

Ref: AWAT124 / 004 / 002

September 2010



Upper Heyford
Oxfordshire

Bat Surveys

For

Waterman
Energy,
Environment
and Design

Head Office: Compass House, 60 Priestley Road, Guildford, Surrey GU2 7YU Tel 01483 466000

Cardiff Office: Williams House, 11-15 Columbus Walk, Cardiff CF10 4BY Tel 02920 020674

Leeds Office: Calls Wharf, 2 The Calls, Leeds, LS2 7JU Tel 0113 247 3780

www.thomsonecology.com

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Project Number	Report No.	Revision No.	Date of Issue
AWAT124	004	002	24/09/2010

	Name	Signature	Position
Author	Rebecca Kessock-Philip		Senior Ecologist
Checker	Barry Wheeler		Senior Ecologist
Approved By	Marion Thomson		Principal Ecologist

Disclaimer:

Copyright Thomson Ecology Limited. All rights reserved.

No part of this report may be copied or reproduced by any means without prior written permission from Thomson Ecology Limited. If you have received this report in error, please destroy all copies in your possession or control and notify Thomson Ecology Limited.

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed in writing by Thomson Ecology Limited, no other party may use, make use of or rely on the contents of the report. No liability is accepted by Thomson Ecology Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Opinions and information provided in the report are on the basis of Thomson Ecology Limited using due skill, care and diligence in the preparation of the same and no explicit warranty is provided as to their accuracy. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to Thomson Ecology Limited has been made.

Contents

1	INTRODUCTION	3
1.1	Development Background	3
1.2	The Brief and Objectives	3
1.3	Limitations	4
2	METHODOLOGY	5
2.2	Rapid Daytime Assessment of Potential Roosts	5
2.3	Transect Surveys	8
2.4	Emergence / Return to Roost Surveys	9
2.5	Incidental Records	10
2.6	Dates of Survey	10
	Weather Conditions	11
3	RESULTS	12
3.1	Rapid Daytime Assessment of Potential Roosts	12
3.2	Transect Survey	15
3.3	Emergence Survey	16

FIGURE 1: SITE LOCATION

FIGURE 2: RESULTS OF RAPID ASSESSMENT SURVEY

FIGURE 3: RESULTS OF TRANSECT SURVEYS (JULY AND AUGUST 2010)

FIGURE 4A: RESULTS OF EMERGENCE SURVEY VISIT 1

FIGURE 4B: RESULTS OF EMERGENCE SURVEY VISIT 2

FIGURE 4C: RESULTS OF EMERGENCE SURVEY VISIT 3

1 INTRODUCTION

1.1 DEVELOPMENT BACKGROUND

1.1.1 Waterman Energy, Environment and Design (Waterman) has obtained planning permission for the Flying Field part of the 516ha decommissioned Heyford Park Airfield, in Upper Heyford, Oxfordshire with conditions relating to ecology including the production of an Environmental Impact Assessment (EIA). Part of the site, known as the New Settlement Area (see Figure 1) is to be resubmitted to planning with a mixture of refurbished and new-build houses with the demolition of some existing buildings and extensive landscaping proposals including the retention of some or all hedgerows, trees and enhancement of public open spaces to be confirmed. The proposals described above are hereafter referred to collectively as the 'development'.

1.1.2 The development will be located on an approximately 82ha area of developed land, recently used for offices, housing and associated facilities for the former airfield (Grid Reference SP521 257) adjacent to Camp Road and close to the village of Upper Heyford (see Figure 1). The area affected is hereafter referred to as 'the site' or separately as 'the New Settlement Area', and the 'area adjacent to the Caravan Park' (see Figure 1).

1.2 THE BRIEF AND OBJECTIVES

1.2.1 Waterman commissioned Thomson Ecology on the 14th June 2010 to undertake bat surveys within the New Settlement Area, Heyford Park. The brief was to:

- Carry out dusk emergence and dawn return to roost surveys of six buildings which have previously been confirmed as bat roosts;
- Conduct a rapid assessment of all remaining buildings (up to 150) to assess the potential of the buildings to support roosting bats;
- Conduct an internal inspection of building 712 to assess the potential to support roosting bats;
- Conduct internal inspections on a further six buildings that are due for demolition to assess the potential to support roosting bats;
- Undertake three transects of the site using Anabats, to establish the current use of the New Settlement Area by bats;

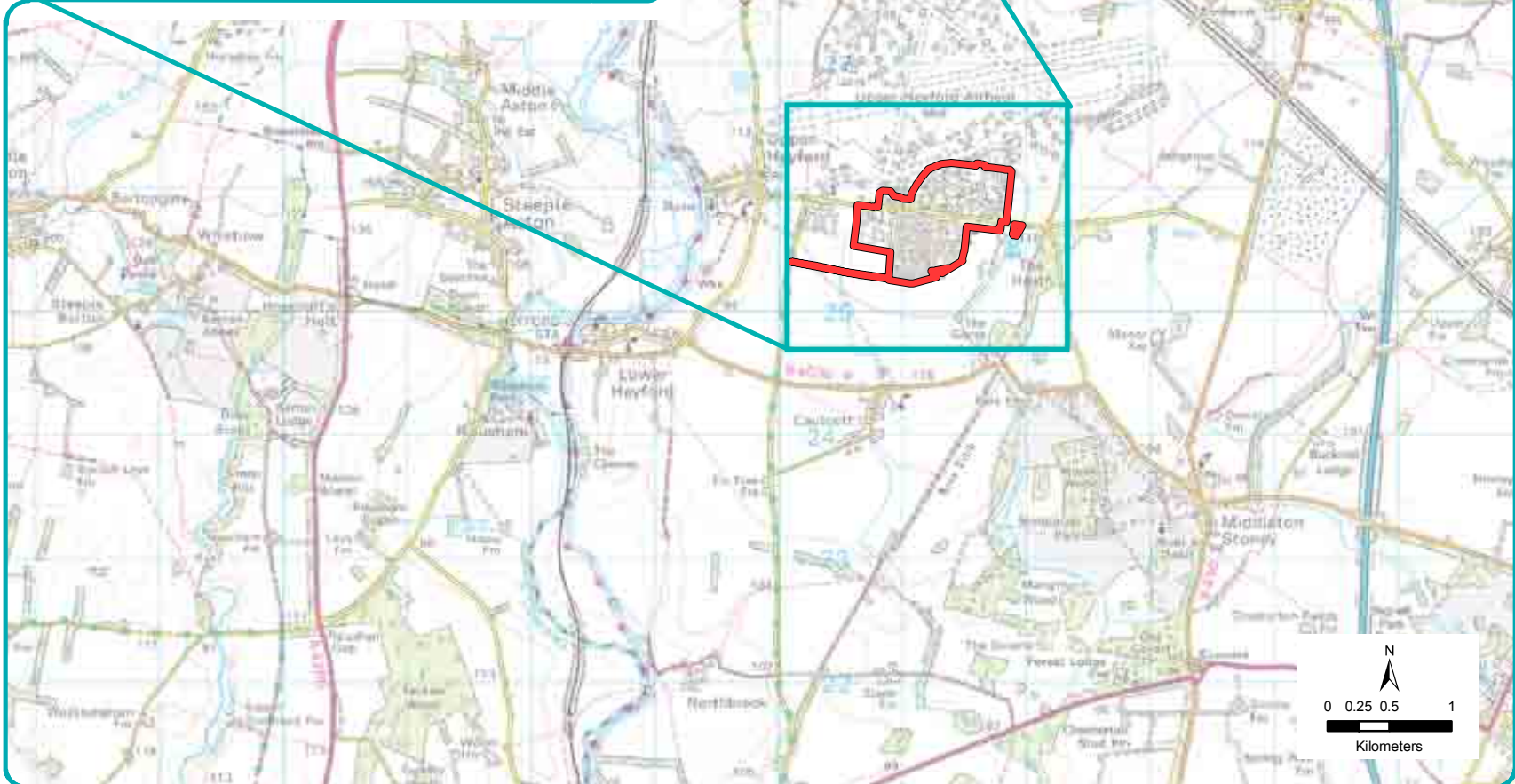
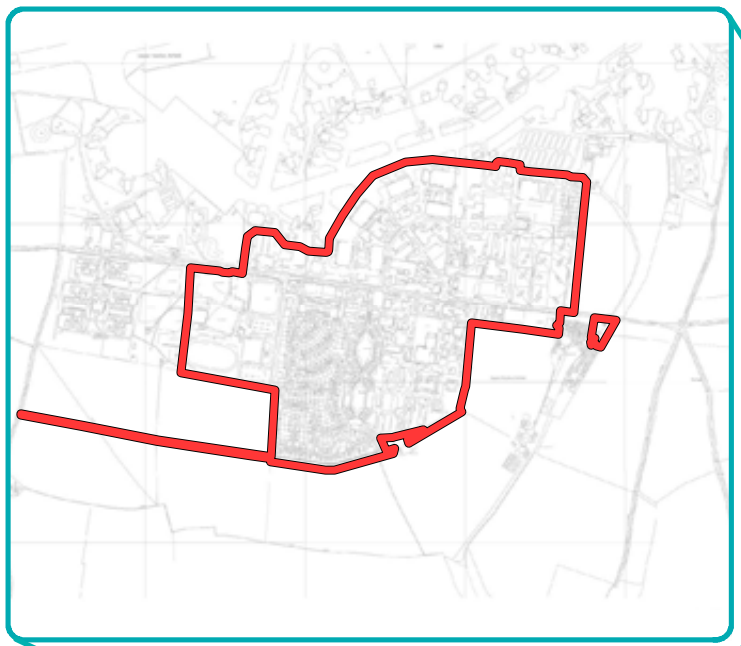
Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

