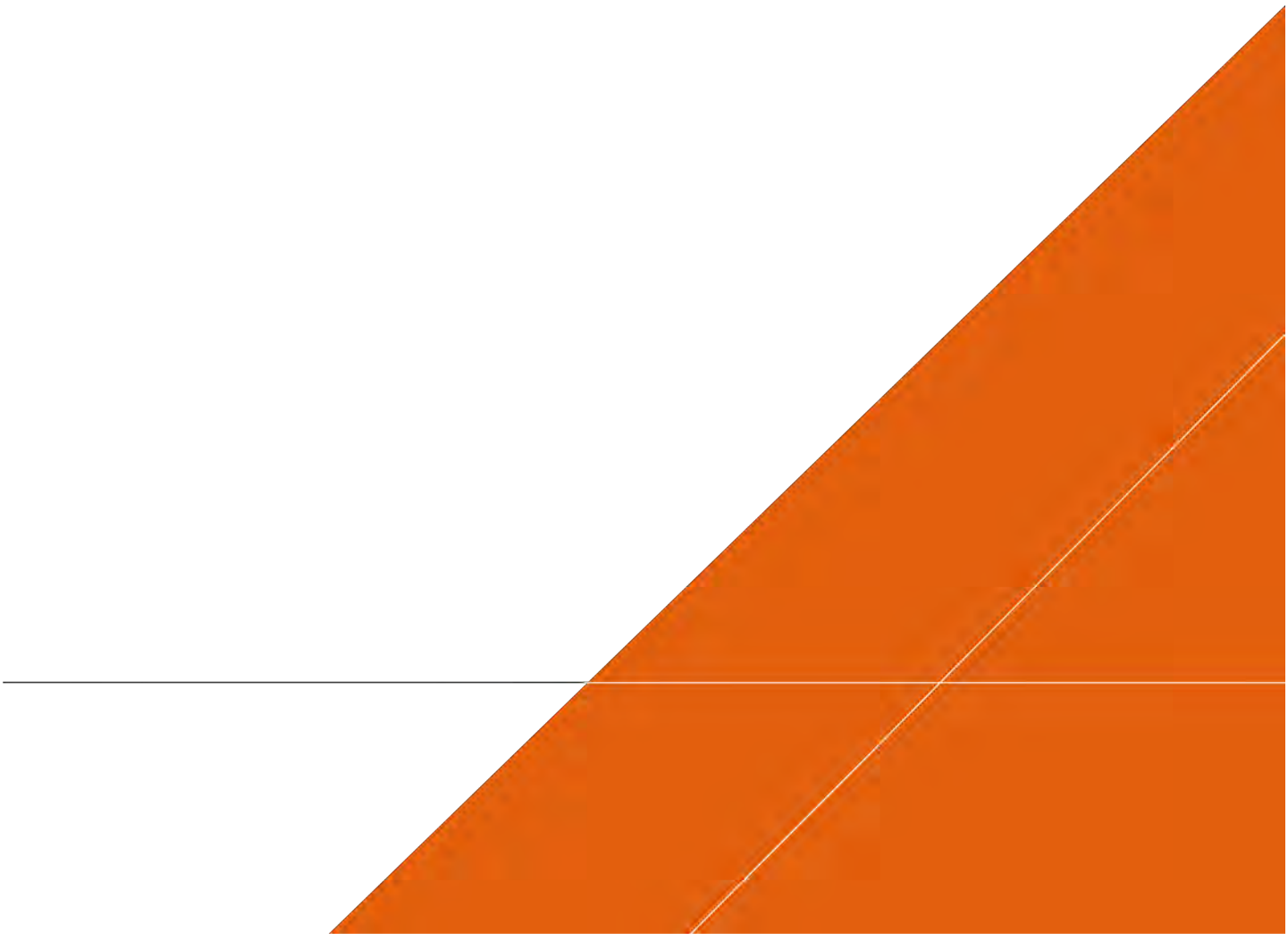
OTTERPOOL PARK ENVIRONMENTAL STATEMENT

Appendix 7.12 - Bat Activity Survey (Transects) 2017 and 2021

MARCH 2022



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Executive Summary

Arcadis Consulting (UK) Limited has been commissioned on behalf of Otterpool Park LLP to undertake bat transect surveys to inform an Environmental Impact Assessment (EIA) for the proposed new development and accompany an outline planning application. The proposed development is 'Otterpool Park', a garden settlement located within Folkestone, Kent. The development area has been identified as an 'area of search'; hereafter, the area of search is referred to as "the site".

The site is located within Folkestone, Kent within the administrative boundary of Folkestone and Hythe District Council (FHDC) and spans a large area located immediately south of Junction 11 of the M20. The site is approximately 589ha and is largely agricultural in nature with the majority of the site comprising arable and pasture fields, a disused horseracing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas.

This report describes wide-scale bat transect surveys undertaken over a season in 2017 and again in 2021, to a defined repeatable methodology. The surveys conducted are considered sufficient for the stage of planning for which they were conducted (master planning, EIA and outline planning submission).

In both 2017 and 2021, the assemblage of bats recorded on the site supported a reasonable number of species (with nine species being recorded and identified to species level) but the vast majority of bats recorded were common or soprano pipistrelle bats. Some rarer and / or less recorded bats were identified, where possible the important areas of the site for these species were identified during the surveys and subsequent data assessment.

During the surveys, important areas for commuting, foraging and roosting bats were identified. Measures to reduce the impact to these areas will be incorporated with the masterplan and outline planning. Mitigation measures to be employed would include:

- Creation of dark corridors within the development, that are designed to ensure that bats can continue to utilise the area;
- Retention and enhancement of foraging areas and connectivity between foraging areas;
- Creation of bat roosting features including bat barns and installation of tree roost boxes and roost boxes within structures;
- Where roads etc. cross commuting corridors, planting / underpasses / bridges to ensure that bats can continue to traverse these features.

The survey, when combined with the other bat surveys referred to within this document, is considered sufficient to inform the EIA, allow for masterplan design and to inform outline planning. However, due to the details of the proposed development and the requirement for an extended build out, subsequent surveys are likely to be required to inform each phase of the development at the detailed design stages (i.e. Tiers 2 and 3). These surveys will inform detailed planning and construction mitigation.

1 Introduction

1.1 Overview

1.1.1 Arcadis Consulting (UK) Limited has been commissioned on behalf of Otterpool Park LLP to undertake bat transect surveys to inform an Environmental Impact Assessment (EIA) for the proposed new development and accompany an outline planning application. The proposed development is 'Otterpool Park', a garden settlement located within Folkestone, Kent. The development area has been identified as an 'area of search'; hereafter, the area of search is referred to as "the site". This report presents the results of bat transect surveys conducted in 2017 and 2021.

1.2 Site Location and Setting

1.2.1 The site is located within Folkestone, Kent within the administrative boundary of Folkestone and Hythe District Council (F&HDC) and spans a large area located immediately south of Junction 11 of the M20. The site is largely agricultural in nature with the majority of the site comprising arable and pasture fields, a disused horseracing course with an artificial lake ('Folkestone Racecourse Lake'), areas modified from historical use (airfields), existing historic settlements and relatively new industrial areas.

1.2.2 The M20 motorway, Channel Tunnel Rail Link and Westenhanger Station are located to the north of the site, beyond which lie the villages of Stanford and Postling within a largely rural setting including the Kent Downs Area of Outstanding Natural Beauty (AONB). This AONB extends to the east, beyond which lies the town of Hythe, and to the south where it includes Lympne village. The site also includes the settlements of Barrowhill, Sellindge, Westenhanger and Newingreen. Lympne Industrial Park and some areas of woodland are located immediately south of the site. In addition, East Stour River flows through the site in a north-east to west direction. The site is centred on BNG TR 111 363.

1.2.3 An aerial image illustrating the site is presented in Image 1.

Image 1: Aerial imagery of the site.

1.3 Proposed Development

1.3.1 The proposed Otterpool Park Area Development is located on approximately 589ha of land within the wider study area as shown in Image 1. The planning application seeks permission for a new garden settlement accommodating up to 8,500 homes (Use Classes C2 and C3) and Use Class E, F, B2, C1, Sui Generis development, including use of retained buildings as identified, with related infrastructure, highway works, green and blue infrastructure, with access, appearance, landscaping, layout and scale matters to be reserved. A summary of the maximum floorspace areas for each land use type is provided in Chapter 4: The Site and Proposed Development of the Environmental Statement (ES).

1.4 Bat biology

1.4.1 Within the UK there are 18 species of bats, with 17 species which breed in the UK. All of the UK species of bats eat insects and locate their prey utilising echolocation.

1.4.2 Bats roost in multiple places during the year. Locations which bats utilise for roosting include houses and buildings, trees, caves and mines. Within buildings, bats are most often found under tiles and slates and within loft spaces.

1.4.3 Throughout the year, bats utilise multiple different roosting locations. Bats hibernate between approximately November and March. Bats hibernate in cool quiet locations where temperatures are stable. When the weather warms up in spring, bats emerge to feed. UK bats mate in the Autumn and the females store the sperm until spring. Pregnant females tend to gather together in maternity roosts to give birth, usually giving birth to one offspring per year. The females suckle the offspring for four to five weeks, until they are developed enough to fly.

1.4.4 The table below outlines the light tolerance and roosting preference for the bat species recorded within the desk study or within the site.

Table 1: Basic ecological information on the bat species recorded on the site

Species / Species Group (Common Name)	Latin Binomial	Light Tolerance	Roost Sites
Serotine	*Eptesicus serotinus*	Light tolerant. Will forage around artificial lights	Roosts in buildings in cavities and sometimes found in trees.
Daubenton's Bat	*Myotis daubentonii*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Roosts in hollow trees, bridges and sometimes buildings close to water.
Natterers' Bat	*Myotis nattereri*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Roosts in tree holes and different types of building.
Leisler's Bat	*Nyctalus leisleri*	Light tolerant. Will forage around artificial lights	Roosts in trees, bat boxes, and buildings including houses.
Noctule	*Nyctalus noctule*	Light tolerant. Will forage around artificial lights	Roosts almost exclusively in tree holes.

Species / Species Group (Common Name)	Latin Binomial	Light Tolerance	Roost Sites
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Light tolerant. Will forage around artificial lights	Hibernation roosts in hollow trees and crevices in cliffs.
Common Pipistrelle	*Pipistrellus pipistrellus*	Light tolerant. Will forage around artificial lights	Maternity colonies usually found in buildings. Will roost in crevices. Males will roost in buildings and trees and in bat boxes.
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Light tolerant. Will forage around artificial lights	
Brown Long-eared Bat	*Plecotus auritus*	Not tolerant of light. Artificial light may impact upon foraging and commuting.	Maternity roosts found in trees, in the voids of large old buildings and in bat boxes in woodlands. Bats require enough space for unobstructed internal flight.

1.5 Bat Legislation

1.5.1 Bats are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are subject to the provisions of Section 9 of the Act, which make it an offence to:

- intentionally or recklessly disturb a wild animal listed on Schedule 5 whilst it is occupying a structure or place which it uses for shelter or protection;
- intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a wild animal listed on Schedule 5;
- sell, offer or expose for sale, or to possess or transport for sale alive or dead wild animal listed on Schedule 5 or any part of or anything derived from a wild animal listed on Schedule 5.

1.5.2 Bats are also listed on Schedule 2 (European protected species of animals) of the Conservation of Habitats and Species (Amendment) (EU exit) Regulations 2019 and are subject to the provisions of Regulation 41 which makes it an offence to:

- deliberately capture, injure or kill any wild animal of a European protected species;
- deliberately disturb wild animals of any such species (where disturbance is likely to impair their ability to survive, breed or reproduce, rear or nurture their young; or to hibernate or migrate; or to affect significantly the local distribution or abundance of the species);
- damage or destroy a breeding site or resting place of such an animal; or
- be in possession of, control, transport, sell or exchange, or offer for sale or exchange any live or dead animal of such a species or any part of a wild animal or anything derived from an animal or any part of an animal of such a species.

1.6 Policy

1.6.1 The loss of existing roost and foraging sites is an important factor in the decline in bat populations and national planning policy has been devised to halt or reverse this decline.

The NPPF (National Planning Policy Framework (2021)) (HMSO 2021)

1.6.2 Paragraph 179 of the NPFF, states that: plans should*:*

- identify and map components of the local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
- promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species and identify and pursue opportunities for securing measurable net gains for biodiversity.

1.6.3 Paragraph 180 states that: *When determining planning applications, local planning authorities should apply the following principles: If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.*

1.6.4 In addition to the NPPF, the NERC Act 2006 (HMSO 2006) lists priority species which are a material consideration within planning decisions, on Section 41 of the Act (this supersedes the UK Biodiversity Action Plan - BAP species list). Seven of the British bats are listed as Priority Species. Species listed on Section 41 (S41) are presented in Table 2 below.

Table 2: Bat species listed on S41 of the NERC Act 2006

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

1.7 Conservation status of bats

1.7.1 Of the 14 bat species that have been recorded in Kent, only four of these are considered ‘common’. Daubenton’s bats are relatively common near water, common and soprano pipistrelle and brown long-eared bats are common and widespread throughout the county. Noctule, serotine, Natterer’s and Leisler’s bats are uncommon and the other species recorded within the county scarce or rare. A summary of the status of the bats in Kent is presented in Table 3, information obtained from Kent Bat Group (Kent Bat Group 2018).

1.7.2 The main threats to bats in the UK are thought to include:

- Building and development work, leading to loss or damage of roosts;
- Loss of habitat through development and land use change; and
- The intensification of agriculture, inappropriate riparian management and changes in land use; leading to a decline of insect prey and loss of connectivity for feeding and commuting (BCT 2018).

Table 3: Conservation status of bat species in Kent and the UK (information obtained from Kent Bat Group (Kent Bat Group 2018))

Common name	Scientific name	UK status	Kent status
Greater horseshoe bat	*Rhinolophus ferrumequinum*	Native, very rare and endangered	Not considered present
Lesser horseshoe bat	*Rhinolophus hipposideros*	Native, rare and endangered	Not considered present
Whiskered bat	*Myotis mystacinus*	Native, locally distributed	Scarce and elusive
Brandt's bat	*Myotis brandtii*	Native, common in west and north England, rare or absent elsewhere	Rare and elusive
Bechstein's bat	*Myotis bechsteinii*	Native, very rare	Very rare (see ES Appendix 7.14 for further information)
Daubenton's bat	*Myotis daubentonii*	Native, common throughout much of the UK	Common near water
Natterer's bat	*Myotis nattereri*	Generally scarce	Scarce
Serotine	*Eptesicus serotinus*	Native, widespread in southern Britain	Widespread but declining
Noctule	*Nyctalus noctula*	Native, generally uncommon, but more numerous in well-wooded areas	Generally uncommon, declining
Leisler's bat	*Nyctalus leisleri*	Native, widespread, scarce in GB, common in Northern Ireland	Scarce, may be under-recorded
Common pipistrelle	*Pipistrellus pipistrellus*	Native, common across the UK	Common
Soprano pipistrelle	*Pipistrellus pygmaeus*	Native, common across the UK	Common
Nathusius' pipistrelle	*Pipistrellus nathusii*	Native, rare	Scarce, often migrant
Barbastelle	*Barbastella barbastellus*	Native, widespread but rare	Not present or very rare (see ES Appendix 7.14 for further information)
Brown long-eared bat	*Plecotus auritus*	Native, common	Common
Grey long-eared bat	*Plecotus austriacus*	Native, very rare	Not present or very rare
Alcathoe's bat	*Myotis alcathoe*	Native, uncertain distribution	Insufficient data, status uncertain, probably rare

2 Approach and Methodology

2.1 Introduction and Overview

2.1.1 This report outlines the results of the bat roost assessments of the buildings on and around the site, and subsequent backtracking and emergence /re-entry surveys conducted across the site. This report should be read alongside the following reports:

- Otterpool Park EIA bat building assessment and emergence / re-entry surveys (ES Appendix 7.13);
- Otterpool Park EIA bat static detector surveys report (ES Appendix 7.14); and
- Otterpool Park EIA bat survey summary and impact assessment (ES Appendix 7.11).

2.1.2 This report also provides information on the habitat assessment and desk study conducted to inform the surveys.

2.2 Purpose of the surveys, proportionality and design

2.2.1 The purpose of the transect surveys was threefold:

- To identify the assemblage of bats utilising the site (in conjunction with the bat static automated detector surveys, see specific survey report);
- To identify the usage of the site by commuting and foraging bats, and to identify key, important areas;
- To identify any areas where bats are likely to be roosting (in conjunction with the bat building assessment and emergence and re-entry surveys (see specific report). In particular, this applied to areas where access was not permitted. These surveys are not intended to identify individual roosts (unless these are incidentally observed within the surveys).

2.2.2 The purpose of obtaining this data was in order to:

- Inform an Ecological Impact Assessment, within and Environmental Impact Assessment, to determine the potential impact of the proposed development upon bats;
- To inform the masterplan design of a development to minimise impacts to bats,
- To provide sufficient information to allow the proposed development to proceed to the outline design planning stage;
- To provide information to allow an overview of the likely mitigation required to mitigate for impacts to bats within the development;
- To inform the requirement for any subsequent surveys to be completed within each phase of the subsequent development.

2.3 Habitat assessment

2.3.1 In order to inform the survey design, a habitat assessment was undertaken to identify habitats and areas likely to be if value for bats. This Assessment was undertaken on 4, 5 and 6 October 2016 by Arcadis ecologists Guy Stone and Brandon Murray, combined with a Phase 1 habitat survey. During this survey, key habitat areas, including likely commuting routes, foraging areas and roosting locations were identified. These assessments were utilised to design and scope the bat surveys.

2.3.2 Update surveys across the site have been conducted throughout 2017 – 2021.

2.4 Desk study

2.4.1 A desk study was conducted to collate and review existing information regarding bats within the site and the surrounding area. A selection of resources was utilised to inform the desk study, including publicly available data sets, previous survey information regarding the site obtained from previous planning applications and from local record centres. Initially, records centre data from a desk study requested in May 2016 was utilised to inform the surveys, with an updated information request for records within a 2km radius of the site from Kent and Medway Biological Records Centre (KMBRC) obtained in March 2018. An updated information request was obtained from KMBRC in April 2020.

2.4.2 The following data was reviewed to inform the desk study:

- Aerial photography (e.g. google mapping);
- WYG (2016) Shepway District Council, Folkestone Kent, Extended Phase 1 Habitat Survey Ecology Report (Ref 7.20);
- Highways England (2016) M20 Lorry Area Stanford West Interim Environmental Assessment Report (Ref 7.21);
- Ecotricity (2012) Harringe Brooks Wind Park Environmental Statement (Ref 7.22);
- Peter Brett Associates LLP (2015) Link Park Phase 2 Supplementary Environmental Statement Non Technical Summary (Ref 7.23);
- CSA Environmental Planning (2013) Ecological Appraisal – Lympne, Former Lympne Airfield – Proposed Housing Development (Ref 7.24);
- Ecology Solutions Ltd (2014) Ecological Assessment, Land at Sellindge, Kent;
- NBN Atlas https://nbn.org.uk/.

2.5 Survey design and methodology

2.5.1 Transect surveys are surveys where surveyors (in a two person team) walk a predetermined route around the site, recording bat activity on a portable hand held bat detector. During these surveys, Elekon Bat loggers were utilised. Throughout a transect, ‘stops’, locations where surveyors pause for 3-5 minutes are conducted. Within these surveys, between 10 and 20 stops were conducted. During the survey, in addition to recording bat activity on the detectors, notes are taken on the behaviour of the bats observed.

2.5.2 Dusk transects commence prior to sunset (up to 30 minutes before sunset) and proceed for up to two hours after sunset. Dawn transect commence approximately 2 hours prior to dawn and commence until sunrise.

2.5.3 The transect routes were initially proposed to fulfil the following requirements (requirements from bat survey good practice guidance and in order to fulfil the purpose of the surveys):

- Transect routes were designed to cover all of the broad habitat types present within the site area;
- Transect routes followed, or transacted features likely to be key bat commuting routes (where access was permitted);
- Transect routes were designed to be of a length whereby they could be walked in the two hours following sunset or prior to sunrise;
- Transects were positioned to pass the periphery of areas where bats could be roosting, but access was not permitted / obtained, in order to obtain information on the likelihood of the presence of bat roosts. In addition, the transects allowed some information on the usage of the site by bats emerging from these areas.

- Transects were designed to cover areas of the site likely to be of high value for bats, in order to obtain information on the assemblage of bats utilising the site.

2017 Surveys

2.5.4 These transects were conducted monthly between April and September, 2017. Each transect route was walked in both directions, alternating between visits (where access permitted). Each survey was also conducted at both dusk and dawn on consecutive days, in line with appropriate guidance, on one occasion within the survey season.

2.5.5 Full details of the dates, times and weather conditions during the surveys can be found within Appendix A. In total, over 76 hours of transect surveying were conducted across the site in 2017.

2.5.6 The details of the ecologists who conducted the surveys can be found within Appendix A.

2021 Surveys

2.5.7 These transects were repeated monthly between April and September, 2021. Each survey was also conducted at both dusk and dawn on consecutive days, in line with appropriate guidance, on one occasion within the survey season.

2.5.8 Full details of the dates, times and weather conditions during the surveys can be found within Appendix A.

2.5.9 The details of the ecologists who conducted the surveys can be found within Appendix D.

2.6 Data analysis

2.6.1 Subsequent to the completion of the surveys, the recordings from the Elekon Bat loggers were analysed within the Elekon propriety software (Bat Explorer). For the 2017 surveys, this data analysis was completed by Liat Wicks (Bat Licence Number 2015-10211-CLS-CLS), for the 2021 surveys this analysis was conducted by Alex Burrows. All outputs from Bat Explorer were manually reviewed and verified. The data from this analysis is utilised within the results tables assessing the bat assemblage data. Where two detectors were used on a survey, subsequent to analysis, the detector which recorded the higher level of bat passes was utilised (to avoid duplication of results).

2.6.2 This analysed data was assessed alongside the manual ‘in-the-field’ notes from the surveyors, which contained visual observations to provide a more qualitative assessment of the data. This was used to infer information such as where bats are likely to be roosting, where important foraging areas are, and where it is likely that bats are commuting.

2.6.3 Prior to mapping, the analysed Batlogger data was reviewed, and where a number of passes were likely attributable to a single foraging bat (from reviewing the field data), this was reduced to a single point for the mapping, to allow analysis of the findings of the data.

2.7 Other bat surveys

2.7.1 Alongside the transect surveys, a range of other surveys were conducted, to thoroughly assess the usage of the Otterpool Park site by bats.

2.7.2 The results from the surveys are compiled and assessed holistically in the associated EIA (ES Chapter 7: Biodiversity) and in the Targeted Species Mitigation Strategy (ES Appendix 7.18).

2.7.3 The following surveys were conducted, and the results of these surveys can be seen in the appropriate report.

Desk study

2.7.4 Prior to the surveys commencing, in order to determine the likely usage of the site by bats, a desk study was conducted. This obtained any data of any bats, bat roosts or signs recorded within 2km of the site. The data from this survey was used to determine the level of survey required (ES Appendix 7.13).

Preliminary roost assessments (buildings)

2.7.5 Alongside the surveying reported within this document, a preliminary roost assessment of buildings was conducted. This assessed the likelihood of these structures supporting significant bat roosts. Details of these surveys is reported in the Preliminary Roost Assessment and Bat Emergence / Re-Entry Surveys Report (ES Appendix 7.13).

Bat emergence / re-entry surveys

2.7.6 Subsequent to the Preliminary Roost Assessments, where a moderate or high likelihood of significant bat roosts being present was identified, emergence / re-entry surveys were conducted. The results of these surveys are reported in the Preliminary Roost Assessment and Bat Emergence / Re-Entry Surveys Technical Appendix (ES Appendix 7.13).

Static automated surveys

2.7.7 Alongside the transect surveys, static (automated) detector surveys were conducted. These assessed the assemblage of bats present within and around the site. The details of these surveys are presented in the Static Automated Surveys report (ES Appendix 7.14).

2.8 Survey limitations

2.8.1 During the surveys a small number of limitations were encountered. These were not considered to have significantly impacted the results of the surveys or subsequent analyses but are noted within this section for transparency.

2.8.2 The principal limitation of the reported surveys is that the numbers of passes recorded demonstrate only relative bat activity, and not bat numbers. Relative bat activity is therefore used to determine the importance of different areas to bat species / species groups and cannot be used to infer where the greatest number of individuals may be found.

2.8.3 The detection rate of bats varies between species dependent upon the parameters of their echolocation calls. It is very important to recognise these differences in the inferences that are drawn from the raw data.

