



## **St Asaph Flood Risk Management Strategy**

### **Bat Survey Report: Tree Roosts**

August 2016



## ST ASAPH FLOOD RISK MANAGEMENT STRATEGY Bat Survey Report: Tree Roosts

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**Details of document preparation and issue:**

<b>Versi on no.</b>	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Authorised for issue</b>	<b>Issue date</b>	<b>Issue status</b>
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B&V project no. 122488      Client's reference no.

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## 1. INTRODUCTION

### 1.1 Project Brief and Background

Following severe flooding from the River Elwy during November 2012, Natural Resources Wales (NRW) is developing a Flood Risk Management Scheme (FRMS) to reduce flood risk in St Asaph, referred to as the St Asaph FRMS.

The St Asaph FRMS is being delivered as two separate packages with separate planning applications being made to cover each package of work (Package A and B).

The first package (Package A) of the St Asaph FRMS comprised a proposal to replace the Spring Gardens Bridge with a new bridge crossing which does not impede flow on the River Elwy. This planning application was submitted in June 2016. A bat survey report was produced in June 2016 with reference to Spring Garden Bridge (BV, 2016).

A second package (Package B) for planning permission for the St Asaph FRMS is anticipated to be sought in late summer 2016. This package includes all of the main elements of the St Asaph FRMS apart from Package A (i.e. Spring Gardens Bridge replacement) which will be undertaken in advance.

Package B consists of work to provide new, and improve, existing flood defences throughout St Asaph to protect it from flooding from the Afon Elwy.

The work will include a combination of new flood walls, raising and widening of existing embankments, construction of new flood walls on top of existing embankments and a section of new flood embankment. Work will extend along both sides of the River Elwy between Lower Denbigh Road south of New Inn, to Spring Gardens Caravan Park. Works will also include two sections of work downstream of St Asaph, namely a short section of embankment raising at Dol Afon footbridge and low level embankment along Station Road in Rhuddlan.

It is anticipated that, subject to obtaining all relevant consents, the construction of Package B would begin in late 2016 or early 2017.

A bat roost potential survey was conducted on all potentially impacted trees along the St Asaph FRMS in 2015 for both packages (GBV, 2015). With regards to the wider St Asaph FRMS (Package B) three trees were highlighted that had a high bat roost potential and twenty two moderate bat roost potential and the report concluded that *‘– bat activity surveys (dusk emergence / dawn re-entry) should be undertaken to determine the bat status of the remaining (Package B) trees. This would likely consist of three dusk/dawn surveys conducted on each tree with high potential (three trees). For trees with moderate potential (22 trees in total) this would likely consist of one dusk and one dawn survey conducted on each tree between May and August in accordance with current best practice.*

This report specifically describes the bat roost surveys for Package B.

## 1.2 Scope

This report presents the findings of the bat activity (roost) surveys; comprising desk study and a dusk emergence and dawn re-entry surveys. The aim of the report is to:

- to confirm where possible the presence/absence of bat roosts with regards to trees due to be removed/lopped as part of Package B;
- to summarise the findings of previous desk study (GBV, 2014);
- to summarise findings of bat roost surveys in 2016;
- to make recommendations if a bat roost is recorded or if a bat roost cannot be proven to be absent during activity surveys; and
- to identify any further survey requirements.

The survey methodology is detailed in Section 2. The survey results are presented in Section 3 and on tree locations in Appendix A. Information on individual trees is located in Appendix B. Survey recording sheets are located in Appendix C. Discussion of the survey and any recommendations are discussed in Section 4.

## 1.3 Survey Locations

The 25 potential roost sites surveyed in 2016 are located throughout the Scheme and can be cross referenced with Appendix 1: Potential Roost Location Figure.

The potential roost sites are recorded in Appendix B: Bat Roost Potential Assessment Table.

## 2. METHODOLOGY

### 2.1 Desk Study

A desk study was undertaken for the St Asaph Scheme as part of the Preliminary Ecological Assessment (GBV, 2014) and data has been summarised as part of this report.

For the Preliminary Ecological Assessment data was sought to identify any nature conservation sites and/or any relevant protected or notable species records within 2km of the site.

The following sources of information were utilised:

- NRW Protected Sites Map (<http://www.ccg.gov.uk/interactive-maps/protected-sites-map.aspx>)
- NBN Gateway (<https://data.nbn.org.uk/>)
- Ordnance Survey website (<http://www.getamap.ordnancesurvey.co.uk/>)
- Wales Biodiversity Partnership (<http://www.biodiversitywales.org.uk/>)
- A data enquiry was also made to NRW for any records of bats.

For this report an updated search was made of the NRW Protected Sites Map for sites designated for bats within 10km and a review of the Bat Roost Potential Report (GBV, 2015) was also undertaken.

### 2.2 Bat Roost Surveys

Methodology for bat surveys undertaken as part of this study was undertaken in accordance with standard best practice survey guidelines 'Bat Surveys: Good Practice Guidelines (Hundt, 2016).

The methodology comprised dusk and dawn surveys. Dusk surveys started 15-30 minutes prior to sunset and extended for 90 minutes after sunset. Dawn surveys started 90 minutes prior to sunrise and extended up to sunrise. A survey visit in accordance with Hundt (2016) comprises all survey with a 24hr period; i.e. a dusk followed by a dawn the following morning is counted as one survey visit.

Trees surveyed with moderate bat roost potential comprised one consecutive dusk and dawn survey (1 survey visit). Where any indication of emergence/re-entry was found in moderate potential trees then a further dusk and dawn were conducted. Surveys of high bat roost potential trees comprised 3 survey visits of a combination of dusk and dawn visits.

Each tree was surveyed by two surveyors on each survey; this ensured that where more than one feature or large feature there was complete visual coverage. Surveyors used hand-held heterodyne bat detectors (BatBox Duet). Recording devices (Zoom H1 or an automated static detector: Anabat Express) were also used at each feature to record any movements of bats from trees and any other incidental recordings of bat species activity. The primary objective of the roost surveys was to highlight any presence of bat roosts within tree structures and therefore bat activity was recorded only to supplement roost survey data.



Surveys were only undertaken in suitable weather conditions, avoiding periods of heavy rainfall and strong winds. In general, weather conditions throughout the survey period, and the summer in general, were dry and warm.

Table 2.1 below provides the survey dates at all of the potential roosts, including details of weather conditions.

**Table 2.1: Environmental data and timing of bat roost surveys**

Feature ID	Survey Date	Survey No.	Weather Conditions (temperature, precipitation, wind, cloud cover)	
			Dusk	Dawn
<b>Tree 1 (high bat roost potential)</b>	13/05/16	1 of 3		No temperature recorded, dry and clear (0%)
	31/05/16	2 of 3	17°C, dry, still, 50%	15°C, dry, still, 70%
	27/06/16	3 of 3	16°C, dry, light breeze, 80%	
<b>Tree 4</b>	02/05/16	1	9°C, dry, still, cloud cover data not provided	6°C, dry, still, cloud cover data not provided
<b>Tree 24/35 (in close proximity to T24 and surveyed at same time)</b>	13/06/16	1	13°C, dry, still, 100%	8°C, dry, still, 100%
<b>Tree 66</b>	Not surveyed. Tree downgraded to negligible bat roost potential following pre-dusk/dawn survey assessment. (Fallen over)			
<b>Tree 68/Tree 71</b>	12/05/16	1 of 3	16°C, dry, light breeze, 30%	14°C, dry, still, 100%
<b>Tree 68</b>	21/06/16	2 of 3	17-15°C, dry, still, 100%	
	29/06/16	3 of 3		10°C, dry, still, 40%
<b>Tree 157</b>	23/05/16	1	11°C, dry, still, 20%	6°C, dry, still, cloud cover data not provided
<b>Tree 602/607</b>	20/06/16	1	16°C, dry, still, 10%	14°C, dry, still, 0%
<b>Tree: Poplar</b>	17/05/16	1 of 2		7.5°C, dry, still, 0%
	18/05/16	2 of 2	12°C, dry, still, 50%	
<b>Tree 503</b>	30/05/16	1	16°C, light breeze, 50%	11°C, light breeze, 30%
<b>Tree 465/468</b>	04/04/16	1	12°C, dry, still, 40%	9°C, dry, still, 20%

