

Castle Cement Limited

# Carbon Capture and Storage Project – Padeswood, North Wales

Volume 4, Draft Technical Appendix 5.2

Ecological Baseline Report (Animal)



JUNE 2024

## EXECUTIVE SUMMARY

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This report presents the results of terrestrial ecological surveys (for great crested newt, reptiles, breeding birds, bats, water vole, badger and other species of principal importance) carried out by RSK Biocensus between May 2022 and February 2024 on behalf of Castle Cement Limited for the Padeswood Carbon Capture and Storage Project.

The Proposed Development is located within Padeswood Cement Works, south of Buckley, Flintshire (OS grid reference: SJ 29127 62227). The wider site and proposed works area boundaries are defined in **Figure 1**). The Ecological Survey Area is described for each survey type in this report.

The proposed works area contained a variety of man-made and natural habitats including buildings, hardstanding, plantation woodland, scrub, hedgerows, grasslands, tall ruderal vegetation, standing water and running water. The wider site contained further examples of these habitats but with large areas of hardstanding and buildings within the existing cement works within the centre of the wider site.

There are two statutory designated sites within 2km of the wider site, both of which are located c.900m away and are primarily designated for their breeding populations of great crested newt. There are a further seven internationally designated sites within 10km.

There are 14 non-statutory designated sites within 2km of the wider site, the closest of which is c.230 m away.

Surveys undertaken from May 2022 – February 2024 are as follows:

- Great crested newt eDNA survey of one pond;
- Reptile artificial refuge surveys;
- Breeding bird surveys;
- Bat surveys (activity transect, static monitoring, ground level tree assessment, preliminary roost assessment, aerial tree inspection, dusk emergence survey);
- Water vole habitat assessment and presence / absence surveys; and
- Badger survey.

The pond surveyed returned a negative eDNA result for great crested newts, however ongoing monitoring of ponds containing great crested newts across the wider site (as part of a previous mitigation licence) makes the presence of the species within the proposed works area highly likely.

No reptiles were identified within the wider site during the surveys.

The habitats within the proposed works area offer suitable nesting habitat for many common breeding birds. Two bird species listed on Annex 1 of the [EU Birds Directive](#)<sup>1</sup> and on Schedule 1 of the [Wildlife and Countryside Act 1981 \(as amended\)](#)<sup>2</sup> were observed within the wider site, one of which was found to be nesting within the cement works. One barn owl box was present

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<sup>1</sup> <https://eur-lex.europa.eu/eli/dir/2009/147/oj>

<sup>2</sup> <https://www.legislation.gov.uk/ukpga/1981/69>



within the red line boundary of the Site, and once confirmed to be empty was replaced with another box elsewhere on the wider site.

Various methods of survey for bats have been undertaken. Three confirmed bat roosts have been identified within two buildings under the ancillary works footprint. One roost was identified during the bat transect surveys, however no adverse impacts on the latter roost are anticipated due to its distance from the works area.

Habitat assessments for water vole were undertaken of eight habitat features within the Ecological Survey Area: four ditches, two ponds and two stretches of stream. Of these, two ditches, one pond and both stretches of stream were assessed as being of marginal suitability for water vole. The remaining features were assessed as unsuitable. No evidence of water vole was identified during the surveys.

No evidence of badger was identified within the wider site during the badger surveys; however one sett was found incidentally during aerial tree inspections in June 2023.

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# 1 INTRODUCTION

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## 1.1 Purpose of this report

- 1.1.1 This baseline report presents the results of terrestrial ecological surveys (for great crested newt, reptiles, breeding birds, bats, water vole, badger and other species of principal importance) carried out by RSK Biocensus between May 2022 and July 2023 on behalf of Castle Cement Limited for the Padeswood Carbon Capture and Storage (CCS) Plot Area (here on referred to as the 'Proposed Development') located within the Padeswood Cement Works, south of Buckley, Flintshire (OS Grid Reference: SJ 29127 62227).
- 1.1.2 Ecological surveys were commissioned to provide baseline information on habitats, vegetation and protected species to inform the environmental assessment process and any habitats regulations assessment (HRA) which may be required.
- 1.1.3 Different areas and site boundaries are referred to in this report. A summary is given below but the Ecological Survey Area is outlined for each survey type in the relevant sections:
- The 'wider site' – the entire Castle Cement Limited Landholding, shown as the red line boundary on **Figure 1**. Includes the proposed works areas (see below), ancillary works areas and areas where no works are proposed as part of the Proposed Development.
  - The 'proposed works area' – area within which the Proposed Development works will occur (except for ancillary works), shown as the blue line boundary on **Figure 1**.
  - 'Ancillary works' – proposed works to facilitate and support the Proposed Development as described in **Section 1.2.5**.
- 1.1.4 The results of terrestrial botanical surveys (including the Phase 1 Habitat Survey) are provided in **Volume 4, Technical Appendix 5.1**, the information is therefore not duplicated in this report.

## 1.2 Proposed Development

- 1.2.1 The Proposed Development aims to integrate Castle Cement Limited's Padeswood Cement Works into the HyNet North West network through the capture of CO<sub>2</sub> for transportation and subsequent storage in Liverpool Bay CCS Limited's Liverpool Bay storage facilities to ensure that cement production at the cement works is carbon neutral.
- 1.2.2 The Proposed Development includes an extensive gas cleaning stage to prepare the emissions from the cement kiln for carbon capture and storage.
- 1.2.3 Waste heat from the kiln system, supplemented by a Combined Heat and Power (CHP) plant, will provide heat for the Post Combustion Carbon Capture and Compression (PCCCC) plant and nearly all the capture plant electrical power



requirements. Amine absorption technology will capture emissions from the kiln and CHP plant.

- 1.2.4 CO<sub>2</sub> will be cleaned to meet the HyNet CO<sub>2</sub> specification, compressed to and then delivered by a pipeline for storage in Liverpool Bay. Liverpool Bay CCS Limited is responsible for the consenting, construction and operation of the CO<sub>2</sub> pipeline.
- 1.2.5 The individual components of the development can be summarised as follows:
  - A Combined Heat and Power (CHP) plant with 15 MWe (minimum) and 83MW (minimum) thermal of installed capacity, to produce electricity and heat to power the carbon capture equipment;
  - A Post Combustion Carbon Capture and Compression (PCCCC) plant, to extract CO<sub>2</sub> from waste gases and compress it for transport and storage; and
  - Various temporary and permanent enabling development to support and facilitate the Proposed Development.
- 1.2.6 A full description of the main Proposed Development's components is presented in **Volume 2, Chapter 1: Introduction, Table 2.1.**
- 1.2.7 The CHP plant will exceed the 10 MWe threshold specified in the [Developments of National Significance \(Specified Criteria and Prescribed Secondary Consents\) Regulations 2016](#)<sup>3</sup> and therefore is expected to need to be a DNS application for determination by Welsh Ministers.

## 1.3 Landscape context

- 1.3.1 The Castle Cement Limited landholding is bordered to the north by the A5118 road, to the west by agricultural fields and to the east and south by railway lines, though the railway line to the south is understood to be disused. These railway lines provide a link to the wider landscape which is predominantly agricultural with the residential areas of Buckley to the north west and Penymynydd to the east.
- 1.3.2 Both the proposed works area and the wider site contain a variety of man-made and natural habitats including woodland, scrub, grassland, standing and running water, ditches and hedgerows. The centre of the wider site is an active cement works dominated by areas of hardstanding, buildings and industrial structures.

## 1.4 Validity of data

- 1.4.1 According to Chartered Institute of Ecology and Environmental Management (CIEEM) advice ([CIEEM 2019](#)<sup>4</sup>), survey data are valid for a period of 12 to 18 months from the date of the survey. The report highlights any circumstances where data may be valid for less than 18 months (such as 6 month validity on badger surveys). Between 18 months and 3 years a professional ecologist will need to undertake a site visit and may also need to update desk study information (effectively updating the PEA) and then review the validity of the report.

<sup>3</sup> <https://www.legislation.gov.uk/wsi/2016/56/contents>

<sup>4</sup> <https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf>

## 2 METHODS

### 2.1 Overview

- 2.1.1 The suitability of habitats within the Ecological Survey Area to support protected animal species was assessed during the preliminary ecological appraisal (PEA). Where habitats were assessed as suitable for protected species, further species-specific surveys were undertaken, the results of which are reported here.
- 2.1.2 Habitats within the Ecological Survey Area were assessed as unsuitable or not suitable enough to require further survey effort for the following species, they are therefore not mentioned further in this report:
- Invertebrates;
  - Hazel dormouse (*Muscardinus avellanarius*); and
  - Otter (*Lutra lutra*).

### 2.2 Background data search

- 2.2.1 A search was made in June 2022 for reference materials relating to the ecology of the Site, and a list of sources is given in **Table 1**.

**Table 1 Data sources**

Information Obtained	Available From
Protected and noteworthy species-records	<a href="#">Cofnod – North Wales Environmental Information Service</a> <sup>5</sup>
Designations and legal protection of noteworthy species	<a href="#">Joint Nature Conservation Committee (JNCC) website</a> <sup>6</sup>
Details of species listed on the LBAP	Local Biodiversity Action Plan (LBAP) currently unavailable

- 2.2.2 A search was made for records of noteworthy species within 2km of the Site boundary. Species included in the search parameters were:
- European protected species (listed on Schedules 2 and 5 of [The Conservation of Habitats and Species Regulations 2017](#)<sup>7</sup>);
  - Nationally protected species under Schedules 1, 5 and 8 of [The Wildlife & Countryside Act 1981](#)<sup>8</sup> and [The Protection of Badgers Act 1992](#)<sup>9</sup>;

<sup>5</sup> <https://www.cofnod.org.uk/Home>

<sup>6</sup> <https://jncc.gov.uk/>

<sup>7</sup> <https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

<sup>8</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>9</sup> <http://www.legislation.gov.uk/ukpga/1992/51/contents>



- Species listed as critically endangered, endangered or vulnerable based on the [IUCN Red List Categories and Criteria 2001](#)<sup>10</sup>;
- All species listed on the [RSPB Birds of Conservation Concern 5](#)<sup>11</sup> as red or amber;
- Nationally rare or nationally scarce species;
- Notable invertebrates; and
- Species of principal importance under the [Environment \(Wales\) Act 2016](#)<sup>12</sup> or are priority species under the LBAP.