2017 Limitations

2.8.4 During the April surveys, the Elekon Batloggers being used to complete the transect surveys were unable to obtain a GPS connection (the reason for this is unknown). As a result, an alternative professional bat detector, a Wildlife Acoustics ‘EM Touch’ coupled to an Apple iPad was utilised. This data was analysed as opposed to the data from the Batloggers within the data analysis.

2.8.5 During the April surveys, the weather was suboptimal (April and early May were very cold in 2017). Initial surveys conducted on 24th April were abandoned due to bad weather and low temperatures. Low numbers of bats were detected in the subsequent April transects. Also, due to weather conditions and access constraints, a subset of the April Transects (on Transects 2 and 4) were conducted in early May (not in mid-April as proposed).

2.8.6 During the season, due to health and safety considerations (such as the presence of livestock in fields), tall crops and changing access arrangements, the transect routes were modified. In addition, during the survey period, additional information regarding the evolving

masterplan was obtained and the transects were modified to better cover the proposed development areas.

2.8.7 During the August transects, due to access restrictions and the timings of the surveys, the transects on areas 4 and 5 could not be conducted. These surveys were conducted in September.

2021 Limitations

2.8.8 Access to areas in the west of the site was not permitted in 2021. Areas adjacent to Harringe Brooks Wood were not accessed, the results from 2017 were used to assess this area, and this is not considered to have impacted the results.

2.8.9 During the 2021 surveys, some of the transects proposed were within fields which were found to have tall crops next to the field boundaries. Where this was the case, the transects were modified to account for this, with the routes utilising adjacent areas where required. Overall, the transects covered were largely as planned, and this is not considered to have impacted the results of the surveys.

2.9 Data analysis limitations

2.9.1 The Batloggers trigger at recordings above a certain level which is set to minimise noise files from background noise. Bats observed and heard in the field by the surveyor were added manually to the Batlogger data when the audio levels where such that they failed to automatically record. These were added when the bat was recorded to species level by the field surveyor, with suitable a level of confidence.

3 Results

3.1 Reporting Outline

3.1.1 The summary of the results of the transect surveys is presented in this section. Detailed results from each survey are presented in Appendices A and B. Figures are presented as follows:

- Desk study data is presented in Figure 1;
- Initially proposed transect locations for 2017 and 2021 are presented in Figure 2;
- Transect results for each of the surveys conducted each month in 2017 are presented in Figures 3 to 9;
- All of the transect results combined from 2017 are presented in Figure 10;
- Results per bat species / group from 2017 are presented in Figures 11 to 18;
- A summary of the activity transect assessment and Target Notes from 2017 are presented in Figures 19 and 20;
- Transect results for each of the surveys conducted each month in 2021 are presented in Figures 22 – 28;
- All of the transect results combined from 2021 are presented in Figure 30;
- Results per bat species / group from 2021 are presented in Figures 31 to 36;
- A summary of the activity transect assessment and Target Notes from 2021 are presented in Figures 37 and 38; and
- Proposed dark corridor locations and other mitigation measures are presented in Figure 21.

3.1.2 Bat related appendices within the ES are outlined below, in Table 4.

Table 4: Bat related appendices and information within the ES

Appendix	Title	Description
7.11	Bat survey results summary and impact assessment	This appendix includes a summary of all of the bat surveys conducted, a valuation of the bats present within and around the site (where appropriate) and outlines the potential impacts from the development.
7.12	Bat Activity Survey (Transects)	This appendix includes the results of the bat activity transects conducted across the site in 2017 and 2021.
7.13	Bat Building Assessment and Emergence / Re-entry Surveys	This appendix includes the results of the building assessments conducted across the site in 2017 to 2021 and the emergence/ re-entry surveys conducted across the site in 2017 to 2020.
7.14	Bat static detector surveys	This appendix includes the results of the static (i.e. automated) detector surveys conducted across the site in 2017 and 2021.

3.2 Habitat assessment

3.2.1 The habitat assessment conducted in October 2016 identified multiple habitats of potential value to bats. This included:

- Hedgerows likely to be utilised for foraging and commuting;
- Trees and buildings suitable for roosting;

- Streams, rivers and ponds likely to be utilised for foraging and commuting;
- Woodlands likely to be valuable for foraging and roosting;
- Grasslands and arable habitats likely to be utilised for foraging.

3.2.2 Overall, when the site was considered as a whole, it was assessed that it offers moderate habitat for bats consisting of good habitat connected to the wider landscape that could be used by bats, with large areas of lower value habitats (such as the intensively farmed arable fields). However, certain habitats within the site are of potentially high value to bats, including the woodlands, river and tree lined stream corridors, and water bodies.

3.2.3 The overall assessment of the potential value of the habitats within site was used to determine the surveys required to inform the EIA, design the masterplan and inform the required mitigation. The update habitat walkover surveys undertaken in 2020 and 2021 confirmed that the site had not significantly changed and a comparable effort to that undertaken in 2017 was appropriate in 2021.

3.3 Desk study

3.3.1 The desk study revealed that no designated sites are present within 2km of the site and no Special Areas of Conservation (SACs) where bats are a qualifying feature occur within 30km of the site. Due to the long lived and site loyal nature of bat species no time limit was placed on the data examined (all data received from KMBRC was reviewed.

3.3.2 The information from KMBRC (which included information from Kent Bat Group) returned records of nine bat species within 5km of the site. The table below (Table 5) presents a summary of the desk study data obtained from the KMBRC.

Table 5: Summary of Desk Study Data

Species	Records (non-roost)	Records (roosts)
Soprano pipistrelle	48	22
Common pipistrelle	190	34
Nathusius' pipistrelle	4	6
Noctule	28	1
Serotine bat	42	54
Brown long-eared bat	18	54
Daubenton's bat	24	5
Whiskered Bat	1	0
Natterer's Bat	4	9

3.3.3 Multiple records of roosts were returned from within 5km of the site. Where sufficient accuracy for these results was provided, these locations are presented on Figure 1. The roosts listed within Table 6 are located within the site or in the immediate vicinity of the site.

3.3.4 N.B. Roosts identified as a component of the Otterpool project are identified in ES Appendix 7.13 and are not repeated here to avoid double counting.

Table 6: Bat roosts recorded within the vicinity of the Otterpool site

Roost Location	Species	Roost Type	Notes	Year recorded
Within Barrow Hill, Sellindge TR108375	Unknown	Unknown	Droppings only	1992
Within Westenhanger Village TR127368	Pipistrelle	Unknown roost	1 bat	2000
By Railway station building TR128372	Unknown	Unknown	N/A	1989
Two Chimneys, Westenhanger Village TR128365	Pipistrelle	Unknown	1 bat	1988
Within Lympne village TR119350	Pipistrelle	Maternity	One bat recorded	2007
Within Lympne village TR119350	Pipistrelle	Maternity Roost	Maternity roost recorded on multiple dates peak count 114 bats in 1995.	1995, 1999, 2007, 2008
Within Otterpool Manor TR109365	Common pipistrelle	Summer roost	2 bats (see notes from wind farm surveys below)	2009
South of the site by Lympne Castle TR119347	Serotine	Unknown	Droppings only	2001
Within Stanford TR129377	Long-eared species	Hibernating bat	1 bat	2010

3.3.5 Information was also obtained from previous surveys conducted on and around the site that informed other planning decisions.

Table 7: Data from other sources (previous planning applications)

Information Source	Data obtained
CSa – Former Lympne Airfield – Proposed Housing Development, Ecological Appraisal, January 2013.	Static surveys conducted in July, August and September 2012 on Lympne Airfield site (Ordnance Survey Grid Reference TR 114 353). 'Low' bat activity recorded across the site, higher activity recorded in certain locations. Species recorded were common pipistrelle and pipistrelle species. Static detectors were placed onsite in July 2012 and September 2012. Species recorded were common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, pipistrelle species (not identified to species), long-eared bat species (not identified to

Information Source	Data obtained
	species), noctule, serotine, 'big bat' species (not identified to species), and myotis bat (not identified to species). Structures with low potential for roosting bats were identified around the periphery of the site including bunkers.
TEP, Link Park Green Energy, ES volume 1 Chapter 7: Biodiversity, Surveys conducted in 2013	Transect and static surveys conducted in 2013 on a former quarry site around TR 112 366 Low levels of commuting and foraging by common pipistrelle bats recorded across the site. Soprano pipistrelle, serotine and myotis bats (not identified to species) were also recorded. Static surveys showed steady moderate levels of bat foraging along the woodland edge.
Ecotricity, Harringe Brooks Wind Park Environmental Statement April 2012.	Bat roost assessments conducted in 2009. Bat static and transect surveys conducted in 2009. Fifty five trees around the proposed wind farm location were identified as having medium bat roost potential. Bat roost assessments found three structures within Otterpool Manor (TR 109 365) had high bat roost potential. One building was confirmed as having a common pipistrelle roost. At Harringe Court (TR 094 370) three buildings were identified as having medium bat roost potential. Activity surveys were conducted in 2009. During the survey 253 bat passes were recorded. Species recorded included Daubenton's bats, common pipistrelle bats, soprano pipistrelle bats and Leisler's bats. The largest number of bat passes was recorded within or adjacent to Harringe Brooks Woods or towards the East Stour River.
Ecology Solutions Ltd, Land at Sellindge, Kent, Ecological Assessment July 2014.	Surveys conducted in 2013 included tree assessments and bat activity transects around the Sellindge extension site (TR103380). The tree assessments found no confirmed bat roosts. The activity transects recorded low levels of activity within higher levels of activity along hedgerows, near tree belts and water bodies. The only species recorded within the transect surveys was common pipistrelle.
Highways England, Collaborative Delivery Framework M20 Lorry Area – Stanford West Bat Report	Surveys were conducted around TR123377. Tree and building assessments, transects and habitat assessments were conducted. The tree and building assessments conducted in 2016 found three trees with a high potential roosting features; six trees and one building with moderate roosting potential and one tree and one building with low roosting potential. A transect survey conducted in 2016 recorded common pipistrelle, soprano pipistrelle and myotis bats (not identified to species level).

3.4 Bat survey results - bat assemblage results 2017

Assemblage of bats – overall 2017

3.4.1 During the transect surveys, nine species of bat were recorded. A number of Myotis and "big bats" (Leisler's, noctule and serotine) couldn't be determined to species. Overall, the vast majority of the bats recorded on the site were pipistrelle species (common and soprano pipistrelle formed over 90% of the bat passes recorded).

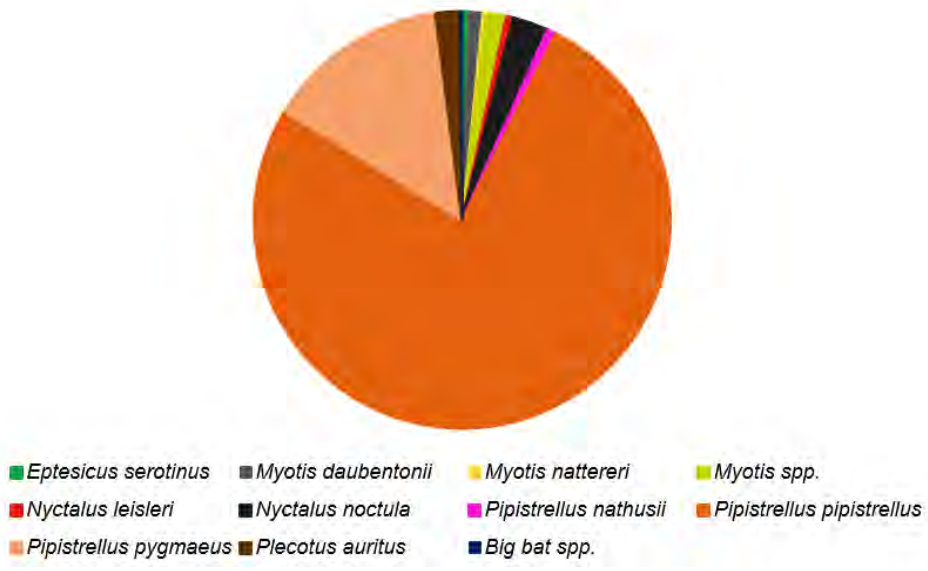
3.4.2 The assemblage of species recorded within the site was as shown in the table below (Table 8).

Table 8: Summary of bats recorded during the transect surveys

3.4.3 Common name	3.4.4 Scientific name	3.4.5 Number of Passes	3.4.6 Percentage of passes
Serotine	*Eptesicus serotinus*	8	0.5
Daubenton's bat	*Myotis daubentonii*	18	1.1
Natterers' bat	*Myotis nattereri*	5	0.3
Myotis bat	*Myotis spp.*	26	1.6
Leisler's bat	*Nyctalus leisleri*	9	0.5
Noctule	*Nyctalus noctule*	46	2.8
Nathusius' pipistrelle	*Pipistrellus nathusii*	12	0.7
Common pipistrelle	*Pipistrellus pipistrellus*	1267	76.3
Soprano pipistrelle	*Pipistrellus pygmaeus*	236	14.2
Brown long-eared bat	*Plecotus auritus*	31	1.9
'Big bat'	*N/A*	3	0.2
TOTALS	Grand Total	1661	100

3.4.7 Image 2 represents the proportions of each bat species recorded.

Image 2: Assemblage of bats recorded during the 2017 activity (transect) surveys



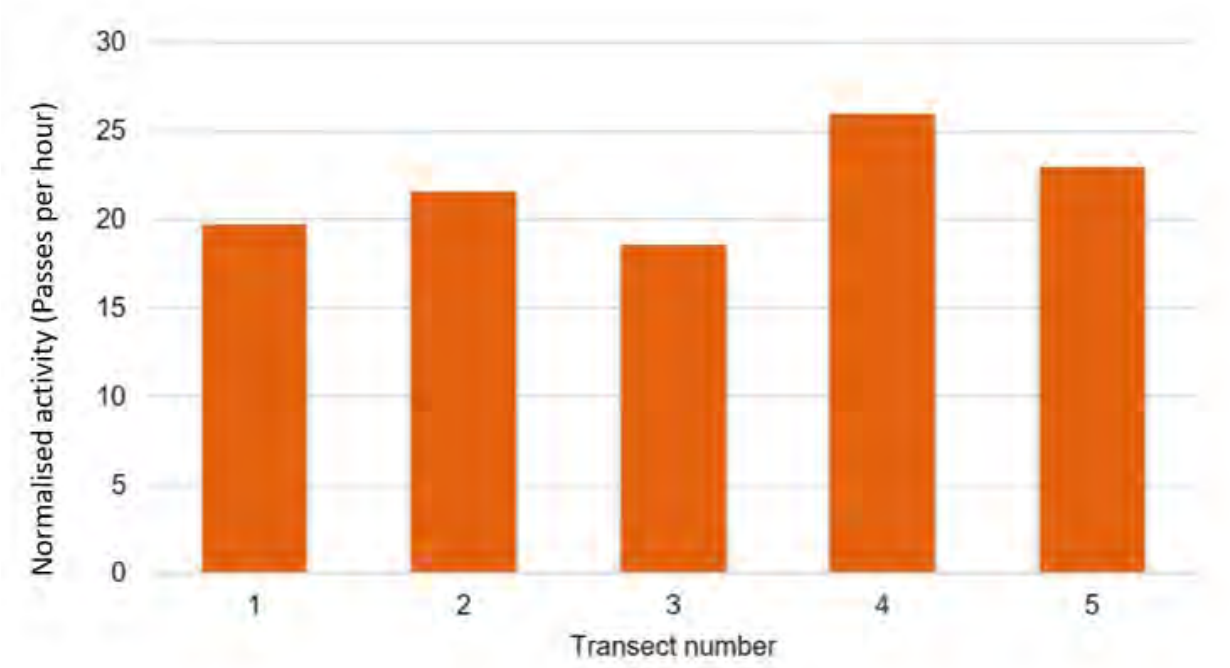
3.4.8 Overall, the assemblage of bats recorded during the transect surveys was relatively diverse, with a greater species diversity than that recorded within the desk study.

3.5 Bat activity results 2017

Bats activity (overview) 2017

3.5.1 To assess the relative levels of activity across the Otterpool site, a normalised activity value of 'passes per hour' was calculated. This was calculated by dividing the total number of passes by the number of hours surveying conducted on each transect. Details of these passes are presented in Appendix A : Survey Details and Weather Information.

Image 3: Bat activity recorded during the 2017 activity (transect) surveys (per transect)



3.5.2 When reviewed, each of the transects had largely comparable levels of activity overall, with a normalised 'Activity' value of 18 to 26 passes per hour. Transect 4 had slightly higher activity levels than the other transects, attributable to the high levels of activity recorded adjacent to the ancient woodland (Harringe Brooks Woods). Transect 3 had a lower level of activity than the other transects, largely attributable to the large expanse of lower quality, homogenous habitat present within the Lympne Airfield area.

3.5.3 As the transects had largely comparable activity levels, it was deemed appropriate to review the bat usage of the site recorded in 2017 within each of the transects. The following sections outline the assessment of these results.

3.5.4 Overall, the highest levels of activity were associated with woodland areas, river and stream corridors, and dense, species rich hedgerows.

3.5.5 The subsequent sections address the importance of distinct areas within each of the transect areas for bats. This assessment is broken down into two sections, the importance for bats overall (as an assemblage) and the areas assessed as having importance for each species.

Areas of importance for foraging bats 2017

3.5.6 Table 9 outlines the areas identified as being important for foraging bats during the 2017 transect surveys. This table should be reviewed alongside Figures 19 and 20 which combine the commuting and foraging results and display the Target Notes.

Table 9: Areas of importance for foraging bats

Target Note	Area	Description and notes
3	Around Stone Street	Largely records of pipistrelle bats foraging around street lights. Is contiguous with a foraging route between Sandling Park and the site.
2	Racecourse Lake	A very important foraging area for multiple species, including the less recorded species such as Daubenton's bats, myotis genus bats and noctule. Large numbers of pipistrelle bat foraging passes were also recorded.
8	Along East Stour River	Foraging activity recorded in most transect surveys, along the tree line and within the field edges.
9, 10	Along ditches / hedgerows south of the East Stour	Foraging activity along these areas was recorded along these routes, particularly in the August transect. These foraging areas are contiguous with commuting routes.
13	Along rear of Barrowhill Sellindge conurbation	Foraging activity by light tolerant species such as pipistrelle bats.
15	Around Park Wood	Lots of foraging activity was recorded around this woodland and the surrounding field margins (which are unmanaged / neutral semi-improved grassland). Common and soprano pipistrelle were recorded, along with noctule.
19, 20	Around Harringe Brooks Woods and nearby hedgerows	Extensive foraging activity was recorded around the periphery of this woodland in almost all surveys. In this area, foraging by the rarer species was also recorded, including foraging by Leisler's Bat, Natterer's bat, Myotis bats and Noctule. In this location the rarer bats formed a significant proportion of the calls recorded.
22	Along tree / hedge line	Foraging, largely by common and soprano pipistrelle bats was recorded within this area, with low numbers of passes from noctule and Nathusius' pipistrelle. Bat calls were recorded in this area close to sunset and sunrise, suggesting a roost of common pipistrelle bats may be nearby.
26	Around lorry park	Low levels of foraging activity were recorded in this area (within a larger area of very low activity). Brown long eared bats were recorded foraging in this area (which were under recorded in the surveys.
28	Around landscape bunds	Around the landscape bunds surrounding the Link Park, foraging by light tolerant species (Noctule, common and soprano pipistrelle bats) was recorded.
30	Around Sycamore copse south of the site	Foraging around the small copse of Sycamore trees within the south east of the airfield was recorded. This was predominantly common pipistrelle bats, likely bats associated with the roost identified within the data search, which is located within Lympne village to the east.

Target Note	Area	Description and notes
31	Along East Stour Tributary	Along this tributary, significant levels of foraging activity were recorded, including activity from the rarer species, including noctule and brown long-eared bats (which tend to forage in darker areas).
32	Along hedgerow	Foraging by common and soprano pipistrelle bats was recorded in this area. This hedgerow was also a commuting route for a low number of bats, likely coming from the buildings along the A20 to the north.
33	Around large pond	Around a large pond, significant levels of foraging activity by bats including common pipistrelle and Daubenton's bats was recorded.

Bat commuting features within the Otterpool Park site 2017

3.5.7 This table should be reviewed alongside Figures 19 and 20 which combine the commuting and foraging results and display the Target Notes. This information will be key in determining the requirements for 'dark corridors' within the development.

Table 10: Locations where bat commuting was noted during the bat activity surveys 2017

Target Note	Area	Description and notes	Dark Corridor Proposed?
1, 3	Between Sandling Park and the Racecourse	A commuting route from Sandling Park to the East and Folkestone Racecourse to the west.	No – This area is already lit by the A20 and Stone Street lighting. A dark corridor is not considered necessary.
6	Between Stone Street and the racecourse lake	This commuting route was inferred from bat behaviour at either end of the area (it was inaccessible). Commuting behaviour in this area was particularly noted in the July transect.	No – Largely used by light tolerant species.
7	Along river corridor within castle grounds, along railway corridor and south along river corridor/ hedgerow	Bats were recorded commuting in these areas, largely heading to / from the river areas to the southeast.	No – This area was lit at the times of the survey. Species present included largely light tolerant species, including common and soprano pipistrelle bats, and noctule.
8	Along river corridor	In addition to the foraging in this area, commuting along the river corridor and surrounding trees was recorded in almost all surveys.	Yes – This area is not currently lit and will form the predominant area of the ecological mitigation within the core of the development.
9	Along defunct hedge / ditch north of the A20	Commuting by common pipistrelle bats recorded	No – Only commuting by common pipistrelle bats recorded.
10	Hedgerow to the north of the A20	A commuting route towards the A20 and habitats beyond, utilised by common and soprano pipistrelle bats and noctule.	Yes – Appears to be an important route between the river area north of the A20 and the habitats to the south west.

Target Note	Area	Description and notes	Dark Corridor Proposed?
14	Ditch between Park Wood and East Stour.	Significant numbers of common and soprano pipistrelle bat passes recorded in the transects.	Yes – Appears to be important for foraging and commuting bats travelling between Park Wood in the south and the River East Stour to the north west.
16	Railway corridor and species rich hedgerows	This area was important commuting route, particularly from the railway in the north to the river corridor in the south.	Yes – This area is likely to be utilised by a significant number of bats and was unlit at the time of the surveys.
17	Along river corridor	This area was utilised by both foraging and commuting bats.	Yes – Dark at time of surveys and utilised by significant numbers of brown long-eared bats (light sensitive) in this area.
18	North / south ditch between Harringe Brooks Woods and the East Stour River Corridor	Access to the central portion of this corridor was limited due to access concerns; commuting bats were recorded extensively at each end of this corridor, suggesting it is an important north- south route for bats.	Yes – Largely the only north – south link for bats within this area. A single brown long-eared bat was recorded in the south of the corridor.
22	Defunct hedge and trees within arable field	Both commuting and foraging activity was recorded along this feature. Particularly high commuting activity was recorded in June and August. It is suggested that bats known to be roosting in the nearby farm may utilise this corridor to access foraging areas around the large trees to the south of the hedgerow or access the woodland to the west (Harringe Brooks Woods) – although evidence of bats crossing the arable field was not recorded.	Yes – Trees will need to be buffered / remain unlit, especially as roosts may be present (See TN 35).
31	Along tributary to East Stour south of the A20	In almost all surveys, bat activity, including commuting and foraging was recorded.	Yes – A significant level of commuting activity, along with foraging activity was recorded, including commuting by light sensitive bat species (including brown long-eared bat) and the rarer species (Leisler's Bat and Daubenton's Bat).
32	Along hedgerows between East Stour Tributary and Houses / structures south of the A20	This area was not surveyed in all transects due to access considerations, but when surveyed, high levels of commuting activity were recorded, including records of rarer species including serotine.	Yes – It is suggested that bats known to be roosting in the structures are utilising this hedgerow to commute between the roosts, small woodlands and the river corridor to the south.
37	Tributary between A20 (connected to stream south of the A20) and the river	This area did not receive a significant level of survey effort but considering the level of bat activity to the south and north, it is considered	Yes – is the only connectivity between the stream to the

Target Note	Area	Description and notes	Dark Corridor Proposed?
	corridor to the north.	that in the balance of probability, this is an important commuting route.	south of the A20 and the river to the north.

