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**BAT AERIAL TREE ASSESSMENT & PRESENCE /
ABSENCE SURVEYS**

At

Plot 3A

Wrexham Industrial Estate
Bryn Lane
Wrexham
LL13 9UT

NGR: SJ 39340 50457

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A handwritten signature in black ink, appearing to read 'Toby Hart', is positioned below the 'Approved by:' line.

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CONTENTS

EXECUTIVE SUMMARY	3
1 INTRODUCTION	5
1.1 Author, surveyors and qualifications	5
1.2 Survey objectives and previous survey information	6
1.3 Proposed development	6
1.4 Structure of the report	6
2 METHODOLOGY	7
2.1 General	7
2.2 Aerial tree assessment	7
2.3 Emergence and re-entry surveys	8
2.4 Survey limitations	9
3 RESULTS	10
3.1 Habitat assessment	10
3.2 Tree assessments	10
3.3 Emergence and re-entry surveys	14
3.4 Activity summary	14
4 EVALUATION AND RECOMMENDATIONS	15
4.1 Evaluation of results	15
4.2 Mitigation and compensation measures	15
5 CONCLUSION	17
6 REFERENCES	18
APPENDICES	19
Appendix 1 – Site plan	19
Appendix 2 – Aerial inspection results	20
Appendix 3 – Presence / absence survey results	21
Appendix 4 – Photographs	22
Appendix 5 – External lighting guidance	23
Appendix 6 – Statutory and planning context	24



EXECUTIVE SUMMARY

This report is written by Robert Mooney MSc, Graduate Ecologist at United Environmental Services Ltd (UES). It provides an assessment of the potential impacts on bats as a result of the tree works associated with a proposed development at Plot 3A, Wrexham Industrial Estate, Wrexham. The development proposals include the construction of three large industrial units with associated parking and infrastructure. No detailed tree removal plan has been provided to UES at the time of writing, but the works are likely to involve the removal of a number of mature and semi-mature trees in order to facilitate the development. However, it is currently proposed that the trees that form a strip of woodland along the northern site boundary will be retained as part of the proposals.

All trees on site were subjected to a ground-level assessment of potential to support roosting bats between 15th February and 4th April 2022. Following this, trees which were assessed as having moderate or high roosting potential, and which were set to be removed or subject to arboricultural works as part of the proposed development, were subject to either aerial tree assessments or presence / absence surveys between 26th July and 26th September 2022. All potential roosting features (PRFs) were closely inspected for bat presence and features associated with bat activity, as detailed in Bat Conservation Trust (BCT) guidance (Collins, 2016).

The site provides largely moderate quality habitat for foraging and commuting bats, with smaller areas of high-quality and low-quality habitat. The presence of the numerous ponds, small stands of woodland, hedgerows, semi-improved and unimproved grassland and dense scrub will provide foraging and commuting opportunities.

A minimum of two species of bat were recorded during the bat presence / absence surveys: soprano pipistrelle *Pipistrellus pygmaeus* and at least one *Myotis* species. Soprano pipistrelles were recorded most frequently. Activity was generally low, with the highest levels of activity recorded within the vicinity of T35 and T45.

No evidence of roosting bats was observed within any of the trees on site during the ground level and aerial assessments, and no bats were observed roosting within any of the trees during the bat presence / absence surveys.

No evidence of roosting bats was found in any of the trees surveyed, nor were any roosting bats recorded during the presence / absence surveys. As such, no further survey effort is considered necessary. However, soft felling techniques or a pre-commencement inspection (where possible) by a licensed ecologist should be undertaken of the eighteen trees assessed as having low, moderate or high potential to support roosting bats, as detailed in section 4.2.1 of this report.

The majority of the trees on site do not contain any PRFs and were assessed as having negligible potential to support roosting bats. This includes T2, T8, T12, T16 and T34 which were initially considered to have potential but have since been assessed as having negligible potential to support roosting bats following a close inspection with an endoscope. These trees may be felled or subject to arboricultural works without restriction with regards to bats.

In order to compensate for the loss of potential roosting opportunities on site, a selection of bat boxes should also be affixed onto retained trees. Additional bat boxes should be provided to ensure there is an enhancement in the roosting opportunities available on site.



Due to the potential presence of nesting birds on site, it is recommended that the vegetation clearance, building demolition, tree felling and arboricultural works, take place outside of the breeding bird season and should not be undertaken from March to August inclusive. If this is not possible and works need to take place during this period, a breeding bird nest survey should be undertaken prior to the commencement of works by a suitably experienced ecologist and an ecological clerk of works appointed to oversee the works if considered necessary.

The report should be read in conjunction with appendices 1 to 6, in addition to the ground level tree assessment report that has previously been prepared for the site (see report reference UES03448/06).



1 INTRODUCTION

1.1 Author, surveyors and qualifications

This report is compiled and written by Robert Mooney MSc, UES Graduate Ecologist. Robert is trained in tree climbing and aerial rescue to CS38 level.

Other surveyors present included:

- Toby Hart BSc MCIEEM PIEMA, UES Managing Director. Toby is licensed by Natural Resources Wales to disturb, take and handle all species of bat other than greater horseshoe *Rhinolophus ferrumequinum* or lesser horseshoe *Rhinolophus hipposideros* under licence number S086508/01. Toby is also trained in tree climbing and aerial rescue to CS38 level.
- Mark Halliwell MBiol, UES Ecologist. Mark is listed as an accredited agent on the bat survey licence of Toby Hart. Mark has been deemed capable by the licence holder to disturb (including using an endoscope) and to handle all species of bat other than greater or lesser horseshoe. Mark is also trained in tree climbing and aerial rescue to CS38 level.
- Alasdair Grubb BSc, UES Ecologist. Alasdair is listed as an assistant on the bat survey licence of Toby Hart. Alasdair has been deemed capable by the licence holder to disturb (including using an endoscope) and to handle all species of bat other than greater or lesser horseshoe, whilst under the direct supervision of Toby Hart or an accredited agent. Alasdair is also trained in tree climbing and aerial rescue to CS38 level.
- Daniel Smith BSc MScRes, UES Ecologist. Daniel is listed as an assistant on the bat survey licence of Toby Hart. Daniel has been deemed capable by the licence holder to disturb (including using an endoscope) and to handle all species of bat other than greater or lesser horseshoe, whilst under the direct supervision of Toby Hart or an accredited agent. Daniel is also trained in tree climbing and aerial rescue to CS38 level.
- Noah Fulton BSc, UES Graduate Ecologist.
- Jacob Miller BSc, UES Graduate Ecologist.
- Paul Cassidy, UES Sub-contractor. Paul is licensed by Natural Resources Wales to disturb, take and handle all species of bats under licence number S088256/1.
- Mark Jeffries, UES Sub-contractor.
- Tilly Edwards, UES Sub-contractor.

All surveyors have the knowledge, skills and experience identified within CIEEM's "Competencies for Species Survey: Bats" (2013).



1.2 Survey objectives and previous survey information

All trees on site were subjected to a ground-level assessment of their potential to support roosting bats by UES between the 15th February and 4th April 2022 (see report reference UES03448/06). Following the ground level assessment, UES was commissioned to conduct further aerial tree assessments and / or bat presence / absence surveys of any trees with the bat roosting potential that could be adversely impacted by the proposed development. The aims of the surveys were to further assess the suitability of trees and the determine presence of absence of bats within these trees, in addition to recommending mitigation and compensation measures where appropriate.

1.3 Proposed development

The development proposals include the construction of three industrial units with associated parking and infrastructure. No detailed tree removal plan has been provided to UES at the time of writing, but the works are likely to involve the removal of a number of mature and semi-mature trees in order to facilitate the development. However, it is currently proposed that the trees that form a strip of woodland along the northern site boundary will be retained as part of the proposals.

1.4 Structure of the report

This report sets out the methodology, results, and recommendations in relation to a specific bat survey. Recommendations are in line with statutory legislation and planning policy objectives.

The report should be read in conjunction with appendices 1 to 6, in addition to the ground level tree assessment report that has previously been prepared for the site (see report reference UES03448/06).



2 METHODOLOGY

2.1 General

All surveys were carried out to recognised guidelines, timings and weather conditions, with particular reference to Natural England and BCT publications (see references for further information).

The habitats on site and in the surrounding area were also assessed during a walkover survey and through studying aerial photographs in order to gauge their suitability to support roosting, foraging and commuting bats.

2.2 Aerial tree assessment

Where the ground-level assessment highlighted suitable PRFs which were not accessible from ground level, the trees were climbed using ropes and harnesses by trained professionals in order to inspect the features more closely using an endoscope. Trees were inspected on all aspects and assessed for their potential to contain roosting bats, based on the number and quality of suitable roosting features present, as detailed in BS8596:2015 Surveying for Bats in Trees and Woodland and BCT guidelines (Collins, 2016). A total of 12 trees were subject to aerial inspections (T3, T6, T7, T8, T9, T10, T11, T12, T14, T15, T34 and T35).

Potential roosting features, as described in Bat Roosts in Trees (Bat Tree Habitat Key, 2018) are listed in Table 1 below.

Table 1 – Types of PRFs found in trees

DISEASE & DECAY FEATURES	DAMAGE FEATURES	ASSOCIATION FEATURES	OTHER FEATURES
Woodpecker holes	Lightning strikes	Fluting	Bat boxes
Squirrel holes	Hazard beams	Ivy	Bird boxes
Knot holes	Subsidence cracks		
Pruning cuts	Shearing cracks		
Tear-outs	Transverse snaps		
Wounds	Welds		
Cankers	Lifting bark		
Compression forks	Desiccation fissures		
Butt rots	Frost cracks		

In addition to assessing the suitability of potential roosting features, the PRFs were inspected in order to identify any roosting bats or field signs of bats and to assess the internal conditions. Field signs of bats can include:

- Scratches, staining or droppings around entry points or within a cavity
- Presence of bat-fly cases
- Odour
- Smoothing of surfaces around cavity
- Audible chattering / squeaking at dusk or in warm weather (during the active season)



Based on the availability of new information from the close inspection of features during the aerial inspection, trees were either kept as the having the same roosting suitability as assessed during the ground level assessment or were re-classified as negligible, low, moderate or high suitability.

Trees still considered to have moderate or high potential to support roosting bats following the initial aerial inspection, and which contained features which could confidently be fully inspected with an endoscope, were subject to additional aerial inspections (total of two inspections for trees with moderate potential and total of three inspections for trees with high potential). All aerial inspections were carried out between 26th July and 12th September 2022 and at least half of all inspections of each tree were undertaken during the peak bat survey season of May to August inclusive, as per BCT guidelines.