- Carry out further dusk emergence and dawn return to roost surveys on buildings to be demolished, using the results of historical data, the rapid assessment and transect surveys;
- Provide a report on the survey giving the methods and results of the survey only, including identification of bat species and their location, where possible, for future appending to the ES chapter; and
- Provide a digitised map of the survey results.


1.3 LIMITATIONS

1.3.1 Although the dusk emergence and dawn return to roost surveys were not carried out a month apart (in line with BCT guidelines), the surveys were undertaken in the June, July and August survey period (optimal survey period) and therefore the surveys are a representative interpretation of bat activity throughout the optimal survey window.

1.3.2 Weather conditions were good during all sets of survey.



Legend


 Application Site Boundary

Reproduced from 1:50,000 Ordnance Survey colour raster.
Crown copyright. All rights reserved. Licence number 100045975
This map must not be copied or reproduced by any means
without prior written permission from Thomson Ecology Limited.

**Figure: 1
Site Location**

For: Waterman Energy, Environmental and Design
Drawing Ref: AWAT124/6379/1
Drawing Size: A4
Drawn By: Thomson Ecology (KS)
Checked By: Thomson Ecology (NS)
Date: 19/08/2010

Legend

 Application Site Boundary

Potential of Buildings for Bats

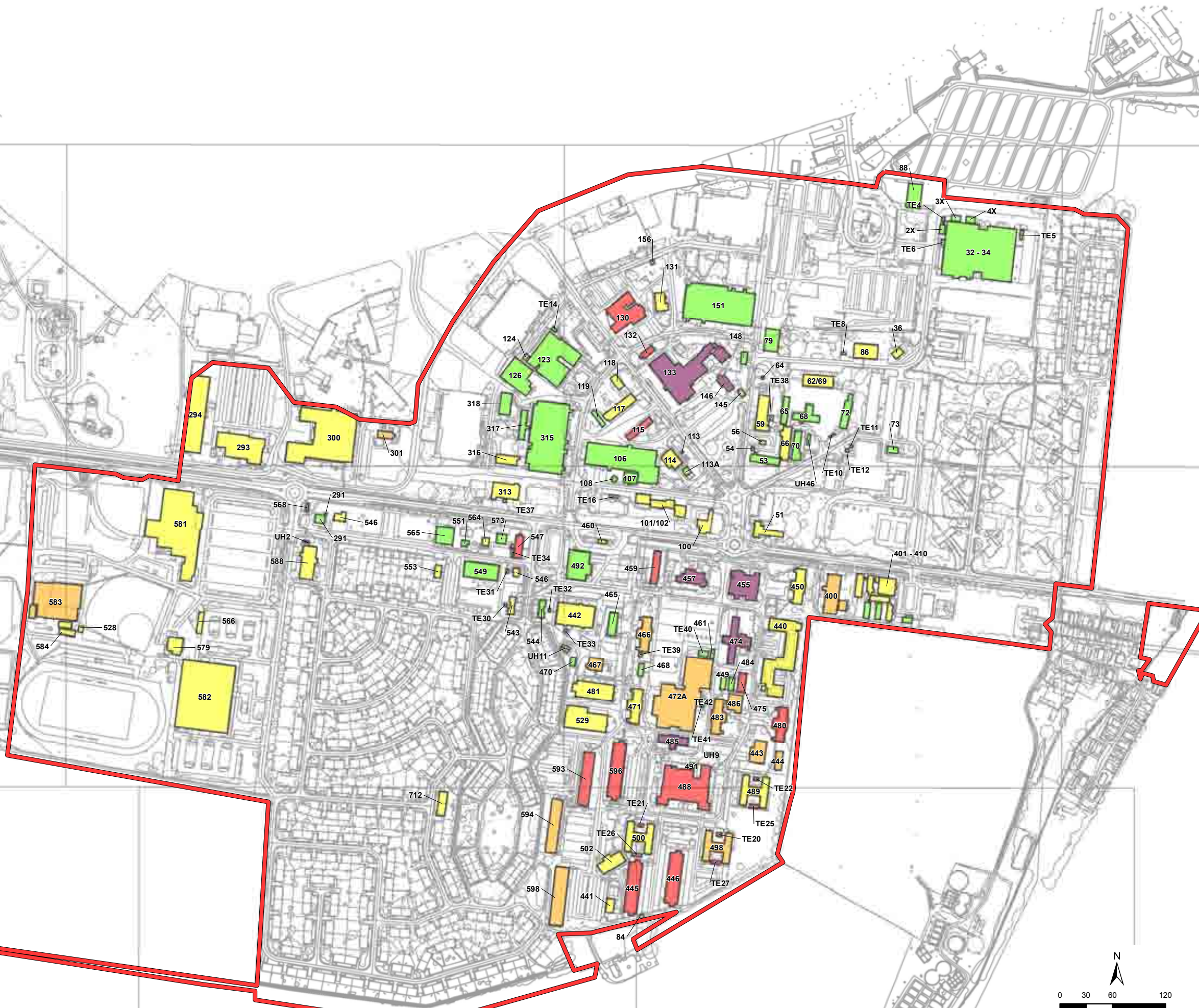
 Confirmed

 High

 Medium

 Low

 Negligible



Base map supplied by Waterman Energy, Environmental and Design
 This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Limited.