Feature ID	Survey Date	Survey No.	Weather Conditions (temperature, precipitation, wind, cloud cover)	
<b>Tree 349/350/351</b>	14/06/16	1	12°C, dry, still, 100-60%	13°C, light rain before survey but survey was clear, still, 100%
<b>Tree: Hawthorn1 and 2</b>	19/05/16	1	13.5°C, periodic rain, light breeze, 100%	8°C, no rain, light breeze, 100%
<b>Tree 254</b>	02/06/16	1 of 2	11°C, light breeze, 0%	10°C, still, misty, 0%
	27/06/16	2 of 2	14°C, light breeze, 100%	11°C, light breeze, 70%
<b>Tree 217 (high bat roost potential)</b>	24/05/16	1 of 3	11°C, dry, light breeze, 80%	
	28/06/16	2 of 3		12°C, fine, still, 10%
	30/06/16	3 of 3	12°C, periodic rain, light breeze, 100%	11°C, dry, no wind, 100%
<b>Tree 200/234 (surveyed at the same time as in close proximity)</b>	09/06/2016	1	15°C, humid, no rain, light breeze, 100%	15°C dry and mild, 100%
<b>Tree 190</b>	26/05/16	1 of 3	12°C, dry, light breeze, 80%	7.5°C, dry, still 0%
	29/06/16	2 of 3	15°C, dry, light breeze, 50%	
	01/07/16	3 of 3		17°C, dry and still 30%
<b>Tree 186 (high bat roost potential)</b>	01/06/16	1 of 3	18°C, light breeze, no rain, 60%	13°C, dry, light breeze, 100%
	28/06/16	2 of 3	13°C, rained 30 mins before survey and during for 10-15 minutes but fine for rest, no wind, 70%	
	30/06/16	3 of 3		13°C, dry, light breeze, 50%

The surveys were led by a number of ecologists; Russell Grey (class licence; WML-CL17), Kate Baggaley (NRW Licence number 60343:OTH:CSAB:2014 and NE Class licence registration number 2015-13308-CLS-CLS), Matt Rung MCIEEM and Martin Page MCIEEM.



## 2.3 Limitations

### *Timing*

The optimal period for the undertaking of bat roost surveys is May to August and it is noted that bats use different roosts at different times throughout this period. Therefore in ideal survey conditions roost surveys would be spread out across this period. However, the survey effort was restricted to the period May-July to facilitate the planning submission (late Summer 2016). This is therefore within the optimal survey window and provides robust and adequate data in order to determine presence/absence.

### *Visibility*

It is acknowledged that conducting roost surveys on trees is particularly difficult due to the presence of full foliage and often obscured views to some parts of any given tree. As many of the trees surveyed were located along the banks of the River Elwy surveyors were limited with their views during the surveys. However, every effort was made to ensure surveyors gained the best possible safe vantage point for each tree, with locations assessed prior to arrival for dusk surveys.

### *Methodology*

Best practice guidance states that for moderate bat roost potential trees two surveys should be undertaken (high bat roost potential: three surveys should be undertaken) that are not conducted within the same 24 hour period. Although the requisite number of surveys were conducted in 2016 for moderate potential trees these consisted of surveys that were conducted in the same 24 hour period for the majority of trees and therefore are not considered to provide two surveys. For high roost potential trees three separate surveys were undertaken as the guidance recommends.

However, given that the most likely use of these trees is for transitory bats, and whenever potential roosting behaviours was seen on the first survey then additional surveys were carried out, this is considered proportional to inform the mitigation strategy (see Section 4.4).

### 3. RESULTS

#### 3.1 Desk Study

There are no statutory or non-statutory sites that are designated for bats within 2km of the site. The following two statutory sites that are designated for bats are located within 10km of the site:

- Ffynnon Beuno and Cae Gwyn Caves Site of Special Scientific Interest (SSSI), 6km southeast, designated for winter roost of lesser horseshoe bat *Rhinolophus hipposideros*; also Natterer's bat *Myotis nattereri* & brown long-eared bat *Plecotus auritus* use caves.
- Coedydd ac Ogofau Elwy a Meirchion SSSI, 6km southwest, designated for Natterer's bat brown long-eared bat; Pipistrelle *Pipistrellus pipistrellus*; and lesser horseshoe bats.

#### NBN Records

Several bat species were recorded within the same 10km grid square as the survey area within the last 10 years. These were:

- Serotine;
- Daubenton's;
- Whiskered *Myotis mystacinus* / Brandt's *Myotis brandtii*;
- Natterer's;
- Noctule;
- Common pipistrelle;
- Soprano pipistrelle;
- Brown long-eared; and
- Lesser horseshoe.

#### NRW Records

NRW provided records for the following species within 1km of the scheme:

- Common pipistrelle;
- *Myotis* sp.;
- Brown long-eared bat; and
- Whiskered bat.

#### 3.2 Roost Surveys

A significant amount of survey time and effort has been put in to roost surveys, generating a large volume of data comprising bat recordings in various formats and field observation sheets. Field observation sheets are supplied in Appendix 3. Sound recordings are available on request. For the purposes of this report, the findings are summarised on a tree by tree basis.

### 3.3 High Roost Potential Trees

#### ***Tree 1***

The dusk surveys recorded activity from several bat species. Common pipistrelle and pipistrelle sp. was recorded foraging close to a residential property on several occasions located across the road from T1. Several passes from pipistrelle, noctule, myotis and unidentified bats were recorded during the surveys.

The dawn surveys recorded foraging common and soprano pipistrelle from the same residential property outlined in the above paragraph with several bat passes from Pipistrelle sp., Nyctalus sp. and an unknown bat.

A total of 4 bat species were recorded during surveys, which included common and soprano pipistrelle, Nyctalus sp, and Myotis sp. The earliest bat recording to sunset was 21:49 which was 19 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Tree 1 during the survey effort. Foraging activity was limited to the residential property situated across the road from T1 with bat passes observed in both directions crossing the road close to T1.

#### ***Tree 217***

The dusk surveys recorded frequent foraging activity from pipistrelle sp. over the river with some foraging observed under the tree canopies and close to T217 but nothing was seen emerging. Daubenton's was recorded commuting downstream low to the river on two occasions.

The dawn surveys recorded constant activity from foraging soprano pipistrelle over the river with observations also from unknown bats commuting and foraging close to trees, including T217. Daubenton's and brown long eared bat were also observed foraging over the river during the survey.

A total of 5 bat species were recorded during the surveys; Daubenton's, soprano and common pipistrelle, brown long-eared bat and noctule. The earliest bat recording to sunset was 21:36 which was 8 minutes before sunset and was from a commuting pipistrelle.

In summary, no roosting activity was recorded or observed associated with Tree 217 during the survey effort. Activity (both foraging and commuting) was frequent being observed mainly along the river but also close to T217.

#### ***Tree 186***

The dusk surveys recorded frequent foraging from soprano pipistrelle over the River Elwy. Noctule and brown long eared bat were observed foraging and commuting over the river with Myotis sp. also commuting. Occasional foraging was observed over the path, with bats coming off the river and circling between trees both above and below the canopy level.

The dawn surveys recorded constant foraging activity from soprano pipistrelle over the river with Motes sp. and noctule passes also noted.

A total of 4 bat species were recorded during surveys; soprano and common pipistrelle, Myotis sp and noctule. The earliest bat recording to sunset was 21:43 which was 14 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Tree 186 during the survey effort. Activity (both foraging and commuting) was frequent and with single and multiple bats foraging along the river and banks.

### ***Moderate Roost Potential Trees***

#### ***Tree 4***

The dusk survey recorded common pipistrelle and pipistrelle (50hz) commuting to and from the river. One foraging observation was recorded of soprano pipistrelle along a ditch and then travelling back towards the river.

The dawn survey did not record any bat activity.

A total of 2 bat species were recorded during surveys; common and soprano pipistrelle. The earliest bat recording to sunset was 20:59 which was 16 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Tree 4 during the survey effort. Activity was generally low with commuting activity more common than foraging activity. As Tree 4 is set back from the river it is likely that commuting bats were heading to and from the river in order to forage.

#### ***Tree 24***

The dusk and dawn surveys recorded constant foraging activity along the path and over the river. This was not located close to T24. Only 3 bat observations were recorded close to T24 and these were all of commuting bats.

In summary, no roosting activity was recorded or observed associated with Tree 24 during the survey effort. Activity was low close to T24 and limited to passes of single bats.

