



Bat Survey Report

Land at Flemingston

(Including Annington Land)

St Athan

Vale of Glamorgan

Central Grid Reference ST0115969632

For Edenstone Homes

September 2016

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1 Introduction

1.1 Survey Brief

TerrAqua Ecological Services Ltd was commissioned by Edenstone Homes to undertake a series of surveys of a parcel of land at Flemingston, St Athan, Vale of Glamorgan approximate central grid reference ST 0115969632, in order to ascertain the use, if any, being made of the site by bats. The survey boundary was taken as that supplied by Mr Richard Kelso acting for Edenstone Homes and included a parcel of additional potential development land referred to as Annington land.

The survey was undertaken in between July and September 2016

1.2 Client Details

The survey was undertaken on behalf of Edenstone Homes, Priory House, Priory Street, Usk NP115 1BJ following instructions to proceed by Mr Mark Richards acting for Edenstone Homes.

2 Background

2.1 Summary

A survey of a proposed development site referred to as land at Flemingston, St Athan, Vale of Glamorgan and the adjacent land known as Annington Land, was undertaken in summer 2016 aimed at ascertaining the use being made of the site by bats. The survey used a number of recognised methodologies including: survey of all buildings within the site boundary, an assessment of all trees within the development footprint likely to be affected by any development and activity surveys designed to understand the use being made of landscape features as feeding and commuting routes. All surveys were undertaken using Bat Conservation Trust Guidelines by experienced and licenced bat ecologists.

The results of the survey confirm that the building referred to as the Pill Box is used as a roost site by a small number of individual common and soprano pipistrelle bats. The survey ascertained that none of the trees within or bordering the site are suitable for use by roosting bats.

Activity surveys show that the Nant y Stepsau stream corridor is a favoured commuting and/or feeding site for a number of bat species as are the hedgerows bordering the site.

The report concludes that the number and species of bats using the pill box, its distance from any proposed development, and an assessment of the routes taken by bats leaving the structure means that it is highly unlikely that the roost will be impacted upon by any proposed development.

In contrast the indirect effects of light spillage onto the hedgerow system and stream corridor does have the potential to disturb a feeding and commuting area used by bats. The report recommends that in order to avoid any significant disturbance or changes to these areas the layout of any proposed development is designed to avoid intrusion into these sensitive habitats and for an appropriate lighting scheme to be incorporated to ensure all dark corridors are retained.

2.2 Rational

The survey was commissioned by the client during the design stage and prior to the submission of a planning application for the development of the above site. Following the initial Extended Phase I Habitat Survey (TerraQua, 2016) recommendations were made that a full bat survey of all buildings within the site boundary, including the potential mitigation land to the north of the proposed development area, was undertaken in order to ascertain the use if any being made of the buildings by roosting bats. In addition a bat activity survey and an assessment of all trees and their potential for use by bats was also recommended. This scope of survey work as

recommended will assist in establishing the value of the site to bats and identify any issues that may need future consideration as required to ensure compliance with current legislation.

2.3 Site Description

The site covers a total area of approximately 23ha and includes four large fields three of which were formerly under arable management but which are now managed as permanent improved grassland. One field located at the northern extreme is in arable production. The fields are separated by an extensive hedgerow system which are generally species rich. The hedgerows are a mix of both managed and un-managed hedges. Mature trees are present within a number of the hedges notably on the periphery of the site. A single watercourse passes through the site in a west to east direction.

The survey area includes 10ha of proposed development land, fields F1 and F2 (Appendix II Red boundary) and 13ha of potential mitigation land located north of the development area (Blue boundary). Two buildings an open barn/shed and a WW2 Pillbox are located in land to the north within the potential mitigation land. In addition to the main development area a further area known as Annington land located to the immediate east comprises an area of amenity grassland and ornamental shrub and tree planting.

2.3 National Designations

No part of the site is covered by a National or International designation for its conservation importance.

2.4 Local Designations

No part of the site is covered by a local designation such as a Site of Interest to Nature Conservation (SINCs). A number of SINCs are located within a 1.5km radius of the site including:

East Flemingston approximately 1km North East (D40 W1)

Land north of Llanbedderi Moor approximately 1.5km North East (D40 G5)

Neither of the above SINCs have been selected for their importance to bat species.

2.6 Ecology

Together with dormice and hedgehogs, bats are the only British mammal to go into hibernation during colder months only emerging occasionally during this time in spells of warmer weather (VWT 1993)

There are 18 resident species of Bat (*Chiroptera*) found in Great Britain consisting of two families *Rhinolophidae* and *Vespertilionidae*. *Rhinolophidae* or horseshoe bats comprise of only two U.K. species the Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) and the Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The family *Vespertilionidae* make up the majority of bat species found in Great Britain and include species such as Natterer's Bat (*Myotis nattereri*), Bechstein's Bat (*Myotis bechsteini*) and Pipistrelle Bat (*Pipistrellus pipistrellus*).

All British bat species feed whilst on the wing, preying on a multitude of invertebrate species which they detect using their unique echolocation which is also used by bats to find their way (Lawrence and Brown 1967)

Bats can utilise a wide range of roost sites, including trees, caves, mines, buildings and other man-made structures. Buildings and trees can offer bats safe dry roosting opportunities for winter hibernation roosts and more so for maternity roosts during the summer months (VWT 1993). The fact that bats readily take to manmade structures has meant that many bat species can be easily affected by such activities as renovation work to older and modern buildings. Modern building techniques and the use of timber preservatives has led to a significant decrease in suitable roosting sites over recent years (Buczacki 2002). Of the 18 species of bat found in Great Britain 11 species are considered rare, vulnerable or endangered

2.7 Legal Status

All Bat species are afforded full protection under the Wildlife and Countryside Act 1981 and the Conservation of habitats and Species Regulations 2010 (as amended). All bat species are listed as European protected species of animals.