Figure: 2
Results of Rapid Assessment Survey

Surveyed For: Waterman Energy, Environmental and Design
 Drawing Ref: AWAT124/6380/1
 Drawing Size: A3
 Drawn By: Thomson Ecology (KS)
 Checked By: Thomson Ecology (TD)
 Date: 23/09/2010

Legend

Transect Results

- Leisler's Bat
Nyctalus leisleri
1 - 5 passes
- Myotis Species
1 - 5 passes
- Noctule
Nyctalus noctula
1 - 5 passes
- Pipistrelle Species
6 - 30 passes
- Pipistrelle Species
1 - 5 passes
- Serotine
Eptesicus serotinus
1 - 5 passes
- Unidentified Bat
1 - 5 passes
- Transect Route
- Application Site Boundary

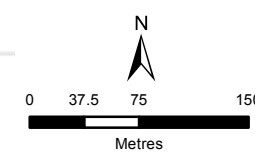


Base map supplied by Waterman Energy, Environmental and Design

This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Limited.

Figure: 3
Results of Transect Surveys
(July and August 2010)

Surveyed For: Waterman Energy, Environmental and Design
 Drawing Ref: AWAT124/6378/2
 Drawing Size: A3
 Drawn By: Thomson Ecology (KS)
 Checked By: Thomson Ecology (TD)
 Date: 23/09/2010

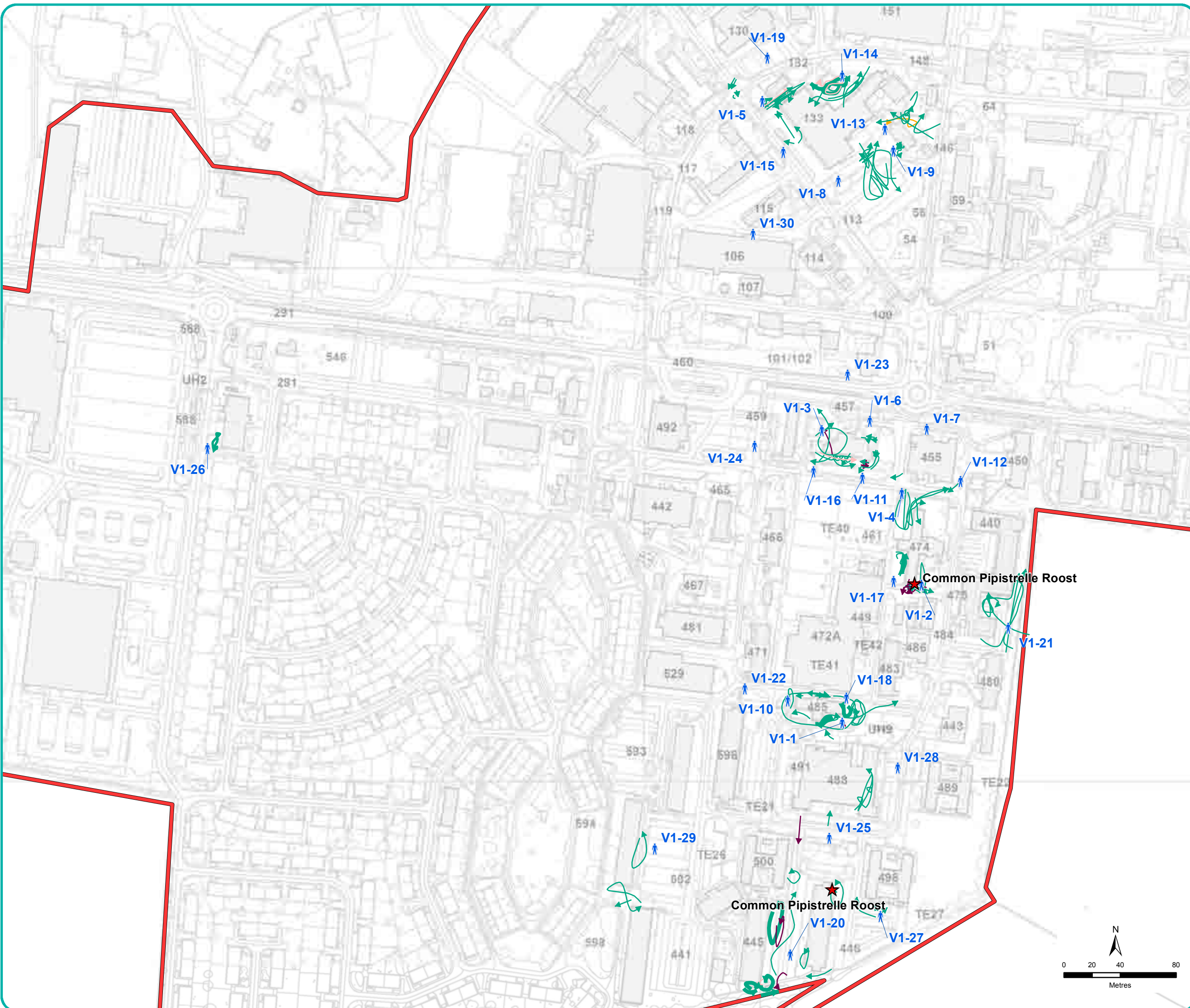


Legend

- ★ Bat Roost
- 👤 Surveyor Location

Emergence Results

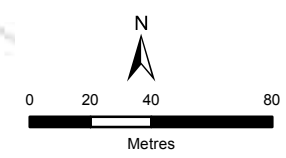
- ➔ Brown long-eared Bat
Plecotus auritus
1 - 30 passes
- ➔ Myotis Species
1 - 30 passes
- ➔ Pipistrelle Species
51+ passes
- ➔ Pipistrelle Species
31 - 50 passes
- ➔ Pipistrelle Species
1 - 30 passes
- ➔ Unidentified
(1 - 30 passes)
- ▭ Application Site Boundary



Base map supplied by Waterman Energy, Environmental and Design
This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Limited.