## 2.3 Great crested newt

- 2.3.1 The suitability of aquatic and terrestrial habitat in the entire Castle Cement Limited landholding to support great crested newts (*Triturus cristatus*) was considered, taking into consideration habitat connectivity between suitable habitat areas. Aerial photography and Ordnance Survey maps were examined for ponds or other suitable breeding habitat within 500m of the Site.
- 2.3.2 The pond in the south west corner of the Ecological Survey Area (Pond 12) was assessed for its suitability for great crested newts using a habitat suitability index (HSI) assessment developed by [Oldham et al. \(2000\)](#)<sup>13</sup>. It is a numerical index, between 0 and 1, where 0 indicates unsuitable habitat and 1 represents optimal habitat. The HSI for great crested newts uses ten factors (suitability indices (SI) 1 to 10), which are thought to affect great crested newts. It should be noted that all other ponds are being monitored for great crested newts as part of the existing licence and were therefore not included in the surveys described here, as there is current data already available for them through these sources.
- 2.3.3 Further research by Brady (unpublished) has developed a system for using HSI scores to define pond suitability for great crested newts according to the following categories:
- HSI <0.5 = poor
  - HSI 0.5 – 0.59 = below average
  - HSI 0.6 – 0.69 = average
  - HSI 0.7 – 0.79 = good
  - HSI > 0.8 = excellent
- 2.3.4 There is a positive correlation between HSI scores and presence and abundance of great crested newts in ponds. Generally, ponds with high HSI scores are likely to support larger populations. However, the relationship is not sufficiently precise to conclude that a pond with a high HSI will definitely have a large newt population, or

<sup>10</sup> <https://iucn-csg.org/red-list-categories/>

<sup>11</sup> <https://www.bto.org/sites/default/files/publications/bocc-5-a5-4pp-single-pages.pdf>

<sup>12</sup> <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>

<sup>13</sup> <https://www.thebhs.org/publications/the-herpetological-journal/volume-10-number-4-october-2000/1617-03-evaluating-the-suitability-of-habitat-for-the-great-crested-newt-triturus-cristatus>

that a pond with a low HSI score will only have a small newt population or no newts at all.

- 2.3.5 The pond was deemed suitable for great crested newts and was sampled for great crested newt eDNA by Shona Redman and Molly Meadows, both of RSK Biocensus at the time, on 29 June 2022. Using a kit purchased from approved suppliers, water samples were collected according to strict protocols approved by Natural England and described in [Biggs et al. \(2014\)](#)<sup>14</sup>.
- 2.3.6 No other surveys for great crested newts were undertaken due to recent monitoring data for all other ponds from EnfyS between 2016 - 2023.

#### **Survey constraints**

- 2.3.7 No survey constraints have been identified.

## **2.4 Reptiles**

- 2.4.1 The reptile surveys were led by experienced ecologists who are all members of CIEEM. Methodology followed that outlined in the Herpetofauna Worker's Manual ([Gent & Gibson, 1998](#))<sup>15</sup>.

#### **Artificial refuge surveys**

- 2.4.2 The standard method for establishing reptile presence is to use artificial refugia (roofing felt or corrugated roofing 'tins' c.0.5m x 0.5m) placed in areas of suitable habitat in, and adjacent to, the proposed works area. The artificial refugia attracts reptiles, which use them for shelter and to aid temperature regulation, which allows surveyors to find reptiles that would otherwise be widely dispersed and well-hidden.
- 2.4.3 Five suitable areas were identified and surveyed using this method; this included waterbodies, woodland edge, tall ruderal vegetation, rough grassland and both vegetated and unvegetated bunds/slopes. A total of 200 artificial refugia were placed in the suitable habitat (equating to c.25 refugia per hectare) and then checked periodically in September 2022 - October 2022 (when reptiles are active but the weather is not too hot which would reduce the need for them to use the refugia for thermoregulation). The locations of the areas surveyed are shown in **Figure 2**. The refugia were checked for reptiles on seven occasions during suitable weather (ideally in bright sunshine between the hours of 08:00 to 11:00 and 16:00 to 18:30 with air temperatures between 9 and 15°C, or if there is hazy or intermittent sunshine and little wind then between 9 and 18°C, but not during rain) (**Table 2**).
- 2.4.4 When checking refugia, a general watch was kept for other signs of reptiles, e.g. grass snake eggs, excrement or sloughed skins (often found beneath refuges).
- 2.4.5 For any reptile species recorded, a scoring system was used to assess the indicative population sizes present as per [Froglife \(1999\)](#)<sup>16</sup>. This scoring system gives a

<sup>14</sup> [https://freshwaterhabitats.org.uk/wp-content/uploads/2014/02/Full\\_Report.pdf](https://freshwaterhabitats.org.uk/wp-content/uploads/2014/02/Full_Report.pdf)

<sup>15</sup> <https://data.jncc.gov.uk/data/9d7da8c4-9d76-4b65-8263-6b925b3433a4/Herpetofauna-Workers-Manual-2003.pdf>

<sup>16</sup> [https://www.wildcare.co.uk/media/wysiwyg/pdfs/froglife\\_advice\\_sheet\\_10\\_-\\_reptile\\_surveys.pdf](https://www.wildcare.co.uk/media/wysiwyg/pdfs/froglife_advice_sheet_10_-_reptile_surveys.pdf)



population size estimate described as low, good or exceptional. This is based on the maximum number of reptiles observed in one survey period across each reptile survey area.

**Table 2 Reptile survey dates and weather conditions**

Date	Start time	End time	Start temp (°C)	End temp (°C)	Cloud cover (Octas)	Wind speed (Beaufort)	Precipitation
01/09/2022	10:00	11:40	16	17	5 - 3	3 - 2	None
05/09/2022	09:00	10:50	16	18	2 - 3	2	None
13/09/2022	11:30	13:00	16	17	6 - 5	0 - 2	None
15/09/2022	16:00	17:30	16	16	0 - 5	1 - 4	None
23/09/2022	11:15	12:15	15	15	2	0 - 1	None
29/09/2022	09:45	11:00	11	14	2	1	None
05/10/2022	10:30	13:30	11	13	5	1	Brief light showers

### Survey constraints

- 2.4.6 Due to high levels of unsuitable weather days in September (i.e. frequent rainfall), the surveys could not be evenly spaced throughout the month and the final check had to be undertaken in October. This is not considered a significant constraint to the survey as all survey visits were still undertaken in suitable weather conditions and the temperature had not dropped significantly enough for reptiles to have started hibernating prior to the final visit. It is therefore considered likely that reptiles would have been detected if they were present.
- 2.4.7 There were brief, light rain showers during the final survey visit. However, given that reptiles were not detected during the previous six visits in optimal weather conditions, it is unlikely that this resulted in the under-recording of any reptiles.

## 2.5 Breeding birds

2.5.1 The objectives of the breeding bird surveys were to:

- Identify areas of good and poor breeding habitat within the Ecological Survey Area (for birds this was the entire Castle Cement Limited landholding);
- Identify the distribution of breeding birds within the Ecological Survey Area;

- Locate any birds protected under Schedule 1 of The [Wildlife and Countryside Act 1981](#)<sup>17</sup> within the Ecological Survey Area; and
- Identify any breeding species for which special mitigation may be required.

## Criteria for evaluation

### *Determination of habitat quality*

2.5.2 Habitats within the entire Castle Cement Limited landholding were assessed for their suitability to support breeding birds based upon the following criteria:

- Density of suitable nesting habitat including trees, scrub and high reed beds;
- Level of management, i.e. grazing/regular mowing; and
- Level of disturbance, i.e. regular tidal flooding.

### *Determination of breeding status*

2.5.3 The results from the six survey visits were used to assess the breeding status of the bird species recorded within the site, in accordance with the criteria presented in [Gilbert et al. \(1998\)](#)<sup>18</sup> and taking into consideration understanding of the breeding ecology of the species in question. These criteria are based on the principle that many species are territorial during the breeding season and, as such, observation of certain behaviours (e.g. singing, displaying, aggressive interactions) can be used to infer breeding or likely breeding by a given species.

2.5.4 Breeding by a particular species within the Site can be assessed as being Confirmed if:

- A nest or used nest was found;
- A nest with young was seen or heard;
- Recently fledged young were seen or heard;
- Adults were seen entering or leaving a nest site, or an adult was seen incubating; or
- A territory was positively identified as a result of the number and type of observations recorded.

2.5.5 Breeding by a particular species within the Site can be assessed as being Probable if:

- Nest-building was observed;
- A bird was seen visiting a probable nest site on a single occasion;
- Agitated behaviour or alarm calls were observed in or near suitable nesting habitat;
- A pair was seen in suitable nesting habitat during the breeding season;

<sup>17</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>18</sup> <https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence>

- Courtship and/or display were seen; or
  - A male was heard singing in the same location on two or more occasions.
- 2.5.6 Breeding by a particular species within the Site can be assessed as being Possible if:
- Birds were seen in or near suitable nesting habitat during the breeding season; or
  - A male was heard singing on one occasion during the breeding season.
- 2.5.7 Species not observed exhibiting the behaviours above are assessed as non-breeding.

### ***Species abundance***

- 2.5.8 The importance of the breeding bird populations recorded was assessed in the context of the sizes of those populations relative to international, national and regional population estimates for the species in question. National population estimates used for this analysis are as presented by [Woodward et al. \(2020\)](#)<sup>19</sup>.

