule 0.50ppn and unidentified *Nyctalus* species 0.10ppn) whilst Option B East recorded a combined average of 0.30ppn (Noctule 0.30ppn).

Plate 4.13 Passes per night for *Nyctalus* species per route option per month



4.7.4 Location C75 recorded a peak of activity in March, recording a combined 1.40ppn (Noctule 1.20ppn, unidentified *Nyctalus* species 0.20ppn) as shown on Plate 4-14. This location recorded no *Nyctalus* species passes for the months prior. The locations that recorded the next highest activity were B4 in November, B5 and B6 in March, all recording 0.6ppn. Activity at the remaining locations between November and February was low, with the majority of locations recording no *Nyctalus* species passes. No call registrations were recorded in February for any of the Locations.

Habitats

4.7.5 The graph showing the passes per night per broad habitat for *Nyctalus* species (Noctule and Leisler's) is shown below on Plate 4-15.

4.7.6 Detectors that were deployed within woodland habitats recorded the highest activity throughout the Survey Area for Noctule, recording an average of 0.12ppn across deployment period. Location C75 showed the highest levels of activity at 0.24ppn, followed by location B6 at 0.12ppn. Location B2 recorded 0.00ppn for Noctule in this habitat.

Plate 4.14 Passes per night for *Nyctalus* species per location per month

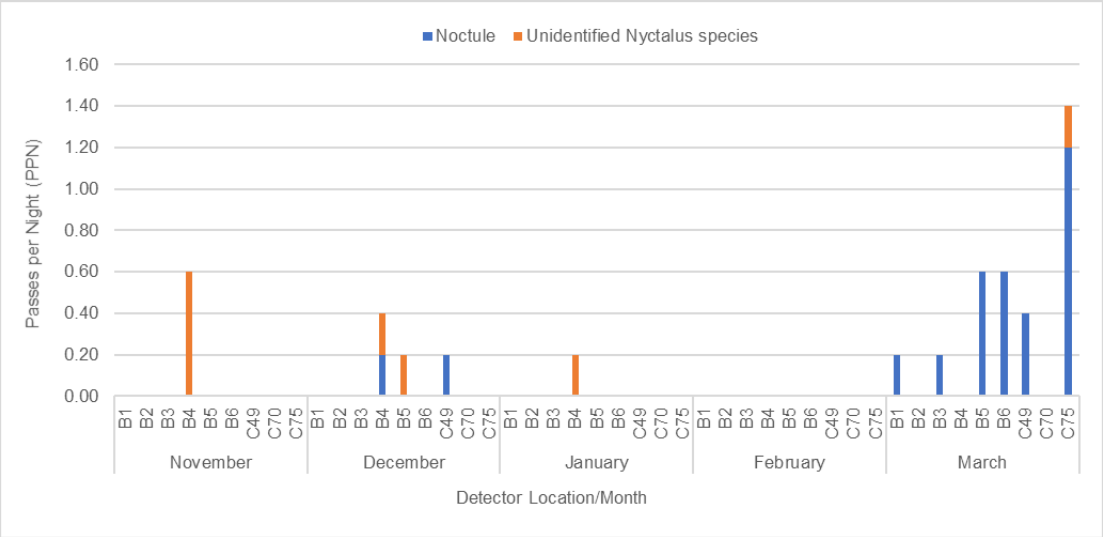
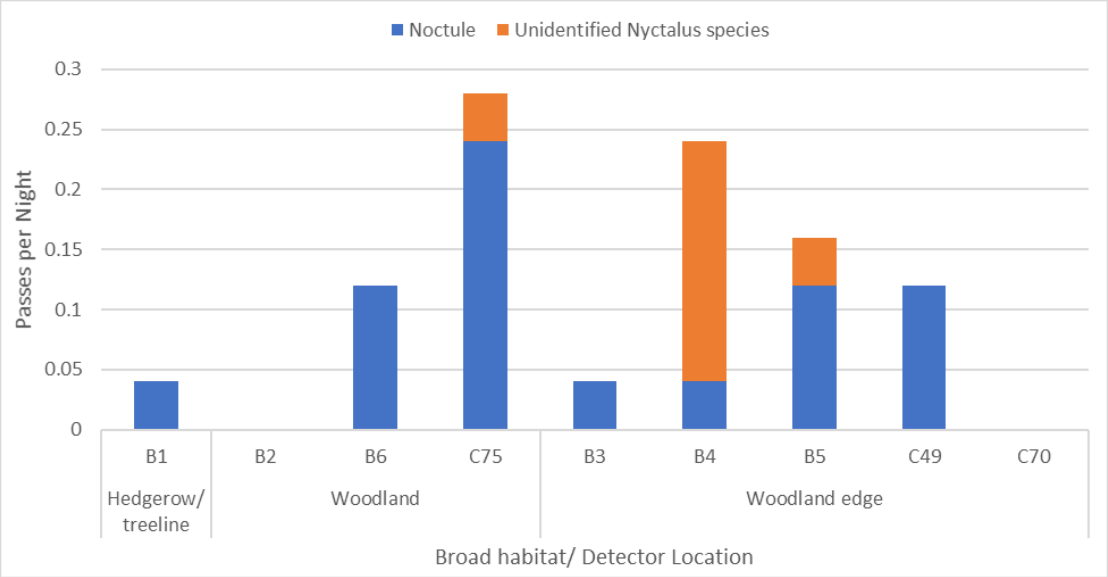


Plate 4.15 Passes per night for *Nyctalus* species per broad habitat type



4.7.7 Woodland edge habitats recorded an average of 0.06ppn for Noctule across the deployment period. Locations B5 and C49 recorded the highest levels of Noctule activity in this habitat, at 0.12ppn across the deployment period. For the remaining detector locations in this habitat for Noctule, activity ranged from 0.00ppn at location C70, to 0.04ppn for locations B3 and B4.