Figure: 4a
Results of Emergence Survey Visit 1

Surveyed For: Waterman Energy, Environmental and Design
Drawing Ref: AWAT124/6373/2
Drawing Size: A3
Drawn By: Thomson Ecology (KS)
Checked By: Thomson Ecology (TD)
Date: 23/09/2010



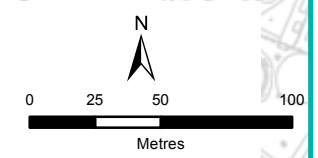
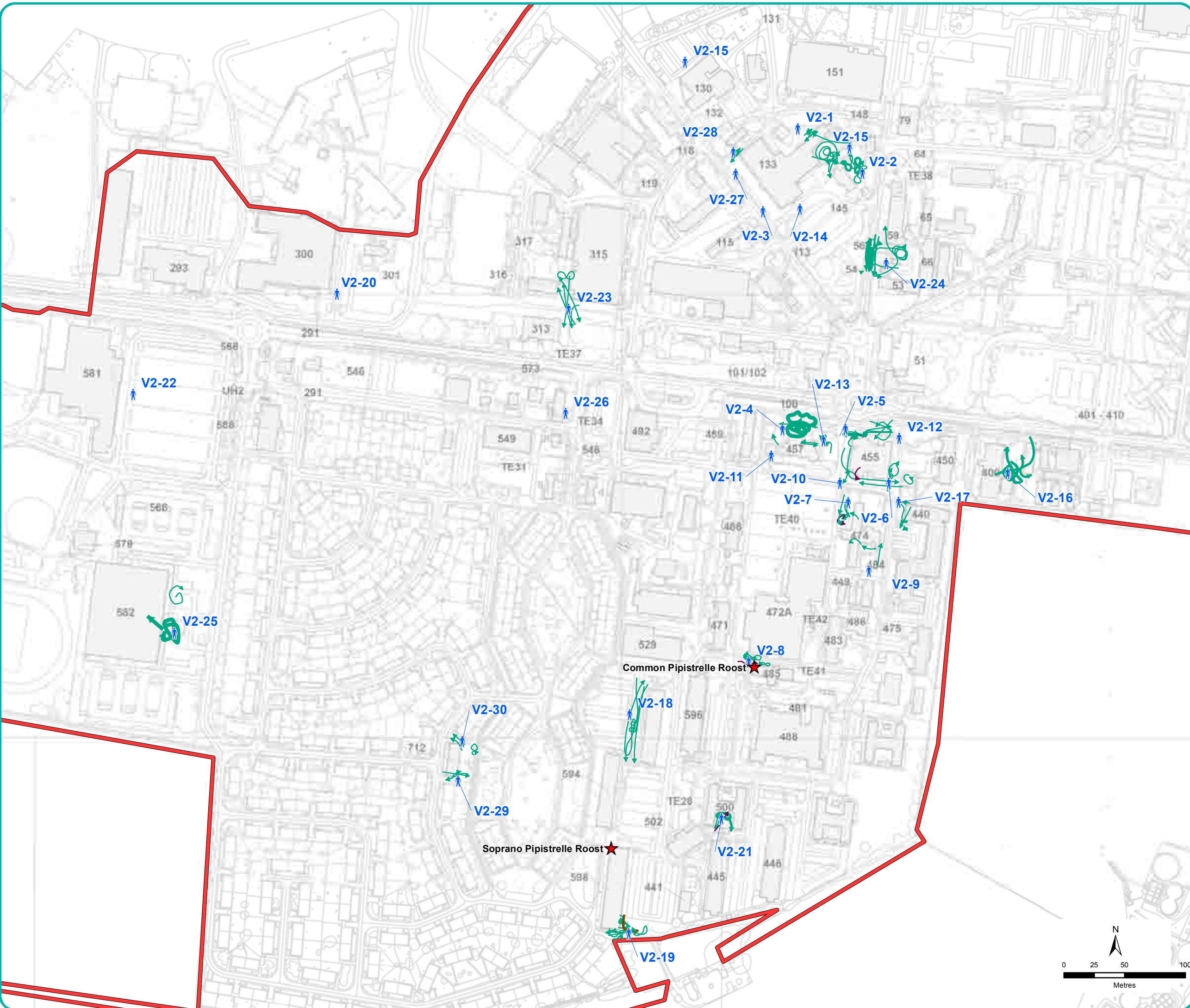
Legend

- ★ Bat Roost
- 👤 Surveyor Location
- Emergence Results**
- ➡ Brown long-eared Bat *Plecotus auritus*
1 - 30 passes
- ➡ Pipistrelle Species
51+ passes
- ➡ Pipistrelle Species
31 - 50 passes
- ➡ Pipistrelle Species
1 - 30 passes
- ➡ Serotine *Eptesicus serotinus*
31 - 50 passes
- ▭ Application Site Boundary






Base map supplied by Waterman Energy, Environmental and Design
This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Limited.

Figure: 4b
Results of Emergence Survey Visit 2

Surveyed For: Waterman Energy, Environmental and Design
Drawing Ref: AWAT124/6374/2
Drawing Size: A3
Drawn By: Thomson Ecology (KS)
Checked By: Thomson Ecology (TD)
Date: 23/09/2010



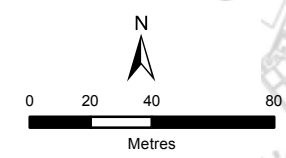
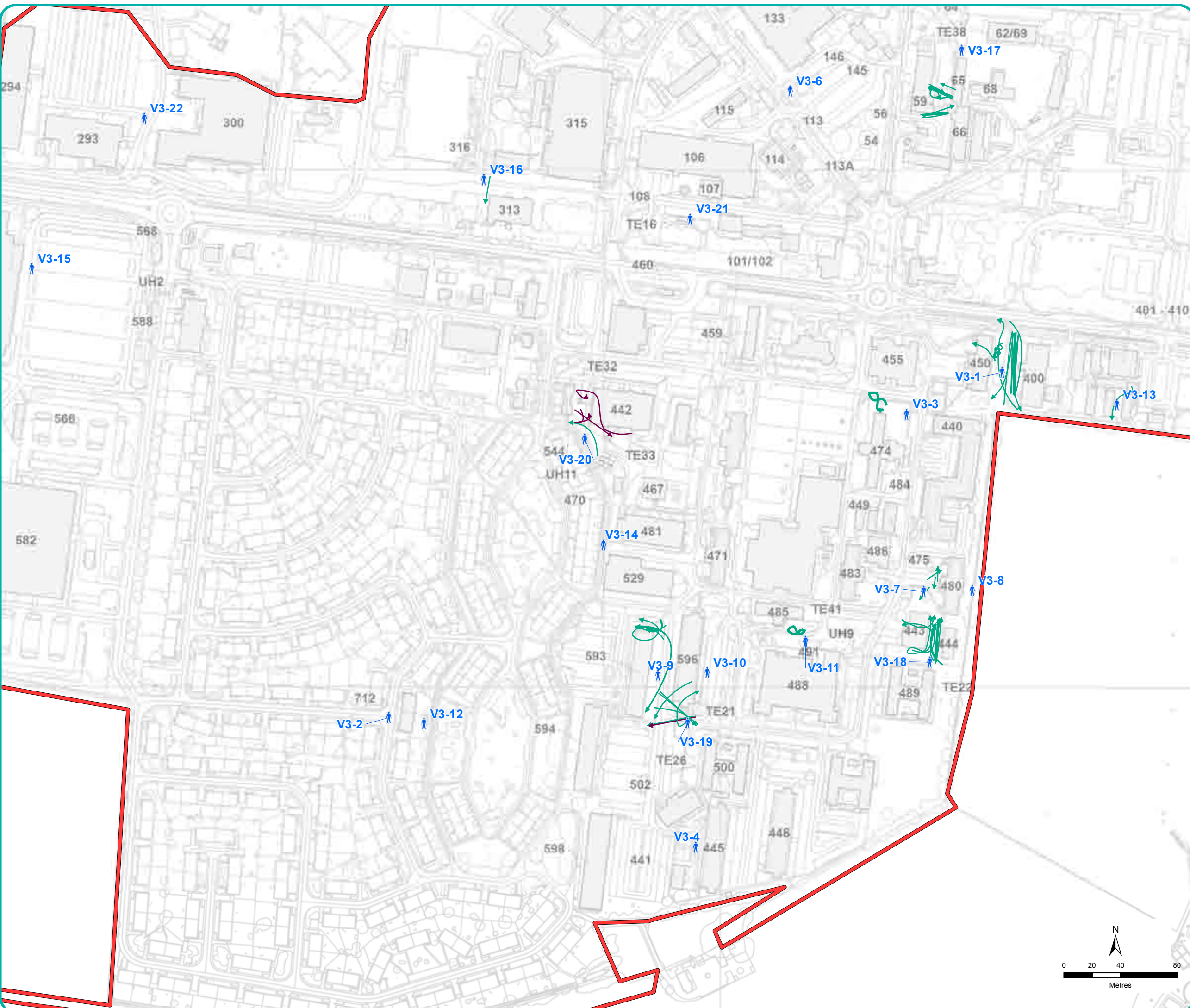
Legend