### ***Species richness***

- 2.5.9 Species richness followed a methodology devised by [Fuller \(1980\)](#)<sup>20</sup> which measured the diversity of a sites breeding assemblage using certain criteria for a simple site assessment. This gives an assessment of importance according to the following categories – Local (25-49 species), County (50-69 species), Regional (70-84 species) and National (85+ species).
- 2.5.10 It should be recognised that breeding birds have undergone widespread decline since these criteria were devised. As such, the qualifying number of species for a given importance category proposed by [Fuller \(1980\)](#)<sup>21</sup> is now considered to be relatively high. This disparity is taken into account when assessing the importance of the breeding bird assemblage recorded within the Site.

### ***Identification of Birds of Conservation Concern***

- 2.5.11 A number of criteria are available to determine the conservation status of those bird species recorded. These criteria aid in evaluating the function of the Ecological Survey Area for breeding birds and thus the value of the breeding bird assemblage. The most appropriate of these are used in this assessment including:
- [The Birds Directive – Directive 2009/147/EC](#)<sup>22</sup> of the European Parliament and of the Council on 29 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended)

<sup>19</sup> <https://www.bto.org/our-science/publications/peer-reviewed-papers/apep-4-population-estimates-birds-great-britain-and>

<sup>20</sup> <https://www.sciencedirect.com/science/article/pii/S0006320780900580>

<sup>21</sup> <https://www.sciencedirect.com/science/article/pii/S0006320780900580>

<sup>22</sup> <https://eur-lex.europa.eu/eli/dir/2009/147/oj>

- [Wildlife and Countryside Act 1981](#)<sup>23</sup> Schedule 1 Species
- [Birds of Conservation Concern \(Stanbury \*et al.\* 2021\)](#)<sup>24</sup>
- [The State of Birds in Wales \(SoBiW\) by Bladwell \*et al.\* \(2018\)](#)<sup>25</sup>
- [The Environment \(Wales\) Act 2016](#)<sup>26</sup>

### Breeding bird survey

- 2.5.12 The breeding bird surveys involved walking a transect within the Ecological Survey Area recording all birds seen or heard using a simplified version of activity notation used by the British Trust for Ornithology (BTO). Transects began within 1 hour of dawn and were completed by 10am or 11am. All bird species encountered were plotted on field maps.
- 2.5.13 Newly published Breeding Bird Survey Guidance suggests that five to six visits should be conducted during the breeding season to be confident of understanding the breeding bird assemblage present. In this instance, six visits were undertaken between May and July in suitable weather conditions (**Table 3**). Whilst beginning surveys in May is later than would be ideal, it is considered six survey visits were sufficient to gather the required evidence of breeding bird activity on the Site.
- 2.5.14 Species were identified by sight or sound and details of behaviour and activity were recorded. Binoculars were used to aid visual identification and to minimise disturbance to potentially breeding species. The results were analysed to assess the breeding status of the bird species recorded on-site.

**Table 3 Dates of breeding bird surveys and the weather conditions**

Survey visit	Date / time	Weather
1	06/05/22, 06:40 – 09:50 am	12°C, Wind 2 (Beaufort), Cloud 4 (Octas)
2	30/05/22, 06:30 – 10:00 am	8°C, Wind 0, Cloud 8
3	17/06/22, 06:15 – 09:30 am	17°C, Wind 1, Cloud 6
4	24/06/22, 06:00 – 09:15 am	13°C, Wind 1, Cloud 1
5	14/07/22, 05:00 – 08:30 am	12°C, Wind 3, Cloud 7

<sup>23</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>24</sup>

<https://www.researchgate.net/publication/356717060> The status of our bird populations the fifth Birds of Conservation Concern in the United Kingdom Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain

<sup>25</sup> <https://www.bto.org/our-science/publications/state-birds-wales/state-birds-wales-2018> - accessed 25/11/2022]

<sup>26</sup> <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>

Survey visit	Date / time	Weather
6	28/07/22, 05:30 – 08:45 am	14 °C, Wind 0, Cloud 8

2.5.15 One barn owl box was present within the red line boundary of the Site, and once confirmed to be empty using a telescopic pole camera was replaced with another box elsewhere on the wider site.

### Survey constraints

2.5.16 Surveys were undertaken at the ideal time of year and during good weather for breeding bird surveys. Despite the good conditions, it is not realistic to expect to record every bird using the site during survey visits. However, the surveys were sufficient to record any important assemblages, and to identify areas of particular interest.

## 2.6 Bats

2.6.1 Habitats in, and adjacent to the works area, were assessed for their suitability for foraging or commuting bats and categorised in accordance with **Table 4**. Areas of particular interest vary between species, but generally include sheltered areas and those habitats with good numbers of insects, such as woodland, scrub, hedges, watercourses, ponds, lakes and more species-rich or rough grassland. For commuting, well-connected hedgerows, woodland edge, watercourses and other linear features are generally considered to be of high value. Habitats and areas of particular interest to foraging and commuting bats in the Ecological Survey Area are:

- Edges of woodland and scrub;
- Tree lines and hedgerows;
- Rough grassland; and,
- Ponds and ditches.

2.6.2 Bat activity surveys were undertaken by suitably qualified and experienced ecologists.



**Table 4 Categorisation of foraging and commuting habitats (adapted from [Collins, 2016](#)<sup>27</sup>)**

Category	Description
Negligible	Negligible habitat features on the Site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated <i>i.e.</i> not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be regularly used by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

### **Transect surveys**

- 2.6.3 Transect surveys followed methodology outlined in [Collins \(2016\)](#)<sup>28</sup> to identify areas of high commuting and foraging activity and the species involved (large roosts can sometimes also be identified from patterns of activity). Survey visits were undertaken monthly between June and October 2022. A supplementary visit in June was also undertaken to replace the May visit (see **Section 2.6.34** for more detail).
- 2.6.4 Two transect routes were covered during the surveys. Transect routes are shown in **Figure 6a** and **Figure 6b**.
- 2.6.5 Given the size of the Ecological Survey Area and the habitats present, the Proposed Development was assessed as having moderate suitability for foraging and commuting bats as defined by [Collins \(2016\)](#)<sup>29</sup>. Current guidance for Proposed Developments of this type is for at least one transect per month between April and October (totalling

<sup>27</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

<sup>28</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

<sup>29</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

seven survey visits), including at least one dusk and pre-dawn within one 24-hour period, and the use of automated static bat detectors.

2.6.6 Transects consisted of 2-hour surveys, starting at sunset or ending at sunrise, across the Ecological Survey Area, consisting of walking sections with five-minute monitoring stops at previously identified locations with high quality habitat where bats were likely to be encountered. On each visit, a set transect route was walked in suitable weather (above 10°C with little or no rain and no strong winds) using a Batlogger M or M2 detector which allow continuous recordings during the survey. The direction of each transect was alternated between each month to take into consideration changes in activity across the Ecological Survey Area throughout the season.

2.6.7 **Table 5** details the dates, survey times and weather conditions for each activity survey completed.

**Table 5 Survey dates, timings and weather conditions for bat transect surveys**

Date	Survey type	Sunset / sunrise time	Start time	End time	Temperature (°C)	Cloud cover (Octas)	Wind speed (Beaufort)	Precipitation
08/06/22	Dusk	21:36	21:36	23:36	14	4	1	None
28/06/22	Dusk	21:43	21:43	23:43	14	8	2	Very light rain/mist during first 30 mins of survey
19/07/22	Dusk	21:26	21:26	23:26	22	4	0	None
17/08/22	Dusk	20:35	20:35	22:35	17	8	1	None
18/08/22	Pre-dawn	05:57	03:57	05:57	14	7	0	None
15/09/22	Dusk	19:28	19:28	21:28	13	5	1	None
05/10/22	Dusk	18:40	18:40	20:40	10	1	3	None

2.6.8 Levels of bat activity were quantified by the number of bat passes recorded during each walking section of monitoring stop. A single pass by a bat was defined by a gap of one second or more between the end and beginning of the next bat call. Species

were identified either in the field or through the analysis of recording using Elekon Bat Explorer® software.

### Static monitoring

- 2.6.9 Wildlife Acoustics Song Meter 4 Bat+ (SM4) detectors were used to monitor two different monitoring points (MPs) (see **Figure 6a** and **Figure 6b**), seasonally between June and October 2022, with a supplementary visit in June also undertaken to replace the May monitoring (see **Section 2.6.34** for more detail). These surveys followed methodology outlined by [Collins \(2016\)](#)<sup>30</sup> by which SM4s were left out for five consecutive nights each month. The SM4 detectors provided complementary data derived from longer recording periods with each monitoring point corresponding with the following habitat:
- MP1 in hedgerow between pasture and overgrown garden, (OS grid reference: SJ 28863 62542); and
  - MP2 on woodland edge next to pond, (OS grid reference: SJ 29163 61923).
- 2.6.10 The MP locations were identified as providing potentially high-quality habitat for both commuting and foraging bats where the number of passes by bats were likely to be high. A third MP was monitored during the first monitoring period in June along woodland edge adjacent to a hay field (OS grid reference: SJ 28908 62038). However, this MP recorded considerably fewer bat passes than the other two MPs and so was dropped from further monitoring. Two MPs were required for moderate quality foraging and commuting habitat in line with [Collins \(2016\)](#)<sup>31</sup>.
- 2.6.11 Survey dates (shown in **Table 6**) were selected when the predicted weather forecast indicated suitable weather conditions for foraging and commuting bats (i.e. air temperatures above 10°C, the absence of strong winds and no precipitation). The surveys were designed to provide information on the level of bat activity and composition of bat species using the Site, the relative importance of features and locations and how patterns of bat activity may change throughout the year. The information collected was used to compliment the information collected during the bat transect surveys as the SM4s collected information over a longer period.