4.7.8 Detectors in the hedgerow-treeline habitat recorded the lowest average levels of Noctule activity across the deployment period, at 0.04ppn. B1 was the only detector in this habitat type.

4.7.9 For unidentified *Nyctalus* sp., detectors in the woodland edge habitat recorded the highest levels of activity, averaging at 0.05ppn across the deployment period. Location B4 showed the highest levels of unidentified Nyctalus sp. activity, averaging at 0.20ppn across the deployment period. For the remaining detector locations, activity ranged from 0.00ppn at B3, C49 and C70, to 0.04ppn at B5.

4.7.10 Detectors placed in woodland habitats recorded an average of 0.01ppn for unidentified *Nyctalus* sp. across the deployment period. Location C75 was the only detector location to record any activity, averaging 0.04ppn.

4.7.11 Hedgerow-treeline habitat recorded the lowest activity for unidentified *Nyctalus* sp. across the deployment period, with 0.00ppn.

4.8 Brown Long-eared Bat

4.8.1 Detector locations along the Scheme and Option B East recorded similar brown long-eared bat activity during the deployment period, November to March. Locations across Option B East recorded an average of 0.21ppn whilst locations across the Scheme recorded an average of 0.28ppn.

4.8.2 In November, December and March, average monthly activity was higher at locations along the Scheme than at locations along Option B East, as shown on Plate 4-16.

4.8.3 For the remaining months, average monthly activity was higher at locations along Option B East than at locations along the Scheme in February and no passes were recorded for either route option in January. Peak activity for both locations was recorded in March with the Scheme recording 0.90ppn and Option B East recording 0.6ppn.

4.8.4 Location C75 recorded a peak of activity in March, recording 1.60ppn, as shown on Plate 4-17. This location also recorded the highest activity in November and December with 0.40ppn and 0.60ppn, respectively. Location B3 in March recorded the next highest activity with 1.40ppn.

Plate 4.16 Passes per night for Brown Long-eared Bat per route option per month

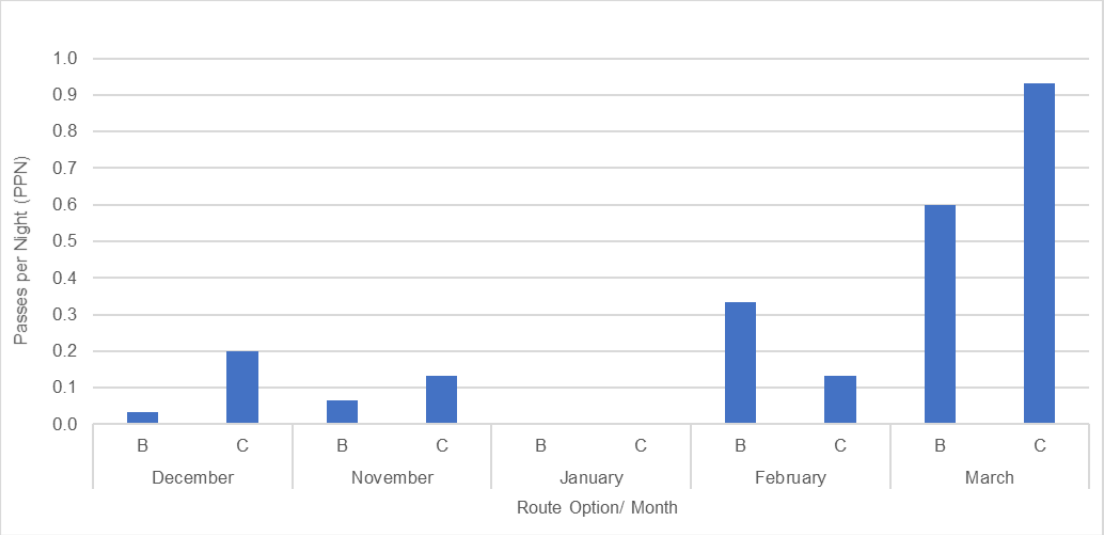
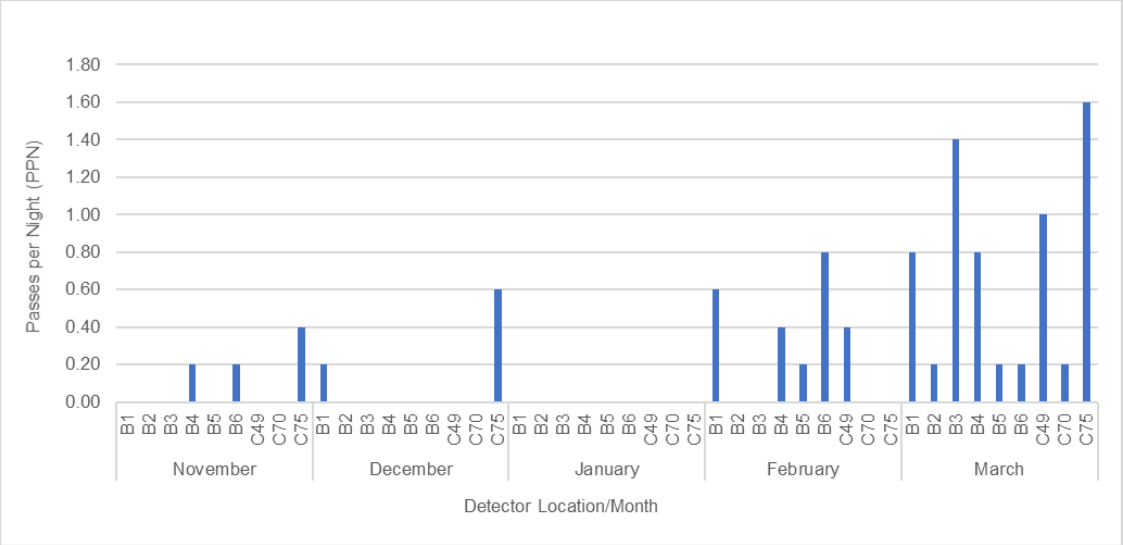