2.3 Emergence and re-entry surveys

During the ground-level and aerial tree inspections, a total of six trees (T3, T6, T7, T10, T35 & T45) were found to contain features which could not be fully inspected with an endoscope (e.g. due to the shape or depth of the cavity) or were unsafe to climb. As such, these trees were subject to further bat presence / absence surveys. During these surveys, all potential roosting features within these trees were covered by a surveyor or infrared camera during the dusk emergence or dawn re-entry periods.

Bat echolocation, flight and habitat characteristics were recorded where possible, in order to determine the species. The level and type of bat activity was also recorded to establish how bats are using the site.

2.3.1 Equipment

BATLOGGER M bat detectors and recorders were used during the surveys. This device records bat echolocation calls across the full spectrum, with a sensitivity range of 10 – 150 kHz. The integrated heterodyne live monitoring also allows the observer to hear the echolocation calls in real time, with automatic tuning. The recordings are individually time/date, GPS and temperature stamped, and are of high enough quality to produce time expansion quality sonograms.

Anabat Walkabout bat detectors were also used during the surveys. This allowed the observer to hear bat echolocation calls and see the sonograms in real time, aiding identification. All registrations were automatically recorded onto a memory card and time/ date stamped. The device can record and display both zero crossing and full spectrum bat echolocation calls and has a built-in GPS and mapping system.

Anabat Scout bat detectors were also used during the surveys. This allowed the observer to hear bat echolocation calls in real time, with automatic tuning. All registrations were automatically recorded onto a memory card and time/ date stamped. The device can record and display both zero crossing and full spectrum bat echolocation calls and has a built-in GPS and mapping system.

Canon XA11 Professional Video Cameras were used in conjunction with infra-red LED illuminators to monitor PRFs within trees during the surveys. Footage of the survey was recorded and reviewed post-survey. This enabled a more thorough assessment of the use of



the trees throughout the entirety of the survey. This ensured that any bats using the trees were identified, even when ambient light levels prohibited surveyors from observing bats.

2.3.2 Weather conditions

Table 2 - Weather conditions and survey timings

DATE	SURVEY TYPE	TIMINGS	SUNSET / SUNRISE	TEMP.	WIND	RAIN	CLOUD COVER
30/08/22	Re-entry	04:48 – 06:33	06:18	15°C	Light breeze	Dry	20%
14/09/22	Emergence	19:15 – 21:00	19:30	14°C	Light breeze	Light drizzle	100%
26/09/22	Emergence	18:46 – 20:31	19:01	12°C	Intermittent moderate breeze	Moderate rainfall until 19:25	100%

2.4 Survey limitations

Moderate rainfall was recorded during the emergence survey carried out of 30th September. However, levels of bat activity recorded were mostly consistent with previous surveys and so this is not considered to be a significant limitation.



3 RESULTS

3.1 Habitat assessment

Plot 3A has an area of approximately 20.9ha and is located at the north-eastern edge of Wrexham Industrial Estate, east of the city of Wrexham. Habitats within the site boundary include semi-improved grassland, unimproved grassland, open mosaic habitat on previously developed land, dense scrub, small stands of woodland, scattered scrub and trees, tall ruderal vegetation, amenity grassland and six ponds of varying size. There are two large areas of hardstanding, one towards the north-western corner of the site and another in the south-eastern corner. Rough semi-improved grassland and dense scrub comprise the majority of the area that will be impacted by the proposed development.

Since the ground-level tree assessments, the site boundary has been amended to incorporate an additional 4.5ha of adjacent land. This land comprises two agricultural grassland fields that are divided and bordered by hedgerows and trees. A dry and unvegetated ditch runs along part of the eastern boundary a pond surrounded by willow scrub is present within the northernmost field. However, as the trees on this section are all being retained, this area has not been included in the scope of the tree surveys.

The local area consists of agricultural land to the north, east and south-east of the site, with the rest of Wrexham Industrial Estate lying to the south-west. Tree lines and hedgerows divide the fields in the nearby agricultural land, providing potential bat foraging and commuting habitat. A large number of ponds are present both in the industrial estate and the agricultural fields that surround the site.

In the wider surrounding area, two golf courses lie to the immediate north-west of Wrexham Industrial Estate, featuring large numbers of trees. The town of Wrexham lies further to the west of the industrial estate, while agricultural land dominates the landscape in all other directions. Some small patches of woodland are also present nearby, particularly to the south near the River Clywedog, which joins the River Dee to the south-east of the industrial estate.

In summary, Plot 3A provides largely moderate quality habitat for foraging and commuting bats, with smaller pockets of high-quality habitat in the form of the woodland, ponds and unimproved grassland, and pockets of low or negligible quality habitat in the form of hardstanding and amenity grassland. The presence of the many ponds and areas of rough grassland, scrub, woodland, and scattered mature trees both within the site and in the local area provide an abundance of foraging opportunities and commuting corridors, whilst roosting alternative opportunities are also available from nearby residential, industrial and agricultural buildings and mature trees.

3.2 Tree assessments

During the earlier ground-level tree assessments, all trees on site were assessed for any PRFs which could support roosting bats. Trees which were considered to have moderate or high potential to support roosting bats, contained PRFs which could not be fully inspected from ground level, and were set to be felled or subject to arboricultural works as part of the proposed development, were subject to further aerial tree assessments. A total of 14 such trees were surveyed. Where these trees were found to contain potential roosting features of moderate or high suitability that could confidently be fully inspected, further aerial inspections were undertaken in place of presence / absence surveys.



Following the initial aerial tree assessments, 6 trees were found to contain features which could not be fully inspected with an endoscope or could not safely be climbed and were instead subject to presence / absence surveys.

T1 is a dead tree of unknown species which lies at the south-west corner of the site, surrounded by dense scrub. It is approximately 3m in height with a diameter at breast height (DBH) of approximately 0.7m. The tree contains fissures in the stem (T1.1), a knot hole on its western aspect (T1.2), flaking bark on the northern aspect (T1.5), and three rot holes, one on the western aspect (T1.3) and two on the eastern aspect (T1.3 & T1.4). Upon close inspection, the rot holes were all found to be shallow and relatively exposed, while the fissures present are too narrow to be used by bats. All features were fully inspected and no evidence of roosting bats was observed. All features are considered to have low potential to support roosting bats.

T3 is a mature pedunculate oak *Quercus robur* found on the western boundary of the site, just beyond the scrub which runs along a wet ditch. It is approximately 14m in height with a DBH of approximately 0.5m. The tree features a basal stem cavity reaching 1.5m from the ground on its western aspect (PRF T3.1), a tear out at around 8m on its eastern aspect (T3.2), a branch cavity at 8m on its northern aspect (T3.3), and a callus roll at 4m on its southern aspect (T3.4). The basal cavity could not be fully inspected as it extends beyond endoscope reach up the stem, and as such was subject to two presence / absence surveys. T3.2 was found to be superficial upon inspection and is considered to have negligible roosting potential. T3.3 is shallow and faces upwards, and is considered to have low roosting potential. T3.4 is horizontal and extends 40-50cm, and is considered to have moderate roosting potential. T3.4 was therefore also subject to two presence / absence surveys alongside T3.1. No evidence of roosting bats was observed in any of the features.

T6 is the northernmost of a line of mature pedunculate oaks found in the continuous scrub which runs north-west/south-east and separates two areas of rough grassland in the north-western section of the site. It is approximately 9m in height with a DBH of approximately 0.8m. The tree contains two tear-outs on its western aspect at approximately 2.5m (PRF T6.1) and 4m (T6.2), at 5m on its northern aspect (T6.3), and at 4.5m on its north-western aspect (T6.4). T6.1 features two entrances into a large branch cavity, which extends approximately 2m up the limb and branches into several small chambers at its top. The limb is deteriorating and light ingress can be observed from other points within, and sections are too large and exposed, however the smaller chambers could support several bats. This feature is considered to contain moderate roosting potential. T6.2 forms a longitudinal crack into a hollow deadwood branch, which extends a short distance at both ends and is considered to have low roosting potential. T6.3 is fairly well sealed against the cambium, however the deadwood has small fissures which could provide shelter for individual bats. This feature is considered to have low roosting potential. T6.4 leads into a large branch cavity which extends downwards 60cm and upwards at least 1.5m to another opening, and is considered to have high bat roosting potential. This feature cannot be fully inspected by endoscope and thus T6 was subject to two presence / absence surveys. No evidence of roosting bats was observed during the tree inspections, however it should be noted that detritivores were present which could have consumed any present bat droppings.

T7 is a mature pedunculate oak located just to the south of T6, in the same line of trees and scrub. It is approximately 9m in height with a DBH of 1.0m. This tree features a large callus roll from ground level on its south-eastern aspect (T7.1), an area of lifted bark at around 2m on its southern aspect (T7.2), and two branch cavities at 2m on its southern aspect (T7.3 & T7.4). T7.1 leads to a cavity which extends upwards for at least 40cm, and is considered to have moderate potential to support roosting bats. T7.2 is shallow and is considered to have low roosting potential. T7.3 is superficial, while T7.4 extends roughly 5cm upwards and downwards. Both are very cluttered, and as such T7.4 is considered to have low roosting potential. No evidence of roosting bats was observed in any of the features.



T8 is the next mature pedunculate oak in the line of scrub, heading south. It is approximately 12m in height and has a DBH of 1.0m. The tree features a broken branch at approximately 5m on its eastern aspect (T8.1), and during the GLTA deadwood at 3m on its north-western aspect (T8.2) was recorded. However, the dead branch forming T8.2 had broken off at the time of the aerial tree assessment, leaving a superficial open wound. All features were found to be superficial upon inspection, and all are considered to contain negligible roosting potential.

T9 is the next mature pedunculate oak in the line of trees and scrub, heading south. It is approximately 7m in height and has a DBH of 0.5m. The tree features a hollow branch cavity on its western aspect at a height of 3m (T9.1). This cavity extends inwards 5 – 10cm, however the feature is very cluttered and unlikely to be used by a roosting bat. As such, this feature is considered to have low potential to support roosting bats. No evidence of roosting bats was observed in the feature.

T10 is the next mature pedunculate oak in the line of trees and scrub, heading south. It is approximately 15m in height with a DBH of 1.0m. The tree contains a total of 16 PRFs across all aspects, of which four are considered to have negligible roosting potential, eight are considered to have low roosting potential, and four are considered to have moderate roosting potential. The features are a combination of branch cavities, callus rolls, tear outs and a large trunk cavity. All features could be fully inspected other than the large basal trunk cavity on the tree's southern aspect (T10.4), one entrance of which branches into multiple features and thus cannot be fully inspected by endoscope. As such, the tree was subject to two presence / absence surveys. No evidence of roosting bats was observed in any of the features.