**Table 6 Survey dates for static detector deployment**

Month	Start date	End date
June (supplemented for May)	08/06/22	13/06/22
June	24/06/22	29/06/22
July	19/07/22	24/07/22
August – MP1	26/08/22	31/08/22

<sup>30</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

<sup>31</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

Month	Start date	End date
August – MP2	17/08/22	22/08/22
September – MP1	15/09/22	20/09/22
September – MP2	15/09/22	20/09/22
October – MP1	05/10/22	09/10/22
October – MP2	05/10/22	10/10/22

- 2.6.12 The units were set up to continuously record from 30 minutes before sunset to 30 minutes after sunset. The microphones were mounted on extension cables at least 3m off the ground. All recordings were stored on memory cards and analysed using the BTO Acoustic Pipeline (BTO AP) and Kaleidoscope® software.
- 2.6.13 The BTO Acoustic Pipeline analysis software auto-analyses the sound files and produces a single file for each identified bat species. The results are returned in an excel spreadsheet and for every recording a result is produced, No ID = nothing biological / i.e. noise. If a recording contains more than one species, the original file name will remain the same, but there will be a separate line for every species.
- 2.6.14 The results were then verified manually by using kaleidoscope software. The auto-identification results from the BTO pipeline were found to be correct for approximately 98% of the recordings analysed. However, it is important to note that manual verification was conducted for only 10% of the pipistrelle species, while all other species' results were manually verified. Echolocation calls were identified down to species or genus level depending on the type of bat encountered using Kaleidoscope (i.e. it is not possible to reliably identify species belonging to the genus *Myotis* unless more obvious diagnostic features were present consistently e.g. kink in *M. daubentonii*, wide range in *M. nattereri*) and the quality of the recording. The data was analysed by Maya Griffin and Iveta Nikandrovaite – both of whom are assistant ecologists.
- 2.6.15 The level of bat activity was quantified by the number of files (i.e. passes) for each recorded species for each monitoring period. The BTO Acoustic Pipeline analysis software produced a single file for each identified bat species. For quality assurance, all results were manually analysed using the Kaleidoscope analysis software. Note that there is no way of extrapolating how many bats were being recorded from this acoustic only data and any comparisons between deployments, spatially or temporally, or relative abundance of species activity would be subject to a number of assumptions.

### Tree assessment and surveys

- 2.6.16 Using guidance set out by [Collins \(2016\)](#)<sup>32</sup>, trees within the Ecological Survey Area were assessed for their suitability for roosting bats and each tree was then given a grading which is based on the guidance as shown in **Table 7**.

<sup>32</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

**Table 7 Categorisation of roosting habitats (adapted from [Collins, 2016](#)<sup>33</sup>)**

Category (Potential to support roosting bats)	Description
Negligible potential	Negligible habitat features on-site likely to be used by roosting bats.
Low Potential	A tree or structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate potential	A tree or structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High Potential	A tree or structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Confirmed roost	Bats or evidence of bats recorded within the tree or structure during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

### ***Aerial inspections***

2.6.17 For trees identified as having high or moderate potential during the initial survey, aerial climbing assessments were used (where safe) to inspect the potential roost features up close for evidence of roosting bats. The aerial assessments were carried out by Lee Bagnall, an experienced ecologist and tree climber, between 23 June 2023 and 29 February 2024.

### ***Emergence surveys***

2.6.18 For those trees identified as being unsafe to climb or those which could not be fully inspected during aerial assessment due to dense ivy, emergence and re-entry surveys were used in place of aerial inspections. Surveyors were positioned at locations offering a good view of all likely roost exit points and roosting features. Emergence surveys commenced 15 minutes before sunset and continued for up to two hours (conditions allowing) after sunset. Re-entry surveys commenced two hours before, and

<sup>33</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>



finished 15 minutes after, sunrise. Surveyors used a bat detector such as a Batlogger M to record bat activity during the survey. In addition, an infra-red camera (Canon XA11 infra-red video camera with additional external infra-red spotlight) was used to monitor the most suitable bat roosting features on both the emergence and dawn surveys.

- 2.6.19 The recordings of any bats seen emerging from the trees were analysed using sound analysis to identify the calls down to the species of bat, where possible.
- 2.6.20 Surveys were carried out in weather conditions suitable for bats to emerge i.e. no rain, no strong wind and air temperature 10 °C or above.

## **Building assessment and surveys**

### ***Preliminary roost assessment***

- 2.6.21 A preliminary roost assessment (PRA) of the buildings anticipated to be impacted by the Proposed Development was carried out on 4 August 2022. The weather conditions during the survey were 18°C with intermittent cloud, brief rain showers and a gentle breeze. The assessment was undertaken by Lewis Wright and Joseph Mould. Lewis is a principal ecological consultant with over nine years of experience in ecological consultancy. He is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and holds a licence to survey for bats in Wales (ref: S089006/1).
- 2.6.22 An additional PRA was conducted for Buildings 9 and 10 on 9 May 2023 (building numbers are provided in **Figure 5**). The weather conditions during the survey were 15°C with scattered showers and cloudy skies. The assessment was undertaken by Emily Shaw and Iveta Nikandrovaite. Emily is a senior ecological consultant with over seven years' experience in ecological consultancy and is licensed by Natural Resources Wales to disturb all species of bats, take and handle all species other than greater or lesser horseshoe under licence number S092059-1. Subsequent to these surveys, internal access to Building 11 was granted, and as such Lewis Wright, Rob Regan and Iveta Nikandrovaite were able to inspect two loft spaces and a cellar within the building.
- 2.6.23 A change in design required the inspection of an office building (B12) to the north of the cement works, and a sports pavilion building to the north east of the cement works (B13). As such this survey was conducted on 7 June 2023. Weather conditions during the survey were 14°C, dry and with minimal cloud.
- 2.6.24 All surveys were carried out in-line with best practice guidelines ([Collins, 2016](#)<sup>34</sup>).
- 2.6.25 The external features of the buildings were surveyed for characteristics that may be used by roosting bats. Potential access points into roof voids were noted as well as any crevices and voids in the external structure which could provide roosting opportunities.
- 2.6.26 The buildings were assessed according to the following factors that influence the likelihood of bats roosting:

<sup>34</sup> <https://cieem.net/resource/bat-surveys-for-professional-ecologists-good-practice-guidelines-3rd-edition/>

- Surrounding habitat: whether there are potential flight-lines and foraging areas for bats nearby;
- Construction detail: the type and construction of architectural features such as attics, soffit boxes, lead flashing and hanging tiles that could be used by roosting bats;
- Building condition: whether disrepair has opened potential bat-access points (especially around roofs);
- Potential bat-access points: whether there is flight and crawl access; and
- Potential roosting locations: description of all bat-accessible voids, cracks and crevices.

2.6.27 Where safe to do so internal areas were inspected for potential roosting features and direct evidence of roosting bats, including; actual sightings, droppings, urine stains, odour, scratch marks, grease stains and feeding remains.

2.6.28 The criteria shown in **Table 7** were used to categorise the buildings according to their potential for roosting bats.

#### ***Hibernation surveys***

2.6.29 B3 was assessed as having low suitability for hibernating bats. Targeted surveys were undertaken between December 2022 and February 2023 to look for and identify hibernating bats or other evidence of bat occupation.

2.6.30 Two inspections were carried out, one on 17 January 2023 and one on 17 February 2023. Both were led by Emily Shaw. All cracks, crevices and voids (where accessible) were inspected using torches and endoscopes. Any bats, or evidence of them, was recorded and its location within the building marked on a plan.

2.6.31 Bats sometimes rouse from hibernation to feed and drink. Two SM4 static bat detectors were deployed within the building for two consecutive weeks in each of December, January and February with the aim of detecting any bats if they became active. A temperature and humidity datalogger was deployed alongside each static detector to provide environmental context for the survey results collected. To avoid confusion with the summer MPs, the winter MPs were numbered as MP4 and MP5. MP4 was located within Building 3 – Slurry pit pump room within the eastern section of the building, MP5 was located within Building 3 – Slurry pit pump room within the north western section of the building. Deployment dates are shown below in **Table 8** below.

**Table 8 Survey dates for static detector deployment within B3**

Month	Start date	End date
December	15/12/22	06/01/23
January	06/01/23	20/01/23

Month	Start date	End date
February	10/02/23	24/02/23

### ***Emergence surveys***

2.6.32 Surveys were carried out on 07 June 2023, 19 June 2023, 06 July 2023, 11 July 2023 and 14 August 2023 and were in accordance with the BCT guidelines, which contains the methodologies for undertaking bat roost characterisation surveys. All surveyors were members of the Chartered Institute of Ecology and Environmental Management (CIEEM) and competent at carrying out this type of survey. The dusk emergence surveys started 15 minutes before sunset and continued for 90 minutes after sunset. Weather conditions and survey timings are provided in **Table 9** below.

**Table 9 Emergence survey details**

Date	Building No.	Sunset / Sunrise	Start / End	Temperature (°C) Start / End	Wind (Beaufort) Start / Finish	Cloud (Octas) Start / Finish	Precipitation
07/06/23	7,8,9,10	21:35	21:20 / 23:05	14 / 13	0 / 0	2 / 2	Dry
19/06/23	1,4,11	21:42	21:27 / 23:12	18 / 16	1 / 1	1 / 4	Dry
06/07/23	2,12,13	21:40	21:25 / 23:10	18 / 17	2 / 5	6 / 6	Dry
11/07/22	9	21:36	21:21 / 23:06	17 / 16	1 / 1	1 / 1	Dry
14/08/23	7, 8, 11	20:45	20:30 / 22:15	17 / 16	1 / 1	2 / 4	Dry

2.6.33 Surveyors were positioned in locations with a good view of potential roosting features (PRFs) within the buildings. Surveyors used BATLOGGER M and BATLOGGER M2 bat detector recorders during the surveys. The devices record bat echolocation calls across the full spectrum, with a sensitivity range of 10 – 150 kHz. The integrated heterodyne live monitoring also allows the observer to hear the echolocation calls in real time, with automatic tuning. The recordings are individually time/date, GPS and temperature stamped, and are of high enough quality to produce time expansion quality sonograms. Bat calls were analysed using Bat Explorer 2.1.10.1.