Plate 4.17 Passes per night for Brown Long-eared Bat per detector location per month



Habitats

4.8.5 The graph showing the passes per night per broad habitat for Brown Long-eared Bats is shown below on Plate 4-18.

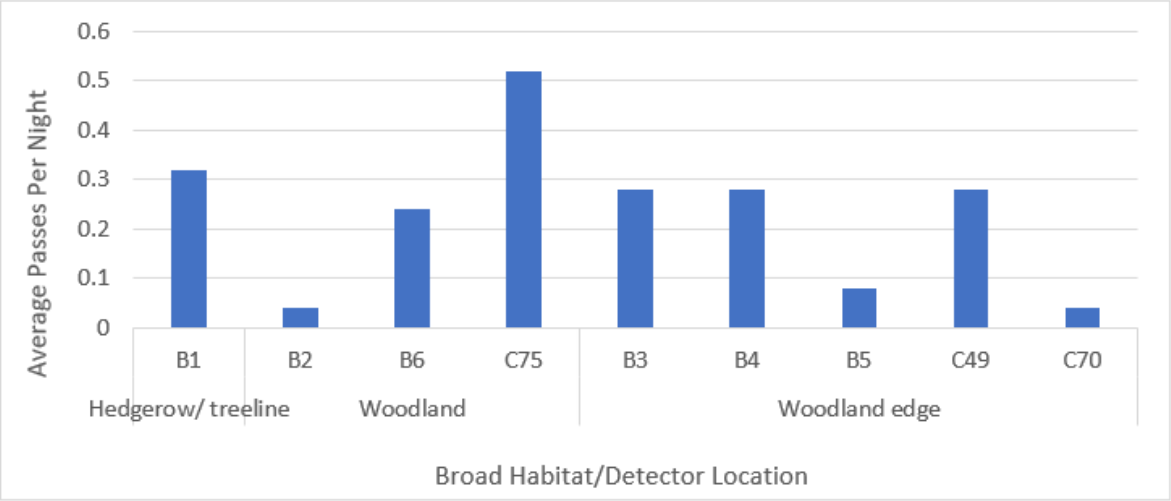
4.8.6 Detectors that were deployed within hedgerow-treeline habitats recorded the highest activity throughout the Survey Area, recording an average of 0.32ppn

across the deployment period. B1 was the only detector deployed in this habitat.

4.8.7 Woodland habitat recorded an average of 0.27ppn across the deployment period. Location C75 recorded the highest levels of activity, averaging 0.52ppn. B2 showed the lowest levels of activity within this habitat, at 0.04ppn.

4.8.8 Woodland edge habitats recorded the least amount of activity, with an average of 0.19ppn across the deployment period. Detector locations B3, B4 and C49 all recorded the highest level of activity at 0.28ppn. For the remaining detector locations, B5 recorded 0.08ppn, whilst C70 recorded the lowest activity level within this habitat at 0.04ppn.

Plate 4.18 Passes per night for Brown Long-eared Bat per broad habitat type



4.9 Serotine

4.9.1 Serotine activity was low across both route options, as shown on Plate 4-19. Passes were only recorded at locations B4 in November, C75 in December, and C49 in January, resulting in 0.20ppn respectively.

Plate 4.19 Passes per night for Serotine per location per month

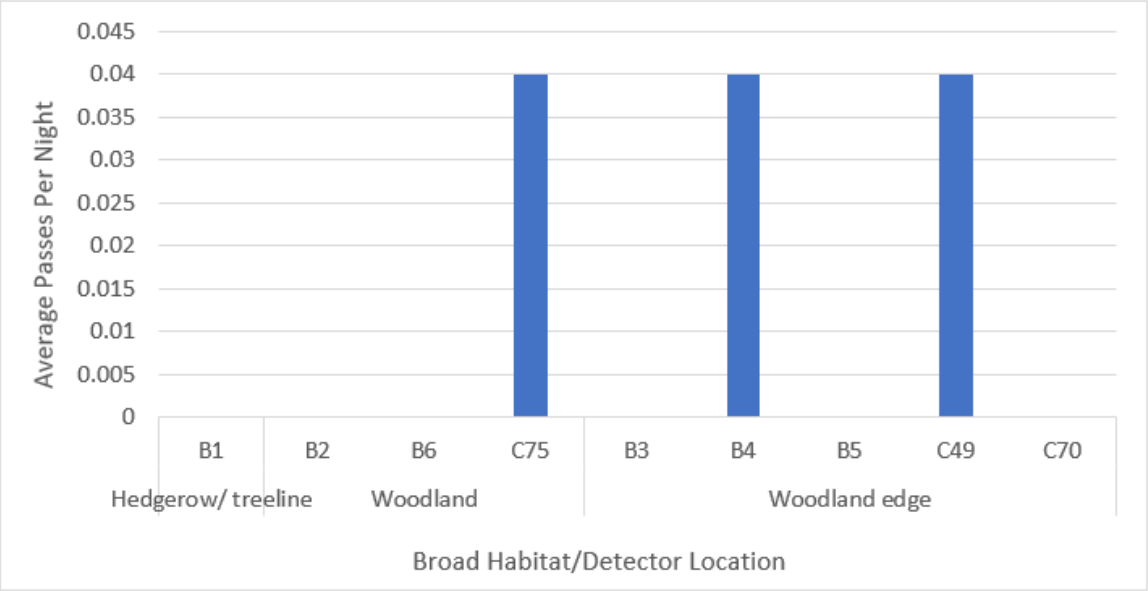
Habitats

4.9.2 The graph showing the passes per night per broad habitat for Serotine is shown below on Plate 4-20.

4.9.3 Throughout the winter survey months, Serotine were only recorded within the woodland and woodland edge habitats. Woodland edge showed the highest level of activity at 0.02ppn across the deployment period. Detector locations B4 and C49 were the only locations to record any activity for Serotine in this habitat type, both averaging 0.04ppn.