#### ***Tree 35***

The dusk survey recorded both common and soprano pipistrelle and noctule foraging and commuting along the river. No roosting activity was observed at the bird box located on the tree.

The dawn survey recorded common and soprano pipistrelle and Daubenton's bat and brown long-eared bat along the river. No roosting activity was observed at the tree.

In summary, no roosting activity was recorded or observed associated with Tree 35 or the bird box that was fitted to it.

#### ***Tree 66***

This tree was assessed prior to the planned dusk/dawn survey and was found to have fallen down. The tree was re-assessed for its potential to support roosting bats. Previous features, such as the woodpecker hole were no longer elevated on the main trunk and the tree was therefore downgraded from moderate to negligible bat roost potential. No further surveys were conducted on the tree.

#### ***Tree 68***

The dusk survey recorded continuous activity close to the river and near the bridge. Pipistrelle sp., and noctule were both recorded foraging. One lesser

horseshoe bat was observed on two occasions foraging over the river. One bat was observed potentially emerging at 5m height from within the ivy cover at 21:18.

The dawn survey recorded frequent bat activity over the river corridor. One bat was observed to disappear at approximately a 10m height behind the tree and was a possible re-entry but this could not be confirmed.

Following the potential emergence and re-entry from this tree a further dusk and dawn survey was conducted to provide further information.

The second dusk survey recorded constant commuting and foraging activity from pipistrelle sp. over the river and close to T68 and nearby trees. Peak activity was between 21:50 and 22:15. No bats were observed emerging from the tree.

The second dawn survey recorded constant foraging activity over the River Elwy from pipistrelle sp. Daubenton's, Myotis sp., and brown-long eared bat passes were also heard with foraging Daubenton's also noted over the river.

A total of 5 bat species were recorded during surveys, which included soprano/common pipistrelle, Myotis sp, Daubenton's and brown long-eared bat. The earliest bat recording to sunset was 21:40 which was 5 minutes before sunset. This was noted to be flying low along the path and towards the river and was foraging.

In summary, potential roosting activity was recorded during the first dusk and dawn survey but this was not subsequently picked up on the follow up dusk and dawn survey.

#### ***Tree 71***

Tree 71 was surveyed co-currently with the first dusk and dawn survey (13/05/16) at T68 as they are located within close proximity to one another. Therefore, activity data is the same as T68 with respect to these dates. However, no roosting activity was recorded at either the dusk or dawn survey in relation to T71

#### ***Tree 157***

The dusk survey recorded pipistrelles commuting and foraging along the river bank, close to the footbridge and around surrounding tree canopies.

The dawn survey recorded a significantly lower volume of bat activity in general, with very occasional pipistrelle activity by the bridge and under the tree line.

Pipistrelle bats were the only bat encountered during both these surveys. The earliest bat recording to sunset was at 21:30 which was 33 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Tree 157 during the survey effort. Activity was low and limited to commuting and foraging along the river banks, bridge and trees.

#### ***Tree 602/607***

The dusk and dawn surveys recorded constant foraging activity from pipistrelle bats over the river with some foraging and commuting observed around T602 and T607 but no evidence of emergence or re-entry.

Pipistrelle species were the only species recorded during surveys. The earliest bat recording to sunset was 21:39 which was 6 minutes before sunset.

In summary, no roosting activity was recorded or observed associated with Tree 602/607 during the survey effort. Activity was constant throughout the surveys and limited to pipistrelle sp. foraging along the river bank.

#### ***Tree: Poplar***

The dusk survey recorded both common and soprano pipistrelles which were constantly foraging over the river and close to the Poplar and surrounding trees. Noctule was observed commuting on two occasions.

The dawn survey recorded a similar level of foraging activity to the dusk survey with foraging continuous over the river by common and soprano pipistrelle. 3-4 bats were seen circling above trees about 10m away from the Poplar but no re-entry was observed.

A total of 3 bat species were recorded during surveys; common and soprano pipistrelle and noctule. The earliest bat recording to sunset was 21:09 which was two minutes before sunset.

In summary, no roosting activity was recorded or observed associated with the Poplar during the survey effort. Activity was constant and associated with the river and surrounding bankside trees which included the Poplar.

#### ***Tree 503***

The dusk survey recorded both common and soprano pipistrelles commuting and foraging close to Tree 503 but no emergence was observed. Two noctule passes were observed close to the river and one Myotis sp. was observed foraging for 3 minutes over the River Elwy.

The dawn survey recorded a significantly lower volume of bat activity in general, with very occasional pipistrelle activity up until 30 minutes prior to sunrise. No re-entry was observed.

In summary, no roosting activity was recorded or observed associated with Tree 503 during the survey effort.

#### ***Tree 465/468***

The dusk survey recorded both common and soprano pipistrelles foraging regularly along the river with some commuting activity along the footpath all in close proximity to T465 but there were no observations of emergence. One commuting noctule was also heard but not seen.

The dawn survey recorded constant soprano pipistrelle foraging above the trees. A total of approximately 20 soprano pipistrelles were observed with feeding buzzes and swarming-type activity above a tree located approximately 20m north of T465 and then dispersing towards the nearby WwTW, which is located approximately 50m east of T465. The WwTW contains a number of single storey buildings that have the potential to hold bat roosts but do not fall within the survey boundary.



A total of 3 bat species were recorded during surveys; soprano and common pipistrelle and noctule. The earliest bat recording to sunset was 21:03 which was 17 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Tree 465 during the survey effort. Activity was restricted to foraging and commuting activity along the river and footpath close to T465 but not associated with it.

#### ***Tree 349/350/351***

The dusk survey recorded both common and soprano pipistrelles commuting and foraging both along the river and footpath close to Trees 349/350/351 with some bats passing between trees during foraging. Foraging noctule was also observed over the river. Commuting *Myotis* sp and brown long eared bat were also recorded but not seen.

The dawn survey recorded constant foraging activity from common and soprano pipistrelle over the River Elwy and associated trees and footpath. This included bats foraging in between the surveyed trees. *Myotis* sp. and brown long-eared bats were observed commuting on two occasions during the survey.

A total of 5 bat species were recorded during surveys; common and soprano pipistrelle, *Myotis* sp, noctule and brown long eared bats. The earliest bat recording to sunset was 21:44 which was 2 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Trees 349/350/351 during the survey effort. Activity was high along the river with activity close to the surveyed trees.

#### ***Tree: Hawthorn 1 and 2***

The dusk survey recorded both common and soprano pipistrelle, Pipistrelle sp. and *Myotis* sp. *Myotis* was recorded on one occasion and was a brief pass. Pipistrelle species were recorded both foraging and commuting over the River Elwy.

The dawn survey recorded soprano pipistrelle, Pipistrelle sp. and *Myotis* sp.. Foraging and commuting along the River Elwy and the footpath was recorded. It was noted that the lights from the cattle market adjacent to the trees were bright and could reduce the potential of the trees as a bat roost.

A total of 3 bat species were recorded during surveys; common, soprano pipistrelle and *Myotis* sp. The earliest bat recording to sunset was 21:37 which was 26 minutes after sunset.

In summary, no roosting activity was recorded or observed associated with Hawthorn 1 and 2 during the survey effort. Activity was low and limited to foraging and commuting either on the path or river away from Hawthorn 1 and 2.

#### ***Tree 254***

The first dusk survey recorded continuous activity from 22:05 over the river and under trees. Pipistrelle sp, and Daubenton's were recorded foraging. One bat was observed potentially emerging at 22:00 which flew at 1m above the ground from the tree and over the river. No recording of this was made and therefore species could not be determined.

The first dawn survey recorded frequent bat activity over the river between 04:00 and 04:20 with pipistrelle observed commuting and foraging. No re-entry activity was observed.

Following the potential emergence from this tree a further dusk and dawn survey was conducted on this tree to provide further information.

The second dusk survey recorded constant commuting and foraging activity from pipistrelle sp. over the river with noctule passes on three occasions. Daubenton's and potential Leisler's were recorded commuting over the river. No emergence activity was recorded.

The second dawn survey recorded frequent foraging activity close to the tree over the canopy by 2 soprano pipistrelles but these flew away down the river. Pipistrelle, Daubenton's and noctule were observed commuting along the river, with noctule also commuting perpendicular to the river over trees. No re-entry activity was recorded.