### Survey constraints

- 2.6.34 Due to access constraints, transect surveys and static monitoring did not commence until June meaning that no data was collected in April and May 2023. However, the weather in North Wales in April was largely too cold in the evenings for considerable bat activity and a supplementary visit was undertaken at the start of June, when weather conditions were similar to the week previous at the end of May. This is therefore not considered a significant constraint to the survey effort and data collected.
- 2.6.35 During transect surveys, bats and their direction of flight were easiest to observe during the period just after sunset (or just before sunrise) when light levels were high. As the light faded, visual observation often became impossible and 'heard not seen' records were made. When this occurred only the location of the bat pass could be recorded and not the direction of flight.
- 2.6.36 During the transect surveys conducted in June, the bat detector deployed in transect one failed to detect bats. However, this is not considered a significant constraint as the surveyors' notes and the results from other months were consistent, and subsequent surveys successfully detected bats.
- 2.6.37 The static detector deployed at MP1 in August failed due to a corrupt memory card. However, the detector was successfully deployed later in the month in suitable weather conditions, as such this is not considered a significant constraint to the survey.
- 2.6.38 The statics deployed in October were deployed at the start of the transect survey around sunset. They therefore did not record for the 30-minute period prior to sunset. However, this is not considered to be a significant constraint as the first bat on the transect survey was not recorded until 19:08, 28 minutes after sunset. Additionally, the batteries in MP1 failed during the fifth night of recording. As the monitoring was almost complete and the overall activity level was lower than in previous months, the detector was not redeployed as it was deemed that the monitoring had recorded enough to sufficiently assess the bat species assemblage and level of activity.
- 2.6.39 Various aspects of B5-8 were not accessible or visible during the PRA due to dense scrub surrounding the buildings. Although this meant that potential roosting features or access points could not be observed, the dense scrub likely limits the use of any features present by roosting bats as it will block flight paths. It is therefore not considered a significant constraint to the assessment of these buildings. Access into Padeswood Hall loft was limited due to the presence of asbestos and the deteriorated condition of the loft. An assessment for the loft's suitability to support bats was restricted to a view from the hatch. However, sufficient information was gathered to determine the buildings suitability to support roosting bats, with a precautionary approach adopted where necessary. Therefore, this is not considered to be a significant constraint to the survey results.

## 2.7 Water vole

- 2.7.1 Surveys of all suitable habitats within the Ecological Survey Area (**Figure 1**) were carried out. The surveys were carried out on two occasions, one early season (June 2022) and one late season (August 2022) in line with the latest water vole guidance

(2016). The surveys focused on ditches, watercourses and ponds within the Ecological Survey Area. The areas surveyed are shown in **Figure 8**.

### Habitat assessment

2.7.2 The suitability of the ditches not previously surveyed for water voles was assessed using the following criteria ([Dean et al. 2016](#)<sup>35</sup>):

1. Dry areas above water level for nesting, either in burrow or above ground woven nests. Need to consider;
  - a. Burrow entrances do not need to be above water level;
  - b. Bank profile – steep banks are preferred as water voles can excavate burrow systems that are more adaptable to changing water levels (*n.b.* water voles can use banks with shallow profiles where water levels are stable);
  - c. Bank substrate – whether water voles can burrow into the banks (*n.b.* burrows can be formed behind stonework with suitably sized gaps, behind sheet piling, where water voles can access the banks behind by either corrosion or by climbing the sheet piling or adjacent vegetation, and water voles can also create burrows some distance back from the water's edge, where substrate at the toe of the bank is unsuitable);
  - d. Daily fluctuations in water level (such as on estuaries or tidal reaches of rivers); and
  - e. The availability of suitable above-ground nest sites, where there are no banks, or banks with a shallow profile, such as in extensive reed/sedge bed habitats or in tussocks within ponds.
2. Herbaceous vegetation to provide food and cover. Water voles will generally favour areas with herbaceous vegetation on the banks and (ideally) in the channel. However, it should be noted that:
  - a. The level of cover provided by vegetation will vary depending on the season and how recently management works has been undertaken;
  - b. The level of cover required by water voles will vary, with urban / sub-urban populations or those in intensively sheep-grazed uplands surviving in habitat with very little cover;
  - c. Water voles will eat a wide variety of plant species (as well as amphibians, invertebrates and fish) and can survive in areas where there is a low diversity of species and a lack of lush emergent vegetation;
  - d. Water voles are very capable climbers and will forage up into a hedgerow understorey for fruits and shoots where a watercourse is present as its base; they can also exist in low densities in the banks of watercourses shaded by woodland.
3. Water, as a means to escape from predators:

<sup>35</sup> <https://www.nhbs.com/the-water-vole-mitigation-handbook-book>



- a. Water voles will sometimes use very shallow watercourses that contain a few centimetres of water, and terrestrial populations have been recorded which are unconnected to wetland habitat.

2.7.3 In general, water voles require all three of these habitat 'preferences' in close proximity to each other, although there are circumstances where water voles survive in less favourable habitat. With these preferences in mind, classification of habitat suitability for each ditch was made as follows:

- *Excellent* – ideal or optimal habitat with good cover, food sources and other elements that would allow a population of water voles to thrive throughout the year.
- *Suitable* – habitat that has all the elements required for water voles certainly in the summer, and probably through most winters.
- *Marginal* – habitat that has some of the habitat features that are suitable for water vole, but with some constraints so that suitability throughout the year is not certain.
- *Unsuitable* – habitat lacking one or more crucial element for use by water voles. This category does not necessarily preclude the habitat being used by commuting water voles, but it would not be able to support a resident population.

#### **Presence / likely absence surveys**

- 2.7.4 A search for field signs - including droppings (the principal evidence required), feeding remains, burrows and footprints - indicating presence was completed on the ditches suitable for water voles within the breeding season. The breeding season for the majority of the UK is considered to be between mid-April to the end of September (though this can vary depending on season variation based on latitude and altitude) and this is when field evidence is more evident ([Dean et al. 2016](#)<sup>36</sup>).
- 2.7.5 The apparent size and distribution of water vole populations can be affected by changes in habitat suitability during the breeding season. Two surveys are recommended according to published guidelines ([Dean et al. 2016](#)<sup>37</sup>); one between mid-April to the end of June and one between July and September, inclusive (at least two months apart). In some cases it may be possible to justify an assessment based on a single visit if a precautionary approach is followed.
- 2.7.6 Where water vole presence is confirmed, estimates of latrine density can be used to indicate the relative size of the population and highlight the areas of most value to the species (**Table 10**). Subdivision of the survey area into 'low', 'medium' or 'high' relative population densities could assist with interpretation of the Site ([Dean et al. 2016](#)<sup>38</sup>):

**Table 10 Approximate latrine numbers and relative population density**

<sup>36</sup> <https://www.nhbs.com/the-water-vole-mitigation-handbook-book>

<sup>37</sup> <https://www.nhbs.com/the-water-vole-mitigation-handbook-book>

<sup>38</sup> <https://www.nhbs.com/the-water-vole-mitigation-handbook-book>

Relative Population Density	Approximate number of latrines per 100m of bank-side habitat	
	Mid-April to end of June	July to September (inclusive)
High	10 or more	20 or more
Medium	3 – 9	6 – 19
Low	≤ 2 (or none, but with confirmatory signs)	≤ 5 (or none, but with confirmatory signs)

### Survey constraints

- 2.7.7 Many of the features surveyed were dry, shallow or overgrown at the time of survey making them unsuitable or sub-optimal habitat at this time of year (June and August). Where features were overgrown there are inherent difficulties with surveying effectively for evidence of water vole. Additional stretches were inaccessible due to water pollution and intentional barriers marking the edge of site. These were viewed from distance using binoculars where possible but stretches which could not be surveyed fully are shown in **Figure 8**.

## 2.8 Badger

- 2.8.1 A badger survey was carried out during the Phase 1 habitat survey using appropriately trained ecologists with experience of carrying out such surveys. All areas within 30m of the Site boundary (where access was possible) were systematically searched for signs of badgers including setts, foraging signs, paths (runs) and latrines. Incidental sightings of badger evidence were also noted during the other protected species surveys carried out at the Site.

### Sett and hole terminology

- 2.8.2 Individual holes or setts are described using terminology defined by [Harris et al. \(1989\)](#)<sup>39</sup> as set out below:

#### Hole terminology

- *Well-used holes* - These are clear of any debris and vegetation, are obviously in regular use, and may or may not have been excavated recently.
- *Partially-used holes* - These are not in regular use and have debris such as leaves or twigs in the entrance or, have moss or other plants growing in or around the entrance. Partially-used holes could be in regular use after a minimal amount of clearance.
- *Disused holes* - These have not been in use for some time, are partially or completely blocked, and cannot be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible

<sup>39</sup> [https://www.mammal.org.uk/wp-content/uploads/2016/04/Surveying\\_Badgers\\_Mammal\\_Society.compressed.pdf](https://www.mammal.org.uk/wp-content/uploads/2016/04/Surveying_Badgers_Mammal_Society.compressed.pdf)

is a depression in the ground where the hole used to be, and the remains of a spoil heap, which may be covered in moss or other plants.