T11 is the next mature pedunculate oak in the line of trees and scrub, heading south. It is approximately 13m in height with a DBH of 0.8m. PRFs include a callus roll 5m from ground level on an upward-facing branch on the tree's south-western aspect (T11.1), a crack in deadwood at 5m on the eastern aspect (T11.2), and a cavity created by a lost limb at a height of 6m on the north-western aspect (T11.3). T11.1 extends inwards 5cm and is considered to have low roosting potential, while T11.3 extends in 35cm and is considered to have moderate roosting potential; however evidence of nesting birds is present in T11.3 and no evidence of roosting bats was observed in either feature. T11.2 was found to be superficial upon inspection and has negligible roosting potential.

T12 is the southernmost pedunculate oak in the line of trees and scrub. It is approximately 13m tall with a DBH of 0.8m. The tree features a knot hole on a branch elbow at a height of 4m on the tree's north-eastern aspect (T12.1). This feature was found to be superficial upon inspection, and is considered to have negligible potential to support roosting bats.

T14 is a mature pedunculate oak in the dense scrub on the eastern side of the lorry park. It is approximately 15m in height with a DBH of 0.8m. The tree features a tear out at 3.5m on its western aspect (T14.1), an adjacent callus roll, a stem cavity at 8m on the tree's northern aspect (T14.2), deadwood at 5m on its southern aspect (T14.3), and peeling bark at 5m on the north-eastern aspect (T14.4). T14.1 was found to lead to only a small cavity, and is considered to have low potential to support roosting bats. T14.2 extends downwards approximately 50cm, but is open at the top and features multiple entrance points, and is thus subject to rain and light ingress and considered to contain low roosting potential. T14.4 leads to a small PRF, and is likewise considered to have low roosting potential. T14.3 was found to contain no suitable features upon inspection. No evidence of roosting bats was observed in any of the features.

T15 is a mature pedunculate oak in the dense scrub on the eastern side of the lorry park. It is approximately 17m in height with a DBH of 0.8m. The tree features light ivy cover (T15.1),

exposed heartwood on the southern aspect of its trunk at a height of 7m (T15.2), a tear-out at 6m on its western aspect (T15.3), fissures in a split branch at 4m on the south-western aspect (T15.4), and a stem cavity at 2m on its northern aspect (T15.5). T15.2 was found to be superficial upon inspection and was heavily cluttered by ivy, and as such is considered to have negligible potential to support roosting bats. The ivy cover on the tree becomes sparse above approximately 6m in height and is considered to provide low roosting potential. T15.4 extends inwards for approximately 20cm and tapers until it becomes too narrow to provide a suitable PRF, and is thus considered to have low roosting potential. Bird droppings were seen in this feature. T15.3 and T15.5 both extend inwards for around 40cm, but both feature upward-facing entrances and are thus relatively exposed, as well as subject to clutter from ivy and hawthorn scrub. These features are considered to contain moderate roosting potential. No evidence of roosting bats was observed in any of the features present.

T34 is a mature pedunculate oak found in the small stand of broadleaved woodland which stretches around Pond 2 in the south-eastern section of the site. It is approximately 20m in height with a DBH of 1.0m. This tree features deadwood at 3m on its northern aspect (T34.3) and at 7m on both its northern and southern aspects (T34.1 & T34.2 respectively). All features were found to be exposed and upward-facing upon close inspection, and are considered to have negligible potential to support roosting bats.

T35 is a mature pedunculate oak found in the broadleaved woodland which stretches around a large pond in the south-east of the site. It is approximately 20m in height with a DBH of 1.0m. It has a stem cavity at 3.5m on its southern aspect (T35.1), and deadwood on the trunk at 4m, 7m and 8m on its western (T35.4), eastern (T35.3), and southern (T35.2) aspects respectively, and a knothole and deadwood on a western branch at 10m (T35.5). T35.2 and T35.4 were found to contain no suitable cavities upon inspection, and are considered to have negligible potential to support roosting bats. T35.1 has a 25cm diameter and extends upwards approximately 30cm, and bird droppings were observed inside. T35.3 likewise has a 25cm diameter and extends inwards at least 1.5m. T35.5 features a cavity which extends inwards 70cm and was found to contain an old bird nest. These features are considered to have high roosting potential. However, no evidence of roosting bats was observed in any of the features present.

T45 is a mature crack willow found on an island around Pond 2 in the southern section of the site. It is approximately 16m in height with a DBH of 1m. This tree cannot be fully inspected due to its position, although missing bark can be observed on its eastern aspect at a height of around 10m, possibly indicating a cavity underneath (T45.1). As a precaution, this tree was assessed as having moderate potential to support roosting bats and was subject to two presence / absence surveys.

See also Appendix 2 – Survey results and Appendix 3 – Photographs.



3.3 Emergence and re-entry surveys

Table 3 – Survey results

DATE	SURVEY TYPE	SPECIES	NUMBER OF INDIVIDUALS	ROOST LOCATION	ACCESS POINT	TIMINGS
30/08/22	Re-entry (focusing on T3, T6, T35 & T45)	None	N/A	N/A	N/A	N/A
14/09/22	Emergence (focusing on T10)	None	N/A	N/A	N/A	N/A
26/09/22	Emergence (focusing on T3, T6, T7, T10, T35 & T45)	None	N/A	N/A	N/A	N/A

3.4 Activity summary

Table 4 – Bat activity summary

DATE	SURVEY TYPE	SPECIES	NOTES
30/08/22	Re-entry	Soprano pipistrelle	A moderate level of soprano pipistrelle foraging activity was recorded near T35 and T45, while activity near the other surveyed trees was low.
		<i>Myotis</i> sp.	A low level of <i>Myotis</i> sp. activity was recorded near T35 and T45.
14/09/22	Emergence	N/A	No activity recorded.
26/09/22	Emergence	Soprano pipistrelle	A low level of soprano pipistrelle activity was recorded around T6, T7, T35 and T45.
		<i>Myotis</i> sp.	A single <i>Myotis</i> sp. pass was recorded near T45.

4 EVALUATION AND RECOMMENDATIONS

4.1 Evaluation of results

The site provides largely moderate quality habitat for foraging and commuting bats, with smaller areas of high-quality and low-quality habitat. The presence of the numerous ponds, small stands of woodland, hedgerows, semi-improved and unimproved grassland and dense scrub will provide foraging and commuting opportunities.

See Table 5 below for a summary of the potential of the trees on site that could be impacted by the works to support roosting bats. This is based on the results of the ground level tree assessment and the subsequent aerial inspections and bat presence / absence surveys.

PRFs identified on T8, T12 and T34 during the ground-level tree assessments were initially assessed as having moderate potential to support roosting bats, but were downgraded to negligible following closer inspection during aerial assessments. The PRFs present on T1, T9 and T14 were downgraded from moderate to low potential, while those on T7 were downgraded from high to moderate roosting potential.

Table 5 – Summary of bat roosting potential of the trees that have the potential to be adversely impacted by the proposed development

Negligible	Low	Moderate	High
T2, T8, T12, T16, T34	T1, T4, T9, T13, T14, T36, T37, T38 T39, G1	T3, T7, T11, T15, T45	T6, T10, T35

A minimum of two species of bat were recorded during the bat presence / absence survey: soprano pipistrelle and at least one *Myotis* species. Activity was highest around T35 and T45, while activity in the vicinity of the other trees was low. Soprano pipistrelles accounted for the majority of recorded activity in both surveys where bats were recorded.

No roosting bats nor any evidence of roosting bats were recorded in any of the trees on site during the ground level tree inspections, aerial tree inspections or presence / absence surveys.

4.2 Mitigation and compensation measures

4.2.1 Mitigation

As per BCT guidelines, no further surveys are required of any trees assessed as having low potential to support roosting bats. However, if any trees assessed as having low potential to support roosting bats are to be felled or subject to arboricultural works, soft felling techniques should be implemented. This involves felling the tree or removing large branches in sections, any of which that contain potential roosting features will be lowered to the ground and left for a period of 24 hours with the cavity entrance facing upwards before removing them from the site. Alternatively, where possible, a licenced ecologist can undertake a pre-commencement aerial inspection to confirm the absence of roosting bats prior to the felling works.

Although no bats were found to be roosting within the trees assessed as having moderate and high potential, bats use tree roosts in a very transient way and their remains some, albeit very low potential for bats to use the trees in the future and at the time of the felling and arboricultural works. As such, any trees assessed as having moderate or high potential to support roosting bats should also be subject to soft-felling techniques or a pre-commencement inspection (where possible) as detailed above.



Trees T2, T8, T12, T16 and T34 have been assessed as having negligible potential to support roosting bats and as such the felling of these trees will have no direct impact on bats or bat roosts. These can be felled or subject to arboricultural works without restriction, with regards to bats.

Table 6 – Summary of further action required for surveyed trees

To be felled	
Fell without restriction	Soft-felling or pre-commencement inspection
T2, T8, T12, T16, T34	T1, T3, T4, T6, T7, T9, T10, T11, T13, T14, T15, T35 T36, T37, T38, T39, T45, G1

4.2.2 Compensation and enhancement

Bat boxes should be provided as part of the development, to compensate for the loss of roosting habitat within the trees that are to be removed and to further enhance the roosting habitats on site. Bat boxes can be affixed to trees that are to be retained on site and the exact number and specification can be detailed in a Landscape and Ecological Management Plan (LEMP) which can be secured through a suitability worded planning condition.

The bat boxes should be fitted at a height of 4-6 metres on a southerly aspect, with no clutter around the entrance by surrounding branches. External lighting must be directed away from installed bat boxes, as well as tree lines ponds, woodland and any other retained or newly created habitat, so that nocturnal wildlife is not deterred from using the site. For more information, see Appendix 4 – External lighting guidance.

4.2.3 Nesting birds

A detailed nesting bird check was not conducted, although evidence of nesting birds was incidentally recorded in several of the trees during aerial tree assessments. Additionally, numerous other habitats on site provide suitable nesting opportunities for birds including dense scrub, hedgerows, trees, ponds, ditches, areas of rough grassland and building. As such, it is recommended that the vegetation clearance, building demolition, tree felling and arboricultural works, take place outside of the breeding bird season and should not be undertaken from March to August inclusive. If this is not possible and works need to take place during this period, a breeding bird nest survey should be undertaken prior to the commencement of works by a suitably experienced ecologist and an ecological clerk of works appointed to oversee the works if considered necessary.



5 CONCLUSION

The site provides mostly moderate quality habitat for foraging and commuting bats in the form of scrub and rough grassland, with smaller areas of high-quality habitat (small stands of woodland and ponds) and low-quality habitat (hardstanding and amenity grassland).

Following the completion of the ground level assessment, aerial inspection and bat presence / absence surveys, three of the trees on site that have the potential to be adversely impacted by the proposed development are considered to have high potential to support roosting bats. Five trees were assessed as having moderate potential and ten as having low potential. All other trees that are due to be impacted have been assessed as having negligible roosting potential, including five trees that initially appeared to have potential roosting features when viewed from ground level, but were found to be unsuitable when viewed closely as part of the aerial inspection.