A total of 5 bat species were recorded during surveys; soprano/common pipistrelle, Daubenton's, noctule and Leisler's. The earliest bat recording to sunset was 21:56 which was 24 minutes after sunset.

In summary, roosting activity, in the form of emergence, was potentially recorded but not confirmed during the first dusk survey. There was no evidence of roosting activity during the follow up dusk and dawn survey.

#### ***Tree 200/234***

The dusk surveys recorded Pipistrelle sp. frequently foraging and commuting and with social calls over the water. A spot light from the cattle market was observed to be bright close to both trees. One Daubenton's was recorded over the water foraging. No emergence activity was observed.

The dawn surveys noted frequent activity from Daubenton's and pipistrelle sp. with occasional social calls from pipistrelle. Activity was concentrated across the river and associated banks.

In summary, no roosting activity was recorded or observed associated with Tree 200/234 during the survey effort. Activity was low and limited to passes with infrequent foraging of single bats.

#### ***Tree 190***

The first dusk survey recorded constant activity from common pipistrelle around the river and the canopy of T190. Noctule was also recorded commuting along the River Elwy. It was observed that there was lots of activity around the upper 5m of the canopy but no emergence was recorded.

The first dawn survey recorded a significantly lower volume of bat activity in general with only three observations by unidentified bats. At 4.20 emergence was potentially observed from T190 by 1-2 bats which then flew towards the river. The emergence was not confirmed and no bats were seen entering the tree.

Following the potential sighting of emergence by bats during the dawn survey a follow up dusk and dawn survey was undertaken to provide more information.

The second dusk survey recorded constant activity from between 1-7 soprano pipistrelles which foraged over the river and bank side tree canopies. One Daubenton's bat was seen foraging over the river.

The second dawn survey recorded bat activity from common and soprano pipistrelle, Myotis sp. and noctule which were all observed commuting along the river. Common and soprano pipistrelle were observed foraging over the river and banks close to T190.

In summary, emergence from 1-2 bats was observed associated with Tree 190 during the survey effort, however this was during a dawn survey when re-entry would normally be observed. No re-entry was subsequently observed. Activity was low and limited to passes with infrequent foraging of single bats.

## **4. DISCUSSION**

### **4.1 Confirmed Roosts**

There were no confirmed bat roosts recorded during the bat roost surveys.

### **4.2 Prospective Roosts**

Three trees (T190, T68 and T254) were observed with a potential sighting of a bat emerging from a tree but this was not confirmed during the survey.

At T190 emergence was potentially observed during the dawn survey but no subsequent re-entry was observed. At this time of the morning (close to dawn) it would be expected that re-entry would be observed rather than emergence. If the emergence of a bat from this tree was legitimate then the re-entry should have been observed before the end of the survey. As this did not occur the presence of a roost cannot be confirmed. A follow up dusk and dawn survey of the tree was conducted which did not highlight any further emergence or re-entry activity.

At T68 potential emergence was observed during the first dusk survey and potential re-entry during a dawn survey. This was not confirmed during the survey and so a follow up dusk and dawn was conducted which did not highlight any emergence or re-entry activity. This tree contains a dense cover of ivy which is the major bat roosting feature of the tree. The surveys highlighted that this tree potentially has been and could be used in the future as a temporary summer bat roost.

At T254 potential emergence was observed from the tree during the first dusk survey. A subsequent dawn survey and follow up dusk and dawn survey did not record any further roosting activity.

### **4.3 No Roosting Activity**

Roost surveys of the remaining 23 trees (which included the fallen tree, T66) indicated that no bat roosts were present within the trees along the Scheme that were highlighted as having moderate/high bat roost potential. It was observed that bat commuting and foraging activity was frequently constant along the River Elwy and its associated banks and the river is considered to be an important commuting and foraging route.

A number of limitations prevent the confirmation of absence of bat roosts from these trees, notably proximity to the River Elwy and dense ivy growth. As the majority of trees were located in close proximity to the River Elwy surveyors were not able to survey one side of trees which restricted visual observations from trees. In addition to this, many of the trees contained moderate to dense ivy growth which, although will not provide the potential for large roosts, can provide temporary summer roosts. In addition, surveying the entire ivy growth on trees can be problematic as there is not a single feature to focus on.

#### 4.4 Recommendations

Of the trees originally identified as being potential bat trees, there are 14 that are planned to be lopped and 11 trees that are planned to be removed as part of the works in late 2016 (see Appendix B).

Survey results to date indicated that no bat roosts were present on surveyed trees along the scheme. However, owing to survey limitations there still remains a low risk that bats could use surveyed trees as roosts; although it is considered this is most likely to be only as summer transitory roosts as ivy is the main suitable roost feature recorded. Therefore, as a precautionary measure, the following mitigation is recommended for all medium and high risk bat trees:

- Where the tree has a potential roost feature and is to be felled, or that feature would be affected by tree work, then a 'climb and inspect' survey should be undertaken (where safe to do so) under the supervision of a licenced bat ecologist prior to works.
- When details of limb removal or pruning are confirmed and the ecologist confirms this is not likely to impact a potential roost feature then works can proceed without a climb and inspect survey.
- Trees with ivy covering should be cut back between October-December to allow the ivy to die back and then removed under the supervision of bat licensed ecologist. It is recommended that this is undertaken outside of breeding bird season which runs from March-July (inclusive) and outside of summer bat roost season (April-September). Once ivy is stripped and if there are no further roost features exposed (e.g. cracks and fissures) then felling or lopping can proceed without a further climb and inspect survey.

Measures to enhance the terrestrial habitats within the working footprint and the vicinity of the scheme should be considered as ecological compensation. These enhancements should be focused on improving the availability and abundance of prey items for bats.

Offset Measures: As trees are planned to be removed as part of the Scheme it is recommended that any loss or damage to features during the Scheme are offset e.g. bat boxes, new planting.

## 5. REFERENCES

Hundt, L. (2016). Bat Surveys for Professional Ecologists – Good Practice Guidelines, Bat Conservation Trust. 3<sup>rd</sup> Edition

Galliford Try, Black & Veatch (GBV) (2014). St Asaph Flood Risk Management Strategy. Preliminary Ecological Appraisal. Natural Resources Wales

Galliford Try, Black & Veatch (GBV) (2015). St Asaph Flood Risk Management Strategy. Bat Roost Potential Report. Natural Resources Wales









## APPENDICES

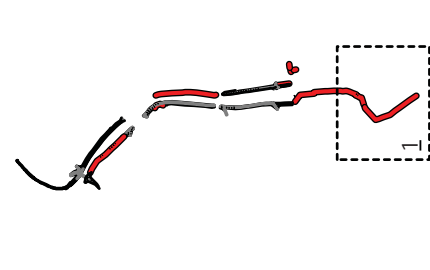
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**APPENDIX A: SURVEY LOCATION**

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**Proposed Works**

-  Floodwall
-  Embankment
- Bat Roost Potential**
-  Tree felled with high roost potential
-  Tree felled with moderate roost potential
-  Tree lopped with high roost potential
-  Tree lopped with moderate roost potential



POI	NS	MR	HB	ES	10/AUG/2016	FIRST ISSUE
Rev.	Drawn	Chk.	Drawn	Appr.	Date	Description
1					10/AUG/2016	Issue for approval