Schedules 5 and 6 of the Wildlife and Countryside Act 1981 subsequently amended by the Countryside and Rights of Way Act 2000 makes it an offence for any person to:

- Intentionally kill, injure or take a bat
- Possess or control a live or dead bat
- Intentionally or recklessly damage, destroy or obstruct access to any place used for shelter or protection by a bat.
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection

3 Bat Survey Methodologies

3.1 General

3.1.1 Survey Personnel and Experience

The surveys were undertaken by experienced consultants, Carmen Jones MSc MCIEEM and Dyfrig Jones BSc, licensed by Natural Resources Wales (NRW) to undertake bat work. Licence number 59099: OTH: CSAB: 2014.

Carmen Jones is an experienced bat worker with over 10 years' experience in bat work including survey and mitigation production. Dyfrig Jones is an experienced bat worker with over 10 years' experience of bat work including a period exceeding eight years as associate on the above licence. Carmen and Dyfrigs experience includes both survey and mitigation production.

3.1.2 Survey Dates

The survey was undertaken using a number of separate methodologies. A daylight assessment of all buildings within the site boundary, a daylight assessment of specific trees in order to identify the potential for use by bats, emergence surveys undertaken at dusk to ascertain the use being made of the buildings and specific trees by bats and an activity survey of the site undertaken to ascertain the location of any important commuting or feeding areas used by bats. The surveys were undertaken on the following dates:

Table 1 Survey dates, times and prevailing weather conditions

Date	Survey Type	Weather Conditions
22/07/2016	Daylight Assessment of all buildings	Dry and warm 18°C
22/07/2016	1 st Emergence Survey of Barn	Dry and warm 18°C start 14°C end
23/07/2016	1 st Emergence survey Pill Box	Dry and warm 17°C start 14°C end
24/07/2016	1st Activity Survey	Dry and warm 18°C start 14°C end
6/08/2016	Dawn re-entry survey The Pill Box	Dry 12°C
7/08/2016	2 nd Emergence Survey Pill Box	Dry and warm 16°C start 13°C end
8/08/2016	2 nd Emergence Survey Barn	Dry and warm 16°C start 13°C end
9/08/2016	2 nd Activity Survey	Dry and warm 19°C start 12°C end
1/09/2016	3 rd Activity Survey	Dry overcast 15°C start 14°C end
6/08/2016	Daylight Tree Assessments	Dry and warm 17°C start 14°C end

3.2 Building Survey

A total of Two (2) buildings were included within the survey. An initial building assessment was undertaken using a daylight examination of both of the buildings within the site boundary (Both buildings are located within the mitigation land and outside the proposed development area), in order to assess their potential for use by bats and a search of the buildings to identify any evidence of bat activity. This included the search for evidence indicating current, recent or historic use of the building by bats. The daylight assessment was then followed by emergence and re-entry survey work undertaken at dusk and dawn on all areas of the buildings considered suitable for use by bats.

3.2.1 Building Descriptions

Building (1) Barn

A single storey barn located close to the western boundary of F4. The building is constructed from concrete block with a corrugated asbestos apex roof. The un-glazed windows and missing doors allow unrestricted access to the interior of the building.



Plate 1 Building (1) barn with potential unrestricted access

Building (2) Pill Box

A Second World War pillbox located within hedgerow H8. The building is constructed entirely of concrete with a concrete roof. The pill box is partially concealed beneath hedgerow vegetation. Open slits afford potential unrestricted access to bats.



Plate 2 Building (2) Pill Box

3.2.2 Building Survey Methodology

The survey of the internal and external areas of the buildings was conducted using a powerful torch and close focusing binoculars. The roof area, of the exterior with any potential to support bats was searched for evidence of bat activity using ladders. An endoscope, model Pro Vision 618 and digital Borescope Model Sealy VS8221 Proscribe, was used to examine any accessible gaps in and behind walls and other areas on both the exterior and interior structures and interior roof spaces of the buildings.

The interior and exterior of the buildings were systematically searched for evidence of bat activity. This included searches of different building sections such as where present:

- In Walls
 - Behind external wooden panels and weather boards
 - Along ledges and door lintels
 - At top of exposed walls
 - Within gaps in stonework
- In Eaves
 - Inside soffit and barge boarding
- Roofs
 - Between roof, roofing felt and insulating materials
 - In gaps between gable ends and coping
 - Between roof timbers

* The Pill box was inaccessible and only the exterior of the building was examined during the daylight assessments.

3.2.3 Field Signs

The presence or otherwise of bats was determined using characteristic field signs of bat activity such as:

- Droppings
Mouse sized (larger for larger bat species) droppings composed of invertebrate remains, often found below roost entrance points
- Staining
Dark grease like stains around potential roost entry points, indication of use by bats
- Feeding remains Insect wings below potential perch, roosting areas or inside roof space
- Sound of chattering bats
- Observation of actual bats

3.2.4 Emergence Survey Methodology Buildings

The emergence surveys were carried out on a number of evenings between July and September inclusive. Two emergence surveys were undertaken on each of the buildings. All surveys were undertaken during appropriate weather conditions.

All surveys commenced 30 minutes before sunset and continued for a period of 120 minutes after sunset. Two surveyors, Carmen Jones MSc MIEEM and Dyfrig Jones BSc, both licensed and experienced in carrying out emergence survey work were positioned at points around the buildings where previous surveys had indicated any potential to conceal bats, and/or locations where potential access into and from the structure was considered possible, in order to observe the emergence of any bats from the building. All these areas of the building were visible to at least one of the surveyors.

The number and species of any bats leaving or entering the buildings was recorded.