4.9.4 Woodland recorded an average activity level of 0.01ppn across the deployment period. C75 was the only detector to record any Serotine activity in this habitat type, at 0.04ppn.

Plate 4.20 Passes per night for Serotine per broad habitat type



5 References

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5.2 Technical References

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Annex A - Background Information

Annex A contains two figures showing the Route Options boundaries and Winter Automated Detector Locations.

Figure A-1 Route Option Boundaries

Figure A-2 Winter Automated Detector Locations

Annex B - Winter Automated Detector Deployments

Annex B contains tables showing background information on the Winter Automated Detector Deployments, including deployment dates and weather conditions.

Table B-1 Average weather conditions across the automated detector deployment periods

Month	Deployment period	Average weather conditions	Average weather conditions	Average weather conditions	Average weather conditions
Month	**Deployment period**	**Temperature (°C) High**	**Temperature (°C) Low**	**Rainfall**	**Max Wind (km/h)**
November	26.11.2021 – 01.12.2021	8.17	2.33	Scattered showers on 4/6 days, and 1/5 nights of deployment.	35.33
December	22.12.2021 – 27.12.2021	7.83	3.00	Drizzle on 4/6 days, and light rain on 2/5 nights during deployment.	21.25
January	20.01.2022 – 25.01.2022	5.67	1.67	Scattered showers on 1/6 days of deployment.	17.50
February	23.02.2022 – 28.02.2022	9.83	2.00	Light rain on 1/6 days during deployment.	30.83
March	18.03.2022 – 23.03.2022	14.5	2.17	No rain.	24.83

Table B-2 Detector deployments from December 2021 to March 2022 (refer to Figure A-2 for detector locations)

Detector Location	Date Deployed	Date Collected	Number of Nights
B1	26/11/2021	01/12/2021	5
B1	22/12/2021	27/12/2021	5
B1	20/01/2022	25/01/2022	5
B1	23/02/2022	28/02/2022	5
B1	18/03/2022	23/03/2022	5
B2	26/11/2021	01/12/2021	5
B2	22/12/2021	27/12/2021	5
B2	20/01/2022	25/01/2022	5
B2	23/02/2022	28/02/2022	5
B2	18/03/2022	23/03/2022	5
B3	26/11/2021	01/12/2021	5
B3	22/12/2021	27/12/2021	5
B3	20/01/2022	25/01/2022	5
B3	23/02/2022	28/02/2022	5
B3	18/03/2022	23/03/2022	5
B4	26/11/2021	01/12/2021	5
B4	22/12/2021	27/12/2021	5
B4	20/01/2022	25/01/2022	5
B4	23/02/2022	28/02/2022	5
B4	18/03/2022	23/03/2022	5
B5	26/11/2021	01/12/2021	5
B5	22/12/2021	27/12/2021	5
B5	20/01/2022	25/01/2022	5
B5	23/02/2022	28/02/2022	5
B5	18/03/2022	23/03/2022	5

Detector Location	Date Deployed	Date Collected	Number of Nights
B6	26/11/2021	01/12/2021	5
B6	22/12/2021	27/12/2021	5
B6	20/01/2022	25/01/2022	5
B6	23/02/2022	28/02/2022	5
B6	18/03/2022	23/03/2022	5
C49	26/11/2021	01/12/2021	5
C49	22/12/2021	27/12/2021	5
C49	20/01/2022	25/01/2022	5
C49	23/02/2022	28/02/2022	5
C49	18/03/2022	23/03/2022	5
C70	26/11/2021	01/12/2021	5
C70	22/12/2021	27/12/2021	5
C70	20/01/2022	25/01/2022	5
C70	23/02/2022	28/02/2022	5
C70	18/03/2022	23/03/2022	5
C75	26/11/2021	01/12/2021	5
C75	22/12/2021	27/12/2021	5
C75	20/01/2022	25/01/2022	5
C75	23/02/2022	28/02/2022	5
C75	18/03/2022	23/03/2022	5

Annex C – Tree Survey Results

Annex C contains a series of plans and tables showing the results of the tree assessment for each route option.