-  Surveyor Location
- Emergence Results**
-  Brown long-eared Bat
Plecotus auritus
1 - 30 passes
-  Pipistrelle Species
31 - 50 passes
-  Pipistrelle Species
1 - 30 passes
-  Application Site Boundary

Base map supplied by Waterman Energy, Environmental and Design
This map must not be copied or reproduced by any means without prior written permission from Thomson Ecology Limited.

Figure: 4c
Results of Emergence Survey
Visit 3

Surveyed For: Waterman Energy, Environmental and Design
Drawing Ref: AWAT124/6377/2
Drawing Size: A3
Drawn By: Thomson Ecology (KS)
Checked By: Thomson Ecology (TD)
Date: 23/09/2010



2 METHODOLOGY

General Approach

2.1.1 A survey area was defined that encompassed all buildings on site to be demolished, which totalled 120 buildings. The site boundary is shown on Figure 1. The surveys were lead by Claire Andrews, a Natural England Conservation, science, and education licence holder (Natural England Licence No. 20091963), a Principal Ecologist with five years experience of professional bat surveys, including surveys for and holding 15 'development' licences over the past four years. The methodology was agreed with the Cherwell District Council ecology officer on 27th July 2010,

2.2 **RAPID DAYTIME ASSESSMENT OF POTENTIAL ROOSTS**

External Inspection

2.2.1 A rapid inspection of all buildings to be demolished was made from the ground with the aid of binoculars and a powerful torch. The perimeter of each building was walked to look for signs of current or past bat use and assess the potential of each building to support roosting bats.

2.2.2 All buildings were assessed for their potential to support roosting bats which includes the presence of potential roosts, access points and evidence of bats or bats themselves. Features looked for included:

- Gaps around windows, doors and lintels;
- Lifted lead flashing;
- Loose or missing tiles;
- Gaps between stone or brickwork where mortar has fallen out;
- Other gaps or cracks between various elements of building structure;
- Presence or absence of cavity wall and potential access points; and
- Suitable access points around eaves, soffits, barge board, fascia, flashing and hanging tiles.

2.2.3 Evidence of roosting bats searched for included:

- Dark staining below an access point that may be caused by bat faeces;
- Staining around a hole that may be caused by the natural oils in bat fur;

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

- Scratch marks around the hole made by bat claws;
- Bat droppings; and
- Noises made by bats.

2.2.4 Each building was then graded and placed into a category for its level of potential for roosting bats (high, medium or low), dependent on the degree of exposure, cavity dimensions and the presence or absence of crevices considered suitable for bats to use as roosts. In addition the following factors were also considered:

- Setting & locality;
- Level of disturbance;
- Age of building or structure;
- Proximity of nearest woodland and / or water;
- Presence or absence of substantial linear features linking to woodland or other commuting and foraging habitat; and
- Size, particularly when considering potential for winter hibernation sites.

2.2.5 Table 1 shows the relevant categories.

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Table 1: Outline of categories of bat potential.

Type of roost Level of potential	Summer or transitional roost used by non breeding bats	Maternity roost	Hibernation roost
Confirmed	Presence of bats or evidence of bats. Confirmation of roost status may require further survey.		
High Bat Potential	Feature with multiple roosting opportunities for one or more species of bat. With good connectivity to high quality foraging habitat.	Feature with multiple roosting opportunities for breeding bats (size, temperature). With proximity and connectivity to high quality foraging habitat.	Large site that offers cool stable conditions with multiple roosting opportunities. With proximity and connectivity to high quality foraging habitat.
Medium Bat Potential	Feature with some roosting opportunities. With connectivity to moderate - high quality foraging habitat.	Feature providing some roosting opportunities. With some connectivity and proximity to moderate or high quality foraging habitat.	Medium sized feature with a number of roosting opportunities. With some connectivity and proximity to moderate or high quality foraging habitat.
Low Bat Potential	Feature with a limited number of roosting opportunities. With poor connectivity to foraging habitat.	Feature with a limited number of roosting opportunities for breeding bats. With low proximity and connectivity to low - moderate quality foraging habitat.	Small sized feature or feature which may be subject to disturbance or environmental variations, with a limited number of roosting opportunities. With limited connectivity to foraging habitat.
Negligible Bat Potential	Feature with no or very limited roosting opportunities for bats or where the feature is isolated from foraging habitat.	Feature with no suitable roosting opportunities for breeding bats.	Feature with no suitable roosting opportunities for hibernating bats.

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Internal Inspection

2.2.6 Seven buildings (Buildings 88, 528, 566, 579, 583, 584 and 712) were also subject to an internal inspection as internal inspections had not been possible in previous surveys and they are proposed for demolition. With the aid of a ladder, roof voids, all holes and cavities that could be accessed and investigated were searched for bats themselves and evidence of current or past bat use. Evidence searched for and techniques used included:

- A torch and fibrescope were used to inspect for bats themselves and evidence of bats along ridge beams and over brickwork, in wall cavities and in joins and cracks in tie beams and other large beams;
- Droppings were searched for, concentrating on the area beneath the ridge beam and hips, in darker areas, over internal lintels, tops of walls and wall cavities;
- Evidence of dark staining or marks or evidence of scratch marks around or below potential access points which may be caused by bat faeces, natural oils in bat fur or made by bat claws was looked for;
- Feeding remains, bat droppings (including characteristic smell), and remains of bats were searched for; and
- Cool areas within the building which may be suitable for roosting bats.

2.3 **TRANSECT SURVEYS**

2.3.1 A transect line was chosen which encompassed as many of the buildings to be demolished within the site as possible.

2.3.2 The transects were undertaken to establish areas of high bat activity over the site and inform the surveyor locations for the emergence/return to roost surveys subsequently undertaken. The results were used to identify survey locations for the dusk emergence and dawn return to roost surveys.

2.3.3 The transect was driven initially in daylight then revisited during the evening and morning survey periods. The survey period began at sunset and continued for the next two hours and began two hours before sunrise and ended at sunrise. Each driven transect lasted one hour, being repeated within each survey period. A total of 2 hours was spent within the site on each survey period. Six transects were undertaken in total, two on each survey visit.