3.2.5 Bat Detectors

Bat detectors were used to assist in the identification of any species exiting from the building or foraging in the immediate vicinity. Bat detectors included heterodyne model Petterson D-200 and frequency division detectors Petterson D-230, Wildlife Acoustics EM3, EM3+ and Eco Meter Touch and Bat Box Duet. The Frequency division detectors were linked to a digital recording device permitting the data to be saved to an SD Card to allow for further analysis if necessary. In addition the calls observed by the EM3 and Echo Meter Touch detectors were visibly assessed on the device screen in real time.

3.2.6 Dawn Survey

A single dawn re-entry survey was undertaken on the Pill Box. The survey commenced 90mins before dawn and was terminated when bat activity in the area ceased and conditions became too light for further bat activity. No dawn survey was considered necessary on the Barn which was fully accessible and had limited potential for use by bats.

3.3 Tree Assessments Methodology

An assessment of all trees within the development footprint likely to be affected by the proposed future development of the site was undertaken. The assessment was carried out in July 2015 by Carmen Jones MIEEM and Dyfrig Jones both experienced bat surveyors licensed by Natural Resources Wales.

All trees with a diameter of greater than 30cm at breast height (dbh) that fall within the proposed development/construction footprint were assessed. Trees of less than 30cm dbh are generally unsuitable for use by bats and were therefore not recorded unless they were considered to have features suitable for roosting bats. A total of six (6) groups of trees were assessed and these included trees within both the main Flemingston Site and the Annington Land.

An assessment was made of each tree as to their potential as bat roosts by inspecting important tree features, including:

- Tree and Branch Splits
- Old Woodpecker Holes
- Rot Holes (through the removal of branches)
- Hollow Trunks, Branches or Root
- Loose Bark
- Tree Cavities (in root buttresses and coppice stools)
- Dense epicormic Growth
- Bat and Bird boxes

The presence of features considered important for roosting bats was used to categorise each tree as to its potential for use as a roost based upon the following criteria:

Table 2 Criteria used to categorise assessed trees as to suitability as bat roosts

Category		Category Description
1*	Trees used by bats or tree with potential for use by large number of bats	Trees with direct evidence of current use by bats. Includes sighting or hearing bats, or the presence of fresh droppings. Large features suitable for use by a number of bats or as a maternity roost

1	Tree with features suitable for use by a single bat	Significant features present suggesting possibility of use by bat individual bats further survey work required
2	Trees with some potential for use by bats	These will be trees of an age and structure that while lacking any obvious features make their use by bats a possibility
3	Trees with negligible potential for use by bats	Few/no opportunities for roosting bats

The assessment of the trees was undertaken from the ground using 10x40 close focusing binoculars and a powerful torch.

The actual presence of bats was determined by the identification of characteristic field signs including:

- Holes, cracks, broken limbs and loose bark with black streaks below caused by oozing droppings
 - Smooth edges around holes and cracks caused by bats rubbing on wood when entering and leaving the roost
 - Droppings below access points
 - Audible chattering of bats
- (JNCC, 2004)

3.4 Activity Survey

Bat activity surveys were undertaken across the entire site. The survey included a single walked transect (Appendix I) around the site with the transect being walked on three separate occasions. The survey transects were walked in a reverse direction on the second survey visit in order to ensure as far as possible that early emerging bats were detected on at least one of the survey visits. Any bats observed were identified and their flight direction noted.

Two time expansion detectors EM3 and Echo Meter Touch were used all with the capacity to save data to an SD card for future analysis. All detectors also showed real time spectrograms for identification in the field. A Petterson D-200 heterodyne detector was also used for the immediate identification of bat species in the field.

3.5 Data Search

A desk top data search was undertaken for any records of species and/or habitats within the survey boundary as part of the Extended Phase I habitat survey undertaken in 2016. The data search was also extended to include a search for records within a 1.5 km radius of the survey centre of species or habitats, including protected and designated sites, which could be affected by the proposals for the site.

The data search included a search of records as held by the National Biodiversity Network online Gateway and sensitive Natural Resources Wales bat records *released under licence at full resolution* and a full data search undertaken by the South East Wales Biodiversity Information Service (SEWBRc) as part of the initial Phase I Habitat Survey.

4 Results

4.1 Building Survey Results

4.1.1 General

Both of the buildings assessed had some features suitable for use by bats although the building referred to as the barn was considered to have low potential. The buildings lie outside the proposed development area but were surveyed in order to establish if any bats using these buildings would be affected during their normal feeding and commuting activities by the proposed development. The Pill box was assessed as having a high potential for use by roosting bats. Only the Barn was accessible for a full internal assessment. The Pill box was surveyed using an emergence and re-entry survey methodology only.

No evidence of the use of the barn was found during the daylight assessment. No bats were recorded emerging from the barn during either of the two emergence surveys.

A total of two (2) common pipistrelle bats were recorded emerging from the Pill Box during the first emergence survey. A single common pipistrelle and a single soprano pipistrelle were recorded emerging during the second survey. No bats were recorded returning to the structure during the dawn re-entry survey.

The full results of the building surveys are shown in tables 3-6 below:

Table 3 Results of daylight survey

Structure	Potential Bats	Evidence of Bats
Barn	Small gaps beneath door lintels Gaps between wall and corrugated roof sheets Exposed roof timbers General Interior ledges etc.	None found None found None found None found
Pill Box	No internal inspection. Exterior of structures concrete box	None found