Figure C-1 Option B East Ground Level Tree Assessment Results

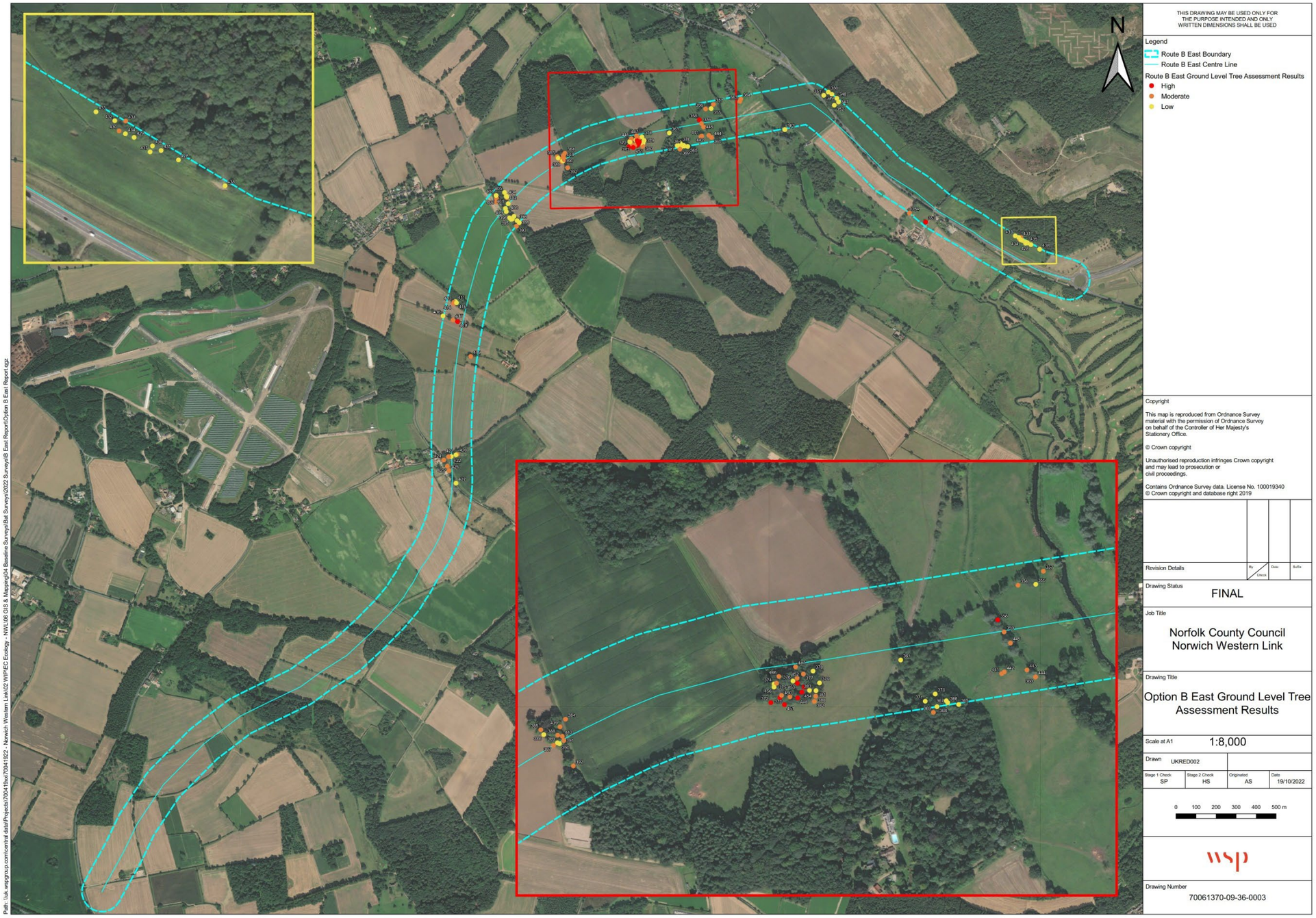


Figure C-2 Option B East Aerial Inspection Results

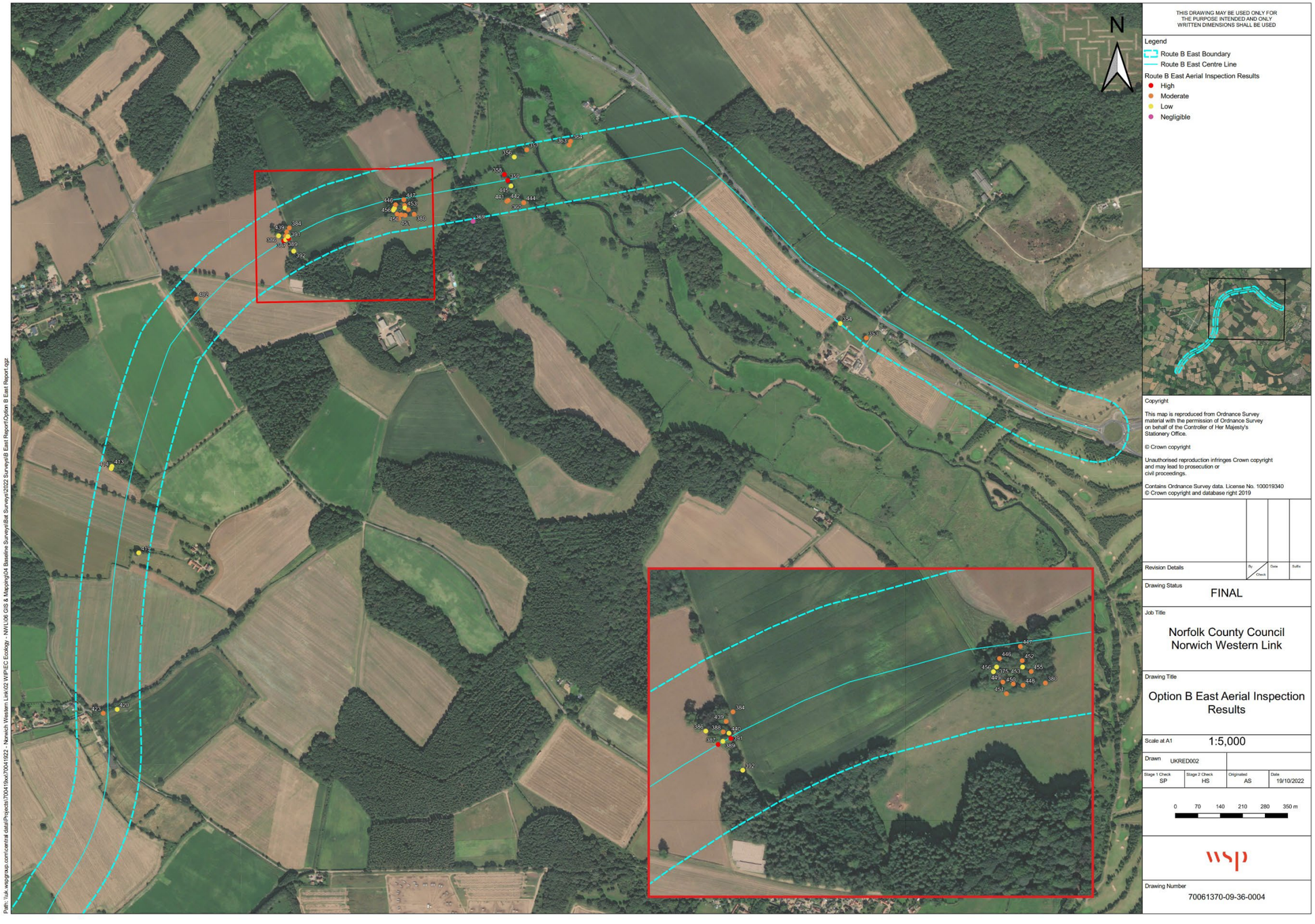


Table C-1 Option B East Ground Level Tree Inspection and Aerial Inspection Results

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
347	13/12/2021	Pedunculate Oak (Quercus robur)	Low	Not applicable	Not applicable	**Low**
348	13/12/2021	Ash (Fraxinus excelsior)	Low	Not applicable	Not applicable	**Low**
349	13/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
350	13/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
351	13/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
352	13/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
353	13/12/2021	Pedunculate Oak	High	11/01/2022	Moderate	**Moderate**
354	13/12/2021	Pedunculate Oak	Moderate	11/01/2022	Low	**Low**
355	13/12/2021	Poplar (Populus sp.)	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
356	13/12/2021	Alder (Alnus glutinosa)	Moderate	25/01/2022	Low	**Low**
357	13/12/2021	Alder	Moderate	25/01/2022	Moderate	**Moderate**
358	13/12/2021	Willow species (Salix sp.)	High	25/01/2022	High	**High**
359	13/12/2021	Poplar	Moderate	25/01/2022	High	**High**
360	13/12/2021	Poplar	Moderate	25/01/2022	Moderate	**Moderate**
361	13/12/2021	Poplar	Low	Not applicable	Not applicable	**Low**
363	15/12/2021	Crack Willow (Salix fragilis)	Low	Not applicable	Not applicable	**Low**
363	15/12/2021	Willow species	Moderate	27/01/2022	Moderate	**Moderate**
364	15/12/2021	Willow species	Moderate	27/01/2022	Moderate	**Moderate**
365	15/12/2021	Oak species (Quercus sp.)	Low	Not applicable	Not applicable	**Low**
366	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
367	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
368	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
369	15/12/2021	Pedunculate Oak	Moderate	26/01/2022	Negligible	**Negligible**
370	15/12/2021	Unknown species	Low	Not applicable	Not applicable	**Low**
371	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
372	15/12/2021	Pedunculate Oak	High	Not applicable	Unsafe for further survey	**Precautionary roost**
373	15/12/2021	Pedunculate Oak	High	Not applicable	Unsafe for further survey	**Precautionary roost**
374	15/12/2021	Pedunculate Oak	Low	Not applicable	NA	**Low**
375	15/12/2021	Beech (Fagus sylvatica)	Moderate	13/01/2022	Low	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
376	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
377	15/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
378	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
379	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