Despite this, no field signs of bats, such as droppings, were found during the ground level or aerial tree inspections. Furthermore, no bats were recorded roosting in any of the trees on site during the presence / absence surveys.

Soft felling techniques or a pre-commencement inspection by a licensed ecologist (where possible) should be undertaken of the eighteen trees assessed as having low, moderate or high potential to support roosting bats, as detailed in section 4.2.1 of this report. Compensation for the loss of roosting opportunities can be provided through the provision of bat boxes as detailed in section 4.2.2.

Due to the potential presence of nesting birds on site, it is recommended that the vegetation clearance, building demolition, tree felling and arboricultural works, take place outside of the breeding bird season and should not be undertaken from March to August inclusive. If this is not possible and works need to take place during this period, a breeding bird nest survey should be undertaken prior to the commencement of works by a suitably experienced ecologist and an ecological clerk of works appointed to oversee the works if considered necessary.



6 REFERENCES

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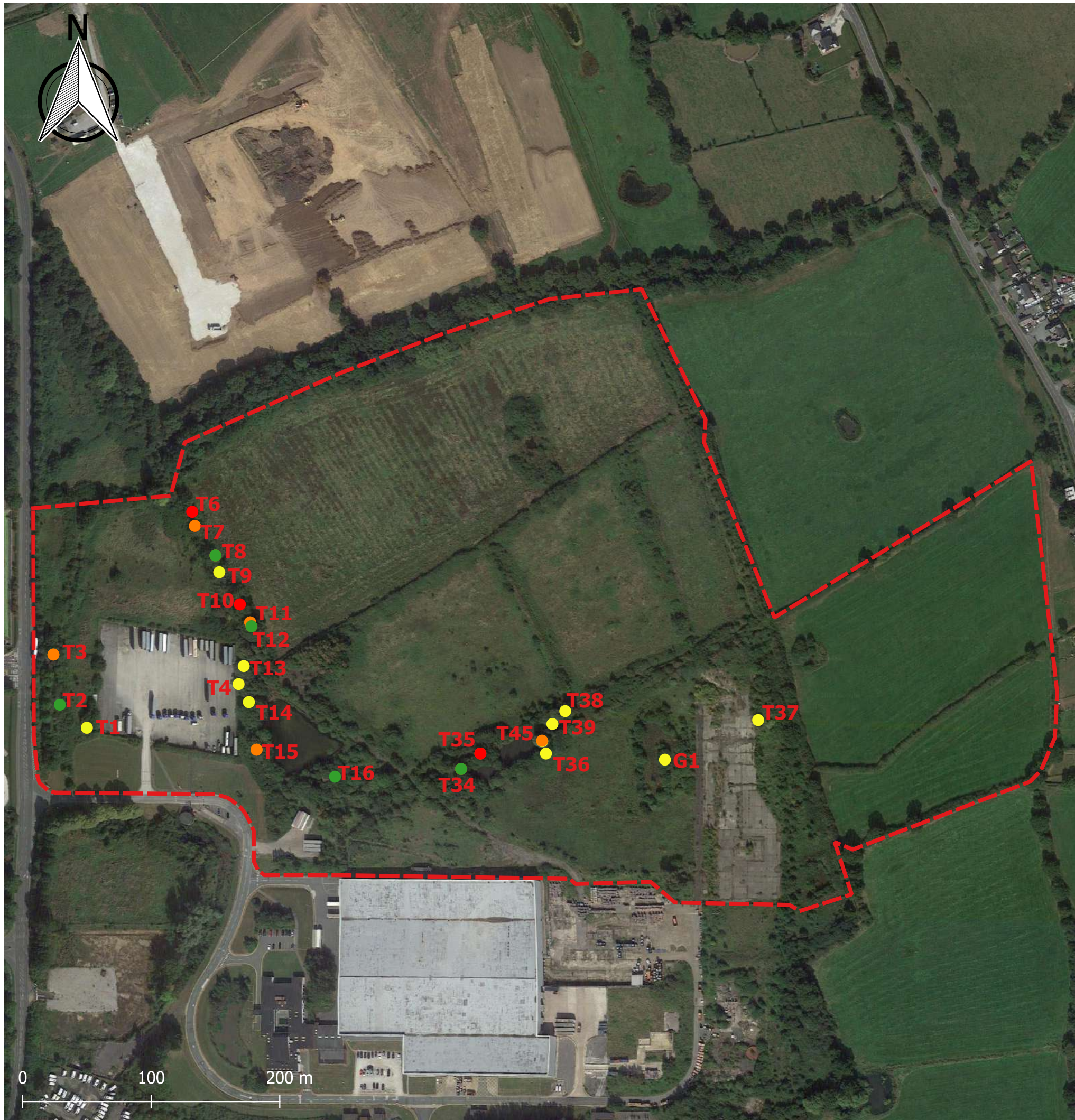
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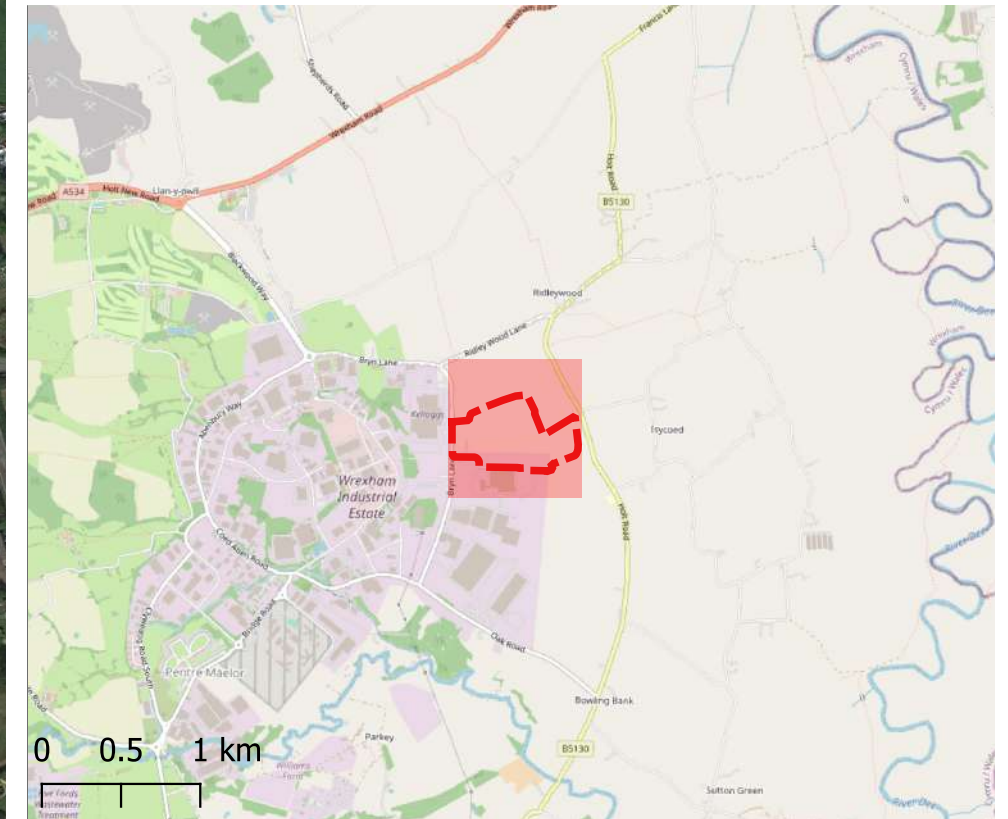
APPENDICES

Appendix 1 – Site plan



Aerial Tree Assessment

Site: Plot 3A, Wrexham
NGR: SJ 39272 50416
Author: Robert Mooney
Date: 10/10/2022



KEY:

--- Development Boundary
 Bat Roosting Potential

- High
- Moderate
- Low
- Negligible

Map data © 2022 Google, Imagery © 2022 Google

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Appendix 2 – Aerial inspection results

Appendix 1 - Survey results

Site: Plot 3A, Wrexham Industrial Estate Job no: UES03448/16

Date: 11/10/2022

Surveyors: Toby Hart, Mark Halliwell, Alasdair Grubb, Daniel Smith, Robert Mooney, Noah Fulton

Table 7 – Summary of trees subject to aerial inspection or aerial climbing inspection

Tree number / GPS	Species	Age class	Height (m) / DBH	Description of PRF(s) & position in tree	BCT Cat. (N/L/M/H)	Surrounding habitat context	All aspects of tree seen? Y/N	Climbable (only if qualified)	Photo no.	Notes from inspection of PRF(s)
T1	N/A	Dead	3/0.7	Fissures running up whole height of stem on the western aspect. Knot hole at 2.5m on the western aspect. Single rot hole on the western aspect and two on eastern aspect, all at ~2.5m.	L	Tree located within dense bramble scrub. Very cluttered, but good connectivity to other woodland and standing water habitats nearby.	Y	N	1-5	Rot holes found to be shallow and relatively exposed upon close inspection.
T3 / SJ38986 50366	Pedunculate oak <i>Quercus robur</i>	Mature	14/0.5	Basal stem cavity on western aspect. Tear-out at 8m on eastern aspect. Branch cavity at 8m on northern aspect. Callus roll at 4m on southern aspect.	M	One of a line of trees near the site's western boundary between a road and dense scrub along a watercourse.	Y	Y	6-9	Unable to fully inspect the basal stem cavity as it extends beyond the reach of endoscope, presence / absence surveys required. Tear-out is superficial. Branch cavity is upward-facing and exposed.
T6 / SJ39094 50477	Pedunculate oak <i>Quercus robur</i>	Mature	9 / 0.8	Tear outs at ~2.5m and ~4m on western aspect, at 5m on northern aspect, and 4.5m on north-western	H	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	10-14	Tear-out on north-western aspect cannot be fully inspected by endoscope. presence / absence surveys required.

				aspect. Flaking bark on main stem.						
T7 / SJ39096 50466	Peduncul ate oak <i>Quercus robur</i>	Mature	9 / 1	Large callus roll on south-eastern aspect from ground level. Lifted bark on southern aspect at ~2m. 2 branch cavities at 2m on southern aspect.	H	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	15-17	
T8 / SJ39112 50443	Peduncul ate oak <i>Quercus robur</i>	Mature	12 / 1	Broken branch at ~5m on eastern aspect. Wound at 3m on north-western aspect	N	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	18-19	Wound on north-western aspect left by deadwood recorded in GLTA, which has since snapped off. All features superficial upon inspection.
T9 / SJ39115 50430	Peduncul ate oak <i>Quercus robur</i>	Mature	7 / 0.5	Branch cavity at ~3m on western aspect	L	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	20-21	Feature is highly cluttered.
T10 / SJ39131 50405	Peduncul ate oak <i>Quercus robur</i>	Mature	15 / 1	16 PRFs in total across all aspects consisting of branch cavities, callus rolls, tear outs and a large basal trunk cavity.	H	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	22-36	Basal trunk cavity cannot be fully inspected by endoscope, presence / absence surveys required.