4.1.3 Emergence/ Re-Entry Survey Results

Table 4 Results of 1st Emergence Survey

Building	Date/Time	Start + End Times	Weather	Bat Emergence/Activity Recorded
The Barn	22/07/2016	20:30-23:00	Dry and warm 16°C start 13°C end	<p>No bats recorded emerging from any part of the building</p> <p>20:35 C Pip foraging above hedgerow at rear of building from unknown location north east</p> <p>20:40 C Pip commuting from location east of site over building away north</p> <p>20:50 Noctule detected not seen distant</p> <p>20:55 S Pip detected not seen distant</p> <p>20:55 Noctule over building from south east</p> <p>21:15 S Pip foraging around arable field</p> <p>21:25 C Pip foraging over arable field away west</p> <p>21:30 Noctule over building east to west</p> <p>21:45 Noctule detected not seen</p> <p>21:55 S Pip from north away south along hedge</p> <p>22:00 Natterer's foraging in field at rear of building</p> <p>22:15 C pip foraging over building from east</p> <p>22:20 Lesser Horseshoe detected not seen distant</p> <p>22:25 Lesser Horseshoe over building from east along hedge heading south</p> <p>22:30 C Pip foraging over arable field</p> <p>22:40 C Pip over building north to south</p> <p>22:45 Myotis sp (prob whiskered) detected not seen</p> <p>22:45 C Pip x 3 foraging around grassland and arable field away south east</p> <p>22:50</p> <p>No further observations made</p>
Pill Box	23/07/2016	20:30-23:00	Dry and warm 17°C start 14°C end	<p><i>Two (2) Soprano Pipistrelle observed emerging from building</i></p> <p>20:50 C Pip foraging above hedgerow at rear of building from unknown location north east</p> <p>20:50 S Pip commuting from location east of site over building away north</p> <p>20:55 Noctule detected not seen distant</p> <p>20:55 S Pip over building from north away south</p> <p>20:55 C Pip over building from east</p> <p>21:00 S Pip and C Pip foraging around arable field and grassland</p> <p>21:05 C Pip foraging over arable field away west</p> <p>21:20 Noctule detected not seen</p>

				<p>21:30 Lesser Horseshoe over building away south along hedge</p> <p>21:40 S Pip from north away south along hedge</p> <p>22:00 Natterer's x 2 foraging in field at rear of building</p> <p>22:05 C pip foraging over grassland</p> <p>22:10 Lesser Horseshoe detected not seen distant</p> <p>22:25 Lesser Horseshoe detected not seen distant</p> <p>22:30 C Pip foraging over arable field</p> <p>22:40 C Pip over building north to south</p> <p>22:45 C Pip from north over building away south east</p> <p>22:45 C Pip from north away south east</p> <p>22:50 Noctule detected not seen</p> <p>No further observations made</p>
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Table 5 Results of 2nd Emergence Survey

Building	Date/Time	Start + End Times	Weather	Bat Emergence/Activity Recorded
The Barn	07/08/2016	20:15-22:45	Dry and warm 16°C start 13°C end	<p>No bats recorded emerging from any part of the building</p> <p>20:35 C Pip from north away south east</p> <p>20:40 C Pip from south east of site over building away north</p> <p>20:50 S Pip from east over building away east</p> <p>20:55 Noctule detected not seen distant</p> <p>20:55 Noctule over building from south east</p> <p>21:00 S Pip foraging around arable field and grassland</p> <p>21:25 C Pip foraging over building from east away west</p> <p>21:35 Lesser Horseshoe detected not seen distant</p> <p>21:45 S Pip from north away south along hedge</p> <p>21:50 Natterer's x 2 foraging above hedge at rear of building</p> <p>22:00 C pip foraging over building from north</p> <p>22:20 Lesser Horseshoe detected not seen distant</p> <p>22:25 C Pip from west over building away east</p> <p>22:30 C Pip foraging over grassland to rear of building</p> <p>22:40 C Pip over building north to south</p> <p>22:45 Lesser Horseshoe over building away west along hedge</p>

				22:45 C Pip x 2 foraging around grassland and arable field away west No further observations made
Pill Box	8/08/2016	20:15-22:45	Dry and warm 16°C start 13°C end	<p><i>One (1) Soprano Pipistrelle and one (1) Common pipistrelle observed emerging from building</i></p> <p>20:30 C Pip foraging over field from east 20:40 C Pip commuting from location east of site over building away north 20:45 C Pip from north over building to south 20:45 S Pip over building from north away south 20:50 C Pip over building from east 21:00 Noctule detected not seen 21:05 C Pip foraging over arable field away west 21:10 Noctule detected not seen distant 21:30 C Pip from west away south east 21:40 S Pip from north away south east 21:50 c Pip from south west heading north 22:05 C pip foraging over grassland 22:10 Natterer's over building foraging over field 22:25 Lesser Horseshoe detected not seen distant 22:20 C Pip foraging over arable field 22:30 C Pip over building north to south east 22:40 C Pip from north over building away south east 22:40 Lesser Horseshoe detected not seen distant 22:50 C Pip over building from south west to east</p> <p>No further observations made</p>

Table 6 Results of dawn Re-entry Survey

Building	Date/Time	Start + End Times	Weather	Bat Emergence/Activity Recorded
Pill Box	6/08/2016	04:00-05.40	Dry 12°C	No Bats recorded re-entering building

4.2 Results Trees

4.2.1 Tree Assessments

A total of six (6) individual trees, or groups of trees were assessed. None of the trees are located within the main proposed development area. One group of large ash form part of the hedgerow boundary H1 (Target TN1 Phase I Habitat Map), a second group comprise an area of woodland

immediately outside the northern boundary of H7 and forms part of the stream corridor outside the survey boundary (TN2 on Phase I Habitat Map), a single large ash forming part of the hedgerow/wooded corridor along the un-named road at Flemingston (Target Note TN5 Phase I Habitat Map) and the planted ornamental trees associated with the open areas of the Annington land located at the south eastern corner of the site.