Areas where activity was low or absent 2017

3.5.8 Table 11 presents areas where bat activity was notably absent.

Table 11: Areas where bat activity was notably absent 2017

Target Note	Area	Description and notes
4	Within in the east of the Study Area, between Stone Street and the A20	This area received significant survey effort during 2017, but very low levels of bat activity were recorded. This is likely due to the management of the area as intensively farmed arable fields. Development in this area is unlikely to significantly impact large numbers of foraging or commuting bats. It should be not that the emergence / re-entry surveys revealed roosts in this area (ES Appendix 7.13)
11	Fields to the west of Westenhanger castle and east of Barrowhill Sellindge	Within this area, very low levels of bat activity were recorded, likely due to the absence of foraging or commuting habitats for bats. Development in this area is unlikely to significantly impact large numbers of foraging or commuting bats
12	River corridor to the north of the 'seven furlongs' east of Barrowhill Farm	From the Preliminary Ecological Appraisal (PEA) it was expected that this area would be of importance for bats. However, it appears that low number of bats utilise this area. This potentially allows development in this area which may impact upon the river corridor to a greater degree (i.e. closer development with less risk of impacts from lightspill).
23	Arable fields to the west of Otterpool Lane	During the surveys, very low levels of activity were recorded. This is likely due to the management of the area as intensively farmed arable fields. Development in this area is unlikely to significantly impact large numbers of foraging or commuting bats.
24, 38	Arable fields to the east of Harringe Court and around Somerfield Court Farm	This area, despite having coverage during a number of the transects, had very little recorded bat activity. Development in this area is unlikely to significantly impact large numbers of foraging or commuting bats.

Key areas for bats (by species) 2017

3.5.9 Notable individual species are mapped separately on Figure 11 to Figure 18. The overall distribution of certain species demonstrated that for certain species and species groups, distinct areas of the site were of higher importance, which impacts upon the mitigation prescriptions in these areas. Where this is the case, this is reported below. The species for which the distribution was notable were:

- Serotine and Leisler's bat;
- Myotis bats (including those differentiated to species level);
- Noctule;
- Nathusius' pipistrelle;
- Brown long-eared bats; and

- Common and soprano pipistrelle bats

3.5.10 The distribution of the records of these bats is discussed below.

Serotine and Leisler's bats

3.5.11 Low numbers of these bats were recorded during the surveys. The Leisler's bat passes were sparse, but there were notable clusters around the Westenhanger Castle and associated buildings (in the north of the site) and around the lake and stream around Target Notes 31 and 33. These clusters of activity around the stream were also mirrored in the serotine records, suggesting that this area is of important for these rarer, 'big-bat' species.

Myotis bats

3.5.12 With the exception of a few scattered records, the majority of the records of myotis bats were recorded in a few distinct locations. Areas around the Folkestone Racecourse Lake and Westenhanger Castle appear to be important for this species group. However, the most important area for these bats appears to be around Harringe Brooks Woods, where the vast majority of the records of these species was recorded.

Noctule

3.5.13 Within the site, noctule records were scattered widely across the site, with a few areas particularly notable for this species, namely the area around the castle and grounds, and around the stream / large pond south of the A20 (Target Notes 31 and 33). The usage of this area was mirrored by usage by serotine and Leisler's bats.

Nathusius' pipistrelle

3.5.14 Only a very few records of Nathusius' pipistrelle were obtained, these were scattered across the site. In general, these bats appeared to be utilising areas important for other pipistrelle species. The Folkestone Racecourse Lake and an area adjacent to Harringe Brooks Woods appeared to be important for this species.

Brown long-eared bat

3.5.15 These bats were notable in a few locations, namely along the East Stour Tributary south of the A20, around the Racecourse Lake and along the East Stour in the west of the site.

Likely Roosting locations 2017

3.5.16 This section of the report only outlines likely roosts identified within the transect surveys and does not comment upon other roosts identified within other surveys (emergence surveys etc). Further roosts identified are reported in the building report Appendix 7.13 and summarised in the associated EIA chapter.

Table 12: Roosting locations identified within the transect surveys 2017

Target Note	Area	Description and notes
1	Houses east of Stone Street	Within this area, behaviour indicative of a roost within a row of terrace houses was recorded. It is considered likely that a common pipistrelle roost is present in this structure (roost type unknown). These houses are currently outside of the redline for the proposed development.

Target Note	Area	Description and notes
7	Trees around castle and racecourse grounds.	Within this area, noctule activity was recorded very soon after the commencement of the surveys. This was also recorded on the emergence surveys in this area. It is considered likely that a roost (within a tree as noctules are primarily tree roosting) is present within this area.
34	Within Harringe Brooks Woods	The activity around this area was indicative of the presence of roosts. Considering the habitat within the woodland, the presence of multiple roosts is considered likely.
35	Within large trees to the south of a defunct hedgerow.	Within the surveys, bats were recorded within this area very close to the start / end of the survey period, and the behaviour of the bats recorded suggested roosts may be nearby.

3.6 Bat survey results - bat assemblage results 2021

Assemblage of bats – overall 2021

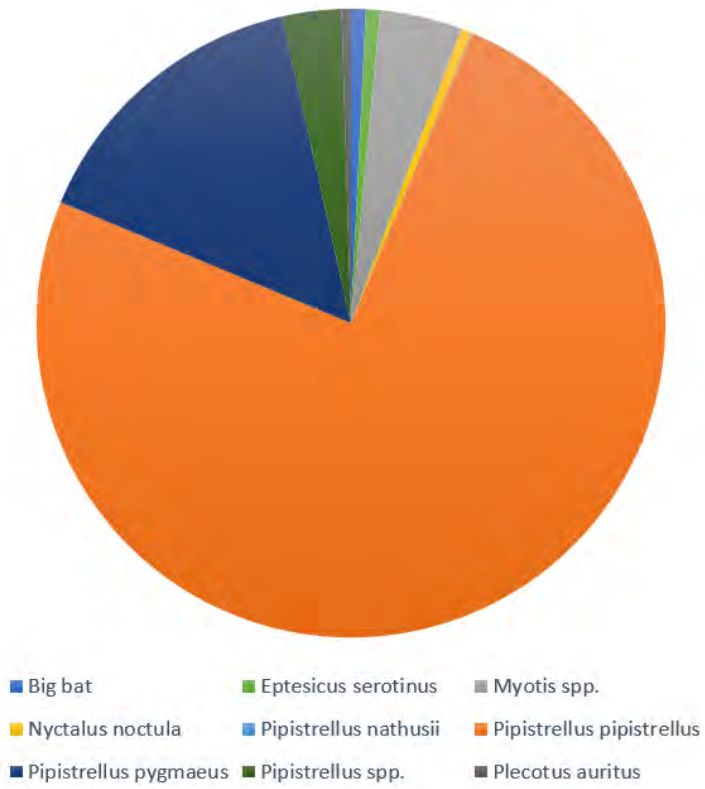
3.6.1 During the transect surveys, six species of bat were recorded to species level. A number of *Myotis*, *Pipistellus* and "big bats" (Leisler's, noctule and serotine) couldn't be determined definitively to species level. Overall, the vast majority of the bats recorded on the site were pipistrelle species (common, soprano and unidentified pipistrelles formed over 90% of the bat passes recorded).

3.6.2 The assemblage of species recorded within the site was as shown in the table below (Table 13). Image 4 presents the proportions of each bat species recorded

Table 13: Summary of bats recorded during the transect surveys 2021

Common name	Scientific name	Number of Passes	Percentage of passes
Big bat	N/A	21	0.8
Serotine	*Eptesicus serotinus*	20	0.7
Myotis bat	*Myotis spp.*	117	4.2
Noctule	*Nyctalus noctula*	15	0.5
Nathusius' pipistrelle	*Pipistrellus nathusii*	1	0.0
Common pipistrelle	*Pipistrellus pipistrellus*	2068	75.0
Soprano pipistrelle	*Pipistrellus pygmaeus*	419	15.2
Pipistrellus bat	*Pipistrellus spp.*	84	3.0
Brown long-eared bat	*Plecotus auritus*	13	0.5
Grand Total		2758	100.0

Image 4: Assemblage of bats recorded during the 2021 activity (transect) surveys



Comparison of bat assemblage between 2017 and 2021

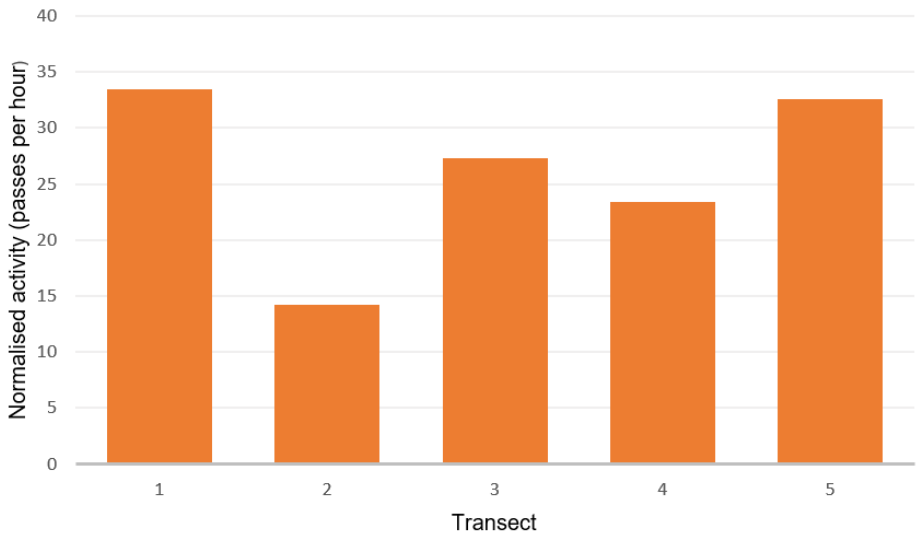
3.6.3 The surveys conducted in 2021 show a largely similar species composition to that recorded in 2017, the main difference being that no Natterers', Daubenton's or Leisler's bat were identified down to the species level in 2021. Both surveys showed the majority of passes were common or soprano pipistrelle bats. Overall, the assemblage of bats is comparable between 2017 and 2021, with minimal changes identified.

3.7 Bat activity results 2021

Bats activity (overview) 2021

3.7.1 To assess the relative levels of activity across the Otterpool site, a normalised activity value of 'passes per hour' was calculated. This was calculated by dividing the total number of passes by the number of hours surveying conducted on each transect. Details of these passes are presented in Appendix A.

Image 5: Bat activity recorded during the 2021 activity (transect) surveys (per transect)



3.7.2 When reviewed, each of the transects had largely comparable levels of activity overall, with a normalised 'Activity' value of 14 to 34 passes per hour. Transects 1 and 5 had slightly higher activity levels than the other transects, attributable to the high levels of activity recorded behind the housing seen at Barrowhill (Transect 1) and the high activity between Harringe Brooks Woods and the East Stour River Corridor. Transect 2 had a slightly lower level of activity than the other transects.

3.7.3 Overall, the highest levels of activity associated with woodland areas, river and stream corridors, and dense, species rich hedgerows. The subsequent sections address the importance of distinct areas within each of the transect areas for bats. This assessment is broken down into two sections, the importance for bats overall (as an assemblage) and the areas assessed as having importance for each species.

3.7.4 The 2021 transect results had a slightly higher level of activity than the 2017 results, but the activity was not notably higher (difference in weather could account for the level of difference between the two surveys). As such, it is not considered that there was a significant change between 2017 and 2021 in the bat activity across the site.

Areas of importance for foraging bats 2021

3.7.5 Table 14 outlines the areas identified as being important for foraging bats during the 2021 transect surveys. This table should be reviewed alongside Figure 37 which combine the commuting and foraging results and Figure 38 which displays the Target Notes.

Table 14: Areas of importance for foraging bats 2021

2021 Target Note	Area	Description and notes
1	Around Westenhanger Castle	This was largely common and soprano pipistrelle bats (roosts are known to be present in this area)

2021 Target Note	Area	Description and notes
5	Along ditches / hedgerows south of the East Stour	Foraging activity along these areas was recorded. These foraging areas are contiguous with commuting routes.
10	Within the east of the Study Area, between Stone Street and the A20	A number of pipistrelle species recorded here, associated with the railway.
12	Around large pond	Around a large pond, significant levels of foraging activity by bats including Pipistrellus and Myotis spp. were recorded.
15	Around Sycamore copse south of the site	Foraging around the small copse of Sycamore (*Acer Pseudoplatanus*) trees within the south east of the airfield was recorded. This was predominantly common pipistrelle, likely bats associated with the roost identified within the data search, which is located within Lympne village to the east.
17	Along boundary of upper Otterpool	Records of Common and other Pipistrellus spp.
18	Along trees / hedgerows to the west of Otterpool Lane	Mainly pipistrelle bats with noctule recorded (foraging over the fields and grassland to the south).
19	South of Harringe Brook Woods, just west of the application site boundary	Largely common pipistrelle bats recorded, part of the wider area of activity all around Harringe Brooks Wood (including the commuting area).
20	East of Harringe Brooks Woods	Important foraging area near woodland. Numbers of soprano and common pipistrelle recorded.
21	Around Harringe Brooks Woods and nearby hedgerows	Number of common pipistrelle and Myotis spp. recorded.
23	Along the East Stour River	Extensive foraging activity was recorded along the river corridor in the west of the site
25	Park Wood	Foraging activity all around this small woodland.
26	Just east of Barrowhill Sellindge conurbation	Records of common and soprano pipistrelle bats and rarer species including Myotis and serotine in this area.

Bat commuting features within the Otterpool Park site

3.7.6 This table should be reviewed alongside Figure 37 which combine the commuting and foraging results and Figure 38 which displays the Target Notes. This information will be key in determining the requirements for ‘dark corridors’ within the development.

Table 15: Additional locations where bat commuting was noted during the bat activity surveys 2021

2021 Target Note	Area	Description and notes	Dark corridor proposed?
2	Railway corridor north of Westhanger Castle	Largely records of pipistrelle bats, an important commuting route along the railway corridor.	No, but area is retained within a green buffer
3	Between East Stour and Railway line to the north	North - south commuting between the East Stour and the Railway Corridor	No, but area is retained within a green buffer, and a north / south route along the East Stour is a dark corridor.
4 /5 / 6	Along the East Stour River and Tributary	Records of common and soprano pipistrelle and some rarer bats The commuting on the north / south oriented section of the East Stour was not recorded in 2017.	Yes
9	Between Sandling Park and the Racecourse	Species including common pipistrelle and brown long-eared bat. A commuting route from Sandling Park to the East and Folkestone Racecourse to the west.	A dark corridor is proposed connecting Sandling Park to the Racecourse Lake (TN8)
11	Along Ashford Road to the west of Kiln Wood	A number of recorded common and soprano pipistrelle bats and few records of serotine.	A dark corridor is proposed connecting Sandling Park to the Racecourse Lake (TN8)
13	Along hedgerow	Foraging by common and soprano pipistrelle bats were recorded in this area. This hedgerow was also a commuting route for a low number of bats, likely coming from the buildings along the A20 to the north.	A dark corridor is proposed along the East Stour River tributary corridor
12 / 14	Along tributary to East Stour south of the A20	High bat activity, including commuting and foraging was recorded.	A dark corridor is proposed along the East Stour River tributary corridor
22	Between Harringe Brooks Wood and the East Stour River	Extensive commuting along this tributary to the East Stour	A dark corridor is proposed between Harringe Brooks Woods and the East Stour
23	Along the East Stour	Extensive commuting along this river	A dark corridor is proposed along the East Stour River
24	Railway corridor and species rich hedgerows	This area was important coming route, particularly from the railway in the north to the river corridor in the south.	This area is within a Natural Wetland area open space

Areas where activity was low or absent 2021

3.7.7 Table 16 presents areas where bat activity was notably absent during the 2021 surveys.

Table 16: Areas where bat activity was notably absent

2021 Target Note	Area	Description and notes
7	Along A20	Very few bats recorded along the road edge in this area.
8	Racecourse Lake	Although considered an important foraging area for multiple species, fewer bats were recorded here in 2021.
16	East of industrial site	Notable absence of bat records. This was also observed in 2017.

Key areas for bats (by species) 2021

3.7.8 Notable individual species are mapped separately on Figure 30 to Figure 36. The overall distribution of certain species demonstrated that for certain species and species groups, distinct areas of the site were of higher importance, which impacts upon the mitigation prescriptions in these areas. Where this is the case, this is reported below. The species for which the distribution was notable were:

- Serotine bats;
- Myotis bats (including those differentiated to species level);
- Noctule;
- Brown long-eared bats; and
- Common and soprano pipistrelle bats

3.7.9 The distribution of the records of these bats is discussed below.

Serotine bats

3.7.10 Low numbers of these bats were recorded during the surveys. Notable areas included around the Westenhanger Castle and associated buildings (in the north east of the site) and around the A20 corridor to the east of the site.

Myotis bats

3.7.11 Myotis bats showed a few scattered records. Areas included the north-west of the site above Harringe Brooks Wood (2021 Target Note 23) and to the east of the site near a large pond and tributary to East Stour (2021 Target Note 12).

Noctule / Leisler's / Big Bat

3.7.12 Within the site, noctule records were sparse and scattered widely across the site, area included a corridor along the A20 and the north-east corner of the industrial park on Otterpool Lane (2021 Target Notes 7 and 18). This is as would be expected with high flying bats such as noctule.

Brown long-eared bat

3.7.13 These bats were few but found present in particular locations, namely along the East Stour Tributary south of the A20, around the Racecourse Lake and along the East Stour in the west of the site.

Likely Roosting locations 2021

3.7.14 Within the 2021 surveys, no additional evidence of roosting was recorded beyond that noted in section 0.

Comparison of Bat activity from 2017 to 2021

3.7.15 The level of bat activity identified during the surveys conducted in 2017 and 2021 was relatively similar and comparable. Notable areas of activity difference included a high number of records of common and other pipistrelle along Ashford Road in the north-east of the site (2021 Target Note 11) identified in 2021 but not in 2017. In 2021, high levels of common and soprano pipistrelle activity were identified in the north of the site, directly east of the Barrowhill urban area, a potential corridor or foraging area, this was not recorded in 2017.

3.7.16 Fewer bats were recorded around the Folkestone Racecourse Lake in 2021 than 2017.

4 Discussion

4.1 Introduction

4.1.1 This section of the report outlines a description of the bats recorded on the site and the relative conservation status of these bats. A valuation of the individuals and the assemblage is presented in ES Appendix 7.11.

4.1.2 Overall, the approach to retention of key areas that was employed as a result of the 2017 survey includes all of the new areas that were identified for bats in 2021 (as the approach to design retained as much of the valuable habitat across the site as possible). No significant changes to the layout of the development are necessitated by the 2021 results. For example:

- The area between Barrowhill and the proposed development has a buffer area and Sustainable Drainage Systems (SuDS), retaining habitat for bats;
- The A20 by Sandling Park is to be relocated, creating a green buffer adjacent to the retained woodland, improving this area for bats; and
- The East Stour River and the area around Harringe Brooks Wood are retained for foraging and commuting bats.

4.2 Description and assessment of ecological features

Overall assemblage conservation status

4.2.1 The assemblage of bats recorded on the site is relatively diverse, with nine species being identified. Table 17, presents the distribution and population and conservation status of the bats recorded on the site. This is subsequently utilised to determine the likely value of these species.

Table 17: Details of the conservation status of the bats recorded within the site.

Common name	Scientific name	Distribution*	Estimated Population*	UK status*	Kent status**	UK BAP Priority Status
Serotine	*Eptesicus serotinus*	South of England and South Wales 'rarer' bat	15,000 (England - estimate relies on limited data)	Increase since 1999	Widespread but declining	N
Daubenton's Bat	*Myotis daubentonii*	Widespread in Britain 'rarer' bat	95,000 in England (Harris et al. 1995)	Stable / increasing in some parts of range since 1999	Common near water	N
Natterers' Bat	*Myotis nattereri*	Throughout British Isles 'rarer' bat	70,000 in England (Harris et al. 1995)	Potentially increasing since 1999	Scarce	N
'Myotis Bat'	*Myotis spp.*	N/A All 'rarer' bats	N/A	N/A	N/A	N/A
Leisler's Bat	*Nyctalus leisleri*	Rare but occurs throughout Britain 'rarer' bat	Insufficient Data	Insufficient Data	Scarce, may be under-recorded	N
Big bat	*N/A*	All 'rarer' bats	N/A	N/A	N/A	N/A
Noctule	*Nyctalus noctule*	England, Wales and Southwest Scotland	45,000 (England)	Stable since 1999	Generally uncommon, declining	N
Nathusius' pipistrelle	*Pipistrellus nathusii*	Widely recorded but sparse.	Insufficient Data	Insufficient Data	Scarce, often migrant	N
Common pipistrelle	*Pipistrellus pipistrellus*	Widely distributed – range extends	2,430,000 (UK)	Increasing since 1999	Common	N

Common name	Scientific name	Distribution*	Estimated Population*	UK status*	Kent status**	UK BAP Priority Status
		further north than soprano pipistrelle				
Soprano pipistrelle	*Pipistrellus pygmaeus*	Widely distributed in the UK with the exception of the far north of Scotland.	1,300,000 in UK	Population may have increased since 1999	Common	Y
Brown long-eared bat	*Plecotus auritus*	Throughout the UK, Ireland and the Isle of Man	155,000 in England	Stable since 1999.	Common	Y

*Information provided by JNCC BCT National Bat Monitoring Programme 2017

**Conservation status of bat species in Kent and the UK (information obtained from Kent Bat Group (2018) online, edited and compiled by Jessamy Battersby 2005 and Mammals of Kent Atlas 2001 - 2012.

Summary of species status on the site

Myotis bat

4.2.2 Overall, Myotis bats were a small proportion of the bat passes recorded, largely associated with a few distinct locations across the site. In total, approximately 40 'Myotis' passes were recorded in 2017, and 117 in 2021 generally associated with the periphery of Harringe Brooks Woods, the East Stour and it's tributaries the Racecourse Lake and a Pond south of the A20 (As presented in Figure 12 and Figure 31).

4.2.3 Overall, the site does not appear to support a significant population of Myotis bats.

Brown long-eared bat

4.2.4 Brown long-eared bats were relatively scarce across the site, with few passes recorded within the surveys in 2017 and 2021. This may be a result of the low detectability of brown long-eared bats (which echolocate very quietly). Brown long-eared bats are widespread in the UK (being the third most common species) and from the records returned by KMBRC

4.2.5 There is a relatively low number of brown-long eared bats recorded within the site.

Leisler's bat

4.2.6 Leisler's bats are relatively rare in Kent, with no records returned within the desk study data supplied by KMBRC. However, a Leisler's bat had previously been recorded on the site during the surveys to inform a proposed wind farm in the west of the site.

4.2.7 On site, Leisler's bats were found to be located across the site, but they were sparsely recorded. Within the vicinity of the site, no records were returned within the desk study obtained from KMBRC. Therefore, these results suggest that the Leisler's bats present on the site may be a notable population within the geographical context, therefore this species is assessed as having value in the local area.

Serotine bat

4.2.8 Serotine bats had a very limited distribution, only being recorded during two surveys in one location in 2017 (recorded on Transect 3 adjacent to a tributary of the East Stour). In 2021, this species was recorded more frequently, but sparsely across the site. Within the desk study, this species was recorded 20 times within 5km of the site, suggesting that there is a widely distributed population of this species in the local vicinity.

4.2.9 The site is likely to have local value for serotine bats.

Noctule

4.2.10 Noctule bats were also recorded across the site in 2017 and 2021, with clusters of records around the Westenhanger Castle area and along the tributary of the East Stour south of the A20. These are fast and high flying bats and can cover significant distances whilst foraging. Key habitats for these bats are meadows, which was mirrored in the results, with these bats being recorded where grassland was present, with no records within the arable areas of the site (in the west).

4.2.11 Noctule bats were recorded 28 times in the desk study, suggesting that this species is relatively common in the surrounding area.

4.2.12 Overall, it is assessed that the site is likely to have local value for noctule.

Common and soprano pipistrelle bats

4.2.13 Within the surveys, common and soprano pipistrelle bats were recorded extensively, foraging and commuting through habitats across the site.

4.2.14 Multiple records of pipistrelle bats were recorded around the site and these species are common and widespread within the UK. The desk study did reveal a large maternity roost within the vicinity of the site and a number of small roosts were recorded within the Arcadis emergence surveys in 2018 (for details please see ES Appendix 7.13). Overall, it is assessed that the site is likely to have local value for common and soprano pipistrelle bats.

Nathusius' pipistrelle

4.2.15 This species was recorded across the site at low density, largely associated with aquatic features across the site. Considering the limited number of Nathusius' pipistrelle bats recorded in the surrounding area (one record in the KMBRC data search) it is considered that the Nathusius' pipistrelle recorded on the Otterpool site are likely to be of value in the Folkestone and Hythe area. Overall, it is assessed that the site is likely to have local value for Nathusius' pipistrelle bats.

4.3 Potential habitat loss, degradation and fragmentation

Commuting routes

4.3.1 Where access roads are required within the development, commuting routes have the potential to be severed. Lighting related to any proposed development has the potential to disturb the usage of commuting routes by bats.