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

- 2.3.4 Ecologists drove at a continuous speed (10mph) along the transect. An AnaBat SD1 (passive) detector was positioned on the roof of the vehicle for the duration of the transect. The Anabat detectors were programmed to respond to high frequency sounds, the sound 'triggering' the detector to record the duration of the sound for analysis on removal of the detector. The AnaBat detectors were used to record bat activity (echolocation calls) during the survey period. Data files containing the acoustic information gathered from each transect were processed as follows:
- Removal of the files containing non-bat acoustic data;
 - Count of total number of AnaBat files recorded for each species containing bat data as the total number of bat passes for each species; and
 - Species identification of bat passes from bat data files to group level.
- 2.3.5 The locations of all bats and the number of passes recorded by the Anabat during the transect surveys are shown on Figure 3.
- 2.3.6 For each transect the start time, finish time, percentage of cloud cover, wind strength, rain and temperature were all noted and shown in Table 4.
- 2.4 **EMERGENCE / RETURN TO ROOST SURVEYS**
- 2.4.1 The emergence and return to roost surveys were undertaken at locations around the site, using the rapid assessment results, the transect results and historical data of the site.
- 2.4.2 Ecologists were stationed at various locations around the site. The six buildings which had previously been confirmed as roosts during historical surveys were watched during at least two of the three visits. High potential buildings were also targeted for survey, with medium and low potential buildings being surveyed on fewer occasions.
- 2.4.3 Other locations for the emergence/return to roost surveys were chosen from the results of the rapid daytime assessment surveys and transect surveys. After each transect survey, areas of high bat activity during that transect were targeted for further survey.
- 2.4.4 Locations at the selected buildings were positioned to maximise the efficacy of surveys on the buildings proposed for demolition with bat potential.
- 2.4.5 At dusk, potential egress points were watched constantly by the ecologist. At dawn bats were tracked back to any access points within the view of the ecologist. A Duet frequency division bat detector with an Mp3 recording device attached was used by the ecologist to detect bats emerging from or

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

returning to the potential roost site. Bat calls were then retained for later analysis using Adobe Audition software where necessary.

2.4.6 The dusk survey began 30 minutes before sunset and ended 90 minutes after sunset (or up to 2 hours after the first bats are seen emerging). The dawn survey began 90 minutes before sunrise and ended at sunrise (or 15 minutes after the last bat was recorded). The cloud cover, wind strength, rain and temperature were all noted (see Table 4).

2.5 **INCIDENTAL RECORDS**

2.5.1 During the dusk emergence and dawn return to roost surveys, incidental bat activity within the vicinity of the potential roost was also recorded. For each location the species of bat and number of passes was recorded. As a gauge to the overall level of activity, the total number of passes for all species during each survey event at each location is divided by the duration time of the survey. This is then multiplied by 100 to give an activity score. The activity score is then compared to those in Table 2 below. A bat pass was defined as an unbroken stream of echolocation calls, heard as a series of 'clicks' on a bat detector as the bat passes in and out of the detector's range.

Table 2: Categorisation of activity level (based on analysis of bat surveys undertaken by Thomson Ecology in 2006 and 2007).

Activity Score	Assessment of Activity Level
Up to 5	Very Low
6 - 30	Low
31-50	Medium
51-90	High
91 plus	Very High

2.6 **DATES OF SURVEY**

Table 3: Dates of the bat surveys

Survey	Dates of Survey	
Rapid Daily Assessment of Buildings and Internal Inspections	23/06/10, 08/07/10 and 17/09/10	
Transect Surveys	Transect 1	08/07/10 (Dusk) and 09/07/10 (Dawn)
	Transect 2	19/07/10 (Dusk) and 20/07/10 (Dawn)
	Transect 3	09/08/10 (Dusk) and

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Survey	Dates of Survey	
		10/08/10 (Dawn)
Emergence Surveys	Visit 1	23/06/10, 24/06/10, 07/06/10, 08/07/10, 09/07/10, 14/07/10, 15/07/10 16/07/10
	Visit 2	28/07/10, 29/07/10, 30/07/10, 05/08/10
	Visit 3	09/08/10, 10/08/10, 11/08/10, 12/08/10

2.6.1 The weather conditions during the dusk emergence and dawn return to roost surveys are detailed in Table 4.

WEATHER CONDITIONS

Table 4: Weather conditions during the emergence/return to roost surveys

Survey	Temperature °C		Cloud cover	Rain	Wind (Beaufort scale)
	Max	Min			
23/06/10 (Dusk)	17.0	12.6	1/3	Dry	0-1
24/06/10 (Dawn)	16.4	11.5	1/3	Dry	0-1
08/07/10 (Dusk)	17	15	3/3	Dry	2-3
09/07/10 (Dawn)	14.0	10.0	1/3	Dry	0-1
14/07/10 (Dusk)	17.0	15.0	2/3	Dry	2-3
15/07/10 (Dusk)	15.0	14.0	3/3	Dry	4-6
16/07/10 (Dawn)	12.0	11.0	1/3	Dry	4-5
28/07/10 (Dusk)	21.0	17.0	3/3	Dry	0-1
29/07/10 (Dawn)	15.0	14.0	3/3	Dry	0-1
29/07/10 (Dusk)	17.8	15.0	1/3	Dry	2-3
30/07/10 (Dawn)	14.0	13.0	2/3	Dry	0-1
05/08/10 (Dusk)	17.8	14.5	2/3	Dry	0-1
09/08/10 (Dusk)	16.8	13.9	1/3	Dry	2-3
10/08/10 (Dawn)	14.7	12.5	2/3	Dry	0-1
10/08/10 (Dusk)	16.3	13.7	1/3	Dry	0-1
11/08/10 (Dawn)	15.1	14.3	1/3	Dry	2-3
11/08/10 (Dusk)	16.1	12.3	3/3	Dry	0-1
12/08/10 (Dawn)	15.7	12.2	1/3	Dry	2-3

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

3 RESULTS

3.1 RAPID DAYTIME ASSESSMENT OF POTENTIAL ROOSTS

3.1.1 A total of 130 buildings were surveyed during the rapid daytime assessment. Where these had a building number assigned to them this was used, where no building number could be found on the maps provided, on very small outbuildings, a number prefixed by TE was used to distinguish the numbering method. The results are summarised in Table 5 and shown on Figure 2.

Table 5: Results of the rapid assessment survey

Building number	Roosting Bat Potential
133	Confirmed
146	Confirmed
455	Confirmed
457	Confirmed
474	Confirmed
485	Confirmed
115	High
130	High
132	High
445	High
446	High
459	High
475	High
480	High
488	High
547	High
547	High
593	High
596	High
400	Medium
443	Medium
444	Medium
466	Medium
467	Medium
483	Medium
486	Medium
498	Medium
583	Medium
594	Medium

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Building number	Roosting Bat Potential
598	Medium
472A	Medium
36	Low
51	Low
59	Low
66	Low
86	Low
100	Low
114	Low
117	Low
118	Low
131	Low
293	Low
294	Low
300	Low
313	Low
316	Low
401	Low
404	Low
440	Low
441	Low
442	Low
450	Low
471	Low
481	Low
489	Low
500	Low
502	Low
528	Low
529	Low
543	Low
543	Low
546	Low
546	Low
553	Low
566	Low
579	Low
581	Low
582	Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Building number	Roosting Bat Potential
584	Low
588	Low
712	Low
62/69	Low
101/102	Low
113	Low
402	Low
TE3	Low
TE30	Low
TE31	Low
TE33	Low
TE37	Low
TE38	Low
TE8	Low
UH2	Low
32-34	Negligible
53	Negligible
54	Negligible
56	Negligible
64	Negligible
65	Negligible
68	Negligible
70	Negligible
72	Negligible
73	Negligible
79	Negligible
88	Negligible
106	Negligible
107	Negligible
108	Negligible
113A	Negligible
119	Negligible
123	Negligible
124	Negligible
126	Negligible
145	Negligible
148	Negligible
151	Negligible
291	Negligible