None of the trees were categorised as having a high potential for use by bats (Category 1) or identified as actual roosts (Category 1*). The full results of the tree assessment is shown in table 7:

Table 7 Results of Tree Assessments

Tree ID	Category	Comments
TN1	2 (all trees)	Group of large ash within hedgerow H1. Some small gaps and cracks but limited potential
TN2	3 (all trees)	Stand of trees within wooded copse outside survey boundary behind H7. Outside development area
TN5	2	Large ash some small gaps and fissures but limited potential. Significant distance from potential development area
Scattered Ornamental Trees Annington Land	3 (all trees)	Scattered ornamental planting within open space no features suitable for use by bats on any tree
Group Leylandii along St Athan Road Annington Land	3 (group)	Leylandii no features suitable for use by bats
Ornamental Planting- Woodland Block at north of Annington Land	3	Managed woodland block/ornamental buffer no trees with features suitable for use by bats

4.3 Activity Survey

A total of eight bat species were recorded during the course of the three activity transects walked. The full results of the transect survey can be seen in Appendix III. Common pipistrelle, soprano pipistrelle, noctule, brown long eared, Natterer's, whiskered, daubentons and lesser horseshoe were recorded over the survey period. Of these daubentons was only recorded as a single bat during the first of the survey visits. A single whiskered bat was recorded during the second visit only. All other species were recorded on all three survey visits.

Bat activity was concentrated around the periphery of the site in particular along the wooded stream corridor. Activity was also high along the boundary with the un-named road at Flemingston at the extreme north of the site.

Activity within the main proposed development area was primarily along the stream corridor and the along the boundary hedges at the northern end of the development area. Activity was generally low within the Annington land area although common and soprano pipistrelle were recorded feeding around the trees in this area on all visits. The main grasslands within the

proposed development area of site were mainly observed to be used by small numbers of foraging common and soprano pipistrelle bats.

Lesser horseshoe bats were recorded on all visits. These were confined to the mitigation area of the site with no observations directly within the development area. Lesser horseshoe activity occurred along the woodland edge associated with the un-named road at the extreme north of the site. A single lesser horseshoe was recorded foraging over woodland adjacent to hedgerow H7 immediately outside the proposed development area.

Bats were recorded crossing the road from the St Athan base area and foraging over the grassland areas although these were generally confined to common and soprano pipistrelle bats. Noctule bats were also recorded flying high over the site from unknown locations.

Brown long eared bats were recorded feeding along the stream corridor and some of the development area boundary hedgerows.

4.4 Data Search Results

No records were found relating directly to the site or for any immediately adjacent habitat for any bat species.

The search results do show that a number of bat species are known to roost within 700m of the site including:

Common pipistrelle (*Pipistrellus pipistrellus*),

Soprano pipistrelle (*Pipistrellus pygmaeus*),

Brown long eared (*Plecotus auritus*)

Lesser horseshoe (*Rhinolophus hipposideros*)

Noctule (*Nyctalus noctula*)

Greater Horseshoe (*Rhinolophus ferrumequinum*) are also known to roost within a 2km radius

5 Conclusions

No part of the site is subject to a National, International or local designation for its importance to any bat species

The Data search results show that a number of bat species are known to roost within 1km of the site although no records relating directly to the site were found. Common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long eared (*Plecotus auritus*), lesser horseshoe (*Rhinolophus hipposideros*) and Noctule (*Nyctalus noctula*) are all known to historically roost within 1.5km. The site lies within approximately

100m of the bat houses built as part of the St Athan former RAF base works and bat mitigation strategy.

The results of the building assessments and subsequent emergence survey work confirm that the structure known as the Pill Box located within a hedgerow (H7) north west of the proposed development area has been confirmed as a summer roost used by a small number of common pipistrelle (max 2) and soprano pipistrelle (max 1) bats. The pill box lies outside any proposed development area. The small number of individual bats and the species using the box means that the proposed development of the land to the south east is unlikely to have an impact on the roost either directly or indirectly. In addition the activity survey results would indicate that the proposed development does not lie on any obvious commuting route between the pill box and feeding habitat.

The building referred to as the barn is not currently being used by bats and no evidence was found suggesting bats had used the building as a roost at any point in the past.

All trees within or bordering the site were assessed as to their potential for use by roosting bats. Following these assessments it was concluded that none of the trees are currently used as a roost site by bats. None of the trees had features giving them high potential for use by bats. Two groups of trees TN1 and TN5 (see Phase I Habitat Map) were assessed as being Category (2) trees meaning they had low potential for use by bats. All other trees were assessed as category (3) trees with no potential for use by bats. No emergence survey work was required on any of the trees assessed.

The stream corridor along the north western boundary between the proposed development area and land to the north west has been identified as both a commuting route and feeding area for a number of different bat species. Natterer's, common pipistrelle, soprano pipistrelle, and brown long eared were all observed using the stream corridor on all activity survey visits.

In addition to the stream corridor all boundary hedges were observed as being used as feeding and commuting routes for bat species. Lesser horseshoe bats were observed foraging above the hedgerow forming the northern boundary of the site and above the small wooded copse immediately adjacent to the stream corridor but falling outside the development boundary. The main activity area for lesser horseshoe lies outside the development area and is located far enough away from any proposed development to suggest that this feeding and/or commuting area will not be directly or indirectly affected by any development of the land further south.

Some habitats bordering the site and lying immediately outside such as all hedgerows the stream corridor and adjacent woodland are located such that they currently receive very limited spillage from the main existing ST Athan residential area. All of these habitats have been confirmed as feeding and or commuting routes for bats. The development of the site has the potential to result in an increase in light levels to those currently noted and result in light

spillage into sensitive areas. As bats can be seriously affected by increased light levels consideration will need to be given to the use of appropriate lighting, the retention of dark commuting and feeding corridors and the prevention of light spillage into these sensitive areas.

6 Recommendations

The above surveys have been undertaken during the appropriate survey window, under suitable weather conditions and by licenced and highly experienced personnel. The results are therefore considered an accurate reflection of bat activity across the site and highlight structures identified as used by roosting bats and important landscape features. No further ground based surveys are considered necessary.