### **Sett terminology**

- *Currently-used setts* - Any sett entrance that is well-used or partially-used can fall within the category of current use as interpreted by English Nature (as was) (1999 & 2002).
- *Disused setts* - If all the entrances of a sett are disused, then even though it was originally dug by a badger, it is no longer a badger sett as defined under the [Badger Act 1992](#)<sup>40</sup>.
- *Cohabitation* - Both fox (*Vulpes vulpes*) and rabbit (*Oryctolagus cuniculus*) are sometimes known to occupy badger setts at the same time as badgers are resident. The presence of fox hair and rabbit signs at a sett complex does not necessarily indicate that the sett is being used exclusively by these animals. These findings should be considered in conjunction with other findings or observations in and around the sett.
- *Main sett* - A badger sett forming the main abode of a group of badgers. Main setts are occupied continually throughout the year and are generally used by at least one sow to rear young. In a national survey of setts, the average number of holes for a main sett was 12, although there may be any number of holes from one to more than 40.
- *Annexe sett* - Setts situated in the immediate vicinity of a main sett. Although such setts are often occupied throughout the year, they will generally only be used for breeding when the main sett is used by another breeding sow. These setts can have any number of holes although it is usually around eight. The distinguishing feature of these setts is an obvious, well-used path running to the main sett.
- *Subsidiary sett* - Setts situated away from the main sett that may represent an area of particularly good foraging. Such setts are used occasionally throughout the year and occasionally for breeding but are more likely to be used only to exploit a seasonal food source. These setts usually have around four holes.
- *Outlying sett* - These setts are away from the main sett. They have a small number of holes, often only one or two. Such setts are rarely in continuous occupation and are most often used either to exploit a seasonal food source or as a refuge when visiting certain parts of the territory.

### **Survey constraints**

- 2.8.3 The majority of areas within 30m of the Ecological Survey Area were not accessible due to landowner restrictions. Where possible, these areas were viewed from outside the land parcel boundary; however, a full badger survey of these areas has not been carried out.

<sup>40</sup> <http://www.legislation.gov.uk/ukpga/1992/51/contents>

## 2.9 Other species of principal importance

- 2.9.1 During the surveys outlined above, a record was made of any incidental sightings of other notable species, including polecats (*Mustela putorius*), European hedgehog (*Erinaceus europaeus*) and brown hare (*Lepus europaeus*).

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## 3 RESULTS

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### 3.1 Background data search

- 3.1.1 Aspects of the background data search (BDS) related to priority habitats and designated sites are presented in **Volume 4, Technical Appendix 5.1** and are therefore not duplicated in this report.

#### Protected and noteworthy species

- 3.1.2 At least 126 noteworthy species are recorded from places within 2km of the Site boundary. Noteworthy species include species of principal importance that are listed under Section 7 of the [Environment \(Wales\) Act 2016](#)<sup>41</sup>.
- 3.1.3 Of these, 10 are plants, 28 are invertebrates, 3 are fish, 5 are amphibians, 4 are reptiles, 64 are birds and at least 12 are mammals. Species that are protected by law under Schedules 2 and 5 of [The Conservation of Habitats and Species Regulations 2017 \(as amended\)](#)<sup>42</sup>, Schedules 1, 2, 5 and 8 of [The Wildlife and Countryside Act 1981 \(as amended\)](#)<sup>43</sup> or [The Protection of Badgers Act 1992](#)<sup>44</sup> that have been recorded in the search area are highlighted in the full species list given in **Appendix A**. Those of relevance to the Site and the current proposals are discussed in **Section 3.2 – Section 3.8**.

### 3.2 Great crested newt and other amphibians

- 3.2.1 The BDS returned records of great crested newts, most recently from 2021, and they have been previously recorded in all ponds within the Castle Cement Limited landholding except Pond 4 which has been dry for a considerable time and Pond 12 which had not been surveyed previously ([AECOM, 2017](#)<sup>45</sup>; Enfys 2016-2021). Great crested newts have also been found previously within the active working areas of the Site, particularly in underground cable tunnels ([AECOM, 2017](#)<sup>46</sup>). Furthermore, an adult female great crested newt was found on a track near Pond 6 during a bat transect survey in June 2022. Common amphibian species were also recorded on the Site during reptile surveys (**Table 11**).
- 3.2.2 There are a total of 14 ponds within the Site boundary and a further 15 within 500m (considered the distance relevant for permanent works). Due to the known presence of great crested newts on the Site, ponds outside of the Site boundary were not surveyed as this would not impact the mitigation requirements. The great crested newts pond locations are shown in **Figure 10**.

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<sup>41</sup> <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>

<sup>42</sup> <https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

<sup>43</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>44</sup> <http://www.legislation.gov.uk/ukpga/1992/51/contents>

<sup>45</sup> <https://planning.agileapplications.co.uk/flintshire/application-details/61541>

<sup>46</sup> <https://planning.agileapplications.co.uk/flintshire/application-details/61541>



- 3.2.3 The HSI assessment of Pond 12 identified it as being of 'good' suitability to great crested newts, but the pond was negative for great crested newt eDNA.
- 3.2.4 The Ecological Survey Area is almost entirely suitable for great crested newts and other amphibians containing a variety of habitats including scrub, ruderal vegetation, woodland, grassland of varying heights and refuges such as log piles, spoil heaps and rubble piles.

**Table 11 HSI assessment results for Pond 12**

Suitability Index	Score
SI1 - Geographic location	1.00
SI2 - Pond area	0.90
SI3 - Permanence	0.90
SI4 - Water quality	0.33
SI5 - Shade	0.80
SI6 - Waterfowl	0.67
SI7 - Fish	1.00
SI8 - Pond count	1.00
SI9 - Terrestrial habitat	1.00
SI10 - Macrophytes	0.30
<b>HSI score</b>	<b>0.73</b>
<b>HSI categorisation</b>	<b>Good</b>

### 3.3 Reptiles

- 3.3.1 The BDS returned records of all four common reptile species outside of the wider site, mostly recently common lizard in 2022 and slow-worm in 2020.
- 3.3.2 The results of the surveys are presented in **Table 11** and the location of the reptile survey areas is shown in **Figure 2**. No reptiles were observed but common amphibian and small mammal species were recorded under the refuges during surveys (**Table 12**).

**Table 12 Reptile survey results**

Survey location	Area (Ha)	Survey sub-location	No. of refugia	Reptiles recorded	Other species recorded
1	2.11	A	10	None	None
		B	10	None	None
		C	10	None	None
		D	10	None	None
2	0.72	A	20	None	Survey 1 – Juvenile smooth or palmate newt Survey 2 – Bank vole Survey 3 – Juvenile common toad Survey 5 – Wood mouse Survey 6 – Male smooth newt, and bank vole
3	1.71	A	20	None	Survey 4 – Bank vole Survey 6 – Bank vole Survey 7 – Juvenile common toad
4	0.20	A	10	None	Survey 4 – Mouse Survey 6 – Mouse
5	2.85	A	20	None	None
		B	20	None	Survey 6 – Four mice and two voles
		C	10	None	Survey 4 – Juvenile common toad
		D	10	None	Survey 6 – Common toad
		E	20	None	Survey 7 – Adult male smooth newt
		F	10	None	Survey 7 – Wood mouse
		G	10	None	Survey 1 – Bank vole Survey 3 – Juvenile common toad, and bank vole
		H	10	None	Survey 6 – Bank vole

Survey location	Area (Ha)	Survey sub-location	No. of refugia	Reptiles recorded	Other species recorded
Totals	7.59	-	200	-	-

### 3.4 Breeding birds

- 3.4.1 The BDS returned records of 16 protected bird species and 48 species of conservation concern.
- 3.4.2 Figures for the breeding bird surveys are presented on **Figure 3a – f**. A total of 43 species were recorded during the surveys. A complete species list is presented in **Table 13**.
- 3.4.3 Interpreting the data using the criteria specified in **Section 2.5.3**, 10 species are confirmed as breeding, 13 as probable breeding species and 17 as possible breeding species. In addition, 3 species are categorised as non-breeding.
- 3.4.4 Of all the species recorded, red kite (*Milvus milvus*) and peregrine (*Falco peregrinus*) were the only species listed on Annex 1 of the [EU Birds Directive](#)<sup>47</sup> and on Schedule 1 of the [Wildlife and Countryside Act 1981 \(as amended\)](#)<sup>48</sup>.
- 3.4.5 Nine Section 7 [Environment \(Wales\) Act](#)<sup>49</sup> priority species were observed during the surveys: black-headed gull (*Chroicocephalus ridibundus*), bullfinch (*Pyrrhula pyrrhula*), dunnoek (*Prunella modularis*), herring gull (*Larus argentus*), house sparrow (*Passer domesticus*), peregrine, reed bunting (*Emberiza schoeniclus*), song thrush (*Turdus philomelos*) and starling (*Sturnus vulgaris*).
- 3.4.6 Of those species classed as Confirmed, Probable or Possible Breeding, five were listed on the UK BoCC Red list and five were listed on the Welsh BoCC Red list. Eleven species were listed on the UK BoCC Amber list and nine on the Welsh BoCC Amber list as Species of Conservation Concern. Twenty species classed as Confirmed, Probable or Possible Breeding were of little or no conservation concern. These birds and their breeding status are all listed in **Table 13**.