T11 / SJ 39139 50391	Peduncul ate oak <i>Quercus robur</i>	Mature	13 / 0/8	Callus roll at ~5m on north-western aspect. Crack by deadwood at ~5m on eastern aspect. Knot hole cavity at 6m on south- western aspect.	M	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	37-40	Evidence of nesting birds in trunk cavity.
T12 / SJ39240 50388	Peduncul ate oak <i>Quercus robur</i>	Mature	13 / 0.8	Knot hole on a branch elbow at ~4m on north- eastern aspect	N	One of a line of oaks within an area of dense scrub running between two areas of semi-improved grassland.	Y	Y	41-42	Feature is superficial.
T14 / SJ39144 50292	Peduncul ate oak <i>Quercus robur</i>	Mature	15 / 0.8	Tear out at ~3.5m on western aspect with adjacent callus roll. Stem cavity at 8m on northern aspect. Deadwood at centre of crown at 5m on southern aspect. Peeling bark at 5m on north-eastern aspect.	L	Within dense scrub between hardstanding and pond. Cluttered.	Y	Y	43-45	Stem cavity is open and exposed. Deadwood at crown contains no features.
T15 / SJ30144 50292	Peduncul ate oak <i>Quercus robur</i>	Mature	17 / 0.8	Light ivy cover on stem. Exposed heartwood at ~7m	M	Within blackthorn thicket in dense scrub between hardstanding and pond.	Y	Y	46-50	Bird droppings recorded in split branch.

				on southern aspect. Callus roll at 6m on western aspect. Fissures in split branch a 4m on south-western aspect. Stem cavity at 2m on northern aspect.						
T34 / SJ39303 50277	Peduncul ate <i>Quercus robur</i>	Mature	20 / 1	Deadwood at 3m on northern aspect, and at ~7m on both the northern and southern aspects.	N	Within broadleaved woodland surrounding large pond.	Y	Y	51-54	All features are upward-facing and very exposed.
T35 / SJ39303 50277	Peduncul ate oak <i>Quercus robur</i>	Mature	20 / 1	Stem cavity at ~3.5 on southern aspect. Deadwood at 7m on eastern aspect, 8m on the southern aspects and at 4m on the western aspect. Knot hole with associated deadwood on a western-leaning limb at ~10m.	H	Within broadleaved woodland surrounding Pond 2.	Y	Y	55-60	Bird droppings recorded in stem cavity on southern aspect. Deadwood on western and southern aspects contain no suitable cavities. Bird nest observed in knot hole on western aspect. Cavity associated with deadwood on eastern aspect cannot be fully inspected, presence / absence surveys required.
T45 / SJ 39366 50299	Crack willow <i>Salix</i> × <i>fragilis</i>	Mature	16 / 1	Missing bark at 10m on eastern aspect.	M	On an island in Pond 2, surrounded by broadleaved woodland.	Y	N	61-62	Tree unable to be fully inspected due to inaccessibility. Bat presence/absence survey undertaken.

Table 8 – Summary of PRFs found

Tree ID	PRF number	PRF type	Aspect	Height (m)	Distance from main stem (m)	Clutter	Entrance orientation	Size of entrance (cm)	Evidence	Roost potential (N/L/M/H)	Photo no.
T1	T1.1	Fissure	W	0-2.5	0	Bramble scrub up to ~1.5m	Horizontal	5	None	L	2
	T1.2	Knot Hole	W	~2.8	0	None	Upwards, diagonal	10x10	None	L	3
	T1.3	Rot hole	W	~2.9	0	None	Upwards-diagonal	5x5	None	L	4
	T1.4	Rot hole	E	2.5	0	Willow and bramble scrub	Horizontal	5x5	None	L	5
	T1.5	Rot hole	E	2.5	0	Willow and bramble scrub	Horizontal	5x5	None	L	N/A
	T1.6	Flaking bark	N	1.5	0	Willow and bramble scrub	Horizontal	N/A	None	N	N/A
T3	T3.1	Basal stem cavity	W	0~1.5	0	None	Vertical, pointing downwards	8x8	None	M	6
	T3.2	Tear-out	E	~8	0	None	N/A	N/A	None	N	7
	T3.3	Branch cavity	N	~8	0	None	Upwards	N/A	None	L	8
	T3.4	Callus-roll	S	4	0	None	Horizontal	N/A	None	M	9
T6	T6.1	Tear-out	W	~2.5	0.5	Scrub up to ~2m	Upwards-diagonal	N/A	None	M	11
	T6.2	Tear-out	W	4	1	None	Vertical, pointing upwards	N/A	None	L	12



T6	T6.3	Tear-out	N	5	2	None	N/A	N/A	None	L	13
	T6.4	Tear-out	N-W	4.5	1	None	N/A (multiple entrances)	N/A	None	H	14
T7	T7.1	Callus-roll	S-E	0~4	0	Branches, ivy	Horizontal	10	None	M	15
	T7.2	Lifted bark	S	2	0	Branches, ivy	N/A	N/A	None	L	N/A
	T7.3	Branch cavity	S	2	0	Branches, ivy	Horizontal	N/A	None	N	16
	T7.4	Branch cavity	S	2	0	Branches, ivy	Horizontal	N/A	None	L	17
T8	T8.1	Branch cavity	W	5	1	None	Horizontal	10x10	None	N	N/A
	T8.2	Deadwood	N-W	3	0	None	N/A	N/A	None	N	19
T9	T9.1	Branch cavity	W	3	2	None	Horizontal	10x100	None	N	21
T10	T10.1	Branch cavity/loose bark	W	6	2	None	N/A	N/A	None	L	22
	T10.2	Knot-hole	S	12	4	None	Horizontal	10x10	None	N	23
	T10.3	Tear-out	N	6	3	Branches	Horizontal	10x5	None	N	24
	T10.4	Basal stem cavity	S	0	0	Scrub	N/A	10x15, 10x5	None	M	25
	T10.5	Fissure in snapped branch	S	4	2	None	N/A	8x4	None	L	26
	T10.6	Flaking bark	S	10	0.5	Ivy	Horizontal	10x5	None	L	27



T10	T10.7	Cavity associated with dead branch	S	9.5	0	None	Downwards, diagonal	8x4	None	M	28
	T10.8	Cavity associated with dead branch	S	9.5	0	None	Downwards, diagonal	8x4	None	M	28
	T10.9	Deadwood	S-E	9.6	0	None	Horizontal	10x10	None	M	29
	T10.10	Raised bark	S	10.5	0	Ivy	Upwards, diagonal	10x5	None	L	30
	T10.11	Branch fissure	S	10.5	0.5	Ivy	Upwards, diagonal	5x5	None	L	31
	T10.12	Tear-out	W	10	0.5	None	Horizontal	10x10	None	L	32
	T10.13	Branch cavity	W	10	1	Ivy, brambles	Upwards	10x10	None	L	33
	T10.14	Flaking bark	W	7	2	Ivy	Horizontal	15x5	None	L	34
	T10.15	Callus-roll	N	9	4	None	Downwards	N/A	None	N	35
	T10.16	Hazard beam	N-E	6	6	None	Horizontal	10x10	None	N	36
T11	T11.1	Callus-roll	S-W	5	2	None	All	150x15	None	L	38
	T11.2	Branch cavity	E	5	1	None	N/A	N/A	None	N	39
	T11.3	Knot-hole	N-W	6	0	None	N/A	N/A	None	M	40
T12	T12.1	Knot-hole	N-E	4	3	None	Horizontal	15x20	None	N	42
T14	T14.1	Tear-out	W	3.5	0	Ivy	N/A	N/A	None	L	44



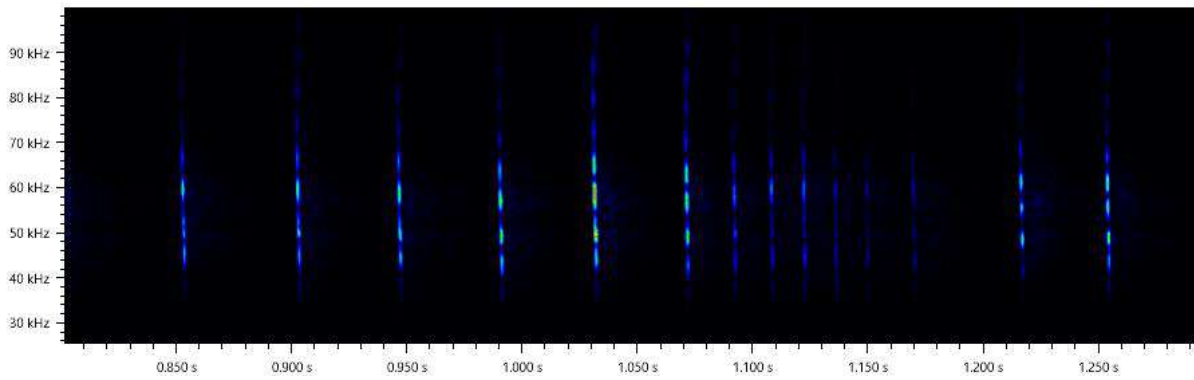
T14	T14.2	Stem cavity	N	8	0	Bramble scrub	N/A	N/A	None	L	45
	T14.3	Deadwood	S	5	0-1	None	N/A	N/A	None	N	43
	T14.4	Flaking bark	N-E	5	0	None	N/A	N/A	None	L	N/A
T15	T15.1	Ivy cover	All	0-12	0	Branches, scrub from 0~2m	N/A	N/A	None	L	46
	T15.2	Exposed heartwood	N	8	0	Ivy, branches	N/A	N/A	None	N	47
	T15.3	Tear-out	W	6	0	Ivy	Upwards diagonal	3x5	None	M	48
	T15.4	Branch fissure	S-W	4	1	Ivy	Horizontal	5x5	None	L	49
	T15.5	Trunk cavity	N	2	0	Ivy, hawthorn	Upwards	5x5	None	M	50
T34	T34.1	Deadwood	N	7	0-1.5	Scrub	N/A	N/A	None	N	52
	T34.2	Deadwood	S	7	0-1.5	None	N/A	N/A	None	N	53
	T34.3	Deadwood	N	3	0-1	None	N/A	N/A	None	N	54
T35	T35.1	Stem cavity	S	3.5	0	Ivy	N/A	N/A	None	H	56
	T35.2	Deadwood	8	S	0-0.5	None	N/A	N/A	None	N	57
	T35.3	Cavity created by snapped limb	7	E	0-1	None	N/A	N/A	None	H	58
	T35.4	Deadwood	4	W	0-1	Ivy	N/A	N/A	None	N	59