Foraging areas

4.3.2 Bat foraging areas have the potential to be impacted by the proposed works. Development has the potential to directly remove foraging areas through construction, isolation of foraging areas (through the severance of commuting routes), degradation of the value of foraging areas through habitat conversion, lighting or disturbance.

Roosts (confirmed)

4.3.3 Within the surveys reported within this report, a limited number of roosts were discovered. There is the potential for these roosts to be damaged, destroyed or isolated by the development if appropriate mitigation is not implemented.

Roosts (unconfirmed)

4.3.4 It was not the purpose of the surveys conducted to inform the EIA to identify all the roosts present within the site, only key roosts likely to have an impact upon the masterplan design. As such, a number of buildings which had low bat roosting potential were not surveyed. In addition, due to the extended buildout of the project, it was not practicable to conduct tree roosting surveys. However, the habitat details of the site have been extensively surveyed, and the location of buildings and trees which have the potential to support roosts is known. As such, it will be possible to identify potential impacts upon the roosts that these features may support. There is the potential for these 'unidentified' roosts to be damaged, destroyed or isolated by the development if appropriate mitigation is not implemented.

5 Mitigation recommendations and further survey

5.1 Design mitigation

5.1.1 Detailed bat mitigation for the proposed development will be formalised within the associated Bat Mitigation Strategy (ES Appendix 7.18). In summary, the following will be incorporated within the masterplan and proposed development in order to ensure that the conservation status of bats in and around the Otterpool site is maintained.

- Retention of key areas for bats, buffered with a suitably sized and designed buffer;
- Creation of dark corridors within the development, that are designed to ensure that bats can continue to use the area for commuting and foraging. These should be designed to limit light spill into these areas and maximise continuity of these dark areas, the core dark corridors should be based upon those areas identified in Table 10 and Table 15 and shown in Figure 19 and Figure 37.
- A lighting design across the entire site which limits light spill onto retained habitats and specifies that all artificial lighting must be directional and low light spill.
- Retention and enhancement of connectivity and foraging areas, especially the core important foraging areas identified within the table above Table 8 and Table 14 and shown in Figure 19 and Figure 37.
- Specification for creation of bat roosting features including bat barns and installation of tree roost boxes and roost boxes within newly created structures. These features should be positioned in locations adjacent to the retained / enhanced dark corridors.
- Where roads etc. cross commuting corridors, planting / underpasses / bridges to ensure that bats can continue to traverse these features. These will be designed and specified within the bat mitigation strategy.
- Design of water features and SuDS to create valuable feeding habitats for bats.
- Prescriptions for the provision of bat boxes within the developed parcels and within retained / created habitats.

5.2 Additional mitigation

5.2.1 During the build out of the development, the following will be required to ensure that impacts to bats are identified and can be adequately mitigated.

Construction mitigation

General

5.2.2 During the construction phase of the development, a range of measures will need to be implemented to ensure that impacts to bats are minimised. These measures would be specified within a Code of Construction Practice (CoCP) and would include (but not be limited to)

- Prescriptions for the provision of tool box talks for on-site contractors and staff, informing them of the legal protection afforded to bats;
- Prescriptions for site lighting to minimise the impacts and disturbance to bats (duration of works and construction lighting specifications);
- Buffers and offsets from sensitive areas for bats, to be fenced and protected appropriately.
- Appropriate measures are put in place to control dust and other emissions that could affect air quality.

- Site compounds, storage facilities and staff facilities are suitably bunded and located in places that would not have an adverse effect on the environment; in particular, the CoCP would ensure that retained trees are protected.
- In advance of site clearance, protective fencing is installed to protect retained and/or ecologically sensitive habitats (woodlands, mature trees and hedgerows) and their associated buffer zones to ensure that they are not subject to accidental damage (to be determined on a phase-by-phase basis).
- Haul routes, storage compounds and staff facilities would be located away from retained habitats to minimise disturbance to the species they support.
- An Ecological Clerk of Works is in place to oversee site clearance, in particular any works that have the potential to disturb notable receptors. They would also ensure that the mitigation measures proposed adhere to best practice guidelines and take account of any changes in legislation that may have occurred.
- The Ecological Clerk of Works would ensure that hedgerow translocation is undertaken in accordance with an agreed method statement. They would also ensure that the retained and translocated hedgerows are monitored to ensure that they are managed appropriately.

5.2.3 An ecological clerk of works would be employed to ensure that the ecological protection measures outlined in the CoCP are adhered to. They would also undertake regular monitoring to ensure that the protection measures remain in place for the time that they are required.

5.2.4 The Ecological Clerk of Works would report to the Site Manager and/or Environmental Clerk of Works to ensure that remedial actions are undertaken in a timely manner.

Roost mitigation and licensing

5.2.5 During demolition and tree removal on the site, there will be a need to safeguard roosting bats within structures and trees to be removed. This will need to be informed by up-to-date roost surveys. Disturbance or removal of any roosts is likely to require a licence form the statutory Authority (currently Natural England) and may specify:

- Dedicated mitigation;
- Specific timings for works;
- Displacement and exclusion of bats from structures;
- Supervision by a licensed ecologist of demolition works.
- Suitable alternative roosting provision will also be likely to be required, which may include bat barns and houses and / or bat boxes.

5.2.6 Details of licences that may be required are specified within Chapter 7: Biodiversity of the ES.

Operational Mitigation

Safeguarding habitats

5.2.7 In order to minimise the potential for operational impacts to the bat populations within the site, measures will be implemented to minimise these impacts. These are likely to include:

- Installation of new roosting opportunities including bat houses/barns and tree/structure mounted boxes (both as an enhancement within the new development and as mitigation for roost loss, where appropriate) will be conducted. This is outlined within the Targeted Species Mitigation Strategy (ES Appendix 7.18) but will be specified in detail

within the detailed planning for each zone / phase of the development (at Tier 2 and Tier 3 as appropriate).

- Implementation of a suitable lighting strategy, ensuring that dark corridors and areas important for foraging bats are kept dark; and
- Features being installed to limit access by humans in areas where disturbance may adversely impact bats. This could include fences or carefully deployed SuDS features.

Maintenance and monitoring

5.2.8 Maintenance and monitoring will be required of any retained or created habitats. An outline of the desired outcomes for the monitoring and maintenance is provided within a site Biodiversity Action Plan (BAP) (ES Technical Appendix 7.20). As each phase is brought forward for development, detailed strategies will be required for creation, management and maintenance of the habitats created will be required (this is beyond the remit of this document).

5.2.9 A broad outline of the locations of proposed habitat creation is provided within the Targeted Species Mitigation Strategy (ES Technical Appendix 7.18).

Design parameters for built parcels

5.2.10 The value of the built parcels for bats will be maximised (as specified at planning Tier 2 and Tier 3 as appropriate).

5.2.11 Native planting, including scrub and trees, will provide habitats and food sources for foraging and commuting bats. In addition, bat boxes may be strategically placed to target specific species, and a minimum number of bat boxes per a certain number of built structures and trees should be installed, to be determined separately.

5.2.12 Within the built parcels, parameters will be set (dependent upon the proposed density of the buildings) for the Green Infrastructure (GI) which will be of value for bats. This will include:

- Parameters for amounts of green roofs within built parcels;
- Parameters for the number of trees and street trees within built parcels;
- A dedicated lighting strategy will be required to minimise light spill; and
- Parameters for the number of additional bat roosts.

5.3 Further survey work

5.3.1 These surveys, when combined with the other bat surveys referred to within this document, are considered sufficient to inform the EIA, allow for masterplan design and to inform outline planning. However, due to the details of the proposed development and the requirement for an extended build out, subsequent surveys are likely to be required to inform each phase of the development (at Tier 2 and Tier 3 as appropriate). These surveys will inform detailed planning and construction mitigation and avoidance. This section of the report outlines the survey work likely to be required as the development progresses. The following surveys are likely to be required prior to and during the buildout:

- Further ‘Preliminary Roost Assessment’ (PRA) surveys of structures, as access to previously inaccessible areas is obtained;
- Further, and more detailed PRA and subsequent emergence / re-entry surveys to identify roosts to safeguard individual roosts or structures to be removed, once this is known. These should be phased to be conducted as each phase proceeds to planning and be designed to ensure that sufficient data can be collected to allow a licence to be

obtained (determined by the current best practice and licence guidelines at the time of the development);

- Assessment of the roosting potential of trees, especially those identified within these surveys as likely to support bat roosts; once the details of tree impacts and removal is known. These should be phased as each parcel proceeds to planning.
- The assessments above are likely to prompt the requirement for emergence / re-entry surveys to be completed on trees within the development area.
- Throughout the development buildout and subsequent to buildout completion, monitoring of the bat usage of the site will need to be conducted, to determine any significant changes in the usage of the site by the recorded assemblage of bats.

6 Conclusions

6.1.1 Within the activity transect surveys, no Annexe II species (as listed on the Habitats Directive (HMSO 2019) were recorded within the site or its environs. The surveys conducted are considered sufficient for the stage of planning for which they were conducted (masterplanning, EIA and outline planning submission).

6.1.2 The assemblage of bats recorded on the site supported a reasonable number of species (with nine species being recorded) but the vast majority of bats recorded were common or soprano pipistrelle bats. Some less recorded bats were identified (particularly Myotis bats, 'big bats' and brown long-eared bats), where possible the important areas of the site for these species were identified.

6.1.3 During the surveys, important areas for commuting, foraging and roosting bats were identified. Measures to reduce the impact to these areas will be incorporated with the masterplan and outline planning. Mitigation measures to be employed would include:

- Creation of dark corridors within the development, that are designed to ensure that bats can continue to utilise the area;
- Retention and enhancement of connectivity and foraging areas;
- Creation of bat roosting features including bat barns and installation of tree roost boxes and roost boxes within structures;
- Where roads etc. cross commuting corridors, planting / underpasses / bridges to ensure that bats can continue to traverse these features.

6.1.4 The surveys, when combined with the other bat surveys referred to within this document, are considered sufficient to inform the EIA, allow for masterplan design and to inform outline planning. However, due to the details of the proposed development and the requirement for an extended build out, subsequent surveys are likely to be required to inform each phase of the development (at Tier 2 and Tier 3 as appropriate). These surveys will inform detailed planning and construction mitigation and avoidance.

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Figure 1: Desk study results – bat roosts

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Legend

- Areas of search / study area
- Outline Planning Application Boundary
- Framework Masterplan Boundary
- 2km buffer from OPA
- Unknown species
- Brown Long-Eared Bat
- Long-Eared species
- Myotis species
- Noctule Bat
- Common Pipistrelle
- Soprano Pipistrelle
- Pipistrelle species
- Serotine Bat

Roost Results - Kent and Medway Biodiversity Record Center

- Hibernation Roost
- Maternity Roost
- Roost type not classified

Roost Results 2017-2018 Arcadis Surveys

- Maternity Roost
- Summer Roost

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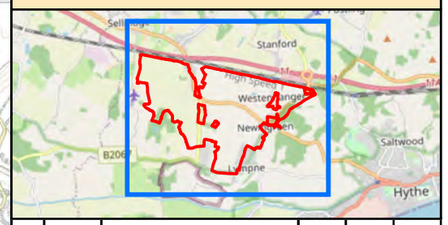

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01	07-12-2018	FOR INFORMATION	PN	BM	MG

ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 1
Bat Roost Records from Arcadis 2017 and 2018 Surveys and form Records Centre Data (2km radius)

scale	original size	datum	grid
1:27,500	A3	Sx	BNG

0 1:27,500 1.5 km

C:\Users\psi01069\ARCADIS\10029956 - Otterpool Park Stage 4a - 23 GIS\Figures_2021\Ecology\7.12 - Bat activity survey (transects)\Figure 1 - Bat Roost Records from Arcadis 2017 and 2018 Survey and from Records Centre Data.mxd

Figure 2: Bat transects initially proposed

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Area of Search
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

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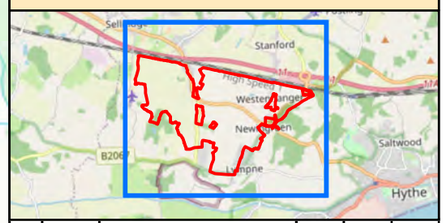

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Figure 2
Bat Transect Results
Original Proposed Transects

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

C:\Users\psi01069\ARCADIS\10029956 - Otterpool Park Stage 4a - 23 GIS\Figures_2021\Ecology\7.12 - Bat activity survey (transects)\Figure 2 - Bat Transect Results Original Proposed Transects.mxd

Figure 3: Bat transect surveys - April transects and results 2017

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Legend

Outline Planning Application Boundary

Framework Masterplan Boundary

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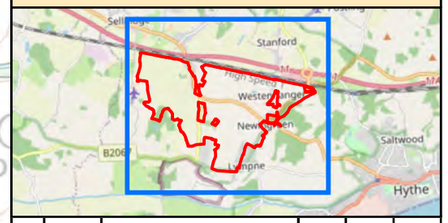

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80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 3
Bat Transect Results - April 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 4: Bat transect surveys - May transects and results 2017

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Legend

- Outline Planning Application
- Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, May
- Common Pipistrelle, May
- Daubenton's Bat, May
- Leisler's Bat, May
- Myotis sp., May
- Nathusius Pipistrelle, May
- Natterer's Bat, May
- Noctule, May
- Soprano Pipistrelle, May

Transect Number

- Transect 1, May
- Transect 2, May
- Transect 3, May
- Transect 4, May
- Transect 5, May

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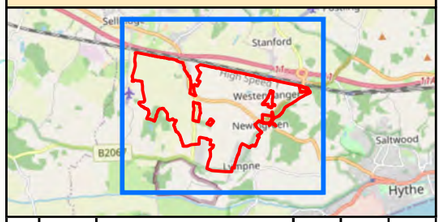

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01	7-12-2018	FOR INFORMATION	PN	BM	MG

ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 4
Bat Transect Results - May 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

C:\Users\psi01069\ARCADIS\10029956 - Otterpool Park Stage 4a - 23 GIS\Figures_2021\Ecology\7.12 - Bat activity survey (transects)\Figure 4 - Bat Transect Results May 2017.mxd

Figure 5: Bat transect surveys - June transects and results 2017

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, June
- Common Pipistrelle, June
- Leisler's, June
- Nathusius Pipistrelle, June
- Natterers Bat, June
- Noctule, June
- Soprano Pipistrelle, June

Transect Number

- Transect 1, June
- Transect 2, June
- Transect 3, June
- Transect 4, June
- Transect 5, June

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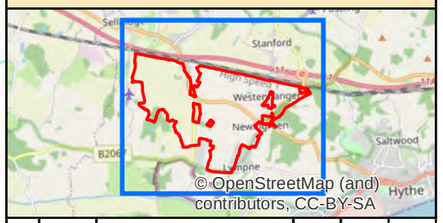

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Figure 5
Bat Transect Results - June 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 6: Bat transect surveys - July transects and results 2017

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Legend

- Outline Planning Application
- Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, July
- Common Pipistrelle, July
- Daubenton's Bat, July
- Leisler's Bat, July
- Myotis Bat, July
- Noctule, July
- Serotine, July
- Soprano Pipistrelle, July

Transect Number

- Transect 1, July
- Transect 2, July
- Transect 3, July
- Transect 4, July
- Transect 5, July

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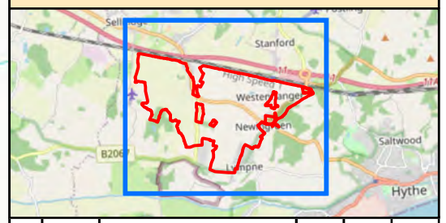

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Figure 6
Bat Transect Results - July 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 7: Bat transect surveys - August transects and results (dawn) 2017

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Legend

Outline Planning Application Boundary

Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, August
- Common Pipistrelle, August
- Leisler's Bat, August
- Noctule, August
- Soprano Pipistrelle, August

Transect Number

- Transect 1, August Dawn
- Transect 2, August Dawn
- Transect 3, August Dawn
- Transect 4, August Dawn (conducted in September)
- Transect 5, August Dawn (conducted in September)

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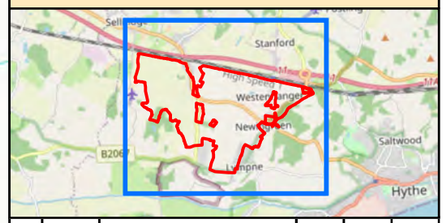

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Figure 7
Bat Transect Results
August (Dawn) 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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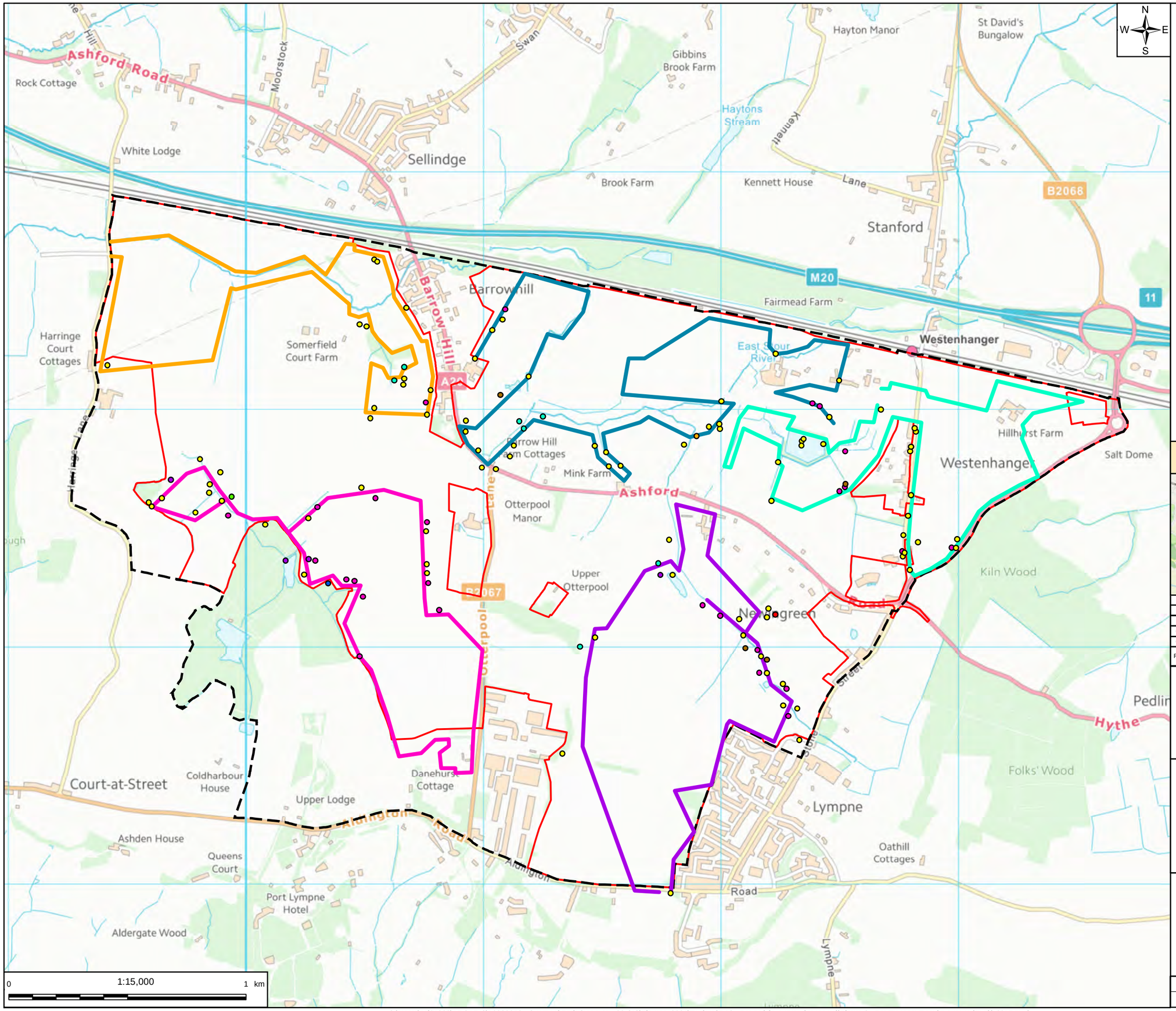
Figure 8: Bat transect surveys - August transects and results (dusk) 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, August (dusk)
- Common Pipistrelle, August (dusk)
- Daubenton's Bat, August (dusk)
- Leisler's Bat, August (dusk)
- Myotis, August (dusk)
- Nathusius Pipistrelle, August (dusk)
- Noctule, August (dusk)
- Serotine, August (dusk)
- Soprano Pipistrelle, August (dusk)

Transect Number

- Transect 1, August Dusk
- Transect 2, August Dusk
- Transect 3, August Dusk
- Transect 4, August Dusk (conducted in September)
- Transect 5, August Dusk (conducted in September)

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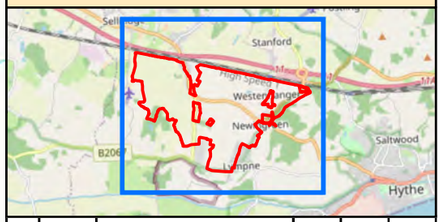

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Figure 8
Bat Transect Results
August (Dusk) 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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Figure 9: Bat transect surveys - September transects and results 2017

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Brown Long-eared Bat, September
- Common Pipistrelle, September
- Daubenton's Bat, September
- Leislers Bat, September
- Nathusius Pipistrelle, September
- Noctule, September
- Soprano Pipistrelle, September

Transect Number

- Transect 1, September
- Transect 2, September
- Transect 3, September
- Transect 4, September
- Transect 5, September

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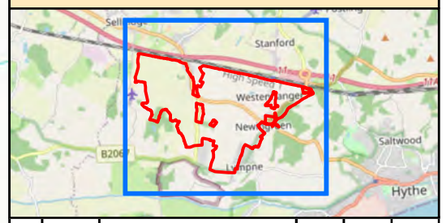

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Figure 9
Bat Transect Results - September 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 10: Bat transect surveys - overall transect routes and combined results 2017

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Brown Long-eared Bat
- Common Pipistrelle
- Daubenton's Bat
- Leisler's Bat
- Myotis sp.
- Nathusius Pipistrelle
- Natterer's Bat
- Noctule
- Serotine
- Soprano Pipistrelle

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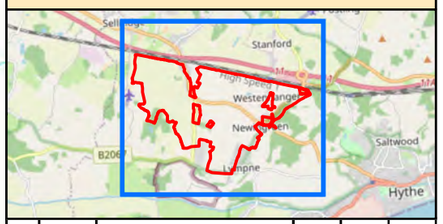

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Figure 10
Bat Transect Results
Overview 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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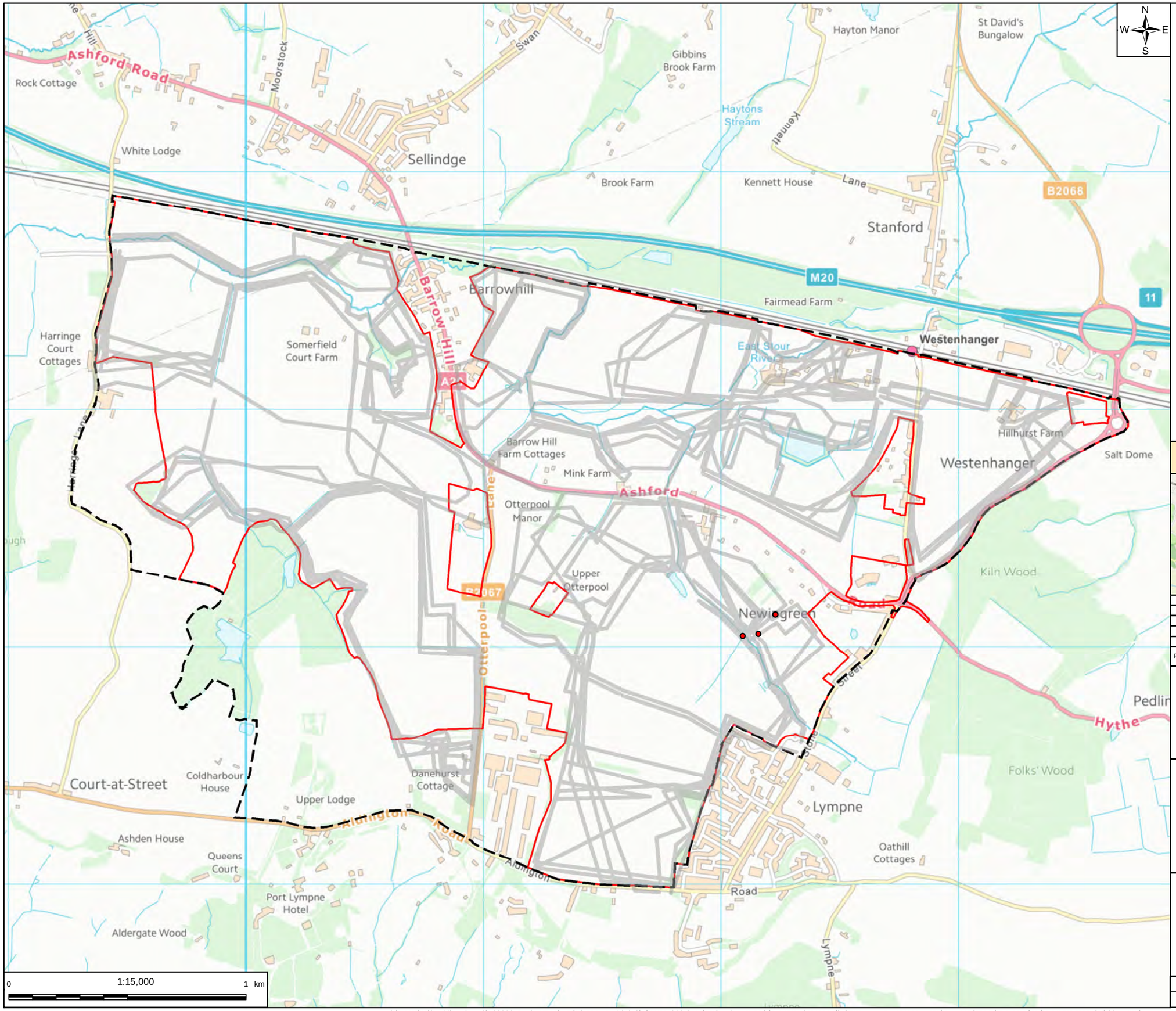
Figure 11: Bat transect surveys - locations where serotine were recorded 2017



Legend

- Outline Planning Application
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Serotine

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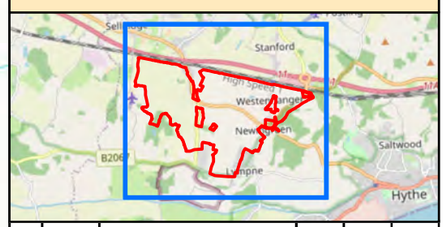

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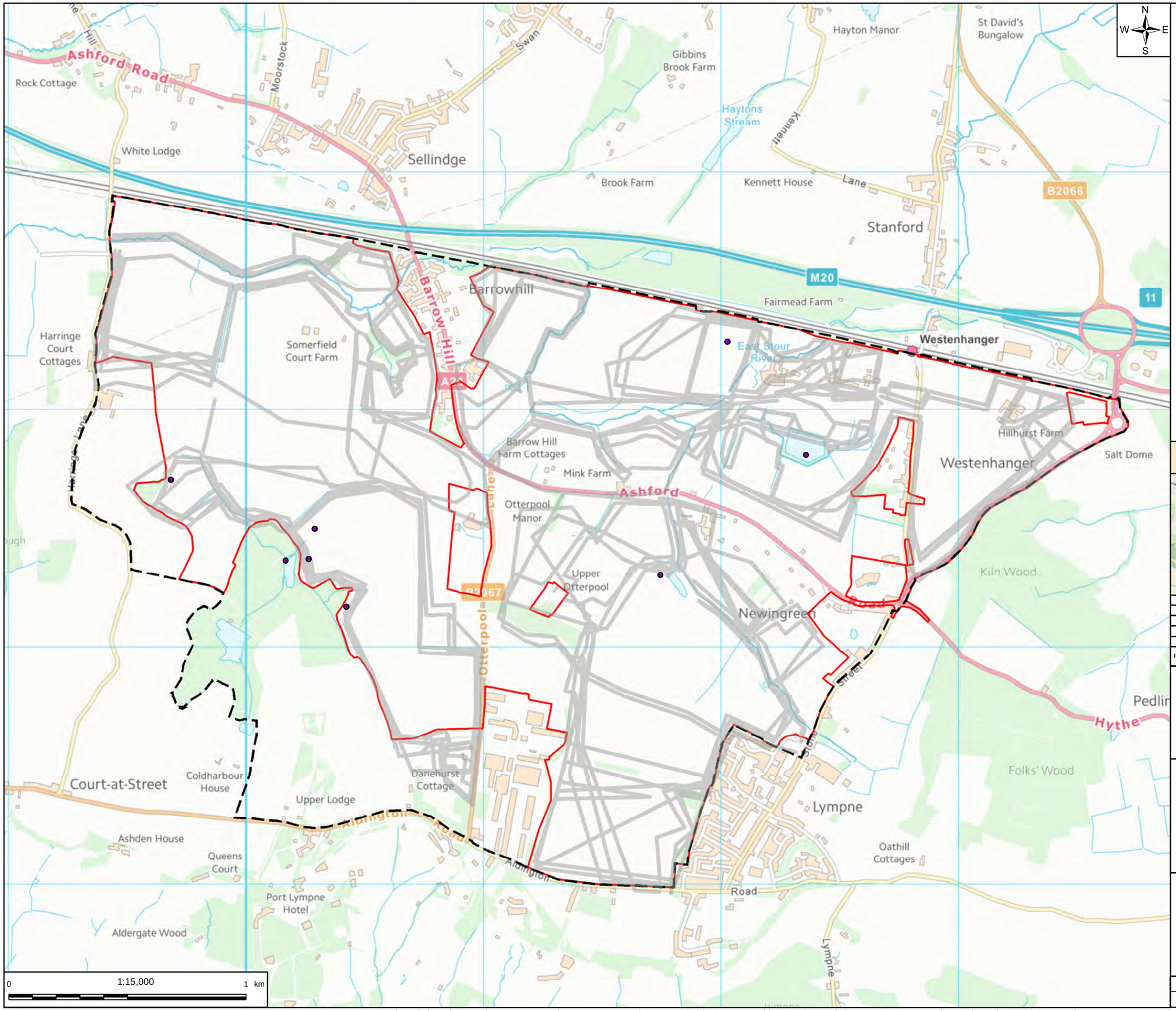
Figure 11
Bat transect results
Locations where serotine bats were recorded 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

C:\Users\psi01069\ARCADIS\10029956 - Otterpool Park Stage 4a - 23 GIS\Figures_2021\Ecology\7.12 - Bat activity survey (transects)\Figure 11 - Bat Transect Results - Locations where serotine bats were recorded 2017.mxd

Figure 12: Bat transect surveys - locations where myotis bats were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Myotis sp.

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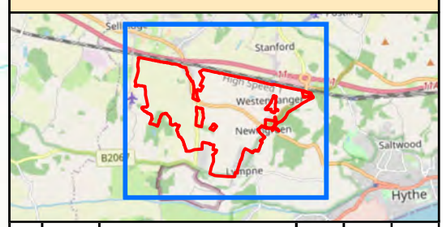

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Figure 12
Bat Transect Results
Myotis Species Recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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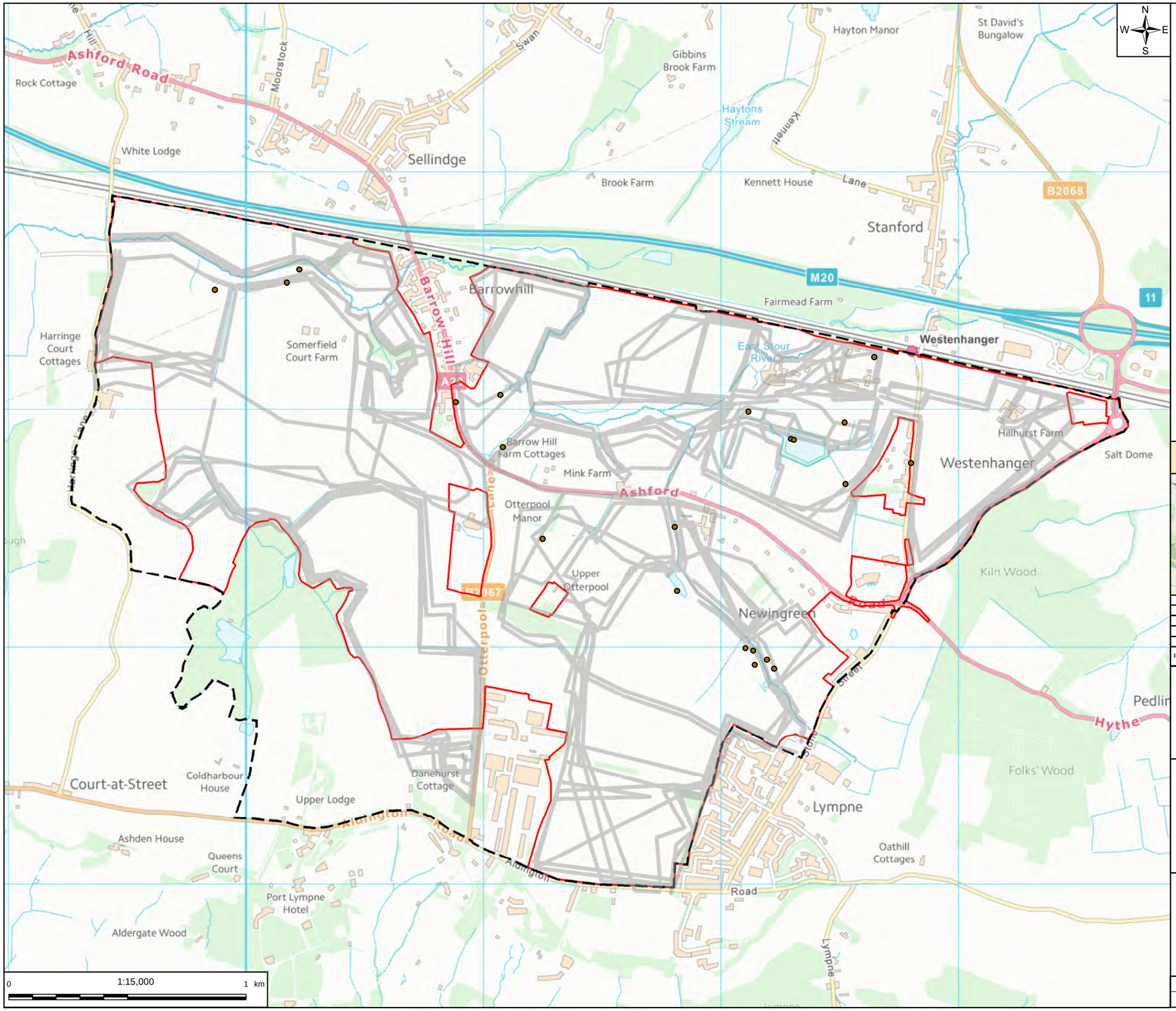
Figure 13: Bat transect surveys - locations where brown long-eared bats were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Brown Long-eared Bat

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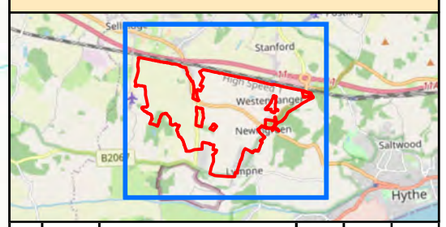

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Figure 13
Bat Transect Results
Brown Long-eared bats recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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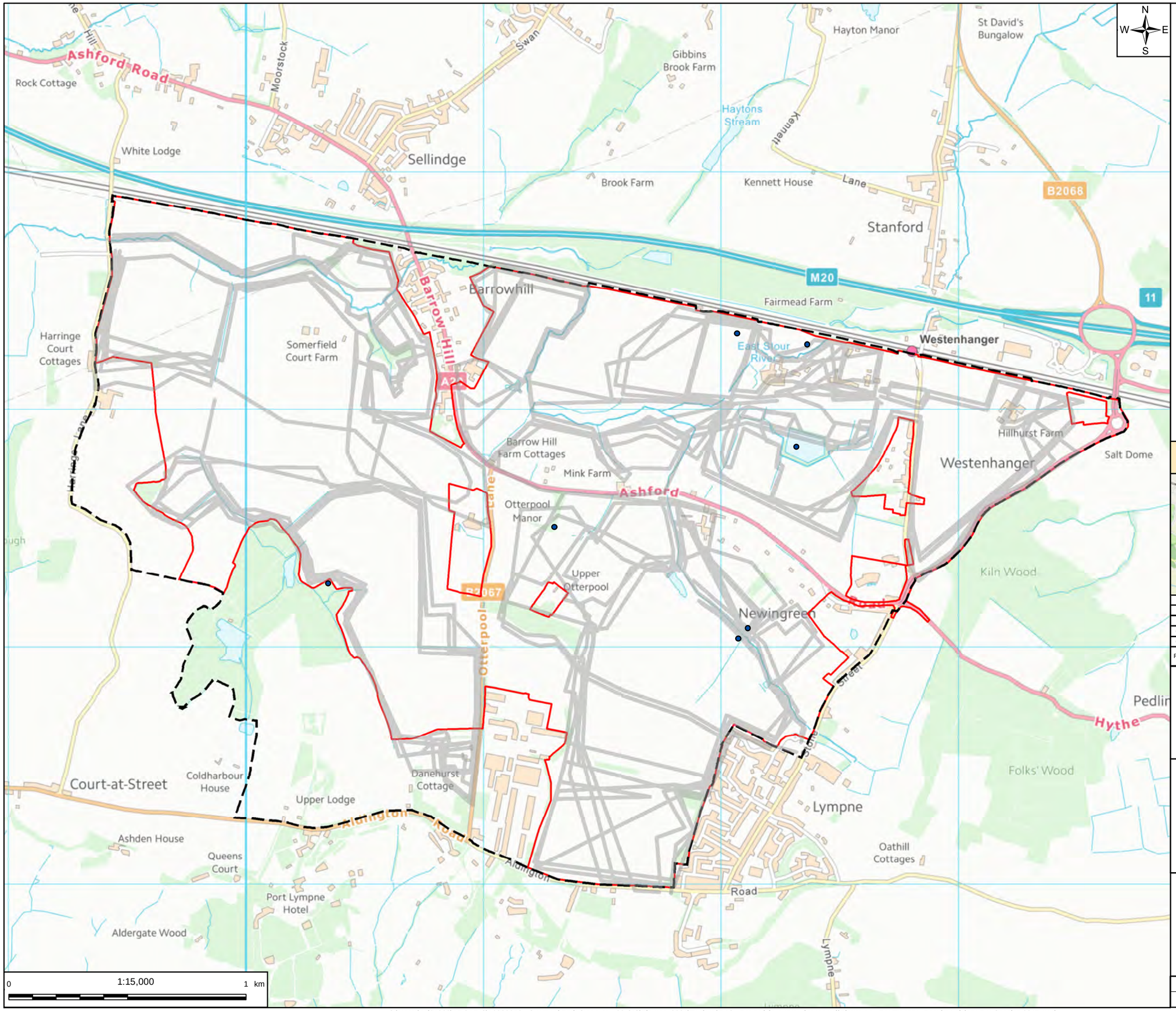
Figure 14: Bat transect surveys - locations where Leisler's bats were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Leisler's Bat

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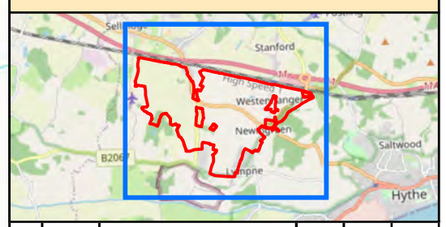

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Figure 14
Bat Transect Results
Leisler's bat recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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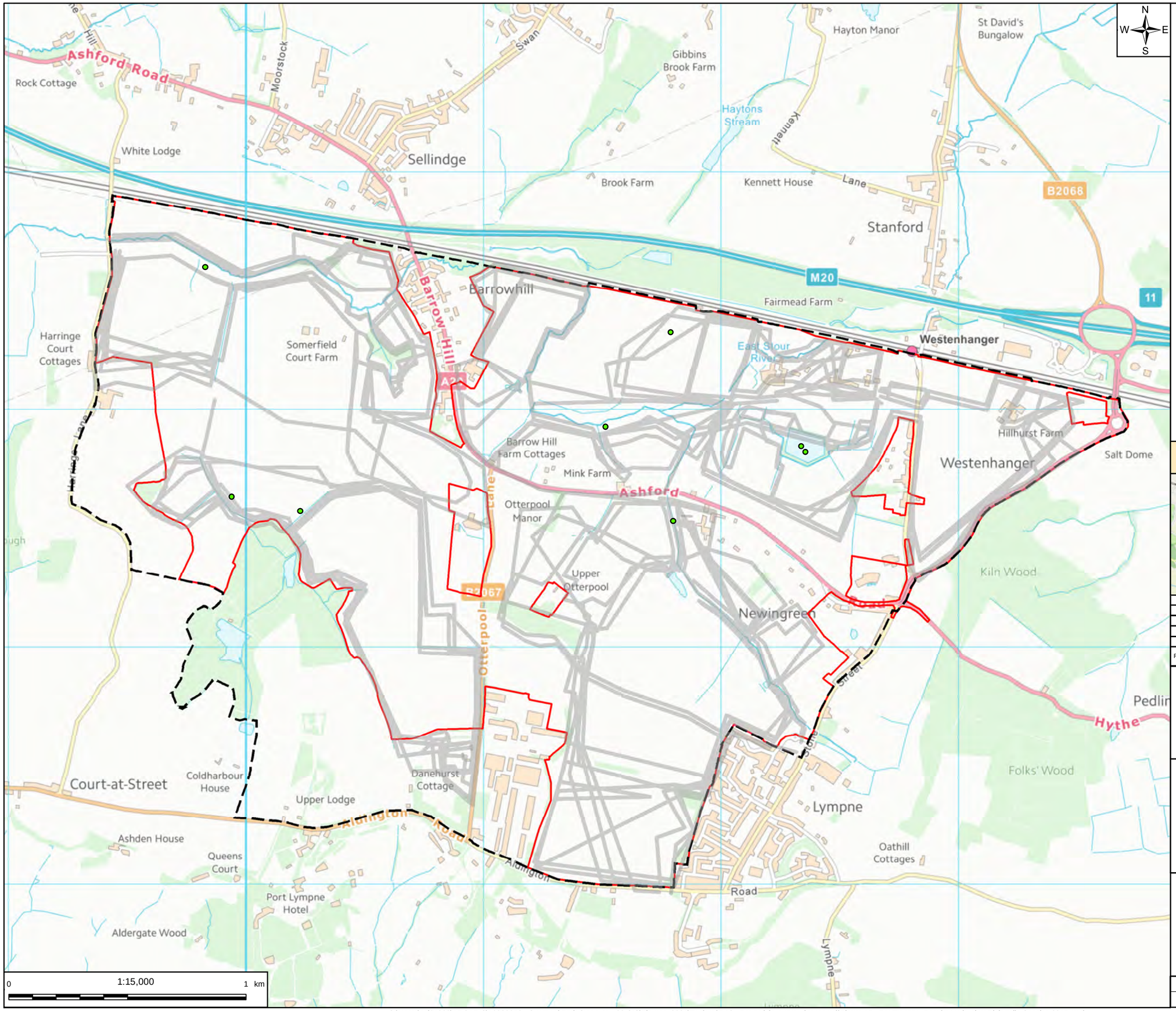
Figure 15: Bat transect surveys - locations where Nathusius' pipistrelle bats were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Nathusius' Pipistrelle

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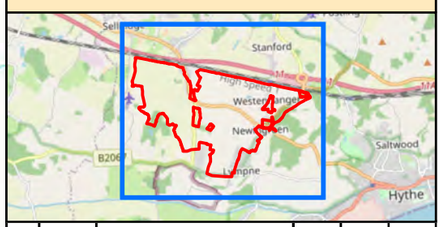

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Figure 15
Bat Transect Results
Nathusius' Pipistrelle bat recorded 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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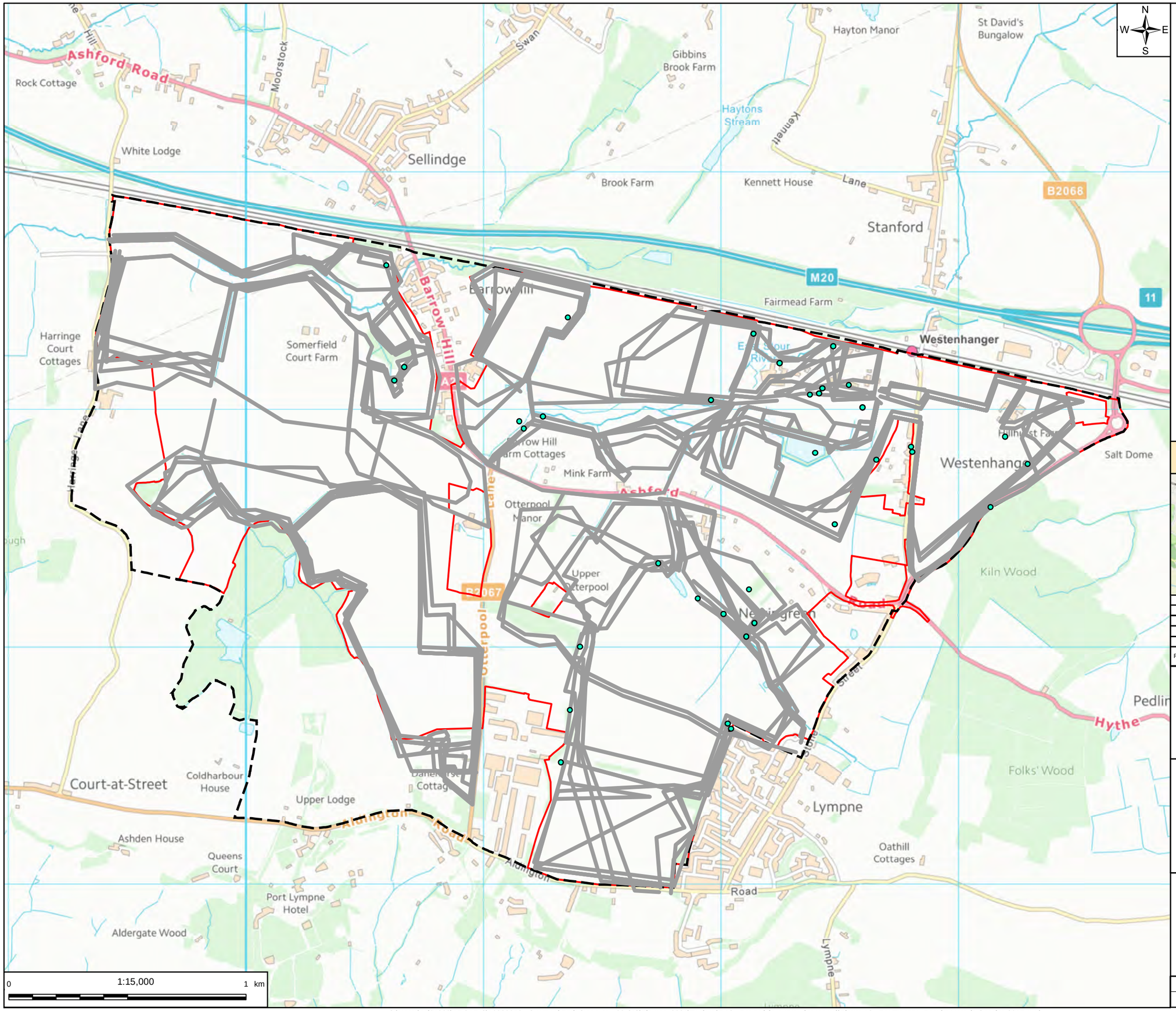
Figure 16: Bat transect surveys - locations where noctule were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Noctule

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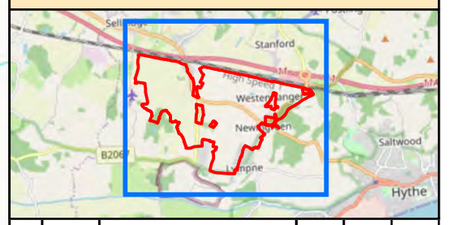

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Figure 16
Bat Transect Results
Noctule bat recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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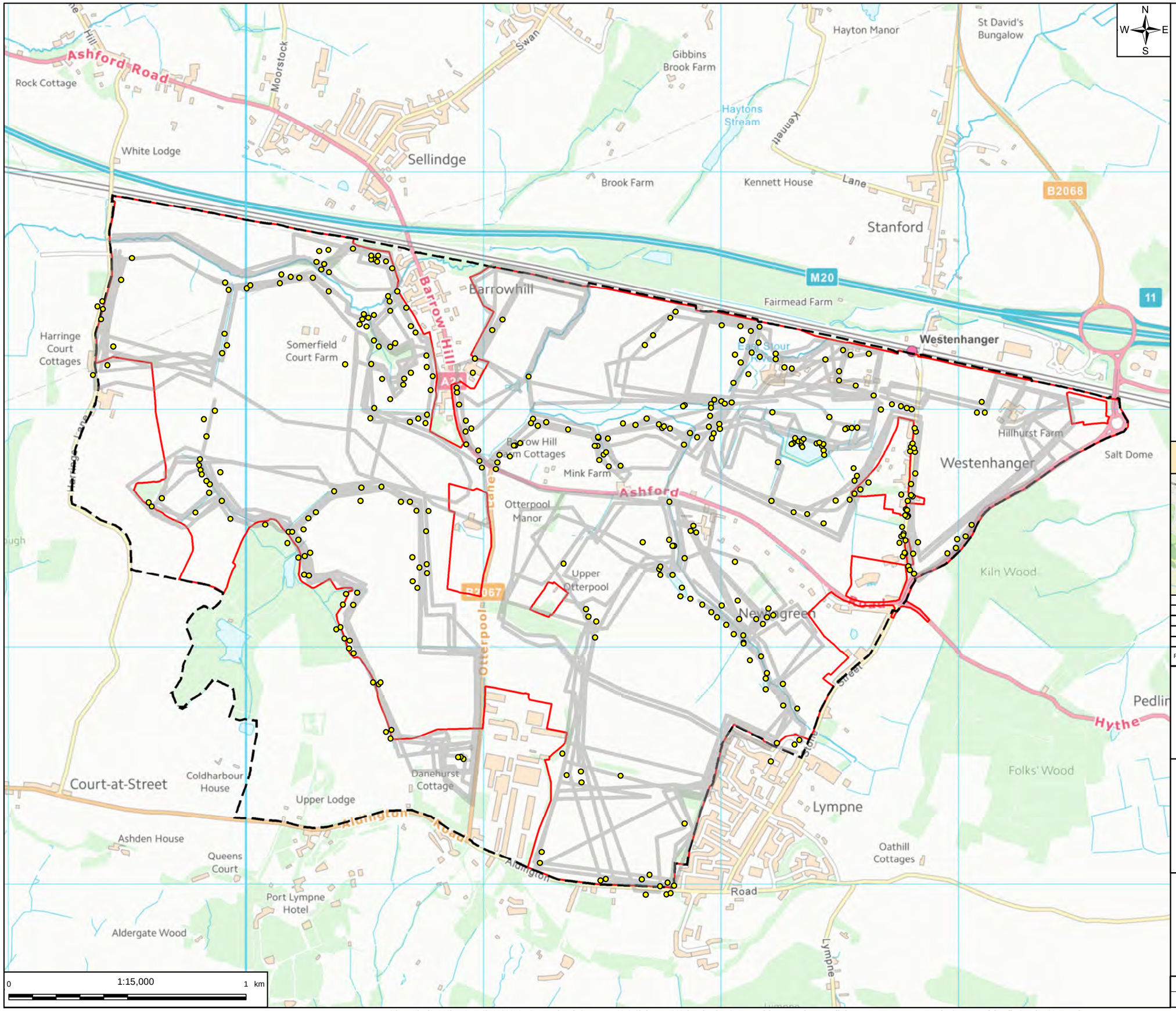
Figure 17: Bat transect surveys - locations where common pipistrelle were recorded 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Transect Routes (all)

Bat Species Indentified

- Common Pipistrelle

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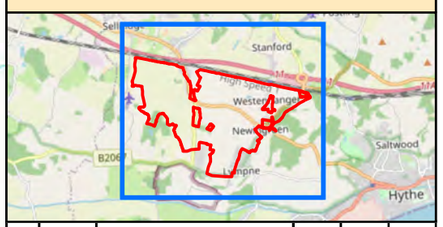

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01	06-12-2018	FOR INFORMATION	PN	BM	MG

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Figure 17
Bat Transect Results
Common Pipistrelle bat recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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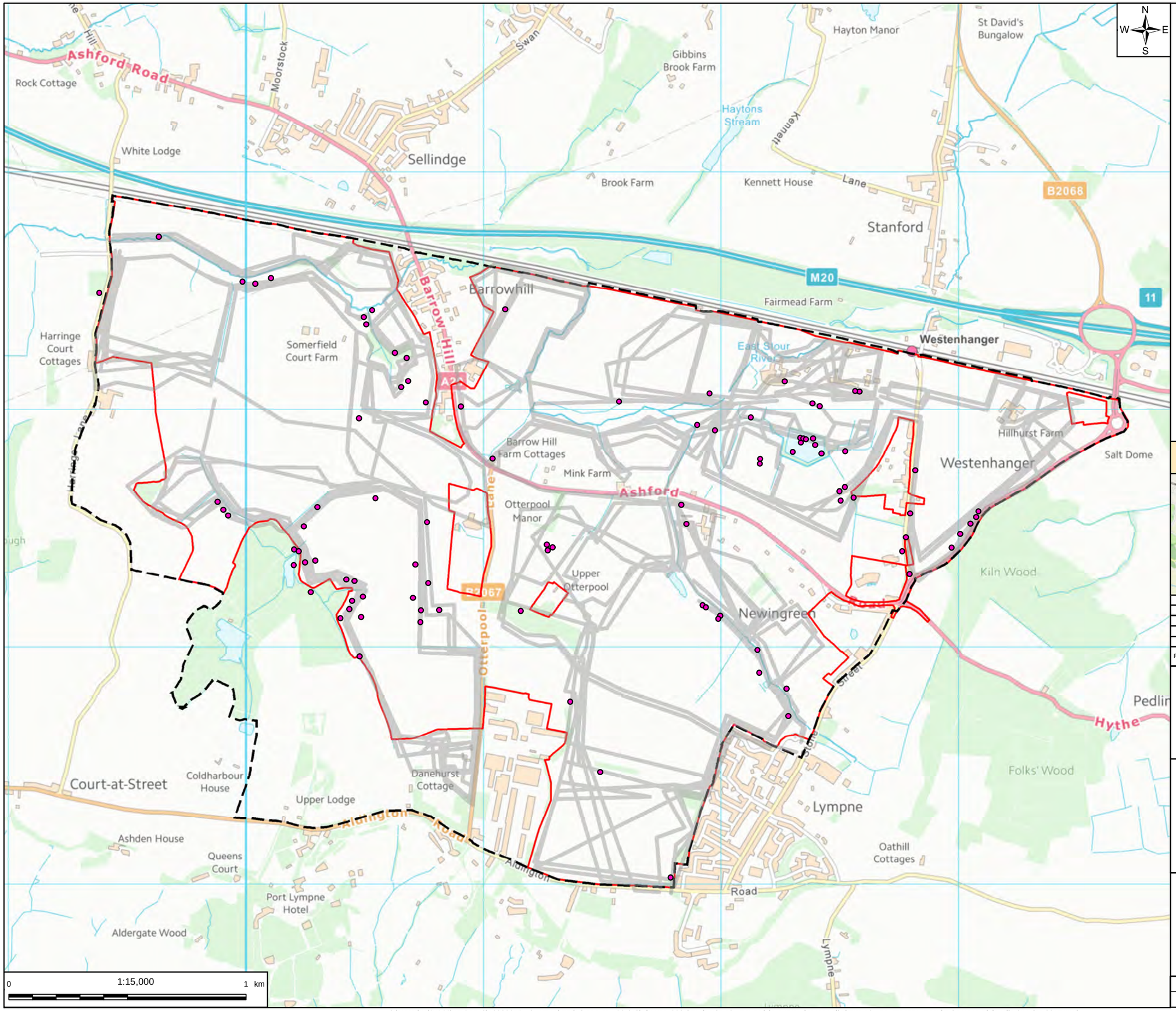
Figure 18: Bat transect surveys - locations where soprano pipistrelle were recorded *2017*



Legend

- Outline Planning Application Boundary
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- Transect Routes (all)

Bat Species Indentified

- Soprano Pipistrelle

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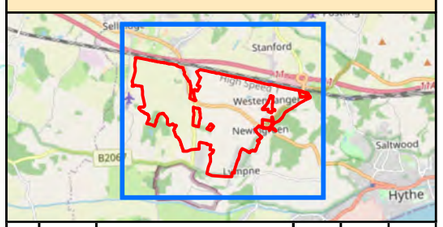

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Figure 18
Bat Transect Results
Soprano bat recorded
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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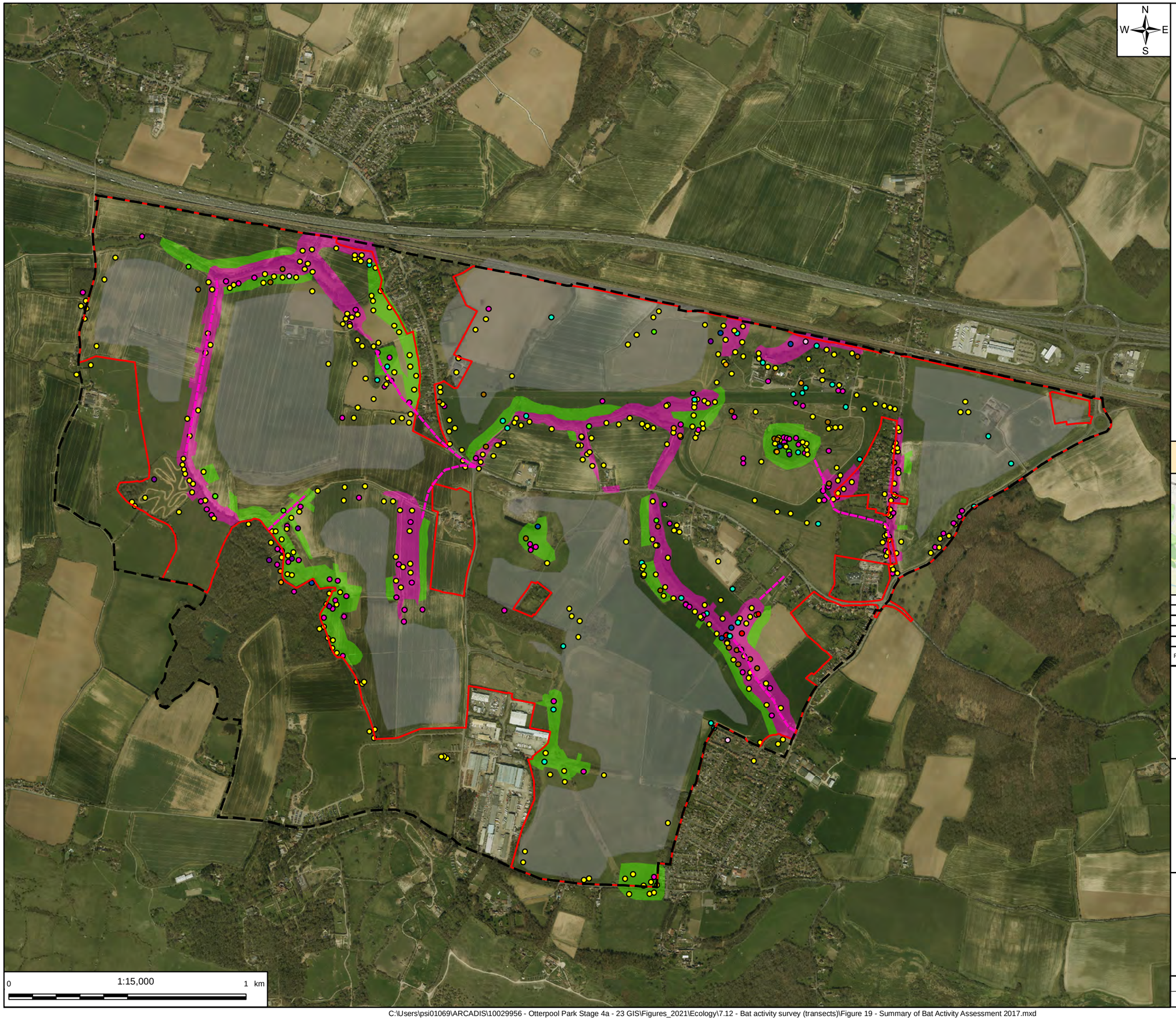
Figure 19: Summary of bat activity assessment 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Indentified

- Brown Long-eared Bat
- Common Pipistrelle
- Daubenton's Bat
- Leisler's Bat
- Myotis sp.
- Nathusius Pipistrelle
- Natterer's Bat
- Noctule
- Serotine
- Soprano Pipistrelle
- Commuting Routes (inferred from survey data)
- Key Areas for Foraging
- Key Areas for Commuting
- Notably Low Activity

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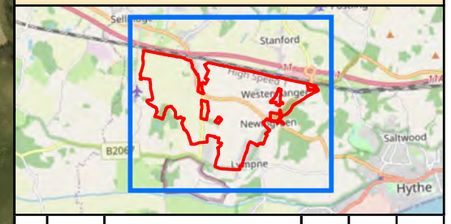

REV	Date	Description	Drawn	Check	Approv
02	07-03-2022	FOR INFORMATION	PS	BM	MG
01	07-12-2018	FOR INFORMATION	PN	BM	MG

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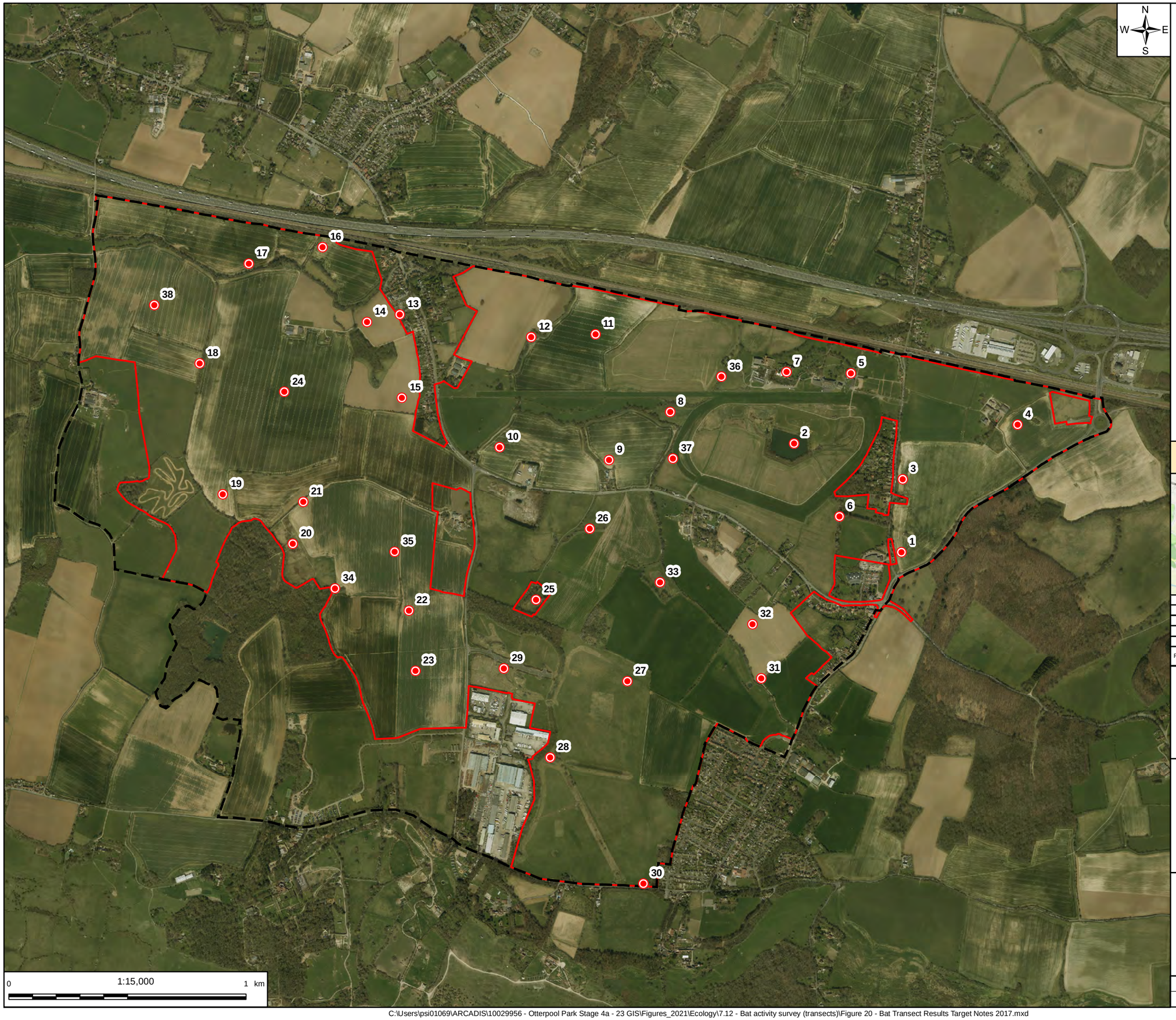
Figure 19
Summary of Bat Activity Assessment from the Transect Surveys. 2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

C:\Users\psi01069\ARCADIS\10029956 - Otterpool Park Stage 4a - 23 GIS\Figures_2021\Ecology\7.12 - Bat activity survey (transects)\Figure 19 - Summary of Bat Activity Assessment 2017.mxd

Figure 20: Bat transect surveys – Target Notes 2017



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Target notes

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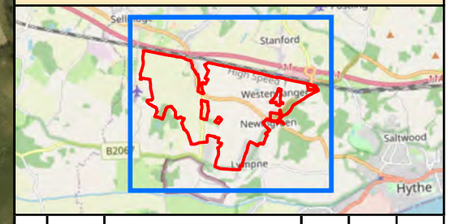

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01	07-12-2018	FOR INFORMATION	PN	BM	MG

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Figure 20
Bat Transect Results
Target Notes
2017

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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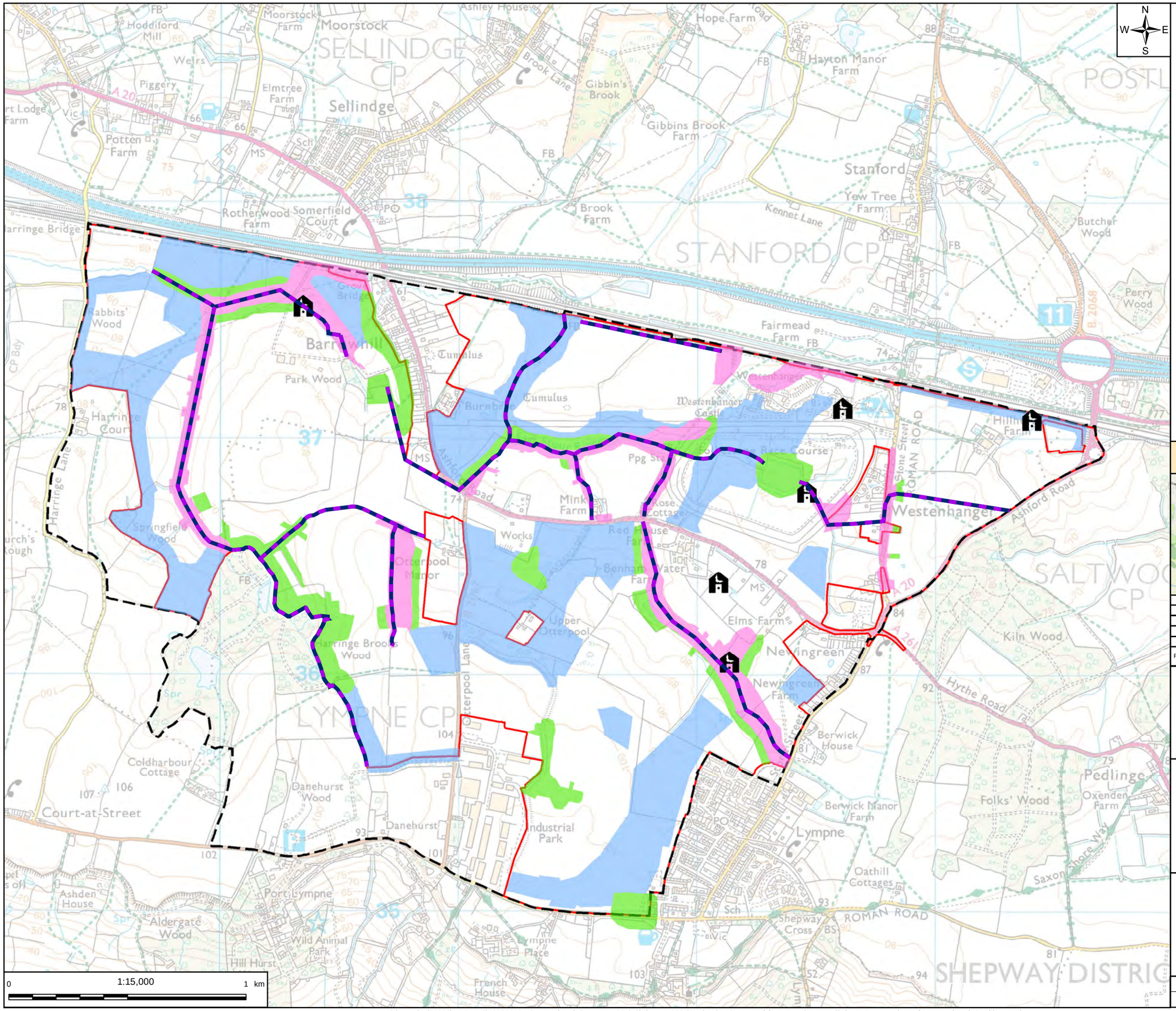
Figure 21: Proposed dark corridor locations



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Bat House (indicative)
- Dark Corridor
- Key areas for foraging identified during the surveys which are retained
- Key areas for commuting which were identified during the surveys which are retained
- Key areas retained or enhanced for bat foraging and / or commuting

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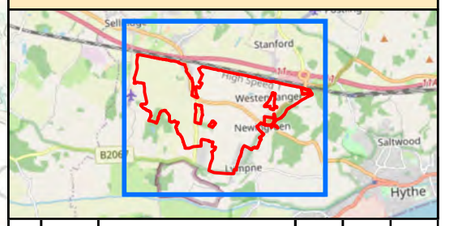

REV	Date	Description	Drawn	Check	Approv
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01	16-01-2019	FOR INFORMATION	EP	BM	MG

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Figure 21
Locations of Proposed Dark Corridors

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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Figure 22: Bat Transect Surveys April 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

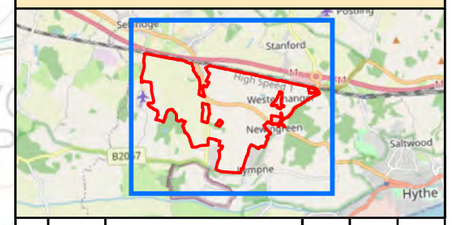

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Figure 22
Bat Transect Results
April 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 23: Bat Transect Surveys May 2021

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Legend

Outline Planning Application Boundary

Framework Masterplan Boundary

Bat Species Identified

Common pipistrelle

Soprano pipistrelle

Pipistrellus spp.

Myotis spp.

Brown long-eared bat

Transect Number

Transect 1

Transect 2

Transect 3

Transect 4

Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

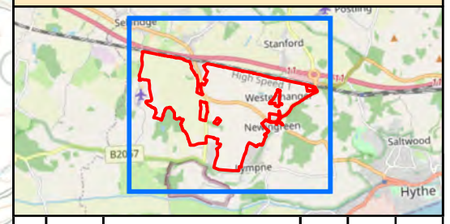

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Figure 23
Bat Transect Results
May 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 24: Bat Transect Surveys June 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Myotis spp.