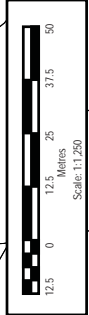
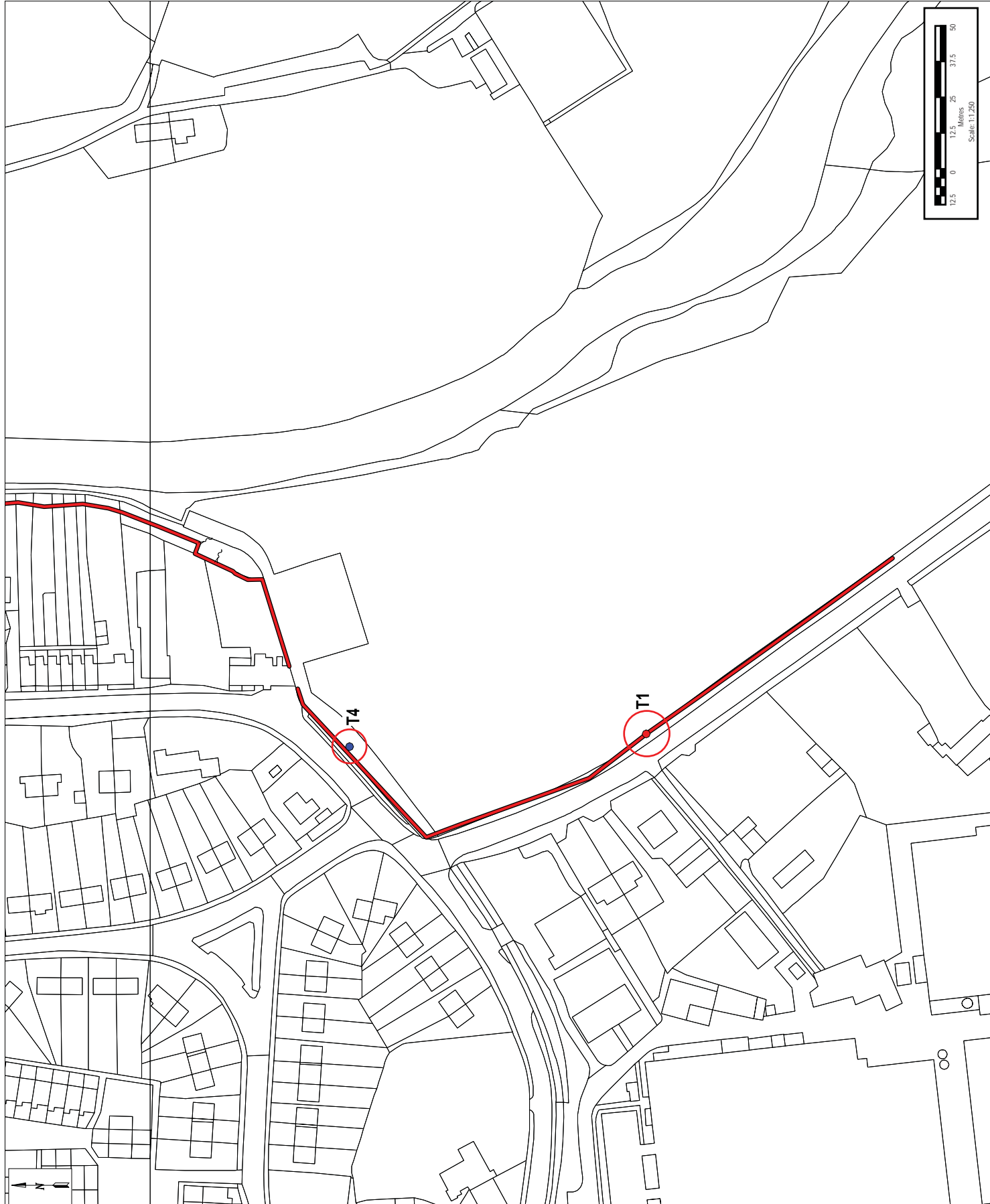


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**ST ASAPH FRMS**  
 DETAILED DESIGN





**BAT ROOST SURVEY PLAN**  
 SHEET 1 OF 4

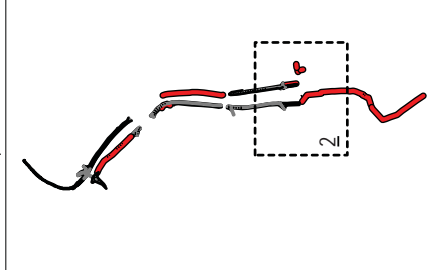
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 Revision: P01



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**Proposed Works**

-  Floodwall
-  Embankment
- Bat Roost Potential**
-  Tree felled with high roost potential
-  Tree felled with moderate roost potential
-  Tree lopped with high roost potential
-  Tree lopped with moderate roost potential



POT	NS	MR	HB	ES	10/AUG/2016	FIRST ISSUE
Rev.	Drawn	Chk.	Issued	Appr'd.	Date	Description

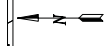
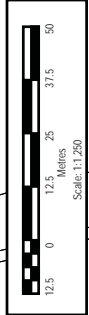
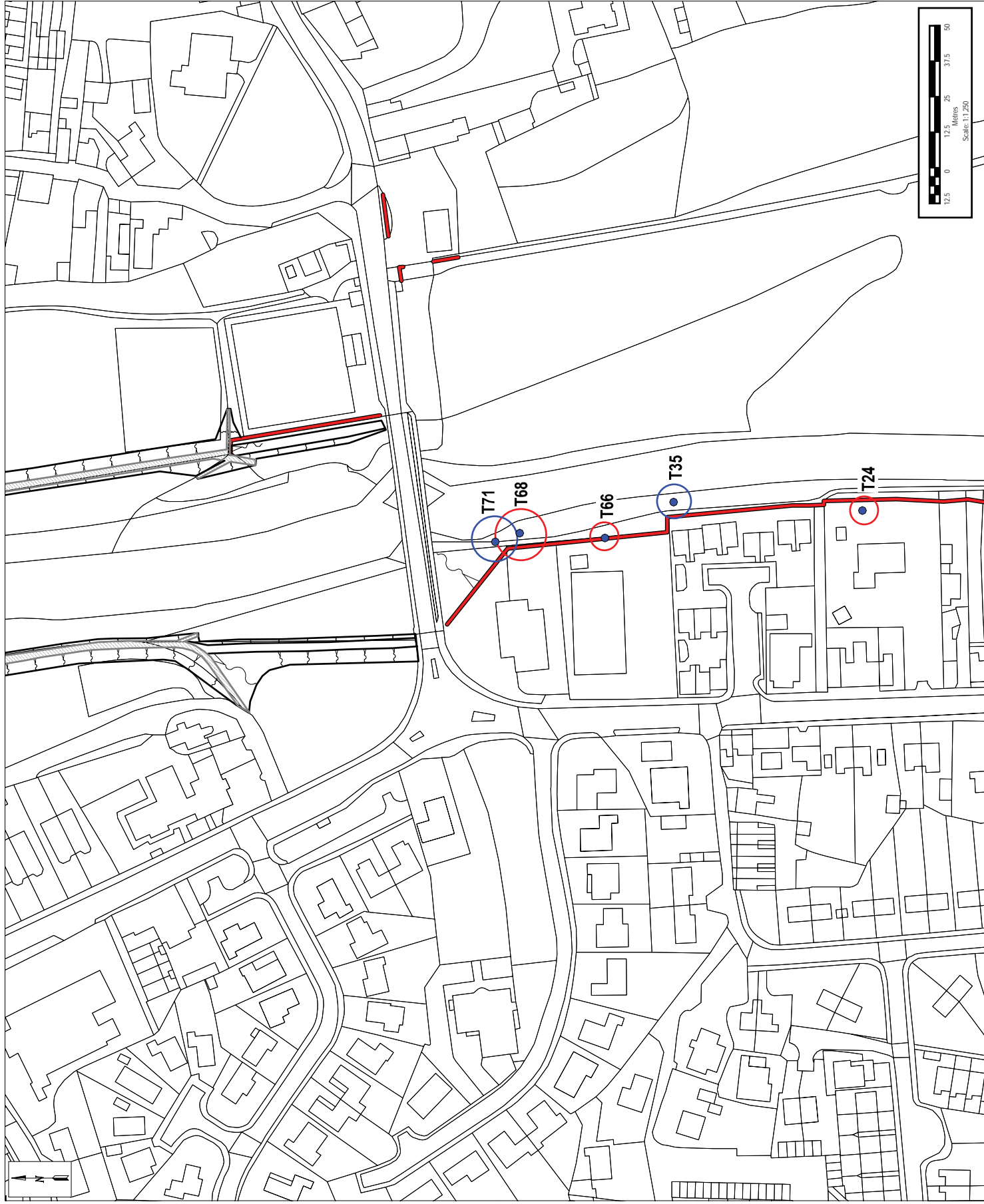


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**ST ASAPH FRMS**  
 DETAILED DESIGN








**BAT ROOST SURVEY PLAN**  
**SHEET 2 OF 4**

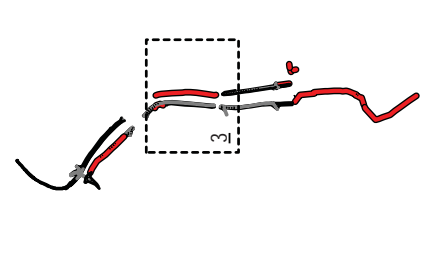
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 Revision: P01