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Building number	Roosting Bat Potential
315	Negligible
317	Negligible
318	Negligible
405	Negligible
407	Negligible
410	Negligible
449	Negligible
460	Negligible
461	Negligible
465	Negligible
468	Negligible
470	Negligible
484	Negligible
491	Negligible
492	Negligible
544	Negligible
549	Negligible
551	Negligible
565	Negligible
568	Negligible
573	Negligible
TE10	Negligible
TE12	Negligible
TE13	Negligible
TE14	Negligible
TE16	Negligible
TE40	Negligible
UH11	Negligible
UH46	Negligible

3.2 TRANSECT SURVEY

3.2.1 The results of the transect survey were used to establish where the bat hotspots were around the site and therefore enable Thomson Ecology to undertake the dusk/dawn surveys in targeted locations. The results of the transect surveys are shown on Figure 3.

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

3.3 EMERGENCE SURVEY

3.3.1 The results of emergence surveys from Visits 1, 2 and 3 are summarised in Table 6 below, and shown on Figures 4a, 4b and 4c respectively.

Table 6: Results of the dusk emergence and dawn return to roost surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
Visit 1	23/06/10 (Dusk)	1	No bats seen to emerge	233 passes of common pipistrelle feeding and commuting around building 485 and 2 passes of brown long-eared bats commuting around building 485.	195.8 = Very High
		2	One common pipistrelle was seen emerging from the south side of building 474	Fifteen passes of common pipistrelle feeding and commuting around building 474 and two passes of <i>Pipistrellus</i> sp. commuting over building 474.	14.1 = Low
		3	No bats seen to emerge	One pass of a brown long-eared bat commuting over building 457, 30 minutes after sunset and 16 passes of common pipistrelle feeding around the west of building 457.	14.1 = Low
		4	No bats seen to emerge	Twenty two passes of common pipistrelle and four passes of soprano pipistrelle feeding and commuting around the north of building 474. Three passes of <i>Pipistrellus</i> sp. commuting over building 474.	24.1 = Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		5	No bats seen to emerge	Twelve passes of common pipistrelle and two passes of soprano pipistrelle feeding and commuting between building 132 and building 133.	11.6 = Low
		6	No bats seen to emerge	Thirteen passes of common pipistrelle commuting around building 457.	10.8 = Low
		7	No bats seen to emerge	Nine passes of common pipistrelle, two passes of soprano pipistrelle and one pass of <i>Nyctalus</i> sp. commuting around building 455. N bats were seen.	10 = Low
	24/06/10 (Dawn)	10	No bats were seen returning to roost	Twenty seven passes of common pipistrelle around building 485.	30 = Low
	11	No bats were seen returning to roost	Ten passes of common pipistrelle feeding and commuting around building 457 and four passes of brown long-eared bat commuting around building 457.	15.5 = Low	
	12	No bats were seen returning to roost	Six passes of common pipistrelle around building 455.	6.6 = Low	
	13	No bats were seen returning to roost	Seventy three passes of common pipistrelle and seven passes of <i>Myotis</i> sp. feeding around building 146.	88.8 = High	

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		14	No bats were seen returning to roost	111 passes of common pipistrelle, 22 passes of soprano pipistrelle and five passes of <i>Pipistrellus</i> sp. feeding around the north of building 133.	153.3 = Very High
		15	No bats were seen returning to roost	Three passes of soprano pipistrelle and two passes of common pipistrelle commuting around the south of building 133.	5.5 = Low
		16	No bats were seen returning to roost	27 passes of common pipistrelle feeding and commuting around the north of building 457.	30 = Low
	08/0710 (Dusk)	8	No bats seen to emerge	Nine passes of soprano pipistrelle and seven passes of common pipistrelle around building 133.	13.3 = Low
	08/0710 (Dusk)	9	No bats seen to emerge	Eleven passes of common and seven passes of soprano pipistrelle around the south of building 133.	15 = Low
	09/07/10 (Dawn)	17	No bats were seen returning to roost	Seven passes of common pipistrelle, 24 passes of soprano pipistrelle and three passes of brown long eared around building 474.	37.7 = Medium
		18	No bats were seen returning to roost	Twenty four passes of common pipistrelle and one pass of a leisler's bat around building 485.	27.7 = Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
	14/07/10 (Dusk)	19	No bats seen to emerge	Twenty passes of common pipistrelle and six passes of soprano pipistrelle feeding and commuting between building 132 and building 133.	21.6 = Low
		20	No bats seen to emerge	192 passes of common pipistrelle and 34 passes of brown long-eared bats feeding and commuting between building 445 and building 446.	188.3 = Very High
		21	No bats were seen to emerge	Sixty four passes of common pipistrelle and one pass of a noctule commuting around building 440.	54.1 = High
	15/07/10 (Dusk)	22	No bats seen to emerge	Two passes of common pipistrelle around building 471 and building 596. No bats were seen.	1.6 = Very Low
		23	No bats seen to emerge	No bats were recorded.	0 = Very Low
		24	No bats were seen to emerge.	One pass of a noctule commuting around building 459. The bat was not seen.	0.83 = Very Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		25	One common pipistrelle was seen to return to the northeast corner of building 446.	Fourteen passes of common pipistrelle and seven passes of soprano pipistrelle feeding and commuting around building 488 and one pass of a brown long-eared bat commuting south from building 488.	18.3 = Low
		26	No bats were seen returning to roost.	Fifty passes of common pipistrelle feeding around building 588.	41.6 = Medium
		27	No bats were seen returning to roost.	Forty three passes of common pipistrelle, 28 passes of <i>Pipistrellus</i> sp. and seven passes of soprano pipistrelle feeding and commuting around building 498.	65.0 = High
	16/07/10 (Dawn)	28	No bats were seen returning to roost	Twenty one passes of common pipistrelle feeding and commuting around over building 488 and one pass of a serotine commuting around building 488.	24.4 = Low
	29	No bats were seen returning to roost	Thirty passes of soprano pipistrelle and two passes of common pipistrelle feeding and commuting to the south of building 594.	35.5 = Medium	