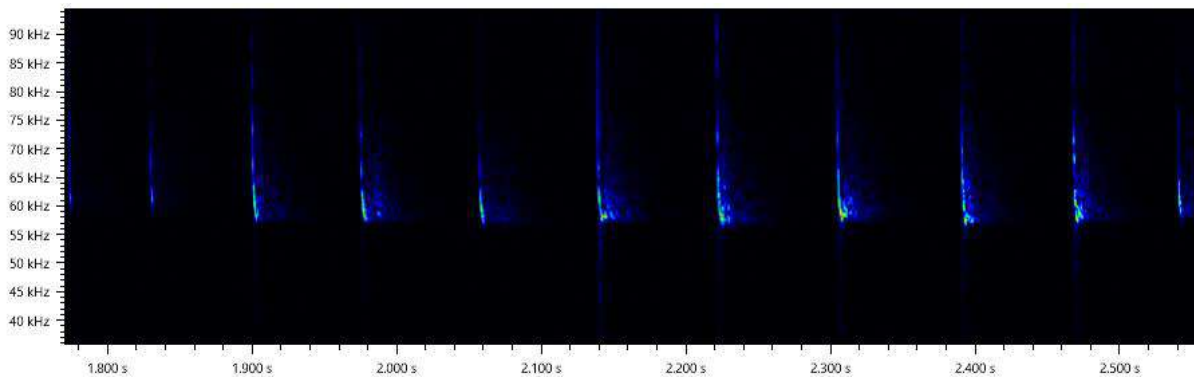
T35	T35.5	Deadwood + knot-hole	10	W	2-2.5	None	N/A	N/A	None	H	60
T45	T45.1	Missing bark (possible stem cavity)	10	E	0	None	N/A	N/A	None	M	62



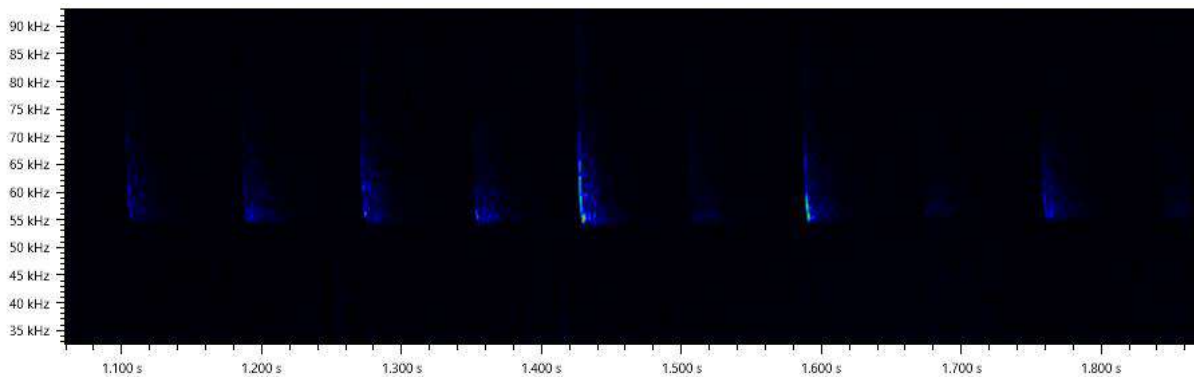
Appendix 3 – Presence / absence survey results



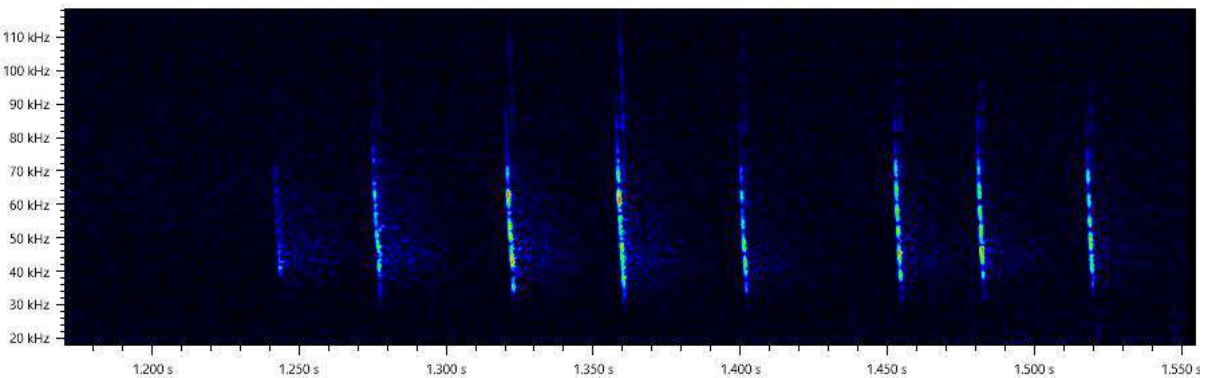
Sonogram 1 – *Myotis* sp. echolocation calls recorded at 04:52 on 30th August 2022.



Sonogram 2 – Soprano pipistrelle echolocation calls recorded at 05:02 on 30th August 2022.



Sonogram 3 – Soprano pipistrelle echolocation calls recorded at 19:42 on 26th September 2022.



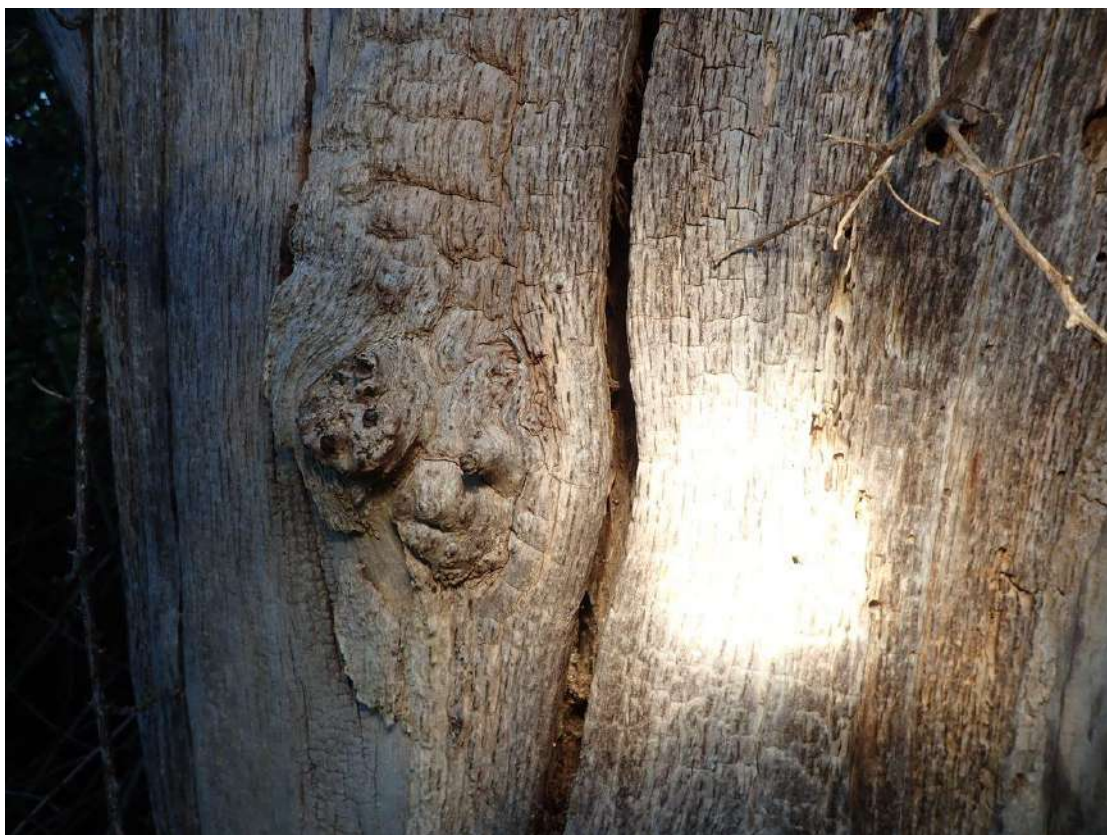
Sonogram 4 - *Myotis* sp. echolocation calls recorded at 20:09 on 26th September 2022.



Appendix 4 – Photographs



Photograph 1 – T1



Photograph 2 – T1 showing trunk fissure (T1.1).



Photograph 3 – T1 showing knot-hole (T1.2).



Photograph 4 – T1 showing rot-hole (T1.3).



Photograph 5 – T1 showing rot-hole (T1.4).



Photograph 6 – T3 showing basal stem cavity.



Photograph 7 – T3 showing tear-out (T3.2).



Photograph 8 – T3 showing upward-facing branch cavity (T3.3).



Photograph 9 – T3 showing callus-roll (T3.4).



Photograph 10 – The crown of T6.



Photograph 11 – T6 showing entrances to T6.1.



Photograph 12 – T6 showing tear-out (T6.2).



Photograph 13 – T6 showing tear-out (T6.3).



Photograph 14 – T6 showing tear-out (T6.4)



Photograph 15 – T7 showing callus roll and ivy cover.



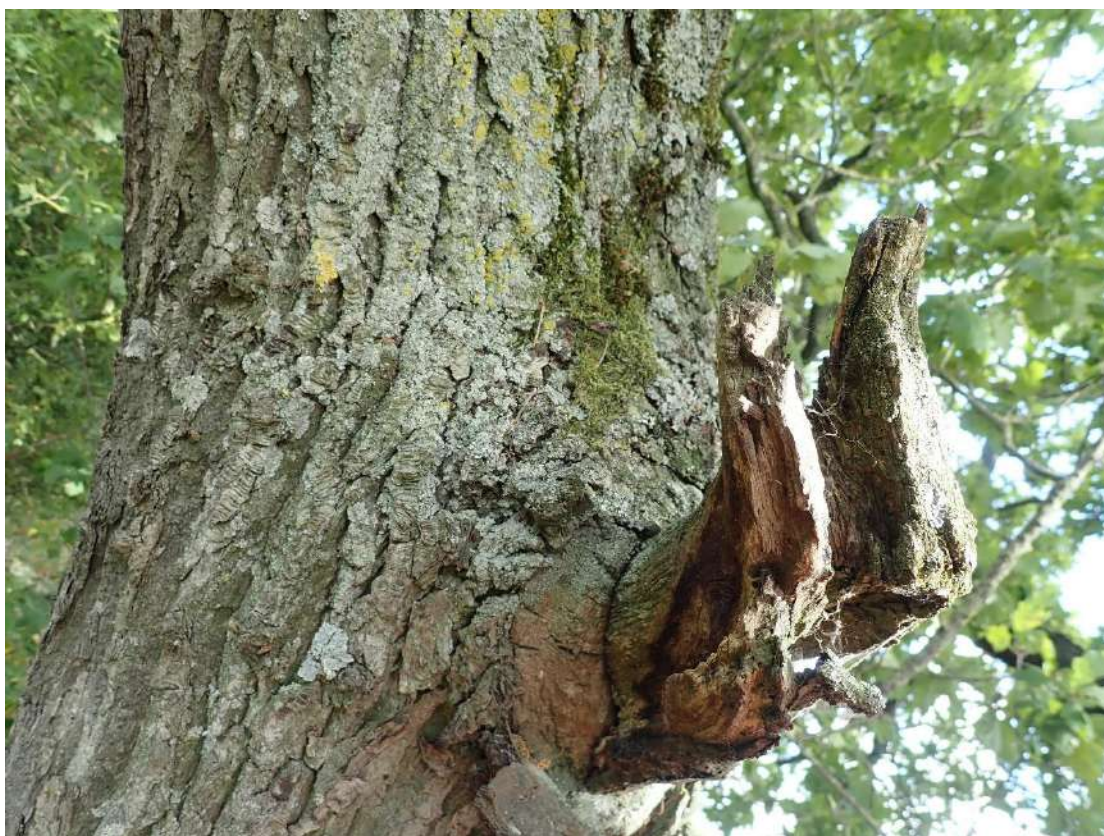
Photograph 16 – T7 showing branch cavity (T7.3).