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**Proposed Works**

-  Floodwall
-  Embankment
-  Bat Roost Potential
-  Tree felled with high roost potential
-  Tree felled with moderate roost potential
-  Tree lopped with high roost potential
-  Tree lopped with moderate roost potential



POT	NS	MR	HB	ES	09 AUG 2016	FIRST ISSUE
Rev.	Drawn	Chk'd	Iss'd	App'd	Date	Description
0					09 AUG 2016	

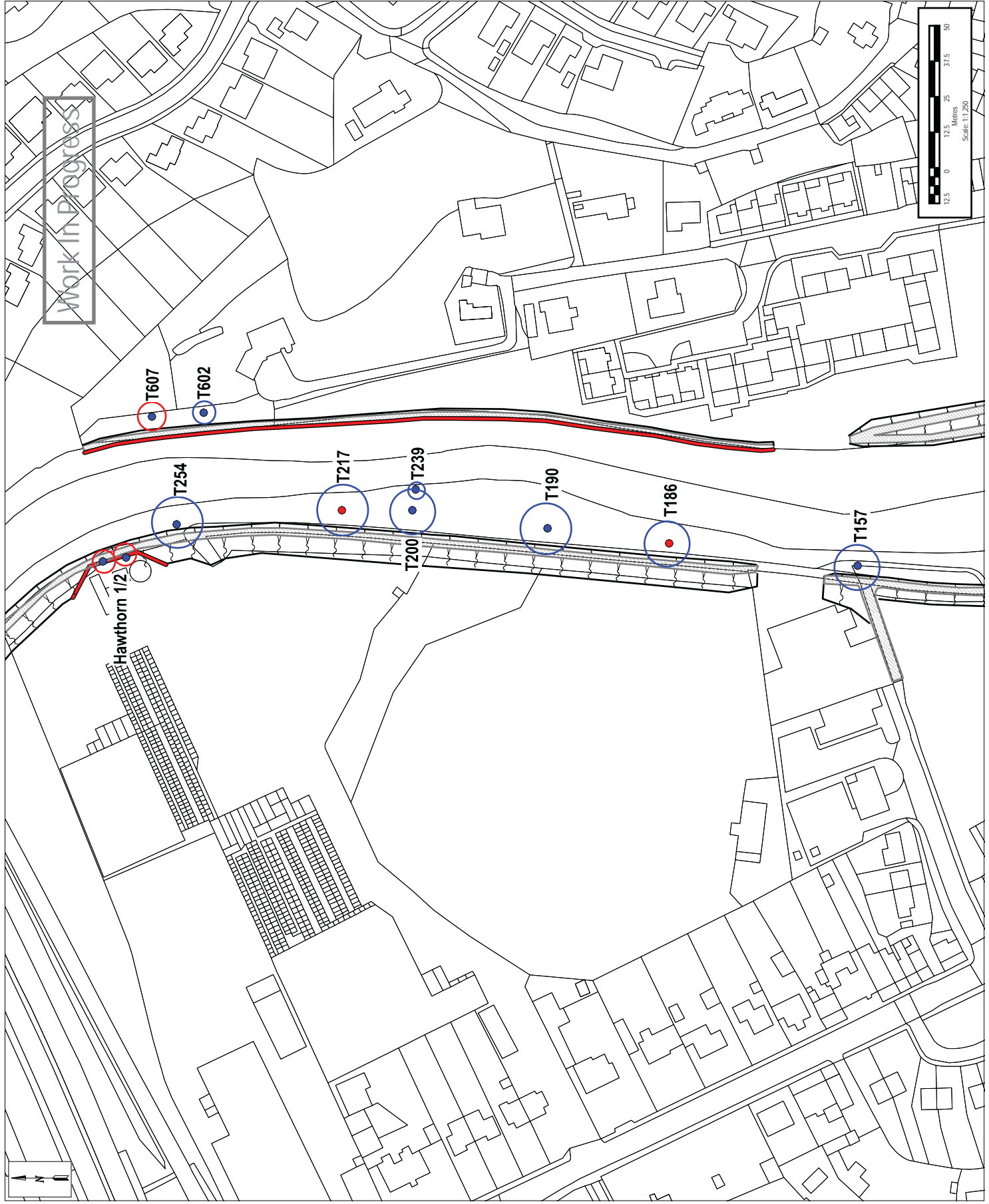


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**STASAPH FRMS**  
 DETAILED DESIGN

**BAT ROOST SURVEY PLAN**  
**SHEET 3 OF 4**

Drawing No: 11\_250 @ A3 Sheet Size: A3  
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 Revision: P01







## APPENDIX B: TREE DESCRIPTIONS

Tree number / ref	Tree species	DBH (m)	Height (m)	Age (OM / M/ SM/S)	Description of Feature							Roost Potential				Proposed action (removed or lopped)		
					Split	Loose bark	Trunk cavity	Branch cavity	Ivy	Callus rolls	Other	Bats/evidence present Describe	Confirmed	High	Medium		Low	Negligible
1	Ash	1.5	12	M	X		X	X		X					X			Removed
4	Ash	1	12	M			X			X						X		Removed
24	Lime	0.3-0.5	6-8	M			X									X		Removed
35	Ash	1	12	M						X			X					Lopped
66	Alder	0.4-0.8	8-12	OM				X								X		Removed

Tree number / ref	Tree species	DBH (m)	Height (m)	Age (OM / M / SM / S)	Description of Feature								Roost Potential				Proposed action (removed or lopped)			
					Split	Loose bark	Trunk cavity	Branch cavity	Ivy	Callus rolls	Other	Bats/evidence present Describe	Confirmed	High	Medium	Low		Negligible		
68	Ash	0.6-0.8	10	M						X						X				Lopped
71	Sycamore	0.6-0.8	10	M						X						X				Lopped
157	Sycamore	1	12	M						X						X				Lopped
602	Sycamore	0.6-0.8	10	M						X						X				Removed
607	Willow	0.8	12	M						X						X				Removed
Poplar	Poplar	1	10-12	M						X						X				Removed

Tree number / ref	Tree species	DBH (m)	Height (m)	Age (OM / M / SM / S)	Description of Feature							Roost Potential				Proposed action (removed or lopped)			
					Split	Loose bark	Trunk cavity	Branch cavity	Ivy	Callus rolls	Other	Bats/evidence present Describe	Confirmed	High	Medium		Low	Negligible	
503	Ash	1	8	M					X										Lopped
468	Crack willow	1	10	Dead		X													Lopped
465	Crack willow	1	10	M					X										Lopped
349/350/351	Alder	0.3-0.5	10	M					X										Removed
Hawthorn 1 and 2	Hawthorn	0.3-0.5	8	M	X				X										Lopped
254	Ash	1	14	M		X			X										Removed
217	Black poplar	180	15	M	X		X		X						X				Lopped

Tree number / ref	Tree species	DBH (m)	Height (m)	Age (OM / M / SM / S)	Description of Feature							Roost Potential				Proposed action (removed or lopped)		
					Split	Loose bark	Trunk cavity	Branch cavity	Ivy	Callus rolls	Other	Bats/evidence present Describe	Confirmed	High	Medium		Low	Negligible
234	Alder	0.6	19	OM	X		X			X								Lopped
200	Ash	1	12	M						X								Lopped
190	Ash	0.8	12	M						X								Lopped
186	Ash	1	12	M	X			X							X			Lopped

## **APPENDIX C: BAT ROOST (DUSK/DAWN) SURVEY SHEETS**













Date	2/6/16		
Location	ST. ASAPH	T254	Ash tree, up to half height + cracks + loose bark
Surveyor	RG		
Weather conditions	Dry, 4mph NW, clear sky.		
Sunrise / sunset time	21.32 / 04.52		
Temp start	11°C	Temp end	10°C
Survey start	21.17	Survey finish	23.02

Time of activity	Species noted	Location	Type of activity
21:38	Kingfisher	flies downstream over river	
51	1 x fp	10' left, over river	
56	1 x bat	flies @ 1m above ground	from tree, out over river. - potential emergence.
22:00	1 x bat	flies @ 1m above ground	river channel.
04	many fgs	along + flying over	all activity starts over water + under veg
05	dark starling + both fp sp	lots	constant fgs, dark + other sp? @ foot of embankment
45	still crazy volume of bat activity		
	No activity around T254 tho.		
<u>Rain -</u> clear, misty, still			
03:22	START	... quiet.	
04:00	freq bat activity	over channel	
07	occ	" "	embankment.
11	1 x fp	flies low (2m) along	balling towards tree, up stream
12	"	"	"
16	"	flies low + around tree,	one pass.
20	over nesting	in main trunk, under wing	
Nothing seen to enter tree.			