380	15/12/2021	Pedunculate Oak	Moderate	12/01/2022	Moderate	**Moderate**
381	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
382	15/12/2021	Monolith	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
383	15/12/2021	Sycamore (Acer pseudoplatanus)	Low	Not applicable	Not applicable	**Low**
384	15/12/2021	Pedunculate Oak	Moderate	15/12/2021	Moderate	**Moderate**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
385	15/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
386	15/12/2021	Pedunculate Oak	Low	26/01/2022	Low	**Low**
387	15/12/2021	Pedunculate Oak	Moderate	26/01/2022	High	**High**
388	15/12/2021	Pedunculate Oak	Moderate	26/01/2022	Moderate	**Moderate**
389	15/12/2021	Pedunculate Oak	Low	26/01/2022	Low	**Low**
390	15/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
391	15/12/2021	Pedunculate Oak	Moderate	25/01/2022	High	**High**
392	15/12/2021	Pedunculate Oak	Moderate	25/01/2022	Low	**Low**
393	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
394	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
395	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
396	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
397	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
398	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
399	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
400	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
401	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
402	16/12/2021	Sycamore	Moderate	26/01/2022	Moderate	**Moderate**
403	16/12/2021	Sycamore	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
404	16/12/2021	Sycamore	Low	Not applicable	Not applicable	**Low**
405	16/12/2021	Beech	Low	Not applicable	Not applicable	**Low**
406	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
407	16/12/2021	Sycamore	Low	Not applicable	Not applicable	**Low**
408	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
409	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
410	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
411	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
412	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
413	16/12/2021	Pedunculate Oak	Moderate	27/01/2022	Low	**Low**
414	16/12/2021	Ash	Moderate	27/01/2022	Low	**Low**
415	16/12/2021	Ash	Low	Not applicable	Not applicable	**Low**
416	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
417	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
418	16/12/2021	Pedunculate Oak	High	Not applicable	Unsafe for further survey	**Precautionary roost**
419	16/12/2021	Pedunculate Oak	Moderate	27/01/2022	Low	**Low**
420	16/12/2021	Pedunculate Oak	Moderate	26/01/2022	Low	**Low**