Photograph 17 – T7 showing branch cavity (T7.4).



Photograph 18 – T8.



Photograph 19 – T8 showing superficial wound left by breaking deadwood.



Photograph 20 – The crown of T9.



Photograph 21 – T9 showing lateral branch cavity.



Photograph 22 – T10 showing T10.1.



Photograph 23 – T10 showing knot-hole on horizontal branch (T10.2).



Photograph 24 – T10 showing tear-out on horizontal branch (T10.3).



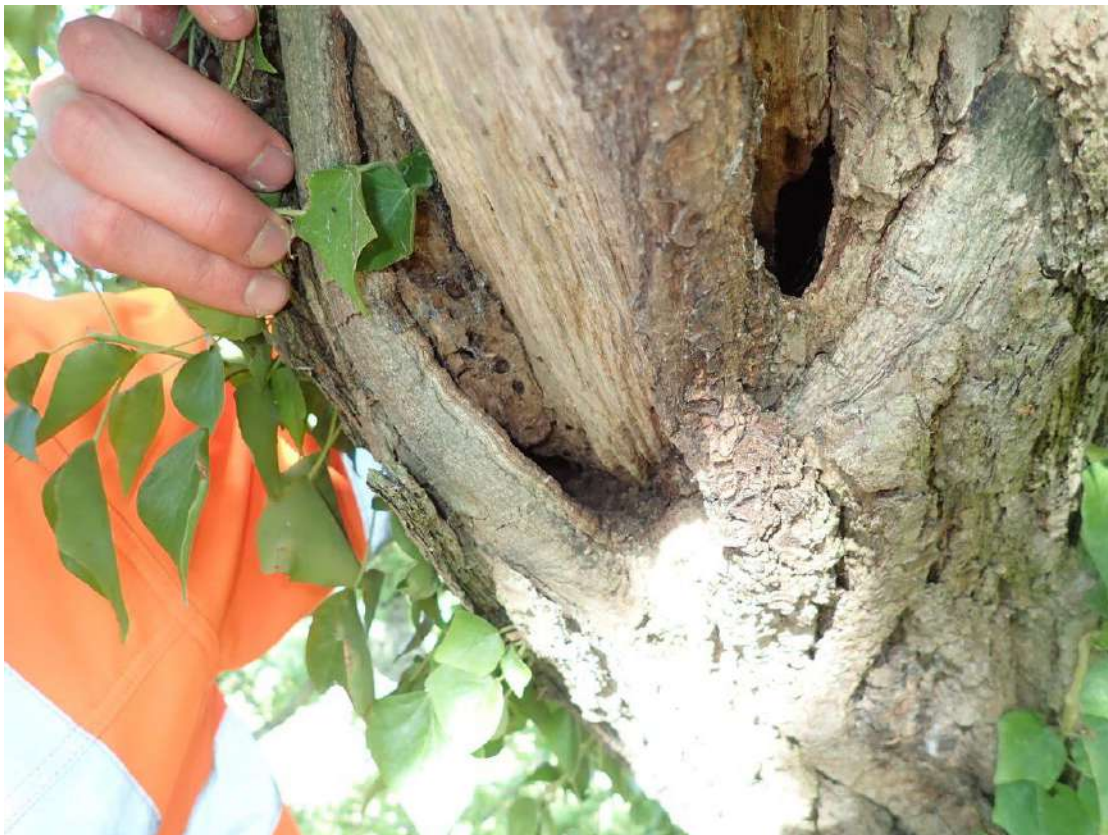
Photograph 25 – T10 showing entrances to basal stem cavity (T10.5).



Photograph 26 – T10 showing fissures in split branch (T10.5).



Photograph 27 – T10 showing flaking bark (T10.6).



Photograph 28 – T10 showing cavities where dead branch meets stem (T10.7 & T10.8).



Photograph 29 – T10 showing cavity where dead branch meets stem (T10.9).



Photograph 30 – T10 showing raised bark (T10.10).



Photograph 31 – T10 showing branch fissure (T10.11).



Photograph 32 – T10 showing tear-out (T10.12).



Photograph 33 – T10 showing branch cavity (T10.13).



Photograph 34 – T10 showing flaking bark (T10.14).



Photograph 35 – T10 showing callus roll (T10.15).



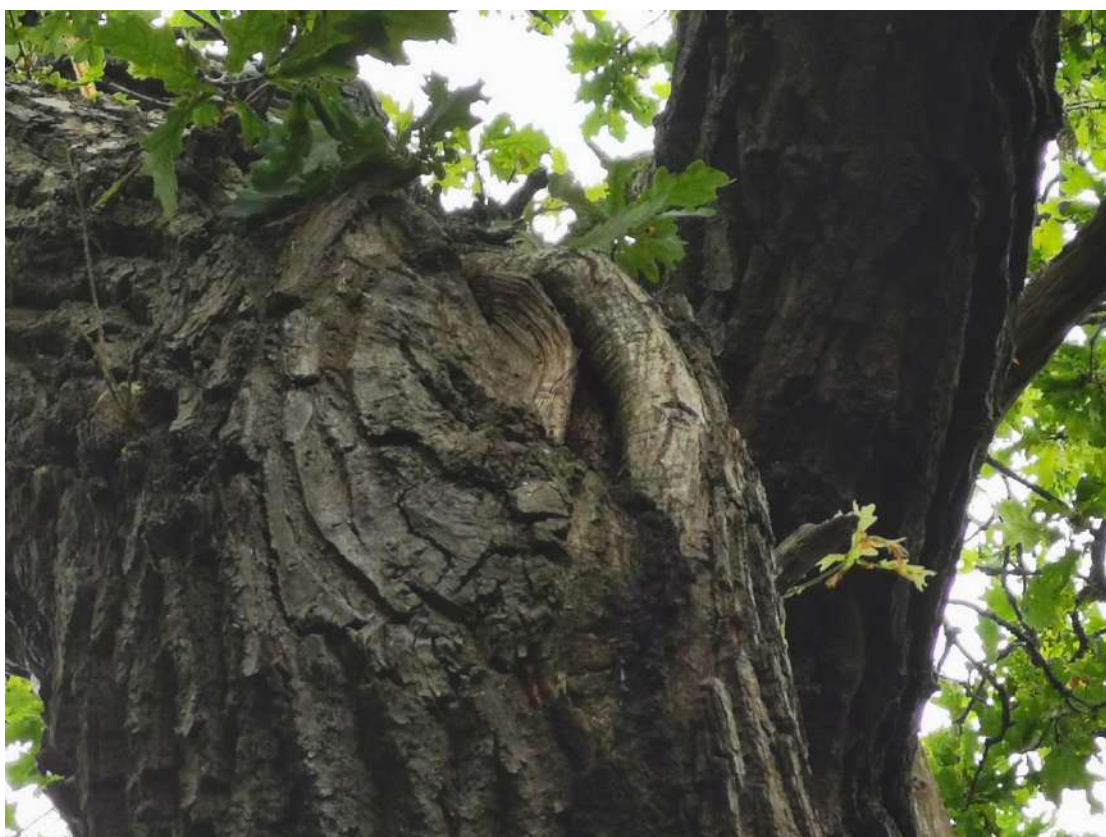
Photograph 36 – T10 showing hazard beam (T10.16).



Photograph 37 – T11.



Photograph 38 – T11 showing vertical callus-roll (T11.1).



Photograph 39 – T11 showing knot-hole (T11.2).



Photograph 40 – T11 showing knot-hole (T11.3).



Photograph 41 – T12.



Photograph 42 – T12 showing knot-hole on branch elbow (T12.1).



Photograph 43 – T14 showing deadwood (T14.3).



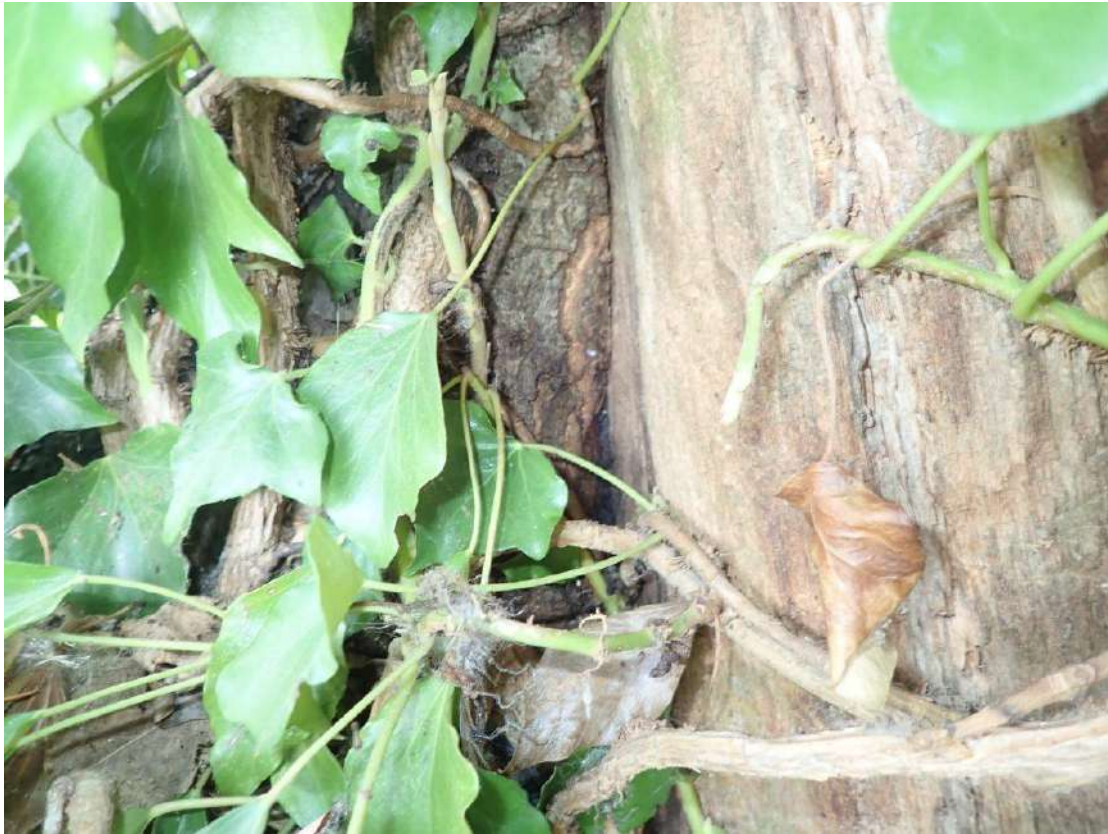
Photograph 44 – T14 showing cluttered vertical tear-out (T14.1).