**Table 13 Bird species peak counts recorded during the breeding bird surveys, and their breeding status**

English name	Scientific name	Peak count	UK BoCC status	Wales BoCC status	Breeding status
Blackbird	<i>Turdus merula</i>	22	-	-	Probable breeding

<sup>47</sup> <https://eur-lex.europa.eu/eli/dir/2009/147/oj>

<sup>48</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>49</sup> <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>

English name	Scientific name	Peak count	UK BoCC status	Wales BoCC status	Breeding status
Blackcap	<i>Sylvia atricapilla</i>	6	-	-	Probable breeding
Black-headed gull	<i>Chroicocephalus ridibundus</i>	2	Amber	Red	Non-breeding
Blue tit	<i>Cyanistes caeruleus</i>	38	-	-	Confirmed breeding
Bullfinch	<i>Pyrrhula pyrrhula</i>	3	Amber	Red	Confirmed breeding
Buzzard	<i>Buteo buteo</i>	2	-	-	Possible breeding
Carrion crow	<i>Corvus corone</i>	5	-	-	Possible breeding
Chiffchaff	<i>Phylloscopus collybita</i>	23	-	-	Confirmed breeding
Coot	<i>Fulica atra</i>	2	-	Amber	Confirmed breeding
Dunnock	<i>Prunella modularis</i>	8	Amber	-	Probable breeding
Feral pigeon	<i>Columba livia</i>	45	-	-	Probable breeding
Goldcrest	<i>Regulus regulus</i>	7	-	Amber	Probable breeding
Goldfinch	<i>Carduelis carduelis</i>	29	-	-	Probable breeding
Great spotted woodpecker	<i>Dendrocopos major</i>	2	-	-	Possible breeding
Great tit	<i>Parus major</i>	11	-	-	Probable breeding
Herring gull	<i>Larus argentus</i>	3	Red	Red	Confirmed breeding

English name	Scientific name	Peak count	UK BoCC status	Wales BoCC status	Breeding status
House martin	<i>Delichon urbicum</i>	52	Red	-	Confirmed breeding
House sparrow	<i>Passer domesticus</i>	16	Red	Amber	Confirmed breeding
Jackdaw	<i>Coloeus monedula</i>	20	-	-	Possible breeding
Jay	<i>Garrulus glandarius</i>	2	-	-	Possible breeding
Long-tailed tit	<i>Aegithalos caudatus</i>	9	-	Amber	Possible breeding
Magpie	<i>Pica pica</i>	8	-	-	Probable breeding
Mallard	<i>Anas platyrhynchos</i>	28	Amber	Amber	Possible breeding
Mistle thrush	<i>Turdus viscivorus</i>	2	Red	Amber	Probable breeding
Moorhen	<i>Gallinula chloropus</i>	3	Amber	-	Possible breeding
Nuthatch	<i>Sitta europaea</i>	1	-	-	Possible breeding
Peregrine	<i>Falco peregrinus</i>	3	-	-	Confirmed breeding
Pheasant	<i>Phasianus colchicus</i>	1	-	-	Non-breeding
Pied wagtail	<i>Motacilla alba</i>	4	-	-	Possible breeding
Raven	<i>Corvus corax</i>	1	-	-	Non-breeding
Red kite	<i>Milvus milvus</i>	1	-	Amber	Possible breeding

English name	Scientific name	Peak count	UK BoCC status	Wales BoCC status	Breeding status
Reed bunting	<i>Emberiza schoeniclus</i>	1	Amber	Amber	Possible breeding
Reed warbler	<i>Acrocephalus scirpaceus</i>	1	-	-	Possible breeding
Robin	<i>Erithacus rubecula</i>	18	-	-	Confirmed breeding
Rook	<i>Corvus frugilegus</i>	1	Amber	-	Possible breeding
Song thrush	<i>Turdus philomelos</i>	6	Amber	Amber	Probable breeding
Starling	<i>Sturnus vulgaris</i>	4	Red	Red	Possible breeding
Swallow	<i>Hirundo rustica</i>	11	-	-	Confirmed breeding
Treecreeper	<i>Certhia familiaris</i>	1	-	-	Possible breeding
Whitethroat	<i>Sylvia communis</i>	4	Amber	Red	Probable breeding
Willow warbler	<i>Phylloscopus trochilus</i>	1	Amber	Red	Possible breeding
Woodpigeon	<i>Columba palumbus</i>	20	Amber	-	Probable breeding
Wren	<i>Troglodytes troglodytes</i>	22	Amber	-	Probable breeding

### Species abundance

3.4.7 Based on the peak counts and the number of territories recorded for the species encountered during the 2022 field surveys, no species are assessed as being present in numbers of national and international importance.



### Species richness

- 3.4.8 A total of 41 species were recorded breeding or potentially breeding during the 2022 field surveys. In line with the guidance described in **Section 2.5.9**, the breeding bird assemblage is therefore considered to be of local importance.

### Site usage by breeding birds

- 3.4.9 A pair of nesting peregrines were identified as Confirmed Breeding on one of the buildings within the cement works. At least two chicks successfully fledged from the nest. A female peregrine was observed predating on a feral pigeon south of the cement works.
- 3.4.10 Large cylindrical buildings within the cement works provided excellent nesting structures for house martin. Swallows were also observed nesting within rafters of the workshop at the western extent of the cement works.
- 3.4.11 House sparrows and herring gulls were also observed nesting on buildings within the main complex of the cement works.
- 3.4.12 One red kite was flushed from woodland within the forest school to the north east of the cement works, however no nesting behaviour was observed.
- 3.4.13 An owl box was identified to the south-west of the cement works, however no usage by barn owl was observed, and results of enquiries made suggested that no monitoring of the box was taking place.
- 3.4.14 Habitats of particular value to the breeding bird populations recorded during the field surveys were assessed and evaluated. Scrub to the south of the Site was of particular value to breeding birds, including species such as blackbird and whitethroat.
- 3.4.15 The unmanaged hedgerows with trees and woodland provided particular value to breeding birds across the Site. The marginal scrub habitat along these boundaries allowed breeding opportunities for notable species such as bullfinch and song thrush. The mature trees scattered along these field margins often had suitable features for cavity nesters such as great tit, blue tit and great spotted woodpecker.
- 3.4.16 Waterbodies in the southern area of the Site attracted invertebrates which provided a foraging resource for house martin and swallow.
- 3.4.17 The grassland areas were of low value for breeding birds aside from their value as a foraging resource.

## 3.5 Bats

- 3.5.1 The BDS returned records of at least six species of bat:
- Unidentified bat species;
  - Myotis species (*Myotis* sp.);
  - Whiskered bat (*Myotis mystacinus*);
  - Noctule bat (*Nyctalus noctula*);
  - Pipistrelle species (*Pipistrellus* sp.);

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Brown long-eared bat (*Plecotus auratus*); and
- Lesser horseshoe bat (*Rhinolophus hipposideros*).

### Transect surveys

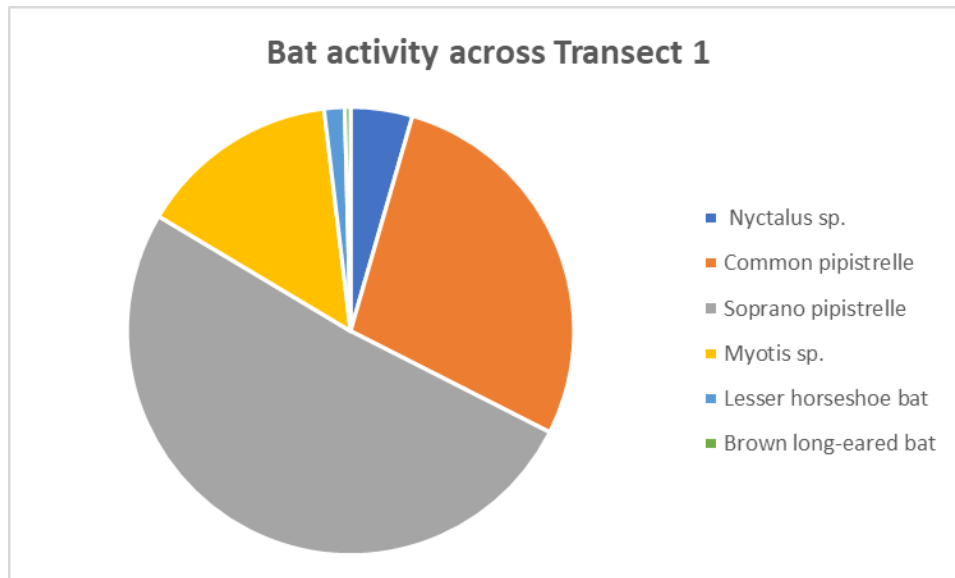
- 3.5.2 **Table 14** details the total number of bat passes recorded for each transect between June and October 2022.
- 3.5.3 On Transect 1, at least six different species of bat were recorded during the transect surveys including; common pipistrelle, soprano pipistrelle, brown long-eared bat and lesser horseshoe bat. The *Nyctalus* sp. on the Site is either noctule bat and/or Lesler's bat. Based on geographic distributions, the *Myotis* sp. was likely to be one or more of four 'common' myotids: Brandts bat (*Myotis brandtii*), Daubenton's bat (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri*) or whiskered bat. Over the course of the surveys, soprano pipistrelle attributed for 51.09% of all activity recorded (foraging and commuting) on the Site. This was followed by common pipistrelle (27.99%), *Myotis* sp. (14.54%), *Nyctalus* sp. (4.48%), lesser horseshoe bat (1.49%) and brown long-eared bat (0.41%), as shown in **Chart 1**.
- 3.5.4 On Transect 2, the same species as Transect 1 were observed and in addition, Nathusius' pipistrelle was also recorded. Over the course of the surveys soprano pipistrelle attributed for 56.43% of all activity recorded (foraging and commuting) on the Site. This was followed by common pipistrelle (31.62%), *Myotis* sp. (6.35%), lesser horseshoe bat (2.57%), *Nyctalus* sp. (1.97%), brown long-eared bat (0.91%) and Nathusius' pipistrelle (0.15%) as shown in **Chart 2**.