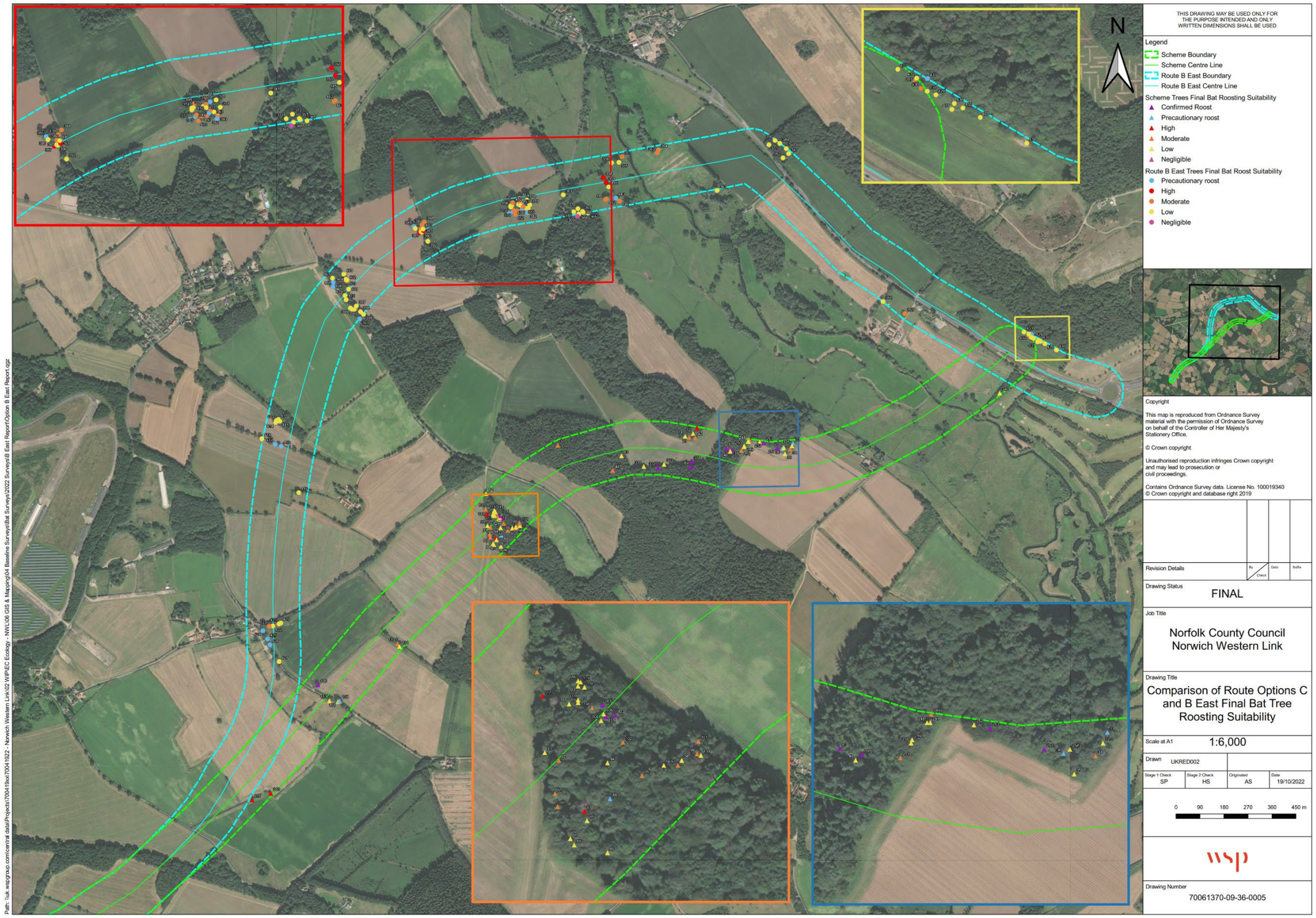
Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
421	16/12/2021	Ash	Low	Not applicable	Not applicable	**Low**
422	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
423	16/12/2021	Ash	Moderate	26/01/2022	Moderate	**Moderate**
424	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
425	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
426	16/12/2021	Pedunculate Oak	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
427	16/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
428	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
429	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
430	23/12/2021	Sycamore	Moderate	11/01/2022	Moderate	**Moderate**
431	23/12/2021	Pedunculate Oak	Moderate	NA	Unsafe for further survey	**Precautionary roost**
432	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
433	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
434	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
435	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
436	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
437	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
438	23/12/2021	Pedunculate Oak	Low	Not applicable	Not applicable	**Low**
439	25/01/2022	Unknown species - dead	Moderate	25/01/2022	Moderate	**Moderate**
440	25/01/2022	Ash	Moderate	25/01/2022	Low	**Low**
441	25/01/2022	Ash	Moderate	25/01/2022	Moderate	**Moderate**
442	25/01/2022	Ash	Moderate	25/01/2022	Moderate	**Moderate**
443	25/01/2022	Willow species	Moderate	Not applicable	Unsafe for further survey	**Precautionary roost**
444	25/01/2022	Willow species	Moderate	25/01/2022	Moderate	**Moderate**
445	25/01/2022	Willow species	Moderate	25/01/2022	Low	**Low**
446	13/01/2022	Ash	Moderate	13/01/2022	Moderate	**Moderate**
447	13/01/2022	Field Maple (Acer campestre)	Moderate	13/01/2022	Moderate	**Moderate**
448	13/01/2022	Ash	High	13/01/2022	Moderate	**Moderate**
449	12/01/2022	Beech	Moderate	12/01/2022	Moderate	**Moderate**
450	12/01/2022	Field Maple	Moderate	13/01/2022	Moderate	**Moderate**

Tree Reference	GLTA date	Tree Species	GLTA Suitability	Further Survey Date	Aerial Inspection Results	Final Bat Roosting Suitability
451	12/01/2022	Hawthorn (Crataegus monogyna)	High	12/01/2022	Moderate	**Moderate**
452	12/01/2022	Sycamore	Moderate	13/01/2022	Moderate	**Moderate**
453	12/01/2022	Ash	High	12/01/2022	Low	**Low**
454	12/01/2022	Ash	High	Not applicable	Unsafe for further survey	**Precautionary roost**
455	12/01/2022	Ash	High	12/01/2022	Moderate	**Moderate**
456	13/01/2022	Field Maple	Low	13/01/2022	Low	**Low**

Figure C-3 Comparison roost provision between Option B East and the Scheme



Annex D - Winter Automated Detector Survey Results

Annex D contains a table showing the number of passes per night per bat species per month during the winter surveys at each detector location.