Photograph 45 – T14 showing stem cavity (T14.2).



Photograph 46 – T15 showing ivy cover on trunk and some limbs (T15.1).



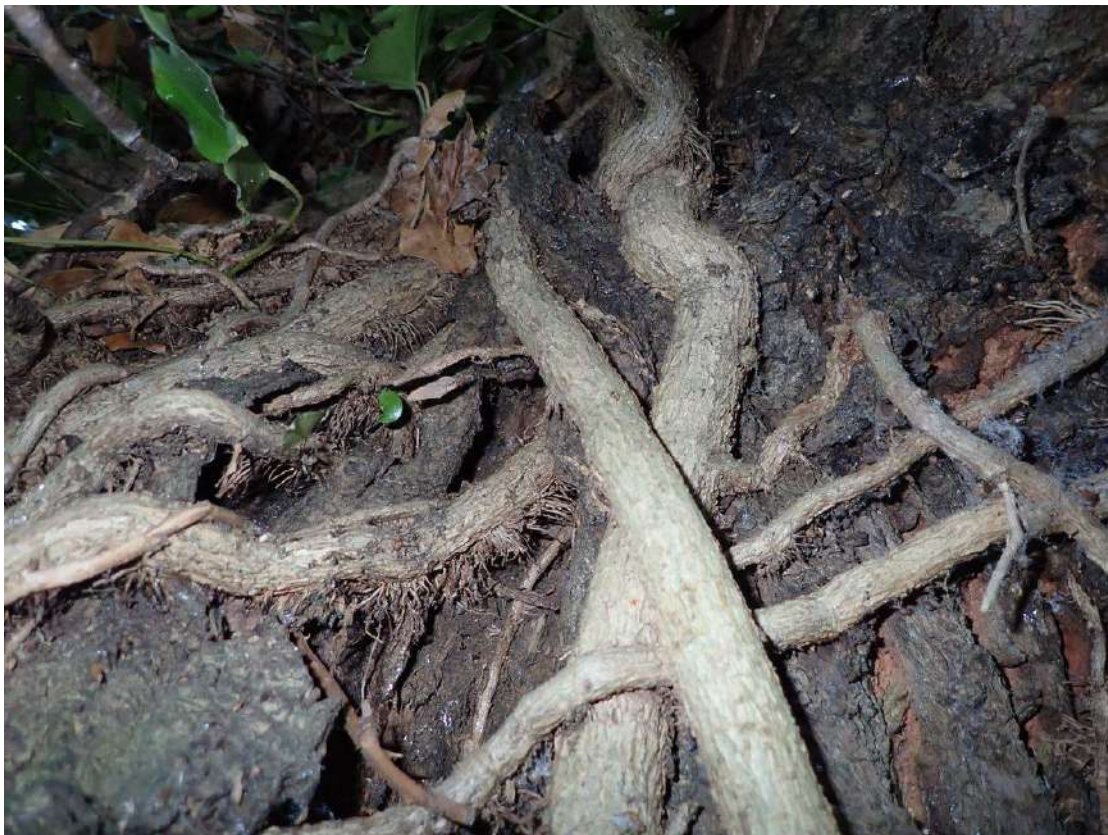
Photograph 47 – T15 showing exposed heartwood (T15.2).



Photograph 48 – T15 showing tear-out (T15.3).



Photograph 49 – T15 showing branch fissure (T15.4).



Photograph 50 – T15 showing trunk cavity (T15.5).



Photograph 51 – T34.



Photograph 52 – T34 showing deadwood on northern aspect (T34.1).



Photograph 53 – T34 showing deadwood on southern aspect (T34.2).



Photograph 54 – T34 showing deadwood on northern aspect (T34.3).



Photograph 55 – T35.



Photograph 56 – T35 showing stem cavity (T35.1).



Photograph 57 – T35 showing deadwood on southern aspect (T35.2).



Photograph 58 – T35 showing deadwood on eastern aspect (T35.3).



Photograph 59 – T35 showing deadwood on western aspect (T35.4).



Photograph 60 – T35 showing deadwood and knot hole on western aspect (T35.5).



Photograph 61 – T45.



Photograph 62 – T45 showing missing bark (T45.1).



Appendix 5 – External lighting guidance

Lighting scheme in relation to bats

The two most important features of street and security lighting with respect to bats are:

1. The UV component. Low or zero UV installations are preferred to reduce attraction of insects to lighting and therefore to reduce the attraction of foraging bats to these areas.
2. Restriction of the area illuminated. Lighting must be shielded to maintain dark areas, particularly above lighting installations, and in many cases, land adjacent to the areas illuminated. The aim is to maintain dark commuting corridors for foraging and commuting bats. Bats avoid well lit areas, and these create barriers for flying bats between roosting and feeding areas.

UV characteristics:

Low

- Low pressure Sodium Lamps (SOX) emit a minimal UV component.
- High pressure Sodium Lamps (SON) emit a small UV component.
- White SON, though low in UV, emit more than regular SON.

High

- Metal Halide lamps emit more UV than SON lamps, but less than Mercury lamps
- Mercury lamps (MBF) emit a high UV component.
- Tungsten Halogen, if unfiltered, emit a high UV component
- Compact Fluorescent (CFL), if unfiltered, emit a high UV component.
- Variable
- Light Emitting Diodes (LEDs) have a range of UV outputs. Variants are available with low or minimal UV output.
- Glass glazing and UV filtering lenses are recommended to reduce UV output.

Street lighting

- Low-pressure sodium or high-pressure sodium must be used instead of mercury or metal halide lamps. LEDs must be specified as low UV. Tungsten halogen and CFL sources must have appropriate UV filtering to reduce UV to low levels.
- Lighting must be directed to where it is needed and light spillage avoided. Hoods must be used on each lamp to direct light and contain spillage. Light leakage into hedgerows and trees must be avoided.
- If possible, the times during which the lighting is on overnight must be limited to provide some dark periods. If the light is fitted with a timer this must be adjusted to reduce the amount of 'lit time' and provide dark periods.

Security and domestic external lighting

The above recommendations concerning UV output and direction apply. In addition:

- Lighting should illuminate only ground floor areas. Light should not leak upwards to illuminate first floor and higher levels.
- Lamps of greater than 2000 lumens (150 W) must not be used.
- Movement or similar sensors must be used. They must be carefully installed and aimed, to reduce the amount of time a light is on each night.
- Light must illuminate only the immediate area required, by using as sharp a downward angle as possible. Light must not be directed at or close to bat roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit.
- Wide angle illumination must be avoided as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.
- Lighting must not illuminate any bat bricks and boxes placed on buildings, trees or other nearby locations.



Appendix 6 – Statutory and planning context

STATUTORY AND PLANNING CONTEXT

Ecological assessments

Ecological assessments play an important part within the planning context; they include an initial assessment which highlights any specific interests of a site. From the initial site assessment, the surveyor assesses the suitability of habitats within the site to support protected species and makes recommendations for further survey works if required. The following paragraphs provide a brief interpretation of the legislative protection that is relevant to the findings of this report.

Habitats

Section 7 of the Environment Act (Wales) places a duty on Welsh Ministers to publish, review and revise lists of types of habitats and species in Wales which they consider are of key significance to sustain and improve biodiversity. The Welsh Ministers must also take all reasonable steps to maintain and enhance the habitats published in these lists, and encourage others to take such steps.

Bats

In the United Kingdom, all species of bat and their roosts are afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (known as the “Habitats Regulations”). The Wildlife and Countryside Act is the domestic implementation of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) and was amended by the Countryside and Rights of Way Act 2000. This makes it an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture a bat
- Deliberately, intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any place that a bat uses for shelter or protection (even if the bat is not present at the time)
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead bat, any part of a bat or anything derived from a bat

Under UK law, a bat roost is *any structure or place which any wild [bat] ... uses for shelter or protection*. As bats often reuse the same roosts, legal opinion is that a roost is protected whether or not the bats are present at the time of the activity taking place.

Penalties for offences include unlimited fines (formerly up to £5000), plus up to six months imprisonment, for each offence committed.

If an activity is likely to result in any of the above offences, a licence can be applied for to derogate from the protection afforded. These licences must provide appropriate mitigation and are issued by NRW.

The Environment (Wales) Act 2016 also lists the following bat species as species of principle importance under Section 7:

- Barbastelle *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*
- Noctule *Nyctalus noctula*
- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Brown long-eared bat *Plecotus auritus*
- Greater horseshoe *Rhinolophus ferrumequinum*
- Lesser horseshoe *Rhinolophus hipposideros*

Birds

All wild birds, their nests and young are protected throughout England and Wales by the Wildlife & Countryside Act 1981 (as amended). It is illegal to kill, injure or take any wild bird, or damage or destroy the nest or eggs of breeding birds. The legislation applies to all bird species, common and rare.

In addition to the protection afforded to all wild birds, more vulnerable species listed on Schedule 1 of the Act receive enhanced protection when breeding. Schedule 1 species, including their dependent young, are protected from intentional or reckless disturbance whilst at or near the nest, in addition to the protection afforded the more common species.

The Environment (Wales) Act 2016 offers further protection to the nests of some species that regularly re-use their nests, even when the nests are not in use.

The leading governmental and non-governmental conservation organisations in the UK have reviewed the population status of 244 UK bird species. "Birds of Conservation Concern 4: the Red List for Birds" is the most recent publication summarising their findings. Three lists, Red, Amber and Green, have been produced based on the most up-to-date evidence available and criteria include conservation status at global and European levels and, within the UK: historical decline, trends in population and range, rarity, localised distribution and international importance. These lists are a valuable resource when considering conservation priorities.

Planning Policy

National planning guidance is issued in the form of Planning Policy Wales (PPW - 2018). The most relevant sections are included in Chapter 6: Distinctive and Natural Places. This chapter details the policies on issues such as the protection of trees, woodlands, species, and designated sites. The document is free and available to view online