T68 (M) | ↑ |  
MEX

Date	12/5/16.		
Location	T68 - St. Asaph	Dense veg cover. No other features visible.	
Surveyor	RG		
Weather conditions	High cloud - 30% cov, light breeze	ONLY bats SEEN are noted below.	
Sunrise / sunset time	21.00	ANY other bats RECORDED were not seen.	
Temp start	16°C	Temp end	14°C.
Survey start	20.45	Survey finish	22.30

Time of activity	Species noted	Location	Type of activity
21.18		1x bat emerged @ 5m height	from veg cover. + flew upstream.
21.21	FP x 1	foraging over river	+ LH Bank.
22	2x FPs	to LNB, upstream of me	+ over my head.
25	multiple bats	foraging immediately upstream of bridge.	
28	Noctule	foraging high to left of bridge.	
35	1x bat,	flying upstream on LNB,	over my head.
39	1x bat,	from left, over river,	then back + away left.
40/41	10+ bats	flying up + down river.	
47	1 pair of a bat,	downstream	over my head.
22.30	END		
DAWN SURVEY			
03.55	START.		
04.17	frequent bat activity over river		
31	1x bat, disappeared @ 10m behind trees		- came from the left - possible re-entry
Section of watercourse immediately upstream of bridge - likely to be important foraging area as immediately downstream of bridge = strong/bright lights cast over the channel.			
04.52	2x bats seen flying together		L→R across bridge, then dropping + disappearing.
05.17	SUNRISE.		



7/10/16  
~~2016~~ Sunset = 9.16 PM  
 Sunrise = 4.44 AM

should be 213

Date	9/6/16		
Location	T 200 (Waves #?) + T234		# Taped bank T213 R 200 river T200
Surveyor	Heubner		
Weather conditions	Humid, warm but dry (rained earlier), overcast.		
Sunrise / sunset time	Sunset 9.20? PM		
Temp start	87°	Temp end	86°C (in car)
Survey start	9.20 PM / 23.25 am	Survey finish	23.05   5.00 am


Time of activity	Species noted	Location	Type of activity
21.45	50 Hz	Net area	what bank d parasit bat? (over river?)
21.50	"	"	"
21.57	"	"	stated spotting rain slightly 9.45 - 9.55
21.58	"	"	short burst of echolocation, combs/flocks over river.
21.59	"	"	" #1
22.01	"	"	" #3
"	"	"	" #4 occasional social calls
"	"	"	" #5
22.03	"	"	" #6 - clear tracks, so far (DRY)
06	"	"	what, pan #7 - "
			#8
			#9 feeding as per
22.11			more frequent passes, foraging as per
<del>22.15</del>	<del>end</del>		#10 + 3 passed foraging bat, no visual - 0
23.05	end		multiple passes for 5-10 min.
3.25	start dawn survey - dry & mild	sun - dry & mild	has been raining a few + (Mist)
"	50 Hz	No vis	frequent passing bat noise behind bank
			#11 No visual - too dark far river
			Frequent passes, some distant away, towers over
			from start until 4.28
			#12 ground recording of typical activity. (4.25)
			Contrast activity, feeding above river + near bank (above tunnel's bottom)
			4.28 = last bat heard.
			4.45 end.

(Dark - No spots on the water)

(V. light by 4.25)

No entry or emergence noted during dusk or dawn.

Date	2/6/16		
Location	ST. ASAPH	T254	Ash tree, up to half height + cracks + loose bark
Surveyor	RG		
Weather conditions	Dry, 4mph NW, clear sky.		
Sunrise / sunset time	21.32 / 04.52		
Temp start	11°C	Temp end	10°C
Survey start	21.17	Survey finish	23.02

Time of activity	Species noted	Location	Type of activity
21.58	Kingfisher flies	downtree over river	
57	1 x fp	10' left over river,	
56	lyon has his foot 'bat		
22.00	1 x bat, flying	@ 1m above ground, from tree, out over river. - potential emergence.	
04	murran sp, King + foraging	over river channel.	
05	darkstart + both fp sp ... LOTS		of activity starts ... over water + under veg
45	still crazy volume of bat activity -		const. fips, dark + other sp? @ foot of embankment
	No activity around T254 tho.		
			
<u>Rain -</u>			
clear, misty, still			
03.22	START ...	quiet.	
04.00	freq, bat activity	over channel	
07	occ	" "	embankment.
11	1 x fp,	flying low (2m) along	banking towards tree, over upstream
12	" "	" "	" "
16	" "	flying low + around tree,	one pass.
20	when entering	in main trunk, under wing	
Nothing seen to enter tree.			



























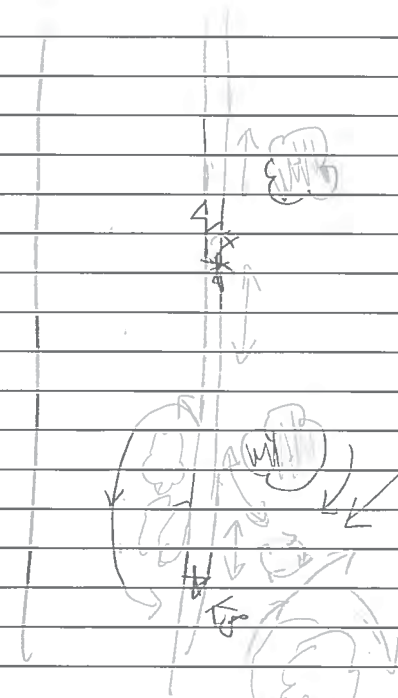






WAV 15

Date	20/6/16		
Location	St. Asaph. T602 & T607		
Surveyor	KSI, WH		
Weather conditions	Dry, calm, 60% cloud cover.		
Sunrise / sunset time	21.45. - 22.20 - wind increased 04.46 - dry, still.		
Temp start	16.5°C / 14°C	Temp end	16°C. / 16°C
Survey start	21.05 / 03.00	Survey finish	22.50 / 04.45.

Time of activity	Species noted	Location	Type of activity
WAV 15			
21.39	1st call (WH)		
21.41	1st call (KS) - faint (on river)		
	constant fly-bus/prosper		
	feeding buzzes after 21.55		
WAV 16			
03.00	calls constantly		
-03.45	feeding buzzes		
	Activity ceased @ ~ 04.30		
			Above & below canopy
			

see over  
↘







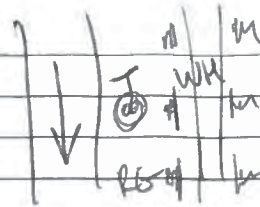




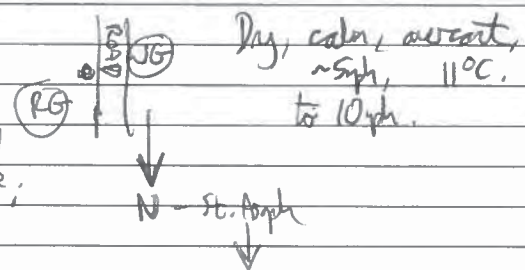


ONLY bats seen are recorded below.

Date	20 <sup>th</sup> June		
Location	T217		
Surveyor	RG <small>for station</small>		
Weather conditions	Overcast + raining. 15 mph.		
Sunrise / sunset time	21.45		
Temp start	13°C	Temp end	12°C.
Survey start	21.30	Survey finish	23.15



Time of activity	Species noted	Location	Type of activity
21.36	x 1 fp pair	over river, heading upstream	
37	x 1	dambian, over bank, typed to tree, fly, dambian over river	
38	x 2 ffs	from dambian, foraging	under upper tree canopy.
42	x 1	from dambian →	
44	x 1	flicking around upper canopy + limbs of the tree ... not seen to emerge.	
↳	stopped raining, but trees shed large beads of water in the mid = feels like rain under		
22:00	x 2 bats, minor, foraging low over river edge next to me - repeated foraging circles.		the lower canopy.
08	→ away, increase in fp activity as it has become drier + less breezy.		
15	Dambian, low over river, flying down stream...?		
39	x 1 seen above river, outside of the tree canopy.		
55	END.		
03.25	START	DAWN.	
38	x 1 bat, flying up to tree from N along hedge		
40	as above, but flew under tree canopy in field		
46	x 1, foraging below lower branches of tree		
48	x 1, N → S along hedge		
49	x 1, S → N		
51	foraging N of tree, field side.		
53	x 1 foraging under tree, field side.		
04 04	x 1 S → N, field side.		
22	x 1 " " " "		
45	END.		