Table D-1 Summary of bat species passes per night during the winter surveys at each location

Location	Month	No. of Nights	Barbastelle	Common Pipistrelle	Soprano Pipistrelle	Nathusius' Pipistrelle	*Myotis* Species	Brown Long-eared	*Nyctalus* Species	Noctule	Serotine	Total PPN
B1	November	5	0.00	0.00	1.40	0.00	0.40	0.00	0.00	0.00	0.00	1.80
B1	December	5	0.00	0.40	0.00	0.00	1.00	0.20	0.00	0.00	0.00	1.60
B1	January	5	0.20	0.00	0.00	0.00	1.60	0.00	0.00	0.00	0.00	1.80
B1	February	5	0.60	0.40	0.00	0.00	0.60	0.60	0.00	0.00	0.00	2.20
B1	March	5	27.0	6.60	5.00	0.00	1.20	0.80	0.00	0.20	0.00	40.80
B2	November	5	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.20
B2	December	5	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.20
B2	January	5	0.00	1.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	1.80
B2	February	5	0.20	0.60	0.20	0.00	0.40	0.00	0.00	0.00	0.00	1.40
B2	March	5	0.40	17.40	25.20	0.00	3.20	0.20	0.00	0.00	0.00	46.40
B3	November	5	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.80
B3	December	5	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.60
B3	January	5	0.00	0.00	0.40	0.20	0.60	0.00	0.00	0.00	0.00	1.20
B3	February	5	1.00	0.00	0.00	0.00	0.80	0.00	0.00	0.00	0.00	1.80
B3	March	5	4.40	2.40	15.20	0.00	3.00	1.40	0.00	0.20	0.00	26.60
B4	November	5	0.00	0.80	1.20	0.00	2.80	0.20	0.60	0.00	0.20	5.80
B4	December	5	0.20	0.00	0.20	0.00	4.20	0.00	0.20	0.20	0.00	5.00
B4	January	5	0.00	0.00	0.40	0.00	1.00	0.00	0.20	0.00	0.00	1.60
B4	February	5	0.20	0.00	0.00	0.00	0.60	0.40	0.00	0.00	0.00	1.20
B4	March	5	4.20	2.00	17.80	0.00	2.40	0.80	0.00	0.00	0.00	27.20
B5	November	5	0.00	0.00	0.40	0.00	0.20	0.00	0.00	0.00	0.00	0.60
B5	December	5	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.00	0.00	0.40

Location	Month	No. of Nights	Barbastelle	Common Pipistrelle	Soprano Pipistrelle	Nathusius' Pipistrelle	*Myotis* Species	Brown Long-eared	*Nyctalus* Species	Noctule	Serotine	Total PPN
B5	January	5	0.60	0.00	1.40	0.00	1.80	0.00	0.00	0.00	0.00	3.80
B5	February	5	0.20	0.00	11.20	0.00	2.20	0.20	0.00	0.00	0.00	13.80
B5	March	5	5.00	33.40	19.00	0.00	5.40	0.20	0.00	0.60	0.00	63.60
B6	November	5	0.00	2.20	183.60	0.00	4.80	0.20	0.00	0.00	0.00	190.80
B6	December	5	1.60	0.00	22.00	0.00	0.40	0.00	0.00	0.00	0.00	24.00
B6	January	5	0.00	1.60	0.20	0.00	0.20	0.00	0.00	0.00	0.00	2.00
B6	February	5	0.60	0.20	0.60	0.00	3.00	0.80	0.00	0.00	0.00	5.20
B6	March	5	5.00	33.40	19.00	0.00	5.40	0.20	0.00	0.60	0.00	63.60
C49	November	5	0.00	1.40	1.00	0.00	1.40	0.00	0.00	0.00	0.00	3.80
C49	December	5	0.00	0.60	0.80	0.00	1.00	0.00	0.00	0.20	0.00	2.60
C49	January	5	0.00	1.40	1.40	0.00	0.00	0.00	0.00	0.00	0.20	3.00
C49	February	5	0.20	0.80	0.20	0.00	3.20	0.40	0.00	0.00	0.00	4.80
C49	March	5	11.20	26.20	35.20	0.00	2.80	1.00	0.00	0.40	0.00	76.80
C70	November	5	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
C70	December	5	0.00	0.40	18.20	0.00	0.40	0.00	0.00	0.00	0.00	19.00
C70	January	5	0.00	0.00	1.00	0.00	0.20	0.00	0.00	0.00	0.00	1.20
C70	February	5	5.80	12.60	1.20	0.00	0.60	0.00	0.00	0.00	0.00	20.20
C70	March	5	0.20	7.60	3.20	0.00	1.20	0.20	0.00	0.00	0.00	12.40
C75	November	5	2.00	15.60	108.00	0.00	2.20	0.40	0.00	0.00	0.00	128.40
C75	December	5	2.60	1.80	16.20	0.00	5.20	0.60	0.00	0.00	0.20	26.60
C75	January	5	0.00	0.20	0.80	0.00	0.20	0.00	0.00	0.00	0.00	1.20
C75	February	5	1.60	0.20	3.00	0.00	6.20	0.00	0.00	0.00	0.00	11.00
C75	March	5	1.80	70.60	98.80	0.00	11.00	1.60	0.20	1.20	0.00	185.20