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		30	No bats were seen returning to roost	Two passes of soprano pipistrelle and one pass of a common pipistrelle commuting around building 115. No bats were seen.	3.3 = Very Low
Visit 2	28/07/10 (Dusk)	1	No bats seen to emerge	Thirty three passes of common pipistrelle feeding and commuting around building 133 and one pass of a <i>Pipistrellus</i> sp. feeding around building 133.	28.3 = Low
		2	No bats seen to emerge	163 passes of common pipistrelle commuting and feeding around building 146.	135.8 = Very High
		3	No bats seen to emerge	Five passes of common pipistrelle around building 133.	4.1 = Very Long
		4	No bats seen to emerge	100 passes of common pipistrelle commuting and feeding around building 457.	83.3 = High
		5	No bats seen to emerge	Eleven passes of soprano pipistrelle, seven passes of common pipistrelle and two passes of brown long-eared bats commuting around building 455.	16.6 = Low
		6	No bats seen to emerge	Seventeen passes of common pipistrelle and three passes of soprano pipistrelle commuting around building 455.	16.6 = Low
		7	No bats seen to emerge	Seven passes of <i>Pipistrellus</i> sp, nine passes of soprano pipistrelle, three passes of common pipistrelle and six passes of brown long eared around building 474.	20.8 = Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
	29/07/10 (Dawn)	8	One common pipistrelle returned to roost on north east of the building	Twenty six passes of common pipistrelle and 20 brown long eared passes around building 485	51.1 = High
		9	No bats were seen returning to roost	Three passes of common pipistrelle around building 474.	3.3 = Very Low
		10	No bats were seen returning to roost	Sixteen passes of common pipistrelle, five passes of soprano pipistrelle and one pass of a brown long-eared bat commuting north of building 455.	24.4 = Low
		11	No bats were seen returning to roost	Two passes of common pipistrelle commuting around building 457 and one pass of a leisler's bat around building 457.	3.3 = Very Low
		12	No bats were seen returning to roost	Eighty three passes of soprano pipistrelle around building 455.	92.2 = Very High

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		13	No bats were seen returning to roost	Twenty nine passes of common pipistrelle feeding and commuting around building and five passes of soprano pipistrelle around building 457.	37.7 = Medium
		14	No bats were seen returning to roost	Three passes of common pipistrelle around building 133.	3.3 = Very Low
		15	No bats seen or heard	No bats were recorded.	0 = Very Low
	29/07/10 (Dusk)	16	No bats seen to emerge	118 passes of <i>Pipistrellus</i> sp, seven passes of soprano pipistrelle and 23 passes of common pipistrelle commuting and feeding around building 401 and 400.	123.3 = Very High
	17	No bats seen to emerge	Ninety passes of common pipistrelle feeding and commuting around building 440, two passes of <i>Pipistrellus</i> sp. and one pass of a <i>Nyctalus</i> sp. commuting around building 440.	77.5 = High	
	18	No bats seen to emerge	Seventeen passes of common pipistrelle and three passes of soprano pipistrelle feeding and commuting around building 593.	16.6 = Low	

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		19	One soprano pipistrelle seen to emerge from gap between concrete blocks on central pillar wall below roof on west side of building 598.	147 passes of common pipistrelle feeding and commuting around building 598 and two passes of soprano pipistrelle commuting around building 598.	124.1 = Very High
		20	No bats seen or heard	No bats were recorded.	0 = Very Low
		21	No bats seen to emerge	Sixty passes of common pipistrelle feeding and commuting around building, one pass of a noctule around building and one pass of a brown long-eared bat commuting over building 500.	51.6 = High
	30/07/10 (Dawn)	22	No bats seen or heard	No bats were recorded.	0 = Very Low
	23	No bats were seen returning to roost	Twenty six passes of common pipistrelle commuting between building 315 and 316. .	28.8 = Low	

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		24	No bats were seen returning to roost	Eleven passes of <i>Pipistrellus</i> sp., nine passes of soprano pipistrelle, seven passes of common pipistrelle and one pass of a brown long-eared bat commuting between building 54, building 56 and building 59.	31.1 = Medium
		25	No bats were seen returning to roost	Two common pipistrelle, one soprano pipistrelle and one brown long eared pass.	4.4 = Very Low
		26	No bats seen or heard	No bats were recorded.	0 = Very Low
		27	No bats were seen returning to roost	Eleven passes of common pipistrelle feeding around building 133.	12.2 = Low
		28	No bats were seen returning to roost	Seven passes of soprano pipistrelle, two passes of common pipistrelle and one pass of a <i>Pipistrellus</i> sp. commuting around building 133.	8.3 = Low
	05/08/10 (Dusk)	29	No bats seen to emerge	Three soprano pipistrelle and three common pipistrelle commuting around building 712.	5 = Very Low
	30	No bats seen to emerge	Thirty two passes of common pipistrelle commuting and feeding around building 712.	26.6 = Low	

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
Visit 3	09/08/10 (Dusk)	5	No bats seen to emerge	Seventeen passes of common pipistrelle feeding and 29 passes of soprano pipistrelle around building 133.	38.3 = Medium
	10/08/10 (Dawn)	6	No bats were seen returning to roost	Six passes of soprano pipistrelle and one pass of common pipistrelle around building 133.	7.7 = Low
	10/08/10 (Dusk)	1	No bats seen to emerge	Fifty seven passes of common pipistrelle commuting and feeding between buildings 450 and 400.	47.5 = Medium
		3	No bats seen to emerge	Thirty five passes of common pipistrelle commuting and feeding and one pass of a noctule bat.	29.1 = Low
		7	No bats seen to emerge	Sixteen passes of common pipistrelle feeding, two passes of soprano pipistrelle, one pass of brown long eared bat and one pass of noctule around building 480.	16.6 = Low
		9	No bats were seen returning to roost	Thirty five passes of common pipistrelle and 11 passes of soprano pipistrelle commuting and feeding around building 593.	38.3 = Medium
		11	No bats were seen returning to roost	Thirty seven passes of common pipistrelle commuting and feeding to the north of building 488 and one pass of a noctule bat.	31.6 = Medium
	11/08/10 (Dawn)	2	No bats seen or heard	No bats were recorded.	0 = Very Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		4	No bats were seen returning to roost	Two passes of common pipistrelle.	2.2 = Very Low
		8	No bats were seen returning to roost	Eleven passes of soprano pipistrelle around building 480.	12.2 = Very Low
		10	No bats were seen returning to roost	Three passes of common pipistrelle commuting around building.	3.3 - Very Low
		12	No bats were seen returning to roost	Four passes of a common pipistrelle feeding	4.4 = Very Low
	11/08/10 (Dusk)	13	No bats seen to emerge	Fifteen passes of common pipistrelle feeding around building 407.	12.5 = Low
		14	No bats seen or heard	No bats were recorded.	0 = Very Low
		15	No bats seen to emerge	Two passes of common pipistrelle.	1.6 = Very Low
		16	No bats seen to emerge	Seven passes of common pipistrelle commuting and 24 passes of pipistrelle species.	25.8 = Low

Waterman Energy, Environment and Design
Heyford Park, Oxfordshire
Bat Surveys

Visit Number	Date	Surveyor Location	Details of bats emerging from or returning to building	Incidental results of return to roost survey	
				Species and description of behaviour	Overall level of activity ((Passes / survey time) 100)
		17	No bats seen to emerge	Eighty passes of common pipistrelle commuting and feeding between buildings 59 and 65.	66.6 = High
	12/08/10 (Dawn)	18	No bats were seen returning to roost	Twenty four passes of common pipistrelle and five passes of soprano pipistrelle commuting and feeding between building 443 and 444.	32.2 = Medium
		19	No bats were seen returning to roost	Seventeen passes of common pipistrelle around building 596.	18.8 = Low
		20	No bats were seen returning to roost	Four passes of common pipistrelle and nine passes of brown long eared bat commuting and feeding between buildings 445 and 544.	14.4 = Low
		21	No bats were seen returning to roost	Twenty nine passes of common pipistrelle feeding over building 103.	32.2 = Medium
		22	No bats were seen returning to roost	Two passes of pipistrelle species.	2.2 = Very Low