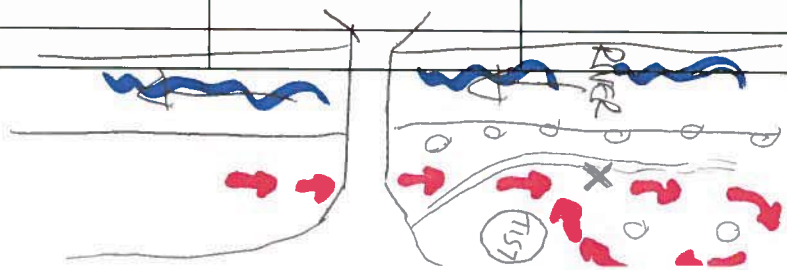
Date	19/5/16		
Location	Hawthorn 1 + 2 (10y covered)		
Surveyor	MR + RK		
Weather conditions			
Sunrise / sunset time			
Temp start	8	Temp end	8-5
Survey start	3.11	Survey finish	5.11

Time of activity	Species noted	Location	Type of activity
3.11	pup	foraging nr + over river	1 or 2 foraging
3.20			
3.52	S-pup	common	HNS
4.00	S-pup	"	"
4.03			
4.07	BLE? myo	-	Lights from cattle market turned on which
4.08	S-pup	on path	Faint comm HNS
4.21	myo	HNS	comm once up + down path.
4.22	J-pup	on path (6M)	comm
4.28	"	"	foraging up + down.
4.41	Pup	faint HNS	"
5.11	end.		comm

20  
  
 20/5

Date	23/24 May 16 .		
Location	St Asaph by footbridge T157		
Surveyor	Kate Baggaley		
Weather conditions	DUSK - Dry, clear, no wind ~11°C Dawn - Dry, clear, no wind ~6°C		
Sunrise / sunset time	Sunset - 20.57 Sunrise - 04.5		
Temp start		Temp end	
Survey start	20.35 / 03.30	Survey finish	22.00 / 04.30 .

Time of activity	Species noted	Location	Type of activity
21.30	Pip sp	from f/bridge	faint pass-by
21.35	" "	" "	faint pass-by
21.40	unknown	" "	" " "
21.42	Pip sp	Around surrounding tree canopies	-feeding buzzes - constant activity for ~15 mins
~~~~~			
03.31	Pip sp	unknown	v. faint call
03.40	" "	under tree line	faint call - poss feeding buzz. (River noise obscuring calls!)
03.45	Pip sp	By bridge	v. faint call
03.46	" "	Under tree line	Pass by .



X - Position of Surveyors  
 ↘ - Flight direction

Adrian

Date	25/6/16 - (AM)		
Location	T186 - foot of embankment, upstream of Tree.		
Surveyor	RG		
Weather conditions	40% cloud, breezy, 10-15mph dry.		
Sunrise / sunset time	04.47		
Temp start	13°C	Temp end	15°C
Survey start	03.20	Survey finish	04.47

Time of activity	Species noted	Location	Type of activity
	fp actively foraging @ top of bank @ survey start.		
03.34	fp x 1	flying under lower foliage of tree	foraging, over bank too.
39			get the impression that the fips are flying upstream, one by one, foraging as they go
54			fp activity in upper canopy.
58	x 1 fp	under lower canopy over embankment.	
59			at least 2 x fips circling under the upper tree canopy.
04.04	Noctule	flying upstream, direct	
			fips still circling upper canopy.
11			still at least 2 fip activity in upper canopy
	+ 1 fly	direct, downstream,	under lower canopy over river bank.
13			upto 4 bats in upper canopy.
22	+ 1	direct flight downstream	over river bank
24	+ 2	"	" " "
25	+ 1	direct, downstream,	over river bank
27			at least x3 bats in upper canopy
29			activity moved downstream - was still seen over river + high trees canopy as 25m away
30	x 1 bat	still circling nearby,	but downstream...
34	x 2	came back, circling under	upper canopy... then gone but not into the
38-40	x 1	foraging over river channel,	then flew west over embankment, tree. + over cricket ground, towards residential? roosting over the
	No bats seen to enter tree		
	But lots of activity in canopy + over river.		





71 <sup>-HB</sup> ~~67~~ + 68 <sup>-RL</sup> 66 = dead = fallen down 5 bat up.



Date	12/5/2016		
Location	T-1 PRow rear of co-op 8r Jh		
Surveyor	Heather		
Weather conditions	Dry, warm, clear		
Sunrise / sunset time	9.15		
Temp start	9:15 pm	Temp end	
Survey start	9:15 pm	Survey finish	

Take photos tomorrow.

Time of activity	Species noted	Location	Type of activity
21:22	4 Hz		Bat flew past tree + road + road
21:24			low pass
			2 bats Feeding.
			circles between tree + bridge
			over river +
			multiple passes 2-3 bats.
			Noctules +
	Continuous feeding		#1 + 2 @ 50 Hz
	@ bridge		#3 @ 20 Hz
	+ near tree		#4 @ 50 Hz
			#5 @ 20 Hz
			#6 20-50 scolding
	9:22 through		9:22 slow down
	10:30 ish		9:40 low noise
	pm +		still picking up echo location @ 20 + 50 Hz
			Chasing around on bridge, less a path
			occasional passes. + near tree
	reasonably well lit		9:44 mostly 50 Hz
	from High St / bridge side		Visual under bridge Continuous
			some @ 20 Hz feeding #6
	Noct		lowest @ 50 Hz
	+ Pip		occasional fly past along path on
			river side of tree, mostly nearby
			@ bridge.
			Some fun in and behind tree

9th June, St. Asaph. SUNSET @ 21.35, START @ 21.20.  
Tree 234 on river edge. Dead alder. → becoming breezy @ 21.44

21.44 1 bat, towards tree from left bank, fluttered upstream  
48 " , flying @ foot of L bank beneath trees.

STARTED RAINING @ ~ 21.45. Light rain. ~~---~~

21.50 1 bat, flying upstream, perched close by to Tree.

still flying/active, flying @ foot of L bank.

21.58 1 bat, from R → L in front of tree (downstream side), came from  
the direction of Newland's Tree...?

22.05 LOTS of activity, but NONE around Tree.

14 2 bats seen chasing one another upstream over channel. Noctules high above

June 10th, Tree 234, Dawn Survey.

Heavy rain overnight, Overcast + still warm. 15°C.

START @ 03.25,

SUNRISE @ 04.45

04.03. Bat flew @ Tree + lost. - possible entry?

04.19. " " + lost - possible entry?

Generally lots of activity around tree, but no obvious swarming behaviour.

04.33 Noctule, flying upstream, high above canopy.







Date	2/5/16		
Location	T4, ROADSIDE	STREET LIGHT ADJ TO TREE. ILLUMINATES CAVITY / CRACK ON TRUNK.	
Surveyor	R. GREY		
Weather conditions	CLEAR, DRY		
Sunrise / sunset time	20.43 / 5.34		FIELD-FACING GAPS, PARTIALLY ILLUMINATED.
Temp start	9°C / 6°C	Temp end	6°C / 6°C
Survey start	20.28 04.00	Survey finish	22.15 05.34.

Time of activity	Species noted	Location	Type of activity
20.59	45 pip.	Not seen (NS)	FLY BY
21.11	55 pip	NS.	"
21.13	"	Along ditch.	Flying away from river.
21.31	"	"	Foraging back towards river
21.43	45 pip.	NS	FLY BY
21.45	"	"	"
21.49	BARN OWL	APPLE FIELD	
"	55 pip	NS	
21.59	" pip	NS	Foraging.
	NO	BATS	EMERGED
~~~~~			
AM - No bats.			
Blue tit, likely nesting within tree.			