A number of landscape features have been identified as important commuting and foraging areas for bats. It is therefore recommended that a whole site strategy is produced detailing the methodologies and mitigation proposals designed to ensure the protection of bats during the pre development and development phase and the measures planned for the long term retention of dark corridors and foraging habitats. This should include an appropriate lighting plan designed to ensure that all dark corridors are retained following completion of the development.

The limited availability of roosting sites within and immediately around the site would indicate that the installation of integral bat boxes into a percentage of the new properties would be a valuable ecological enhancement within any new development.

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Appendix I

Aerial View Showing Bat Survey Boundary and Transect Line Walked



Plate 3 View showing Bat Survey Boundary (Red Line) and Survey Transect (Orange Line) (Image Google Earth 2016)

Appendix II









Map Showing Habitats Present and Targeted Ecological Features

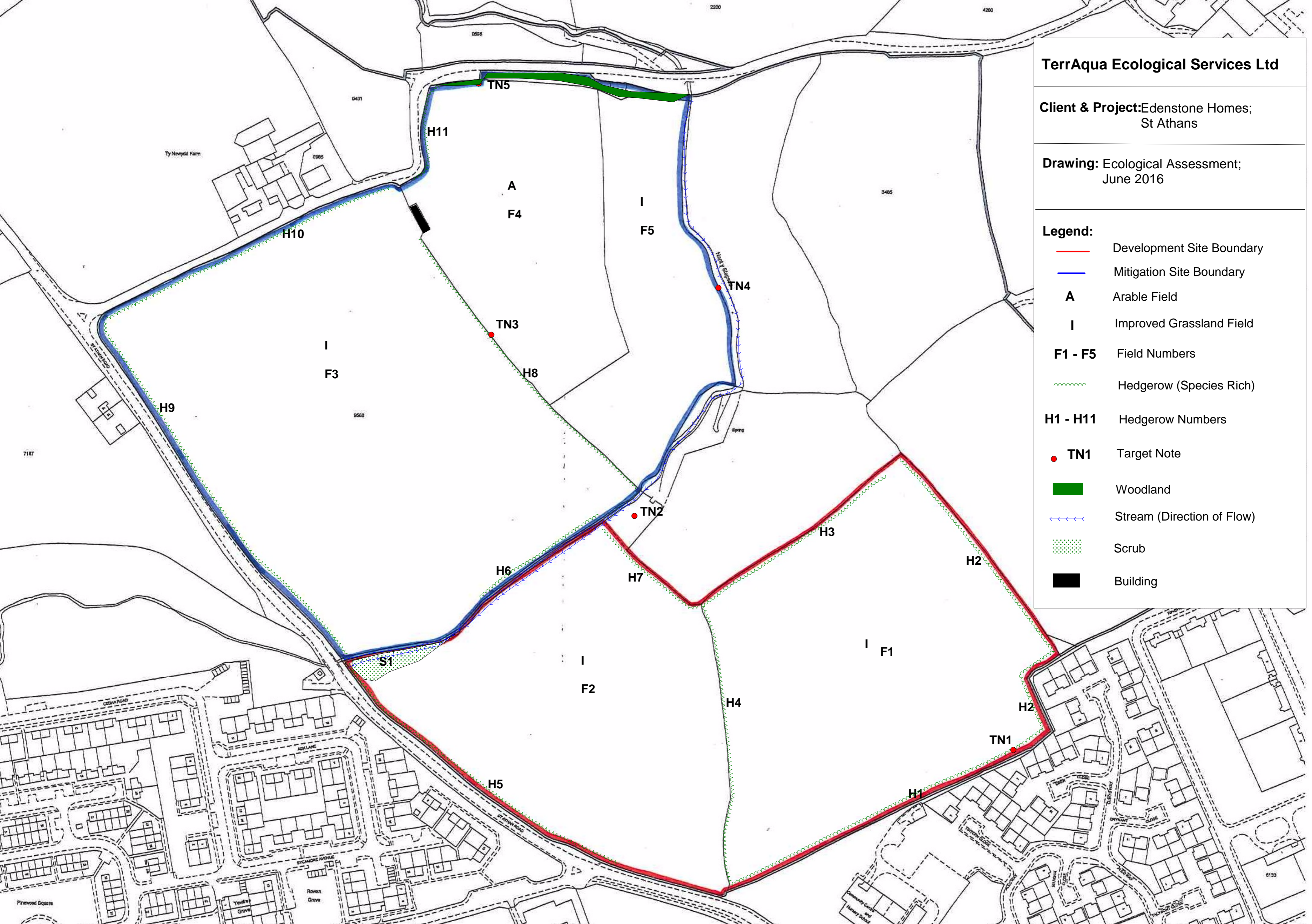
TerrAqua Ecological Services Ltd

Client & Project: Edenstone Homes;
St Athans

Drawing: Ecological Assessment;
June 2016

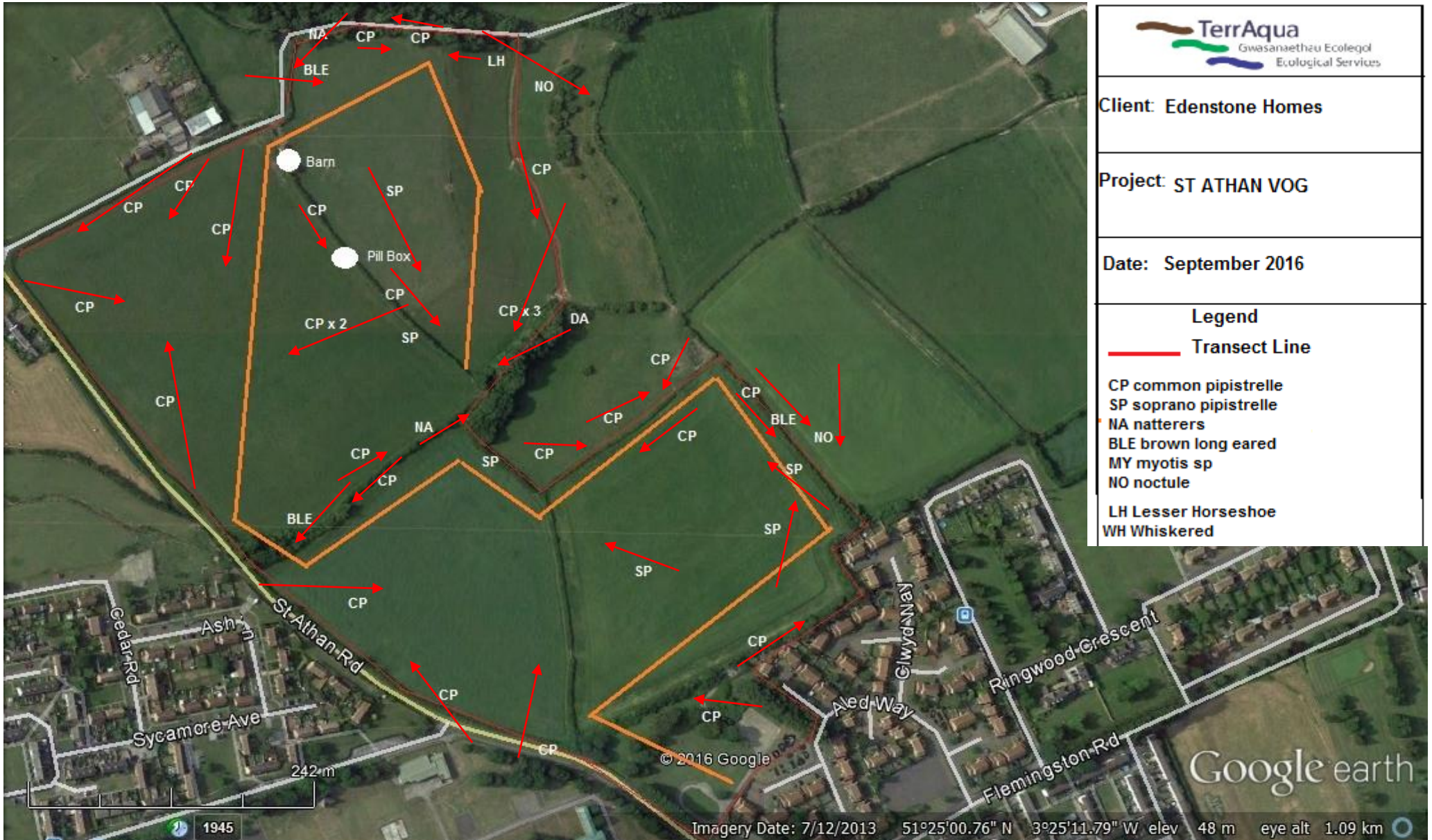
Legend:

-  Development Site Boundary
-  Mitigation Site Boundary
- A** Arable Field
- I** Improved Grassland Field
- F1 - F5** Field Numbers
-  Hedgerow (Species Rich)
- H1 - H11** Hedgerow Numbers
-  **TN1** Target Note
-  Woodland
-  Stream (Direction of Flow)
-  Scrub
-  Building