**Table 14 Total number of bat passes recorded during each transect survey.**

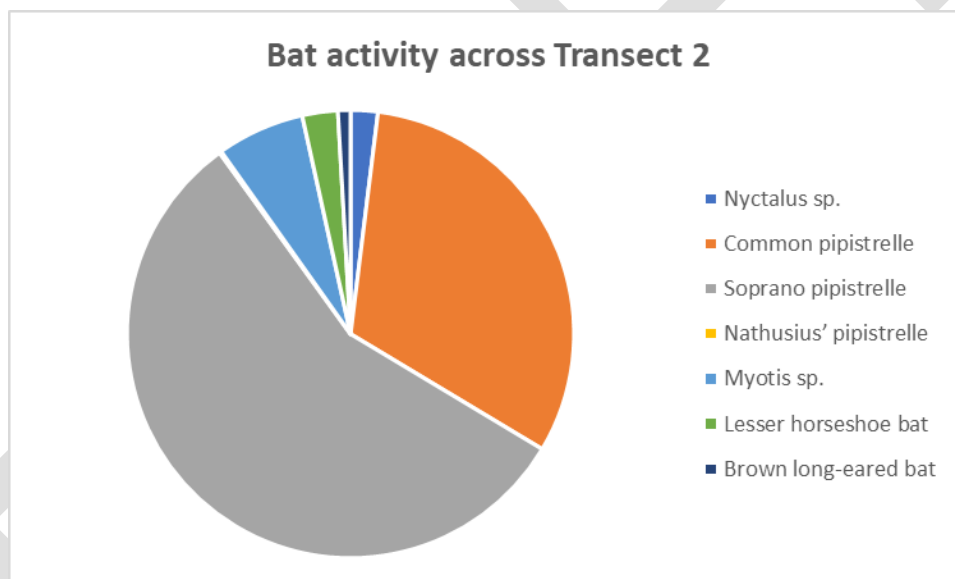
Species	June (May )	June (detector failure)	July	August Dusk	August Dawn	September	October	TOTAL
<b>Transect 1</b>								
Noctule	20	0	10	1	1	1	0	<b>33</b>
Common pipistrelle	58	0	63	11	2	50	22	<b>206</b>
Soprano pipistrelle	65	0	101	11	9	81	109	<b>376</b>
Nathusius' pipistrelle	0	0	0	0	0	0	0	<b>0</b>
<i>Myotis</i> sp.	0	0	11	1	1	30	0	<b>43</b>

Species	June (May )	June (detector failure)	July	August Dusk	August Dawn	September	October	TOTAL
Daubenton's bat	0	0	5	21	28	10	0	<b>64</b>
Lesser horseshoe bat	4	0	4	1	1	1	0	<b>11</b>
Brown long-eared bat	0	0	0	3	0	0	0	<b>3</b>
<b>TOTAL</b>	<b>147</b>	<b>0</b>	<b>194</b>	<b>49</b>	<b>41</b>	<b>173</b>	<b>131</b>	<b>736</b>
<b>Transect 2</b>								
Noctule	3	5	3	2	0	0	0	<b>13</b>
Common pipistrelle	7	26	93	53	8	22	0	<b>209</b>
Soprano pipistrelle	8	50	138	28	144	4	1	<b>373</b>
Nathusius' pipistrelle	1	0	0	0	0	0	0	<b>1</b>
Myotis sp.	1	9	0	7	1	3	0	<b>21</b>
Daubenton's bat	4	10	1	2	0	3	1	<b>21</b>
Lesser horseshoe bat	4	0	6	0	1	3	3	<b>17</b>
Brown long-eared bat	0	1	0	5	0	0	0	<b>6</b>
<b>TOTAL</b>	<b>28</b>	<b>101</b>	<b>241</b>	<b>97</b>	<b>154</b>	<b>35</b>	<b>5</b>	<b>661</b>

**Chart 1 Species contributions to total level of bat activity across Transect 1**



**Chart 2 Species contributions to total level of bat activity across Transect 2**



- 3.5.5 The peak level of bat activity on Transect 1 was observed in July, with a total of 194 bat passes recorded. On Transect 2, the highest level of bat activity occurred in August, with 251 bat passes documented. The June (May) surveys recorded the highest diversity of bat species, with seven species.
- 3.5.6 A soprano pipistrelle was observed returning to roost in a tree adjacent to Pond 6 during the August pre-dawn transect. It was observed circling for over 10 minutes but the actual roost entry point and tree could not be observed from the track. The trees in this area have not been surveyed as it is understood they will not be affected by the Proposed Development.

### Static monitoring

- 3.5.7 A summary of the results for each monitoring point are given in **Table 15**.
- 3.5.8 Across both monitoring points at least seven different species of bat were recorded; common pipistrelle, soprano pipistrelle, *Myotis* sp., *Nyctalus* sp., lesser horseshoe, Nathusius' pipistrelle, and brown long-eared bat. Soprano pipistrelle and common pipistrelle bats were recorded most frequently across both monitoring points and mostly on a nightly basis. *Myotis* sp. were the next most frequently recorded. At MP1 the next most frequently recorded species was lesser horseshoe, followed by *Nyctalus* sp. and brown long-eared bat. At MP2 the next most frequent recorded species was *Nyctalus* sp. Brown long-eared and lesser horseshoe bat passes were recorded less frequently.
- 3.5.9 Overall the highest levels of activity were recorded at MP1 within the north-western corner of the Site, within an overgrown, mature residential garden. MP2 was situated in the south-eastern section of the Site, on the edge of a hedgerow, near a small waterbody. Due to the proximity of MP1 to residential dwellings, mature gardens and hedgerows, this may have contributed to the higher levels of activity (likely from foraging bats) in comparison to MP2 – a hedgerow edge where commuting behaviour may be more typical. **Table 15** presents the number of files recorded for each monitoring point. This metric corresponds to the number of passes per species (intervals of one second between bat calls represents a new pass).

**Table 15 Number of files containing each species recorded at each monitoring point.**

Species	June (May) 2022	June 2022	July 2022	August 2022	September 2022	October 2022	TOTAL
<b>Monitoring Point 1</b>							
Noctule	50	2	19	32	19	8	<b>130</b>
Common pipistrelle	6,735	1,043	1,072	1,735	1,887	723	<b>13,195</b>
Soprano pipistrelle	538	976	976	342	772	950	<b>4,554</b>
Nathusius' pipistrelle	2	28	0	0	1	0	<b>31</b>
Myotis sp.	1,140	20	2	462	1,113	92	<b>2,829</b>
Daubenton's bat	838	129	69	282	341	194	<b>1,853</b>

Species	June (May) 2022	June 2022	July 2022	August 2022	September 2022	October 2022	TOTAL
Lesser horseshoe bat	50	7	1	39	213	121	<b>431</b>
Brown long-eared bat	8	1	0	62	37	7	<b>115</b>
<b>TOTAL</b>	<b>9,361</b>	<b>2,206</b>	<b>2,139</b>	<b>2,954</b>	<b>4,383</b>	<b>2,095</b>	<b>23,138</b>
<b>Monitoring Point 2</b>							
Noctule	5	9	21	8	13	1	<b>57</b>
Common pipistrelle	2,156	828	1,011	1,214	51	23	<b>5,283</b>
Soprano pipistrelle	1,947	0	358	970	220	123	<b>3,618</b>
Nathusius' pipistrelle	0	0	0	0	0	0	<b>0</b>
Myotis sp.	29	0	20	42	37	5	<b>133</b>
Daubenton's bat	0	152	441	58	47	8	<b>706</b>
Natterer's bat	3	2	4	0	2	0	<b>11</b>
Lesser horseshoe bat	3	0	10	0	1	1	<b>15</b>
Brown long-eared bat	4	2	1	12	12	3	<b>34</b>
<b>TOTAL</b>	<b>4,147</b>	<b>993</b>	<b>1,866</b>	<b>2,304</b>	<b>383</b>	<b>164</b>	<b>9,857</b>



## Tree assessment and surveys

### *Ground level tree assessment*

- 3.5.10 The majority of the trees within the Ecological Survey Area are in good condition and do not support features suitable for roosting bats. **Figure 6** shows individual trees which are of high, moderate or low suitability for roosting bats. These trees all featured at least one potential roost feature but were of a large enough size to possess more that could not be viewed from ground level.

### *Aerial inspections*

- 3.5.11 Upon aerial and endoscope inspection, no bats were observed in any of the trees and no evidence of roosting within the features was recorded.
- 3.5.12 Subsequent to the first aerial inspection three trees were categorised as high roosting potential and thirteen trees were categorised as moderate roosting potential. Six trees were categorised as having potential for hibernating bats. For trees on which a full aerial inspection could not be undertaken due to dense ivy or those which were deemed unsafe to climb (ten trees in total), emergence surveys were proposed in lieu of further aerial inspections.
- 3.5.13 Hibernation climbing surveys were undertaken during February 2024. No bats were found to be roosting within the trees.

### *Emergence surveys*

- 3.5.14 Emergence surveys on the ten trees mentioned above were undertaken between 14 August 2023 – 5 September 2023. No bats were found to be roosting within the trees.

## Building assessment and surveys

### *Preliminary roost assessment*

#### *Building 1 – Toilet block*

- 3.5.15 Building 1 was in use as a toilet block, including changing facilities and a drying room. The building was of a simple single skin breezeblock construction, with a double pitched roof comprised of concrete roof tiles and central ridge. The windows and doors were a mixture of timber and UPVC framed, with wooden fascia boards on the western and eastern aspects. There were two porch extensions adjoining the main building on the western aspect both with a felt covered flat roof and wooden fascia boards.
- 3.5.16 The roof void was accessed on 15 December 2022 by Emily Shaw. The roof was a trussed timber design and was lined with bitumen roofing felt. The roof height was c.2m. There were two vents, one on the northern aspect and one on the southern aspect, which may provide access into the loft void. No evidence of roosting bats was recorded within the loft void and it appeared very clean.
- 3.5.17 The following potential roost features (PRFs) were identified within Building 1 and photographs are provided in **Appendix D**:

- Damaged and missing mortar on the gable end of the southern elevation;
- Several slipped or damaged roof tiles on the southern elevation, particularly at the join between the two roof pitches;
- Raised ridge tile on eastern roof ridge;
- Gap between the roof and the top of the main building wall on the western elevation, where the larger porch extension meets the main building;
- Large open wooden air vents located on the northern, eastern and southern elevations, allowing potential access into the two roof voids;
- