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Inglewood, Paignton

Ecological Baseline Report

A Report on behalf of Deeley Freed Estates

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CONTENTS

Figures

Appendices

SUMMARY

Deeley Freed Estates Ltd propose to submit an outline planning application to construct up to 400 dwellings, a 2 form entry primary school, public house and associated public open space and landscaping on approximately 28 ha of land south of White Rock, Paignton. The Site consists of cattle pasture and arable fields bounded by hedgerows.

Nicholas Pearson Associates undertook a series of ecology surveys to determine the ecology value of site and inform the proposals.

This work determined that whilst the intensely managed cattle pasture and arable land was of limited inherent nature conservation value, the hedgerow network was of greater value.

Whilst the cattle pasture is of limited value for much wildlife, it is recognised as an important habitat type for Greater Horseshoe bats (GHS), which benefit from the availability of dung beetle prey items. The presence of the cattle pasture and hedgerow network is of added value given that the Site is within a sustenance zone associated with a site of European importance for GHS at the Berry Head peninsula.

The detailed bat surveys recorded low numbers of GHS roosting within 200m of the Site, GHS foraging across the Site and a diverse range (at least 9 species in total) of other bat species foraging across the Site. These records were predominantly associated with the hedgerow network.

The bird surveys recorded four breeding pairs of Cirl Bunting on Site and a typical diversity of other species associated with farmland. Again these records were predominantly associated with the hedgerow network.

The Site was considered to support habitat of moderate potential conservation value for invertebrates. The hedgerow network largely providing this potential, with the site's grasslands being considered of low conservation value due to their limited botanical and structural interest.

The surveys did not record any evidence of GCN or Dormice, and only a maximum count of two Slow Worms.

1.0 INTRODUCTION

This document has been prepared by Nicholas Pearson Associates (NPA) on behalf of Deeley Freed Estates Ltd, who propose to submit an outline planning application to construct up to 400 dwellings, a 2 form entry primary school, public house and associated public open space and landscaping on approximately 28 ha of land south of White Rock, Paignton (central OS grid reference SX881575), hereafter referred to as 'the Site' and identified in Figure 1. The Site consists of cattle pasture and arable fields bounded by hedgerows on the western edge of Paignton.

This report provides detailed information on the existing ecological conditions to be found on Site. A description of the survey methods used is provided together with detailed descriptions of habitats present on and around the Site. A range of protected species surveys have been undertaken, including surveys for Badgers *Meles meles*, bats, breeding birds, Dormice *Muscardinus avellanarius*, Great Crested Newts (GCN) *Triturus cristatus*, invertebrates and reptiles. The results of these surveys are included in this report with figures where appropriate.

An area of land to the west of Site (see Figure 1) within the client's control was also subject to a Phase 1 Habitat Survey in August 2016 to help determine its potential to provide off-site mitigation, hereafter referred to as the off-site mitigation land (OSML).

Ecological evaluations of habitats/species and mitigation/enhancement measures have not been provided in this report but are detailed within the ecological chapter of the Environmental Statement that supports the outline application.

2.0 METHODS

2.1 Desk study

In June 2016 records of wildlife sites and legally protected, biodiversity priority, red data book (RDB) and county notable species, within a 2km search buffer surrounding the Site boundary were requested from the Devon Biodiversity Records Centre (DBRC). The search buffer was extended to 4km for bat records. Devon Bat Group were subsequently contacted to ascertain

if there were records of Greater Horseshoe bat (GHS) *Rhinolophus ferrumequinum* maternity roosts within this search buffer.

In November 2016 records of Cirl Bunting *Emberiza cirlus* within 1km of the Site and the off-site mitigation land were requested from the RSPB. This included records from the RSPB's 2016 Cirl Bunting Population Survey.

Records of Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Marine Conservation Zones (MCZ) within a 5km radius of the Site and records of Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Community Importance (SCI) and Ramsar Sites (i.e. sites of international importance) within a 10km buffer of the Site were retrieved from Natural England's Nature on the Map website[1].

Aerial photography and OS mapping were also reviewed to help place the Site in context.

Ecology surveys were previously undertaken on Site to support a planning application for a site to the north known as White Rock (Planning reference P/2011/0197) and also to support a land promotion study for a development on this Site. As such the following reports produced by EcoSulis were reviewed to inform the understanding of the ecology baseline conditions of the Site:

White Rock ecology reports:

- Baseline Ecological Surveys[2];
- Ecological Impact Assessment[3]; and
- Landscape and Ecological Management Plan – Off-site Woodland and Hedgerows[4].

Land Promotion Study ecology reports:

- Update Phase 1 Habitat Survey, May 2014[5];
- Bat Activity Survey, July 2014[6]; and
- Horseshoe Bat Activity Survey Cirl Bunting Survey, March 2016[7].

[1] http://www.natureonthemap.naturalengland.org.uk/ [Last accessed 22nd May 2017]
[2] Issue Two, 10th February 2011, STRTRE-WHIROC-2833
[3] Issue Two, February 2011, STRTRE-WHIROC-2833_TA2
[4] Final Issue 24th August 2012, DEEFRE-WHIROC-C-C4407_B
[5] Issue Two, 22nd September 2014, J005441
[6] Issue Three 12th November 2014, J005441
[7] Issue Two 8th March 2016, J005799/J005945

2.2 Extended Phase I Habitat Survey

An Extended Phase 1 Habitat Survey of the Site was undertaken in April 2016 by an experienced ecologist from NPA. Habitats and obvious features within the Site were mapped following the Joint Nature Conservation Committee's Phase 1 Habitat Survey Method (2010) to map habitats and land use categories to a consistent level of detail and accuracy.

The scope of the Phase 1 Habitat Survey was further widened in accordance with the methodology provided by the Institute of Environmental Assessment (IEA, 1995) in that provision was made for recording information on features suitable for faunal species of conservation interest. This included, for example, an assessment (from ground level) of all mature trees on Site for their potential to support roosting bats and roosting Barn Owls *Tyto alba*, as well as a search for any evidence of Badger setts.

An area of land to the west of Site (see Figure 1) was also subject to a Phase 1 Habitat Survey in August 2016 to help determine its suitability/potential to provide off-site mitigation (e.g. cattle grazing, Cirl Bunting habitat).

The results of the desk study exercise and the Extended Phase 1 Habitat Survey identified the potential for a number protected species to be present on Site and the immediate surrounds. As such a series of further surveys for bats, breeding birds, Cirl Bunting, Dormice, Great Crested Newts, invertebrates and reptiles were undertaken to inform the proposals and are described in detail below.

2.3 Badgers

During the Extended Phase 1 Habitat Survey a thorough search for evidence of Badgers on/adjacent to the Site was carried out (where accessible). Signs of Badgers typically include the following:

- Badger setts;
- Dung pits/latrines;
- Pathways through vegetation;
- Evidence of feeding (snuffle marks and feeding scrapes); and
- Snagged hairs under fence lines.

If there was uncertainty if a sett was active, sticks were placed at the entrance and checked on subsequent visits. If the sticks had not been moved for a period of three weeks the sett was considered inactive.

2.4 Bats

The aims of the bat surveys were to:

- identify any bat roosts on or immediately adjacent to Site;
- estimate the minimum number of bat species using the Site; and
- identify key habitats for commuting and foraging bats.

2.4.1 Preliminary Assessment of Features

An assessment from the ground of trees on and adjacent to the Site was undertaken as part of the Extended Phase I Habitat Survey to determine their potential to support roosting bats. This involved a search for suitable features such as cracks, splits, cavities, knotholes and loose bark.

Whilst there are no buildings on Site, White Rock Cottages (OS Grid SX 88087 57898) and derelict farm buildings (OS Grid SX 88015 57992) approximately 150m north of the Site were also assessed for their potential to support roosting bats. This involved a search for features providing potential access points and roosting opportunities for bats. Such features can include:

- Suitable gaps beneath tiles;
- Suitable cracks and crevices within stonework;
- Suitable access points via the head of gable ends;
- Gaps around lead flashing;
- Access via chimneys and eaves; and
- Access points via decorative features.

White Rock Cottages were assessed from the boundaries of the property with the use of binoculars, and whilst access was permitted to the derelict farm buildings, their condition prevented internal access to some areas.

Based on the number and quality of features present/evidence recorded each tree/building was assigned a rating (negligible; low; moderate; high; confirmed roost) for its potential to support roosting bats.

2.4.2 Bat activity surveys

A series of activity surveys for bats were conducted to assess the use of the Site by bats. The surveys consisted of manual activity surveys, deployment of automated bat detectors over a series of nights and hibernation surveys. These survey were undertaken in accordance with the South Hams SAC – Greater horseshoe bat consultation zone planning guidance (Natural England, 2010) and the Bat Conservation Trust's Bat Surveys for Professional Ecologists (Collins, J, 2016).

All activity surveys were undertaken in suitable weather conditions (no or little rain, no strong wind above Beaufort 4, and moderate temperature, typically not below 10^0C). During manual surveys temperature (^{0}C), cloud cover (%), wind (Beaufort) and intensity of rain were recorded at hourly intervals. Whilst the automated detectors recorded temperature, additional weather information was taken from a weather station[8] based in St Mary's Brixham, approximately 4km south east: of the Site.

Manual Activity Surveys

Three transects routes which covered a cross-section of habitats present on Site were attempted/undertaken on 13 survey visits in April to October 2016 (See Figure 2). This included one dusk and dawn survey on the 17th and 18th of August. Due to a positive TB test the movement of cattle was restricted during the course of 2016 and transect routes/ surveyor numbers were adjusted to deal with the presence of bulls and/or cattle and calves.

Each transect began 15 minutes prior to sunset, and lasted until 3 hours after sunset. Each surveyor remained static for the first 1hr and 15 minutes (i.e. until 1hr post sunset to identify potential roosts and/or early commuting routes) and then walked the transect route at a steady pace stopping at pre-defined listening points for at least 5 minutes to record bat activity. Incidental records of bats in-between listening points were also made.

[8] https://wow.metoffice.gov.uk/observations/details/20170119catkqds6gae6pfybyyguicqpgo

In August additional dawn emergence surveys were also undertaken at features on and adjacent to Site, that were considered suitable for roosting bats (See Figure 2). These began at least 1.5hrs before sunrise, with the surveyor remaining in position until at least sunrise.

The off-site derelict farm buildings, were also subject to emergence/re-entry surveys given their potential to support Greater Horseshoe bat roosts (for which there is a site of European importance approximately 5km away). The number and duration of these surveys were adjusted, based on the results of the automated detectors deployed internally, to try and identify the presence of night as well as day roosts (See Figure 3).

When a bat was encountered the time, species and notes on activity were recorded. Bat echolocation was recorded using time expansion bat detectors (AnaBat Walkabout, Pettersson D240X (connected to Edirol solid state .WAV recorder) or Echo Meter 3).

Recorded echolocation calls were manually analysed using BatSound and/or AnaLookW to verify species identification. As the calls of *Myotis* bat species are very similar, with most of the variation between their calls attributable to the habitat in which they occur (Russ, 1999), the *Myotis* recordings have not been attributed to a particular species.

Automated Surveys

Automated bat detectors (AnaBat Express) were also deployed across the Site (See Figure 2) to supplement the manual surveys. AnaBats were placed approximately 1m off the ground and left in position for at least five nights (dusk-dawn). They were programmed to come on at least 15 minutes before sunset and turn off no earlier than 15 minutes after sunrise.

Recorded echolocation calls were run through filters for both horseshoe bat species within AnaLookW to identify likely horseshoe bat calls (see Table 1 below for filter parameters). These were then analysed manually to verify if they were attributable to either Lesser *Rhinolophus hipposideros* or Greater Horseshoe bats.

Table 1: Horseshoe Filter Parameters

	Greater Horseshoe Bat	Lesser Horseshoe Bat
Characteristic Frequency (KHz)	75-90	95-120
Call Duration (ms)	0.2-100	0.2-100

Identification of other bat species was gained through use of the automated species identification feature within Kaleidoscope 4.1. Whilst the accuracy of the automated species identification works well for certain species (e.g. 95% accuracy for Pipistrelles) it is less accurate for others (e.g. ~50% accurate identification to a particular Myotis species). For the purpose of this project Myotis were not attributed to species and the larger bat species Noctule *Nyctalus noctula*, Leisler's Bat *Nyctalus leisleri* and Serotine *Eptesicus serotinus* (N-L-S) were grouped together. In addition any records of Barbastelle *Barbastella barbastellus* were analysed manually for verification (due to their rarity).

In addition automated detectors (AnaBat Expresses and SM2s) were also deployed in the derelict farm buildings (see Figure 3) to help identify the presence of roosting horseshoe bats. Recorded echolocation calls were analysed using the horseshoe filters within AnaLookW and as above, those identified were then analysed manually.

2.4.3 Hibernation Surveys

The internal/external assessment of the derelict farm buildings identified the basement of an off-site building known as Inglewood (See Figure 3) was considered suitable to support hibernating horseshoe bats. Access into the basement was not possible due the buildings derelict nature. As such AnaBat Express detectors were deployed in the basement (suspended from gaps in the floorboards above) in January and February 2017 to help determine if the building supported hibernating bats.

2.5 Birds

Breeding Bird Surveys (BBS) were completed during spring 2016 using a methodology based upon a combination of Common Bird Census methodology, devised by the British Trust for Ornithology (BTO), and the national Breeding Bird Survey (BBS) techniques, jointly devised by the BTO, Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservation Committee (JNCC) as well as standard methodology outlined in Bibby *et al* (2000). This technique records the species, their breeding status and estimates the number of individual territories of the birds within the site or survey area.

The survey aimed to determine possible, probable and confirmed breeding status of all species heard or observed and to determine which birds are using the Site for breeding or foraging

purposes. The locations of birds which were seen or heard during the surveys and their signs (moulted feathers, egg shells etc.) were carefully noted and recorded. In order to define possible, probable or confirmed breeding, details were recorded of birds behaviour in favourable habitat and those displaying, singing, calling, exhibiting territorial aggression, carrying food or nesting material and juvenile birds and family groups.

The method comprised three survey visits to the site during the breeding season, April to July between the hours of 5.30 am and 11.00 am at a time when birds are generally most active. Visits were carried out in the early morning with a start time just after sunrise; this period was chosen to avoid the first hour after dawn (as recommended by Gilbert, Gibbons and Evans, 1989). A suitably experienced surveyor slowly walked a predetermined transect and sought to maximise the observance of all habitat types present within the route by either incorporating, or passing within 50m of each habitat type. These were walked at a slow and constant pace with frequent pauses being made at appropriate vantage and listening points to enable nest searches within notable habitats or suitable trees to be undertaken.

Visits were undertaken on 26th April, 12th May and 21st June 2016 and notes made as to the birds present, resulting in population estimates and mapping of locations on site for each of the individual species. This in turn allowed for an assessment of the Site's overall value to breeding birds. Days were selected when weather conditions were forecast to be optimal for survey, with no rain, light winds and temperatures normal for early mornings during the spring and summer months.

Additionally, a combined crepuscular visit for breeding birds and Cirl Buntings was made on the 21st July and during this survey observations were made to establish whether the Site was utilised by hunting Barn Owl or other nocturnal species.

Weather conditions at the time of the surveys were recorded and presented in Table 2 below.

Table 2: Breeding bird survey dates, times and weather conditions

Date	Start Time	Finish Time	Start Temp(°C)	Start Cloud Cover (okta)	Wind Speed (Beaufort)
26/04/2016	06:00am	11:00am	4	0	3
12/05/2016	05:00am	10:00am	11	7	0-1
21/06/2016	05:00am	10:30am	14	6	2
21/07/2016	16:30pm	20:30pm	18	6	2-3

A weakness of the methodology is the tendency for inconspicuous and /or skulking species to be under-recorded. Conversely, numbers of species with large territories (e.g. Buzzard, Wood Pigeon and Magpie) may have been over-recorded as a consequence of double counting as individuals moved across the Site during the survey period.

2.6 Cirl Bunting

2.6.1 Breeding Survey

A minimum of five survey visits were undertaken on the following dates in accordance with the methodology detailed in the 'Survey methodology to establish presence of breeding Cirl Buntings on a site' (RSPB 2015). Details of the survey dates and weather information during the surveys are detailed in Table 3 below.

Table 3: Cirl Bunting Survey Details

Date	Survey Number	Start Time	Finish Time	Surveyor	Weather Information
27/04/2016	1	06:00am	11:15am	Mark Tunmore	Clear, dry, breezy, 3-8°C, light frost first thing
13/05/2016	2	05:20am	11:00am	Daryl Robinson	Partly cloudy, rain previous evening, light breeze, 12°C
22/06/2016	3	06:00am	11:00am	Daryl Robinson	Still, misty start then clear, 12°C
21/07/2016	4	16:30pm	20:30pm	Daryl Robinson	Partly cloudy, no rain, gentle breeze, 18°C
16/08/2016	5	06:00am	11:00am	Daryl Robinson	Cloudy and warm, no rain, breezy sometimes strong

A route was plotted on a map of the Site and ensured that the route taken by the surveyor approached to within 10m of every hedge within the survey area. The route was walked slowly to aid detection and the direction of the route was varied between visits. Visits were timed to avoid periods of low activity between the hours of 1100 and 1500hrs.

During the surveys all Cirl Buntings either seen or heard were mapped accurately onto a map noting, the appropriate BTO behaviour codes, the time, habitat, movements and behaviour of each individual or pair. Records such as age and sex of each individual bird were recorded were possible. After the final survey visit, all sightings were transferred onto a single map to

identify clusters of Cirl Bunting sightings. These clusters were then allocated to possible territories.

Areas adjacent to the Site were also surveyed where practicable and any registrations of Cirl Buntings in these areas were noted.

The interpretation of behaviour to assess breeding[9] is shown in Table 4 below.

Table 4: Interpretation of Behaviour to Assess Breeding

Possible breeding	Probable breeding	Confirmed breeding
• Bird recorded in suitable breeding habitat • Singing male	• Pair in suitable nesting habitat • Territorial behaviour • Display • Visiting probable nest site • Agitated behaviour • Carrying nesting material	• Adult carrying faecal sac or food for young • Recently fledged young • Chicks heard

Survey Limitations

The presence of cows and bulls in Fields 3 and 4 prevented the effective survey the hedges on their western boundary on two occasions, due to health and safety risks. However, the surveyor was able to get close enough to observe this hedgerow using binoculars whilst listening for singing males or any other calls made by the Cirl Bunting. In addition, on the first Cirl Bunting survey visit, when the cows and bulls were not in this field, a single male Cirl Bunting was seen along this hedgerow.

As Cirl Bunting are so elusive, some individuals may have been missed during the surveys, however all precautions and survey effort was completed to minimise this possibility.

2.6.2 Wintering Survey

Wintering surveys were undertaken by EcoSulis between December 2015 and February 2016. The report (see Appendix 1 for full details) states four survey visits were undertaken in accordance with the methodology detailed in the RSPB 2015 guidance.

[9]Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. 2013. *Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland*. BTO Books, Thetford

2.7 Dormouse

Presence/absence surveys for Dormouse were carried out following best practice guidance (Bright, Morris & Mitchell-Jones 2006) between April and November 2016. The survey method involved deployment of nest tubes, a method where plastic tubes are fixed firmly (by wire) underneath horizontal branches of trees/shrubs in areas of suitable habitat. If Dormice are present the nest tubes are often adopted as nest sites thus allowing their presence to be detected.

Within the best practice guidance document a score can be devised to provide an indicator of the thoroughness of a survey for Dormice. For each month that tubes are on site a score is obtained which is based on the probability of whether Dormice will be present. The scoring is as shown below in Table 5.

Table 5: Index of probability of finding Dormice

Month	Index of probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

Therefore if tubes are on a site between April and November a score of 25 (the sum of all the individual scores) is gained. The scoring is based on a standard of 50 tubes being deployed on site (the recommended minimum). It is recommended that absence should not be assumed for a search effort score of less than 20 points.

Habitat suitable to attach tubes to was limited, but a total of 60 tubes were installed, between 1-2m above ground, in April 2016 in areas shown in Figure 4. Tubes were checked at least every other month. Whilst some nest tubes were not located due to the dense vegetation, or needed retying or inserts re-inserting, at least 50 tubes were checked on each visit.

2.8 Great Crested Newt

Ordnance Survey topographic MasterMap mapping and aerial photography was used to search for ponds within 250m (with potential habitat connectivity to the Site) of the Site which could potentially support Great Crested Newts (GCN). Two such ponds were identified (see Figure 7) and were subject to a Habitat Suitability Index (HSI) assessment (Oldham *et al.* 2000) to determine their suitability to support GCN.

This assessment uses numerous criteria such as water quality, fish/waterfowl presence and quality of surrounding terrestrial habitat from which a score is derived. Water features with higher scores are more likely to support GCNs compared to those with lower scores. Scores are classified as follows in Table 6.

Table 6: HSI Scoring

HSI Score	Pond Suitability
<0.5	poor
0.5-0.59	below average
0.6-0.69	average
0.7-0.79	good
>0.8	excellent

Whilst these ponds both scored "Poor" HSIs, they were subject to a precautionary environmental DNA (eDNA) test on the 20th of April 2016. Water samples were collected by a licensed GCN surveyor in accordance with methods given within Appendix 5 of DEFRA research project WC1067 and sent away to a laboratory to determine the presence/absence of GCN DNA.

2.9 Invertebrates

A site visit was undertaken by an experienced entomologist on 20th April, 2016, during generally warm and sunny conditions. The Site was walked and key habitat features supporting or beneficial to key invertebrate assemblages/species were recorded using geo-referenced target notes. Particular emphasis was placed on habitat features important to S41 species and other species of note which have been recorded within the locality. Due to the perceived low value of improved agricultural land, the survey focused primarily on the network of hedgerows and associated margins. Details of vegetation composition and structure were recorded within

the target notes, to add resolution to the potential of the site to support invertebrate species with a known affinity to a particular food-plant.

Data analysis

No formal data analysis was undertaken for the purpose of the current project, however, all recorded species were entered into an Excel spreadsheet and the conservation status of each species was checked using available materials such as the Taxon Designation Spreadsheet (available from the JNCC website) and various published taxon-specific atlases and reviews; Hyman and Parsons (1992) for example.

Limitations

This effort undertaken was essentially a scoping study (report provided in Appendix II). Findings are based on a review of local record centre data-search and on the findings of a single visit survey which aimed to assess invertebrate habitat potential only. Whilst some species were recorded incidentally during the survey, these records cannot be seen as providing a representative cross section of species potentially occurring on site. From assessment of the habitat present on site it is possible to reasonably evaluate the site's potential value for invertebrates, however, there is no guarantee that rare, uncommon or designated species are not present on the site.

The DBRC data-search provides background information on certain species or species groups which have been recorded historically within a two kilometre radius of the site. However, certain records held by groups such as those held by the county invertebrate recorders may not be represented within the dataset.

2.10 Reptiles

Reptile surveys were undertaken in September and October 2016 based on standard reptile survey methodology (Froglife 1999). This involved the deployment of artificial refuges which reptiles use for shelter and basking. 0.5m x 0.5m squares of roofing felt were placed around the Site (See Figure 5) in what was considered to be suitable reptile habitat adjacent to hedgerows.

A total of 90 refugia were deployed in early September 2016 and a total of 7 checks were subsequently undertaken in suitable weather conditions (air temperature between 10 and 20°C with wet and windy days being avoided). The Froglife survey guidelines were also used to categorise the reptile population on Site into a size class.

3.0 RESULTS

3.1 Desk Study

3.1.1 Statutory Sites

There are nine statutory sites within the area of search, details of which are provided in Table 7 below. They are mapped in Figure 6.

Table 7: Statutory Nature Conservation Designations within Area of Search

Site Name	Reasons for designation	Distance from Site.
Lyme Bay and Torbay marine SCI	Annex I habitats that are a primary reason for selection of this site: <u>Reefs</u> This site is situated mostly within the Western English Channel and Celtic Regional Sea and lies off the south coast of England off the counties of Dorset and Devon. The site comprises of two main areas containing Annex I 'reef' and 'sea cave' habitat. The reef features extend over a large area. Unlike other sites within the Lyme Bay and Torbay site, they do not extend directly out from the coast but occur as outcropping bedrock slightly offshore. The softer sediment habitats are commonly found between the bedrock or cobble / boulder areas. Examples of the classical wave-eroded sea caves are found at all the sites of different levels and rock types. The site is indicative of offshore reef and has particularly high species richness and identified it as a marine biodiversity "hot spot". <u>Submerged or partially submerged sea caves</u> A large number of infralittoral sea caves have been identified within Torbay and the surrounding coastline from Mackerel Cove in the north, to Sharkham Point in the south. Examples of the classical wave-eroded sea caves are found at all the sites. They occur in several different rock types, and at levels	1.2km east

Site Name	Reasons for designation	Distance from Site.
	from above the high water mark of spring tides down to permanently flooded caves lying in the infralittoral zone.	
Torbay MCZ	Conservation objectives for the protection of: • Intertidal coarse sediment • Intertidal mixed sediments • Intertidal mud • Intertidal sand and muddy sand • Low energy intertidal rock • Moderate energy intertidal rock • Subtidal mud • Intertidal underboulder communities • Seagrass beds • Long-snouted seahorse *Hippocampus guttulatus*; and • Native oyster *Ostrea edulis*	1.1km east
South Hams SAC	Five discrete sites spread across Devon, with nearest being the Berry Head to Sharkham Point SSSI component. Annex I habitats that are a primary reason for selection of this site: <u>European dry heaths</u> Although this site is important for its extensive limestone grasslands, some areas on the plateau support dry heath characteristic of acid soils. <u>Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)</u> The Devonian limestone headland and cliffs of the Torbay area of south Devon support a large area of the rare CG1 *Festuca ovina – Carlina vulgaris* grassland, including the *Scilla autumnalis – Euphorbia portlandica* sub-community, known from no other site in the UK. The site is exceptional in that it supports a number of rare and scarce vascular plants typical of the oceanic southern temperate and Mediterranean-Atlantic elements of the British flora. Semi-natural grassland gives way to European dry heaths on flatter slopes above the cliffs in some areas. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • Vegetated sea cliffs of the Atlantic and Baltic Coasts • Caves not open to the public, and	5.0km south east

Site Name	Reasons for designation	Distance from Site.
	• Tilio-Acerion forests of slopes, screes and ravines * Priority feature Annex II species that are a primary reason for selection of this site: <u>Greater horseshoe bat *Rhinolophus ferrumequinum*</u> South Hams in south-west England is thought to hold the largest population of greater horseshoe bat *Rhinolophus ferrumequinum* in the UK, and is the only one containing more than 1,000 adult bats (31% of the UK species population). It contains the largest known maternity roost in the UK and possibly in Europe. As the site contains both maternity and hibernation sites it demonstrates good conservation of the features required for survival. Berry Head to Sharkham Point SSSI component is understood (information from Devon Bat group) to support approximately 65 GHS during the maternity period, and approximately 100 GHS during the hibernation period. The Site falls within a GHS sustenance zone for the SAC.	
Berry Head to Sharkham Point SSSI	This site is important for its extensive area of limestone grassland containing many nationally rare plants and for its important assemblages of lichens. Also, the sea cliffs support the largest Guillemot colony to be found along the south coast of England. In addition, important geological features are to be found at Shoalstone Beach. The SSSI citation also notes "*The flooded marine caves with their wide range of salinity and light conditions have an interesting cave and marine fauna. Some are inhabited by Greater and Lesser Horseshoe Bats Rhinolophus ferrumequinum and R. hipposideros.*"	5.0km south east
Berry Head NNR	Main habitats: coastal, lowland grassland	5.0km south east
Saltern Cove SSSI	Saltern Cove is an important geological locality. It also supports a diverse intertidal flora and fauna including communities' characteristic of both sediment and rocky shores.	1.4km east
Sugar Loaf Hill and Saltern Cove LNR	No information given by DWT	1.4km east

Site Name	Reasons for designation	Distance from Site.
Roundham Head SSSI	Geological SSSI (as such, not discussed further in this assessment)	2.3 km north east
Lord's Wood SSSI	The site comprises one of the best examples of oak-hazel-ash woodland in Devon and is an important representative of woods developed on loamy soils in western and northern Britain.	3.0km south

3.1.2 Non-statutory Sites

There are approximately 30 non-statutory sites within 2km of the Site, which are made up of County Wildlife Sites (CWS), Unconfirmed Wildlife Sites (UWS) and Other Sites of Wildlife Interest (OSWI). The closest sites are provided in Table 8 below, with full details of all sites and location provided in Appendix III.

Table 8: Closest Non-statutory Nature Conservation Designations

Site Name	Reasons for designation	Distance from Site.
Galmpton Common CWS SX85/095	Herb-rich neutral and calcareous grassland, with some woodland blocks	450m south east
Manor Farm OSWI SX85/092	Broadleaved woodland & scrub, with semi-improved & species-rich calcareous grassland	450m south
Tor Rocks CWS SX85/096	Broadleaved woodland	500m east
Waddeton UWS SX85/120	Orchard	550m south west

Stewardship agreements

The hedge banks and field margins present in Field 5 and in the OSML fields to the west of Waddeton Road are subject to an Entry Level Stewardship (ELS) agreement. The agreement is due to run to august 2021 and requires there to be 2m grass margins (Option EE1), sensitive hedge management (Option EB2) and protection of the earth banks (Options EB13). In addition the field to the west of Waddeton Lane Plantation is subject to a Higher Level Stewardship (HLS) agreement, which requires "reduced-depth, non-inversion cultivation" to protect archaeological features.

3.1.2 Species records

Records of legally protected or otherwise notable species of flora and fauna within 2km of the Site (extended to 4km for bats) were provided by Devon Biodiversity Records Centre. A summary of the most significant results is given in Table 9 below.

Table 9: Key Species Records

Species	Record Summary
Amphibians	Records of Common Frog *Rana temporaria*, Toad *Bufo bufo*, Smooth Newt *Lissotriton vulgaris* and "newt". Nearest record is for a Common Frog approximately 50m west on Steed Close. Nearest records for "a Newt" are all greater than 500m from the Site.
Badgers	None on or in close proximity to the Site.
Bats	Records of nearly all UK species (no records for Leisler's bat or some Myotis inc. Bechstein's Bat *Myotis bechsteinii*). Nearest records of GHS are approximately 1km away. Records do not state if they are for roosting or foraging bats, but Paignton Zoo caves (approx. 1.7km north) are understood to support hibernating GHS, and Devon Bat Group confirmed they have no records of GHS maternity roosts within 4km of the Site, with nearest known to be at Berry Head and Dartmouth >5km away.
Birds	Diverse range of bird species records. Most records from costal or riparian habitats. Also species associated with farmland, including Cirl Bunting, Fieldfare *Turdus pilaris*, Redwing *Turdus iliacus*, Barn Owl, Red Kite *Milvus milvus*, Red-backed Shrike *Lanius collurio*, Whimbrel *Numenius phaeopus* and Brambling *Fringilla montifringilla* (although none recorded on/adjacent to Site). RSPB returned approx. 10 records of Cirl Bunting within 1km of the Site.
Brown Hare	Nearest records approximately 500m west.
Dormouse	One record from 2002, shown in woodland approximately 800m north east.
Hedgehog	One record approximately 200m east.

Species	Record Summary
Invertebrates	Noting four exceptions (two dragonflies, a bush-cricket and a cave shrimp), limited to records of butterflies and moths (Lepidoptera). Records include Marsh Fritillary *Eurydryas aurinia*, Brown Hairstreak *Thecla betulae* and White-letter Hairstreak *Satyrium w-album* and over 30 S41 species.
Reptiles	Records Slow Worm *Anguis fragilis,* but none on or in close proximity to the Site.

Table 10 below provides a summary of the key information recorded by EcoSulis historical surveys on Site.

Table 10: Summary of Historical EcoSulis Survey Data

Species	Record Summary
Amphibians	Ponds not considered suitable for GCN. As such no surveys undertaken.
Badgers	No setts recorded on or adjacent to Site.
Bats	No roosts recorded on or adjacent to Site. Surveys in 2010 and 2015 recorded the following species foraging on site: GHS, Lesser Horseshoe bat, Barbastelle, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Myotis and Serotine.
Birds	2010 surveys recorded a good population of breeding birds, including Birds of Conservation Concern (BOCC), UK BAP and Devon BAP species.
Cirl Bunting	Breeding surveys split over 2014/15 recorded found the Site to support two probable breeding territories of Cirl Bunting, with a further territory located directly south of the Site. Wintering Cirl Bunting surveys recorded two males and a female in the field adjacent to the northern boundary of the Site. These were recorded during three of the four survey visits.
Brown Hare	Seen on the White Rock 1 Site.
Dormouse	2010 survey did not record any evidence
Invertebrates	An invertebrate survey conducted in September 2010 within the White Rock survey area recorded a species of micromoth formerly classed as Red Data Book (RDB3) 'Rare' in the UK, the Chestnut Pigmy Moth

Species	Record Summary
	Stigmella samiatella (the species has now been subject to a status revision due to an increasing number of UK records). The other significant record was for Great Green Bush-cricket *Tettigonia viridissima*, listed as a Devon LBAP species.
Reptiles	2010 surveys recorded a low population of Slow Worms.

3.2 Extended Phase I Habitat Survey

3.2.1 General description

The Site is located on the western edge of Paignton (central OS grid reference SX881575), bounded by Brixham Road to the east, a recent mixed used development known as "White Rock" in close proximity to the north and open farmland to the south and west. The approximately 28ha Site consists of five fields (one permanent cattle pasture, one arable and three in arable/pasture rotation) bounded predominantly by hedge banks (and also a woodland plantation along a short approx. 100m section of it southern boundary) and two small (≤100m^2) ponds.

Parts of the Site are subject to a management plan (EcoSulis, August 2012) to provide off-site mitigation for the White Rock development. Where relevant the habitat descriptions below note proposed habitat creation/ management prescriptions.

3.2.2 Habitats

The results of the field survey are indicated on Figure 7 and 8, with associated target notes provided in Appendix IV.

Summary descriptions of the habitats found on or adjacent to the Site, are given below. Where habitats are considered important, defined here as those that would qualify for inclusion in a local, UK BAP or those that are otherwise important in a local context, this is indicated.

Broad-leaved Plantation

A small (approx. 0.7ha) planation known as Nords is adjacent to the southern boundary of the Site (i.e. off Site). It supports a range of native and non-native trees including Sycamore *Acer pseudoplatanus*, Ash *Fraxinus excelsior*, pines *Pinus spp.*, Norway Spruce *Picea abies*, Holme Oak *Quercus ilex* and Beech *Fagus sylvatica*. The understory included Grey Willow *Salix cinerea*, Elder *Sambucus nigra*, Bramble *Rubus fruticosus agg*. and Butcher's Broom *Ruscus aculeatus*. Ground flora largely consisted of shade-tolerant herbs with Dog's Mercury *Mercurialis perennis*, Common Nettle *Urtica dioica*, Lords and Ladies *Arum maculatum*, Stinking Iris *Iris foetidissimma*, Bluebell *Hyacinthoides non-scripta*, Red Campion *Silene dioica*, Primrose *Primula vulgaris*, Ground Ivy *Glechoma hederacea*, Herb Robert *Geranium robertiana* and Sweet Violet *Viola odorata*. A Cotoneaster species was locally dominant. Whilst the woodland is fenced from the adjacent fields there was evidence of occasional cattle access (cows themselves, dung and trampled areas).

Adjacent to the northern boundary of the Site a recently planted (<3 years) woodland (approx. 3.5ha) was present. It was planted over semi-improved grassland in which Yorkshire Fog *Holcus lanatus*, Cock's foot *Dactylis glomerata*, Creeping Bent *Agrostis stolonifera*, Dandelion *Taraxacum officinale (agg.)*, Creeping Thistle *Cirsium arvense*, Marsh Thistle *Cirsium palustre*, Cut-leaved Crane's-bill *Geranium dissectum*, Broad-leaved Dock *Rumex obtusifolius*, Curled Dock *Rumex crispus*, Creeping Buttercup *Ranunculus repens*, Ribwort Plantain *Plantago lanceolata*, White Clover *Trifolium repens*, Hogweed *Heracleum sphondylium*, Common Ragwort *Senecio jacobaeae* and a Hawkweed *Hieracium sp.*, Red Campion *Silene dioica* and Teasel *Dipsacus fullonum*. In disturbed areas (from the planting works and installation of the gravel track) Southern Marsh Orchid *Dactylorhiza praetermissa* was also recorded.

The sward was fairly tussocky, but was subject to occasional management to aid the establishment of the tree saplings. Tree saplings (mainly broadleaved) included English Oak *Quercus robur*, Field Maple *Acer campestre*, Holly *Ilex aquifolium*, Blackthorn *Prunus spinosa*, Hawthorn *Crataegus monogyna*, Hazel *Corylus avellana* and Scots Pine *Pinus sylvestris*.

Poor semi-improved grassland

Field 1 covers approximately 5.4ha and appears to be permanent pasture grazed by cattle. For the majority of the survey period this field was grazed leaving a short (<5cm) sward. This has

resulted in a relatively low diversity of flora with Perennial Rye-grass *Lolium perenne* abundant, with Yorkshire Fog, Sweet Vernal-grass *Anthoxanthum odoratum*, White Clover *Trifolium repens*, Dandelion, Bird's Foot-trefoil *Lotus corniculatus,* Broad-leaved Dock, Creeping Buttercup and Ribwort Plantain also recorded.

Open Water

Two ponds are present in/on the boundary of Field 1. The pond in the western hedgerow boundary of Field 1 is approximately 80m^2. It is stone edged and heavily over-shaded by mature multi-stemmed Goat Willow *Salix caprea* and Hawthorn. It was approximately 1m deep with shallow margins at time of the April Phase 1 Habitat survey, with no visible macrophyte vegetation. The pond became dry during the course of the summer. Banks with Ivy *Hedera helix,* Common Nettle *Urtica dioica* and Lesser Celandine *Ranunculus ficaria*.

The pond in the middle of Field 1 is approximately 100m^2. It's less shaded than the other pond, with Goat Willow growing in and around it and also Ash and stone rubble on the banks. At the time of the Phase 1 Habitat Survey the pond was shallow (<50cm deep). During the course of the summer the pond became dry. It is heavily cattle poached at the margins and eutrophic with blanket algal blooms. It contained some macrophyte vegetation Floating Sweet Grass *Glyceria fluitans* and Brooklime *Veronica beccabunga*.

Arable

Field 5 is approximately covers approximately 9ha, of which approximately 5ha is within the red line planning boundary. During the course of the ecology surveys it supported cereal crops, one which was harvested in the summer, with another being sewn in the autumn (i.e. no winter stubbles present). Approximately 3m wide poor semi-improved grassland margins where present all-round the field. They were tussocky for the majority of the time (subject to a summer cut) with Perennial Rye-grass, Cock's foot, Yorkshire Fog, False Oat-grass *Arrhenatherum elatius*, Hogweed, Spear-thistle *Cirsium vulgare,* Cut-leaved Crane's-bill, Broad-leaved Dock, Germander Speedwell *Veronica chamaedrys*, Dandelion, White Clover and Ribwort Plantain recorded.

The remaining three fields, totalling approximately 21ha (with approx. 4.5ha of Field 3 lying outside the red line planning boundary) are managed as grassland leys and late summer/autumn sewn crop rotations. The improved grassland leys were dominated by Perennial Rye-grass,

with White Clover, Broad-leaved Dock, Dandelion, Creeping Buttercup, Creeping Bent and Ribwort plantain also recorded. Field 2 was sewn with Kale in later summer 2016, with 5m field margins left uncultivated. The grassland leys were grazed in rotation by cattle.

Hedgerows

Species-rich hedge banks with and without trees define the majority of the field boundaries. Most hedgerows appear to have been subject to heavy management/cut close to the hedge bank in recent years. They supported typical hedgerow species, including Blackthorn and Hawthorn being most abundant, with other low growing woody species including English Elm *Ulmus procera,* Goat Willow, Elder *Sambucus nigra*, Hazel and Holly.

Several ancient woodland indicator species (also associated with old hedgerows) were recorded including native Bluebell *Hyacinthoides non-scripta,* which occurred on the banks of a number of hedges and species such as Ransoms *Allium ursinum* and Wood False Brome *Brachypodium sylvaticum*. Other characteristic hedgerow herbs recorded on hedge-banks included Lesser Celandine *Ranunculus ficaria,* Primrose *Primula vulgaris,* Common Dog Violet *Viola riviniana,* Sweet Violet *V. odorata,* Dog's Mercury *Mercurialis perennis,* Ground Ivy *Glechoma hederacea*, Red Campion *Silene dioica*, Hedge Bedstraw *Galium mollugo*, Stinking Iris *Iris foetidissima,* Herb Robert *Geranium robertianum*, Shining Crane's-bill *Geranium lucidum* and Wood Avens *Geum urbanum*.

Many of the hedge banks are defined as species-rich with trees only due to the recent tree planting undertaken as part of the mitigation measures required for White Rock (set out in the off-site LEMP).

Unimproved neutral grassland

The White Rock LEMP also proposes there would be a 3m wide crop free margin either side of hedgerows to be managed under the LEMP, with these margins to be sown with a wildflower mix. Whilst no evidence of such margins was recorded, if the measures were undertaken in accordance with the LEMP over its 20 year period, it might be possible for approximately 0.4ha of grassland approximating unimproved neutral grassland to establish.

Off-site mitigation land

The off-site mitigation land (OSML) is to the west of the Site. It covers approximately 25ha and consists of five fields (one of which is part of the on Site cereal crop field noted above), with another three being used to grow cereal crops and one in arable/pasture rotation). The cereal crop fields surround the existing/established Waddeton Lane Plantation, are bounded by hedgebanks and recently planted (<5 years) woodland plantations and generally have 1-2m wide species-poor grass margins. They are not left as over wintering stubbles. The field in arable/pasture rotation is very similar to those described on Site (i.e. managed as grassland leys and late summer/autumn sown crop rotation).

3.2.3 Fauna

The Extended Phase I Habitat Survey identified habitats on Site as being potentially suitable for Badger, bats, breeding birds, Dormouse, Great Crested Newts, reptiles and invertebrates. Further surveys (as detailed in sections 3.3- 3.10) were therefore undertaken for these species/species groups.

The habitats were also considered suitable for Brown Hare *Lepus europaeus* (a Devon Biodiversity Action Plan species which was incidentally recorded on a few occasions), but further surveys were scoped out on the basis that mitigation proposals would avoid significantly impacting this species (e.g. through retention of a mixed farming system, no net loss of hedgerows, increased areas of tall grass).

3.3 Badgers

A potential sett was recorded on the eastern hedge bank of Field 2, which consisted of single hole with a latrine approximately 200m further south in the same hedge. Sticks were placed at the entrance of the hole, but no signs of activity were recorded during several subsequent checks (last check March 2017). As such no setts were considered present on Site at the time of surveys. However the hedge banks and adjacent woodland do provide future sett building opportunities and the extensive grassland provides foraging habitat.

3.4 Bats

3.4.1 Preliminary Assessment of Features

Eight trees on Site were considered to offer suitable habitat for roosting bats. Figure 2 shows their locations and provides details of the potential bat roosting features.

Whilst no buildings are present on Site, White Rock Cottages and the derelict farm buildings to north of the Site were considered to offer suitable habitat for roosting bats, with the latter offering potential roosting habitat for horseshoe bats. Figure 3 shows their locations and Appendix V provides details of their suitability.

3.4.2 Activity Surveys

Roosts

The activity surveys did not record any roosts on Site. It did however record bats roosting in the derelict farm buildings to the north of the Site.

The AnaBat in the basement of Inglewood recorded calls suggesting that both Greater and Lesser Horseshoe bats were both day roosting here. The manual emergence and re-entry surveys here in late August and September recorded a single Lesser Horseshoe bat emerging/returning to the basement on three separate occasions, but no other bat species (including GHS) were recorded roosting.

Given the lack of GHS bat recorded roosting during the emergence surveys and the conditions of the basement (relatively open/limited sheltered locations, damp, lacking a heat source and risk of disturbance/attack by cats with being at ground level) it is considered likely to only supports low numbers of day roosting GHS (i.e. not a maternity roost).

A single storey barn (building 5) was found to support a GHS night roost and a day roost for a single Common Pipistrelle. Buildings 9 and 11 might also support night roosts for both species horseshoe bat.

The earliest/latest records for GHS (defined by being within 30 minutes of sunset or sunrise) were recorded at AnaBat location 1 (see Table 11 below. Note that no GHS records were made within 30 minutes of sunrise). This accords with the records of GHS bats roosting at

Inglewood farm building to the north i.e. the closest know GHS roost and with AnaBat location 1 being on hedge with trees leading to the farm buildings.

Table 11: Total number of early GHS records by location

AnaBat Location	GHS records within 30 mins of Sunset
1	29
2	0
3	1
4	0
5	2
6	0
7	0
8	1
9	2
10	1
11	2
Total	38

The majority of these "early" records were made in October (Table 12 below). This suggest that Inglewood might also support a transitional GHS roost. However, an AnaBat was deployed in Inglewood from the 28th of September to 10th of October 2016, and only four records of GHS were recorded and these being "in the middle of the night" (see Table 13).

Table 12: "Early" GHS records by Month

Month	GHS records within 30 mins of Sunset
April	4
May	4
June	7
July	0
August	0
September	0
October	23

Table 13: GHS recorded at Inglewood (Farm Building) in September/October

Date (Year-Month-Night)	Time	Sunset	Sunrise
20160928	04:12:09	18:53	07:11
20160928	04:24:49	18:53	07:11
20160928	04:26:52	18:53	07:11
20161005	01:15:31	18:43	07:22

The majority of GHS bats were recorded "in the middle of the night" (defined as not being within 3hrs of sunset or sunrise), see Table 14 below. This suggests that most GHS are travelling some distance to forage on Site. However it's worth noting that 238 of the GHS records were made at location 5 on the 13th of September, between 01:28 and 01:40 (i.e. likely intense feeding activity by single or low number of GHS). If this feeding bout is discounted the "middle of the night" count would drop to 545, and be roughly equivalent to the total count of GHS records within 3hrs of sunset or sunrise (665).

Table 14: Time of GHS records by month.

Month	GHS records within 3hrs of sunset	GHS records within middle of the night	GHS records within 3hrs of sunrise
April	103	38	1
May	116	161	69
June	21	42	19
July	11	28	6
August	123	72	7
September	8	450	9
October	161	37	11
Total	543	828	122

Species Diversity

The activity surveys recorded at least* nine species of bat on Site, these being:

- Noctule;
- Serotine;
- Barbastelle;
- Common Pipistrelle;
- Soprano Pipistrelle;
- at least one species of Long-eared bat *Plecotus sp*.;
- at least one species of Myotis;
- Greater Horseshoe; and
- Lesser Horseshoe bat.

*With further analysis it may be possible that Leisler's bat, Nathusius' Pipistrelle *Pipistrellus nathusii* as well as other particular species of Myotis bats could be verified as present on Site.

The activity was dominated by pipistrelle bats with them accounting for over 85% of bat calls recoded by the automated detectors, as shown in Table 15 below, with on Site manual survey data provided in Appendix VI.

Table 15: Total number of bat records by species

Species/ Species Group	Count of records
Pipistrelle species	50,170
Noctule- Leisler's-Serotine (N-L-S)	4,125
Myotis Species	2,015
Greater Horseshoe bat	1,321
Lesser Horseshoe bat	670
Long-eared bat	266
Barbastelle	10
Total	58,577

Key commuting and foraging habitat

Bat activity was fairly well distributed across the Site, with:

- the manual surveys recording most activity along the hedgerows and woodland edge (accepting this was the route the transects took, activity could also be recorded/and was in the fields on these transects);
- a large proportion of activity was recorded along the Brixham Road, with pipistrelle species feeding around the street lamps and tree cover;
- the majority of bat activity recorded within close proximity of Brixham Road (See Table 16 below and Figures 9a-g), even accounting for the varying number of nights activity was recorded).

Table 16: Total number of bat records by location by automated detectors

AnaBat Location	Count of records	Nights of recording
4	10,127	59
5	9,373	67
10	9,356	77
9	8,046	61
11	6,413	59
7	4,085	67
6	3,141	58
1	2,520	75
8	2,083	66
3	1,990	50
2	1,443	72

A total of 1,493 GHS records were recorded by the AnaBats (See Table 14). This figure is higher than the 1,321 figure presented in Table 16, due to the horseshoe filters in AnaLookW in combination with manual verification being more powerful than the automated species identification in Kaleidoscope. Whilst this equates to a very small proportion (<3%) of the bat records, it should be seen in the context that GHS are very rare.

Table 17 below and Figures 10a-g (with pivot tables provided in Appendix VII) show that most GHS were recorded at location 5, followed by locations by locations 7, 1, 6, 11 and 10. The records made at location 5 include the likely feeding bout in September discussed above. Locations 4, 2, 8 and 9 recorded the fewest GHS. This might be as Brixham Road is lit, there is a 200m break in the hedge to the west of location 2 and GHS could be commuting through Nords plantation as well/in preference to commuting along its edge.

Table 17: Total number of GHS records by location (in descending order of records)

AnaBat Location	Count of GHS records	Nights of recording
5	465	67
7	198	67
1	178	75
6	141	58
11	134	59
10	117	77
3	94	50
4	52	59
2	43	72
8	40	66
9	31	61
Total	1493	

Of the 23 manual records made of GHS, no feeding activity was specifically recorded over the cattle pasture. However it should be noted that surveyors only saw a small proportion of the GHS they heard on the detectors.

A total of ten records of Barbastelle Bat were made (all on the automated detectors), with the locations and times given below Table 17. The records are not close to Barbastelle emergence times and together with the limited records recorded on Site and with only one

record returned in the desk study (approx. 3km north in Collaton St. Mary) suggest there is not a Barbastelle roost in close proximity and the Site is not a key foraging area for them.

Table 18: Barbastelle records

Month	Location	Date (Year-Month-Night)	Time
August	10	20160810	22:51:09
August	10	20160816	01:58:55
August	10	20160816	23:50:57
August	10	20160816	01:35:00
August	10	20160817	23:24:41
August	10	20160817	01:53:19
August	7	20160820	02:29:00
August	7	20160824	04:03:19
September	7	20160906	20:45:35
September	3	20160911	23:48:13

Seasonality

There appears to have been increased bat activity in May, August and October, and reduced activity in April (see Table 19 below).

Table 19: Total number of bat records by month

Month	Count of Records	Nights of recording
April	1,776	87
May	10,767	97
June	8,542	111
July	5,510	104
August	9,934	89
September	7,111	100
October	14,937	123

The amount of GHS records made in each month (see Table 20 below) suggests reduced GHS activity in June and July, with increased activity in May and September. This might be because pregnant females/ young mothers remain closer to the maternity roost at Berry Head and do not commute as far as this Site or might be a reflection that GHS were feeding more within the cattle pasture in these months away from the AnaBats positioned on the hedgerows

(although no GHS were specifically recorded feeding over cattle pasture by the manual survey effort).

Table 20: Total number of GHS records by Month

Month	Count of GHS records	Nights of recording
April	142	87
May	346	97
June	82	111
July	45	104
August	202	89
September	467	100
October	209	123

3.4.3 Hibernation Surveys

The AnaBats recorded one horseshoe record, that being for a Lesser Horseshoe bat on the 18th February at 18:14, when sunset was at 17:37. As such it is considered Inglewood at least supported a Lesser Horseshoe bat hibernation roost.

3.5 Birds

The habitats within the area provide breeding and foraging opportunities for common bird species associated with farmland, hedgerows and woodland.

A full list of bird species recorded during the surveys is given in Table 21 below. The table details the habitat with which each species was observed to be associated, the breeding status, the maximum number of pairs likely to be breeding within the Site and the conservation status, as categorised by Eaton *et al.,* (2016). The approximate breeding locations are presented in Figures 11a-c and UK BAP Species, Wildlife and Countryside Act Schedule 1 and Species of Principal Importance recorded within the Site are given in Table 22.

Table 21: Bird species recorded during the surveys

Common Name	Latin Name	Habitat association	Breeding Status				Number of breeding pairs (max)	Conservation status
			Confirmed	Probable	Possible	Not breeding		
Species recorded during breeding bird surveys								
Barn Swallow	*Hirundo rustica*	Aerial				✓	?	Green
Blackbird	*Turdus merula*	Hedgerows/scrub, farmland, open ground	✓				8	Green
Blackcap	*Sylvia atricapilla*	Woodland		✓			1	Green
Blue Tit	*Cyanistes caeruleus*	Hedgerows, mature trees	✓				3	Green
Buzzard	*Buteo buteo*	Mature trees, farmland, aerial		✓			1	Green
Bullfinch	*Pyrrhula pyrrhula*	Hedgerows/scrub		✓			1	Amber
Canada Goose	*Branta canadensis*	Aerial				✓		n/a
Cirl Bunting	*Emberzia cirlus*	Hedgerows/scrub, farmland	✓				2	Red
Chaffinch	*Fringilla coelebs*	Mature trees, hedgerows/scrub		✓			2	Green
Chiffchaff	*Phylloscopus collybita*	Mature trees		✓			2	Green
Dunnock	*Prunella modularis*	Hedgerows/scrub	✓				4	Amber
Gold Finch	*Carduelis carduelis*	Hedgerows/scrub		✓			4	Green
Great Tit	*Parus major*	Hedgerows/scrub mature trees	✓				3	Green
Herring Gull	*Larus argentatus*	Aerial				✓		Red
Heron	*Ardea cinera*	Aerial				✓		Green
House Sparrow	*Passer domesticus*	Hedgerows/scrub, open ground		✓			4	Red
Jackdaw	*Corvus monedula*	Mature trees, aerial	✓				2	Green
Lesser Black-backed Gull	*Larus fuscus*	Aerial				✓		Amber

Common Name	Latin Name	Habitat association	Breeding Status				Number of breeding pairs (max)	Conservation status
			Confirmed	Probable	Possible	Not breeding		
Species recorded during breeding bird surveys								
Linnet	*Carduelis cannabina*	Hedgerows/scrub, farmland, open ground	✓				14	Red
Long-tailed Tit	*Aegithalos caudatus*	Scrub, hedgerows					1	Green
Magpie	*Pica pica*	Hedgerows, open ground		✓			2 groups	Green
Mallard	*Anas platyrhynchos*	Farmland, water bodies				✓	-	Amber
Meadow Pipit	*Anthus pratensis*	Aerial			✓		?	Amber
Pheasant	*Phasianus colchicus*	Farmland		✓			?	n/a
Robin	*Erithacus rubecula*	Hedgerows/scrub, mature trees, open ground	✓				11	Green
Rook	*Corvus frugilegus*	Mature trees, farmland	✓				14	Green
Skylark	*Aluda arvensis*	Semi-improved grassland, open ground, arable crop		✓			8-10	Red
Stock Dove	*Columba oenas*	Semi- improved grassland on-site				✓	-	Amber
Whitethroat	*Sylvia communis*	Hedgerows/scrub	✓				3	Green
Willow Warbler	*Phylloscopus trochilus*	Hedgerows/scrub			✓		1	Amber
Woodpigeon	*Columba palumbus*	Mature trees, semi-improved grassland, farmland		✓			?	Green
Wren	*Troglodytes troglodytes*	Hedgerows/scrub	✓				17	Green

Table 22: UK BAP Species, Wildlife and Countryside Act and Species of Principal Importance recorded within the Site

Bird Species	UK BAP Priority Species	Species of Principal Importance	Wildlife and Countryside Act 1981 (as amended) Schedule 1
Bullfinch	✓	✓	
Dunnock	✓	✓	
Herring Gull	✓	✓	
Cirl Bunting	✓	✓	✓
House Sparrow	✓	✓	
Linnet	✓	✓	
Skylark	✓	✓	

A total of thirty-two bird species were recorded during the surveys, four of which were only recorded flying over.

Of the species recorded on Site, five are considered to be of high (red-listed) conservation status: Skylark, Cirl bunting, Linnet, House Sparrow and Herring Gull. Of these, House Sparrow, Linnet and Skylark are probable breeders. Cirl Bunting is a confirmed breeder on Site. Herring Gulls were most likely commuting between foraging grounds and roosting/breeding locations.

Seven species are considered to be of medium (amber-listed) conservation status: Dunnock, Stock Dove, Mallard, Meadow Pipit, Willow Warbler, Bullfinch and Lesser Black-backed Gull. Of these dunnock is a confirmed breeder whilst Bullfinch is a probable breeder. Meadow Pipit, Stock Dove, Mallard and Lesser Black-backed Gull were observed on Site but not thought to nest on site.

A total of seven species, with six confirmed or probable breeders, were recorded during surveys that are listed as UK Biodiversity Action Plan (BAP) Priority Species (succeeded by the UK Post-2010 Biodiversity Framework) and Species of Principal Importance.

One species, Cirl Bunting, listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) was recorded as breeding on Site.

The remainder of the bird species recorded are of low conservation status (Green listed) or are without status (e.g. Pheasant and Canada Goose).

3.6 Cirl Bunting

During the surveys, Cirl Buntings were recorded on and off Site, confirming that the Site and surrounding areas are actively used by this species. The full results of the survey visits to the Site are presented in Table 23 below and each individual survey visit along with locations of Cirl Buntings shown in Figures 12a-f.

Table 23: Cirl Bunting Survey Results

Date	Survey and Figure Number	Cirl Bunting Observations	Survey Results and Behavioural Notes
27/04/2016	1	4 (2 off-site)	Three separate individual Cirl Buntings were heard calling along the north–west hedgerows; two of these were located outside of the survey boundary. A single male was seen along the western hedgerow of the Site. No other behavioural signs were noted.
13/05/2016	2	5 (2 off-site)	A single male was seen on the ground along the northern hedgerow of the Site adjacent to a housing development but outside of the survey boundary. A single singing male was seen along central hedgerows adjacent to the arable field. Two pairs of Cirl Buntings were noted in a recently used arable field located in the south of the Site simultaneously indicating separate pairs. One of these pair was seen collecting nesting material. A single singing male was seen off-site to the south of the Site boundary near the off-site woodland.
22/06/2016	3	4 (3 off-site)	A pair of Cirl Buntings was seen in appropriate breeding habitat in the eastern corner of the Site and contact calls were heard coming from this pair. Three other sightings of Cirl Bunting were seen along the north-west hedgerows with at least one singing male heard and juvenile contact calls heard along the hedgerow that runs parallel to the road.
21/07/2016	4	4 (1 off-site)	A pair of Cirl Bunting located on the fenceline between the newly planted

Date	Survey and Figure Number	Cirl Bunting Observations	Survey Results and Behavioural Notes
			woodland to the north of the Site and a newly installed footpath of hardstanding. A single individual was seen along the north western hedgerow located outside the survey boundary near Waddeton Road. A pair was seen along the far south eastern corner of the Site in suitable breeding habitat. A single female was seen in the eastern corner of the Site and had been previously seen in this exact location.
16/08/2016	5	5 (Two off-site)	A pair of Cirl Buntings was seen in a previously recorded area in the eastern corner of the Site. A pair was seen feeding juveniles in a previously recorded position in the south eastern corner of the Site. Another pair with at least two fledglings were seen along a central hedgerow close to the eastern corner of the Site but were a different family group. Fledgling contact calls were heard coming from a hedgerow along the newly harvested arable field in the north of the Site. Two different pairs were seen in the area of the newly planted woodland and semi-improved grassland on Site. These were two separate pairs of Cirl Bunting.

During the Cirl Bunting surveys conducted on Site during the breeding season in 2016, a minimum of at least four pairs (eight individuals) currently occupy the Site with a further three pairs (six individuals) located off-site in adjacent farmland but using habitats within the Site boundary to forage.

Three pairs are concentrated towards the south-eastern areas of the Site with partial overlaps in territories. In this area mature hedgerows and associated scrub/grazing pasture provide suitable nesting and foraging habitat. At least two of the pairs on-site were seen with fledglings during the August survey with the adult birds seen feeding the fledglings invertebrate prey.

3.7 Dormouse

No evidence was recorded of Dormouse during the course of the surveys. Given this and the sub-optimal habitat provided by the historically heavily managed hedgerows, lack of dense understory in Nords Planation and lack of connectivity to the Dormouse recorded in woodland near Clennon Gorge (Shown on DWT species map at SX88525854), Dormouse are considered absent from the Site.

3.8 Great Crested Newts

In addition to the two on Site ponds, a further two ponds were identified on OS mapping within 250m of the Site. These being on the western boundary of the site at OS grid references SX87895722 and SX87975751. On inspection these locations did not hold any water (even during checks during winter 2016/17).

Whilst the two on Site ponds were considered to provide sub-optimal habitat for Great Created Newts (GCN) (being likely to dry up during the summer months on a regular basis and supporting limited aquatic vegetation), on a precautionary basis they were subject to an eDNA test. Water samples taken from both ponds returned negative for GCN eDNA. As such GCN are considered absent from Site.

3.9 Invertebrates

The Site was considered to support habitat of moderate potential conservation value for invertebrates; the mature hedgerow, mature and veteran hedgerow standards and associated hedge-bank structure and flora and woodland edge bordering the site offered the greatest potential value as invertebrate habitat. The Site's grasslands were of low conservation value in general terms and as potential invertebrate habitat, being improved and generally herb-poor.

Wood decay habitat important for supporting saproxylic invertebrate assemblages was present to some extent within the more mature and veteran standards and in general within the woody growth of the hedgerows. Evidence of saproxylic species mainly included longhorn beetles *Cerambycidae*, wood-boring beetles *Anobiidae* and bark beetles *Scolytidae* - now *Curculionidae*.

There was no clear evidence of heartwood decay assemblages associated with tree hollows and red rot, although some of this resource was potentially present within older standards in particular. Besides the hedgerows, the woodland area at the site's southern border also offered a reasonable wood decay resource. Habitat at the margin of this wood on the hedge bank offered some potential habitat for saproxylics and beetle holes were recorded in this location; however, much of the woods interior was rather heavily shaded and therefore suboptimal.

The 40 species recorded incidentally during the scoping study are listed in Table 4 of Appendix II. The majority of the species recorded were broadly classified within Invertebrate Species-habitat Information System (ISIS) (see synopsis in Lott, 2008) within two broad classifications: The F2-Grassland and scrub matrix and the F1 – Unshaded early successional mosaic assemblages. Five of the remaining species were classed within wetland assemblages including W3- Permanent wet mire and W1 – Flowing water.

None of the species were UK/European protected species and no rare or uncommon species or species subject to classification within Section 41 of the NERC Act (2006), were recorded. It did record several species of solitary bee of the mining bee genus *Andrena* and mason bee *Osmia* as well as social bumblebees *Bombus* spp, which are associated with early flowering hedgerow herbs and in particular Blackthorn *Prunus spinosa* and willow *Salix* spp.

Whilst there were few significant invertebrate records for the Site itself, the Site showed some potential to support species such as Brown Hairstreak *Thecla betulae*, a S41 'Species of Principal Importance', which had been well recorded (post 1990) within 2km of the centre of the Site. The presence of abundant English Elm *Ulmus procera* within the Site's hedgerows also suggests the potential for another S41 species, White-letter Hairstreak *Satyrium w-album*. However, this species has only been recorded once within the search area post 1990 and is less likely to occur on the site at the current time.

The hedgerows and herbaceous borders of the Site also provide suitable habitat for a range of currently common and widespread moth species, listed as S41 species 'for research only'. These species are mainly habitat generalists, but include species which are documented as having undergone a significant decline in the UK in recent decades.

Jersey Tiger, a Nationally Scarce moth is highly likely to occur on the Site from time to time; however, this species is locally common in the Torquay area of south Devon and has generalist habitat requirements. It is possible that the site could also support other species of conservation interest both including those historically recorded from the landscape bordering the site and species as yet unrecorded. A S41 'Species of Principal Importance' the Wall *Lasiommata megera* butterfly, the pRDB3 'Rare' Bugle Marble *Endothenia ustulana* and the Orange Footman *Eilema sororcula* could all potentially occur on the site, however, the Site, in its current condition, may be suboptimal to support the first two of these species.

One species listed as a priority species within the Devon LBAP, the Great Green Bush-cricket *Tettigonia viridissima*, was recorded on the site in 2010 and is highly likely to occur there still. This species, which is mainly coastal in the UK, occurs widely within the locality and occurs in a fairly broad range of mainly scrubby habitats.

3.10 Reptiles

The reptile surveys confirmed the presence of Slow Worms on Site. Figure 5 shows where they were located. The survey results are summarised in Table 22 below.

Table 22: Summary of reptile survey results

Visit number	Date	Max Count of Adult Slow Worms
1	02/09/16	2
2	09/09/16	1
3	12/09/16	0
4	28/09/16	1
5	29/09/16	2
6	06/10/16	1
7	11/10/16	0

The maximum number of adult Slow Worms recorded was 2 on both the 02/09/16 and 29/09/16 which equates to a "Low Population" as defined by Froglife 1999.

All reptiles are afforded legal protection under the W&CA 1981 (as amended). It is an offence to cause the intentional killing and injuring of these species. All species of reptile which occur in the UK are also priority species within the UKBAP.

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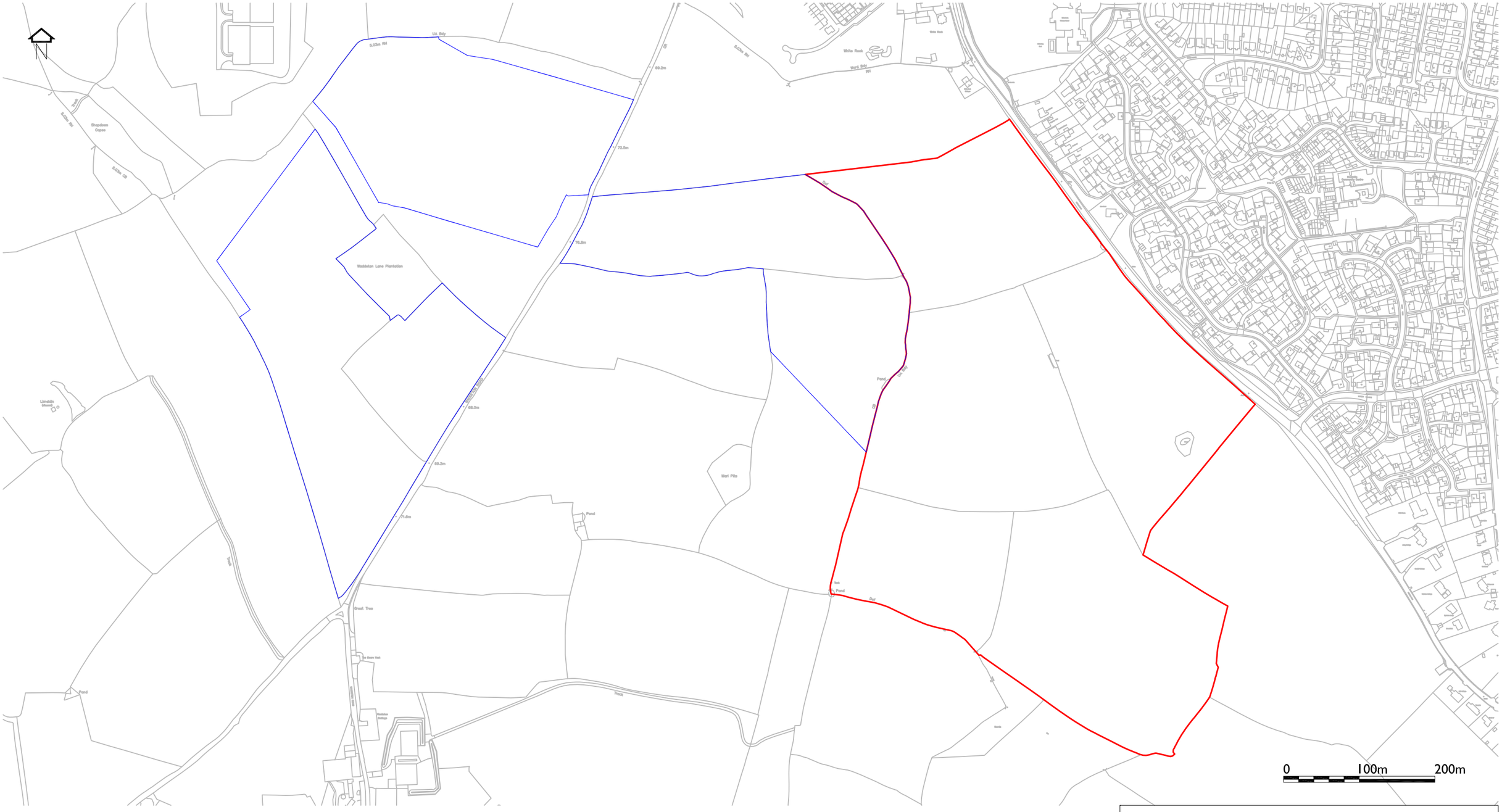

Planning application boundary

Off-site Mitigation Land

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Figure 1: Location Plan

May 2017

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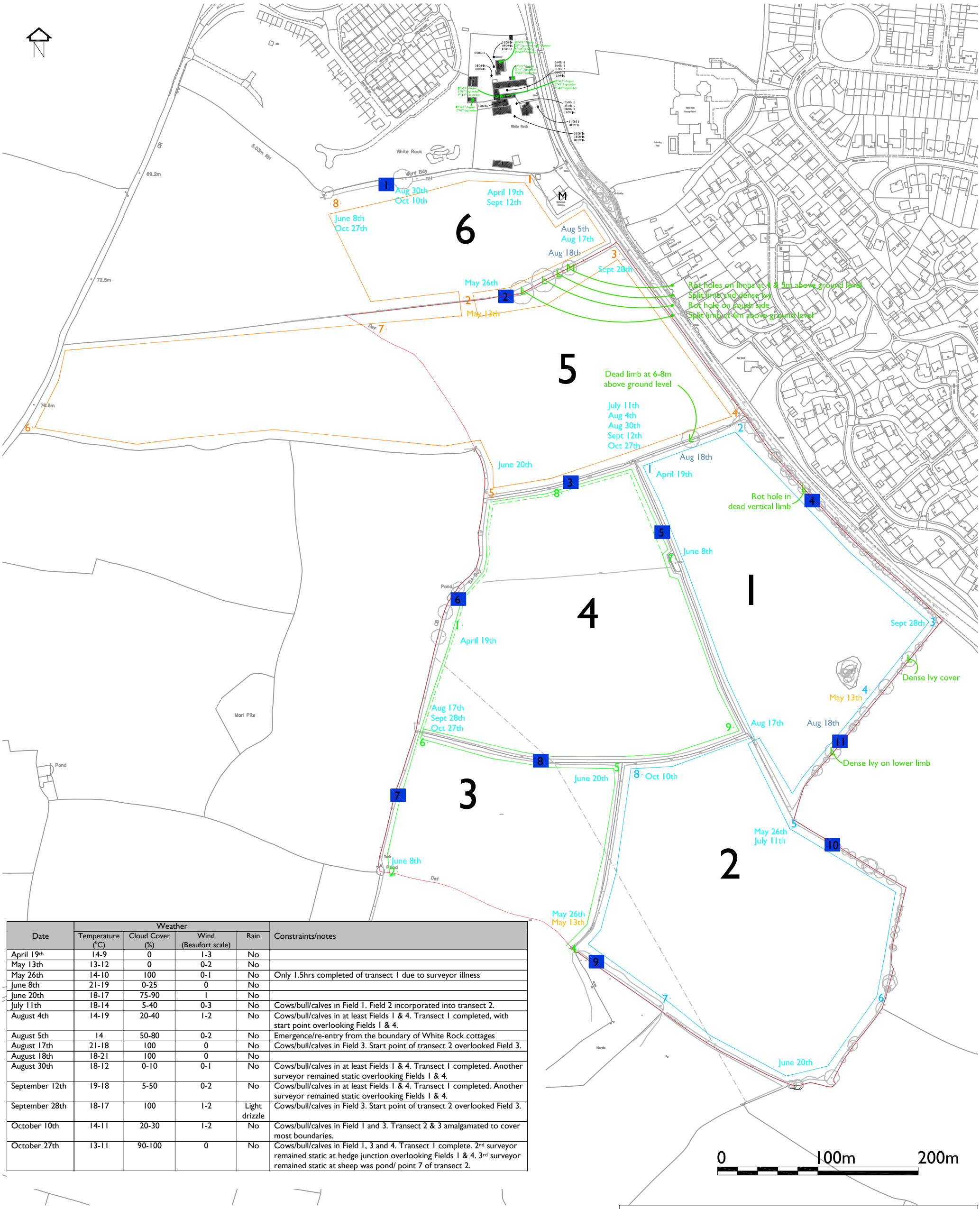

Date	Weather				Constraints/notes
	Temperature (°C)	Cloud Cover (%)	Wind (Beaufort scale)	Rain	
April 19th	14-9	0	1-3	No	
May 13th	13-12	0	0-2	No	
May 26th	14-10	100	0-1	No	Only 1.5hrs completed of transect 1 due to surveyor illness
June 8th	21-19	0-25	0	No	
June 20th	18-17	75-90	1	No	
July 11th	18-14	5-40	0-3	No	Cows/bull/calves in Field 1. Field 2 incorporated into transect 2.
August 4th	14-19	20-40	1-2	No	Cows/bull/calves in at least Fields 1 & 4. Transect 1 completed, with start point overlooking Fields 1 & 4.
August 5th	14	50-80	0-2	No	Emergence/re-entry from the boundary of White Rock cottages
August 17th	21-18	100	0	No	Cows/bull/calves in Field 3. Start point of transect 2 overlooked Field 3.
August 18th	18-21	100	0	No	
August 30th	18-12	0-10	0-1	No	Cows/bull/calves in at least Fields 1 & 4. Transect 1 completed. Another surveyor remained static overlooking Fields 1 & 4.
September 12th	19-18	5-50	0-2	No	Cows/bull/calves in at least Fields 1 & 4. Transect 1 completed. Another surveyor remained static overlooking Fields 1 & 4.
September 28th	18-17	100	1-2	Light drizzle	Cows/bull/calves in Field 3. Start point of transect 2 overlooked Field 3.
October 10th	14-11	20-30	1-2	No	Cows/bull/calves in Field 1 and 3. Transect 2 & 3 amalgamated to cover most boundaries.
October 27th	13-11	90-100	0	No	Cows/bull/calves in Field 1, 3 and 4. Transect 1 complete. 2nd surveyor remained static at hedge junction overlooking Fields 1 & 4. 3rd surveyor remained static at sheep was pond/ point 7 of transect 2.

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5 Field Reference

5 AnaBat Location

June 20th Activity start point

Aug 18th Dawn Emergence

May 13th Dawn Transect Start Point

L Bat roosting potential
(L - Low; M - Moderate; H - High; R - Confirmed roost)

Transect 1

Transect 2

Transect 3

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Figure 2: Bat Survey Plan

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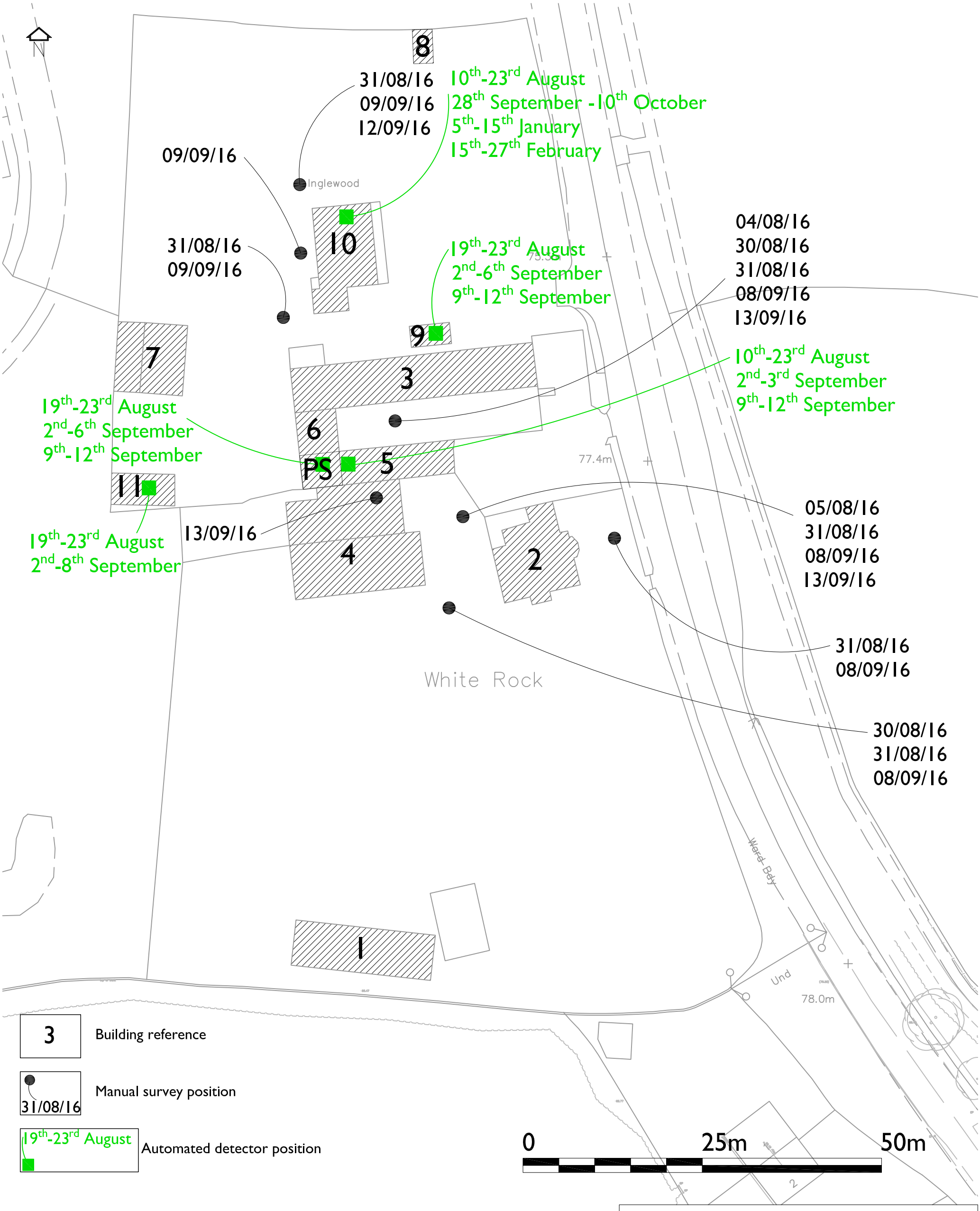

Date	Weather				Start Time	Finish Time
	Temperature (^{0}C)	Cloud Cover (%)	Wind (Beaufort scale)	Rain		
August 4th	14-19	20-40	1-2	No	20:42	23:30
August 5th	14	50-80	0-2	No	04:00	05:41
August 30th	18-12	0-10	0-1	No	19:47	23:02
August 31st	13-14	75-100	0-1	No	04:25	06:30
September 8th	16	30-70	2-3	No	19:30	21:45
September 9th	16	0-100	0-1	No	04:55	06:30
September 12th	19-18	5-50	0-2	No	19:15	22:30
September 13th	15	40-100	0	No	04:45	06:47

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Figure 3: Bat Survey Plan - Offiste

May 2017

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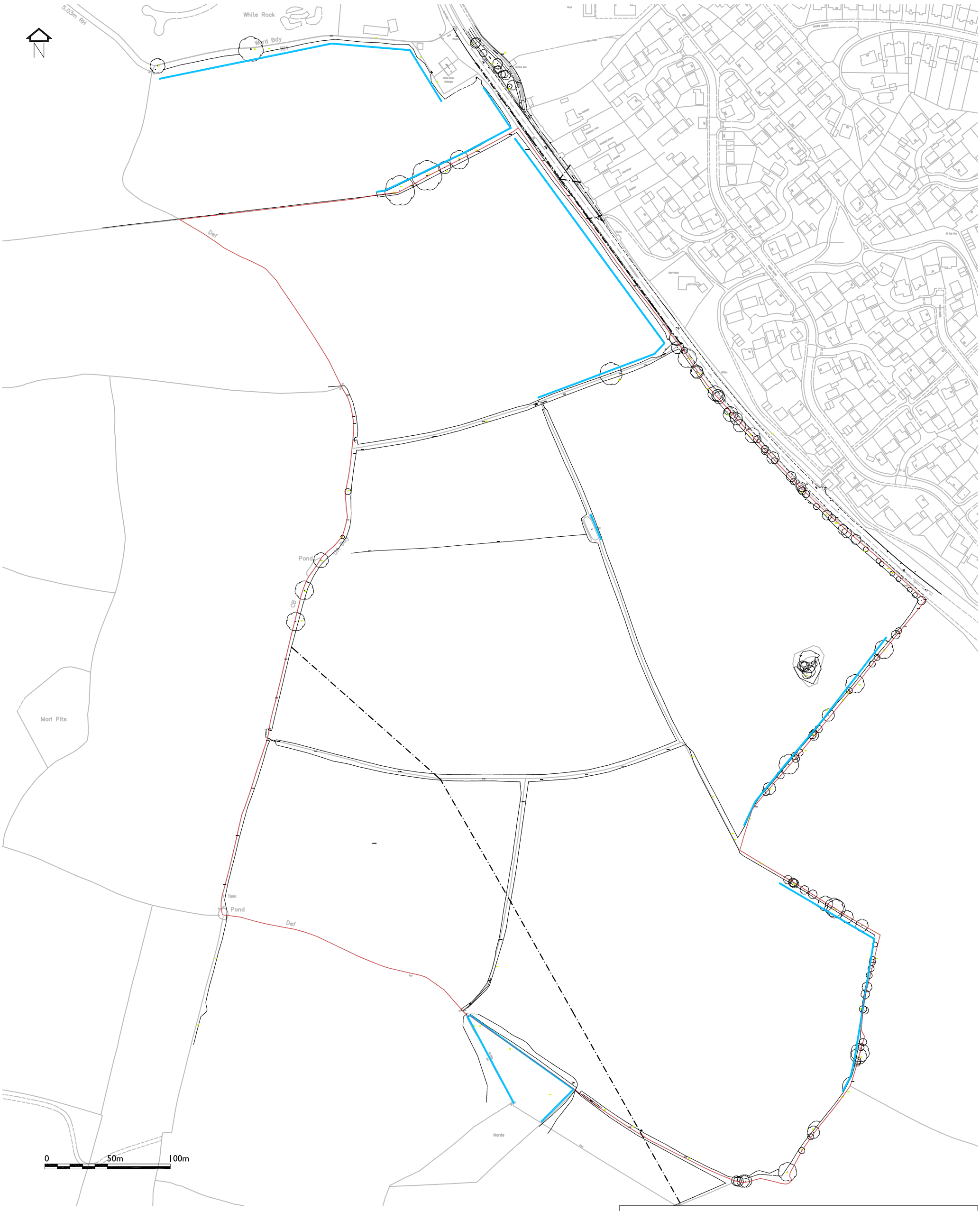

Planning application boundary

Dormouse tube locations

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Figure 4: Dormouse Tube Locations

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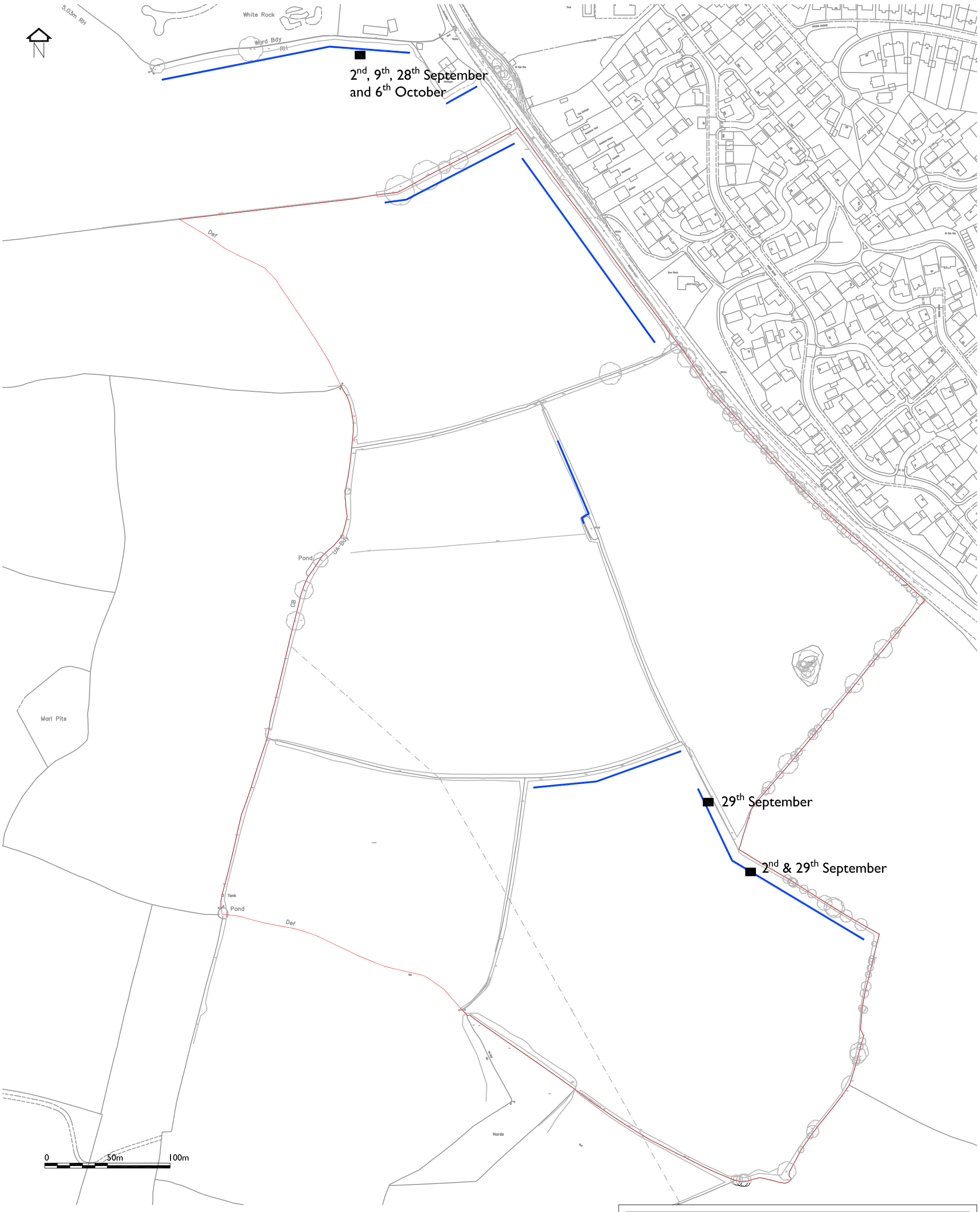

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Reptile refugia locations

29th September — Slow Worm record

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Figure 5: Reptile Survey Results

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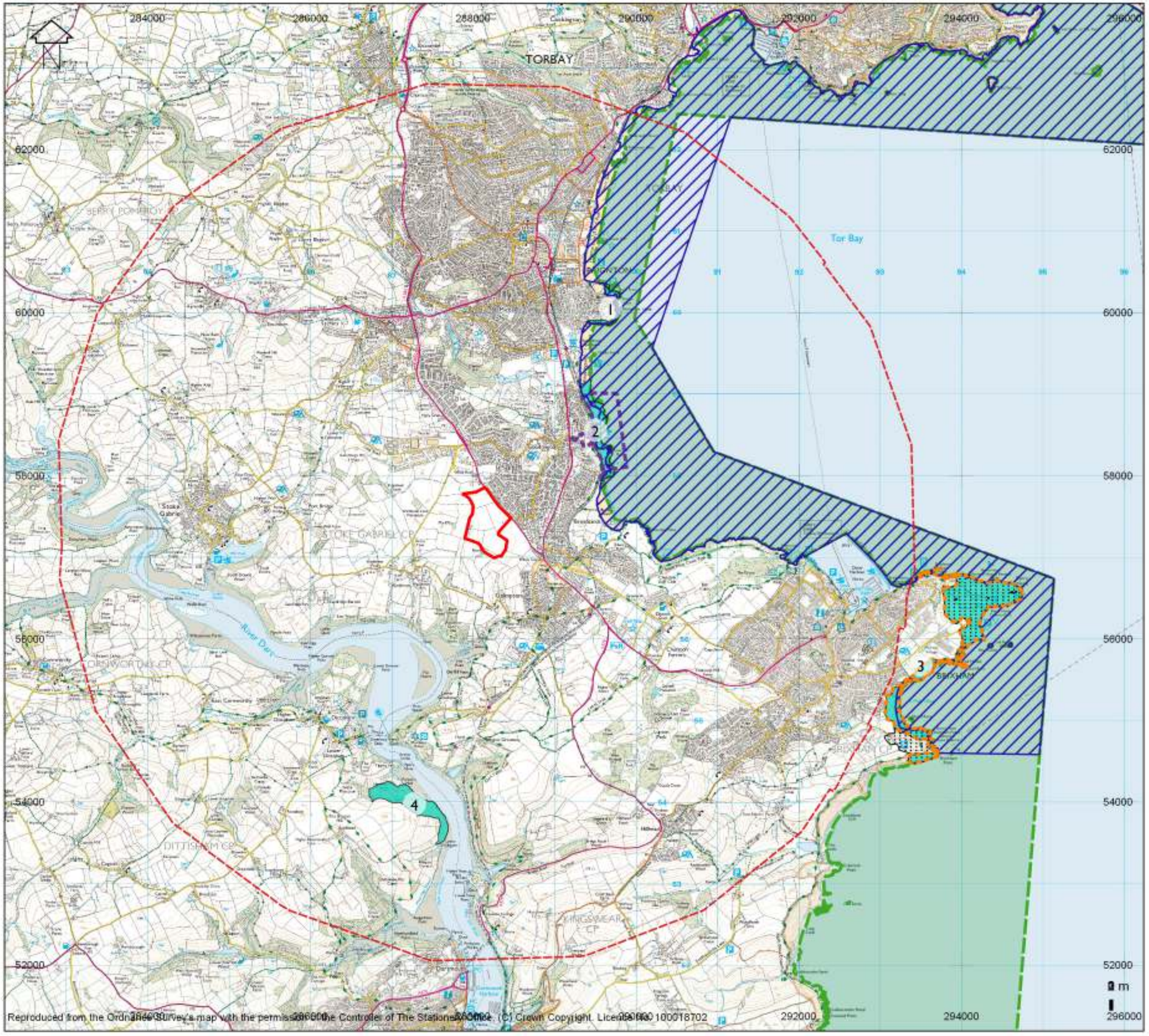

Key

- Site Boundary
- Site Boundary buffer 5km
- Torbay MCZ
- South Hams SAC
- Berry Head NNR
- Sugar Loaf Hill and Saltern Cove LNR
- Lyme Bay and Torbay marine SCI
- SSSI

1. Roundham Head
2. Saltern Cove
3. Berry Head to Sharkham Point
4. Lord's Wood

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Figure 6: Statutory Nature Conservation Desienations

June 2017	Drawn By - FG	10874 - ABA

288000

A
Field 5

A

A
Field 4

SI
Field 1

A
Field 3

A
Field 2

0 100 200 m

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Key

- Site Boundary (+ 5m buffer)
- Scattered trees (broadleaved)
- Defunct hedge - species-poor
- Hedge with trees - native species-rich
- Defunct Hedge with Trees - species-rich
- Hedge with trees - species-poor
- Intact hedge - native species-rich
- Intact hedge - species-poor
- A — Arable
- Broadleaved woodland - plantation
- SI — Poor semi-improved grassland
- Standing water

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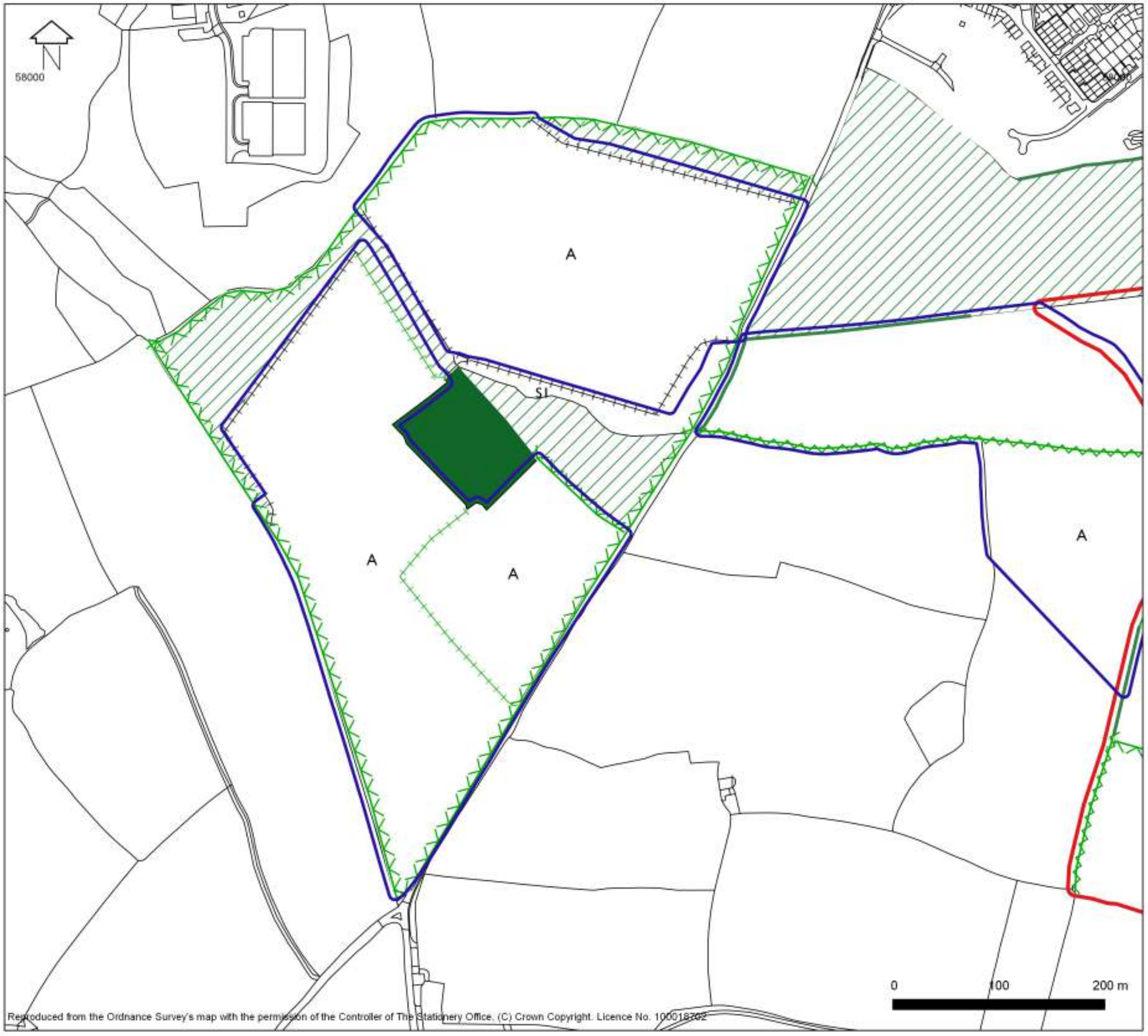
Figure 7: Extended Phase 1 Habitat Map - On Site

June 2017	Drawn By - FG	10874 - ABA



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Key

- Off-site Mitigation Land (+ 5m buffer)
- Fence
- Hedge with trees - native species - rich
- Hedge with trees - species-poor
- A — Arable
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- SI — Poor semi-improved grassland

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Figure 8: Off-site Mitigation Land - Phase 1 Habitat Map

June 2017	Drawn By - FG	10874 - ABA

Legend

Site boundary

Anabat location number

Number of bat records

Myotis bat species
Lesser horseshoe bat
Greater horseshoe bat
Pipistrelle bat species
Noctule, serotine & Leisler's bat species

Anabat recording nights

58000

57500

57000

287501

288001

0 100 200 m

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Figure 9a :
April static detector results

June 2017 10874 ABA

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N

Legend

Site boundary

1 Anabat location number

Number of bat records

Long-eared bat species
Myotis bat species
Lesser horseshoe bat
Greater horseshoe bat
Pipistrelle bat species
Noctule, serotine & Leisler's bat species

Anabat recording nights

58000

57500

57000

287501

288001

0 100 200 m

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Figure 9b :
May static detector results

June 2017 10874 ABA

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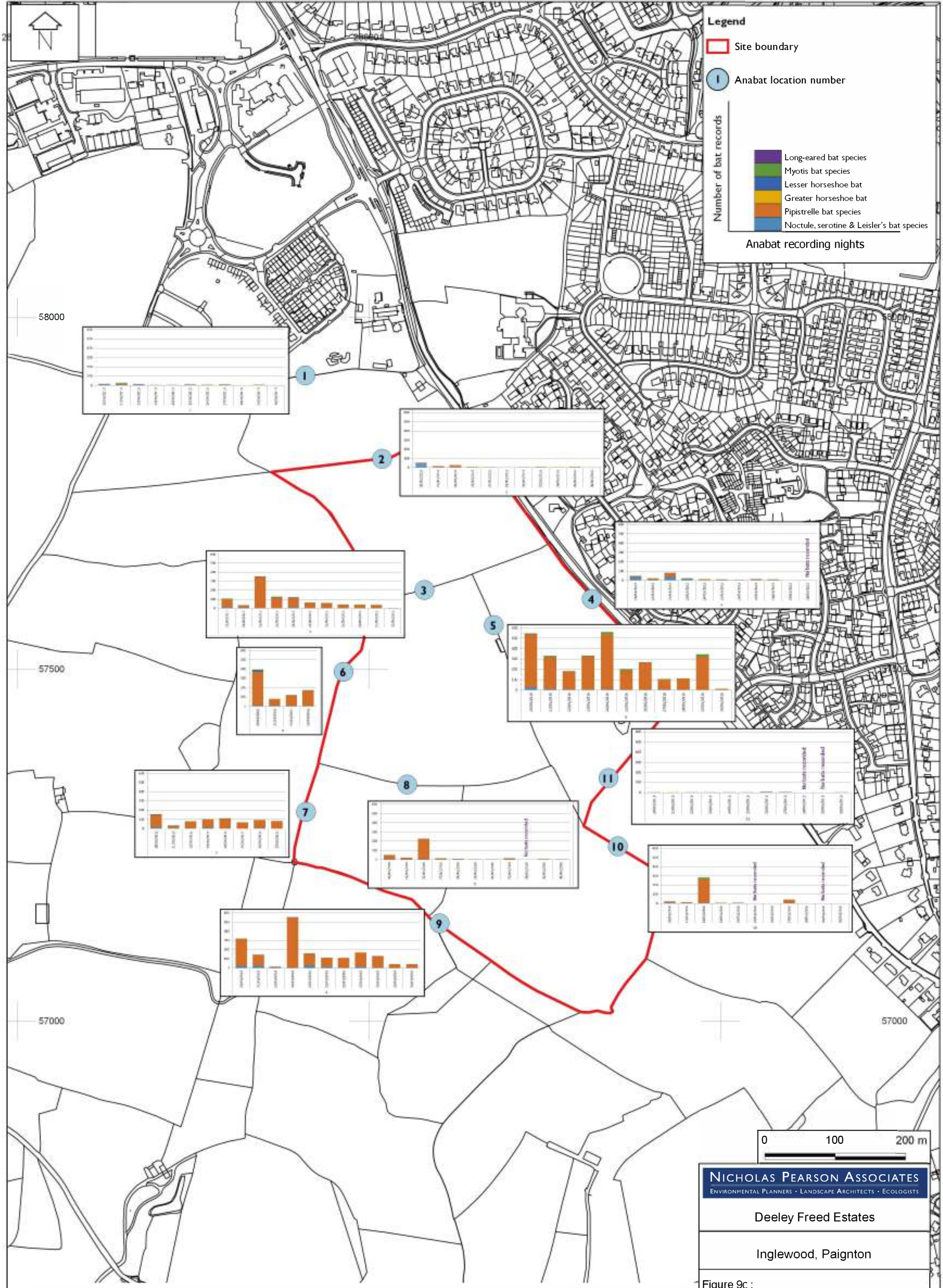

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Figure 9c :
June static detector results

June2017 10874 ABA

287501 288001

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Legend

Site boundary

Anabat location number

Number of bat records

Long-eared bat species
Myotis bat species
Lesser horseshoe bat
Greater horseshoe bat
Pipistrelle bat species
Noctule, serotine & Leisler's bat species

Anabat recording nights

N

58000

57500

57000

287501

288001

0 100 200 m

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Figure 9d :
July static detector results

June 2017 10874 ABA

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N

Legend

Site boundary

1 Anabat location number

Number of bat records

Barbastelle
Long-eared bat species
Myotis bat species
Lesser horseshoe bat
Greater horseshoe bat
Pipistrelle bat species
Noctule, serotine & Leisler's bat species

Anabat recording nights

58000

57500

57000

0 100 200 m

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Figure 9e :
August static detector results

June 2017 10874 ABA

287501 288001

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N

Legend

Site boundary

Anabat location number

Number of bat records

Barbastelle

Long-eared bat species

Myotis bat species

Lesser horseshoe bat

Greater horseshoe bat

Pipistrelle bat species

Noctule, serotine & Leisler's bat species

Anabat recording nights

1

2

3

4

5

6

7

8

9

10

11

58000

57500

57000

287501

288001

0 100 200 m

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Figure 9f :
September static detector results

June 2017 10874 ABA

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N

Legend

Site boundary

Anabat location number

Number of bat records

Long-eared bat species
Myotis bat species
Lesser horseshoe bat
Greater horseshoe bat
Pipistrelle bat species
Noctule, serotine & Leisler's bat species

Anabat recording nights

58000

57500

57000

0 100 200 m

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Figure 9g :
October static detector results

May 2017 10874 ABA

287501 288001

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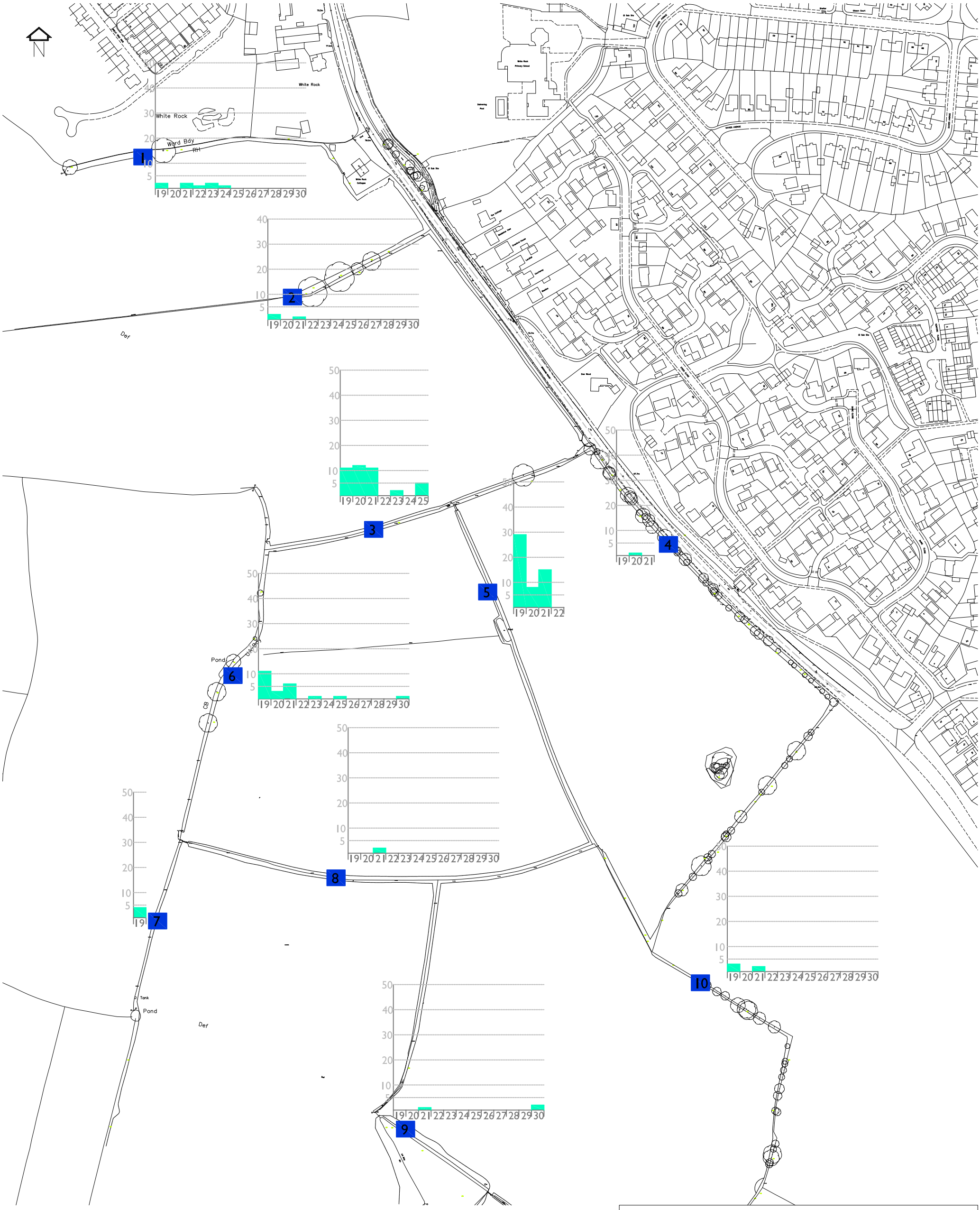

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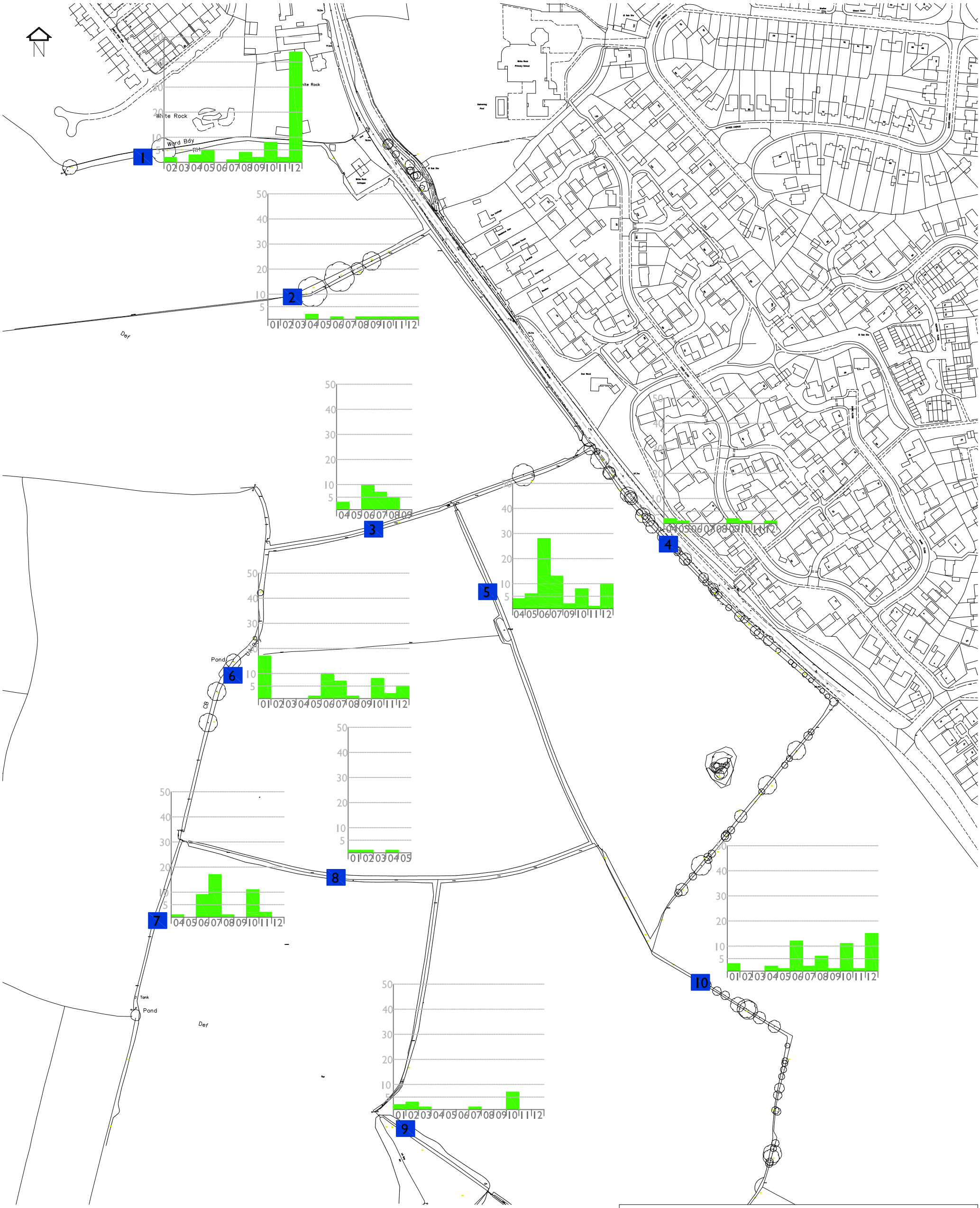
Figure 10a: GHS April

May 2017

10874



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Deeley Freed Estates

Inglewood, Paignton

Figure 10b: GHS May

May 2017

10874

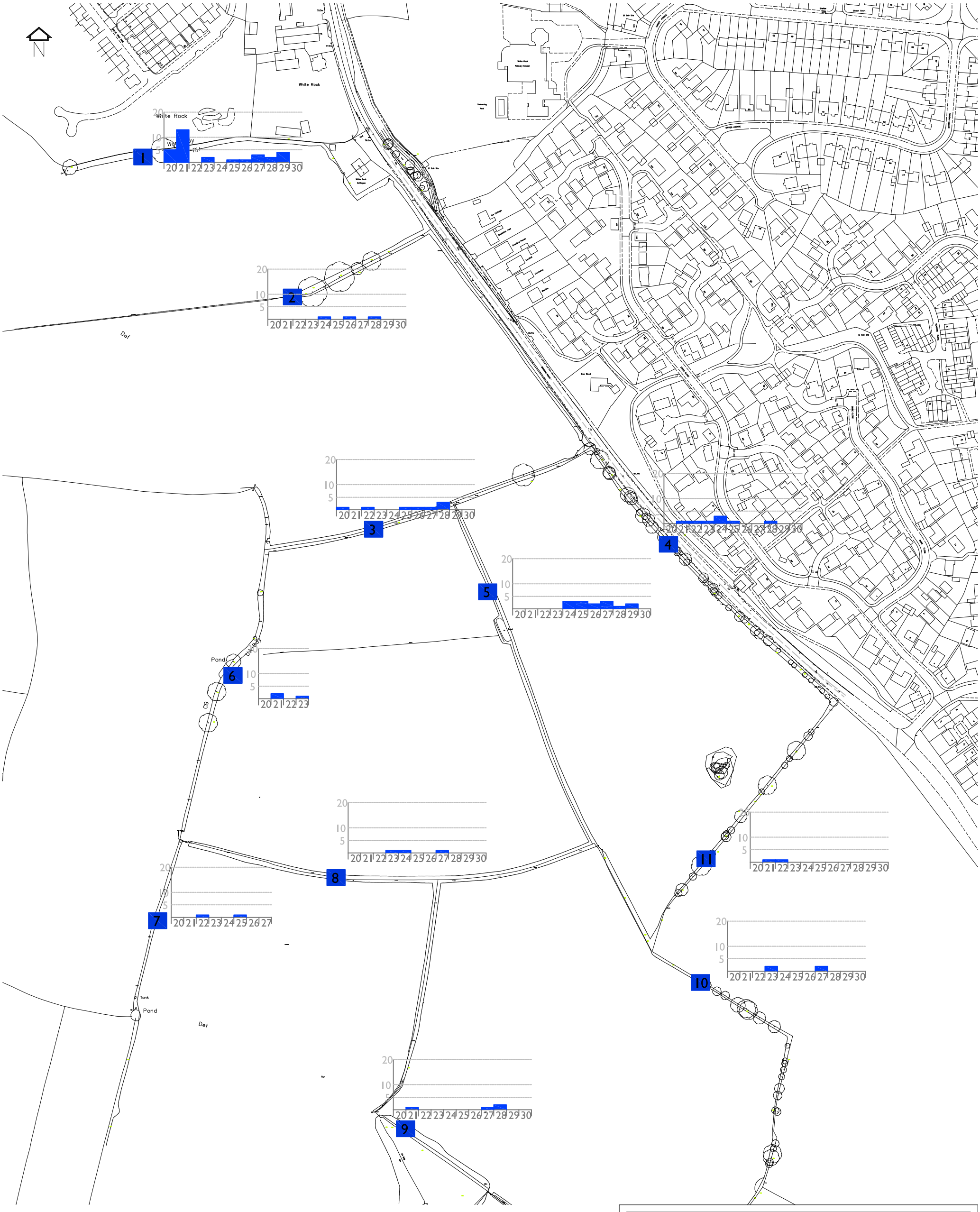

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Figure 10c: GHS June

May 2017

10874

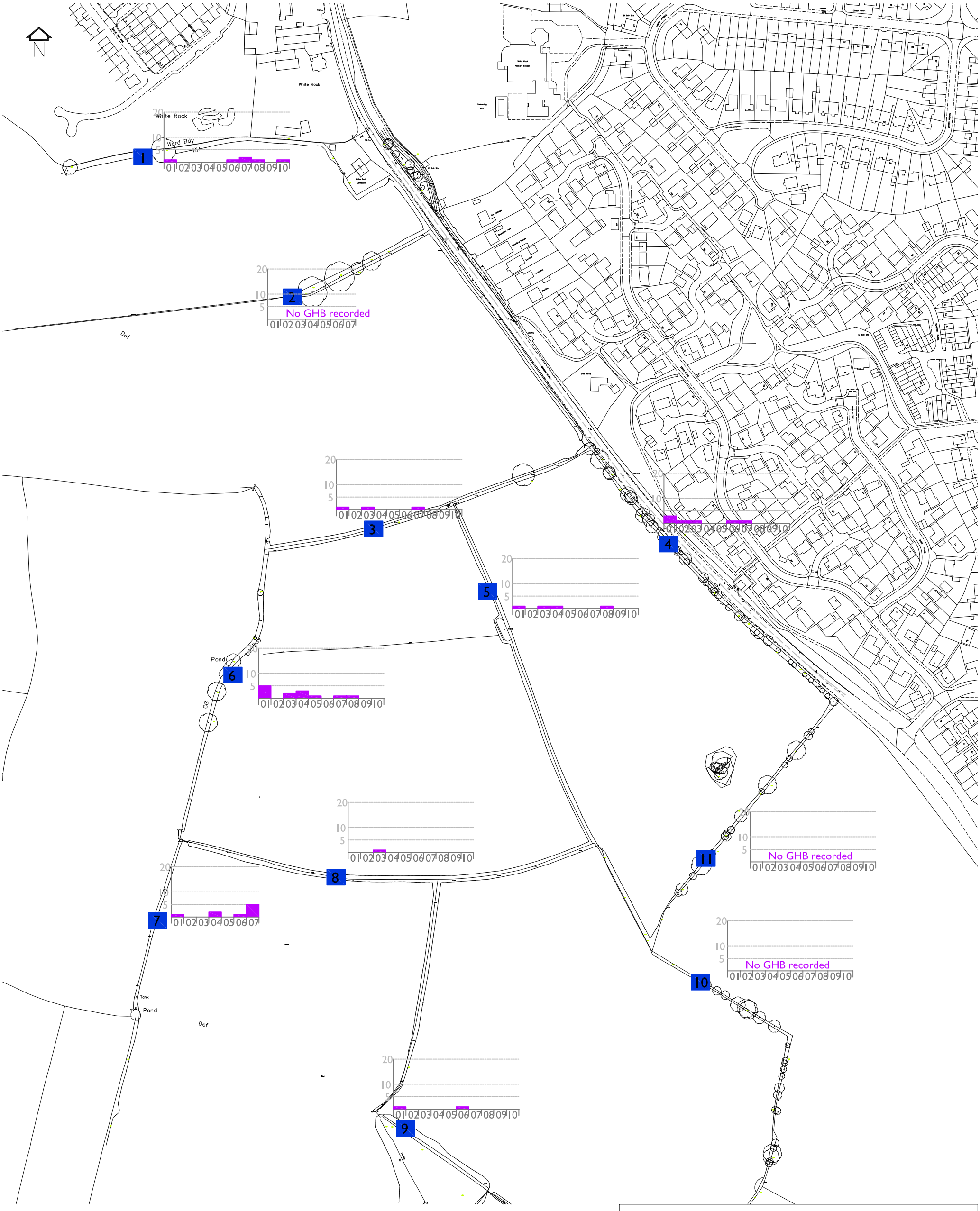

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Figure 10d: GHS July

May 2017

10874

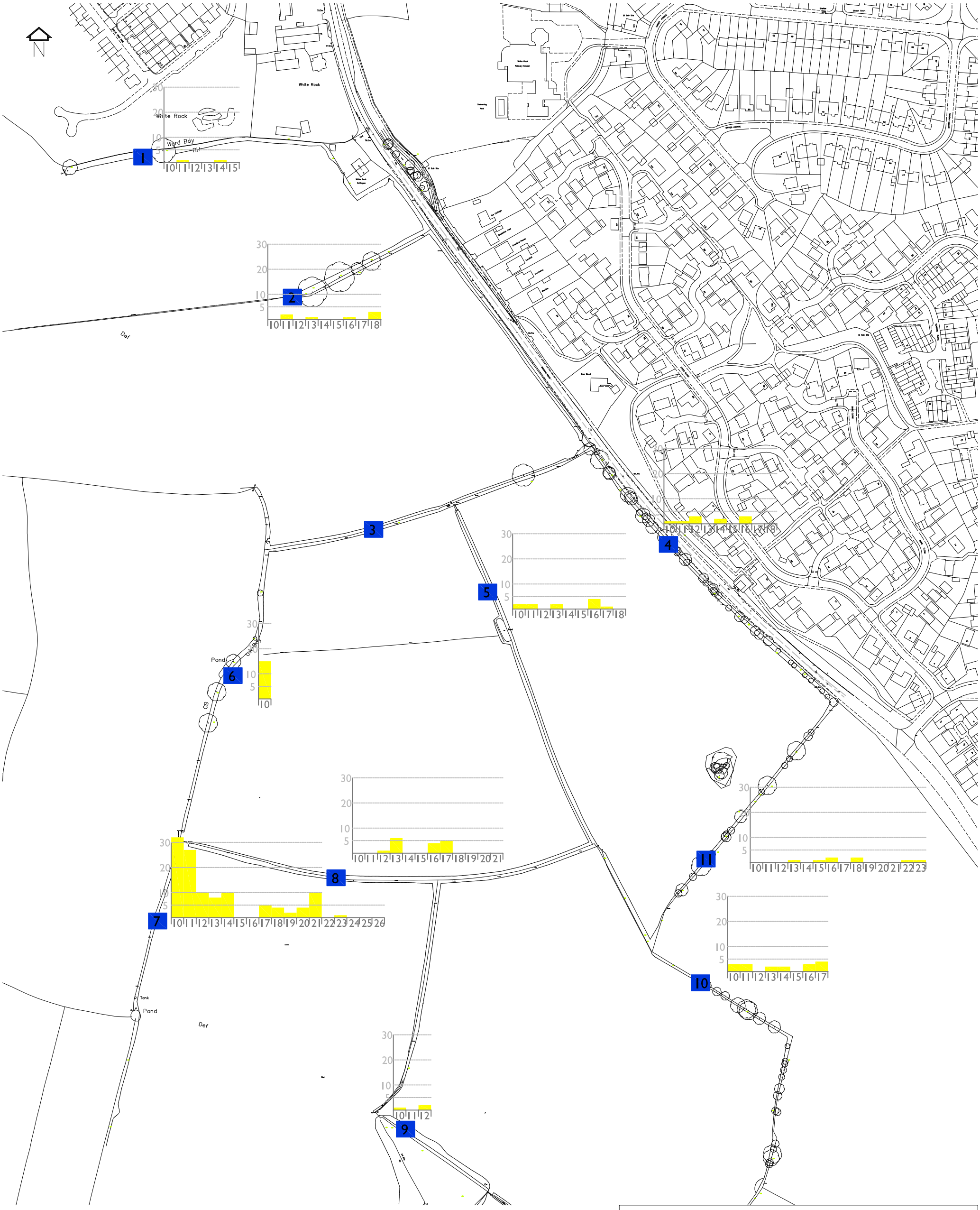

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Figure 10e: GHS August

May 2017

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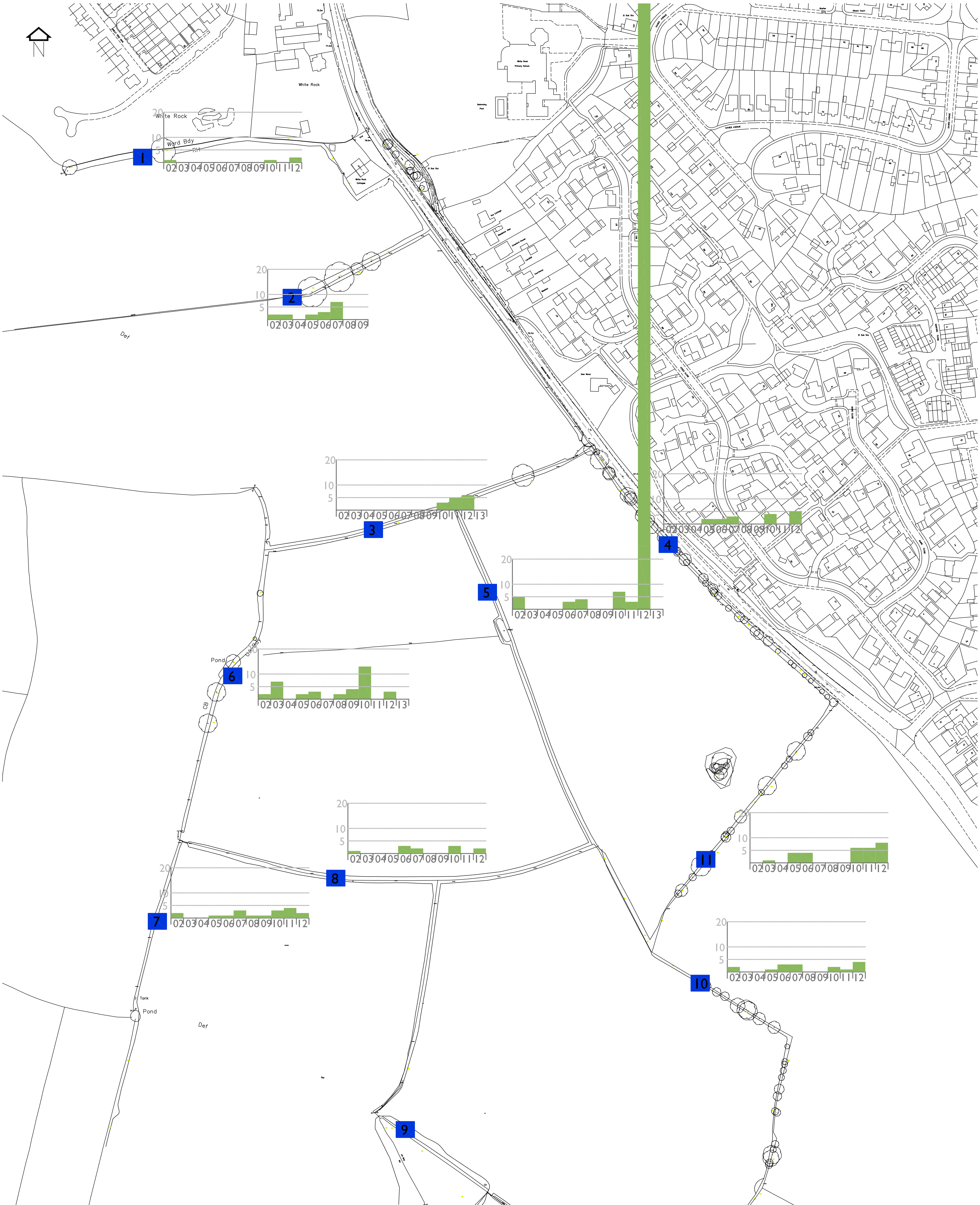

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Figure 10f: GHS September

May 2017

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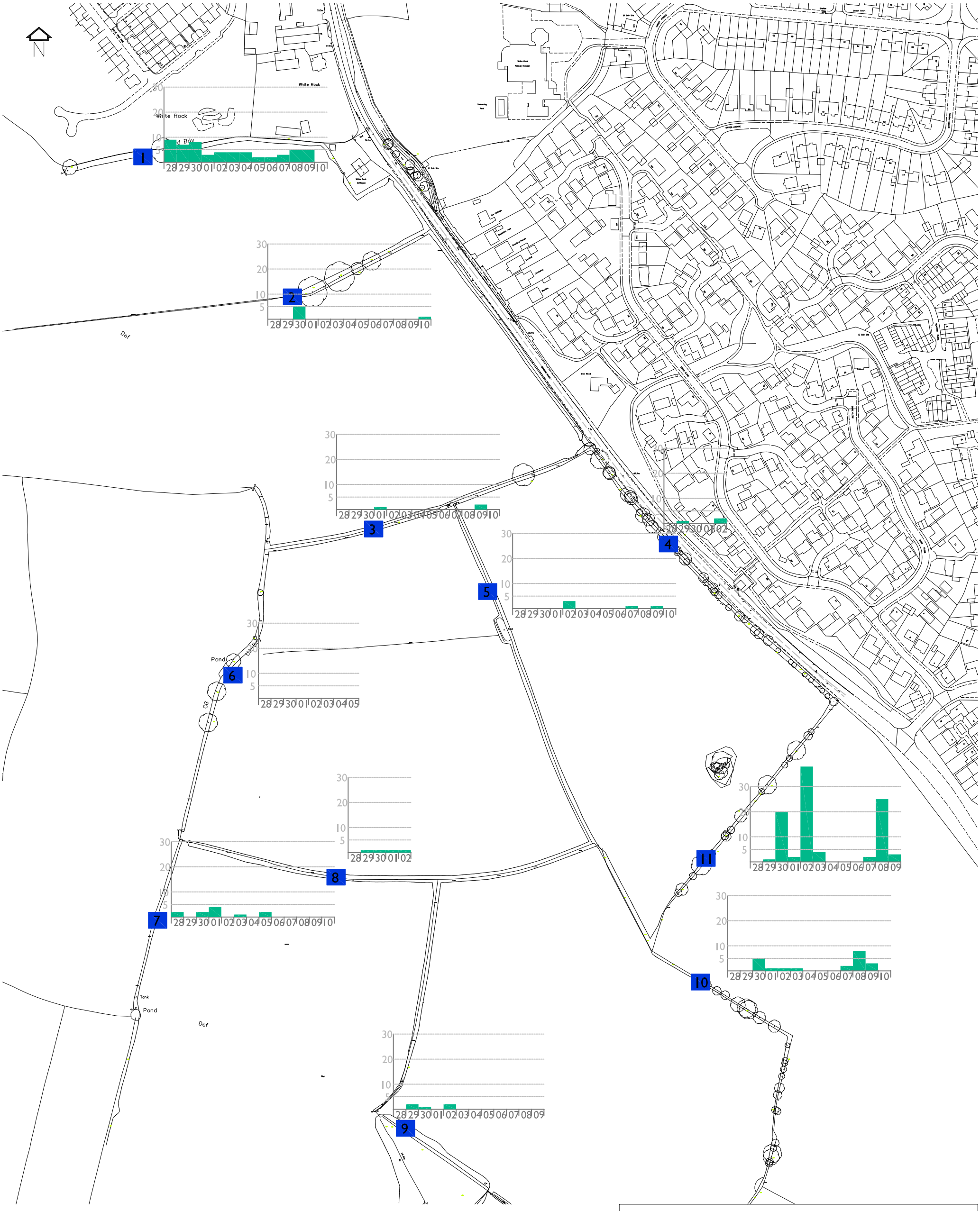

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Figure 10g GHS October

May 2017

10874

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Key

Site Boundary

B. - Blackbird
BT - Blue tit
CC - Chiffchaff
CL - Cirl Bunting
D. - Dunnock
GO - Gold finch
GT - Great tit
HS - House sparrow
LI - Linnet
LT - Long tailed tit
PH - Pheasant
R. - Robin
S. - Skylark
WH - Whitethroat
WP - Woodpigeon
WR - Wren

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Figure 11a: Breeding Bird Survey 1 April 2016

June 2017	Drawn By - FG	10674 ABA

Key

Site Boundary

Same pair

Different pair

B. - Blackbird
BF - Bullfinch
BT - Blue tit
BZ - Buzzard
C. - Carrion Crow
CC - Chiffchaff
CH - Chaffinch
CL - Cirl bunting
D. - Dunnock
GO - Gold finch
GT - Great tit
H. - Heron
HG - Herring Gull
JD - Jackdaw
LI - Linnet
LT - Long tailed tit
MG - Magpie
MP - Meadow Pipit
PH - Pheasant
R. - Robin
RO - Rook
S. - Skylark
WH - Whitethroat

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Figure 11b: Breeding Bunting Survey 2 May 2016

June 2017	Drawn By - FG	10674ABA

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Key

Site Boundary

Same pair

Different pair

B. - Blackbird
BT - Blue tit
BZ - Buzzard
CC - Chiffchaff
CH - Chaffinch
CL - Cirl bunting
CG - Canada Goose
D. - Dunnock
GO - Gold finch
HG - Herring Gull
HS - House sparrow
LI - Linnet
MA - Mallard
MG - Magpie
PH - Pheasant
R. - Robin
RO - Rook
S. - Skylark
WH - Whitethroat
WP - Woodpigeon
WR - Wren

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Figure 11c: Breeding Bird Survey 3 June 2016

June 2017	Drawn By - FG	10674 ABA

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Key

Site Boundary

CL - Cirl bunting

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Figure 12a: Cirl Bunting Survey 1 April 2016

June 2017	Drawn By - FG	10674 ABA

Torbay Business Park

Business Park

Inglewood

White Rock Prim Sch

White Rock

White Rock Cottages

Waddeton Lane Plantation

WADDETON ROAD

Marl Pits

Great Tree

Track

Nords

Waddeton Barton

Waddeton

Broadland Barn

Windy Corner

Community Centre

GIBSON ROAD

DAVIES AVENUE

ASHBURN WAY

HOOKHILLS ROAD

FRESHWATER DRIVE

NEWFORD CLOSE

SHIRE CLOSE

STEED CLOSE

BRIDLE CLOSE

HUNTERS TOR DRIVE

HOUND TOR CL

CL

68m

58000

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Key

Site Boundary

Same pair

Different pair

CL - Cirl bunting

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Figure 12b: Cirl Bunting Survey 2 May 2016

June 2017 | Drawn By - FG | 10674 ABA

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Key

Site Boundary

CL - Cirl bunting

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Figure 12c: Cirl Bunting Survey 3 June 2016

June 2017	Drawn By - FG	10674 ABA

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Key

Site Boundary

CL - Cirl bunting

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Inglewood, Paignton

Figure 12d: Cirl Bunting Survey 4 July 2016

June 2017	Drawn By - FG	10674 ABA

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Key

Site Boundary

CL - Cirl bunting

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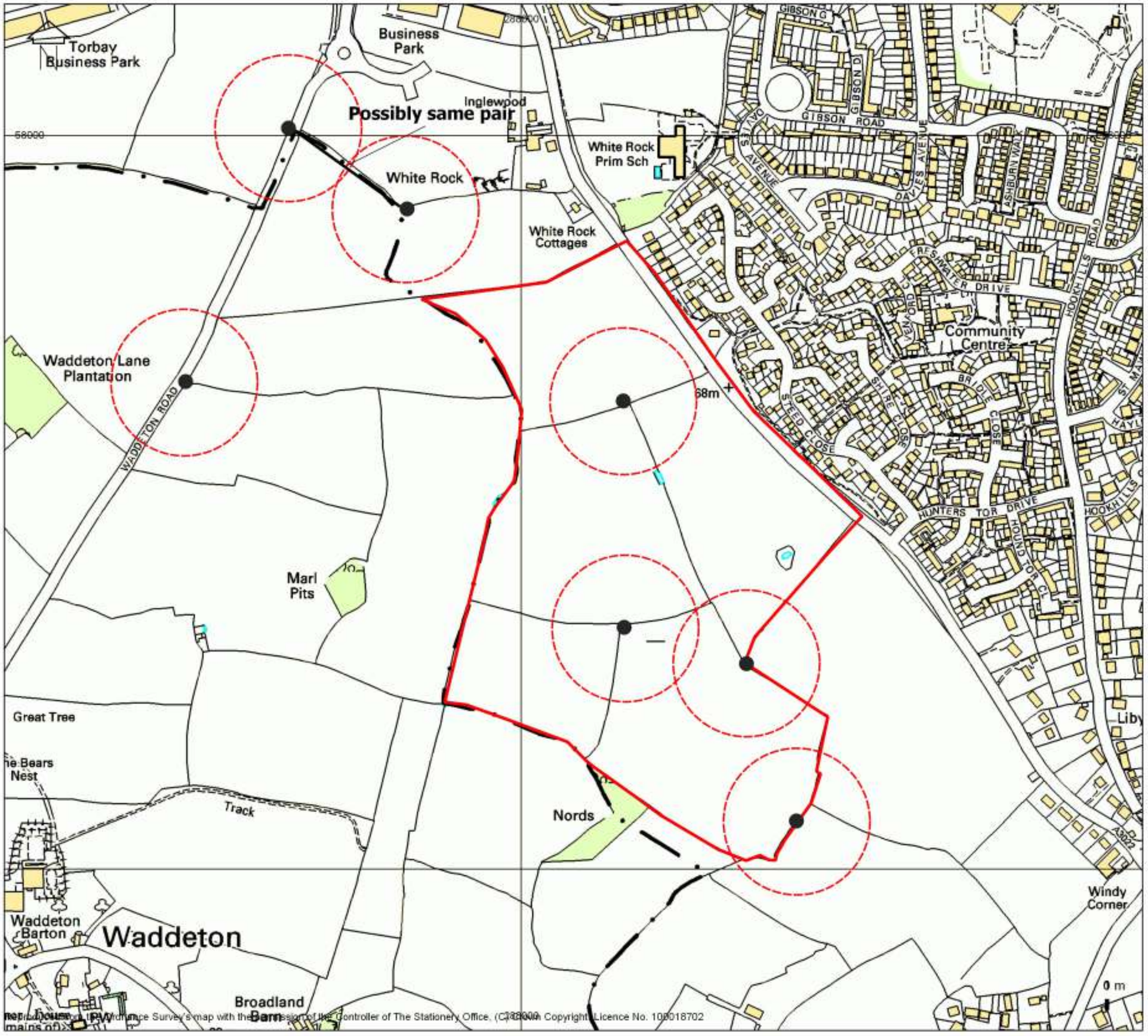
Figure 12e: Cirl Bunting Survey 5 August 2016

June 2017	Drawn By - FG	10674 ABA



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Key

- Site Boundary
- Cirl Bunting pair locations
- Indicative 100m buffer around Cirl Bunting pair

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Inglewood, Paignton

Figure 12f: Combined Cirl Bunting Results

June 2017	Drawn By - FG	10674 ABA

APPENDIX 1: Horseshoe Bat Activity Survey and Cirl Bunting Survey, EcoSulis March 2016

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WHITE ROCK, PAIGNTON

Horseshoe Bat Activity Survey
Cirl Bunting Survey

Client: Stride Treglown Limited

Reference: J005799/J005945

Date of Report: March 2016

Issue:	Date:	Written by:	Reviewed by:	Amended by:	Approved by:
One	28 October 2015	SB	BM/SK	SB	SK
Two	8 March 2016	-	-	SB	SK

Company Registration Number: 372 4176
VAT Number: 601216305

Certificate Number 6745
ISO 9001, ISO 14001, OHSAS 18001

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Ecosulis Ltd (Exeter Office)
The Innovation Centre, University of Exeter,
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NON-TECHNICAL SUMMARY

Site location and size	White Rock, Paignton, Devon; SX 876 578; 40.5ha
Scope and purpose of Works	Horseshoe bat surveys and cirl bunting surveys to inform an impact assessment of the proposed housing development
Dates of site visits and names of surveyors	Bat Activity Surveys: May to October 2015 – Ben Mitchell, Michael Williams, Sarah Booley, Frances Bennett Static Detector Deployment: May to October 2015 Breeding Bird Surveys: 21 May 2014, 3 June 2014, 23 June 2014 - Marc Anderton; 21 July 2015, 28 August 2015 – Ben Mitchell Wintering Cirl Bunting Bird Survey: 4 December 2015, 18 December 2015, 25 January 2016 and 24 February 2016 – Ben Mitchell
Overview	In addition to common species, the following notable bat species have been recorded on site: • Greater horseshoe • Lesser horseshoe • Barbastelle The site has been assessed as having high importance for foraging and commuting greater horseshoe bats due to the distribution of activity and the combination of mature hedgerows and grazed pasture on site. This site supports three probable breeding territories of cirl buntings, with a further territory located directly south of the site. Wintering cirl bunting surveys of the site recorded two males and a female cirl bunting in the north-west corner of the site. These were recorded during three of the four survey visits.
Action Required for Planning and/or Legal Compliance	A mitigation strategy is required for this site in to mitigate for potential impacts of this development on horseshoe bats and breeding and wintering cirl buntings.

CONTENTS

1 INTRODUCTION

1.1 In May 2015, Ecosulis was commissioned by Stride Treglown to undertake breeding cirl bunting and horseshoe bat surveys of land at White Rock, Paignton. Additional wintering cirl bunting surveys of the site were commissioned in November 2015. These surveys are required to inform a planning application for the White Rock 2 Urban Extension.

1.2 Ecosulis, visited the site throughout May 2015 to February 2016 to undertake the surveys. Access was provided by the landowner.

Objectives of Study

1.3 The objectives of this study are: to provide information on the existing ecological conditions at the site with regards to bats and cirl buntings; to identify potential constraints and opportunities that these species may pose to the development plans; and to identify further ecological studies that may be required to ensure that bats and cirl buntings are fully considered within the proposals.

General Description of Site

1.4 The site is located west of the Torbay ring-road, to the west of the built-up area of Paignton. It covers an area of approximately 40.5ha, and is centred on Ordnance Survey (OS) grid reference SX876 578. The site comprises semi-improved grassland, improved grassland, arable land, hedgerows, and semi-natural broadleaved (mixed) woodland.

1.5 The Torbay ring-road bounds the site to the east, with the urban area of Goodrington (a residential suburb of Paignton) beyond. Recently developed employment land runs along Long Road and bounds the site to the north, whilst open fields lie to the south and west.

Nomenclature

1.6 The common name only of fauna species is given in the main text of this report; however, Latin names are used for species where no common name is available. A full list of all species recorded on site during the surveys is given in Appendix I with their Latin names.

Previous Ecological Survey Data

1.7 An Update Phase 1 Habitat survey was undertaken on the site by Ecosulis in 2014 (report reference: J005441). Following this, horseshoe bat activity surveys were conducted on the site between 23 May and 29 September 2014 (report reference: J005441). These surveys recorded the following species; noctule, common pipistrelle and Myotis Sp., as well as greater horseshoe bats and barbastelle bats cross the site. The 2015 surveys have been designed to supplement the existing data for the site, particularly with regards to the use of the site by horseshoe bats.

1.8 Cirl bunting surveys commenced on the site in May 2014 (report reference: J005441). During these surveys, cirl bunting were recorded on the site confirming that they currently use the site. Other notable bird species recorded on site in 2014 include skylark, linnet and house sparrow. The cirl bunting surveys described in this report follow on from those conducted in 2014 and complete the recommended suite of five survey visits.

1.9 The site also provides suitable habitat opportunities for other ecological receptors including; badgers, small mammals, nesting birds, reptiles and amphibians. These species are not given further consideration within this report. Recommendations are detailed in the previous extended Phase 1 survey (report reference: J005441).

2 METHODS

Bat Activity Surveys

2.1 Nine evening bat activity surveys were undertaken between 20 May and 6 October 2015. Surveys were led by Michael Williams, Ben Mitchell, Frances Bennett, Sarah Booley and Andrew Charles, all experienced ecologists and representatives of Ecosulis. Additional details of each of these surveys are included in Table 1 below. These surveys were undertaken in accordance with the Bat Mitigation Guidelines (English Nature, 2004), South Hams Greater horseshoe bat consultation zone planning guidance (Natural England, 2010) and Bat Conservation Trust Survey Guidelines 2012.

Table 1: Horseshoe Survey details

Date	Visit Number	Surveyor
20 May 2015	1	Andrew Charles
26 May 2015	2	Michael Williams
29 June 2015	3	Frances Bennett
13 July 2015	4	Frances Bennett
20 July 2015	5	Ben Mitchell
27 August 2015	6	Ben Mitchell
2 September 2015	7	Frances Bennett
30 September 2015	8	Sarah Booley
6 October 2015	9	Frances Bennett

2.2 A transect was identified for the purpose of the activity surveys which covered all areas of interest within the site. This was used during each of the surveys. Listening points along transect were identified and during each survey stops of ten minutes were taken at each. The location of these listening points is shown in Figure 2. Each activity survey commenced at sunset and continued for three hours after sunset.

2.3 Elekon Batlogger M bat detectors were used to record the calls and locations of bat passes with their flight lines and foraging areas were recorded on a survey form. Notes were recorded on times, locations, species and behaviour Recordings were later analysed manually by an expert using Elekon BatExplorer computer software.

Static Bat detector

2.4 Two SM2 static bat detectors were deployed on the site continuously between 26 June 2015 and 20 September 2015 for a total of 76 nights of survey effort. These were strategically positioned to sample key habitat junctions along the hedgerow in the centre of the site and the woodland within the south of the site. The locations included within this deployment are shown in Figure 2.

2.5 Data collected by these static detectors was then analysed to identify target species using Analook software.

Breeding Cirl Bunting Survey

2.6 Five survey visits were undertaken on the following dates in accordance to the methodology detailed in "Survey Methodology to establish presence of cirl bunting on a site" (RSPB, 2015).

Table 2: Cirl Bunting Survey details

Date	Visit Number	Direction	Surveyor
21 May 2014	1	Clockwise	Marc Anderton
3 June 2014	2	Anticlockwise	Marc Anderton
23 June 2015	3	Clockwise	Marc Anderton
21 July 2015	4	Anticlockwise	Ben Mitchell
28 August 2015	5	Clockwise	Ben Mitchell

2.7 A transect was designed to ensure that all hedgerow and scrub areas were approached within 10m (Figure 1). The direction was varied between visits with the duration calculated to exceed the minimum suggested time. The site area was measured as 40.5 ha requiring a minimum survey duration of 247 minutes. Adverse weather was avoided and a single transect was conducted per visit. Surveys were all completed between sunrise and 11:00.

2.8 A minimum of five survey visits between mid-April and the end of August are required. These survey visits were split across 2014 and 2015 with two visits being undertaken in May and June 2014 and a further three visits being undertaken in June, July and August 2015.

2.9 All registrations were mapped using hand held GIS software with time, habitat, behaviour, call type and location of registration recorded. Registrations from each of the survey visits were then overlaid to identify clusters of repeated registrations within a defined range. These clusters were then allocated into potential territories.

2.10 Areas adjacent to the site were also observed, giving particular attention to the areas of arable crops immediately adjacent to the south fields of the site respectively where there is suitable breeding habitat. During the 2015 visits the fields to the south of the site were included as an additional part of the transect to ascertain the breeding status of cirl buntings which had been heard in this area.

2.11 Ben Mitchell and Marc Anderton, experienced bird surveyors from Ecosulis, conducted all bird surveys.

Wintering Cirl Bunting Survey

2.12 Based on the results of the breeding cirl bunting survey, wintering cirl bunting surveys were undertaken between December 2015 and February 2016. Four survey

visits were undertaken in accordance to the methodology detailed in "Survey Methodology to establish presence of cirl bunting on a site" (RSPB, 2015).

Table 3: Cirl Bunting Survey details

Date	Visit Number	Direction	Surveyor
4 December 2015	1	Clockwise	Ben Mitchell
18 December 2015	2	Anti-clockwise	Ben Mitchell
25 January 2016	3	Clockwise	Ben Mitchell
24 February 2016	4	Anti-clockwise	Ben Mitchell

2.13 The same transect was walked during the wintering cirl bunting surveys as was used during the breeding cirl bunting surveys. The fields to the south of the site were included as part of the winter survey transect as calling males had been recorded in this area during the summer and suitable wintering habitat was present in the form of strip grazed winter fodder crops. Wintering cirl bunting surveys were undertaken by Ben Mitchell MCIEEM.

3 RESULTS

Bat Activity Survey

3.1 A total of ten bats species were recorded during the activity surveys. This included the following notable species

(1) Greater Horseshoe

(2) Lesser Horseshoe

(3) Barbastelle

(4) Bechstein's bat*

3.2 The location of these key records are shown on Figure 3.

3.3 Bechstein's bat species are notoriously difficult to conclusively identify from their calls alone. Therefore, calls matching established call parameters for this species have been included to allow an assessment of the key areas on site for this species. Such calls were identified using a Bechstein's filter which has been designed using parameters from the "British Bat Calls" by Jon Russ and checked using Bechstein's sample calls provided during the Analook Level 2 training course. These filtered calls were then checked manually to confirm call parameters. Again, as these bats are notoriously difficult to identify from calls alone, these should not be taken as conclusive evidence of the presence of this species. The only identification that can be confirmed is that call pulses have been recorded that match the measured parameters for Bechstein's bats. These could have been emitted by other Myotis species as the range of call parameters overlap. Due to this our assessment of the presence of this species on site must be based upon further consideration the suitability of habitats in the local area.

3.4 Other common bat species were recorded on the site including; brown long eared, noctule, serotine, Leisler's, natterers, common pipistrelle, soprano pipistrelle and other species of Myotis bat.

Bat Activity surveys

3.5 The locations of notable species records on the site are shown in Figure 3 along with a heat map showing levels of bat activity recorded across the site. Full survey results can be found in Appendix 2.

3.6 During activity surveys greater and lesser horseshoes were recorded along three hedgerows on the site. This included multiple records of greater horseshoes along hedgerows in the central areas of the site.

3.7 Barbastelles were recorded at a three locations within the central hedgerows on site and at the eastern boundary of Field 6.

3.8 High levels of pipistrelle foraging and commuting activity were recorded throughout the site. Moderate levels of foraging and commuting Myotis bats, Leisler's, noctules and serotines.

Static Detector Results

3.9 The number of passes of key species recorded by each of the two static bat detectors is shown in Table 4.

Table 4: Results of static detector deployments

Static Location	Number of Nights	Greater Horseshoe		Lesser Horseshoe		Barbastelle		Possible Bechstein's bat	
		No. passes	Index score	No. passes	Index score	No. passes	Index score	No. passes	Index score
Static Location 1 – Hedgerow	50	15	0.72	9	7.54	2	0.14	7	1.5
Static Location 2 - Woodland	26	15	5.3	13	4.3	2	0.11	13	7.8

Breeding Cirl Bunting Survey

3.10 The full results of the cirl bunting surveys undertaken are included in Table 5 and shown in Figure 1.

Table 5: Cirl Bunting Results

Survey	Observer	Date	Number of Registrations	Notes
1	MA	21 May 2014	1	Male recorded singing along the southern hedgerow boundaries Pair recorded collecting nesting material
2	MA	3 June 2014	0	None
3	MA	23 June 2015	1	Pair of cirl buntings were observed on the third site visit along the western hedgerows immediately adjacent to the site boundary
4	BM	21 July 2015	1 (off-site)	Male singing
5	BM	28 August 2015	3 (off-site)	Two males singing in southern hedgerow and one male further west, also singing. All birds singing simultaneously.

3.11 In 2014 one pair of cirl buntings were recorded singing on site during the first site visit along the hedgerow boundary between Field 5 and 3. They were also recorded collecting nesting material and commuting along the hedgerow boundary between Field 5 and Field 3 in the south of the site. These signs of breeding behaviour indicate that this species has a probable breeding status on site (see Appendix 2 for definitions).

3.12 An additional pair of cirl buntings were also noted during visit 3 along the western hedgerows immediately adjacent to Field 1, therefore the territory of this pair is likely to include habitats within the site boundary. Breeding activity including singing and flying in pairs indicates a probable breeding status of this species.

3.13 During visits 4 and 5, several male cirl buntings were recorded singing along hedgerows just to the south of site (Figure 1). These were confirmed as being separate individuals. There were not, however, recorded collecting nesting materials.

Other Notable Bird Species

3.14 In both 2014 and 2015 Skylark (UKBAP & red listed Bird of Conservation Concern BoCC) were noted calling within Field 1 on the first two site visits, and display flights were noted indicating probable breeding on site. Linnet (Red-listed Bird of Conservation Concern) were also noted flying in flocks within Field 1 of the site during visits 1 and 2. These were likely attracted to the site by the large crop of oilseed rape in the central fields but are not considered to be breeding on site.

3.15 House sparrow were recorded foraging within hedgerows and likely to be nesting within buildings adjacent to the site and foraging within the site boundary.

3.16 Common bird species were also noted during all site visits within hedgerows and the woodland copse to the south of the site.

Wintering Cirl Bunting Surveys

3.17 The full results of the cirl bunting surveys undertaken are included in Table 6 and shown in Figure 1.

Table 6: Cirl Bunting Results

Survey	Observer	Date	Number of Registrations	Notes
1	BM	4 December 2015	3	Two males and one female within north-west corner of site, foraging in strip grazed fodder crop area
2	BM	18 December 2015	3	Two males and one female within north-west corner of site. Bathing and foraging in strip grazed fodder crop area
3	BM	25 January 2016	3	Two males and one female within north-west corner of site, foraging in strip grazed fodder crop area
4	BM	24 February 2016	0	No cirl buntings recorded

3.18 Three cirl bunting were recorded within the north-west corner of Field 1 during the wintering surveys. These birds were recorded foraging around an area of over-winter fodder crop (turnips and brassicas) during three of the four survey visits. These areas were continuously grazed during the winter survey period and were almost completely grazed-off during the final survey visit.

3.19 No cirl buntings were recorded on the site in February 2016.

3.20 A number of additional species of conservation concern were identified during the winter surveys including skylark Alauda arvensis (red), linnet Carduelis cannabina (red) and song thrush Turdus philomelos (red).

4 ASSESSMENT

Bat Activity Survey

4.1 The site falls within South Hams SAC horseshoe bat sustenance zone, and both greater and lesser horseshoes have been recorded using the site for commuting and foraging. Additionally Barbastelle and possible Bechstein's bat were recorded during the course of surveys along with other common species.

Greater Horseshoe Bats

4.2 The site is frequently and extensively used by greater horseshoe bats, with this species being widely recorded across the site (Figure 3).

4.3 The locations where they were recorded would indicate that they are using the field boundary habitats for commuting. Additionally, open field habitats on the site continue to provide suitable foraging habitat for this species. It is considered likely that given the level of activity recorded the site greater horseshoe bats utilise these habitats.

4.4 Higher levels of greater horseshoe activity were recorded by the woodland static than that located in the hedgerow.

Lesser Horseshoe Bats

4.5 The site is also used by lesser horseshoe bats, although this species was recorded less widely across the site (Figure 3). In particular, hedgerows on the site provide important commuting opportunities for this species. During the September activity survey prolonged foraging behaviour was also recorded along the boundary between Field 2 and Field 4.

4.6 Surveys confirmed the presence of this species within the woodland at the south of the site. This woodland provides suitable foraging habitat for lesser horseshoe bats which foraging close to dense vegetation.

4.7 Higher levels of lesser horseshoe activity were recorded by the hedgerow static than that located in the woodland.

Other notable bat species

Barbastelle

4.8 Barbastelle bats were also recorded on the site, close to the woodland and along field boundary hedgerows. These habitats on site are likely to provide a valuable commuting route for this species between roosting and foraging areas.

4.9 Higher levels of barbastelle activity were recorded by the woodland static than that located in the hedgerow.

Bechstein's bat

4.10 Calls were recorded which match parameters for Bechstein's bat (as detailed in Russ, J; 2014). Conclusively differentiating between the calls of this species and

other Myotis bat species is not possible from calls alone. An assessment of the likelihood that Bechstein's bat are present on the site must therefore be based upon the ecological context of the site and known presence of the species in the local area.

4.11 This species primarily utilises woodland habitats such as those found within the south of the site. Surveys recorded probable calls of this species within this woodland and along the hedgerows on the site. Hedgerows present may provide a commuting route for this species between roosting and foraging areas. The woodland in the south of the site provides some suitable foraging habitat for Bechstein's bat and has connectivity to further woodlands of Kiln Copse and Barn Wood to the south.

4.12 However it is understood that this species of bat has not been recorded within 5km of the site within the last 10 years. This, combined with limited wider connectivity to large expanses of high quality woodland, reduces the likelihood that Bechstein's bats are present.

4.13 Based on these factors it is considered unlikely that Bechstein's bats are present on the site.

Cirl Bunting Surveys

4.14 Surveys conducted in 2014 found that the site supports two probable breeding territories for cirl bunting. In addition to this the 2015 surveys found that there is a further probable breeding territory located directly to the south of the site. The location of these clusters (indicated by a 50m buffer) are detailed on Figure 1. The 50m buffer is indicative and should not be taken as an exact indication of territory size as this is highly variable for this species and can extend up to 250m from the nest site.

4.15 No evidence of confirmed breeding was recorded, therefore the breeding status has been assessed as probable due to the presence of two pairs in suitable nesting habitat on the site.

4.16 An additional probable breeding territory has been identified off site less than 50m south of the site in similar habitat to those on site and along a hedgerow which forms part of the site boundary.

4.17 These birds have not been observed utilising other areas of the site but this should be considered highly likely given the characteristic summer and winter habitat use recorded for this species. Areas of arable and pasture habitats adjacent to the site will also be utilised.

4.18 During the wintering survey foraging cirl bunting were recorded on the site. The presence of these birds during three of the four surveys undertaken indicates that habitats present in the north west of the site provides a valuable winter foraging resource for this species. This species travels large distances up to 2km between

breeding and over-wintering site. As such it should not be assumed that the individuals recorded during breeding surveys are the same birds which use the site during summer.

5 ECOLOGICAL CONSIDERATIONS AND RECOMMENDATIONS

5.1 This section provides considerations in relation to the ecology of the site and any adjacent habitats that should be considered within development proposals to ensure that impacts on ecology are avoided and / or mitigated within the scheme.

Bats

5.2 All British species of bat and their place of shelter are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 from deliberate capture, injury and killing, intentional or reckless disturbance, intentional or reckless obstruction of access to any structure or place which any such animal uses for shelter or protection, and deliberate damage or destruction of a breeding site or resting place. This includes buildings and trees and applies throughout the year whether bats are present or not at the time of survey or work being carried out.

5.3 Although foraging areas and commuting routes are not legally protected, the effects of development proposals on these are a material consideration when assessing the impact of the proposal on the maintenance of favourable conservation status (NPPF). Hedgerows should be retained and enhanced in the long-term to maintain opportunities for bats, particularly horseshoe bats and barbastelles. Where not possible, alternative compensatory habitat should be created on or adjacent to the site.

5.4 The site falls within the South Hams SAC greater horseshoe bat sustenance zone and both species of horseshoe bat have been recorded using the site for commuting and foraging. As such the development of this site has the potential to severe key commuting routes for greater horseshoe bats associated with this SAC, as well as a number of other important bat species. It is therefore recommended that a bat mitigation strategy is implemented for the site. This should be incorporated into the initial design stages of the proposed scheme to ensure adequate consideration is given to bats.

5.5 It is recommended that where possible hedgerows on the site are maintained and enhanced as part of the scheme. However it is understood that this is unlikely to be feasible. As such, green corridors will need to be created and established across the site to enhance connectivity, as well as a buffer zone around the woodland at the south of the site to ensure the continued provision of suitable foraging habitat for lesser horseshoes and barbastelles. It is recommended that traditional management of hedgerows, grassland and woodland is undertaken to increase insect biomass across the site.

5.6 In particular horseshoe bats are light sensitive species and as such light spill onto commuting corridors also has the potential to reduce connectivity between important roosting and foraging habitats. The development proposals should incorporate a sensitive lighting scheme should be implemented on site to retain

dark corridors and prevent light spill onto adjacent habitats. Where not possible, alterative off-site mitigation should be created to maintain connectivity and foraging opportunities for horseshoe bats and barbastelles in the local area.

5.7 The development will result in the loss of suitable habitats on the site, and the site is unlikely to provide suitable habitat for horseshoe bats due to likely light spill. As a result, off-site mitigation should be considered to ensure that opportunities for horseshoe bats are retained and enhanced in the local area

5.8 In order to enhance the site for bat species post-development it is recommended that night scented flowers are incorporated into the landscaping plan. This will aid some bat species by encouraging nocturnal invertebrate species, however will not provide foraging opportunities for greater horseshoe bats. It is also recommended that bat boxes and other features designed for roosting bats are installed and monitored and checked annually at an appropriate time of year.

Cirl Bunting

5.9 Cirl Bunting are protected under Schedule 1 (1) of the Wildlife & Countryside Act 1981 (as amended) which affords full protection to this bird species. It is an offence to intentionally or recklessly disturb at or near an active nest of this species. Cirl Buntings are also a red listed species which identifies the bird as a globally threatened species according to IUCN criteria; those whose populations or range has declined or contracted rapidly in the last 25 years by 50% or more; and those that have declined historically (between 1800 and 1995) and not shown a substantial recent recovery.

5.10 This data establishes this site as an important site for this species during both the breeding season and over winter. Although breeding has not been confirmed, it is highly probable. Additionally, habitats on site provide winter foraging opportunities for this species.

5.11 The site is located within the off-site mitigation for cirl bunting for the consented scheme to the north. As such, it is recommended that the scheme includes the implementation of a full mitigation strategy relating to this species. This should include compensating for the loss of the off-site mitigation area for the northern development. This will require a large area of habitat to be provided and enhanced for breeding and wintering cirl buntings off-site.

5.12 Where possible hedgerow habitats on the site should be protected as part of a green corridor within the scheme and enhanced. Hedgerows should be retained and trimmed as late as possible in the winter and ideally in January or February in the long-term to maintain opportunities for Cirl buntings. The scheme should also incorporate suitable winter foraging opportunities for cirl bunting. This could include replicating areas of over-wintered stubble within retained habitats and green areas of the site.

5.13 Where this is not possible, alternative compensatory habitat should be created on or adjacent to the site in accordance with the Off-Site Landscape and Ecological Management Plan which is in place for the White Rock Phase 1 development located directly to the north of the site (reference: DEEFRE-WHIROC-C4407_B).

6 LIMITATIONS OF SURVEY AND REPORT

6.1 This report records wildlife found during the survey and anecdotal evidence of sightings. It does not record any plants or animals that may appear at other times of the year and were therefore not evident at the time of visit. Some species that might use the site or be apparent at other times of year, or only in certain years, would not have been detected.

6.2 Identification is known to be very difficult between species of Myotis bats using call analysis software. This includes differentiating between Bechstein's bats and other species of Myotis bats.

6.3 The landowner requested that surveyors did not access fields containing cattle during the bat activity surveys. This resulted in a diverted transect route avoiding part of Fields 4 and 6 on surveys 2,3,4,6,7,8 and 9.

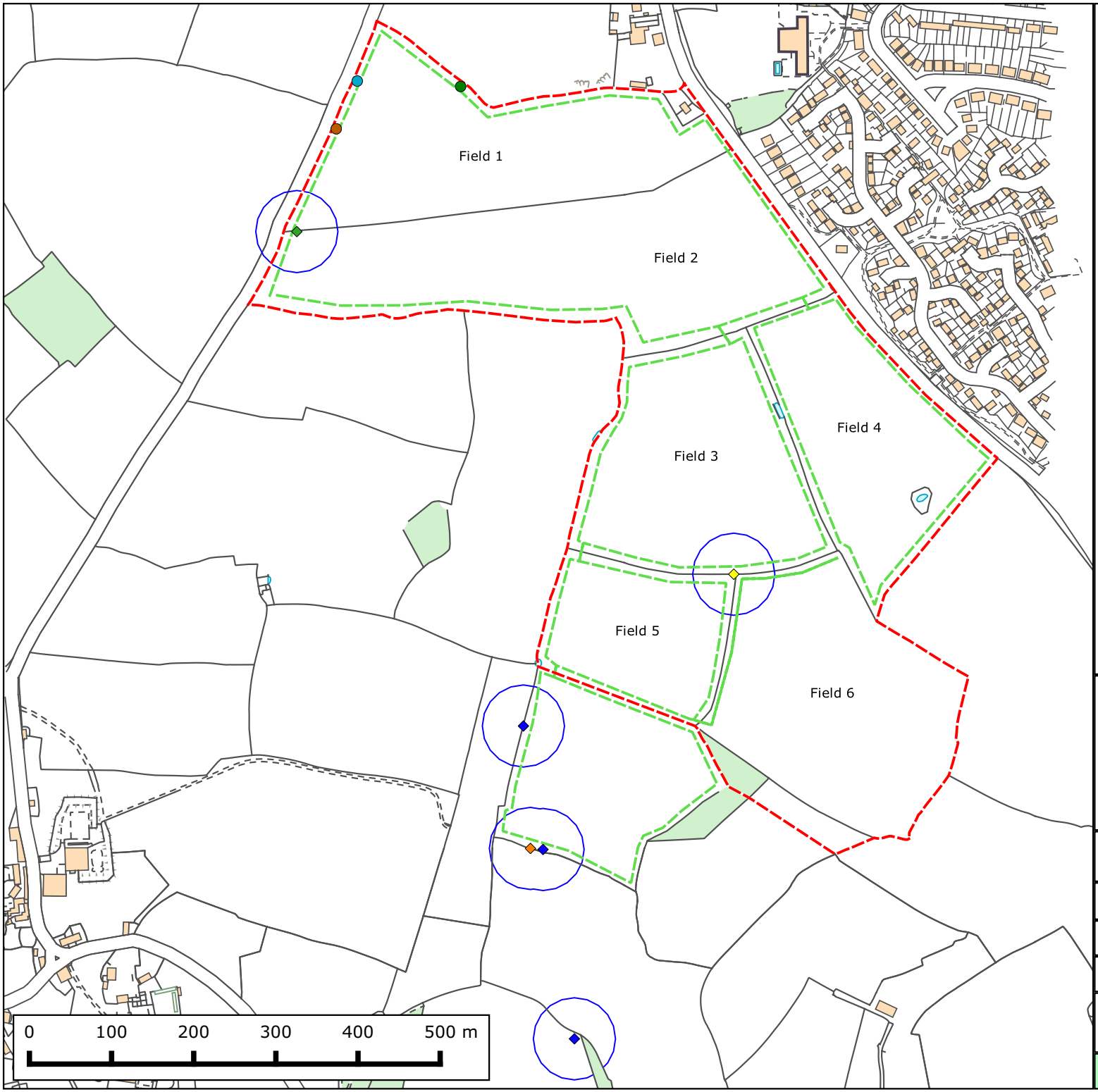
6.4 Cirl bunting surveys were undertaken two separate breeding seasons. As such the assessment of distinct territories cannot be considered definitive as it is considered possible that birds recorded in 2014 may be the same individuals recorded in 2015 but using different locations. The results do however, provide a robust assessment of the importance of this site, and the most important areas within the site, for breeding cirl buntings.

6.5 This report provides further data to inform a provisional ecological baseline for the site and should not be considered to be conclusive until the ecological considerations have been undertaken and all necessary further surveys completed. Likewise the ecological considerations at this stage are not necessarily final and may be subject to change or additional proposals made following the results of further surveys and detailed development plans.

6.6 The recommendations contained within this report should be considered in addition to those detailed in the previous ecological reports for this site (Ecosulis report reference: J0051441)

6.7 The behaviour of animals can be unpredictable and may not conform to standard patterns recorded in current scientific literature. This report therefore cannot predict with absolute certainty that animal species will occur in apparently suitable locations or habitats or that they will not occur in locations or habitats that appear unsuitable.

6.8 The advice contained in this report relate primarily to factual survey results and general guidance only. On all legal matters you are advised to take legal advice.



Key

Site Boundary

Survey Transect

Breeding Cirl Bunting Survey Results

- May 2014
- Late August 2015
- June 2014
- July 2015

Breeding Cirl Bunting Territory

Wintering Cirl Bunting Survey Results

- Early December 2015
- Mid December 2015
- January 2016

N

ecosulis
Experience Better

The Rickyard, Newton St Loe, Bath BA2 9BT
T: 01225 874 040 E: info@ecosulis.co.uk

Client: Stride Treglown Ltd

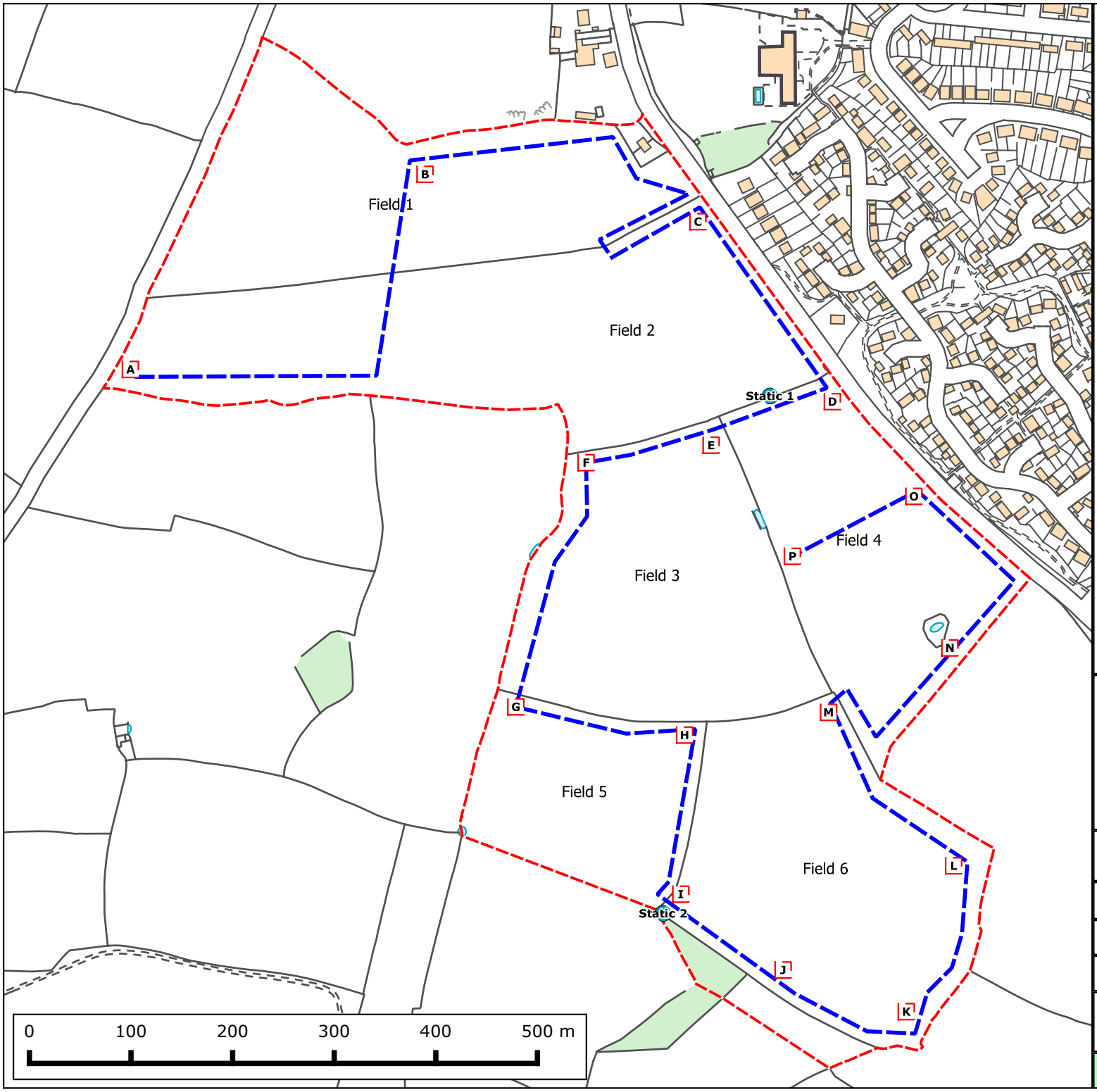
Project: White Rock

Title: Cirl Bunting Survey

February 2016

Figure 1

www.ecosulis.co.uk



Key

- Site Boundary
- Transect Route
- Static Detector Location
- Listening Point Location

N

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Experience Better

The Rickyard, Newton St Loe, Bath BA2 9BT
T: 01225 874 040 E: info@ecosulis.co.uk

Client: Stride Treglown Ltd

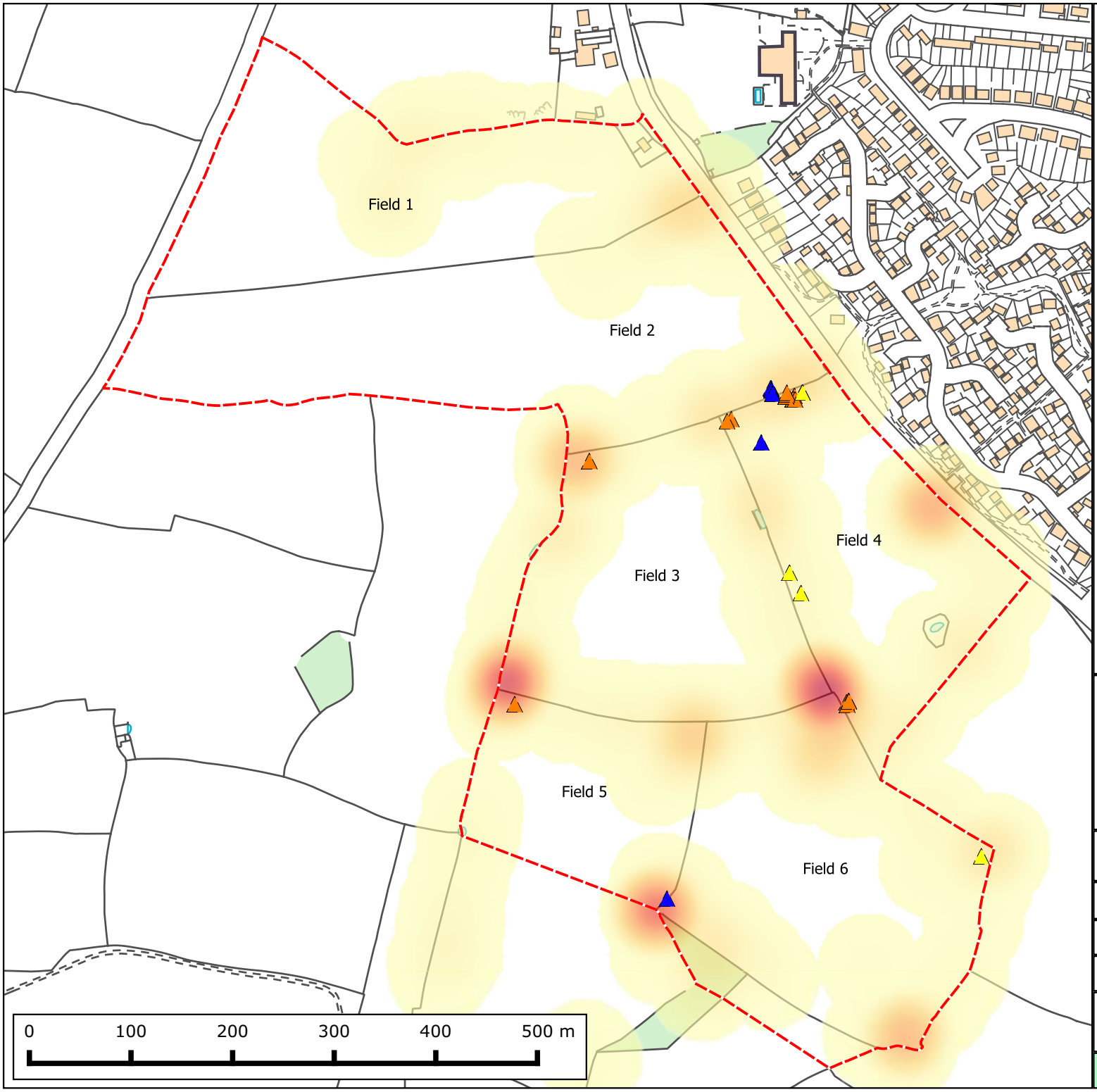
Project: White Rock

Title: Bat surveys

October 2015

Figure 2

www.ecosulis.co.uk



Key

Site Boundary

Notable bat species

- Greater Horseshoe
- Lesser Horseshoe
- Barbastelle

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The Rickyard, Newton St Loe, Bath BA2 9BT
T: 01225 874 040 E: info@ecosulis.co.uk

Client: Stride Treglown Ltd

Project: White Rock

Title: Heatmap showing bat activity

October 2015

Figure 3

www.ecosulis.co.uk

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Appendix I: SPECIES LIST

Fauna	
Common Name	**Latin Name**
Barbastelle bat	Barbastella barbastellus
Bechstein's bat	Myostis bechsteinii
Brown long eared bat	Plecotus auritus
Cirl bunting	Emberiza cirlus
Common pipistrelle	Pipistrellus pipistrellus
Greater Horseshoe bat	Rhinolophus ferrumequinum
Lesser Horseshoe bat	Rhinolophus hipposideros
Myotis bat	Myotis sp.
Noctule bat	Nyctalus noctula
Serotine bat	Eptesicus serotinus
Soprano pipistrelle	Pipistrellus pygmaeus

Appendix II: BREEDING EVIDENCE DEFINITIONS

Non-breeding:

- Flying over
- Species observed but suspected to be still on Migration
- Species observed but suspected to be summering non-breeder

Possible breeder:

- Species observed in breeding season in suitable nesting habitat.
- Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat.

Probable breeder:

- Pair observed in suitable nesting habitat in breeding season.
- Permanent territory presumed through registration of territorial behaviour (song etc) on at least two different days a week or more part at the same place or many individuals on one day.
- Courtship and display (judged to be in or near potential breeding habitat)
- Visiting probable nest site
- Agitated behaviour or anxiety calls from adults, suggesting probable presence of nest or young nearby.
- Nest building or excavating nest-hole.

Confirmed breeder:

- Distraction display or injury feigning.
- Used nest or eggshells found (occupied or laid within period of survey)
- Recently fledged young or downy young.
- Adults entering or leaving nest-site in circumstances indicating occupied nest.
- Adult carrying faecal sac or food for young.
- Nest contains eggs.
- Nest with young seen or heard.

Appendix III: Activity Survey Results

For clarity records of common and soprano pipistrelle are not included within each results table

Table 7: Results of Activity Survey, 20 May 2015

Date: 20/05/15	**Start time**: 21:00	**Weather**: 11°C, low wind, 5% cloud
	End Time: 01:15	**Weather**: 10°C, 5% cloud, low wind
General Weather Notes: Dry, warm, minimal wind		
Location of Surveyor	**time**	**Species**
G	22:44	Leisler's Bat
Total pipistrelle passes: 17 Common Pipistrelle 1 Soprano Pipistrelle		

Table 8: Results of Activity Survey, 26 May 2015

Date: 26/05/2015	**Start time**: 21:20	**Weather**: 13°C, light wind, 0% Cloud
	End Time: 00:20	**Weather**: 11°C, light wind, 50% Cloud
General Weather Notes:		
Location of Surveyor	**time**	**Species**
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
A	21:30	Noctule
C	21:48	Noctule
C/D	21:53	Noctule
E	22:28	Serotine
E	22:29	Serotine
P	22:29	Brown Long Eared
I	23:00	Natterers
I	23:01	Brown Long Eared
J	23:03	Natterers
J	23:03	Natterers
J	23:04	Natterers
J	23:04	Natterers
L	23:39	Brown Long Eared
L	23:40	Brown Long Eared
L	23:47	Brown Long Eared
M	23:56	Noctule
Total pipistrelle passes: 102 Common Pipistrelle 3 Soprano pipistrelle		

Table 9: Results of Activity Survey, 29 June 2015

DATE: 29/06/2015	START TIME: 21:35	WEATHER: 15°C, LIGHT WIND, 0% CLOUD
	END TIME: 00:35	WEATHER: 15°C, LIGHT WIND, 0% CLOUD
GENERAL WEATHER NOTES: DRY THROUGHOUT		
LOCATION OF SURVEYOR	TIME	SPECIES
E/F	22:44	Myotis Sp.
Total pipistrelle passes: 67 Common Pipistrelle		

Table 10: Results of Activity Survey, 13 July 2015

DATE: 13/07/2015	START TIME: 21:30	WEATHER: 17°C, LIGHT WIND, 30% CLOUD
	END TIME: 00:30	WEATHER: 16°C, LIGHT WIND, 40% CLOUD
GENERAL WEATHER NOTES:		
LOCATION OF SURVEYOR	TIME	SPECIES
F	22:59	Greater Horseshoe
G	23:14	Greater Horseshoe
Total pipistrelle passes: 144 Common Pipistrelle 3 Soprano pipistrelle		

Table 11: Results of Activity Survey, 27 August 2015

DATE: 27/08/2015	START TIME: 20:10	WEATHER: 16°C, LIGHT WIND, 5% CLOUD
	END TIME: 23:14	WEATHER: 11°C, LIGHT WIND, 5% CLOUD
GENERAL WEATHER NOTES: DRY THROUGHOUT		
LOCATION OF SURVEYOR	TIME	SPECIES
D/E	21:24	Barbastelle
D/E	21:24	Barbastelle
E	21:34	Serotine
E	21:35	Lesser Horseshoe
F	21:42	Myotis Sp.
G	22:07	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:11	Myotis Sp.
G/H	22:12	Myotis Sp.
H/I	22:23	Myotis Sp.
N/O	22:58	Myotis Sp.
O/P	23:00	Myotis Sp.
P	23:09	Barbastelle
P	23:13	Barbastelle
Total pipistrelle passes: 97 Common Pipistrelle 14 Soprano pipistrelle		

Table 12: Results of Activity Survey, 2 September 2015

DATE: 02/09/2015	**START TIME**: 19:58	**WEATHER**: 13°C, LIGHT WIND, 10% CLOUD
	END TIME: 22:51	**WEATHER**: 11°C, LIGHT WIND, 40% CLOUD
GENERAL WEATHER NOTES: DRY THROUGHOUT		

LOCATION OF SURVEYOR	TIME	SPECIES
D	20:42	Greater Horseshoe
D/E	20:43	Greater Horseshoe
D/E	20:43	Greater Horseshoe
D/E	20:43	Greater Horseshoe
D/E	20:43	Greater Horseshoe
D/E	20:44	Lesser Horseshoe
D/E	20:44	Lesser Horseshoe
D/E	20:44	Lesser Horseshoe
D/E	20:44	Lesser Horseshoe
D/E	20:45	Greater Horseshoe
D/E	20:45	Greater Horseshoe
D/E	20:45	Greater Horseshoe
D/E	20:45	Greater Horseshoe
E	20:46	Myotis Sp.
E	20:48	Greater Horseshoe
E	20:49	Greater Horseshoe
E/P	20:57	Serotine
E/P	20:57	Serotine
E/P	20:57	Serotine
E/P	20:57	Serotine
P	20:58	Serotine
P	20:59	Serotine
P	21:03	Serotine
P	21:03	Serotine
P/O	21:04	Serotine
P/O	21:04	Serotine
P/O	21:04	Serotine
Po	21:04	Serotine
N	21:17	Serotine
N	21:17	Serotine
M	21:23	Serotine
I	21:36	Myotis Sp.
I	21:36	Myotis Sp.
I	21:42	Lesser Horseshoe
M	22:26	Myotis Sp.
M	22:26	Myotis Sp.

DATE: 02/09/2015	START TIME: 19:58	WEATHER: 13°C, LIGHT WIND, 10% CLOUD
	END TIME: 22:51	WEATHER: 11°C, LIGHT WIND, 40% CLOUD
GENERAL WEATHER NOTES: DRY THROUGHOUT		
LOCATION OF SURVEYOR	TIME	SPECIES
M	22:27	Myotis Sp.
M	22:27	Myotis Sp.
E	22:34	Myotis Sp.
Total pipistrelle passes: 81 Common Pipistrelle 11 Soprano pipistrelle		

Table 13: Results of Activity Survey, 30 September 2015

DATE: 30/09/2015	START TIME: 19:04	WEATHER: 14°C, STRONG WIND, 10% CLOUD
	END TIME: 22:50	WEATHER: 13°C, MODERATE WIND, 50% CLOUD
GENERAL WEATHER NOTES: DRY THROUGHOUT		
LOCATION OF SURVEYOR	TIME	SPECIES
M	21:17	Greater Horseshoe
M	21:17	Greater Horseshoe
M	21:23	Greater Horseshoe
M	21:23	Greater Horseshoe
L	21:36	Barbastelle
Total pipistrelle passes: 210 Common Pipistrelle		

Table 14: Results of Activity Survey, 6 October 2015

DATE: 06/10/2015	START TIME: 18:59	WEATHER: 15°C, LIGHT WIND, 50% CLOUD
	END TIME: 21:30	WEATHER: 14°C, LIGHT WIND, 100% CLOUD
GENERAL WEATHER NOTES: DRY WITH GUSTY WIND		
LOCATION OF SURVEYOR	TIME	SPECIES
H	19:21	Noctule
H	19:22	Noctule
G	19:34	Serotine
M	19:51	Serotine
M/P	19:53	Brown Long Eared
M/P	19:54	Serotine
P	20:03	Myotis Sp.
Total pipistrelle passes: 228 Common Pipistrelle 12 Soprano pipistrelle		

Appendix IV: RELEVANT LEGISLATION

Bats

All British species of bat and their places of breeding and shelter are protected under the Wildlife & Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended) from deliberate capture, injury and killing; intentional or reckless disturbance; intentional or reckless obstruction of access to any structure or place which any such animal uses for shelter or protection; and deliberate damage or destruction of a breeding site or resting place. This includes buildings and trees and applies throughout the year whether bats are present or not at the time of survey or work being carried out.

Although foraging areas and commuting routes are not afforded direct legal protection, the effects of development proposals on these are a material consideration in planning (NPPF and TAN5) and should be considered when assessing the impact of the proposal on the maintenance of favourable conservation status of bat species.

As protected species, bats are covered by NPPF, which states that the presence of a protected species is a material consideration when considering a planning application.

All bat species (except Pipistrellus pipistrellus) are listed on both the Habitats Directive 1992 (transposed by The Conservation of Habitats and Species Regulations 2010 (as amended)) and The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). The principal aims of the Convention are to ensure conservation and protection of wild plant and animal species and their natural habitats, to increase cooperation between contracting parties, and to regulate the exploitation of those species (including migratory species). The Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

There are 18 species of bat found in the UK (17 species are known to breed here) and all are included in the UK BAP. Seven species are listed as priority species; priority species are those that have been identified as being most threatened and in need of conservation. It should be noted that the identification of these seven bat species as priority species does not extend throughout Britain (seven are priority species in England and three are priority species in Wales).

Of the seven species identified as priority species, five also have specific SAPs, which aim to further encourage and help population numbers.

Abbreviations: BAP – Biodiversity Action Plan; SAP – Species Action Plan; NPPF – National Planning Policy Framework; TAN – Technical Advice Note.

Birds

In Britain all wild birds are granted legal protection under the Wildlife & Countryside Act 1981 (as amended). This legislation protects birds, their eggs, dependant young, and nests while being built or whilst in use.

Schedule 1 Bird Species

Schedule 1(1) of the Wildlife & Countryside Act 1981 (as amended) affords full protection to certain bird species. It is an offence to intentionally or recklessly disturb at or near an active nest of species on this list.

Birds of Conservation Concern

The bird species found in the UK, Channel Islands and the Isle of Man are assigned a red, amber or green category based on their conservation status:

Red List Species

Red List species are those that are globally threatened according to IUCN criteria; those whose populations or range has declined or contracted rapidly in the last 25 years by 50% or more; and those that have declined historically (between 1800 and 1995) and not shown a substantial recent recovery.

Amber List Species

Amber List Species are those with an unfavourable conservation status in Europe; those whose breeding population or range has declined or contracted moderately (25 – 49%) in recent years, or whose non-breeding populations have declined to a similar degree; those whose population has declined historically but made a substantial recent recovery; and those which are rare breeders or have internationally important or localised populations.

Green List Species

Species that fulfil none of the above criteria are green-listed.

Abbreviations: IUCN - International Union for Conservation of Nature

National Planning Policy References

Reference should be made to the following documents:

England

Department for Communities and Local Government (2012) National Planning Policy Framework Department for Communities and Local Government

ODPM (2005) Circular 06/05: Biodiversity and Geological Conservation – Statutory Obligations and Their Impact within the Planning System TSO

APPENDIX II: Invertebrate Scoping Survey

Invertebrate Scoping Study: Inglewood, Paignton, Devon

Bloody-nosed Beetle *Timarcha tenebricosa recorded at White Rock 20/4/2016*

Jon Mellings BSc (hons.), MCIEEM for Nicholas Pearson Associates, 2nd June, 2016

Contents

Summary

- During April 2016, an invertebrate habitat scoping study was undertaken in response to a planning application for a residential development within a 32-hectare site at White Rock, Paignton, Devon. The survey aimed to evaluate habitat and although species were recorded incidentally, no invertebrate sampling was undertaken during the survey;
- The footprint of the red-line area comprised agricultural land currently managed as livestock (cattle) pasture and for cereal crops and the field network was bordered by a network of predominately, mature hedgerows located on hedge-banks. Additional habitats on site included an area of mixed woodland and two eutrophic ponds;
- Neither the site itself, or land contiguous to it, supported sites subject to any statutory or non-statutory nature conservation designation. Whilst two statutorily designated sites are located within two kilometres of the site (Saltern Cove gSSSI and SSSI and Lyme Bay and Torbay cSAC), neither was designated for features relating to the habitats present within the survey area and neither site was designated for invertebrate fauna which could potentially be found on the survey area. However, a number of sites in the adjacent landscape, subject to non-statutory CWS and OSWI designations, support ancient woodland and other woody habitat complementary to habitat recorded within the survey area;
- On face-value, the site supported habitat of moderate potential conservation value for invertebrates; the mature hedgerow, mature and veteran hedgerow standards and associated hedgebank structure and flora and woodland edge habitat offered the greatest potential value as invertebrate habitat. Due to the age and structure of the majority of the hedgerows they can be considered irreplaceable;
- From evaluation of post-1990 species records from within a two kilometre radius of the survey area in relation to habitats recorded for the purpose of this study, it was considered that whilst the pastureland and arable fields comprising the site was of very low value, the hedgerow network provided potential habitat for species of conservation value historically recorded within the adjacent landscape including Brown Hairstreak *Thecla betulae*, a S41 'Species of Principal Importance' and the Nationally Scarce Jersey Tiger, both species have been recorded on a number of occasions within the adjacent landscape, as well as S41 White-letter Hairstreak *Satyrium w-album* and Wall *Lasiommata megera* butterflies and the pRDB3 'Rare' Bugle Marble *Endothenia ustulana*. Great Green Bush-cricket *Tettigonia viridissima* - a 'Priority Species' within the Devon LBAP, was the only designated species recorded within the red-line area itself;
- Due to the intensive management of the agricultural land within the survey area and lack of supporting habitat, it is considered that hedgerow scrub-edge and saproxylic assemblages of high conservation value would be unlikely to occur on site; however, surveys to investigate Brown Hairstreak would be recommended. Surveys to establish presence/absence of other S41 species such as White-letter Hairstreak and night-flying moth species are advised.
- Due to the irreplaceable nature of the existing hedgerow network and associated standards and their potential value for supporting invertebrate assemblages of conservation value, it is strongly recommended that integration and enhancement of the existing hedgerow network (for invertebrates) within any development proposal, is given serious consideration and that mitigation adequately compensates any loss through appropriate habitat creation and/or restoration and subsequent management.

Introduction

The following report details the findings of a scoping study to evaluate the conservation value of a 32-hectare area of mixed pasture and arable land located at White Rock, Paignton, South Devon in terms of its potential to support invertebrate assemblages. The survey was commissioned in response to a planning application relating to the construction of residential housing on the site.

At the time of survey, the land was still largely operational farmland with livestock (cattle) grazing occurring in a proportion of the fields.

The survey included a walkover and assessment of habitats on site on the 20th April, 2016. Whilst invertebrate species were incidentally recorded during the survey, no formal sampling was undertaken, the emphasis being placed primarily on invertebrate habitat.

Survey results are considered together with historic survey data from within a two-kilometre search radius of the site provided by Devon Biodiversity Records Centre (DBRC) and used to provide a baseline evaluation of the site's potential entomological value.

Aims and objectives

1) A scoping study to record the key invertebrate habitats and features of a parcel of land located southwest of the A3022, White Rock, Paignton, Devon;
2) A desk study/review of historic invertebrate records associated with the site and wider habitat[1];
3) Production of a report in which the findings of the above surveys would be presented;
4) The report would also include an indicative evaluation of the perceived conservation value of the site based on habitat and recommendations for further survey if the site is found to exhibit potential to support important invertebrate assemblages and/or species;
5) Invertebrate sampling (other than incidental recording) would not be undertaken for the purpose of the scoping study; however, further, detailed surveys may be specified pending the findings of the scoping visit.

Aim

The main aim of the survey was to scope the potential conservation value of invertebrate habitat and and features of a parcel of land located southwest of the A3022, White Rock, Paignton, Devon. The findings will inform a proposal to locate a residential housing development within an area currently supporting mixed agricultural land.

Objectives

1. To assess the potential conservation value of the survey area for invertebrates, both on a within site and wider landscape context;

[1]Costing does not include provision for a local records centre data-search it is expected that Nicholas Pearson Associates would provide this prior to the site visit. If it is required for a data-search to be commissioned by Jon Mellings for the purpose of this project, this would be added to the cost of this quotation

2. To conduct baseline invertebrate surveys using appropriate standard techniques as described in Natural England Research Report NERR005 (Drake *et al*, 2007);
3. To produce a report including findings/species lists, an evaluation of key habitat and species assemblages and an appraisal of the conservation value of the site for invertebrates;
4. Provide brief recommendations in terms of further survey requirements, potential development constraints and mitigation opportunities.

Method

Desk study

Existing information pertaining to the invertebrate fauna of the site was reviewed. Reference material including citations of statutory and non-statutory nature conservation sites within close proximity to the proposed development were consulted as was site-specific data provided by the local biological records centre for the purpose of this project. Site specific record centre data was provided by the Client for the purpose of the project.

Field survey

Habitat Scoping

The site visit was undertaken during generally warm, sunny weather between the hours of 10.30 am and 5.00pm on 20th April, 2016. The survey area (red line area) was walked and key habitat features supporting or beneficial to key invertebrate assemblages/species were recorded using geo-referenced target notes (a hand-held Garmin Etrex was used to record locations). Particular emphasis was placed on habitat features important to S41 species and other species of note which have been recorded within the locality. Due to the perceived low value of improved agricultural land, the survey focused primarily on the network of hedgerows and associated margins. Details of vegetation composition and structure were recorded within the target notes, to add resolution to the potential of the site to support invertebrate species with a known affinity to a particular food-plant.

A small number of readily identifiable Invertebrate species seen during the survey were recorded, however, these records can by no means be used as a means of assessing the value of the site in their own right, the recorded species largely including more obvious species that may or may not be of value as habitat indicators.

Data analysis

No formal data analysis was undertaken for the purpose of the current project, however, all recorded species were entered into an Excel spreadsheet and the conservation status of each species was checked using available materials such as the Taxon Designation Spreadsheet (available from the JNCC website) and various published taxon-specific atlases and reviews; Hyman and Parsons (1992) for example.

Limitations

- This report is essentially a scoping study. Findings are based on a review of local record centre data-search and on the findings of a single visit survey which aimed to assess invertebrate habitat potential only. Whilst some species were recorded incidentally during

the survey, these records cannot be seen as providing a representative cross section of species potentially occurring on site. From assessment of the habitat present on site it is possible to reasonably evaluate the site's potential value for invertebrates, however, there is no guarantee that rare, uncommon or designated species are not present on the site.

- The DBRC data-search provides background information on certain species or species groups which have been recorded historically within a two kilometre radius of the site. However, certain records held by groups such as those held by the county invertebrate recorders may not be represented within the dataset.

Results

Adjacent Landscape and site and landscape level conservation designations

Habitat lying adjacent to the site to the south and west is mainly of a similar nature to the habitat within the red-line area, comprising a network of fields managed for a mixture of arable and livestock farming, with fields enclosed within a network of established hedgerows. The landscape immediately to the east is mainly residential; the A3022 Brixham Road, borders the site boundary. To the north, the site is under development and there are existing light industrial units. The south Devon coast lies within approximately one kilometre of the site's eastern boundary.

There are several blocks of woodland within the general landscape including an area just outside the red-line to the south of the site.

Sites subject to statutory nature conservation designations

The site within the red-line area is not itself subject to any statutory or none statutory conservation designations and there are no designated conservation sites immediately bordering the site. The following sites subject to statutory conservation designations within a two kilometre radius of the site are as follows: (see also data-search results in Appendix 1, Table 1)

Lyme Bay and Torbay cSAC – Occupying 31468 hectares, this candidate SAC comprises a mosaic of two areas containing extremely diverse reef habitats, comprising many geological and topographical forms, and nationally important sea caves. No Annex 2 species are listed as features for the SAC.

Saltern Cove SSSI – Designated for its geological importance and for supporting a diverse intertidal fauna and flora including communities characteristic of both sediment and rocky shores. Invertebrates listed in the SSSI include marine assemblages only.

Non-statutory nature conservation sites

A number of sites subject to non-statutory nature conservation designations are located within the two kilometre search radius of the site. Details of these are included in Appendix 1, Table 1.

The habitats of potential importance for invertebrates are considered in the discussion and evaluation sections below.

Historic invertebrate records of higher conservation value

Historic invertebrate records provided as part of a data-search by Devon Biodiversity Records Centre (DBRC) to inform the project were, with four exceptions (two dragonflies, a bush-cricket and a cave shrimp), limited to records of butterflies and moths (Lepidoptera) recorded within a two-kilometre

radius of the site. Other than five records (all moths) from 1966, all records were from post 1989. (See Appendix 1, Table 2).

International Protected Species
Marsh Fritillary *Eurydryas aurinia* is listed under Annex IIa of the EU Habitats Directive and Under Appendix II of the Bern Convention.

UK Protected Species
Marsh Fritillary *Eurydryas aurinia* receives full protection under the Wildlife and Countryside Act (1981 as amended). See entry under NERC Act Section 41 species for details of record.

Brown Hairstreak *Thecla betulae* and White-letter Hairstreak *Satyrium w-album* both receive protection 'for sale only' under Section 5 of the Wildlife and Countryside Act (1981 as amended).

NERC Act (2006) Section 41 'Species of Principal Importance'
36 of the historically recorded species are listed as 'Species of Principal Importance' within Section 41 (England) of the Natural Environment and Rural Communities Act (NERC Act), 2006. Seven of the S41 species have been prioritised for conservation in England and include the following species:

Note: Some of the below species are also Red Data Book species based on either pre- 1994 post-2001 IUCN criteria. The statuses of these species are indicated where applicable.

British Cave Shrimp *Niphargus glenniei*

The British Cave Shrimp is thought to be an endemic British species, first discovered in 1948 in Pridhamsleigh Cave, near Buckfastleigh, Devon. Until 2000, its known distribution was thought to be Devon, where it has been recorded widely in caves in Devonian limestone, flooded river gravels, a well, two springs and several mines around the edge of Dartmoor. In 2000 it was recorded in West Cornwall and has since been found in several wells as far east as Falmouth. (Knight, L., 2007. Cave Life in Britain, Freshwater Biological Association https://www.fba.org.uk/sites/default/files/Cave%20Life%20in%20Britain.pdf)

Besides its S41 status, British Cave Shrimp is listed as RDBK (insufficiently known) using pre-1994 IUCN criteria. There are two 2012 records for the species within the two kilometre search radius of the White Rock site; one record is specified as being from a spring in Yalberton Valley and Lower Yalberton Cave Nr Paignton. Both records are from approximately 1.8 kilometres of the site.

Small Pearl-bordered Fritillary *Boloria selene*

Small Pearl-bordered Fritillary is associated with damp clearings in broad-leaved woodland and also, in coastal habitat in southwest England, where butterflies occur in areas of Bracken *Pteridium aquilinum* over coastal grassland. Larval foodplants include Common Dog Violet *Viola riviniana* and Marsh Violet *V. palustris*. The butterfly has a largely western distribution in the UK with a number of records from south Devon. Small Pearl-bordered Fritillary is a priority species under S41 in England, due to a recorded decline. Small Pearl-bordered Fritillary is also listed as 'Near Threatened' under Post-2002 IUCN criteria.

One record was found within the two kilometre search radius. This record from 2000 was from approximately 0.85km north of red line area at Vogwell Farm.

Marsh Fritillary *Euphydryas aurinia*

Marsh Fritillary is associated with three main habitat types in the UK: Chalk grassland, damp, tussocky grassland and shorter coastal grasslands. The main larval foodplant is Devil's-bit Scabious *Succisa pratensis*, but Field Scabious *Knautia arvensis* and Small Scabious *Scabiosa columbaria* are occasionally used. There are few coastal records in the Torbay area, with most south Devon records being from some-way inland from the survey area.

Within the two kilometre search area, Marsh Fritillary was recorded once in 2000, approximately 0.85km north of red line area at Vogwell Farm.

Wall *Lasiommata megera*

Formerly common throughout much of the UK, the Wall has suffered a severe decline of inland populations in recent decades and the remaining populations are largely associated with unimproved grassland habitats, wasteland, cliff-edges and hedgerows near the coast. The larvae feed on various coarse grasses including common species such as Cock's-foot *Dactylis glomerata* and Yorkshire Fog *Holcus lanatus*.

There are two post 1990 records for Wall within the search area; in 2009 the butterfly was recorded approximately 1.7km north of red line area at Clennon Hill and in 1999 approximately 1.4km north of the site at Clennon Valley.

White Admiral *Limenitis camilla*

White Admiral is largely a species of broadleaved woodland, but can also be found in conifer plantation woodlands where there is an abundance of the larval foodplant Honeysuckle *Lonicera periclymenum.* White Admiral has declined somewhat in recent decades, having undergone a slight range expansion. There are few coastal records in the survey area, most local records being from inland sites in and around Dartmoor.

There is one, post 1990, record for White Admiral; in 2009 it was recorded approximately 1.4km north of the red line area at Clennon Valley.

White-letter Hairstreak *Satyrium w-album*

White-letter Hairstreak is associated with Elms *Ulmus* spp. Including English Elm *Ulmus procera*, Wych Elm *U. glabra* and Small-leaved Elm *U. minor*. The butterfly is associated with sheltered hedgerows, mixed scrub and woodland rides and may also be found on mature isolated elms. The UK population of White-letter Hairstreak is estimated to have declined by 53% since the 1970s, hence being listed as Red Data Book 'Endangered' under post-2001 IUCN criteria and listed as a priority species in S41. The species has been recorded from most 10km grid squares in South Devon within the vicinity of the survey area.

There is a single post-1990 record for White-Letter Hairstreak. In 2010 the butterfly was recorded approximately 1.2km north of the red line area at Clennon.

Brown Hairstreak *Thecla betulae*

Brown Hairstreak is mainly associated with hedgerows supporting the larval foodplant Blackthorn *Prunus spinosa*, where the hedgerows have not been regularly managed by flailing. Hedgerows with Blackthorn scrub edge persisting into the hedge margin are particularly favoured. South Devon is one of the UK strongholds of Brown Hairstreak. The species is estimated to have declined in the UK by 43% since the 1970s, hence its inclusion as a NERC S41 priority species. Brown Hairstreak is also listed as Red Data Book 'Vulnerable' under post-2001 IUCN criteria. There are several post-1990 records from the two kilometre search radius as follows.

Recorded twice in 2000 within 0.8km of the red line area at Christow and approximately 0.85km north of red line area at Vogwell Farm;

In 1995 the butterfly was recorded twice; approximately one kilometre east of the survey area at Goodrington and from Broadsands, 1.2km from the site;

There are three 1994 records, including two from Clennon Valley 0.75km northeast and 1.3km north of the red-line area and one from Elberry Cove, 1.9km southeast of the site.

'Research only' S41 species

The remaining 29 S41 species recorded within a 2km radius of the survey area, all moths, were included within S41 for 'research only', due to a recorded decline in the UK over recent decades. Four of the 'research only' species are considered to be of 'local' distribution whilst the remaining 25 species are still widespread and common in the UK.

Recorded 'research only' S41 species are listed as follows

Four local moth species listed under S41 'for research only' included:

August Thorn *Ennomos quercinaria*

Galium Carpet *Epirrhoe galiata*

Small Emerald *Hemistola chrysoprasaria*

Mullein Wave *Scopula marginepunctata*

The 25 widespread and common moth species listed under S41 'for research only' were as follows:

Grey Dagger *Acronicta psi*

Knotgrass Acronicta rumicis

Flounced Chestnut *Agrochola litura*

Beaded Chestnut *Agrochola lychnidis*

Green-brindled Crescent *Allophyes oxyacanthae*

Mouse Moth *Amphipyra tragopoginis*

Garden Tiger *Arctia caja*

Centre-barred Sallow *Atethmia centrago*

Mottled Rustic *Caradrina morpheus*

Small Square-spot *Diarsia rubi*

Small Phoenix *Ecliptopera silaceata*

Dusky Thorn *Ennomos fuscantaria*

Rustic *Hoplodrina blanda*

Rosy Rustic *Hydraecia micacea*

Dot Moth *Melanchra persicariae*

Pretty Chalk Carpet *Melanthia procellata*

Rosy Minor *Mesoligia literosa*

Powdered Quaker *Orthesia gracilis*

Large Wainscot *Rhizedra lutosa*

White Ermine *Spilosoma lubricipeda*

Buff Ermine *Spilosoma luteum*

Hedge Rustic *Tholera cespitis*

Blood-vein *Timandra comae*

Cinnabar *Tyria jacobaeae*

Dark-barred Twin-spot Carpet *Xanthorhoe ferrugata*

Species listed within the UK Red Data Book and as Nationally Scarce in the UK

Red Data Book (RDB) species
The following four post-2000 records of UK Red Data Book species (using pre 1994 IUCN Red Data Book criteria) were recorded within a two kilometre radius of the survey area:

British Cave Shrimp *Niphargus glenniei* (discussed under S41 above)

Beautiful Gothic *Leucochlaena oditis*

Beautiful Gothic is confined in the UK to the western half of the south coast of England. The species is associated with 'grassy cliffs and well-drained, south-facing slopes by the sea'. (Waring and Townsend, 2003). The larvae feed on various grasses. Beautiful Gothic was recorded within approximately one kilometre southeast of the site at Broadsands in 2005. Beautiful Gothic is classed as RDB3 (Nationally Rare) under pre- 1994 IUCN Red Data Book criteria.

Bugle Marble *Endothenia ustulana*

Bugle Marble, a species of micromoth, is found mainly in the southern half of the UK. According to Sterling and Parsons (2012) It is associated with damp, open woodland, hedge-banks, waste-ground, gardens, where the foodplant Bugle *Ajuga reptans* and associated cultivars grow. Bugle Marble was recorded in 2008, approximately 1.9km southeast of the site at Elberry Cove. Bugle Marble is a proposed RDB3 Nationally Rare species.

Bloxworth Snout *Hypena obsitalis*

Bloxworth Snout is a recent colonist to the UK and is confined to coastal habitats in southwest England, where it occurs on south-facing cliffs and associated habitats. The larva feeds on Pellitory-of-the-wall *Parietaria officinalis*. There are two, post-1990 records of Bloxworth Snout within the two kilometre search radius; the moth was recorded within approximately one kilometre southeast of the site at Broadsands in 2005 and 1.9km northeast at Clennon Valley in 2008-2009. Bloxworth Snout is listed as RDBK 'Unknown'.

Post 2001 IUCN criteria RDB species
The following six UK Red Data Book species (following post 2001 IUCN Red Data Book criteria) were recorded post-2000, within a two kilometre radius of the survey area (Note: All species are described under S41 above.)

Small Pearl-bordered Fritillary *Boloria selene* – Near Threatened

Marsh Fritillary *Euphydryas aurinia* - Vulnerable

White Admiral *Limenitis Camilla* - Vulnerable

White-letter Hairstreak *Satyrium w-album* - Endangered

Brown Hairstreak *Thecla betulae* – Vulnerable

Wall *Lasiommata megera* – Near Threatened

Nationally Scarce species
Nationally Scarce species (former Notable A and B categories) recorded within a two kilometre radius of the survey area:

Barrett's Marbled Coronet *Hadena luteago barrettii*

Barrett's Marbled Coronet is a predominately coastal species in the UK, being confined to the south and north coasts of Devon and Cornwall in England and in Wales, Carmarthenshire and Pembrokeshire coasts. It is mainly associated with coastal cliffs and shingle beaches. The moth's recorded larval foodplants include Sea Campion *Silene uniflora*, Rock Sea-spurrey *Spergularia rupicola* and Sand Spurrey *Spergularia rubra*. Barrett's Marbled Coronet was recorded at Broadsands in 2005, approximately one kilometre southeast of the site.

Devonshire Wainscot *Mythimna putrescens*

Devonshire Wainscot is a Nationally Scarce (Notable a) species restricted to southwest England. Larval foodplants include unspecified grasses. It is primarily associated with the warm micro-habitats

including coastal cliffs and grasslands. Waring and Townsend (2003) stated that the species 'Does not appear to wander inland'.

Devon Wainscot was recorded in 1995 within 0.25km of the red-line area at Hookhills and in 2005 at Broadsands, approximately one kilometre away.

Webb's Wainscot *Archanara sparganii*

A Nationally Scarce (Notable b) species mainly found along the south and east coasts of England. The larval foodplants of Webb's Wainscot include Reedmace (Bulrush) *Typha* spp.and it occurs in various, predominately open wetland habitat where plants of this genus are present.

Webb's Wainscot was recorded from 1995-2000 at Hookhills, within 0.25km of the red-line area.

Orange Footman *Eilema sororcula*

Orange Footman is listed as Nationally Scarce (Notable b) in the data-search[2]. It is a local species associated with areas of more mature oak *Quercus* and beech *Fagus* woodland. The species also occurs in dense, mature Blackthorn *Prunus spinosa* scrub. (Waring and Townsend, 2003).

Orange Footman was recorded in 2012 approximately 1.2km north of red-line area within the Paignton Zoo Nature Trail and in the same year from 1.6km north of the site at Paignton Zoo.

Jersey Tiger *Euplagia quadripunctaria*

Jersey Tiger is largely confined to and area of southwest England centred in South Devon, where it is relatively common, despite being classed as Nationally Scarce (Nb) in the UK as a whole. It is associated with a range of rough and disturbed grassland habitats and hedgerows. The larvae feed on Common Nettle *Urtica dioica* and a range of other species. There are a number of post-2000 Jersey Tiger records from within two kilometres north and south of the site; the most recent records are from 2009, when the moth was recorded 1.4km north of the site at Paignton Zoo and 1.7km north of the site at Clennon Hill.

Kent Black Arches *Meganola albula*

Kent Black Arches is a Nationally Scarce (Notable b) species mainly found along the south and east coasts of England. Larval foodplants include Dewberry, Bramble, Raspberry and Wild Strawberry. It is associated with coastal heathland, saltmarshes, shingle and sandy beaches as well as inland on chalk downland and open areas in woodland (Waring and Townsend, 2003).

In 2000 Kent Black Arches was recorded within 0.25km of the red-line area at Hookhills.

L-Album Wainscot *Mythimna l-album*

In mainland UK, the L-album Wainscot is a confined to the south coast of England where it occurs between Cornwall and Dungeness. The moth's habitat is described by Waring and Townsend (2003)

[2] Orange Footman is not currently listed as Nationally Scarce within the UK Taxon Designations spreadsheet or within the NBN gateway.

as 'rough grassland by the sea, particularly near cliff edges'. The larvae are known to feed on Marram *Ammophila arenaria* and probably Tall Fescue *Festuca arundinacea* and other grasses.

The moth was recorded between 2008-2009 within 1.9km northeast of the red line area at Clennon Valley.

Ruddy Darter *Sympetrum sanguineum*

Ruddy Darter is listed in the data-search as Nationally Scarce (Nb); however, this species has long been de-listed from this status due to a significant range expansion, it is now recorded in England from most 10km grid squares in the north Midlands southwards. The species is, however, listed as a Regionally Important Key Dragonfly Species in Devon. Ruddy Darter is listed in the Lower Risk – Least Concern category using post 2001 IUCN criteria.

Other species of note: Devon LBAP; Devon Rare and Scarce categories; incidental species:
Great Green Bush Cricket *Tettigonia viridissimma*

Great Green Bush-cricket *Tettigonia viridissima* was listed as a 'priority species' within the Devon LBAP. The species is primarily associated with coastal habitats in the southern half of the UK. It is a common species within its range and is associated with a variety of habitats including grassland, heathland and brownfield sites. It is frequently associated with Bramble scrub and hedgerows.

Great Green Bush-cricket was recorded in 2000 from a residential area approximately 1.2km north of the red-line area. The species was also recorded within the White Rock survey area during a survey by Ecosulis Ltd in 2010.

Keeled Skimmer *Orthetrum coerulescens* (KeyD (N))

Rather locally distributed in the UK, being most commonly found in south-west UK. Keeled Skimmer is still a common species within its range and is far more widespread than a species classed as Nationally Scarce in the UK, but is listed as a Nationally Important Key Dragonfly Species. Meaning that it occurs in less than 10 percent of the UK's 10km grid squares.

Keeled Skimmer was recorded in 1995 from within 1.9km of the site at Clennon Ponds.

Swallowtail *Papilio machaon*

The British subspecies of the Swallowtail *Papilio machaon brittanicus* is more or less confined to the East Anglian fens in the UK. The recorded specimen is likely to be of the European race being an incidental migrant from Europe or an escaped captive-bred individual.

Native Swallowtail *Papilio machaon brittanicus* receives full protection under schedule 5 of the Wildlife and Countryside Act (1981 as amended) and as the East Anglian population of this species is considered to be stable, it is classed as 'Near Threatened' under IUCN post 2001 criteria.

This butterfly was recorded in 2007, approximately 1.2km north of the red-line area within the Paignton Zoo Nature Trail.

Results of an invertebrate survey conducted by Ecosulis Ltd (August-October, 2010).

An invertebrate survey conducted within the White Rock survey area in 2010 as part of a baseline ecological survey by Ecosulis Ltd. During this survey a species of micromoth formerly classed as Red Data Book (RDB3) 'Rare' in the UK, the Chestnut Pigmy Moth *Stigmella samiatella* was recorded (the species has now been subject to a sttus revision due to an increasing number of UK records). The other significant record was for Great Green Bush-cricket *Tettigonia viridissima*, listed as a Devon LBAP species.

2016 Survey

Survey Area

The area covered by the survey is outlined in Appendix 2, Figure 1 which also indicates approximate positions of habitat-specific target notes (A corresponding Target Note (TN) table is included Appendix 1, Table 3).

General habitat

The White Rock survey area as defined within the red-line area (Appendix 2, Figure 1), occupied an area of approximately 32 hectares and comprised four fields managed as agricultural arable pasture and meadowland and a further two fields managed for arable crops (one under wheat, the other recently ploughed at the time of survey). Part of the site was grazed by cattle at the time of survey. The site's grasslands were of low conservation value in general terms and as potential invertebrate habitat, being improved and generally herb-poor.

The northernmost field in the survey area had been recently planted with a range of native broadleaves and ornamental (non-native) conifers (Appendix 3, Photograph 1).

The fields were separated by a network of native hedgerows; the hedgerows for the most part occupied hedge-banks and supported mainly native woody species together with mature standards. The hedgerow habitat and associated field margins, where present, provided the highest potential for invertebrate habitat on site and therefore became the primary focus of the survey and report.

Complementary to the hedgerows, a small mixed woodland at the southern boundary of the red-line area (see TN15 and Photograph 2) provided additional potential invertebrate habitat; however, the woodland other than its boundary lay outside of the red-line area.

Two small ponds were recorded during the survey (see TN's 8 and 11; Photographs 3 and 4 respectively).

Hedgerows

The hedgerows occupied hedge-banks typical of those historically enclosing field systems in Devon. The majority supported mature, woody growth with typical hedgerow species including Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna* being most abundant, with other low growing woody species including English Elm *Ulmus procera,* Sallow/Goat Willow *Salix cinerea/caprea*, Elder *Sambucus nigra*, Hazel *Corylus avellana* and Holly *Ilex aquilinum*.

A number of hedgerows supported mature and occasionally veteran broadleaved trees. Ash *Fraxinus excelsior* was the most frequently recorded standard, with Pedunculate Oak *Quercus robur* and less commonly Sycamore *Acer pseudoplatanus*. Two veteran Beech *Fagus sylvatica* standards were recorded in the southern boundary of the northernmost field (TN4). Sapling Ash *Fraxinus excelsior* and Sycamore *Acer pseudoplatanus* also contributed to the lower woody growth of some of the hedgerows. Scrub species including Bramble *Rubus fruticosus* agg. (an important resource for invertebrates), Old Man's Beard *Clematis vitalba* and Black Bryony *Tamus communis* as well as abundant Ivy *Hedera helix*, another important forage species. Wild Madder *Rubia peregrina*, a species strongly associated with coastal biotopes was also recorded amongst the hedgerow woody species.

The encroachment into the field margins of woody growth, notably Blackthorn *Prunus spinosa* from some of the hedgerows suggested that these had not been managed recently (Photograph 5 and 6). Other hedges with more linear margins may be subject to flaying (see Photograph 7).

The woodland-associated groundflora varied in terms of composition and structure over the site as a whole. Several ancient woodland indicator species (also associated with old hedgerows) were recorded including native Bluebell *Hyacinthoides non-scripta,* which occurred on the banks of a number of hedges and species such as Ransoms *Allium ursinum* and Wood False Brome *Brachypodium sylvaticum* (see Photograph 8). Other characteristic hedgerow herbs recorded on hedge-banks included Lesser Celandine *Ranunculus ficaria,* Primrose *Primula vulgaris,* Common Dog Violet *Viola riviniana,* Sweet Violet *V. odorata,* Dog's Mercury *Mercurialis perennis,* Ground Ivy *Glechoma hederacea*, Red Campion *Silene dioica*, Hedge Bedstraw *Galium mollugo*, Stinking Iris *Iris foetidissima,* Herb Robert *Geranium robertianum*, Shining Crane's-bill *Geranium lucidum* and Wood Avens *Geum urbanum*.

Most of the individual hedgerows are described under target notes (see Appendix 1, Table 3, TNs 2,3,4,6-10,12,13,16,17 and 18).

The adjacent grassy margins, where present, were generally herb-poor and dominated by few species (See Photograph 9 and 10). Coarse grasses such as Cock's-foot *Dactylis glomerata*, Yorkshire Fog *Holcus lanatus* and False Oat Grass *Arrhenatherum elatius* were often co-dominant and of the herbs, Dandelion *Taraxacum officinale* (agg.) was sometimes one of only a few herbs present; however, Dandelion provides an important nectar resource for solitary and social bee species as well as bees and beetles. Examples of other flowering herbs beneficial to invertebrates recorded within the field margins included Germander Speedwell *Veronica chamaedrys*, Creeping Buttercup *Ranunculus repens,* Common Bird's-foot Trefoil *Lotus corniculatus*, Ribwort Plantain *Plantago lanceolata,* White Clover *Trifolium repens,* Hogweed *Heracleum sphondylium,* Common Ragwort *Senecio jacobaeae* and Teasel *Dipsacus fullonum*.

Wood decay habitat

Wood decay habitat important for supporting saproxylic invertebrate assemblages was present to some extent within the more mature and veteran standards and in general within the woody growth of the hedgerows (Photograph 11). Evidence of saproxylic species mainly included bore-holes of beetles from families including longhorn Beetles (Cerambycidae) wood-boring beetles (Anobiidae) and bark beetles (Scolytidae - now Curculionidae). These species being mainly associated with bark and sapwood decay assemblages (See Photograph 12).

There was no clear evidence of heartwood decay assemblages associated with tree hollows and red rot, although some of this resource was potentially present within older standards in particular. Besides the hedgerows, the woodland area at the site's southern border also offered a reasonable wood decay resource. Habitat at the margin of this wood on the hedgebank offered some potential habitat for saproxylics and beetle holes were recorded in this location; however, much of the woods interior was rather heavily shaded and therefore suboptimal.

Wetland habitat

The two small ponds recorded within the site were only sparsely vegetated and evidently degraded through nutrient enrichment and the impacts of eutrophication. The pond described in TN8 was heavily shaded by the hedgerow vegetation, was heavily silted and supported no noticeable aquatic, emergent or marginal vegetation; the second pond (TN11) was more open and supported some macrophyte vegetation including Floating Sweet Grass *Glyceria fluitans* and Brooklime *Veronica beccabunga* and was partially overshaded by Sallow *Salix cinerea* and Ash *Fraxinus excelsior.* This pond deepened gradually from shallow margins and was subject to cattle poaching.

Incidental invertebrate species recorded in 2016

As the survey was essentially an invertebrate habitat scoping exercise rather than an invertebrate species survey, invertebrate species were recorded incidentally only during the survey. Whilst some of the species recorded may in some instances help illustrate the kinds of assemblage present, it is not possible to adequately assess the true value of assemblages based on these records alone.

The 40 species recorded incidentally during the scoping study are listed in Appendix 1, Table 4. The majority of the species recorded were broadly classified within Invertebrate Species-habitat Information System (ISIS) (see synopsis in Lott, 2008) within two broad classifications: The F2- Grassland and scrub matrix and the F1 – Unshaded early successional mosaic assemblages. Five of the remaining species were classed within wetland assemblages including W3- Permanent wet mire and W1 – Flowing water.

None of the species were UK/European protected species and no rare or uncommon species or species subject to classification within Schedule 41 of the NERC Act (2006) were recorded. However, several species of solitary bee of the mining bee genus *Andrena* and mason bee *Osmia* as well as social bumblebees *Bombus* spp, these species together with the common hoverflies a bee-fly, butterflies such as Small Tortoiseshell *Aglais urticae* and Peacock *Inachis io* being associated with early flowering hedgerow herbs and in particular, especially in the case of the mining bees, the resource of flowering Blackthorn *Prunus spinosa* and willow *Salix* spp.

Discussion

Landscape context

The site is located within an area historically managed for agriculture and within close proximity to the coast. It is also subject to the influence of the built environment of Torbay and Paignton. Whilst no part of the survey area is subject to either a statutory or non-statutory nature conservation designation, both a candidate SAC and a SSSI lie within a two kilometre radius of the site and a number of none statutory sites of importance sites designated variously as County Wildlife Sites

(CWS), Other Sites of Wildlife Interest (OSWI), Unconfirmed Wildlife Sites (UWS) and Local Nature Reserves (LNR) also occur within a two kilometre radius of the site.

Of the sites subject to statutory designation within a two kilometre radius of the site, neither of the sites is designated primarily for its invertebrate fauna and whilst invertebrates are mentioned within the Saltern Cove citation, they are mentioned within the context of intertidal assemblages. Similarly, the Lyme Bay and Torbay cSAC is made up of 'a mosaic of two areas containing extremely diverse reef habitats, comprising many geological and topographical forms, and nationally important sea caves', and is does not therefore support habitat of a similar nature to the survey area.

Of the non-satutory sites, 12 of the 13 CWS sites occurring within two kilometres of the site are listed as supporting broadleaved woodland and or scrub habitat. Such habitats comprise woody species of structure and composition analogous to that of native hedgerows and therefore, share an affinity to habitat within the site. In addition to the CWS, six UWS and 12 OSWI located within the two kilometre woody habitat analogous to hedgerows, these sites variously supporting habitats including broadleaved woodland, orchards, scrub and hedgerow habitat.

Collectively, these sites increase the potential value of broadleaved woodland, hedgerows and scrub habitats for invertebrate species occurring in metapopulations[3] on a landscape scale. Species such as the Brown Hairstreak *Thecla betulae*, which requires relatively unmanaged scrub, woodland edge or hedgerow habitat supporting Blackthorn *Prunus spinosa* are more likely to persist in a landscape where there is a strong resource of the foodplant occurring in suitable conditions.

In terms of general habitat, the coastal grassland sites of the south Devon coast as well as associated soft cliffs and littoral habitats are known to support specialist invertebrate assemblages which include species of very restricted range in the UK. Certain of the terrestrial species are restricted by foodplant and others by climatic factors. The likelihood of terrestrial species with a strong affinity to coastal habitats persisting as far inland as the survey area varies between species; examples of these are discussed under species below.

Habitat recorded on site

Improved grassland and arable land

The open grassland pasture and arable land comprising the bulk of the survey area was generally of low conservation value. The pasture was generally improved and supported a low diversity and abundance of flowering herbs. The most abundant flowering herb at the time of survey was Dandelion *Taraxacum officinale* agg., which was most abundant in the northernmost field on site which was planted with small trees. Dandelion can provide a valuable nectar resource for a variety of insects, however, it is found universally.

Hedgerow and associated habitat

The site supported a network of mainly mature hedgerows supporting a range of broadleaved woody species including mature and some veteran standards mainly of Ash *Fraxinus excelsior* and

[3] A metapopulation is a population perceived to exist as a series of subpopulations, linked by migration between them (Begon *et al*, 1986)

Pedunculate Oak *Quercus robur*. The hedgerows were characterised by hedgebanks and the collective features of maturity and hedgebanks suggested these to be long established.

Mature hedgerows such as those on site can provide important habitat for invertebrates in terms of structure, as foodplants and as a nectar resource. The dominant hedgerow species on site Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna* in particular provide a valuable nectar resource from early spring (Blackthorn) to early summer (Hawthorn). Some of the hedgerows on site were structurally of greater potential value as a result of having not been intensively managed in recent years, however, the majority of hedges had evidently been managed by flailing.

Whilst there was little fallen deadwood, the more mature hedgerow sections and standard trees provided a wood decay resource and evidence of saproxylic species was recorded in the form of beetle exit holes. Invertebrates associated with sapwood and barkwood decay habitat are generally found in any habitat where mature trees and other woody species are present, however, the rarity value of such assemblages can vary considerably and is likely to be lower in a habitat with a history of more intensive management, especially where pesticide sprays have been used regularly.

No clear evidence was apparent from the survey of an extensive heart-rot resource, such habitat develops within the hollowed, decayed areas of mature and veteran trees and is more obvious when hollows are evident externally. Saproxylic invertebrate assemblages associated with heart rot can be of high conservation value, however, particularly diverse saproxylic assemblages tend to occur in areas with a long history of unintensive management, such as wood pastureland and in field boundaries which have not been subject to the pressures of intensive agricultural management.

The woodland area bordering the southern border of the red-line area supported a reasonable resource of fallen and standing wood decay habitat, and there were signs of saproxylic activity mainly of bark and sapwood decay species and little heart rot habitat was evident. The habitat was also generally sheltered and the composition of the wood itself suggested it was not ancient in the accepted sense; although it could have been mixed woodland planted on the site of original ancient woodland. Ancient woodlands especially with a long and consistent management history, tend to be most valuable for invertebrates.

Wetland habitat

The two ponds recorded on the site added some habitat variation to the site and provided potential breeding habitat for invertebrate species capable of persisting in anoxic (oxygen deprived) water, as a result of nutrient enrichment from agricultural runoff. Whilst examples of aquatic larvae of hoverflies of the genus *Eristali*s, non-biting midges *Chironomidae* and other taxa capable of persisting in anoxic conditions almost certainly persist within these waterbodies, the lack of structural diversity and poor water quality would be prohibitive to an extensive invertebrate fauna. The fallen wood decay habitat associated with the more open pond, may provide niches for bark and sapwood decay invertebrates and species and more saturated wood can support specialist craneflies (Tipulidae), hoverflies (Syrphidae), however, this resource is limited on a landscape scale.

Species context

Records within the two kilometre search area included a number of nationally rare and scarce invertebrate species as well as species listed as ‘Species of Principal Importance’ under Section 41 of the NERC Act (2006) and species listed under various county level designations. The site itself has

received little survey attention and the site itself is unlikely to have received extensive attention from recorders historically due to the site being inaccessible to the public.

The few records available for the site itself include mainly common and widespread species recorded during a preliminary invertebrate survey conducted by Ecosulis in 2010. Being a preliminary survey, the species was not comprehensive with only 48 species recorded from direct searching, rather than by using more targeted survey methods.

The likelihood of historically recorded species of note occurring within the survey area depends on a number of factors. Several of the species of greater conservation interest listed within the data-search are known to be strongly linked to coastal cliff habitat and therefore, unlikely to occur on site due to the lack of the requisit, specialised specialist features. Similarly, the site has very limited potential to support species associated with grasslands or heathland biotopes of higher conservation value.

Species recorded within the two kilometre search area of the site unlikely to be supported by the habitats present

The RDB3 'Rare' Beautiful Gothic *Leucochlaena oditis*, RDBK 'unknown' Bloxworth Snout *Hypena obsitalis* and Nationally Scarce Barrett's Marbled Coronet *Hadena luteago barrettii*, Devonish Wainscot *Mythimna putrescens* and L-album Wainscot *Mythimna l-album* are moth species listed as having occurred within the two kilometre search radius which are strongly associated with coastal cliffs and associated grasslands and the habitat on site is, therefore, considered unsuitable for these species. Kent Black Arches *Meganola albula* (Nationally Scarce) is also a coastal specialist, but also occurs in habitats including chalk downland and open woodland inland. The Nationally Scarce Webb's Wainscott *Archanara sparganii,* another predominately coastal species is unlikely to occur due to being associated with reedmaces *Typha* spp. none of which were found on site; however, *Typha latifolia* is commonly found in eutrophic farmland ponds.

Other species with specialist habitat requirements not supported within the survey area include the following S41 butterflies: Small Pearl-bordered Fritillary *Boloria selene*, Marsh Fritillary *Euphydryas aurinia* and White Admiral *Limenitis camilla*.

Suitability of the site for wetland species previously recorded within the 2km search radius

The most noteworthy species associated with wetland habitats recorded within the two kilometre search area is the British Cave Shrimp *Niphargus glenniei* an S41 species (UK BAP priority) considered to be a UK endemic. Whilst British Cave Shrimp is essentially a species of underground cave systems, it has been recorded within the two kilometre search radius in surface springs in Yalberton Valley and is known from Lower Yalberton Cave. It is highly unlikely that the British Cave Shrimp occurs on site unless there are springs connected to the Yalverton Cave system and then, the water quality of ponds recorded on the site is likely to be too poor to support the species.

The habitat on site is unsuitable for supporting a breeding population of the Keeled Skimmer *Orthetrum coerulescens*, which is mainly associated with acid, sphagnum dominated habitats and calcareous fens. Ruddy Darter *Sympetrum sanguineum* has less exacting habitat requirements; however, this species favours waterbodies supporting dense vegetation at an advanced state of succession. The habitat on site was, therefore, unsuitable at the time of survey.

Species of conservation interested recorded within the two kilometre search area with potential to occur on the site

If the Chestnut Pigmy Moth *Stigmella samiatella* is disregarded due to status revision, only one species of a known conservation value has been recorded on the site itself. The Great Green Bush-cricket *Tettigonia viridissima*, recorded in the 2010 survey by Ecosulis. This species tends to be common in coastal regions where it occurs and there is a high probability of Great Green Bush-cricket still being present, especially in association with the site's hedgerows.

Of species not recorded from the site itself, there was potentially suitable habitat within the red-line area to support several, historically-recorded, species with a recognised conservation status. Two such species which have been particularly well recorded within the two kilometre search area include Jersey Tiger *Euplagia quadripunctaria* and Brown Hairstreak *Thecla betulae.*

Whilst Jersey Tiger is of restricted range in the UK, it is well represented in the South Devon area and has rather broad habitat requirements and potential to occur in many areas where foodplants such as Common Nettle *Urtica dioica* grow. Brown Hairstreak, however, is rather more specialised, requiring a resource of Blackthorn *Prunus spinosa* scrub or hedgerow habitat which is not excessively managed. The site supported an extensive network of mature hedgerows within which Blackthorn was a significant component. Whilst some hedgerow sections had received management by flailing, others had not received significant management in recent years and supported more structurally diverse edge habitat with potential to support Brown Hairstreak.

Of the remaining S41 butterflies, the site also has potential to support White-letter Hairstreak *Satyrium w-album,* due to the abundance of English Elm *Ulmus procera* on the site*;* however, there is only one post-1990 record for the species in the search area from 2010. The Wall *Lasiommata megera* has been recorded twice since 1990 within a two kilometre radius of the site and being something of a habitat generalist, could potentially occur on the site.

Of the more uncommon moths; Bugle Marble *Endothenia ustulana* is a species which is sometimes associated with hedgerows where its foodplant Bugle *Ajuga reptans* (which was recorded in small amounts on site) grows and could potentially occur on site; however, the species has only been recorded once and whilst this was relatively recently in 2008, the record was from a distance of 1.9 kilometres from the site.

S41 'research only' species

The list of 29 S41 species comprises a number of moth species with fairly generalised habitat requirements and it is probable that most, if not all of these species could occur within the survey area. Listed species included the Cinnabar *Tyria jacobaeae*, a day flying moth associated with ragwort *Senecio* species and a number of night-flying moths of the families noctuidae and geometridae which are regularly caught in mercury vapour moth traps undertaken in most rural and suburban areas in the southern UK

Evaluation

The feature of highest potential conservation value within the site in terms of invertebrate habitat comprised the network of mature hedgerows. The fields themselves supported improved pasture

and were managed for arable crops; habitats generally considered to be of low conservation value for supporting invertebrate assemblages.

On a landscape scale, the hedgerows on site formed part of an extensive network of old hedgerows bordering field systems which comprise the greater part of the South Devon landscape. Several small woodlands and copses, some of which are subject to CWS status and other non-statutory designations such as OSWI, also contributed to the landscape scale value of the area. This habitat continuity and extent increases the potential value of the habitat to support species which exist in metapopulations, but which are somewhat restricted by their inability to travel large distances. Such species, of which Brown Hairstreak and White-letter Hairstreak are examples, persist better in extensive networks of connected habitat, where there is a greater chance of the more specialised habitat requirements being met at any one time.

The site lies within close proximity to the coast and whilst the designated SSSI and cSAC coastal sites are designated primarily for features which lack affinity with the survey area, the coastal microclimate makes the site suitable to support species such as Great Green Bush-cricket *Tettigonia viridissima and* Jersey Tiger *Euplagia quadripunctaria,* for example.

Some of the hedgerows on site were clearly very old and the habitat was enhanced by the presence of a number of mature and veteran standard trees such as Ash *Fraxinus excelsior* and Pedunculate Oak *Quercus robur*.

These features provided potential to support invertebrate assemblages of some conservation value. There was some evidence of use of the site by saproxylics (wood decay invertebrates); however, whilst there was a strong resource of mature trees and hedgerow woody species on site, the wood decay on site was not especially extensive, being typical of mature habitat found within the context of a fairly intensively managed agricultural setting. Furthermore, the lack of supporting habitat such as herb-rich grassland and lack of extent of herb-rich field margin habitat, is likely to have reduced the overall potential of the site for invertebrates requiring different habitat elements at different times in their lifecycles.

The field margins adjacent to the hedgerows were mainly rather narrow, improved and herb-poor. However, the hedge-banks themselves provided significant structural features beneficial to thermophilic invertebrates and often supported plants characteristic of old hedgerow and woodland such as native Bluebell *Hyacinthoides non-scripta* and Wild Garlic *Allium ursinum,* as well as a range of herbs and grasses beneficial as a food and nectar resource to hedgerow insects such as bees (Hymenoptera: Apidae) and two-winged Flies (Diptera). Hedgerow species such as Blackthorn *Prunus spinosa,* Hawthorn *Crataegus monogyna,* willows *Salix* spp. and Hazel *Corylus avellana* also provide a valuable early season nectar resource.

The ponds on site provided some habitat variation and offered niches for a greater range of invertebrates; however, these habitats were generally of poor quality and were clearly subject to nutrient enrichment. It is considered unlikely that the British Cave Shrimp *Niphargus glenniei* would be supported by these waterbodies, especially if they are not hydrologically connected to the Yalberton Cave network.

It is now known to what extent the agricultural land is subject to pesticide treatments, although the field network appears to have been intensively managed in the past. Pesticide drift can be seriously detrimental to invertebrate populations and species with more sensitive habitat requirements can be more prone to the impacts of pesticide use.

Of the species historically recorded within a two kilometre search radius of the site, significant invertebrate species with the greatest potential to occur on the site could possibly include Brown Hairstreak *Thecla betulae* (S41 'Species of Principal Importance' and 'Vulnerable' under post-2001 IUCN criteria) and Jersey Tiger *Euplagia quadripunctaria* (Nationally Scarce – Notable b), each having been recorded on several occasions post-1990 and the species White-letter Hairstreak *Satyrium w-album* (S41 'Species of Principal Importance' and 'Endangered' under post-2001 IUCN criteria), Wall *Lasiommata megera* (S41 'Species of Principal Importance' and 'Near Threatened' under post-2001 IUCN criteria) and Bugle Marble *Endothenia ustulana* (pRDB3) also have some potential to occur, however, records of these species within the search radius are sparse.

The current study based on 2016 survey work did not include more than the cursory and incidental recording of species on the site itself and by examination of the recorded data. Furthermore, the 2010 survey work undertaken on the site by Ecosulis was by no means comprehensive and there was no attempt within either survey to focus strongly on target species or species assemblages. No rarities were found within either survey, although the now reclassified Chestnut Pigmy Moth *Stigmella samiatella* and the Devon LBAP listed Great Green Bush-cricket *Tettigonia viridissima* were both recorded during the 2010 Ecosulis survey. It was clear from the 2016 survey that the flowering resource of hedgerow Blackthorn *Prunus spinosa,* willow *Salix* spp. and Hazel *Corylus avellana* on site was important resource for solitary, social and sub-social bees and other spring flying insects, however, only common species were recorded during the survey.

Conclusions

On face-value, the site supported habitat of moderate potential conservation value for invertebrates; the mature hedgerow, mature and veteran hedgerow standards and associated hedge-bank structure and flora and woodland edge bordering the site offered the greatest potential value as invertebrate habitat. The age and structure of the majority of the hedgerows on site made them irreplaceable in the short term.

Whilst there were few significant invertebrate records for the site itself, the site showed some potential to support species such as Brown Hairstreak *Thecla betulae*, a S41 'Species of Principal Importance', which had been well recorded (post 1990) within two kilometres of the centre of the site. The presence of abundant English Elm *Ulmus procera* within the site's hedgerows also suggested potential for another S41 species, White-letter Hairstreak *Satyrium w-album*, however, this species has only been recorded once within the search area post 1990 and is less likely to occur on the site at the current time.

The hedgerows and herbaceous borders of the site also provide suitable habitat for a range of currently common and widespread moth species, listed as S41 species 'for research only'. These species are mainly habitat generalists, but include species which are documented as having undergone a significant decline in the UK in recent decades.

Jersey Tiger, a Nationally Scarce moth is highly likely to occur on the site from time to time; however, this species is locally common in the Torquay area of south Devon and has catholic habitat requirements. It is possible that the site could also support other species of conservation interest both including those historically recorded from the landscape bordering the site and species as yet unrecorded. A S41 'Species of Principal Importance' the Wall *Lasiommata megera* butterfly, the pRDB3 'Rare' Bugle Marble *Endothenia ustulana* and the Orange Footman *Eilema sororcula* could all potentially occur on the site, however, the site, in its current condition, may be suboptimal to support the first two of these species.

One species listed as a priority species within the Devon LBAP, the Great Green Bush-cricket *Tettigonia viridissima*, was recorded on the site in 2010 and is highly likely to occur there still. This species, which is mainly coastal in the UK, occurs widely within the locality and occurs in a fairly broad range of mainly scrubby habitats.

If found to be present on the site, species such as the Brown Hairstreak would increase the apparent conservation value of the site.

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Appendices

Appendix 1 – Tables

Table 1 – Statutory and non-statutory sites within two kilometres of White Rock, Torbay (6/6/2016) Enq. No. 7934

File Code	Site Name	Grid Reference	Area (ha)	Description	Status
1	Lyme Bay and Torbay		31468	A mosaic of two areas containing extremely diverse reef habitats, comprising many geological and topographical forms, and nationally important sea caves	cSAC
SX85/102	Saltern Cove	SX895585	15.6	Extensive section through Upper Devonian including the Saltern Cove Goniatite Bed. Important intertidal community	gSSSI, SSSI
SX85/090	Clennon Woods	SX880593	21.6	Broadleaved woodland with small area of calcareous grassland. Small unmanaged orchard present	CWS
SX85/093	Clennon Ponds	SX885592	6.2	Mosaic of semi-natural broadleaved woodland, semi-improved neutral grassland, scattered scrub, ponds, reedbeds and running water. Important site area for water birds.	CWS
SX85/095	Galmpton Common	SX894570, SX893569, SX890568 & SX888569	11.6	Herb-rich neutral and calcareous grassland, with some woodland blocks	CWS
SX85/096	Tor Rocks	SX891571	1.7	Broadleaved woodland	CWS
SX85/100	Blue Waters Drive	SX895577	3.7	Small area of species-rich limestone grassland with species-poor rank grassland, dense bracken and scrub	CWS
SX85/101	Broadsands Marsh	SX895573	8.8	Mosaic of alder/willow carr, dry broadleaved woodland, arable fields, reedbed and scrub. Bird interest.	CWS
SX95/010	Churston Point - Elberry Cove	SX902573	4.7	Coastal strip with maritime scrub, woodland, calcareous grassland, maritime cliff and slope, vegetated shingle & semi-improved grassland	CWS
SX95/011	Churston Railway	SX906562	2.6	Species-rich grassland, tall herb vegetation, scrub & developing woodland	CWS

File Code	Site Name	Grid Reference	Area (ha)	Description	Status
SX95/ 012	Elberry Cove - Churston Cove	SX905570	21.4	Coastal strip with broadleaved woodland, maritime cliff and slope, clcareous grassland, scrub and shingle coves. Key plant species recorded	CWS
SX85/ 029	Dart Estuary	SX869549	741.7	Estuary and associated habitats	CWS
SX85/ 032	Byter Mill Copse	SX860578	8.2	Broadleaved woodland & tall herb vegetation	CWS
SX85/ 033	The Cliffs	SX867563	5.7	Mixed woodland	CWS
SX85/ 035	Greenway Estate	SX874551	47.6	Parkland with areas of unimproved neutral grassland and veteran trees. Bat and lichen interest.	CWS
	Sugar Loaf Hill and Saltern Cove	SX896585	34.4		LNR
SX85/ 118	Stoke Hill Road and Whitehill Lane	SX826590	23.8	Road verges, species rich hedgerows, orchards	UWS
SX85/ 034	Shopdown Brake	SX866578	1.4	Mixed plantation	UWS
SX85/ 037	Tors & Barn Woods	SX877563	10.2	Mixed plantation on an ancient woodland site	UWS
SX85/ 038	The Banks	SX877560	7.4	Broadleaved woodland in disused quarry	UWS
SX85/ 116	Lower Well Farm Orchard	SX860574	1.2	Orchard	UWS
SX85/ 120	Waddeton	SX872568	5.4	Orchard	UWS
SX85/ 036	Greenway Wood	SX876550	6.2	Secondary broadleaved woodland	OSWI

File Code	Site Name	Grid Reference	Area (ha)	Description	Status
SX85/ 039	Galmpton Creek	SX883561	2.4	Broadleaved woodland scrub	OSWI
SX85/ 085	Lower Yalberton	SX861582	7.8	Woodland & wet grassland	OSWI
SX85/ 086	Yalberton Stream	SX865594	0.5	Stream & associated marsh	OSWI
SX85/ 087	Yalberton Quarry	SX864590	3.7	Mixed farmland, woodland, species-rich roadside verge	OSWI
SX85/ 088	Waddeton Woods	SX863580	5.5	Mixed conifer & broadleaved wood	OSWI
SX85/ 089	Paignton Zoo	SX877597	4.6	Broadleaved woodland & scrub, with a series of ponds	OSWI
SX85/ 091	Grange Farm	SX881589	23.1	Grassland, scrub & woodland	OSWI
SX85/ 092	Manor Farm	SX883563	7.4	Broadleaved woodland & scrub, with semi-improved & species-rich calcareous grassland	OSWI
SX85/ 094	Meadowside	SX889583	1.1	Species-rich grassland	OSWI
SX85/ 097	Dartmouth Road	SX892581	1.1	Roadside verge with limestone outcrops & areas of species-rich grassland	OSWI
SX85/ 098	Sugar Loaf	SX894584	2.2	Calcareous grassland	OSWI
SX85/ 099	Torbay-Dartmouth Railway	SX891598 - SX888558	13.5	Species-rich grassland & an important wildlife corridor	OSWI
SX85/ 103	Churston Quarry	SX894569	1.2	Broadleaved woodland	OSWI

File Code	Site Name	Grid Reference	Area (ha)	Description	Status
SX85/ 105	Kennels Road	SX894553	0.3	Roadside verge with species-rich grassland & developing scrub	OSWI
SX85/ 109	White Rock	SX869582	1.6	Broadleaved woodland (W8) and an old neglected orchard	OSWI
SX85 NE1	Goodrington Road Cutting and Quarry	SX892581 & SX893581	1.3	Middle Devonian Limestone with corals, stromatoporoids & burrows. Dated by a fauna of conodonts. Shows structural features & a fault/solution fissure with Permian infilling.	RIGS
SX85 SE1	Brokenbury Quarry, Churston Ferrers	SX897563	0.6	Middle Devonian foliated & partly dolomitised limestone with crinoid stems in shaly beds. Late upright folds refold foliation/bedding.	RIGS
0	Crystal Cove	SX896580	28.68	A wll-known exposure of a relatively late (i.e. post Variscan) north-south fault zone associated with a remarkable 25m wide zone of crystalline calcite	RIGS
0	Churston Cove-Churston Point	SX920569	21.2	A thrust-bounded section through the Cherston Member (Frasnian) the highest division of the Berry Head Limestone Formation	RIGS
SX85 NE1	Galmpton Quarries	SX881561	1.6	A wide range of lithological & structural geological features associated with the Torquay limestone	RIGS
SX85 NE2	Waddeton Quarry	SX878560	6.1	The quarry & foreshore show a wide range of lithological & structural features associated with the Torquay limestone	RIGS

Definitions of statutory and none statutory sites

Special Areas of Conservation (SAC): these are notified by Natural England because they contain species and/or habitats of European importance (listed in the Habitats Directive 1994), and are part of a network of conservation sites set up through Europe known as the Natura 2000 series. cSAC is a candidate SAC. On land, almost all candidate SACs are, or will be notified as SSSIs. Natural England needs to be consulted before any operations likely to damage the special interest are undertaken. SAC is a statutory designation with legal implications.

Sites of Special Scientific Interest (SSSI): these are notified by Natural England because of their plants, animals or geological features (the latter are geological SSSIs or gSSSI). Natural England needs to be consulted before any operations likely to damage the special interest are undertaken. SSSI is a statutory designation with legal implications.

County Wildlife Sites (CWS): these are sites of county importance for wildlife, designated on the basis of the habitat or the known presence of particular species. This is not a statutory designation like SSSIs, and does not have any legal status. The National Planning Policy framework requires local authorities to identify and map locally designated sites of biodiversity importance (such as County Wildlife Sites) as part of the Local Plan process and to draw up criteria based policies against which proposals for development affecting them will be judged. CWS recognition does not demand any particular actions on the part of the Landowner and does not give the public rights of access. However, it may increase eligibility for land management grants.

Local Nature Reserve (LNR): are for both people and wildlife. They are places with wildlife or geological features that are of interest locally, which give people special opportunities to study and learn about them or simply enjoy and have contact with nature. They are designated by the local authority with support from Natural England.

Other Sites of Wildlife Interest (OSWI): these are sites of significant wildlife interest within a local context that have been surveyed but do not reach the criteria for County Wildlife Sites. They are not covered by NPPF, but may be included in Local Plans.

Unconfirmed Wildlife Sites (UWS): these are sites identified as having possible interest but not fully surveyed. Some of these sites will be areas of significant wildlife interest.

Regionally Important Geological and Geomorphological Sites (RIGS): these are earth science sites that are of regional or local importance. Like CWS, they are included in Local Plans and referred to under NPPF.

Ancient Woodland Inventory (AWI): Ancient Woodland is a term applied to woodlands which have existed from at least Medieval times to the present day without ever having been cleared for uses other than wood or timber production. A convenient date used to separate ancient and secondary woodland is about the year 1600. In special circumstances semi-natural woods of post-1600 but pre-1900 origin are also included. The Devon Ancient Woodland Inventory was prepared in 1986 by the Nature Conservancy Council. There are two types of ancient woodland, both of which should be treated equally in terms of the protection afforded to ancient woodland in the National Planning Policy framework (NPPF):

Ancient semi-natural woodland (ASNW): where the stands are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. The stands may have been managed by coppicing or pollarding in the past, or the tree and shrub layer may have grown up by natural regeneration.

Plantations on ancient woodland sites (or PAWS, also known as ancient replanted woodland): areas of ancient woodland where the former native tree cover has been felled and replaced by planted stock, most commonly of a species not native to the site. These will include conifers such as Norway spruce or Corsican pine, but also broadleaves such as sycamore or sweet chestnut.

Table 2 – Historic records of invertebrate species from within a 2km radius of the red line area

No	Common Name	Scientific Name	Locality	Year	Grid Reference	Uk Protection	International Protection	Status
289	Grey Dagger	Acronicta psi	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857	NERC 41		UKBAP (P)
181	Knotgrass	Acronicta rumicis	Clennon Valley lakes (1)	2011	SX884591	NERC 41		UKBAP (P)
355	Knotgrass	Acronicta rumicis	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
332	Flounced Chestnut	Agrochola helvola	Paignton, Penwill Way	2009	SX888595	NERC 41		UKBAP (P)
280	Beaded Chestnut	Agrochola lychnidis	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857	NERC 41		UKBAP (P)
288	Green-Brindled Crescent	Allophyes oxyacanthae	Paignton, Hookhills, Hound Tor Close	1997	SX8857	NERC 41		UKBAP (P)
294	Mouse Moth	Amphipyra tragopoginis	Paignton, Hookhills, Hound Tor Close	1995-1999	SX8857	NERC 41		UKBAP (P)
302	Webb's Wainscot	Archanara sparganii	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857			Nb
287	Garden Tiger	Arctia caja	Paignton, Hookhills, Hound Tor Close	1996-1999	SX8857	NERC 41		UKBAP (P)
283	Centre-Barred Sallow	Atethmia centrago	Paignton, Hookhills, Hound Tor Close	1995-2001	SX8857	NERC 41		UKBAP (P)
352	Centre-Barred Sallow	Atethmia centrago	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
125	Small Pearl-bordered Fritillary	Boloria selene	Vogwell farm	2000	SX880590	NERC 41		UKBAP (P); Decline
293	Mottled Rustic	Caradrina morpheus	Paignton, Hookhills, Hound Tor Close	1996-2000	SX8857	NERC 41		UKBAP (P)
609	Ruddy Carpet	Catarhoe rubidata	Brixham	1966	SX900560			Nb
150	Small Square-Spot	Diarsia rubi	Paignton Zoo, Clennon Hill, limestone grassland	2009	SX881595	NERC 41		UKBAP (P)
208	Small Square-Spot	Diarsia rubi	Paignton, Clennon Valley	2008	SX884592	NERC 41		UKBAP (P)
301	Small Square-Spot	Diarsia rubi	Paignton, Hookhills, Hound Tor Close	1995-2001	SX8857	NERC 41		UKBAP (P)
357	Small Square-Spot	Diarsia rubi	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
610	Small Square Spot	Diarsia rubi	Brixham	1966	SX900560	NERC 41		UKBAP (P)
149	Small Phoenix	Ecliptopera silaceata	Paignton Zoo, Clennon Hill, limestone grassland	2008	SX881595	NERC 41		UKBAP (P)

No	Common Name	Scientific Name	Locality	Year	Grid Reference	Uk Protection	International Protection	Status
183	Small Phoenix	Ecliptopera silaceata	Clennon Valley lakes (1)	2011	SX884591	NERC 41		UKBAP (P)
97	Orange Footman	Eilema sororcula	Paignton Zoo Nature Trail	2012	SX878594			Nb
112	Orange Footman	Eilema sororcula	Paignton Zoo	2012	SX878597			Nb
633	Bugle Marble	Endothenia ustulana	Elberry Cove	2008	SX902569			pRDB3
144	Dusky Thorn	Ennomos fuscantaria	Paignton Zoo, Clennon Hill, limestone grassland	2009	SX881595	NERC 41		UKBAP (P)
190	Dusky Thorn	Ennomos fuscantaria	Paignton, Clennon Valley	2008	SX884592	NERC 41		UKBAP (P)
331	Dusky Thorn	Ennomos fuscantaria	Paignton, Penwill Way	2009	SX888595	NERC 41		UKBAP (P)
354	Dusky Thorn	Ennomos fuscantaria	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
349	August Thorn	Ennomos quercinaria	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
286	Galium Carpet	Epirrhoe galiata	Paignton, Hookhills, Hound Tor Close	1995-1996	SX8857	NERC 41		UKBAP (P)
607	Galium Carpet	Epirrhoe galiata	Brixham	1966	SX900560	NERC 41		UKBAP (P)
124	Marsh Fritillary	Euphydryas aurinia	Vogwell farm	2000	SX880590	WCA 5; NERC 41	EC IIa; Bern II	UKBAP (P); DBAP; Nb; VUL
126	Jersey Tiger	Euplagia quadripunctaria	Clennon Hill, Paignton	2009	SX880592			Nb
145	Jersey Tiger	Euplagia quadripunctaria	Paignton Zoo, Clennon Hill, limestone grassland	2009	SX881595			Nb
180	Jersey Tiger	Euplagia quadripunctaria	Clennon Valley lakes (1)	2011	SX884591			Nb
291	Jersey Tiger	Euplagia quadripunctaria	Paignton, Hookhills, Hound Tor Close	1995-2001	SX8857			Nb
327	Jersey Tiger	Euplagia quadripunctaria	Clennon Valley, Paignton. By the sports social club.	2007	SX888594			Nb
333	Jersey Tiger	Euplagia quadripunctaria	Paignton, Penwill Way	2009	SX888595			Nb
368	Jersey Tiger	Euplagia quadripunctaria	Opposite entrance to Warborough Road, Galmpton	2007	SX8921656896			Nb
458	Jersey Tiger	Euplagia quadripunctaria	Broadsands, Torbay	2005	SX8957			Nb
444	Barrett's Marbled Coronet	Hadena luteago barrettii	Broadsands, Torbay	2005	SX8957			Na

No	Common Name	Scientific Name	Locality	Year	Grid Reference	Uk Protection	International Protection	Status
148	Small Emerald	Hemistola chrysoprasaria	Paignton Zoo, Clennon Hill, limestone grassland	2008	SX881595	NERC 41		UKBAP (P)
300	Small Emerald	Hemistola chrysoprasaria	Paignton, Hookhills, Hound Tor Close	1998-1999	SX8857	NERC 41		UKBAP (P)
147	Rustic	Hoplodrina blanda	Paignton Zoo, Clennon Hill, limestone grassland	2008	SX881595	NERC 41		UKBAP (P)
182	Rustic	Hoplodrina blanda	Clennon Valley lakes (1)	2011	SX884591	NERC 41		UKBAP (P)
299	Rustic	Hoplodrina blanda	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857	NERC 41		UKBAP (P)
326	Rustic	Hoplodrina blanda	Clennon Valley Lakes (2)	2011	SX888592	NERC 41		UKBAP (P)
204	Rosy Rustic	Hydraecia micacea	Paignton, Clennon Valley	2008	SX884592	NERC 41		UKBAP (P)
298	Rosy Rustic	Hydraecia micacea	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857	NERC 41		UKBAP (P)
329	Bloxworth Snout	Hypena obsitalis	Paignton, Penwill Way	2008-2009	SX888595			RDB K
447	Bloxworth Snout	Hypena obsitalis	Broadsands, Torbay	2005	SX8957			RDB K
136	Wall	Lasiommata megera	Clennon Hill	2009	SX880594	NERC 41		UKBAP (P)
275	Wall	Lasiommata megera	Clennon Valley, Paignton	1998	SX885593	NERC 41		UKBAP (P)
279	Wall	Lasiommata megera		1990	SX8856	NERC 41		UKBAP (P)
443	Wall	Lasiommata megera		1990-1991	SX8956	NERC 41		UKBAP (P)
445	Beautiful Gothic	Leucochlaena oditis	Broadsands, Torbay	2005	SX8957			RDB3
222	White Admiral	Limenitis camilla	Brantwood Drive, Paignton (garden)	2009	SX884594	NERC 41		Decline
292	Kent Black Arches	Meganola albula	Paignton, Hookhills, Hound Tor Close	2000	SX8857			Nb
179	Dot Moth	Melanchra persicariae	Clennon Valley lakes (1)	2011	SX884591	NERC 41		UKBAP (P)
285	Dot Moth	Melanchra persicariae	Paignton, Hookhills, Hound Tor Close	1995-2000	SX8857	NERC 41		UKBAP (P)
353	Dot Moth	Melanchra persicariae	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
98	Pretty Chalk Carpet	Melanthia procellata	Paignton Zoo Nature Trail	2012	SX878594	NERC 41		UKBAP (P)

No	Common Name	Scientific Name	Locality	Year	Grid Reference	Uk Protection	International Protection	Status
146	Pretty Chalk Carpet	Melanthia procellata	Paignton Zoo, Clennon Hill, limestone grassland	2008-2009	SX881595	NERC 41		UKBAP (P)
356	Pretty Chalk Carpet	Melanthia procellata	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
608	Pretty Chalk Carpet	Melanthia procellata	Brixham	1966	SX900560	NERC 41		UKBAP (P)
297	Rosy Minor	Mesoligia literosa	Paignton, Hookhills, Hound Tor Close	2000	SX8857	NERC 41		UKBAP (P)
334	L-Album Wainscot	Mythimna l-album	Paignton, Penwill Way	2008-2009	SX888595			Nb
284	Devonshire Wainscot	Mythimna putrescens	Paignton, Hookhills, Hound Tor Close	1995	SX8857			Na
451	Devonshire Wainscot	Mythimna putrescens	Broadsands, Torbay	2005	SX8957			Na
7	British Cave Shrimp	Niphargus glenniei	Spring in Yalberton Valley, Nr Paignton	2012	SX861580	NERC 41		UKBAP (P)
18	British Cave Shrimp	Niphargus glenniei	Lower Yalberton Cave, Nr Paignton	2012	SX865585	NERC 41		UKBAP (P)
342	Keeled Skimmer	Orthetrum coerulescens	Clennon Ponds	1995	SX889592			KeyD (N)
296	Powdered Quaker	Orthosia gracilis	Paignton, Hookhills, Hound Tor Close	1996-1998	SX8857	NERC 41		UKBAP (P)
341	Powdered Quaker	Orthosia gracilis	Clennon Valley Nr.Goodrington	2012	SX889587	NERC 41		UKBAP (P)
99	Swallowtail	Papilio machaon	CLENNON VALLEY	2007	SX878594	WCA 5		
168	Purple Hairstreak	Quercusia quercus	CLENNON VALLEY, PAIGNTON	1994	SX883593			Decline
335	Large Wainscot	Rhizedra lutosa	Paignton, Penwill Way	2009	SX888595	NERC 41		
166	White-letter Hairstreak	Satyrium w-album	CLENNON	2010	SX883592	WCA 5 (S); NERC 41		UKBAP (P); Nb; Decline
295	Mullein Wave	Scopula marginepunctata	Paignton, Hookhills, Hound Tor Close	1995-1998	SX8857	NERC 41		UKBAP (P)
100	White Ermine	Spilosoma lubricipeda	Paignton Zoo Nature Trail	2012	SX878594	NERC 41		UKBAP (P)
303	White Ermine	Spilosoma lubricipeda	Paignton, Hookhills, Hound Tor Close	1995-2001	SX8857	NERC 41		UKBAP (P)
111	Buff Ermine	Spilosoma luteum	Paignton Zoo	2012	SX878597	NERC 41		UKBAP (P)
282	Buff Ermine	Spilosoma luteum	Paignton, Hookhills, Hound Tor Close	1995-2001	SX8857	NERC 41		UKBAP (P)

No	Common Name	Scientific Name	Locality	Year	Grid Reference	Uk Protection	International Protection	Status
325	Buff Ermine	Spilosoma luteum	Clennon Valley Lakes (2)	2011	SX888592	NERC 41		UKBAP (P)
330	Buff Ermine	Spilosoma luteum	Paignton, Penwill Way	2009	SX888595	NERC 41		UKBAP (P)
351	Buff Ermine	Spilosoma luteum	Paignton, North Rocks Road	2014	SX890572	NERC 41		UKBAP (P)
343	Ruddy Darter	Sympetrum sanguineum	Clennon Ponds	1995	SX889592			Nb; KeyD (R)
67	Great Green Bush Cricket	Tettigonia viridissima	Lydford Tor Avenue, Paignton	2000	SX875593			DBAP
123	Brown Hairstreak	Thecla betulae	Clennon valley	2000	SX880590	WCA 5 (S); NERC 41		UKBAP (P); Nb
167	Brown Hairstreak	Thecla betulae	CLENNON VALLEY, PAIGNTON	1994	SX883593	WCA 5 (S); NERC 41		UKBAP (P); Nb
177	Brown Hairstreak	Thecla betulae	GRANGE FARM, GOODRINGTON	1993-1994	SX884587	WCA 5 (S); NERC 41		UKBAP (P); Nb
304	Brown Hairstreak	Thecla betulae	CLENNON VALLEY	1995	SX8858	WCA 5 (S); NERC 41		UKBAP (P); Nb
307	Brown Hairstreak	Thecla betulae	CLENNON VALLEY	1994-1995	SX8859	WCA 5 (S); NERC 41		UKBAP (P); Nb
324	Brown Hairstreak	Thecla betulae	Christow	2000	SX888583	WCA 5 (S); NERC 41		UKBAP (P); Nb
472	Brown Hairstreak	Thecla betulae	GOODRINGTON	1995	SX8958	WCA 5 (S); NERC 41		UKBAP (P); Nb
474	Brown Hairstreak	Thecla betulae	BROADSANDS	1995	SX896574	WCA 5 (S); NERC 41		UKBAP (P); Nb
635	Brown Hairstreak	Thecla betulae	ELBERRY COVE	1994	SX902570	WCA 5 (S); NERC 41		UKBAP (P); Nb
290	Hedge Rustic	Tholera cespitis	Paignton, Hookhills, Hound Tor Close	1995	SX8857	NERC 41		UKBAP (P)
281	Blood-Vein	Timandra comae	Paignton, Hookhills, Hound Tor Close	1996-2000	SX8857	NERC 41		
328	Blood-Vein	Timandra comae	Paignton, Penwill Way	2009	SX888595	NERC 41		
350	Blood-Vein	Timandra comae	Paignton, North Rocks Road	2014	SX890572	NERC 41		
186	Cinnabar	Tyria jacobaeae	Paignton, Clennon Valley	2000	SX884592	NERC 41		UKBAP (P)
563	Cinnabar	Tyria jacobaeae	Churston Sewerage works	2007	SX897563	NERC 41		UKBAP (P)
606	Dark-barred Twin-spot Carpet	Xanthorhoe ferrugata	Brixham	1966	SX900560	NERC 41		UKBAP (P)

Table 3 – Invertebrate habitat target notes 20th April, 2016

Target note	Date	Grid reference	Feature	Description
1	20/04/2016	SX 87877 57857	Improved grassland recently planted with mixed broadleaved and coniferous trees	Improved pasture with Yorkshire Fog *Holcus lanatus* dominant and abundant bare ground (clay loam soil). Field extensively planted with mainly native broadleaved and some coniferous trees (seedlings at time of survey). Sward with Cock'sfoot *Dactylis glomerata* and Creeping Bent *Agrostis stolonifera* and herbs including Dandelion *Taraxacum officinale (*agg.), Creeping Thistle *Cirsium arvense*, Marsh Thistle *C. palustre,* Cut-leaved Crane's-bill *Geranium dissectum,* Broad-leaved Dock Rumex obtusifolius, Curled Dock *R. crispus,* Creeping Buttercup *Ranunculus repens,* Ribwort Plantain *Plantago lanceolata,* White Clover *Trifolium repens,* Hogweed *Heracleum sphondylium,* Common Ragwort *Senecio jacobaeae* and a Hawkweed *Hieracium* sp. Sward height <20cmat time of survey. Dandelion and other flowering herbs providing a resource for nectaring insects (aculeate hymenoptera, diptera etc.), but of relatively low conservation value
2	20/04/2016	SX 87862 57906	Mature native broadleaved hedge with standards	Blackthorn *Prunus spinosa* dominant in hedge-line with mature Ash *Fraxinus excelsior s*tandards, as well as younger trees. Hedge in part on hedge-bank, but botanically poor arable margin. Blackthorn encroaching from field boundary increasing potential form species such as Brown Hairstreak *Thecla betulae*but edge generally rather regimented. Also some wood-decay habitat with potential to support saproxylics, also with Cramp-ball fungus. Range of lichens on Blackthorn with potential to support lichen- specialist epiphyte invertebrates. Other woody species included Elder *Sambucus nigra*, Hawthorn *Crataegus monogyna* and Ivy *Hedera helix* and (adjacent to houses only) Cherry Laurel *Prunus laurocerasus.*Bank and field-margin vegetation with Wood False-brome *Brachypodium sylvaticum,* Ground Ivy *Glechoma hederacea,* Common Nettle *Urtica dioica*, Shining Crane's-bill *Geranium lucidum,* Herb Robert *Geranium robertianum,* Hedge Bedstraw *Galium mollugo,* Stinking Iris *Iris foetidissima,* Red Campion *Silene dioica* and Common Teasel *Dipsacus fullonum.*
3	20/04/2016	SX 88114 57877	Sheltered corner of field and associated hedgerow	Field corner as TN1; planted with broadleaved seedlings and of similar composition, but abundant flower resource (Dandelion *Taraxacum officinale* agg.). Hedgeline adjacent to road with English Elm *Ulmus procera* and Sallow *Salix cinerea/caprea* and Blackthorn *Prunus spinosa* saplings, providing a further spring nectar resource in sheltered, sunny location. Few bees recorded using resource despite warm sun, though a few Orange-tailed Mining Bee *Andrena haemorrhoa* and Red Mason Bee *Osmia bicornis* were recorded on Dandelions and further *Andrena* spp. on Blackthorn.

Target note	Date	Grid reference	Feature	Description
4	20/04/2016	SX 88081 57832	Hedgerows and standards	Defunct hedge on hedge-bank, with mature, Ivy *Hedera helix* covered Ash *Fraxinus excelsior* standards. Hedge primarily Blackthorn *Prunus spinosa* with Elder *Sambucus nigra*, Hawthorn *Crataegus monogyna,* English Elm *Ulmus procera* and Bramble *Rubus fruticosus* agg. and Veteran Beech *Fagus sylvatica*.Groundflora on bank included Lords and Ladies *Arum maculatum*, Stinking Iris *Iris foetidissima,* Bluebell *Hyacinthoides non-scripta,* Common Dog *Violet Viola riviniana,* Bush Vetch *Vicia sepium*, Cow Parsley *Anthriscus sylvestris* and Hogweed *Heracleum sphondylium.* Coastal specialist Wild Madder *Rubia peregrina* also recorded. South-facing aspect of hedge of greater potential value for invertebrates; comparatively good structural and floristic diversity.
5	20/04/2016	SX 87978 57796	Arable margin	Arable field with grassland margin approximately 3 metres wide. Margin herb-poor, but with numerous Dandelion *Taraxacum officinale* agg. Providing a potential nectar resource. Other herbs included scattered Ground Ivy *Glechoma hederacea,* Common Nettle *Urtica dioica* and Germander Speedwell *Veronica chamaedrys*. Of limited value as invertebrate habitat other than as a nectar resource for species favouring yellow composites.
6	20/04/2016	SX 88173 57800	Defunct Hedgerow and arable field margin	Defunct hedge on hdge-bank adjacent to road, with Bramble *Rubus fruticosus* agg. dominant with young Blackthorn *Prunus spinosa*, English Elm *Ulmus procera,* Hazel *Corylus avellana* and Ash *Fraxinus excelsior*. Groundflora with Common Nettle *Urtica dioica,* Sweet Violet *Viola odorata,* Three-cornered Garlic *Allium triquetum* and cultivated Daffodil *Narcissus* spThree metre wide arable margin with coarse grasses including Cock's-foot *Dactylis glomerata* and Yorkshire Fog *Holcus lanatus* with few herbs. Hedge-bank creating sheltered microclimate, together with reasonable nectar resource beneficial for bees (Apidae), Two-winged flies (Diptera) and other typical hedgerow invertebrates, but not of especially high value.
7	20/04/2016	SX 88529 57678	Hedgerow and improved grassland	Blackthorn *Prunus spinosa* dominant in hedge-bank with mature small, mature/veteran Pedunculate Oak *Quercus robur* in cornerand another mature oak further along hedge-bank. Groundflora with Lesser Celandine *Ranunculus ficaria* and Primrose *Primula vulgaris*. Field with improved spp.-poor, Perennial Rye Grass *Lolium perenne* dominated sward but with some Sweet Vernal Grass *Anthoxanthum odoratum*. Cattle grazed. Possible wood decay resources in mature hedge-bank trees. No sign of extensive dung fauna, but cattle dung mainly of recent origin.
8	20/04/2016	SX 88194 57543	Pond in hedge boundary	Stone-edged, heavily silted pond overshaded by mature, multi-stemmed willow *Salix cinerea/caprea*. Pond deep with shallow margins, but with no visible macrophyte vegetation. Banks with Ivy *Hedera helix,* Common Nettle *Urtica dioica* andLesser Celandine *Ranunculus ficaria*. Unlikely to support invertebrate fauna of a higher conservation value. Species-poor hedgerow including willow *Salix cinerea/caprea*, Bramble *Rubus fruticosus* agg. and some Blackthorn *Prunus spinosa,* valuable as an early season nectar resource and foodplant, but unlikely to provide habitat of high conservation value.

Target note	Date	Grid reference	Feature	Description
9	20/04/2016	SX 88331 57597	Hedgerow with relatively herb-rich groundflora	Hedge-bank adjacent road with straggly-topped woody growth with Blackthorn *Prunus spinosa,* Hawthorn *Crataegus monogyna,* Ash *Fraxinus excelsior,* English Elm *Ulmus procera* and Holly *Ilex aquifolium* with Black Bryony *Tamus communis,* Old Man's Beard *Clematis vitalba* and standards including Sycamore *Acer pseudoplatanus*. Cut close to field margin, therefore, lacking structural diversity. Some standing wood decay habitat and fairly herb-rich on bank with Common Nettle *Urtica dioica,* Common Bird's-foot Trefoil *Lotus corniculatus,* Stinking Iris *Iris foetidissima,* Bluebell *Hyacinthoides non-scripta,* Herb Robert *Geranium robertianum*, Lesser Celandine *Ranunculus ficaria*, Lords and Ladies *Arum maculatum,* Ivy *Hedera helix,* Wood Avens *Geum urbanum,* Wood False Brome *Brachypodium sylvaticum*, Primrose *Primula vulgaris*, Red Campion *Silene dioica*, Creeping Buttercup *Ranunculus repens,* Hedge Bedstraw *Galium mollugo,* Common Dog Violet *Viola riviniana*, Curled Dock *Rumex crispus* and Ramsons *Allium ursinum.* Several mining bees *(Andrena spp.)* and Dark-edged Bee-fly *Bombylius major* seen foraging on herbs.
10	20/04/2016	SX 88432 57459	Hedegrow with standards	Partly defunct hedge and hedgebank with Bramble *Rubus fruticosus* agg., mature Hawthorn *Crataegus monogyna*, English Elm *Ulmus procera* and Blackthorn *Prunus spinosa* with Ash *Fraxinus excelsior* standards, some mature.Groundflora included Lesser Celandine *Ranunculus ficaria,* Common Nettle *Urtica dioica*, Hogweed *Heracleum sphondylium*, Stinking Iris *Iris foetidissima*, Cleavers *Galium aparine,* Lords and Ladies *Arum maculatum,* Red Campion *Silene dioica,* Herb Robert *Geranium robertianum* and Wood Avens *Geum urbanum*. Hedge rather linear edged; cattle poaching creating bare ground at margin of improved sward.
11	20/04/2016	SX 88367 57427	Pond in corner of field	Shallow pond; heavily cattle poached at margins and eutrophic with blanket algal blooms. More open than pond at TN8 and with some macrophyte vegetation including predominately Floating Sweet Grass *Glyceria fluitans* and Brooklime *Veronica beccabunga.* With mature sallow *Salix cinerea/caprea* growing in pond and Ash *Fraxinus excelsior* growing adjacent to pond, casting shade. Pond gradually deepening from shallow margins. Rubble heaps adjacent to pond and fallen wood decay habitat with some potential to support saproxylic invertebrates. Surrounding habitat damp, improved pasture. Pond unlikely to be of high conservation value for invertebrates, but provides some habitat variation as did the rubble heaps and fallen deadwood.
12	20/04/2016	SX 88338 57267	Hedge with standards on hedgebank	Gappy hedge with standards on stony hedgebank. With Blackthorn *Prunus spinosa,* Hawthorn *Crataegus monogyna* and Hazel *Corylus avellana* and mature Ash *Fraxinus excelsior* standards.Groundflora predominately Common Nettle *Urtica dioica* with Lords and Ladies *Arum maculatum,* Herb Robert *Geranium robertianum*, Ground Ivy *Glechoma hederacea* and Hart's-tongue Fern *Asplenium scolopendrium*. Some wood decay habitat with potential to support saproxylic species.
13	20/04/2016	SX 88345 57026	Hedge with standards on hedgebank	Hedgerow similar to TN12, with mature and leggy Hawthorn *Crataegus monogyna*, Holly *Ilex aquifolium,* Sycamore *Acer pseudoplatanus* and mature Ash *Fraxinus excelsior* standards. Some wood decay habitat with potential to support saproxylics and abundant stones on hedgebank with potential to support carabid beetles, woodlice, centipedes, molluscs etc.

Target note	Date	Grid reference	Feature	Description
14	20/04/2016	SX 88187 57087	Grassy hedgebank with evidence of ground nesting aculeates	Grassy, open hedgebank (lacking woody growth), with patches of bare ground. Some burrows of ground nesting solitary/subsocial bees evident (*Andrena/Lasioglossum* etc.); Grassland on bank herb-poor with Smooth Meadow Grass *Poa pratensis,* Perennial Rye Grass *Lolium perenne*.
15	20/04/2016	SX 88137 57083	Mixed woodland stand	Mixed b/l woodland stand at periphery of survey area, with a range of native and non-native trees including Sycamore *Acer pseudoplatanus,* Ash *Fraxinus excelsior,* pines *Pinus* spp., Norway Spruce *Picea abies,* Holme Oak *Quercus ilex* and veteran Beech *Fagus sylvatica*. Understorey with Grey Willow *Salix cinerea* and Elder *Sambucus nigra* and scrub layer with Bramble *Rubus fruticosus* agg. and Butcher's Broom *Ruscus aculeatus*. Groundflora largely shade-tolerant herbs with Dog's Mercury *Mercurialis perennis*, Common Nettle *Urtica dioica*, Lords and Ladies *Arum maculatum*, Stinking Iris *Iris foetidissimma,* Bluebell *Hyacinthoides non-scripta,* Red Campion *Silene dioic*a, Primrose *Primula vulgaris,* Ground Ivy *Glechoma hederacea*, Herb Robert *Geranium robertiana* and Sweet Violet *Viola odorata.* Some standing and fallen wood decay habitat at edge of wood with evidence of wood boring beetles including Cerambycidae and Scolytidae (Curculionidae). Also log piles and piles of rubble in wood providing niches for invertebrates. Mainly rather heavily shaded interior, but potential for canopy dwelling invertebrate assemblages.
16	20/04/2016	NOT RECORDED	Recently planted hedgebank	Recently replanted, species-poor hedgebank, relatively low invertebrate potential
17	20/04/2016	NOT RECORDED	Hedge with standards on hedgebank	Hedgebank with youngish Blackthorn *Prunus spinosa,* with youngish Ash *Fraxinus excelsior,* Elder *Sambucus nigra*and Bramble *Rubus fruticosus* agg. Some open areas on bank with nesting potential for aculeates. Bank vegetated with Dog's Mercury *Mercurialis perennis,* Common Nettle *Urtica dioica,* Hedge Bedstraw *Galium mollugo,* Bluebell *Hyacinthoides non-scripta* and Wood False-brome *Brachypodium sylvaticum*. Some open areas on bank with nesting potential for aculeates.
18	20/04/2016	SX 88001 57536	Hedge with standards on hedgebank	As TN17 but with greater diversity, including mature Pedunculate Oak *Quercus robur i*n hedgeline. Some standing wood decay habitat.

Table 4 –Incidental invertebrate species recorded within the redline area at the White Rock site on 20th April, 2016

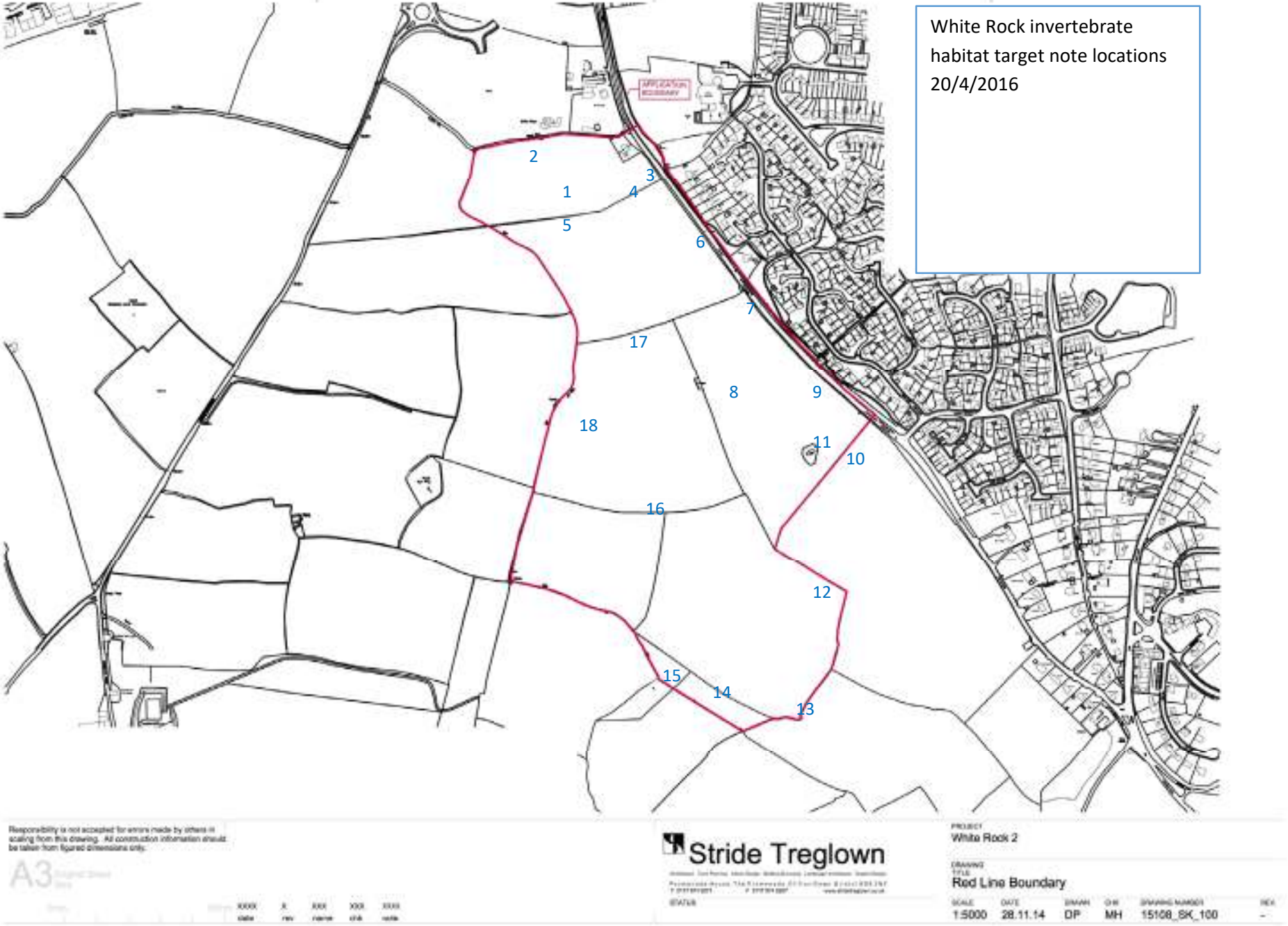
Common name	Scientific name	Family	UK/S41 status	Notes
Woodlice (Isopoda)				
Common Shiny Woodlouse	*Oniscus asellus*	Oniscidae	Widespread	Found under stones, under bark etc.
Common Striped Woodlouse	*Philoscia muscorum*	Philosciidae	Widespread	Found under stones, under bark etc.
Common Rough Woodlouse	*Porcellio scaber*	Porcellionidae	Widespread	Found under stones, under bark etc.
Centipedes (Lithobiomorpha and Geophilomorpha)				
Variegated Lithobius	*Lithobius variegatus*	Lithobiidae	Widespread	Found under stones, under bark etc.
Butterflies, Macro-moths and Micro-moths (Lepidoptera)				
Small Tortoiseshell	*Aglais urticae*	Nymphalidae	Widespread	Larvae feed on Common Nettle *Urtica dioica*
Peacock	*Inachis io*	Nymphalidae	Widespread	Larvae feed on Common Nettle *Urtica dioica*
Green-veined White	*Pieris napi*	Pieridae	Widespread	Larvae feed on crucifers
Beetles (Coleoptera)				
An apionid weevil	*Protapion dichroum*	Apionidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Anchomenus dorsale*	Carabidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Bembidion lampros*	Carabidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Harpalus rufipes*	Carabidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Nebria brevicollis*	Carabidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Paranchus albipes*	Carabidae	Widespread	Common species of grassland and agricultural land etc
A ground beetle	*Pterostichus madidus*	Carabidae	Widespread	Common species of grassland and agricultural land etc
Bloody-nosed Beetle	*Timarcha tenebricosa*	Chrysomelidae	Widespread (south)	Associated with bedstraws *Galium* spp. On which it feeds

Common name	Scientific name	Family	UK/S41 status	Notes
14-spot Ladybird	*Propylea quottuordecimpunctata*	Coccinellidae	Widespread	Common hedgerow and grassland species
A rove beetle	*Paederus littoralis*	Staphylinidae	Widespread	Common species of grassland and agricultural land etc
Two-winged Flies (Diptera)				
Dark-edged Bee-fly	*Bombylius major*	Bombyliidae	Widespread	Cleptoparasite of various ground-nesting bees
Yellow Dung Fly	*Scathophaga stercoraria*	Scathophagidae	Widespread	Associated with livestock dung
A hoverfly	*Eristalis arbustorum*	Syrphidae	Widespread	Common hedgerow and grassland species; larvae develop in organically-rich farmyard drains, ponds etc.
A hoverfly	*Eristalis tenax*	Syrphidae	Widespread	Common hedgerow and grassland species; larvae develop in organically-rich farmyard drains, ponds etc.
A hoverfly	*Helophilus pendulus*	Syrphidae	Widespread	Common hedgerow and grassland species; larvae develop in organically-rich farmyard drains, manure etc.
A hoverfly	*Melanostoma mellinum*	Syrphidae	Widespread	Common hedgerow and grassland species
A hoverfly	*Melanostoma scalare*	Syrphidae	Widespread	Common hedgerow and grassland species
Heineken Hoverfly	*Rhingia caampestre*	Syrphidae	Widespread	Common woodland, hedgerow and grassland species
Bees, Ants and Wasps (Aculeate Hymenoptera)				
Ashy Mining Bee	*Andrena cineraria*	Apidae	Widespread	Ground nesting species associated with *Salix, Prunus* and *Crataegus* and a range of other flowering herbs and shrubs
Short-fringed Mining Bee	*Andrena dorsata*	Apidae	Widespread	Ground nesting species associated with *Salix, Prunus* and *Crataegus* blossom

Common name	Scientific name	Family	UK/S41 status	Notes
Grey-patched Mining Bee	*Andrena nitida*	Apidae	Widespread	Ground nesting species associated with *Salix, Prunus* and *Crataegus* blossom
Chocolate Mining Bee	*Andrena scotica*	Apidae	Widespread	Ground nesting species associated with *Salix, Prunus* and *Crataegus* blossom
Honey Bee	*Apis mellifera*	Apidae	Widespread	Common hive bee
Large Red-tailed Bumblebee	*Bombus lapidarius*	Apidae	Widespread	Ground nesting in colony
Common Carder Bee	*Bombus pascuorum*	Apidae	Widespread	Ground nesting in colony
Buff-tailed Bumblebee	*Bombus terrestris var. audax*	Apidae	Widespread	Ground nesting in colony
Red Mason Bee	*Osmia bicornis*	Apidae	Widespread	Nests in walls, masonry etc.

Appendix 2 – Figures

Figure 1– White Rock 2016 site map and Invertebrate survey Target Note locations


White Rock invertebrate habitat target note locations 20/4/2016
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Responsibility is not accepted for errors made by others in scaling from this drawing. All construction information should be taken from figured dimensions only.
A3
Stride Treglown
PROJECT
White Rock 2
DRAWING TITLE
Red Line Boundary
SCALE 1:5000
DATE 28.11.14
DRAWN DP
CHK MH
DRAWING NUMBER 15108_SK_100
REV -

Appendix 3 - Photographs

Photograph 1 – Improved grassland with planted trees (TN1)

Photograph 2 – Mixed woodland block (TN15)

Photograph 3– Shaded pond in hedgerow (TN8)

Photograph 4 – Eutrophic pond in field (TN11)

Photograph 5 – Uncut hedge with Blackthorn encroaching (TN2)

Photograph 6 – Area of high forest broadleaved woodland (TN4)

Photograph 7 – Mature but Trimmed hedge (TN12)

Photograph 8 – Herb-rich hedgebank (TN9)

Photograph 9 – Herb-poor field margin (TN9)

Photograph 10 – Herb-poor field margin (TN5)

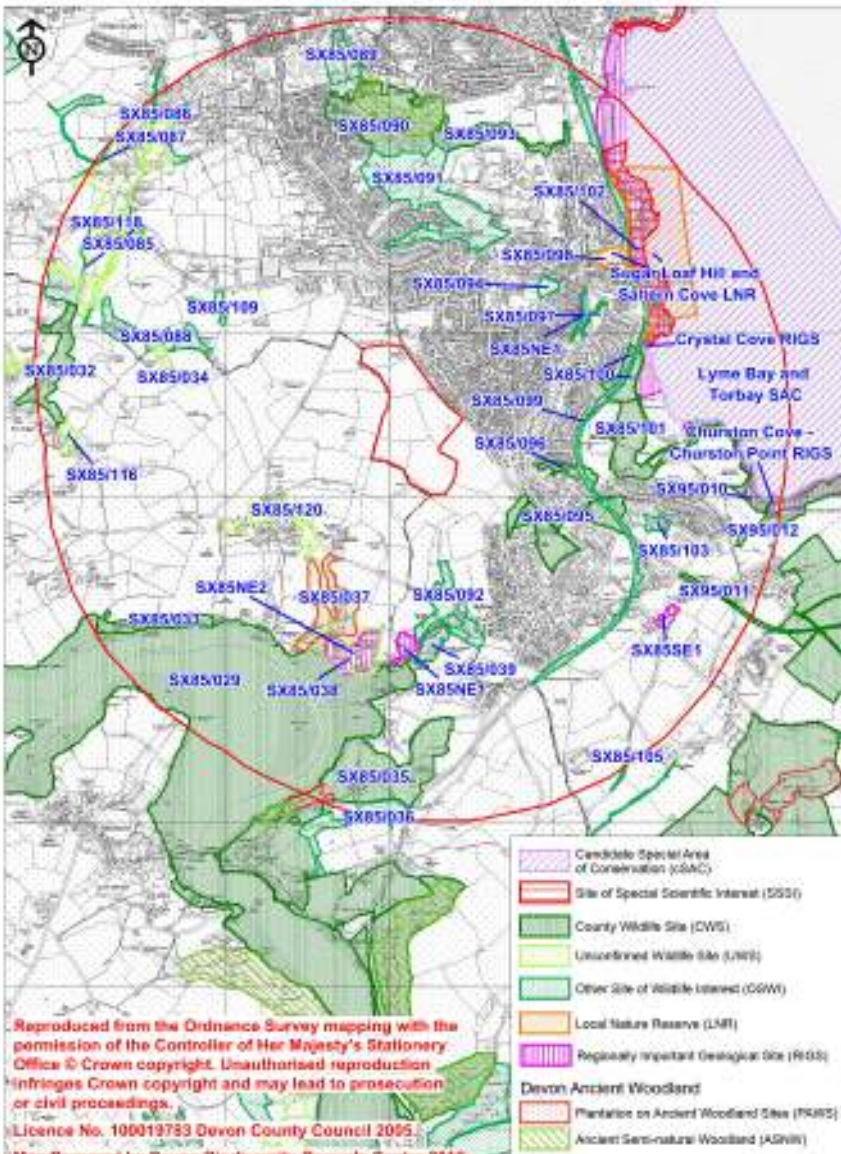
Photograph 11 – Potential wood decay habitat in hedgerow (TN2)

Photograph 12 – Beetle exit holes - probably Cerambycidae (TN15)

APPENDIX III: DWT Nature Conservation Designation Information within 2km of Site

Statutory and non-statutory sites within 2km of White Rock, Torbay (06/06/2016) Enq no. 7934

Devon Biodiversity Records Centre



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Map Prepared by Devon Biodiversity Records Centre 2016.

APPENDIX IV: Extended Phase 1 Habitat Target Notes

Target Notes

F1: Permanent cattle pasture – Perennial Rye-grass *Lolium perenne* (dominant), Common Bird's-foot-trefoil *Lotus corniculatus*, White Clover *Trifolium repens*, Yorkshire-fog, broad-leaved Doc, dandelion, sweet vernal grass, creeping buttercup, Ribwort Plantain).

F2: Arable/grassland ley rotation – Improved pasture earlier in the year (Perennial Rye-grass - PRG). Sewn with Kale in summer 2016 for a winter fodder crop, with ~5m margins of PSI (PRG, broad-leaved doc, white clover, red clover, dandelion, creeping buttercup, Ribwort plantain, Creeping Bent Agrostis stolonifera, Smooth Meadow Grass *Poa pratensis*).

F3: Improved Pasture (but understood is also subject to ploughing/cropping to produce winter fodder crop). PRG, White clover, broad-leaved doc, creeping buttercup, Ribwort plantain

F4: As F3

F5: Arable wheat/barley crop (spring and autumn sewn i.e. no winter stubbles) with ~3m margins. PRG, Cock's-foot, Dandelion, Germander speedwell, Yorkshire-fog, False oat grass *Arrhenatherum elatius*, Hogweed *Heracleum sphondylium,* Spear-thistle *Cirsium vulgare*., and Ribwort Plantain *Plantago lanceolata*.

F6: Recently planted woodland over semi-improved grassland. Yorkshire Fog *Holcus lanatus* dominant. Sward with Cock's foot *Dactylis glomerata* and Creeping Bent *Agrostis stolonifera* and herbs including Dandelion *Taraxacum officinale (*agg.), Creeping Thistle *Cirsium arvense*, Marsh Thistle *C. palustre,* Cut-leaved Crane's-bill *Geranium dissectum,* Broad-leaved Dock Rumex obtusifolius, Curled Dock *R. crispus,* Creeping Buttercup *Ranunculus repens,* Ribwort Plantain *Plantago lanceolata,* White Clover *Trifolium repens,* Hogweed *Heracleum sphondylium,* Common Ragwort *Senecio jacobaeae* and a Hawkweed Hieracium sp. Red Campion Silene dioica and Common Teasel *Dipsacus fullonum*. Southern Marsh Orchids recorded in June.

Tree saplings (mainly broadleaved) including Oak, Holly, Hawthorn, Hazel.

Nords Plantation

Mixed b/l woodland, with a range of native and non-native trees including Sycamore Acer pseudoplatanus, Ash Fraxinus excelsior, pines Pinus spp., Norway Spruce Picea abies, Holme Oak Quercus ilex and veteran Beech Fagus sylvatica. Understorey with Grey Willow Salix cinerea and Elder Sambucus nigra and scrub layer with Bramble Rubus fruticosus agg. and Butcher's Broom Ruscus aculeatus. Ground flora largely shade-tolerant herbs with Dog's Mercury Mercurialis perennis, Common Nettle Urtica dioica, Lords and Ladies Arum maculatum, Stinking Iris Iris foetidissimma, Bluebell Hyacinthoides non-scripta, Red Campion Silene dioica, Primrose Primula vulgaris, Ground Ivy Glechoma hederacea, Herb Robert Geranium robertiana and Sweet Violet Viola odorata. Also Cotoneaster locally dominant

Pond 1 (in hedge)

Stone-edged, heavily silted pond over shaded by mature, multi-stemmed willow *Salix cinerea/caprea*. Pond deep with shallow margins, but with no visible macrophyte vegetation. Banks with Ivy *Hedera helix,* Common Nettle *Urtica dioica* and Lesser Celandine *Ranunculus ficaria*.

Pond 2 (in field)

Shallow pond; heavily cattle poached at margins and eutrophic with blanket algal blooms. More open than P1 with some macrophyte vegetation including predominately Floating Sweet Grass *Glyceria fluitans* and Brooklime *Veronica beccabunga.* With mature sallow *Salix cinerea/caprea* growing in pond and Ash *Fraxinus excelsior* growing adjacent to pond, casting shade. Pond gradually deepening from shallow margins. Rubble heaps adjacent to pond and fallen wood decay habitat.

APPENDIX V: Building Bat Potentials

Off-site Building Bat Potential

Building Ref	Description	Bat Roosting Potential	Access Constraints
1	Open fronted shed with corrugated metal walls and corrugated asbestos roof supported on simple timber beams. Earth floor. Open to the elements and no suitable crevices recorded for roosting bats.	Negligible	None
2	Two-storey derelict brick farmhouse with pitched tiled roof. Numerous entrance points for bats including glass removed from windows, partly open door, large areas of roof collapse and numerous missing tiles in other areas of the roof. Derelict nature of the building lowers its suitability due to exposure to the weather, but some intact areas of roofing and dark/sheltered lower ground floor rooms provide suitable features for roosting bats. No evidence of roosting bats recorded on ground floor.	Moderate	Upper floor and roof space not accessed due to H&S concerns.
3	Large two-storey stone and brick barn structure, in a severe state of disrepair with no roof or ceilings. Some shallow crevices likely where old floor joist remnants enter the stone work.	Low	None
4	Double height open ended barn with corrugated metal walls and roof. Open to the elements and no suitable crevices recorded for roosting bats.	Negligible	None
5	Derelict single storey brick and stone barn with shallow pitched corrugated metal roof, with felt and wooden sarking underneath (providing suitable crevices for roosting bats). Open doorways and windows (no glass) provide access, but also keep internal area lit. Two accumulations of droppings characteristic of GHS present in two rooms underneath wooden roof beams, suggesting GHS night roost (given lit conditions)	Roost	None
Pig sty (PS)	Single storey stone walled former pig sties. Slate tile single pitch roof siting directly on timbers. Open windows and doors make internal conditions light, but overall sheltered internal conditions. Wisteria makes for cluttered external environment.	Potential horseshoe night roost.	None
6	Single storey brick lean-to with collapsed metal roof. Overgrown by wisteria and no obvious features suitable for roosting bats.	Negligible	None
7	Derelict animal kennels with corrugated asbestos and felt roofs. Small extent of wooden sarking in good condition in places. Open doors and windows make internal conditions light and open to the elements.	Low potential, but negligible potential for horseshoe day roost.	None

8	Stone clad and rendered single storey storage building with flat corrugated metal roof. Open windows and door make internal conditions light and exposed to the elements.	Negligible	None
9	Single storey brick storage building. Pitched corrugated asbestos roof sits directly on timbers. MDF sheets create sheltered roof void. Open doors and windows make internal conditions light.	Potential horseshoe night roost.	Only partial access to roof void area.
10 (Inglewood)	Derelict two-storey stone house. Roof and ceilings largely missing. Broken windows and doors removed. A basement area is present with some missing floorboards and hatch at ground level make some areas light, but dark areas are present. Single storey rendered extension with flat felt roof and roof. Windows bricked up, but door open and another door leads into main building. Wooden soffits in relatively good condition.	Moderate	No access to basement due to H&S safety concerns.
11	Single storey breeze block storage building. Pitched corrugated asbestos roof sits directly on timbers. No door makes internal conditions light (no roof space)	Potential horseshoe night roost.	None
White Rock Cottages	Semi-detached two storey houses. Slate tile roof with tiles missing on southern elevation. Large central chimney.	Moderate	External assessment from property boundary. No internal access.

Building Ref	Photos
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Pig sty (PS)	 

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11	 

White Rock Cottages	

APPENDIX VI: Manual Bat Survey Records

Dusk Transect Survey 19/04/2016
Sunset 20:16

Transect	Point count	Time	Species	Number	Notes
2	1	20:47	Pipi	1	Foraging up & down hedge. From north, foraged for 1 minute then flew north
2	1	20:52	Pipi	1	Foraging up & down hedge for 30 seconds. Headed south
2	1	21:00	Pipy	1	Commuting north along hedge
2	1	21:01	Pipi	2	Foraging for 2 minutes
2	1	21:08	Pipi	1	Commuting north
2	1	21:12	Pipi	1	Commuting south
2	1	21:16	Pipi	1	Flew from south. Foraging for 1 minute
2	5	21:59	Pipi	1	Commuting north along the hedge
2	7	22:34	Rhhi	1	Commuting north. Same bat as heard on transect SM
3	1	20:41	Pipi	1	Constant foraging from tree along hedgerow
3	1	20:54	Rhfe	1	Brief foraging pass next to gate (opposite side of hedge to surveyor)
3	1	21:01	Rhhi	1	Brief foraging pass next to gate (near side of hedge)
3	1	21:08	Rhfe	1	Brief foraging pass next to gate (opposite side of hedge to surveyor)
3	1	21:12	Rhfe	1	Brief foraging pass next to gate (opposite side of hedge to surveyor)
3	2	21:18	Pipi	2+	Multiple bats foraging & social calls. Constant
3	2-3	21:24	Pipi	2+	Multiple bats foraging & social calls. Along hedgerow
3	3	21:31	Pipi	1	Foraging. Multiple passes
3	4	21:37	Pipi	1	Foraging. Multiple passes
3	5-6	21:54	Pipi	1	Brief foraging
3	6	22:02	Rhhi	1	Foraging along & next to hedgerow
3	8	22:31	Rhhi	1	Commuting. Brief pass
1	1	20:37	Pipi	1	Faint call
1	1	20:38	Pipi	1	Brief call
1	1	20:41	Pipi	1	Foraging west along hedge from pc1 position
1	1	20:46	Pipi	2	2x bats foraging up & down boundary west from point 1
1	1	20:55	Pipi	2	2x bats foraging up & down boundary west from point 1
1	1	20:57	Pipi	2	2x bats foraging up & down boundary west from point 1
1	2	21:19	Rhfe	1	Quick pass
1	3	21:28	Pipi	1	1 or 2 bats foraging around field corner for full 5 minutes
1	3-4	21:33	Pipi	1-2	1-2 pips foraging along hedge by road between points 3 & 4

Transect	Point count	Time	Species	Number	Notes
1	3-4	21:37	Pipi	1-2	1-2 pips foraging along hedge by road between points 3 & 4
1	4	21:39	Pipi	1-2	Constant foraging around field corner
1	4-5	21:45	Rhfe	1	Single quick pass mid-way between points 4 & 5

Dawn Transect Survey 13/05/16
Sunrise 05:29

Transect	Point count	Time	Species	Number	Notes
3	4	03:44	Pipi	1	Constant foraging. Frequent passes
3	4-5	03:50	Pipi	1	Constant foraging along hedgerow
3	5	04:00	Pipi	1	Constant foraging along hedgerow. Frequent passes for 2 minutes
3	5-6	04:07	Pipi	1	Constant foraging along hedgerow
3	6	04:11	Pipi	1	Constant foraging along hedgerow
3	6	04:15	Pipi	1	Constant foraging along hedgerow
3	6-7	04:19	Pipi	2	Constant foraging along hedgerow
3	8	04:40	Pipi	1	Foraging, single pass
2	5	04:04	Pipi	1	Commuting
2	7-8	04:30	Pipi	1	Commuting
2	7-8	04:36	Pipi	1	Commuting
2	7-8	04:39	Pipi	1	Commuting
2	8	04:43	Pipi	1	Commuting
2	8	04:45	Pipy	1	Foraging
2	1-2	04:55	Pipi	1	Commuting
1	2	03:29	Pi sp.	1	Brief single foraging pass. Loud
1	2	03:33	Pi sp.	1	Brief commuting pass. Quiet
1	2-3	03:35	Pi sp.	1	Constant foraging. Loud
1	3	03:41	Pi sp.	1	Brief single foraging pass. Quiet
1	3	03:42	Pi sp.	1	Brief single foraging pass. Loud
1	4	03:49	Pi sp.	1	Brief single foraging pass. Quiet
1	4	03:51	Pi sp.	1	Constant foraging/ circling. Fairly loud
1	8	04:29	Pi sp.	1	Brief single foraging pass. Quiet

Transect	Point count	Time	Species	Number	Notes
1	8	04:30	Pi sp.	1	Brief single foraging pass. Loud
1	8-2	04:35	Pi sp.	1	Constant foraging along hedge bank/ path
1	8-2	04:38	Pi sp.	1	Constant foraging along hedge bank/ path
1	2	04:46	Pi sp.	1	Brief single foraging pass. Quiet
1	2	04:50	Pi sp.	1	Brief single foraging pass. Quiet
1	2-3	04:52	Pi sp.	1	Brief single foraging pass. Loud
1	3	04:59	Pi sp.	1	Brief single foraging pass. Quiet

Dusk Transect Survey 26/05/16
Sunset 21:10

Transect	Point count	Time	Species	Number	Notes
1	7	22:30	Pi sp.	1	Not seen
2	4	21:56	Pipi	1	Brief, quite
2	3	21:12	Pipi	1	Foraging in hedge. Regular for 5 minutes
2	2	21:24	Pipi	2	Brief, single passes
2	2-1	22:25-35	Pipi	4+	Lots of activity up and down along hedge between points 2 and 1. Constant
2	1	22:38	Pipi	2	Foraging up & down hedge. Constant
2	1-7	22:40-50	Pipi	1	Couple of passes between points 1 & 7
2	7	23:01	Pipi	1	Single pass
2	6	22:17	Pipi	3+	Constant foraging activity. At least three bats
3	5	21:52	Pipi	1	Passing along hedge
3	5	21:54	Pipi	1	Foraging around hedge
3	6	22:19	Pipi	1	Passing
3	7	22:32	Pipi	1	Passing
3	7	22:37	Pipi	1	Passing along by edge of copse. Several passes
3	8	22:50	Pipi	1+?	Passing/ few passes/ can't see bat. Maybe same one.
3	8	23:06	Pipi	1	Passing along hedge. Constant
3	4	23:08	Pipi	1	Foraging
3	4	23:11	Pipi	1	Faint. Passing/ foraging
3	3	23:16	Pipi	1	Pass

Transect	Point count	Time	Species	Number	Notes
3	3	23:20	Pipi	1	Faint pass
3	2	23:31	Pipi	1	Pass
3	2	23:35	Pipi	1	Pass
3	2	23:38	Pi sp.	1	Along hedge along road

Dusk Transect Survey 08/06/16
Sunset 21:23

Transect	Point count	Time	Species	Number	Notes
1	8	22:06-08	Nyno	1	Constant foraging
1	8	22:08	Rhfe	1	Closely following hedge
1	8	22:09	Pipi	1	Commuting
1	8	22:10-12	Nyno	1	Intermittent foraging passes (distant)
1	8	22:15	Pipi	1	Foraging around ash tree canopy
1	8	22:15	Rhfe	1	Commuting
1	8	22:21	Pipi	1	Single pass
1	8	22:23	Pipi	1	Constant foraging around ash tree for around 1 minute
1	8	22:25	Pipi	1	Single foraging pass along hedge
1	7	22:37	Pipi	1	Commuting in a south west direction. Flying directly over arable field.
1	7	22:39	Pipi	1	Single brief pass
1	7-6	22:43	Pipi	1	Single brief pass
1	7-6	22:45-48	Pipi	1	Foraging along hedgerow
1	6	22:50	Pipi	1	Single foraging pass
1	6	22:53-57	Pipi	2	Constant foraging along lane
1	6-5	22:59	My sp.	1	Very brief pass near point 6
1	6-5	22:00-01	Pipi	1+	Single foraging pass
1	6-5	23:04-05	Pipi	1	Foraging along hedge
1	6-5	23:06-11	Pipi	2	Foraging along hedge (likely same bats as above)
1	6-5	23:12	My sp.	1	Single foraging pass along hedge
1	6-5	23:12	Pipi	1	Single foraging pass
1	5	23:14-16	Pipi	2	Constant foraging with intermittent passes recorded

Transect	Point count	Time	Species	Number	Notes
1	5	23:19	Pipi	1	Single pass
1	5	23:20	Pipi	1	Single pass
1	5-4	23:21	Pipi	1	Single pass
1	5-4	23:24	Pipi	1	Constant foraging
1	5-4	23:24	Rhfe	1	Very faint & rapid. Possibly on south side of hedge
1	4	23:27-31	Nyno	1	Constant foraging nearby. Intermittent passes
1	4	23:27-32	Pipi	2	Constant foraging along road hedge and around street lights
1	4-3	23:33-38	Pipi	2+	Constant foraging along road/ around street lights (same bat as above)
1	4-3	23:33	Nyno	1	Single foraging pass
1	3	23:39-44	Pipi	2+	Same pips as above – foraging around lights & over road hedge/ in field corner
1	3	23:39	Nyno	1	Single foraging pass
1	2	23:47	Pipi	1	Single foraging pass
1	2	23:50	Pipi	1	Intermittent passes
1	2-1	22:54	Pipi	1	Brief pass – likely same bat as at point 2
1	2-1	22:56-57	Nyno	1	Single foraging pass
1	1	00:01-04	Pipi	1	Constant foraging. Intermittent passes
1	1	00:02	Nyno	1	Single foraging pass
1	1	00:03	Rhfe	1	Commuting
2	2-3	22:28	Pipi	1	Commuting south
2	3	22:33	Pipi	1	Commuting. Faint
2	3-4	22:38	Pipi	1	Commuting. Faint
2	3-4	22:41	Pipi	1	Commuting. Faint
2	3-4	22:42	Pipi	1	Commuting. Faint
2	3-4	22:46-49	Pipi	1	Constant foraging
2	3-4	22:51	Pipi	1	Commuting. Faint
2	4	22:57-59	Pipi	1	Foraging. Faint
2	4-5	23:07-09	Pipi	1	Constant foraging along hedge
2	5	23:11-16	Pipi	1	Constant foraging other side of hedge
2	5-6	23:16-22	Pipi	1+?	Constant foraging along hedge
2	6	23:22-28	Pipi	1+?	Constant foraging
2	1	23:32-38	Pipi	1+?	Occasional pip
2	1-8	23:43	Pipi	1	
2	8	23:46-52	Pipi	1	Quite

Transect	Point count	Time	Species	Number	Notes
2	8-7	23:55	Pipi	1	Foraging following hedge
2	7	00:01-07	Pipi	1	Occasional passes
3	8	22:22	Pipi	1	Foraging along hedgerow & in pasture field
3	8	22:31	Pipi	1	Foraging along hedgerow & in pasture field
3	8	22:32	Pipi	1	Foraging
3	8	22:33	Pipi	1	Foraging in corner of field. Five or so passes
3	8-7	22:34	Pipi	1	2 passes
3	8-7	22:35	Pipi	2	Foraging along hedgerow. Two passes
3	8-7	22:38	Pipi	1	Very faint, by woodland
3	7	22:41	Pipi	1	Foraging
3	7	22:43	Pipi	1	
3	7-6	22:47	Pipi	1	Foraging along hedgerow just past woodland. Four passes
3	7-6	22:54	Pipi	1	Hedgerow near point 6
3	6	22:57	Pipi	1	Along tree line and within pasture field. Three passes
3	6-5	23:00	Pipi	1	Foraging along treeline just past point 6
3	6-5	23:01	Pipi	1	Just past point 6 by treeline/ hedgerow
3	6-5	23:04	My sp.	1	Hedgerow/ pasture field habitat
3	5	23:07	Pipi	1	Faint at point 5. Hedgerow/ pasture field
3	5	23:08	Pipi	2	Six passes between one and two bats
3	5-4	23:11	Pipi	1	Hedgerow/ pasture habitat
3	5-4	23:14	Nyno	1	(unconfirmed from sound analysis)
3	5-4	23:15	Pipi	2	Hedgerow/ grassland – just out of cow field
3	5-4	23:16	Pipi	1	Hedgerow/ pasture/ grassland
3	5-4	23:17	Pipi	1	Foraging. Two passes
3	4	23:20	Pipi	1	Brief pass
3	4	23:23	Rhfe	1	Very brief & faint (unconfirmed from sound analysis)
3	4	23:25	Nyno	1	
3	4-3	23:26	Pipi	1	
3	4-3	23:27	Nyno	1	
3	4-3	23:28	Pipi	1	Hedgerow near tree 'island'
3	4-3	23:28	Pipi	1	Commuting along hedgerow, 2 passes
3	4-3	23:31	Nyno	1	
3	4-3	23:31	Pipi	1	Hedgerow, 2 passes
3	4-3	23:31	Pipi	1	Hedgerow, 5 passes

Transect	Point count	Time	Species	Number	Notes
3	3	23:34	Pipi	1	Seven passes
3	3	23:35	Nyno	1	Three passes
3	3	23:37-39	Pipi	1	Constant activity through point count
3	3	23:37-39	Nyno	1	Constant activity through point count
3	3-2	23:43-48	Pipi	2	Near constant activity. Between one and two bats. Foraging observed around street light
3	3-2	23:44-48	Nyno	1	Near constant activity. At times, long noctule passes.
3	3-2	23:50	Pipi	1	
3	3-2	23:50	Nyno	1	
3	3-2	23:51	Nyno	1	
3	3-2	23:51	Pipi	1	
3	2	23:53-58	Nyno	1+?	
3	2	23:53-58	Rhfe	1+?	
3	2	23:53-58	Pipi	1+?	
3	2-1	23:59	Pipi	1	
3	2-1	00:01	Nyno	1	Hedgerow/ grassland
3	1	00:03	Nyno	1	
3	1	00:05	Pipi	1	Foraging. Four passes
3	1	00:05	Nyno	1	
3	1	00:06	Nyno	1	
3	1	00:07	Nyno	1	

Dusk Transect Survey 20/06/2016
Sunset 21:28

Transect	Point count	Time	Species	Number	Notes
1	5	21:45	Nyno	1	
1	5	21:51	Nyno	1	
1	5	21:52	Nyno	1	
1	5	21:53	Nyno	1	
1	5	21:58-59	Nyno	1	
1	5	22:01	Nyno	1	

Transect	Point count	Time	Species	Number	Notes
1	5	22:21	Pipi	1	
1	5	22:22	Pipy	1	
1	5	22:24	Pipi	1	Foraging, single pass (eastwards)
1	5	22:25	Pipi	1	Foraging, single pass (south-westwards)
1	5	22:27	Pipi	1	
1	5	22:28	Pipi	1	Constant foraging
1	5	22:30	Pipi	1	
1	5-6	22:32	Pipi	1	Constant foraging
1	5-6	22:33	Pipi	1	Constant foraging
1	5-6	22:34	Pipi	1	Constant foraging
1	5-6	22:38	Pipi	1	
1	6	22:43	Pipi	1	
1	6	22:45	Pipi	1	
1	6	22:47	Pipi	1	
1	6-7	22:49	Pipi	1	
1	7	22:52	Pipi	1	
1	4	23:45	Pipi	1	
2	5	21:57	Nyno	1	Not seen/ faint calls
2	5	22:19	Pipi	1	Foraging up & down hedgerow
2	5	22:23	Pipi	1	Foraging in corner of field. Constant
2	5	22:23	Pipy	1	Foraging in corner of field. Constant
2	4-2	22:29	Nyno	1	Across field
2	2	22:50	Pipy	1	Pass
2	3	22:57	Pipi	1	Pass
2	3	23:00	Pipi	1	Passing
2	3-6	23:03	Pipi	1	Several passes along hedge between points 3 & 6. Maybe same bat
2	6	23:07	Pipi	1	Frequent movement along hedge
2	6	23:10	Pipy	1	
2	1	23:15-45	Rhfe	1+?	
2	1	23:15-45	Pipi	1+?	
2	1	23:15-45	Pipy	1+?	
2	6	23:57	Pipi	1	Passing
2	7	00:06	Pipi	1	Pass

Transect	Point count	Time	Species	Number	Notes
3	7-6	21:59	Nyno	1	
3	7-6	22:03	Pipi	1	
3	7-6	22:03	Nyno	1	
3	7-6	22:09	Pipi	1	
3	7-6	22:09	Pipi	1	Two passes
3	7-6	22:11	Pipi	1	Same flight line as other bats, just in opposite direction
3	7-6	22:12	Pipi	1	
3	7-6	22:13	Pipi	1	
3	7-6	22:17	Pipi	1	Foraging
3	7-6	22:21	Pipi	1	
3	7-6	22:21	Nyno	1	
3	7-6	22:25	Pipi	1	Three passes foraging along treeline
3	7-6	22:27	Pipi	1	Two passes
3	7-6	22:28	Pipi		Commuting along tree/ hedge line
3	7-6	22:30	Nyno	1	
3	7-6	22:33	Nyno	1	
3	6-5	22:39	Pipi	1	Three passes
3	6-5	22:40	Pipi	1	Three passes, foraging over field
3	6-5	22:42	Pipi	1	Foraging in field, 6 passes
3	6-5	22:44	Pipi	1	
3	5	22:46-50	Pipi	1	
3	5-4	22:51	Pipi	1-2	
3	5-4	22:53	Pipi	1-2	Foraging, occasionally 2 bats. Seven passes
3	5-4	22:54	Pipy	1	Two passes
3	4-3	23:05	Pipi	1	Faint
3	3	23:07	Pipi	1	Four passes
3	2	23:20	Pipi	1	Faint
3	1	23:23	Pipi	1	
3	1	23:27	Pipi	1	
3	1-8	23:29	Pipi	1	
3	1-8	23:32	Pipi	1	Three passes along hedge line
3	1-8	23:33-35	Pipi	1	Constant foraging
3	1-8	23:33-35	Pipy	1	Constant foraging

Transect	Point count	Time	Species	Number	Notes
3	1-8	23:38	Pipi	1	
3	8	23:41	Pipi	1	Constant foraging. Nine passes
3	8-7	23:47	Pipi	1	
3	8-7	23:49	Pipi	1	Constant foraging along woodland edge
3	7	23:53	Pipi	1	
3	7	23:53	Pipy	1	
3	7	23:56	Pipi		
3	7-6	00:01	Nyno	1	
3	7-6	00:02	Pl sp.	1	
3	6	00:07	Pipi	1	

Dusk Transect Survey 11/07/2016

Sunset: 21:33

Transect	Point count	Time	Species	Number	Notes
2/3	B5	22:25	Pi sp.	1	Faint to south of surveyor
2/3	B5-B6	22:32	Pipi	1	Commuting
2/3	B6-B7	22:44	Pipi	1	Commuting east
2/3	B6-B7	22:50	Pipi	1	Foraging
2/3	B7	22:54	Pipi	1	Constant foraging
2/3	B7-G4	22:58-23:02	Pipi	1+?	Constant foraging
2/3	G6	22:26	Pipi	1	Faint. Commuting
2/3	G6-G1	23:28	Pipi	1	Commuting
2/3	G1	23:30-36	Pipi	1	Constant foraging
1	4	22:27	Pipi	1	
1	7-6	23:16	Pipi	1	
1	4-3	23:47	Nyno	1	
1	3	23:52	Pipi	1	
1	3	23:53	Pipi	1	
1	3	23:54	Pipi	1	
1	3-2	23:58	Pi sp	1	

Dusk Transect 1 & Off-site Building Survey 04/08/2016
Sunset 20:52

Transect	Point count	Time	Species	Number	Notes
1	5-4	21:41	Pipi	1	Single pass, assumed south side of hedge
1	5-4	21:47	Pipi	1	Commuting single pass, brief
1	5-4	21:49	My sp.	1	Commuting single pass
1	5-4	21:52	Pipi	1	Commuting single pass along hedgerow
1	3	22:06	Pipi	1	Several passes with foraging along hedgerow. Regular intervals during point count
1	3-2	22:13	Pipi	1	Foraging along hedgerow at regular intervals
1	2-1	22:23	Pipi	1	Commuting single pass
1	2-1	22:25	Pipi	1	Several brief passes
1	1	22:33	Pipi	1	Commuting single pass
1	8	22:38	Pipi	1	Commuting single pass
1	7	22:53	Pipi	1	Commuting single pass
1	5	23:20	Pipi	1	Commuting single pass
OS bldng	1	21:55	Pipi	2	
OS bldng	1	21:20	Pipi	1	
OS bldng	1	21:42	Pi sp	1	Commuting
OS bldng	1	21:56	Rhhi	1	Commuting
OS bldng	1	22:00	Pi sp	1	Foraging
OS bldng	1	22:04	Pi sp	1	Commuting east
OS bldng	1	22:09	Pi sp	1	Commuting
OS bldng	1	22:12	Pi sp	1	Commuting west
OS bldng	1	22:14	Rhhi	1	Commuting
OS bldng	1	22:23	Pi sp	2	
OS bldng	2	22:35	Pipi	1	Commuting
OS bldng	2	22:40	Pi sp	1	Commuting
OS bldng	3	23:14	Pipi	1	Commuting
OS bldng	3	23:22	Pi sp	1	
OS bldng	3	23:25	Pipi	1	Commuting
OS bldng	3	22:28	Pipi	1	Commuting & social calling

Dusk Transect Survey 17/08/2016
Sunset 20:29

Transect	Point count	Time	Species	Number	Notes
1	1-2	21:01	Pipi	1	Commuting south
1	1-2	21:01	Pipi	1	Commuting north
1	1-2	21:02	Pipi	1	Faint
1	1-2	21:03	Pipi	1	Foraging along hedge by house
1	1-2	21:05	Pipi	1	Commuting south
1	1-2	21:09	Nyno	1	
1	1-2	21:16	Pipi	1	
1	1-2	21:19	Pipi	1	Flew over field/ into open space
1	1-2	21:26	Pipi	1	Foraging
1	1-2	21:30	Pipi	1	
1	1-2	21:38	Pipi	1	
1	1-2	21:39	Pipi	1	
1	1-2	21:41	Pipi	1	
1	1-2	21:48	Pipi	2	Two bats passed within close timing
1	1-2	21:48	Pipi	1	
1	1-2	21:59	Pipi	1+?	Social calls and constant foraging
1	1-2	22:00	Plau (?)	1	
1	1-2	22:03	Pipi	1	
1	2	22:04	My sp	1	
1	2	22:06-08	Pipi	1	Five passes
1	2-3	22:09	Pipi	1	
1	3	22:12-17	Pipi	1+?	Constant activity through point count
1	3-4	22:17	Pipi	1+?	Constant activity until point count 4 reached (social calls)
1	4	22:21-24	Pipi	1+?	Eight passes
1	5	22:29-34	Pipi	1+?	Eight passes and social calls
1	5-6	22:37	Pipi	1	
1	6-7	22:46	Pipi	1+?	Eight passes with social calls
1	7	22:52-57	Pipi	1+?	Two passes with social calls
1	8	23:06	Rhhi	1	Single pass
1	8	23:07	Pipi	1	Two passes

Transect	Point count	Time	Species	Number	Notes
1	8-1	23:10	My sp	1	
1	8-1	23:11	Pipi	1	
1	8-1	23:14	Pi sp	1	Social calls
1	1	23:20	Pipi	1	
2	6	20:52	Pipy	1	Foraging
2	6	20:57	Pipy	1	Commuting west
2	6	21:01	Pipi	1	Commuting west
2	6	21:04	Pipi	1	Foraging. Came from & returned south
2	6	21:06	Pipi	1	Feeding over fields
2	6	21:12	Pipi	1	Feeding over hedge east - west
2	6	21:14	Rhhi	1	Commuting
2	6	21:19	Pipi	1	Commuting
2	6	21:20	Pipi	1	Feeding over field corner
2	6	21:34	Epse	1	
2	6	21:42	Pipi	1	Occasional foraging passes
2	6	21:46	Pipi	2	Foraging
2	6	21:51	Pipi	1	
2	6	21:52	Rhfe	1	Commuting
2	6	22:00	Pipi	1	
2	1	22:00	Pipi	1	
2	1	22:06	Pipi	1	Commuting
2	1-2	22:14	Pipi	1	Commuting
3	4-5	20:55	Pipi	1	Commuting. Across field & over hedge
3	4-5	20:59	Pipi	1	Foraging
3	4-5	21:00	Pipi	1	Feeding along hedgerow and grasses on border
3	4-5	21:04	Pipi	2	Along hedgerow line
3	4-5	21:10	Pipi	1	Commuting. Straight direct flight across fields
3	4-5	21:12	Pipi	1	
3	4-5	21:14	Nyno	1	
3	4-5	21:14	Pipi	1	
3	4-5	21:15	Epse	1	
3	4-5	21:15	Pipi	1	
3	4-5	21:19	Pipi	1	Constant foraging in corner

Transect	Point count	Time	Species	Number	Notes
3	4-5	21:20	Pipi	2	Constant foraging along hedgerows
3	4-5	21:24	Pipi	1	Commuting along field boundary. Straight flight
3	4-5	21:25	Pipi	1	
3	4-5	21:29	Pipi	1	
3	4-5	21:29	Epse	1	
3	4-5	21:29	Rhfe	1	
3	5	21:38	Pipi	1	
3	6	21:45	Pipi	1	
3	7	21:55	Pipi	1	
3	8	22:00	Pipi	1	Constant foraging along scrub boundary
3	8	22:06	Epse	1	
3	8	22:07	Pipi	1	Foraging
3	8	22:12	Pipi	1	
3	3	22:22	Pipi	1+?	Constant pipistrelle activity at point count
3	3	22:23	Pipi	1+?	
3	3	22:24	Pipi	1+?	
3	3	22:30	Pipi	1+?	Along hedgerow by road
3	2	22:36	Pipi	1	Along hedgerow
3	1	22:45	Pipi	1	
3	1	22:47	Pipi	1	
3	4-5	22:55	Pipi	1	
3	4-5	22:55	My sp	1	
3	5	22:58	Pipi	1+?	Constant pipistrelle activity
3	6	23:05	My sp	1	
3	8	23:21	Pi sp	1+?	Constant pipistrelle foraging

Dusk Transect Survey 30/08/2016
Sunset: 20:02

Transect	Point count	Time	Species	Number	Notes
1	8	20:40	Pipi	1	Brief pass
1	8	20:59	Pipi	1	Loud pass close by
1	1	21:09	Pipi	1	Single pass
1	1-2	21:14	Pipi	1	Single pass
1	2-3	21:22	Pipi	2	Social calls
1	2-3	21:23	Pipi	2/3	Seem to be commuting east to west along the hedge line. Social calls
1	3	21:25	Pipi	1	Brief pass
1	3	21:28	Pipi	1	Pass and foraging
1	3	21:30	Pipy	2	Foraging constantly around the lamp post on the adjoining road and using the field and hedgerows to feed
1	4	21:36	Pipi	1	Brief pass
1	4	21:36	Pipy	1	Feeding around street lamp and gate entrance
1	4-5	21:44	Pipi	2	Two passes
1	6	22:27	Pipi	1	Brief pass
1	6	22:12	Rhhi	1	Single pass
2/3	Static	20:58	Pipi	1	Single fast pass
2/3	Static	20:58	My sp	1	Single fast pass
2/3	Static	21:00	Pipi	1	Single fast pass. Commuting along hedge bank
2/3	Static	21:06	Rhhi	1	Single pass. Seen where field boundaries meet/ hedges
2/3	Static	21:13	Pipi	1	Single brief pass
2/3	Static	21:14	Epse	1	Single brief pass
2/3	Static	21:16-43	Epse	1	Foraging in adjacent field. Feeding buzzes
2/3	Static	21:19	Epse	1	Potentially same bat as above. Also foraging over hedge bank
2/3	Static	21:21	Pipi	1	Constant foraging
2/3	Static	21:25	Epse	3	Foraging & possible social activity
2/3	Static	21:33	Pipi	1	Single fast pass
2/3	Static	21:33	Epse	1	Constant foraging over field & hedgerow
2/3	Static	21:39	Pipi	1	Brief pass. Very slow echolocation pattern
2/3	Static	21:43	Pipi	1	Constant foraging
2/3	Static	21:43	Epse	1	Constant foraging

Transect	Point count	Time	Species	Number	Notes
2/3	Static	21:54	Epse	1	Several foraging passes
2/3	Static	21:56	Epse	1	Continuous foraging until 22:08
2/3	Static	22:04	Pipi	1	Brief & faint pass
2/3	Static	22:09	Rhfe	1	Single brief pass
2/3	Static	22:11	Rhfe	1	Second pass. Not seen. Very faint. Possible distant foraging?
2/3	Static	22:13	Rhfe	1	Seen to briefly fly across the hedge-bank. Several passes heard.
2/3	Static	22:20	Pipi	1	Single brief pass
2/3	Static	22:22	Pipi	1	Single brief pass
2/3	Static	22:32	Pipi	1	Several passes with feeding buzzes. May be foraging along hedge-bank.
2/3	Static	22:35	Epse	1	Several passes. Continued until 22:43
2/3	Static	22:39	Pipi	1	Single pass
2/3	Static	22:43	Epse	1	Probably same bat as at 22:35 but much louder/ closer to surveyor
2/3	Static	22:55	Epse	1	Single pass
2/3	Static	23:00	Pl sp.	1	Fast pass over hedge-bank across to south of field
2/3	Static	23:01	Epse	1	Foraging over the same area as seen previously in survey

Dusk Transect Survey 12/09/2016
Sunset: 19:28

Transect	Point count	Time	Species	Number	Notes
1	1	19:58	Nyno	1	Commuting northwards
1	1	20:02	Pipi	1	Feeding along hedgerow in corner
1	1	20:04	Pipi	1	
1	1-2	20:13	Pipi	1+?	Social calls
1	2	20:19	Pipi	2	Flew from the direction of a large oak by the field entrance.
1	3	20:25	Pipi	1+?	
1	7	21:03	Pipi	1+?	
1	8	21:14	Pipi	1+?	Social calls
1	1	21:23	Rhfe	1	Foraging pass over scrub & flew towards buildings

Transect	Point count	Time	Species	Number	Notes
1	3	21:37	Pipi	1+?	
1	3-4	21:43-45	Pipi	1+?	Social calls
1	4	21:47	Pipi	1+?	
2/3	Static	19:57	Pi sp.	1	Low fast pass from east-west along hedgeline
2/3	Static	20:15	Pipi	1	Not seen, quick pass
2/3	Static	20:23	Pipi	1	Foraging along hedge
2/3	Static	20:32	Pipi	1	Not seen
2/3	Static	20:38	Pipi	1	Flying up and down hedge line
2/3	Static	20:58	Pipi	1	Still flying up and down hedge line
2/3	Static	21:11	Pipi	1	Still using hedge line but less frequent
2/3	Static	21:20	Pipi	2	Passes from west to east with no return
2/3	Static	21:32	Rhhi	1	Very faint quick pass
2/3	Static	21:39	Pipi	2	East – west
2/3	Static	21:42	Pipi	1	West – east
2/3	Static	21:46	Pipi	1	Flying up and down hedge line again
2/3	Static	21:52	Rhhi	1	West – east. Brief pass. May have gone down centre of field

Dusk Transect Survey 28/09/2016
Sunset: 18:55

Transect	Point count	Time	Species	Number	Notes
1	5	20:12	Pipi	1+?	
1	5	20:15	Pipi	1+?	
1	5-6	20:17-19	Pipi	2	Continuous foraging activity
2	6	19:26	Nyno	1	
2	6	19:37	Nyno	1	
2	6	19:40	Nyno	1	
2	6	19:42	Nyno	1	Foraging over grass
2	6	19:52	Pipi	1	
2	8	20:15	Pipi	1	

Transect	Point count	Time	Species	Number	Notes
2	9	20:34	Nyno	1	
3	3	19:25	Pipi	1	Commuting across field
3	3	19:30	Pipi	1	
3	3	19:31	Pipi	1	Foraging along road
3	7	20:28	Pipi	1+?	Sheltered area. Social calls. Constant activity until 20:33
3	7	20:28	Pipy	1+?	Sheltered area. Social calls. Constant activity until 20:33

Dusk Transect Survey 10/10/2017
Sunset: 18:32

Transect	Point count	Time	Species	Number	Notes
1	8-1	18:52	Pipi	1	Commuting southwards across field
1	8-1	19:01	Pipi	1	Commuting along hedgerow
1	8-1	19:09	Pipi	2	Foraging & social activity
1	8-1	19:10	Pipi	2	Social activity/ chasing along hedgerow. Three passes
1	8-1	19:12	Pipi	1	Faint
1	8-1	19:12	Rhhi	1	Commuting
1	8-1	19:16	Pipi	1	
1	8-1	19:17	Pipi	1+?	Two passes
1	8-1	19:22	Rhhi	1	
1	8-1	19:38	Rhhi	1	
1	8-1	19:42	Pipi	1+?	Social calls
1	1	19:45	Nyno	1	
1	1	19:47	Pipi	1	
1	1-2	19:53	Pipi	1	
1	2-3	20:04	Pipi	1	
1	4-5	20:23	Pipi	1+?	Several passes (3-4). Not seen
1	4-5	20:25	Pipi	1	
1	5	20:28	Rhhi	1	
2/3	8b	19:05	Pipi	1	Commuting. Flying over open ground into next field

Transect	Point count	Time	Species	Number	Notes
2/3	7b	19:40	Nyno	1	Faint pass
2/3	7b-6b	19:46	Pipi	1	Quick pass
2/3	6b	19:52	Pipi	1	Quick pass
2/3	9g-1g	20:22	Rhhi	1	Quick pass by gates and along hedge
2/3	1g	20:24	Pipi	1	Along hedge line short passes
2/3	7g	20:41	N/L/S	1	Very brief pass
2/3	2b	21:05	Pipi	1	Foraging around tree canopy/ light

Dusk Transect Survey 27/10/2016
Sunset: 17:58

Transect	Point count	Time	Species	Number	Notes
1	8-1	18:23	Pipi	1	
1	8-1	18:42	Pipy	1	
1	3	19:02	Pipi	2	
1	4	19:07	Pipi	2	
1	5	19:18	Pipi	1	Constant foraging
1	5	19:21	Pipi	1+?	
1	5	19:22	Pipi	1	Constant foraging along hedgerow corners
1	3	20:23	Pipi	1+?	
1	3	20:27	Pipi	1+?	Constant foraging in corner of field
2	Static	18:27	Pipi	1	Constant foraging along hedgerow
2	Static	18:31	Pipi	2	Constant foraging along hedgerow
2	Static	18:31	Epse	1	
2	Static	18:34	Pipi	3	Foraging over field and bank
2	Static	18:41	Pipi	2	Continual foraging over field and bank
2	Static	18:50	Pipi	2+?	Still foraging
2	Static	18:53	Rhfe	1	Not seen
2	Static	18:55	Rhfe	1	Several passes. Not seen
2	Static	18:58	Rhfe	1	

Transect	Point count	Time	Species	Number	Notes
2	Static	18:58	Pipi	1	
2	Static	19:01	Rhfe	1	
2	Static	19:01	Pi sp.	1	
2	Static	19:03	Rhfe	1	
2	Static	19:23	Pi sp	1	Single pass
2	Static	19:30	Pi sp	1	Not seen/ few passes
2	Static	19:39	Pipi	1	Single pass
2	Static	19:43	Pipi	1	Foraging
2	Static	19:49	Pipi	1	Foraging
2	Static	19:59	Pipi	1	Foraging
2	Static	20:09	Pipi	1	Foraging & some social calls
2	Static	20:14	Pipi	1	Flew to the north
2/3	Static	18:27	Pipi	1	Foraging over top of fields & along hedge bank to south of surveyor position
2/3	Static	18:28	Pina	1	Single brief pass
2/3	Static	18:37	Pipi	1	Foraging over top of fields & along hedge bank to south of surveyor position
2/3	Static	18:39	Pipi	3	Commuting east – west straight along the hedge bank surveyor positioned on.
2/3	Static	18:45	Pipi	1	Constant foraging
2/3	Static	19:05	Pipi	1	Continuous activity with feeding buzzes and social calls
2/3	Static	19:21	Pipi	1	Single fast pass
2/3	Static	19:31	Pipi	1	Single pass
2/3	Static	19:39	Pipi	1	Single pass
2/3	Static	19:41	Pipi	1	Single pass
2/3	Static	19:57	Pipi	1	Single pass
2/3	Static	20:16	Pipi	1	Brief pass
2/3	Static	20:35	Rhhi	1	Single brief pass
2/3	Static	20:35	Pipi	1	Single brief pass

APPENDIX VII: Pivot tables of data collected by the on Site automated detectors

April automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	RHHI	Total
19/04/2016	21	84	2	1	**108**
20/04/2016	41	6			**47**
21/04/2016	46	38	2		**86**
22/04/2016	43				**43**
23/04/2016	17	29	1		**47**
24/04/2016	8	3	1		**12**
26/04/2016	8				**8**
27/04/2016	2				**2**
28/04/2016	1				**1**
29/04/2016	4				**4**
30/04/2016		17			**17**
Total	**191**	**177**	**6**	**1**	**375**

Location 2

Date	NLS	PI	RHFE	Total
19/04/2016		11	2	**13**
20/04/2016	3			**3**
21/04/2016		25	1	**26**
22/04/2016				
23/04/2016	5	1		**6**
24/04/2016				
25/04/2016				
26/04/2016				
27/04/2016	1			**1**
28/04/2016				
29/04/2016	2			**2**
30/04/2016				
Total	**11**	**37**	**3**	**51**

Location 3

Date	NLS	PI	RHFE	RHHI	Total
19/04/2016	1	15	8	2	**26**
20/04/2016			11		**11**
21/04/2016		29	8	2	**39**
22/04/2016				1	**1**
23/04/2016		15	1		**16**
24/04/2016					
25/04/2016			4	1	**5**
Total	**1**	**59**	**32**	**6**	**98**

Location 4

Date	NLS	PI	RHFE	RHHI	Total
19/04/2016	19	280			**299**
20/04/2016	63	16	1	1	**81**
21/04/2016	69	307			**376**
Total	**151**	**603**	**1**	**1**	**756**

Location 5

Date	NLS	PI	RHFE	Total
19/04/2016	3	5	28	**36**
20/04/2016	6		8	**14**
21/04/2016		16	13	**29**
22/04/2016				
Total	**9**	**21**	**49**	**79**

Location 6

Date	PI	RHFE	RHHI	MYO	Total
19/04/2016	3	11			**14**
20/04/2016		3			**3**
21/04/2016	3	5			**8**
22/04/2016					
23/04/2016	4	1	1	1	**7**
24/04/2016					
25/04/2016	30	1			**31**
26/04/2016					
27/04/2016					
28/04/2016	2		1		**3**
29/04/2016					
30/04/2016		1			**1**
Total	**42**	**22**	**2**	**1**	**67**

Location 7

Date	NLS	RHFE	Total
19/04/2016	1	3	**4**
Total	**1**	**3**	**4**

Location 8

Date	NLS	PI	RHFE	RHHI	Total
19/04/2016		1		2	**3**
20/04/2016	1				**1**
21/04/2016		4	2	3	**9**
22/04/2016	1	1			**2**
23/04/2016					
24/04/2016					
25/04/2016					
26/04/2016	4				**4**
27/04/2016	46				**46**
28/04/2016					
29/04/2016	26				**26**
30/04/2016	13				**13**
Total	**91**	**6**	**2**	**5**	**104**

Location 9

Date	NLS	PI	RHFE	Total
19/04/2016	3			**3**
20/04/2016	1			**1**
21/04/2016	1	2	1	**4**
22/04/2016				
23/04/2016	1			**1**
24/04/2016	5			**5**
25/04/2016	14			**14**
26/04/2016	4	1		**5**
27/04/2016	15			**15**
28/04/2016	2	1		**3**
29/04/2016	1			**1**
30/04/2016	4		2	**6**
Total	**51**	**4**	**3**	**58**

Location 10

Date	NLS	PI	RHFE	RHHI	MYO	Total
19/04/2016		28	2	4		34
20/04/2016		1		3		4
21/04/2016		121	2	3	2	128
22/04/2016		2		2		4
23/04/2016		4				4
24/04/2016						
25/04/2016	2	5				7
26/04/2016						
27/04/2016	1					1
28/04/2016						
29/04/2016						
30/04/2016		2				2
Total	**3**	**163**	**4**	**12**	**2**	**184**

NB Bat species codes:

NLS – Noctule, Leisler's bat & Serotine bat species
PI – Pipistrelle bat species
RHFE – Greater horseshoe bat
RHHI – Lesser horseshoe bat
MYO – Myotis bat species
PL – Long-eared bat species
BABA - Barbastelle

May automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	RHHI	MYO	Total
02/05/2016	3	1	2			**6**
03/05/2016		16				**16**
04/05/2016	1	20	3			**24**
05/05/2016	1	37	5	1		**44**
06/05/2016	2	41				**43**
07/05/2016	2	33	1	1		**37**
08/05/2016	1	48	2	1	1	**53**
09/05/2016	24	6	2			**32**
10/05/2016	14	16	6	1		**37**
11/05/2016	4	20	2	1		**27**
12/05/2016	4	226	41			**271**
Total	**56**	**464**	**64**	**5**	**1**	**590**

Location 2

Date	NLS	PI	RHFE	RHHI	PL	Total
01/05/2016		1				**1**
02/05/2016						
03/05/2016	1	2				**3**
04/05/2016		14	2			**16**
05/05/2016	4	58				**62**
06/05/2016	4	92		2		**98**
07/05/2016	1	21				**22**
08/05/2016		23	1			**24**
09/05/2016		2	1			**3**
10/05/2016	11	26				**37**
11/05/2016	5	15	1		2	**23**
12/05/2016		27	1			**28**
Grand Total	**26**	**281**	**6**	**2**	**2**	**317**

Location 3

Date	NLS	PI	RHFE	RHHI	MYO	Total
04/05/2016		17	3	2		**22**
05/05/2016	1	22		1		**24**
06/05/2016		95	7	10		**112**
07/05/2016		47	6	4		**57**
08/05/2016		37	4	3	2	**46**
Grand Total	**1**	**218**	**20**	**20**	**2**	**261**

Location 4

Date	NLS	PI	RHFE	MYO	Grand
04/05/2016	20	324			**344**
05/05/2016	27	625	1		**653**
06/05/2016	26	585			**611**
07/05/2016	7	###		1	**1031**
08/05/2016	27	###			**1374**
09/05/2016	12	114			**126**
10/05/2016	51	480		1	**532**
11/05/2016	50	272			**322**
12/05/2016	42	899	1	1	**943**
Grand	**262**	**5669**	**2**	**3**	**5936**

Location 5

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
04/05/2016	3	73	4				**80**
05/05/2016	1	33	5				**39**
06/05/2016	1	116	22	2			**141**
07/05/2016	10	55	13				**78**
08/05/2016		9					**9**
09/05/2016	1	2	2				**5**
10/05/2016	6	124	6			1	**137**
11/05/2016	1	143	1	1	1	1	**148**
12/05/2016		104	8		1		**113**
Total	**23**	**659**	**61**	**3**	**2**	**2**	**750**

Location 6

Date	NLS	PI	RHFE	RHHI	MYO	Total
01/05/2016		18	16	10		**44**
02/05/2016		6		2		**8**
03/05/2016	1	17				**18**
04/05/2016		11				**11**
05/05/2016	1	10	1	1	1	**14**
06/05/2016		39	9	3	12	**63**
07/05/2016		4	7			**11**
08/05/2016	1	1		1		**3**
09/05/2016						
10/05/2016	1	91	8	2	10	**112**
11/05/2016		33	2		7	**42**
12/05/2016		109	4	2	4	**119**
Total	**4**	**339**	**47**	**21**	**34**	**445**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	Total
04/05/2016	1	2	1			**4**
05/05/2016	2	6		1		**9**
06/05/2016	1	89	8	30	6	**134**
07/05/2016		3	15	2	1	**21**
08/05/2016	1	5	1	1		**8**
09/05/2016	2					**2**
10/05/2016	1	118	9	7	33	**168**
11/05/2016	4	101	2	3	3	**113**
12/05/2016						
Total	**12**	**324**	**36**	**44**	**43**	**459**

Location 8

Date	NLS	PI	RHFE	RHHI	Total
01/05/2016			1		**1**
02/05/2016		1	1		**2**
03/05/2016	5	2			**7**
04/05/2016		5	1	2	**8**
05/05/2016	1			2	**3**
Total	**6**	**8**	**3**	**4**	**21**

Location 9

Date	NLS	PI	RHFE	RHHI	MYO	Total
01/05/2016	8	30	2			**40**
02/05/2016	11	1	3	1		**16**
03/05/2016	6	8	1	3		**18**
04/05/2016	6	6			1	**13**
05/05/2016	2	7		2		**11**
06/05/2016	6	22		2	2	**32**
07/05/2016	5	1				**6**
08/05/2016	10	8				**18**
09/05/2016						
10/05/2016	6	60	4		4	**74**
11/05/2016	1	24				**25**
12/05/2016	1					**1**
Total	**62**	**167**	**10**	**8**	**7**	**254**

Location 10

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
01/05/2016	2	8	2				**12**
02/05/2016							
03/05/2016	1	3					**4**
04/05/2016	4	26	2	3			**35**
05/05/2016	2	12	1	4			**19**
06/05/2016		268	10	25	3		**306**
07/05/2016	1	380		6	15		**402**
08/05/2016	3	459	5	6	10		**483**
09/05/2016		43	1	1	3		**48**
10/05/2016	5	44	10	2	1	1	**63**
11/05/2016	1	136	1	3			**141**
12/05/2016		190	9	8	14		**221**
Total	**19**	**1569**	**41**	**58**	**46**	**1**	**1734**

June automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	RHHI	MYO	Total
20/06/2016	11	1	4	1		**17**
21/06/2016	12	8	8			**28**
22/06/2016	10	2				**12**
23/06/2016	2	1	1			**4**
24/06/2016	4	1				**5**
25/06/2016	7		1			**8**
26/06/2016	3	2	1			**6**
27/06/2016	2	5	2		1	**10**
28/06/2016		1	2			**3**
29/06/2016	2	3	3			**8**
30/06/2016		4				**4**
Total	**53**	**28**	**22**	**1**	**1**	**105**

Location 2

Date	NLS	PI	RHFE	MYO	Total
20/06/2016	43	11			**54**
21/06/2016	6	12			**18**
22/06/2016	5	23			**28**
23/06/2016		7			**7**
24/06/2016	2	4			**6**
25/06/2016		3			**3**
26/06/2016	2	2	1		**5**
27/06/2016		5		1	**6**
28/06/2016		3	1		**4**
29/06/2016		8			**8**
30/06/2016	1	1			**2**
Total	**59**	**79**	**2**	**1**	**141**

Location 3

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
20/06/2016	10	89	1	4	2		**106**
21/06/2016	7	22			1		**30**
22/06/2016	2	350		1	3		**356**
23/06/2016	1	115		1	9		**126**
24/06/2016	10	102		2	7	2	**123**
25/06/2016	3	52	1	2	7		**65**
26/06/2016	3	51		1	1	1	**57**
27/06/2016		36		1	1		**38**
28/06/2016	2	31	3		2		**38**
29/06/2016	1	32		2	3		**38**
30/06/2016		2					**2**
Total	**39**	**882**	**5**	**14**	**36**	**3**	**979**

Location 4

Date	NLS	PI	RHFE	RHHI	MYO	Total
20/06/2016	37	13				**50**
21/06/2016	7	13	1			**21**
22/06/2016	36	42	1	1		**80**
23/06/2016	15	5	1		1	**22**
24/06/2016	2	9	3			**14**
25/06/2016	5	2	1			**8**
26/06/2016	1	4				**5**
27/06/2016	5	9			1	**15**
28/06/2016	5	2	1			**8**
29/06/2016		4				**4**
30/06/2016						
Total	**113**	**103**	**8**	**1**	**2**	**227**

Location 5

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
20/06/2016	26	512		3	8		**549**
21/06/2016	7	307			18	1	**333**
22/06/2016	4	176			3		**183**
23/06/2016		330		1	4		**335**
24/06/2016	3	530	2	1	25		**561**
25/06/2016	1	187	3	1	14		**206**
26/06/2016		267	2		1		**270**
27/06/2016	3	92	3	1	6		**105**
28/06/2016	1	109	1		1		**112**
29/06/2016		323	2		20		**345**
30/06/2016		37					**37**
Grand Total	**45**	**2870**	**13**	**7**	**100**	**1**	**3036**

Location 6

Date	NLS	PI	RHFE	RHHI	MYO	Total
20/06/2016	9	361		20	5	**395**
21/06/2016	6	68	2		1	**77**
22/06/2016	4	113		3		**120**
23/06/2016	1	166		1	4	**172**
Total	**20**	**708**	**2**	**24**	**10**	**764**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
20/06/2016	14	135		2	3	1	**155**
21/06/2016	7	25			2		**34**
22/06/2016	6	69	1		1		**77**
23/06/2016	12	89			1		**102**
24/06/2016	3	103		1	4		**111**
25/06/2016		63	1		2		**66**
26/06/2016	6	85			1		**92**
27/06/2016		80					**80**
Total	**48**	**649**	**2**	**3**	**14**	**1**	**717**

Location 8

Date	NLS	PI	RHFE	RHHI	MYO	Total
20/06/2016	5	44			2	**51**
21/06/2016	2	20				**22**
22/06/2016	4	220		1	2	**227**
23/06/2016	2	9	1		2	**14**
24/06/2016	5	4	1			**10**
25/06/2016		3		1		**4**
26/06/2016		3				**3**
27/06/2016	1	11	1		1	**14**
28/06/2016						
29/06/2016		8				**8**
30/06/2016	2					**2**
Total	**21**	**322**	**3**	**2**	**7**	**355**

Location 9

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
20/06/2016	24	298					**322**
21/06/2016	24	119	1		2		**146**
22/06/2016	9	7					**16**
23/06/2016	3	546		2	2	2	**555**
24/06/2016	29	131					**160**
25/06/2016	12	101			1		**114**
26/06/2016	2	108					**110**
27/06/2016	16	153	1				**170**
28/06/2016	5	125			1		**131**
29/06/2016	1	41			1		**43**
30/06/2016	3	42					**45**
Total	**128**	**1671**	**2**	**2**	**7**	**2**	**1812**

Location 10

Date	NLS	PI	RHFE	RHHI	MYO	Total
20/06/2016	9	14				**23**
21/06/2016	5	8				**13**
22/06/2016	9	256		1	15	**281**
23/06/2016	1	5	2			**8**
24/06/2016	2	7				**9**
25/06/2016						
26/06/2016		2				**2**
27/06/2016	4	35	2			**41**
28/06/2016	1	3				**4**
29/06/2016						
30/06/2016	1	2				**3**
Total	**32**	**332**	**4**	**1**	**15**	**384**

Location 11

Date	NLS	PI	RHFE	MYO	Total
20/06/2016	1				**1**
21/06/2016	1		1		**2**
22/06/2016	2				**2**
23/06/2016	1	1			**2**
24/06/2016	1				**1**
25/06/2016	1				**1**
26/06/2016	7				**7**
27/06/2016	1			4	**5**
28/06/2016					
29/06/2016					
30/06/2016	1				**1**
Total	**16**	**1**	**1**	**4**	**22**

July automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	RHHI	Total
01/07/2016	4		1		**5**
02/07/2016	14				**14**
03/07/2016	5	3			**8**
04/07/2016	2				**2**
05/07/2016		1			**1**
06/07/2016	2	2		1	**5**
07/07/2016	1	6	1		**8**
08/07/2016	3	4	1		**8**
09/07/2016					
10/07/2016					
Total	**31**	**16**	**3**	**1**	**51**

Location 2

Date	NLS	PI	MYO	Total
01/07/2016				
02/07/2016		6		**6**
03/07/2016	1	10		**11**
04/07/2016		3		**3**
05/07/2016	1	4	1	**6**
06/07/2016		5		**5**
07/07/2016		6		**6**
Total	**2**	**34**	**1**	**37**

Location 3

Date	NLS	PI	RHFE	RHHI	MYO	Total
01/07/2016		5	1			**6**
02/07/2016		17				**17**
03/07/2016		32	1		3	**36**
04/07/2016		14			1	**15**
05/07/2016		9		1		**10**
06/07/2016		49			2	**51**
07/07/2016	4	36	1			**41**
08/07/2016		16				**16**
09/07/2016	1	3				**4**
10/07/2016		6				**6**
Total	**5**	**187**	**3**	**1**	**6**	**202**

Location 4

Date	NLS	PI	RHFE	MYO	Total
01/07/2016		1	2		**3**
02/07/2016	2	40			**42**
03/07/2016	2	14	1	3	**20**
04/07/2016		15			**15**
05/07/2016					
06/07/2016	3	16	1		**20**
07/07/2016	3	21			**24**
08/07/2016	1	5			**6**
09/07/2016		1			**1**
10/07/2016	3				**3**
Total	**14**	**113**	**4**	**3**	**134**

Location 5

Date	NLS	PI	RHFE	MYO	Total
01/07/2016	1	19	1		**21**
02/07/2016	2	311		20	**333**
03/07/2016	1	68	1	2	**72**
04/07/2016	1	104	1	2	**108**
05/07/2016	1	36			**37**
06/07/2016	3	288		8	**299**
07/07/2016	6	296		3	**305**
08/07/2016	2	98	1	1	**102**
09/07/2016	6	11			**17**
10/07/2016	1	9			**10**
Total	**24**	**1240**	**4**	**36**	**1304**

Location 6

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
01/07/2016		34	5	4	2		**45**
02/07/2016	1	102			3	2	**108**
03/07/2016		62	1	1		1	**65**
04/07/2016		138	3	1	2		**144**
05/07/2016		28	1	2			**31**
06/07/2016	4	193		4	6		**207**
07/07/2016	1	145	1	2	1		**150**
08/07/2016	2	76	1	1	1		**81**
09/07/2016	3	3					**6**
10/07/2016		21					**21**
Total	**11**	**802**	**12**	**15**	**15**	**3**	**858**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
01/07/2016	2	12	1		1		**16**
02/07/2016	1	71		1	1		**74**
03/07/2016	2	24			1		**27**
04/07/2016		79	2				**81**
05/07/2016	1	8			1		**10**
06/07/2016	1	218	1		3	1	**224**
07/07/2016	3	83	5	1	1		**93**
Total	**10**	**495**	**9**	**2**	**8**	**1**	**525**

Location 8

Date	NLS	PI	RHFE	RHHI	MYO	Total
01/07/2016						
02/07/2016		11			1	**12**
03/07/2016		44	1			**45**
04/07/2016		3				**3**
05/07/2016	1	1		1		**3**
06/07/2016	1	16				**17**
07/07/2016		5				**5**
08/07/2016		3				**3**
09/07/2016						
10/07/2016						
Total	**2**	**83**	**1**	**1**	**1**	**88**

Location 9

Date	NLS	PI	RHFE	MYO	Total
01/07/2016	5	27			**32**
02/07/2016	4	182		5	**191**
03/07/2016	6	31		1	**38**
04/07/2016	6	66			**72**
05/07/2016		9			**9**
06/07/2016	4	133	1		**138**
07/07/2016	2	225			**227**
08/07/2016	2	271		1	**274**
09/07/2016		1098		1	**1099**
10/07/2016		181			**181**
Total	**29**	**2223**	**1**	**8**	**2261**

Location 10

Date	NLS	PI	RHHI	Total
01/07/2016	2	3		**5**
02/07/2016	1	5		**6**
03/07/2016		7	1	**8**
04/07/2016		1		**1**
05/07/2016	1	2		**3**
06/07/2016		2		**2**
07/07/2016	5	2		**7**
08/07/2016	6	7		**13**
09/07/2016				
10/07/2016	2			**2**
Total	**17**	**29**	**1**	**47**

Location 11

Date	NLS	MYO	Total
01/07/2016			
02/07/2016			
03/07/2016			
04/07/2016			
05/07/2016			
06/07/2016			
07/07/2016		1	**1**
08/07/2016	1		**1**
09/07/2016	1		**1**
10/07/2016			
Total	**2**	**1**	**3**

August automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	MYO	Total
10/08/2016	5	7			**12**
11/08/2016	1	3	1		**5**
12/08/2016	11	4			**15**
13/08/2016	2	3		1	**6**
14/08/2016	6	5	1		**12**
15/08/2016	1	21		2	**24**
Total	**26**	**43**	**2**	**3**	**74**

Location 2

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
10/08/2016	4	22			1		**27**
11/08/2016	13	11	2	1	1		**28**
12/08/2016	5	18				1	**24**
13/08/2016	3	58	1		2	1	**65**
14/08/2016	2	69					**71**
15/08/2016		49		5	2		**56**
16/08/2016	1	30	1	5	4		**41**
17/08/2016	8	181		2	5		**196**
18/08/2016			3				**3**
Total	**36**	**438**	**7**	**13**	**15**	**2**	**511**

Location 3
N/A

Location 4

Date	NLS	PI	RHFE	RHHI	MYO	Total
10/08/2016	2	85	1		1	**89**
11/08/2016	1	60	1		1	**63**
12/08/2016	3	37	3	1		**44**
13/08/2016	2	162			3	**167**
14/08/2016	1	100	2		5	**108**
15/08/2016	5	886			2	**893**
16/08/2016	3	449	3		3	**458**
17/08/2016	6	136			3	**145**
18/08/2016						
Total	**23**	**1915**	**10**	**1**	**18**	**1967**

Location 5

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
10/08/2016	48	324	1		1	2	**376**
11/08/2016	5	125	2		2	1	**135**
12/08/2016	4	124			1		**129**
13/08/2016	5	44	2		1		**52**
14/08/2016		30			2	1	**33**
15/08/2016	1	72		1	2		**76**
16/08/2016	1	59	3	2	2	1	**68**
17/08/2016	18	230	1	2	3	5	**259**
18/08/2016				4			**4**
Total	**82**	**1008**	**9**	**9**	**14**	**10**	**1132**

Location 6

Date	NLS	PI	RHFE	RHHI	MYO	Total
10/08/2016	4	81	15	2	29	**131**
Total	**4**	**81**	**15**	**2**	**29**	**131**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	PL	BABA	Total
10/08/2016	3	136	29		13			**181**
11/08/2016	3	24	26	1	7	2		**63**
12/08/2016	3	58	10	1	5			**77**
13/08/2016	1	50	7		5	1		**64**
14/08/2016	7	20	10		5	1		**43**
15/08/2016	3	15			3			**21**
16/08/2016	4	5						**9**
17/08/2016	38	272	4	5	22			**341**
18/08/2016	11	178	4	1	17			**211**
19/08/2016	30	8	2		3			**43**
20/08/2016	12	31	4	4	2		1	**54**
21/08/2016	22	18	8		4			**52**
22/08/2016	41	82		2	4			**129**
23/08/2016	36	30	1	2		1		**70**
24/08/2016	7	64		5	13		1	**90**
25/08/2016	14	84		3	5			**106**
26/08/2016	3	24		1				**28**
27/08/2016	8	36		2	1			**47**
Total	**246**	**1135**	**105**	**27**	**109**	**5**	**2**	**1629**

Location 8

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
10/08/2016	4	35					**39**
11/08/2016	1	1		1			**3**
12/08/2016	3	33	1		1	2	**40**
13/08/2016	1	97	5		3		**106**
14/08/2016	4	30					**34**
15/08/2016	1	82			1		**84**
16/08/2016		55	4	1	8	3	**71**
17/08/2016	231	332	4	3	7		**577**
18/08/2016	68	47			2		**117**
19/08/2016	11						**11**
20/08/2016	7						**7**
21/08/2016	15						**15**
Total	**346**	**712**	**14**	**5**	**22**	**5**	**1104**

Location 9

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
10/08/2016	6	431	2	1	4	1	**445**
11/08/2016	3	155			1		**159**
12/08/2016	2	228	1	2	11	1	**245**
Total	**11**	**814**	**3**	**3**	**16**	**2**	**849**

Location 10

Date	NLS	PI	RHFE	RHHI	MYO	PLAUR	BABA	Total
10/08/2016	9	64	3		1	1	1	**79**
11/08/2016	16	36	3		1	1		**57**
12/08/2016	19	57				2		**78**
13/08/2016		68	2		5	1		**76**
14/08/2016	9	35	2		4	1		**51**
15/08/2016	2	487		2	7	2		**500**
16/08/2016	9	208	3	1	6		3	**230**
17/08/2016	16	169	4	6	17	1	2	**215**
Total	**80**	**1124**	**17**	**9**	**41**	**9**	**6**	**1286**

Location 11

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
10/08/2016	1	19					**20**
11/08/2016		32			22	1	**55**
12/08/2016	3	15			1	1	**20**
13/08/2016		19	1		2		**22**
14/08/2016	1	34			9	1	**45**
15/08/2016	1	467	1		11	1	**481**
16/08/2016	3	190	2		21		**216**
17/08/2016	3	59			2		**64**
18/08/2016	13	99	2		11		**125**
19/08/2016		9			1		**10**
20/08/2016	9						**9**
21/08/2016		5					**5**
22/08/2016	17	41	1		3		**62**
23/08/2016	86	27	1	1	1	1	**117**
Total	**137**	**1016**	**8**	**1**	**84**	**5**	**1251**

September automated detector pivot tables

Location 1

Dates	NLS	PI	RHFE	Total
02/09/2016				
03/09/2016				
04/09/2016	2			**2**
05/09/2016	3			**3**
06/09/2016		1		**1**
07/09/2016				
08/09/2016	1			**1**
09/09/2016				
10/09/2016	1			**1**
11/09/2016				
12/09/2016	3		1	**4**
Total	**10**	**1**	**1**	**12**

Location 2

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
02/09/2016	2	10	1		2		**15**
03/09/2016	2	3	2				**7**
04/09/2016	21	2			1		**24**
05/09/2016	35	22	2			1	**60**
06/09/2016	13	28	4	3	2		**50**
07/09/2016	66	89	10	11	14	1	**191**
08/09/2016	8	2					**10**
09/09/2016	1						**1**
Total	**148**	**148**	**19**	**14**	**19**	**2**	**358**

Location 3

Date	NLS	PI	RHFE	RHHI	MYO	PL	BABA	Total
09/09/2016		5						**5**
10/09/2016	3	6	1	9	1			**20**
11/09/2016	9	118	3	2	1	1	1	**135**
12/09/2016	5	12	6	8	5			**36**
Total	**17**	**141**	**10**	**19**	**7**	**1**	**1**	**196**

Location 4

Date	NLS	PI	RHFE	RHHI	MYO	Total
02/09/2016	3	11		1	1	**16**
03/09/2016	1	1				**2**
04/09/2016	5					**5**
05/09/2016	297	79	2			**378**
06/09/2016	5	69	1		4	**79**
07/09/2016	7	159	3		3	**172**
08/09/2016	3	3				**6**
09/09/2016	2					**2**
10/09/2016	3	4	3			**10**
11/09/2016	2	49				**51**
12/09/2016	10	89	5	1	2	**107**
Total	**338**	**464**	**14**	**2**	**10**	**828**

Location 5

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
02/09/2016	28	148	5	1	3	1	**186**
03/09/2016	19	389		1	7		**416**
04/09/2016	62	16			2		**80**
05/09/2016	74	557	2	6	7	1	**647**
06/09/2016	16	43	3	1	1		**64**
07/09/2016	18	130	4	1	4	2	**159**
08/09/2016	7	706			1		**714**
09/09/2016		1					**1**
10/09/2016	7	95	7	1	3	1	**114**
11/09/2016	14	73	3				**90**
12/09/2016	6	26	269	1	1		**303**
Total	**251**	**2184**	**293**	**12**	**29**	**5**	**2774**

Location 6

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
02/09/2016	14	50	2	3	6		**75**
03/09/2016	10	63	6	4	2		**85**
04/09/2016	3	9			6		**18**
05/09/2016	22	229	2	37	7		**297**
06/09/2016	4	28	3	4	6	1	**46**
07/09/2016	2	57		4	4		**67**
08/09/2016	1	43	2	5	6		**57**
09/09/2016		63	4				**67**
10/09/2016	7	31	13	2	9	1	**63**
11/09/2016	2	42		1			**45**
12/09/2016	6	32	3	6	4		**51**
Total	**71**	**647**	**35**	**66**	**50**	**2**	**871**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	PL	BABA	Total
02/09/2016	8	19	2	10	2	1		**42**
03/09/2016								
04/09/2016	8	1			14			**23**
05/09/2016	11	91	1	14	3	1		**121**
06/09/2016	5	16	1	4	4		1	**31**
07/09/2016	6	27	3	1	6			**43**
08/09/2016	7	24	1	2	2			**36**
09/09/2016	4	1	1					**6**
10/09/2016	7	19	3	1	5			**35**
11/09/2016		24	3					**27**
12/09/2016	6	29	2	3				**40**
Total	**62**	**251**	**17**	**35**	**36**	**2**	**1**	**404**

Location 8

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
02/09/2016	4	14	1	1			**20**
03/09/2016	3	1					**4**
04/09/2016	3						**3**
05/09/2016	22	89		1			**112**
06/09/2016	5	14	2			2	**23**
07/09/2016	6	27	2		5		**40**
08/09/2016	4	4					**8**
09/09/2016							
10/09/2016	3	4	3	3			**13**
11/09/2016	4	9					**13**
12/09/2016	7	26	2	4			**39**
Total	**61**	**188**	**10**	**9**	**5**	**2**	**275**

Location 9
N/A

Location 10

Date	NLS	PI	RHFE	RHHI	MYO	Total
02/09/2016	12	9	2			**23**
03/09/2016		4				**4**
04/09/2016	1	4			1	**6**
05/09/2016	14	23	1		1	**39**
06/09/2016	4	19	3		2	**28**
07/09/2016	5	134	2		12	**153**
08/09/2016	4	1				**5**
09/09/2016						
10/09/2016	7	7	2	2		**18**
11/09/2016	4	12	1			**17**
12/09/2016	13	98	4	7	4	**126**
Total	**64**	**311**	**15**	**9**	**20**	**419**

Location 11

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
02/09/2016	2	23		3	7	1	**36**
03/09/2016	2	1	1				**4**
04/09/2016	7	3		6	5		**21**
05/09/2016	32	35	3	2	4	5	**81**
06/09/2016	5	40	3		3		**51**
07/09/2016	5	120			19		**144**
08/09/2016	3	34		9			**46**
09/09/2016	1	4					**5**
10/09/2016	2	5	6	1			**14**
11/09/2016	12	411	6	7	45	1	**482**
12/09/2016	6	58	7	2	17		**90**
Total	**77**	**734**	**26**	**30**	**100**	**7**	**974**

October automated detector pivot tables

Location 1

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016		50	6				**56**
29/09/2016		71	6		47		**124**
30/09/2016	1	118	7	1	15		**142**
01/10/2016			1		5		**6**
02/10/2016	1	17	4	1	20	1	**44**
03/10/2016	1	391	3		5	8	**408**
04/10/2016	3	309	3		2	7	**324**
05/10/2016	1	28	2	1	6	1	**39**
06/10/2016	2	37	2	1	3	1	**46**
07/10/2016		52	3	2	4	5	**66**
08/10/2016		10	5		3	1	**19**
09/10/2016		3	5		8		**16**
10/10/2016	2	10			10	1	**23**
Total	**11**	**1096**	**47**	**6**	**128**	**25**	**1313**

Location 2

Date	NLS	PI	RHFE	MYO	PL	Total
28/09/2016						
29/09/2016						
30/09/2016						
01/10/2016						
02/10/2016						
03/10/2016						
04/10/2016						
05/10/2016						
06/10/2016						
07/10/2016						
08/10/2016						
09/10/2016						
10/10/2016	4	21	1	1	1	**28**
Total	**4**	**21**	**1**	**1**	**1**	**28**

Location 3

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016	1	2				1	**4**
29/09/2016		17		2	1	5	**25**
30/09/2016	1	55	1	15	2		**74**
01/10/2016		7					**7**
02/10/2016	2	14		1		1	**18**
03/10/2016		13			1		**14**
04/10/2016	1	3					**4**
05/10/2016							
06/10/2016	1	7					**8**
07/10/2016	2	30					**32**
08/10/2016		34		2			**36**
09/10/2016		5	2		2		**9**
10/10/2016	5	15		3			**23**
Total	**13**	**202**	**3**	**23**	**6**	**7**	**254**

Location 4

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016	3	5				1	**9**
29/09/2016	7	8	1	3	2		**21**
30/09/2016	5	14		2		1	**22**
01/10/2016	4	22			3		**29**
02/10/2016	5	4	2		2	3	**16**
03/10/2016	3	143			2	34	**182**
Total	**27**	**196**	**3**	**5**	**9**	**39**	**279**

Location 5

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016	2	1					**3**
29/09/2016	2	25		3		1	**31**
30/09/2016	9	94		4	1	2	**110**
01/10/2016		26		2	1		**29**
02/10/2016	2	21	2		1		**26**
03/10/2016	1	3					**4**
04/10/2016						1	**1**
05/10/2016	1						**1**
06/10/2016	7	3					**10**
07/10/2016		40			4		**44**
08/10/2016		18					**18**
09/10/2016	1	15	1				**17**
10/10/2016		4					**4**
Total	**25**	**250**	**3**	**9**	**7**	**4**	**298**

Location 6

Date	PI	Total
28/09/2016		
29/09/2016	1	**1**
30/09/2016		
01/10/2016	3	**3**
02/10/2016	1	**1**
03/10/2016		
04/10/2016		
05/10/2016		
Total	**5**	**5**

Location 7

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016	10	7	2		7	2	**28**
29/09/2016	8	31		2	5	2	**48**
30/09/2016	10	19	2	1	2		**34**
01/10/2016	6	13	3	1			**23**
02/10/2016	9	12			1		**22**
03/10/2016	2	6	1				**9**
04/10/2016	14	3					**17**
05/10/2016		1	2		2		**5**
06/10/2016	1	5			2		**8**
07/10/2016	2	47			5		**54**
08/10/2016	6	56		2	7	1	**72**
09/10/2016	4	6			3	1	**14**
10/10/2016	4	6		3			**13**
Total	**76**	**212**	**10**	**9**	**34**	**6**	**347**

Location 8

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016		1					**1**
29/09/2016	16	6	1				**23**
30/09/2016	16	24	1	2			**43**
01/10/2016	12	6	1		1	2	**22**
02/10/2016	14	29	1	1	1	1	**47**
Total	**58**	**66**	**4**	**3**	**2**	**3**	**136**

Location 9

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016	15	1122			7	23	**1167**
29/09/2016	6	385	1	2	44	3	**441**
30/09/2016		284	1	9	55	2	**351**
01/10/2016	2	157			65	1	**225**
02/10/2016		68	2	2	69	2	**143**
03/10/2016		237			40	4	**281**
04/10/2016	1	35					**36**
05/10/2016	1						**1**
06/10/2016		1					**1**
07/10/2016		94			11	1	**106**
08/10/2016	2	7		1	2	2	**14**
09/10/2016		4			34		**38**
10/10/2016		3			5		**8**
Total	**27**	**2397**	**4**	**14**	**332**	**38**	**2812**

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016							
29/09/2016	1	10		3	11	2	**27**
30/09/2016		15	9	3	3		**30**
01/10/2016	10	99	1	2	9	3	**124**
02/10/2016	5	81	1	2	23	4	**116**
03/10/2016		209	1	1	7	1	**219**
04/10/2016	9	546				4	**559**
05/10/2016	2	286	1		1	1	**291**
06/10/2016	8	699		1	5	8	**721**
07/10/2016	8	1438	1	10	63	5	**1525**
08/10/2016	4	998	5	17	121	15	**1160**
09/10/2016	1	50	2	2	76	7	**138**
10/10/2016	2	304		7	73	6	**392**
Total	**50**	**4735**	**21**	**48**	**392**	**56**	**5302**

Location 11

Date	NLS	PI	RHFE	RHHI	MYO	PL	Total
28/09/2016		31					**31**
29/09/2016	5	26	1	3	4		**39**
30/09/2016	2	84	19	13	3	2	**123**
01/10/2016	3	37	1	1	1	1	**44**
02/10/2016	3	29	29	1	10	3	**75**
03/10/2016		1477			2	1	**1480**

04/10/2016	1	592					**593**
05/10/2016	1	170			1		**172**
06/10/2016	3	797					**800**
07/10/2016	5	596	2		3		**606**
08/10/2016	11	89	24		13	3	**140**
09/10/2016	9	9	3		23	1	**45**
10/10/2016		13		1		1	**15**
Total	**43**	**3950**	**79**	**19**	**60**	**12**	**4163**

APPENDIX VIII: Site Photos

APPENDIX VIII: SITE PHOTOS

Plate No.	
1	 View into Field 5 from Brixham Road
2	 Northern boundary of field 5 looking east

Plate No.	
3	 White Rock woodland planting to north of Field 5
4	 Field 1 looking south

Plate No.	
5	 Field 1 looking north
6	 Pond in hedge of Field 1

Plate No.	
7	 Pond in Field 1
8	 Western boundary of Field 1

Plate No.	
9	 Field 2
10	 Field 2 boundary with Nords plantation

Plate No.	
11	 Nords Plantation
12	 Western boundary of Field 3

Plate No.	
13	 Example whip planting on top of hedge bank in Field 3
14	 Western boundary of Field 4

Plate No.	
15	 Off-site mitigation field looking north-west towards Waddeton Plantation
16	 South-eastern off-site mitigation field looking west

Plate No.	
17	 Example of the off-site field margin
18	 White Rock woodland planting near Waddeton Plantation

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REVISION RECORD

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