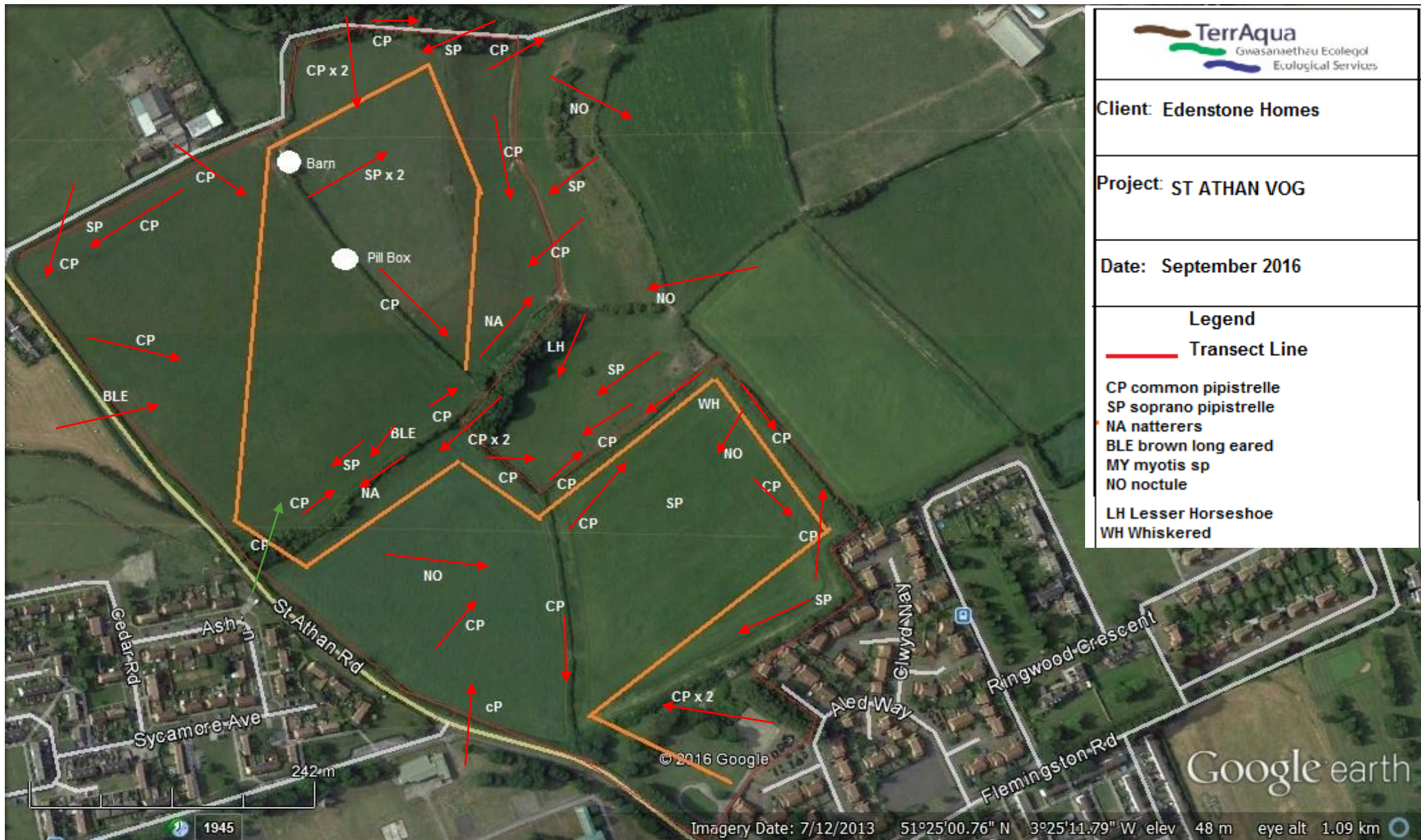


Appendix III

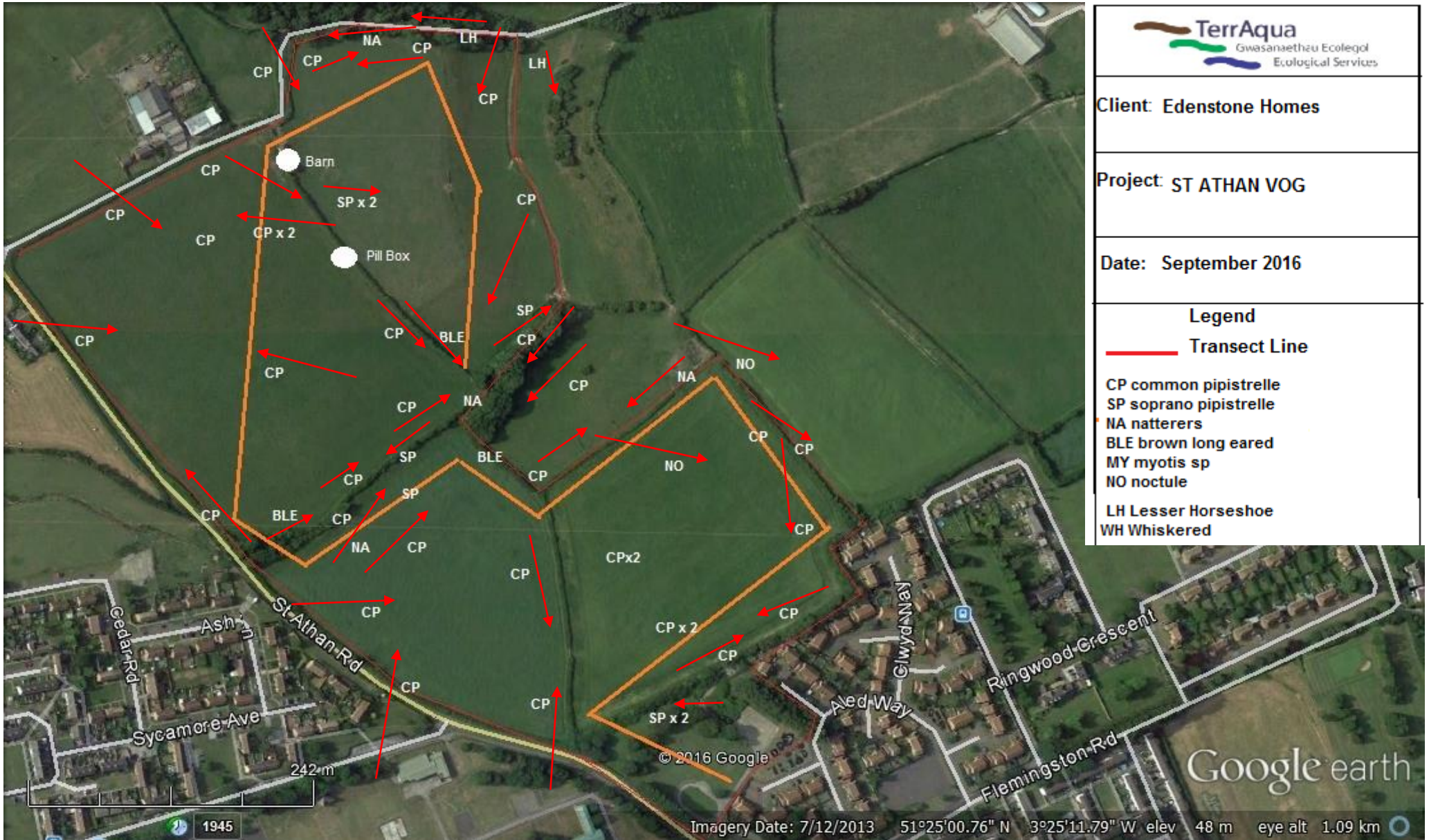
**Aerial Views Showing Results of Transect Surveys 1-3 including Species
Recorded and Direction of Flight**



Aerial View 1 Showing 1st Transect Activity Survey Results 24/07/2016 (Base view Google Earth 2016)



Aerial View 2 Showing 2nd Transect Activity Survey Results 9/08/2016 (Base view Google Earth 2016)



Aerial View 3 Showing 3rdTransect Activity Survey Results 1/09/2016 (Base view Google Earth 2016)