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

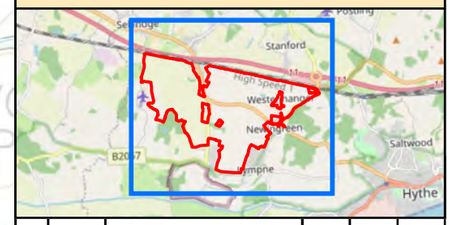

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Figure 24
Bat Transect Results
June 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 25: Bat Transect Surveys July (Dawn) 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

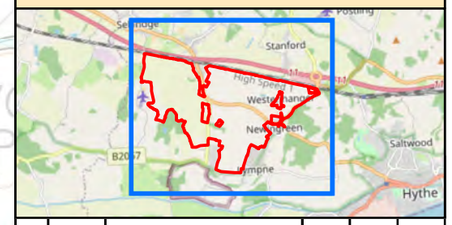

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Figure 25
Bat Transect Results
July (Dawn) 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 26: Bat Transect Surveys (Dusk) 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

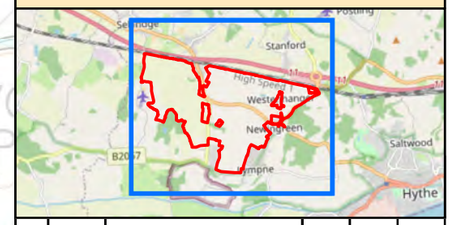
Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council



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REV	Date	Description	Drawn	Check	Approv

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Figure 25
Bat Transect Results
July (Dusk) 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 27: Bat Transect Surveys August 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

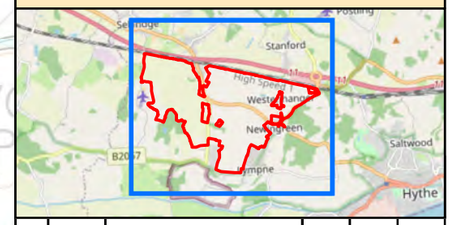

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Figure 28
Bat Transect Results
August 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 28: Bat Transect Surveys September 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Myotis spp.
- Serotine
- Big Bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

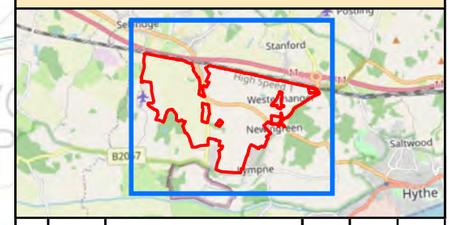

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Figure 28
Bat Transect Results
September 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 29: Bat Transects 2021 Overview

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

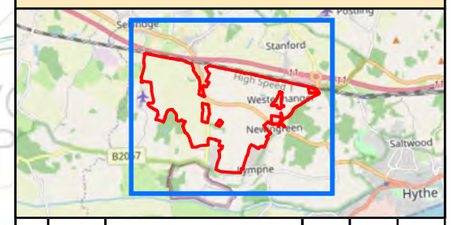

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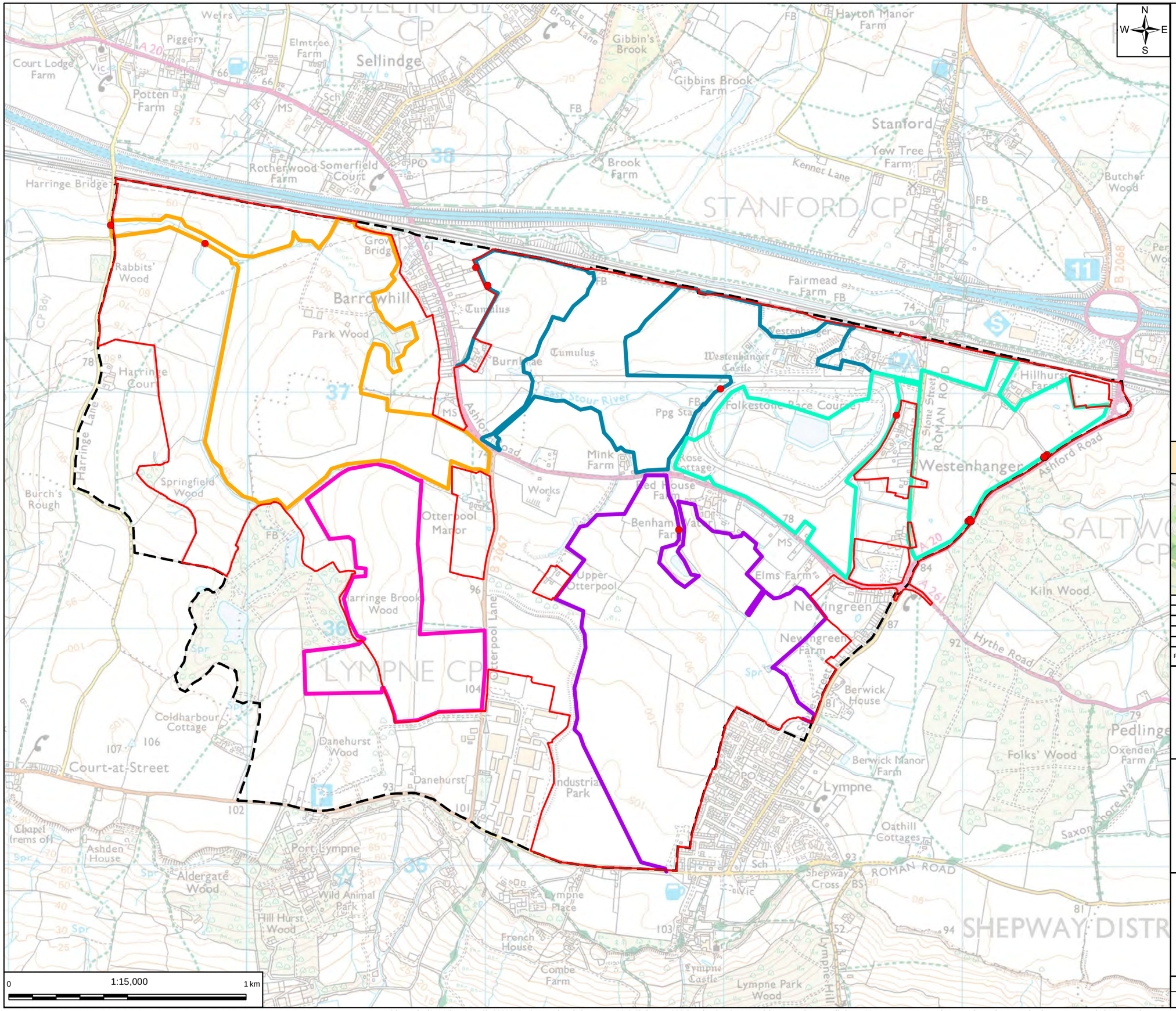
Figure 29
Bat Transect Results
Overview 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 30: Bat Transect Surveys - Locations where serotine were recorded 2021



Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

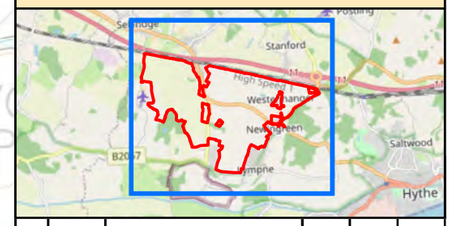


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Figure 30
Bat Transect Results
Locations Where Serotine
Bats were Recorded - 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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Figure 31: Bat Transect Surveys - Locations where myotis bats were recorded 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Myotis spp.

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

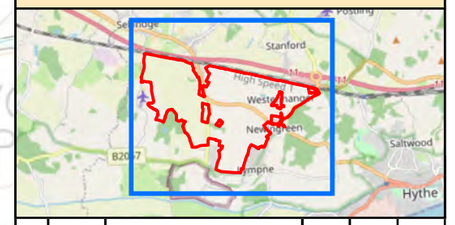

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Figure 31
Bat Transect Results
Myotis Species Recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 32: Bat Transect Surveys - Locations where brown long-eared bats were recorded 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Brown long-eared bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

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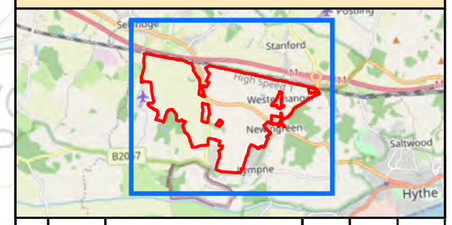

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Figure 32
Bat Transect Results
Brown Long-eared bats recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 33: Bat Transect Surveys - Big bats

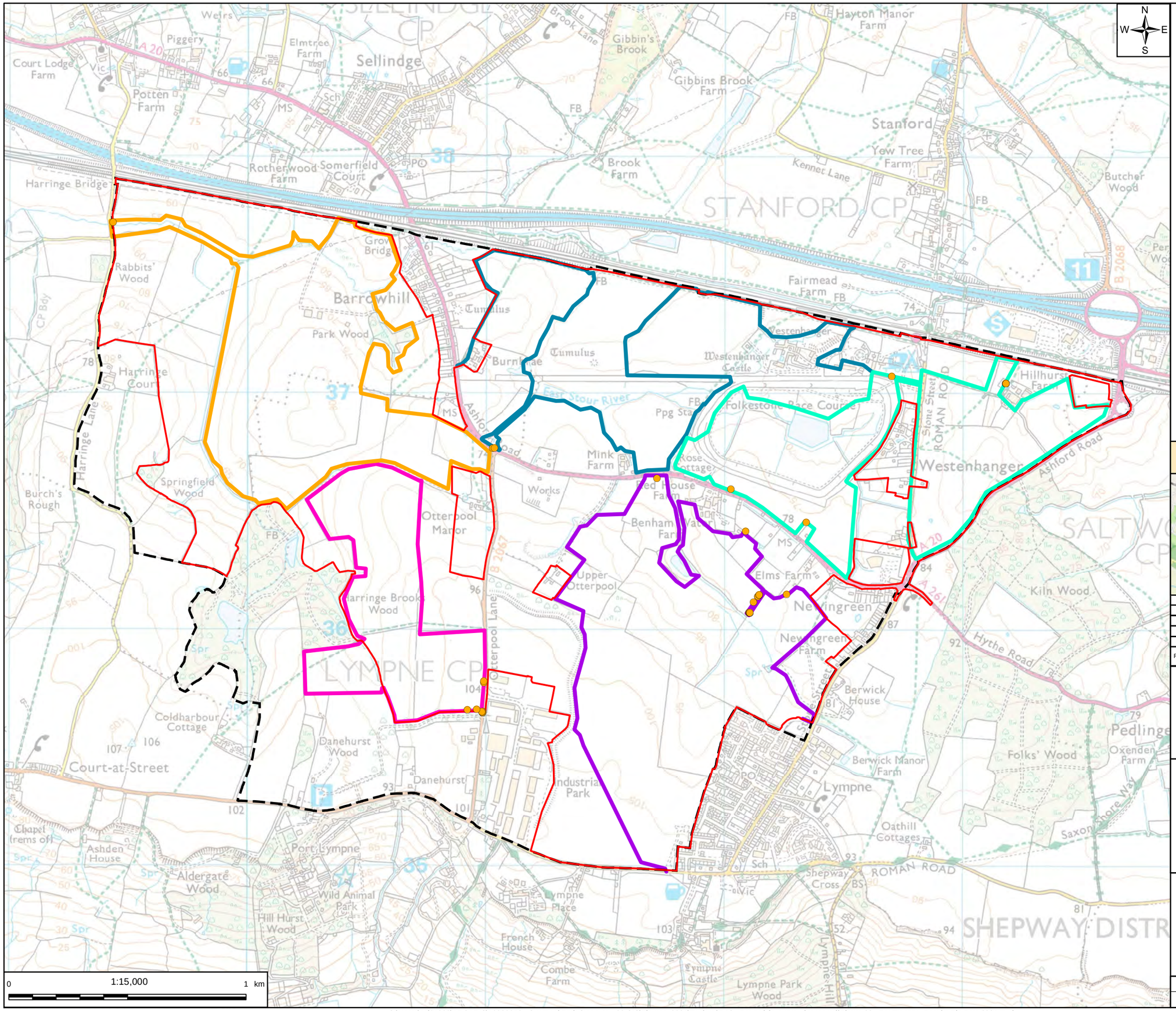

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Figure 33
Bat Transect Results
Big Bats Recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

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Figure 34: Bat Transect Surveys - Locations where Nathusius' pipistrelle were recorded 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Nathusius' pipistrelle

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

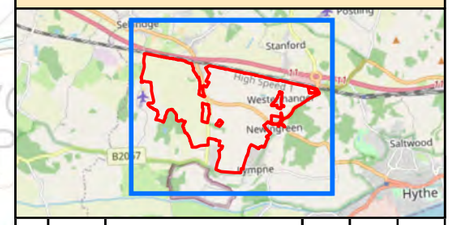

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Figure 34
Bat Transect Results
Nathusius' Pipistrelle bat recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

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Figure 35: Bat Transect Surveys - Locations where common pipistrelle were recorded 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Common pipistrelle

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council

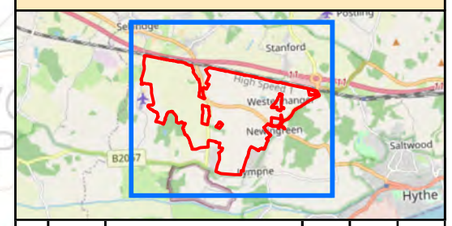

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Figure 35
Bat Transect Results
Common Pipistrelle bat recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 36: Bat Transect Surveys - Locations where soprano pipistrelle were recorded 2021

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Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary
- Soprano pipistrelle

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

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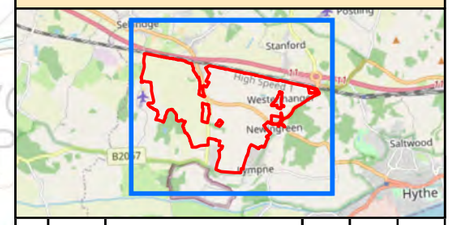

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Figure 36
Bat Transect Results
Soprano bat recorded
2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 37: Summary of bat activity assessment 2021

N
W E
S

Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

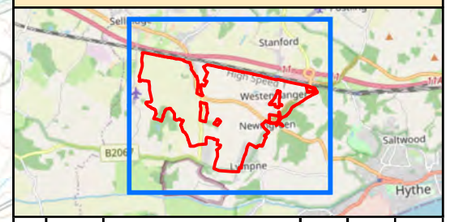
Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat
- Key Areas for Foraging
- Key Areas for Commuting

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains Ordnance Survey data © Crown copyright 2021 OS 0100031673



REV	Date	Description	Drawn	Check	Approv
01	11/11/21	FOR INFORMATION	RM	EG	BM

ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

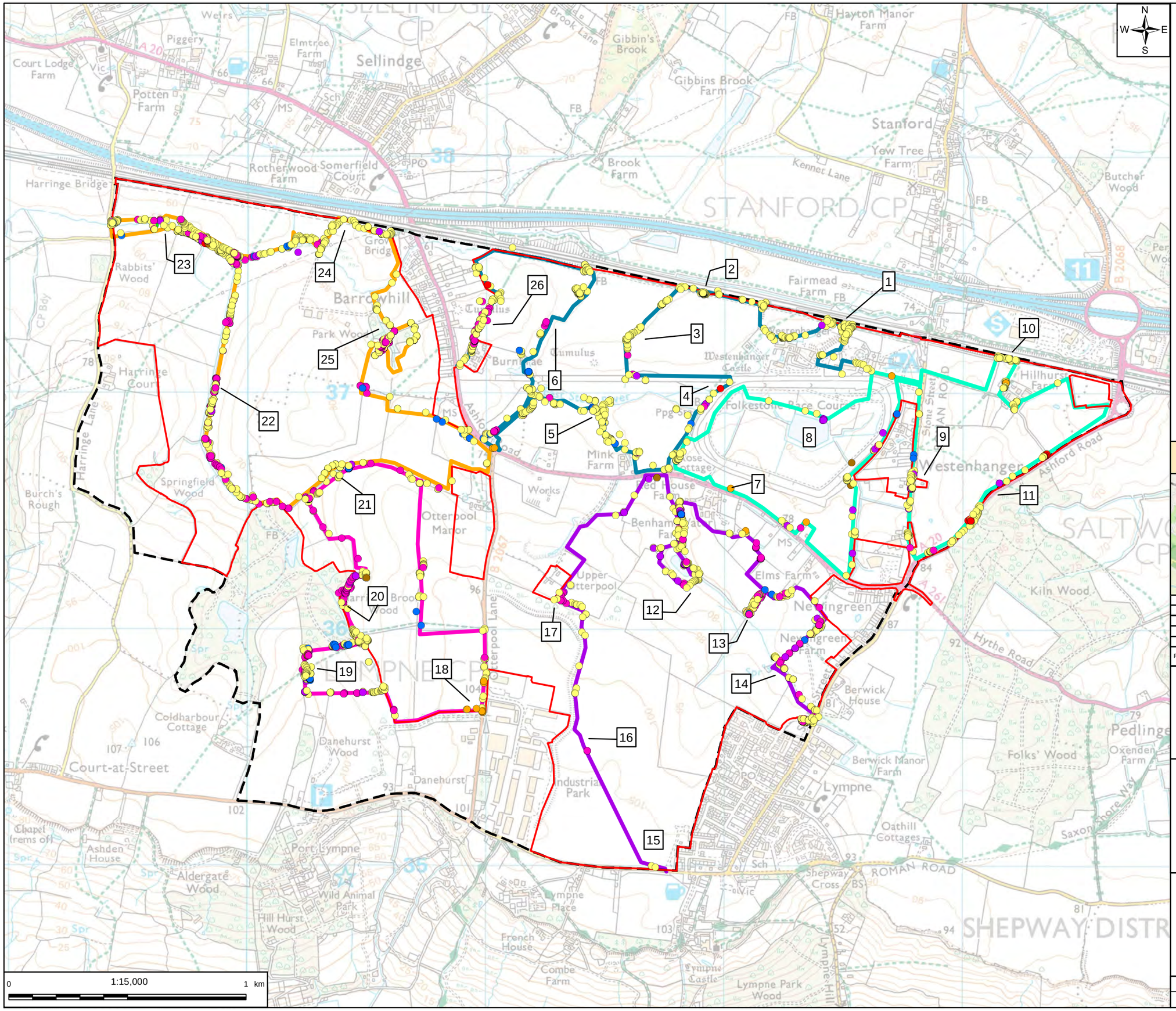
OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 37
Summary of Bat Activity Assessment from the Transect Surveys 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

0 1:15,000 1 km

Figure 38: Target Notes - 2021



Legend

- Outline Planning Application Boundary
- Framework Masterplan Boundary

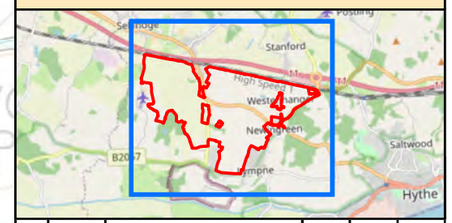
Bat Species Identified

- Common pipistrelle
- Soprano pipistrelle
- Pipistrellus spp.
- Nathusius' pipistrelle
- Myotis spp.
- Serotine
- Brown long-eared bat
- Big Bat

Transect Number

- Transect 1
- Transect 2
- Transect 3
- Transect 4
- Transect 5

Layer Credits: Contains aerial imagery supplied by Folkestone and Hythe District Council



REV	Date	Description	Drawn	Check	Approv
01	11/11/21	FOR INFORMATION	RM	EG	BM

ARCADIS
80Fen
80 Fenchurch Street
London
EC3M 4BY

OTTERPOOL PARK
COUNTRYSIDE · CONNECTED · CREATIVE

Figure 38
Bat Transect Results
Target Notes 2021

scale	original size	datum	grid
1: 15,000	A3	Sx	BNG

APPENDIX A: Survey Details and Weather Information

Table A1: Summary dates of Activity Transects 2017

Transect	April		May		June		July		August*		September	
	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn
1		28/04/2017	22/05/17			21/06/2017	25/07/2017		21/08/2017	22/08/2017		21/09/2017
2		03/05/2017	24/05/17		21/06/2017			26/07/2017	22/08/2017	23/08/2017	20/09/2017	
3	27/04/2017			24/05/2017	19/06/2017		26/07/2017		23/08/2017	24/08/2017	26/09/2017	
4	02/05/2017			23/05/2017	20/06/2017			25/07/2017	18/09/2017	19/09/2017	27/09/2017	
5	27/04/2017		23/05/2017			20/06/2017	24/07/2017		19/09/2017	20/09/2017	28/09/2017	

* Some August transects conducted in September due to access issues

Table A2: Weather information for surveys conducted in 2017

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-	Cloud Cover	Wind (Beaufort)	Equipment Id
1	28/04/2017	Dawn	EG, AB	04:55	03:27	05:40	5 - 11	8/8	2	Batlogger 26 and 27
1	22/05/17	Dusk	EP, LW	20:49	20:47	22:33	20 - 17	6/8	3	Batlogger 27
1	21/06/2017	Dawn	AB, EG	04:40	03:00	04:43	17	1/8	3	Batlogger 26 and 27
1	25/07/2017	Dusk	EG, AB	20:53	20:50	23:00	16 - 12	6/8	1	Batlogger 26 and 27
1	21/08/2017	Dusk	EG, CF	20:05	19:52	22:11	19 - 18	7/8	0	Batlogger 26 and 27
1	22/08/2017	Dawn	EG, CF	05:52	03:52	06:06	16	1/8	0	Batlogger 26 and 27
1	21/01/2017	Dawn	EG, AW	18:58	18:41	20:42	16 - 14	2/8	2	Batlogger 26 and 27
2	03/05/2017	Dawn	EG, AB	05:25	03:27	05:44	8 - 9	8/8	1 - 4	Batlogger 26 and 27
2	24/05/17	Dusk	EP, LW	20:59	20:45	22:40	19	0/8	0	Batlogger 27
2	21/06/2017	Dusk	EG, AB	21:14:00	21:00	23:25	24	1/8	1	Batlogger 26 and 27
2	26/07/2017	Dawn	EG, AB	05:12	03:20	05:05	14 -15	4 – 8/8	1	Batlogger 26 and 27
2	22/08/2017	Dusk	EG, CF	20:04	19:53	22:00	19 - 18	5 – 8/8	0	Batlogger 26 and 27
2	23/08/2017	Dawn	EG, CF	05:54	03:54	06:09	18	6 – 8/8	1	Batlogger 26 and 27

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-	Cloud Cover	Wind (Beaufort)	Equipment Id
2	20/09/2017	Dusk	AW, EG	06:40	04:39	06:54	15	3/8	3	Batlogger 26 and 27
3	27/04/2017	Dusk	BM, EP	20:10	20:00	22:22	9	8/8	3	Batlogger 26 and 27
3	24/05/2017	Dawn	EP, LW	04:53	03:05	05:08	14 - 13	5/8	2	Batlogger 27
3	19/06/2017	Dusk	AB, EG	21:13	21:00	23:30	20 - 18	2/8	1	Batlogger 26 and 27
3	26/07/2017	Dusk	AB, EG	20:51	20:52	22:57	18 - 17	8/8	2 - 3	Batlogger 26 and 27
3	23/08/2017	Dusk	EG, CF	20:03	19:45	22:10	19 - 17	8/8	0	Batlogger 26 and 27
3	24/08/2017	Dawn	EG, CF	05:56	03:53	06:08	15 - 14	0/8	2	Batlogger 26 and 27
3	26/09/2017	Dusk	AW, EG	18:45	18:25	21:00	18	3/8	0	Batlogger 26 and 27
4	02/05/2017	Dusk	AB, EG	20:17	20:10	22:50	13 – 9	8/8	1 - 2	Batlogger 26 and 27
4	23/05/2017	Dawn	EP, LW	04:54	03:01	05:02	15	3/8	1	Batlogger 27
4	20/06/2017	Dusk	AB, EG	21:13	21:03	23:08	20 - 18	2/8	2 - 3	Batlogger 26 and 27
4	25/07/2017	Dawn	AB, EG	05:10	03:17	05:11	15 - 13	8/8	2	Batlogger 26 and 27
4	18/09/2017	Dusk	AB, BM	19:02	18:45	21:21	12	4/8	1	Batlogger 26 and 27
4	19/09/2017	Dawn	AB, BM	06:38	04:33	06:38	11	4/8	1	Batlogger 26 and 27

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-	Cloud Cover	Wind (Beaufort)	Equipment Id
4	27/09/2017	Dusk	EP, BM	18:44	18:36	20:40	16	7/8	0	Batlogger 26 and 27
5	27/04/2017	Dusk	EG, AB	20:10	20:18	23:00	8 - 6	8/8	1	Batlogger 26 and 27
5	23/05/2017	Dusk	EP, LW	20:50	20:49	22:39	17 -13	3/8	3	Batlogger 27
5	20/06/2017	Dawn	EG, AB	04:40	02:59	04:48	13 - 14	1/8	1	Batlogger 26 and 27
5	24/07/2017	Dusk	EG, AB	21:00	20:50	23:01	15	7/8	2 - 3	Batlogger 26 and 27
5	19/09/2017	Dusk	AW, EG	19:00	18:45	20:47	14 - 11	6/8	1	Batlogger 26 and 27
5	20/09/2017	Dawn	AW, EG	06:38	04:35	06:40	8	1/8	1	Batlogger 26 and 27
5	28/09/2017	Dusk	BM, EP	18:39	18:39	21:05	13	2/8	1	Batlogger 26 and 27

Table A3:: Summary dates of Activity Transects 2021

Transect	April		May		June		July		August		September	
	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn	Dusk	Dawn
1	19/04/2021		26/05/2021		23/06/2021		14/07/2021	15/07/2021	18/08/2021		08/09/2021	
2	19/04/2021		25/05/2021		23/06/2021		14/07/2021	14/07/2021	19/08/2021		09/09/2021	
3	19/04/2021		26/05/2021		23/06/2021		14/07/2021	15/07/2021	18/08/2021		08/09/2021	
4	20/04/2021		25/05/2021		24/06/2021		12/07/2021	13/07/2021	19/08/2021		09/09/2021	
5	20/04/2021		25/05/2021		24/06/2021		15/07/2021	16/07/2021	18/08/2021		08/09/2021	

Table A4: Weather information for surveys conducted in 2021

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-Finish	Cloud Cover	Wind (Beaufort	Equipment Id
1	19/04/21	Dusk	AB, JB	19.59	19.59	22.59	4.9-12	0-2/8	0	Batlogger – M detector 2843
2	19/04/21	Dusk	TB, AB	19.59	19.59	22.59	4.9-12	0-2/8	0	Batlogger – M detector 2468
3	19/04/21	Dusk	AM, AR	19.57	19.57	22.57	2.5-8	0/8	0	Batlogger – M detector 2595
4	20/04/21	Dusk	AM, AR	19.59	19.59	22.59	5.7-9.5	1-0/8	0	Batlogger – M detector 2545
5	20/04/21	Dusk	AB, JB	20.00	20.00	23.25	2.4-9.8	0/8	1	Batlogger – M detector 2843
1	26/05/21	Dusk	AB, JB	20.54	20.54	23.54	7.4-11	8-7/8	1-2	Batlogger – M detector 2843
2	25/05/21	Dusk	TB, LW	20.53	20.53	23.53	7.1-11.7	8-4/8	1-2	Batlogger – M detector 2468
3	26/05/21	Dusk	TB, SP	20.54	20.54	23.54	9.8-11.7	8-6/8	0	Batlogger – M detector 4
4	25/05/21	Dusk	AB, MR	20:53	20:53	23.53	6.7-8.6	8-5/8	2-1	Batlogger – M detector 2843
5	25/05/21	Dusk	SP, JB	20:53	20.53	23:53				Batlogger – M detector 3243
1	23/06/21-24/06/21	Dusk	AB, LW	21:15	21:15	00:15	7.4-12.7	1-0/8	1	Batlogger – M

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-Finish	Cloud Cover	Wind (Beaufort	Equipment Id
2	23/06/21-24/06/21	Dusk	TB, CD	21.15	21.15	00.15	6.8-14.2	1/8	1-0	Batlogger – M detector 2468
3	23/06/21-24/06/21	Dusk	JB, AR	21.15	21.15	00.15	7.3-13.8	0/8	0	Batlogger – M detector 2467
4	24/06/21-25/06/21	Dusk	AB, MR	21.15	21.15	00.15	13.7-16	8/8	3	Batlogger – M detector 3243
5	24/06/21-25/06/21	Dusk	TB, CD	21.15	21.15	00.15	13.8-18.3	8/8	0	Batlogger – M detector 2468
1	14/07/21	Dusk	TB, AB	21.06	21.06	00.06	13.3-16.9	2-0/8	0	Batlogger – M detector 2843
2	14/07/21	Dusk	TB, SP	21.07	21.07	00.07	15.1-21.5	6-1/8	1	Batlogger – M detector 1620-2568
3	14/07/21	Dusk	JB, AM	21.06	21.06	00.06	16.8-19.8	1-0/8	2-0	Batlogger – M detector 3634
4	12/07/21	Dusk	TB, MR	21.08	21.08	00.08	15.4-16.9	8/8	0	Batlogger – M detector 2468
5	15/07/21	Dusk	JB, AB	21.05	21.05	00.05	15.1-17.4	8-4/8	4-3	Batlogger – M detector 4275
1	15/07/21	Dawn	TB, SP	04.58	01.58	04.58	13.2-15.6	1-0/8	1	Batlogger – M detector 2568
2	14/07/21	Dawn	TB, AB	01.57	01.57	04.57	12.9-13.1	0-8/8	1	Batlogger – M

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-Finish	Cloud Cover	Wind (Beaufort	Equipment Id
										detector 2843
3	15/07/21	Dawn	JB, AB	04.58	01.58	04.58	13.3-15	0/8	0-2	Batlogger – M detector 4275
4	13/07/21	Dawn	TB, AB	04.56	01.56	04.56	15.7-16.6	8/8	1-0	Batlogger – M detector 2843
5	16/07/21	Dawn	JB, AM	04.59	01.59	04.59	13.7-18.3	8/8	0-1	Batlogger – M
1	08/09/21	Dusk	JB, AR	19.27	19.27	22.27	18.7-23.4	1-3/8	1	Batlogger – M detector 4277
2	09/09/21	Dusk	SP, AR	19.25	19.25	22.25	16.7-18.9	3-2/8	2-1	Batlogger – M detector 2568
3	08/09/21	Dusk	CD, AB	19.27	19.27	22.27	21-25	3-6/8	1	Batlogger – M detector 2843
4	09/09/21	Dusk	CD, AB	19.25	19.25	22.25	16.7-19	2-1/8	3-1	Batlogger – M detector 2843
5	08/09/21	Dusk	SP, AM	19.27	19.27	22.27	17.5-22.8	1-2/8	1	Batlogger – M detector 3634
1	18/08/21	Dusk	JB, MR	20.12	2012	23.12	13.2-18.4	2/8	3-2	Batlogger – M detector 2468
2	19/08/21	Dusk	SP, JB	20.10	20.10	23.10	17	7-8/8	2	Batlogger – M detector 2568
3	18/08/21	Dusk	AR, CD	20.12	20.12	23.12	15.1-17.3	1-6/8	3-1	Batlogger – M

Transect	Date	Dusk / Dawn	Surveyors	Sunrise / Sunset	Start Time	End Time	Temperature (°C) Start-	Cloud Cover	Wind (Beaufort	Equipment Id
										detector 4277
4	19/08/21	Dusk	JB, CD	20.10	20.10	23.10	15.7-18.7	8/8	1-2	Batlogger – M detector 2467
5	18/08/21	Dusk	SP, JB	20.12	20.12	23.12	16-18	6-7/8	3-1	Batlogger – M detector 2568

APPENDIX B: Species Assemblage Results

Table B1: Table showing the assemblage of bats recorded during each transect survey 2017

Transect	Date	Species										
		Eptesicus	Myotis	Myotis nattereri	Myotis spp.	Nyctalus leisleri	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus	Big bat
1	28/04/2017	No Bats Recorded by Batlogger (other bats noted in the field shown in the figures).										
1	22/05/2017		2				7.1.1	7.1.2	7.1.3			
1	21/06/2017			1		7.1.4			7.1.5	7.1.6		
1	25/07/2017				7.1.7		7.1.8		7.1.9		7.1.10	
1	21/08/2017		1						7.1.11	7.1.12	7.1.13	
1	22/08/2017					7.1.14			7.1.15	7.1.16		
1	21/09/2017				7.1.17			7.1.18	7.1.19	7.1.20		
2	03/05/2017								7.1.21	7.1.22		
2	24/05/2017		2		7.1.23	7.1.24	7.1.25	7.1.26	7.1.27	7.1.28	7.1.29	7.1.30
2	21/06/2017							7.1.31	7.1.32	7.1.33	7.1.34	
2	26/07/2017								7.1.35	7.1.36		

Transect	Date	Species										
		Eptesicus	Myotis	Myotis nattereri	Myotis spp.	Nyctalus leisleri	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus	Big bat
2	22/08/2017						7.1.37		7.1.38	7.1.39	7.1.40	
2	23/08/2017						7.1.41		7.1.42	7.1.43	7.1.44	
2	20/09/2017						7.1.45		7.1.46	7.1.47		
3	27/04/2017	No Bats Recorded by Batlogger (other bats noted in the field shown in the figures).										
3	24/05/2017									7.1.48	7.1.49	
3	19/06/2017			2					7.1.50	7.1.51		
3	26/07/2017	7				7.1.52	7.1.53		7.1.54	7.1.55		
3	23/08/2017	1			7.1.56		7.1.57		7.1.58	7.1.59	7.1.60	
3	24/08/2017								7.1.61	7.1.62	7.1.63	
3	26/09/2017		1			7.1.64	7.1.65	7.1.66	7.1.67		7.1.68	
4	02/05/2017								7.1.69	7.1.70		
4	23/05/2017				7.1.71			7.1.72	7.1.73			

Transect	Date	Species										
		Eptesicus	Myotis	Myotis nattereri	Myotis spp.	Nyctalus leisleri	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Plecotus auritus	Big bat
4	20/06/2017						7.1.74		7.1.75	7.1.76		
4	25/07/2017		12		7.1.77				7.1.78	7.1.79		
4	18/09/2017				7.1.80			7.1.81	7.1.82	7.1.83		7.1.84
4	19/09/2017								7.1.85	7.1.86		
4	27/09/2017			1	7.1.87				7.1.88	7.1.89		
5	27/04/2017	No Bats Recorded by Batlogger (other bats noted in the field shown in the figures)										
5	23/05/2017			1					7.1.90	7.1.91	7.1.92	
5	20/06/2017							7.1.93	7.1.94	7.1.95		
5	24/07/2017								7.1.96	7.1.97	7.1.98	
5	19/09/2017						7.1.99		7.1.100	7.1.101		
5	20/09/2017								7.1.102			
5	28/09/2017						7.1.103		7.1.104	7.1.105		

Table B2: Bats recorded during surveys of Transect 1

Species	Latin Binomial	Number of Passes	Percentage of passes
Daubenton's Bat	Myotis daubentonii	3	1.1
Natterer's Bat	Myotis nattereri	1	0.4
Myotis Genus Group Bat	Myotis spp.	2	0.7
Leisler's Bat	Nyctalus leisleri	4	1.4
Noctule Bat	Nyctalus noctula	14	4.9
Nathusius' Pipistrelle	Pipistrellus nathusii	2	0.7
Common Pipistrelle	Pipistrellus pipistrellus	249	87.7
Soprano Pipistrelle	Pipistrellus pygmaeus	5	1.8
Brown Long-eared Bat	Plecotus auritus	4	1.4
TOTAL		284	100

Table B3:: Normalised activity transect 1 (2017)

Number of calls	Minutes surveying	Hours Surveying	'Activity' Value
284	866	14.43 Hours	19.7 Passes Per Hour

Table B4: Bats recorded during surveys of Transect 2 (2017)

Species	Latin Binomial	Number of Passes	Percentage of passes
Daubenton's Bat	Myotis daubentonii	2	0.6
Myotis Genus Group Bat	Myotis spp.	3	0.9
Leisler's Bat	Nyctalus leisleri	1	0.3
Noctule Bat	Nyctalus noctula	9	2.8
Nathusius' Pipistrelle	Pipistrellus nathusii	5	1.5
Common Pipistrelle	Pipistrellus pipistrellus	222	68.5
Soprano Pipistrelle	Pipistrellus pygmaeus	72	22.2
Brown Long-eared Bat	Plecotus auritus	9	2.8
Big bat	N/A	1	0.3

TOTAL	324	100

Table B5: Normalised activity transect 2 (2017)

Number of calls	Minutes surveying	Hours Surveying	'Activity' Value
324	899	14.98	21.6 Passes per hour

Table B6: Bats recorded during surveys of Transect 3

Species	Latin Binomial	Number of Passes	Percentage of passes
Serotine Bat	Eptesicus serotinus	8	2.6
Daubenton's Bat	Myotis daubentonii	1	0.3
Natterer's Bat	Myotis nattereri	2	0.7
Leisler's Bat	Nyctalus leisleri	4	1.3
Noctule Bat	Nyctalus noctula	12	3.9
Nathusius' Pipistrelle	Pipistrellus nathusii	1	0.3
Common Pipistrelle	Pipistrellus pipistrellus	233	76.6
Soprano Pipistrelle	Pipistrellus pygmaeus	27	8.9
Brown Long-eared Bat	Plecotus auritus	15	4.9
TOTAL		304	100

Table B7: Normalised activity transect 3 (2017)

Number of calls	Minutes surveying	Hours	'Activity' Value
304	975	16.27	18.6 Passes per hour

Table B8: Bats recorded during surveys of Transect 4

Species	Latin Binomial	Number of Passes	Percentage of passes
Daubenton's Bat	Myotis daubentonii	12	3.0
Natterer's Bat	Myotis nattereri	1	0.2
Myotis Genus Group Bat	Myotis spp.	20	5.0
Big bat	Nyctalus leisleri	2	0.5
Noctule Bat	Nyctalus noctula	8	2.0

Species	Latin Binomial	Number of Passes	Percentage of passes
Nathusius' Pipistrelle	Pipistrellus nathusii	3	0.7
Common Pipistrelle	Pipistrellus pipistrellus	255	63.6
Soprano Pipistrelle	Pipistrellus pygmaeus	100	24.9
TOTAL		401	100

Table B9: Normalised activity transect 4 (2017)

Number of calls	Minutes surveying	Hours	'Activity' Value
401	925	15.42	26 Passes per hour

Table B10: Bats recorded during surveys of Transect 5

Species	Latin Binomial	Number of Passes	Percentage of passes
Natterer's Bat	Myotis nattereri	1	0.3
Noctule Bat	Nyctalus noctula	3	0.9
Nathusius' Pipistrelle	Pipistrellus nathusii	1	0.3
Common Pipistrelle	Pipistrellus pipistrellus	308	88.5
Soprano Pipistrelle	Pipistrellus pygmaeus	32	9.2
Brown Long-eared Bat	Plecotus auritus	3	0.9
TOTAL		348	100

Table B11: Normalised activity transect 5 (2017)

Number of calls	Minutes surveying	Hours	'Activity' Value
348	905	15.08	23 Passes Per Hour

Table B12: Table showing the assemblage of bats recorded during each transect survey 2021

Transect	Date	Species								
		Eptesicus serotinus	Myotis spp.	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus spp.	Plecotus auritus	Big bat
1	19/04/2021					2				
1	26/05/2021					216	8			
1	23/06/2021		1			6	1	8		
1	14/07/2021	1	1			114	10			
1	15/07/2021	2	1			106	9			
1	18/08/2021					101	11			2
1	08/09/2021		2			83	5	13		
2	19/04/2021		6							
2	25/05/2021		1			16		1	2	
2	23/06/2021		1			8				
2	14/07/2021		1			68	1	2		
2	14/07/2021					61				
2	19/08/2021	9	1	6		62	2	1		
2	09/09/2021	5	5	2		32	4	1		
3	19/04/2021	No Bats Recorded by Batlogger (other bats noted in the field shown in the figures).								
3	26/05/2021		3			99	4	3		

Transect	Date	Species								
		Eptesicus serotinus	Myotis spp.	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus spp.	Plecotus auritus	Big bat
3	23/06/2021		20			18	14	2		
3	14/07/2021		1	1		58	12		1	
3	15/07/2021			1		68	12	3		
3	18/08/2021		26			26	23	4		
3	08/09/2021	1	5			102	47	5		14
4	20/04/2021					34	16			
4	25/05/2021					38	18			
4	24/06/2021		8			43	10	1		
4	12/07/2021					28	7	3		
4	13/07/2021		16			76	42	21		5
4	19/08/2021					29	12		8	
4	09/09/2021		2	4		62	8			
5	20/04/2021		2		1	58	52			
5	25/05/2021					151	40	3		
5	24/06/2021		4			94	25	1		
5	15/07/2021					71	22	4		

Transect	Date	Species								
		Eptesicus serotinus	Myotis spp.	Nyctalus noctula	Pipistrellus nathusii	Pipistrellus pipistrellus	Pipistrellus pygmaeus	Pipistrellus spp.	Plecotus auritus	Big bat
5	16/07/2021					144	18	6		
5	18/08/2021		7	1		92	13	4	2	
5	08/09/2021	2	3			52	13	1		

Table B13: Bats recorded during surveys of transect 1 2021

Species	Latin Binomial	Number of Passes	Percentage of passes
Big bat	N/A	2	0.3
Serotine Bat	*Eptesicus serotinus*	3	0.4
Myotis Genus Group Bat	*Myotis spp.*	5	0.7
Common Pipistrelle	*Pipistrellus pipistrellus*	628	89.3
Soprano Pipistrelle	*Pipistrellus pygmaeus*	44	6.3
Pipistrellus Genus Group Bat	*Pipistrellus spp.*	21	3.0
TOTAL		703	100.0

Table B14: Normalised activity Transect 1 2021

Number of calls	Minutes surveying	Hours Surveying	Activity' Value (passes per hour)
703	1260	21	33.48

Table B15: Bats recorded during surveys of Transect 2 2021

Species	Latin Binomial	Number of Passes	Percentage of passes
Serotine Bat	*Eptesicus serotinus*	14	4.7
Myotis Genus Group Bat	*Myotis spp.*	15	5.0
Noctule Bat	*Nyctalus noctula*	8	2.7
Common Pipistrelle	*Pipistrellus pipistrellus*	247	82.9
Soprano Pipistrelle	*Pipistrellus pygmaeus*	7	2.3
Pipistrellus Genus Group Bat	*Pipistrellus spp.*	5	1.7
Brown Long-eared Bat	*Plecotus auritus*	2	0.7
TOTAL		298	100

Table B16: Normalised activity transect 2 2021

Number of calls	Minutes surveying	Hours Surveying	Activity' Value (passes per hour)
298	1260	21	14.19

Table B17: Bats recorded during surveys of Transect 3 2021

Species	Latin Binomial	Number of Passes	Percentage of passes
Big bat	N/A	14	2.4
Serotine Bat	*Eptesicus serotinus*	1	0.2
Myotis Genus Group Bat	*Myotis spp.*	55	9.6
Noctule Bat	*Nyctalus noctula*	2	0.3
Common Pipistrelle	*Pipistrellus pipistrellus*	371	64.7
Soprano Pipistrelle	*Pipistrellus pygmaeus*	112	19.5
Pipistrellus Genus Group Bat	*Pipistrellus spp.*	17	3.0
Brown Long-eared Bat	*Plecotus auritus*	1	0.2
TOTAL		573	100.0

Table B18: Normalised activity transect 3 2021

Number of calls	Minutes surveying	Hours Surveying	Activity' Value (passes per hour)
573	1260	21	27.29

Table B19: Bats recorded during surveys of Transect 4 2021

Species	Latin Binomial	Number of Passes	Percentage of passes
Big bat	N/A	5	1.0
Myotis Genus Group Bat	Myotis spp.	26	5.3
Noctule Bat	Nyctalus noctula	4	0.8
Common Pipistrelle	Pipistrellus pipistrellus	310	63.1
Soprano Pipistrelle	Pipistrellus pygmaeus	113	23.0
Pipistrellus Genus Group Bat	Pipistrellus spp.	25	5.1
Brown Long-eared Bat	Plecotus auritus	8	1.6
TOTAL		491	100.0

Table B20: Normalised activity transect 4 2021

Number of calls	Minutes surveying	Hours Surveying	Activity' Value (passes per hour)
491	1260	21	23.38

Table B21: Bats recorded during surveys of Transect 5 2021

Species	Latin Binomial	Number of Passes	Percentage of passes
Serotine Bat	Eptesicus serotinus	2	0.2
Myotis Genus Group Bat	Myotis spp.	18	2.0
Noctule Bat	Nyctalus noctula	1	0.1
Nathusius' Pipistrelle	Pipistrellus nathusii	1	0.1
Common Pipistrelle	Pipistrellus pipistrellus	662	74.5
Soprano Pipistrelle	Pipistrellus pygmaeus	183	20.6
Pipistrellus Genus Group Bat	Pipistrellus spp.	19	2.1
Brown Long-eared Bat	Plecotus auritus	2	0.2
TOTAL		888	100.0

Table B22: Normalised activity transect 5 2021

Number of calls	Minutes surveying	Hours Surveying	Activity' Value (passes per hour)
888	1275	21.25	41.79

APPENDIX C: Calibration Details of Elekon Bat Loggers

APPENDIX D: Pen portraits of Surveyors

Table C1: Pen portraits of surveyors

Surveyor	Pen portrait
Caleb Fry (Graduate Ecologist)	Caleb is a seasonal ecologist and has worked in the environmental sector on an ad hoc basis for the past 4 years. He has experience in conducting various protected species surveys and has a good grasp of basic ecology. Caleb has a range of experience in conducting bat surveys and a great deal of experience in conducting bat activity survey transects using a wide range of survey equipment and survey techniques. Caleb helps conduct regular surveys of the greater horseshoe bat population at Woodchester mansion for the long term monitoring project run by Dr. Roger Ransome and has a good understanding of all aspects of bat ecology.
Brandon Murray MCIEEM (Principal Ecological Consultant) BSc(hons)	Brandon has been a professional ecologist for eight years. Brandon has been planning, leading and completing bat surveys for over six years, including bat transects, static detector surveys, bat emergence and re-entry surveys and aerial tree inspections. Brandon is a Class II bat licence holder (Licence Number 2016-19420-CLS-CLS). Brandon has assessed the potential impacts to bats from multiple development projects and written bat survey and impact assessment reports for multiple sites. Brandon has been named on two bat development licences.
Dr Liat Wicks (Director – Sonar Ecology) CEcol MCIEEM PhD MSc BSc (hons)	Dr Wicks is a consultant and Chartered Ecologist with over twelve years' professional experience specialising in bat survey design, mitigation and sound analysis across the UK. She holds 3 Natural England class licences for protected species, and is a class 2 licenced bat surveyor (Registration no. 2015-10211-CLS-CLS). She has produced numerous EPS applications, EIA chapters and authored Bat Masterplans for major infrastructure projects. She is often consulted on her expertise in sound analysis and survey design, and is a Level 1 Thermographer, utilising this skill in ecology survey work. Between 2012 and 2013 Dr Wicks was Head of Biodiversity at the Bat Conservation Trust.
Aline Brodzinski (Senior Ecologist) MCIEEM BSc (hons) MSc	Aline Brodzinski has been a professional ecologist for 7 years, and has been leading bat surveys for 4 years. Aline is proficient in surveying for a rage of protected species including great crested newts, badgers, reptiles, water voles and otters.
Gregor Pecnik (Environmental Economist) Ba MSc	Gregor has over 11 years of experience working in the environmental and sustainability sectors. Gregor has received on-the-job training enabling him to be able to confidently assist with bat surveys.
Ellen Poppleton BSc (hons) GradCIEEM	Ellen Poppleton has been an ecologist for over two years. She has experience surveying for reptiles, bats, badgers, amphibians and water voles. Ellen has received internal and on the job training to ensure that she can confidently conduct a range of protected species surveys.
Alex Ward (Graduate Consultant) BSc (hons) Affiliate IEMA	Alex is a graduate environmental consultant who is predominately involved as the environment lead on a coastal defence construction scheme for the Environment Agency. This has led him to be experienced in the delivery of environmental mitigation, ecological surveying and national and international permitting requirements. Alex has received in-house training in regards to the identification of both reptiles and bats during his time at Arcadis, including the usage of survey equipment.
Hannah Tracey (Graduate Ecologist) MSc BSc (hons) GradCIEEM	Hannah has worked as a professional Ecologist with Arcadis for over four years. During this time, she has developed a wide range of experience in both the field and office-based environment.

Surveyor	Pen portrait
	Hannah regularly undertakes targeted surveys for a range of protected species including great crested newt, dormouse, reptile, badger and bat activity and emergence/re-entry surveys. She has experience of undertaking site supervision activities and ecological clerk of works.
Jon Carter (Assistant Ecologist) BSc GradCIEEM	Jon Carter is an assistant ecologist with a broad range of ecological experience. Jon has been a professional ecologist for three years, during which he has conducted surveys for a range of species, particularly focussed on birds, reptiles and GCN, but also bats, dormice, badger, water vole and otter. Jon has carried out a number of bat emergence/re-entry and activity transect surveys and has undertaken in-house 'on the job' training on conducing bat surveys, which covered identification of bat calls in the field and the use of specific survey equipment to do so.
Tim Buckland MSc MCIEEM	Tim has managed the ecological risk for clients across a range of sectors. His in-depth knowledge of legislation and planning policy allow him to provide shrewd advice to clients, enabling their developments to progress. He has undertaken a number of Ecological Impact Assessments (EcIA) and European Protect Species (EPS) licences. Tim is a full member of the Chartered Institute of Ecology and Environmental Management and has a BSc in Marine Biology and an MSc in Biodiversity Survey. He has a strong understanding of mammal ecology and holds Natural England survey licences for great crested newts, bats, dormice and barn owls. He has been the named ecologist on over eight bat mitigation licences and is registered to use Natural England's bat mitigation class licence.
Alex Burrows BSc MSc Qualifying CIEEM	Alex has experience undertaking a range of protected species surveys including those for bats, great crested newts, reptiles, dormice, badgers, water voles and otters. In addition, Alex has assisted on Phase 1 habitat surveys. His other responsibilities include analysis of bat audio data, carrying out great crested newt Habitat Suitability Index assessments and assisting writing project reports. Alex holds a Construction Skills Certificate Scheme (CSCS) card, is qualified in tree climbing and aerial rescue, and is a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

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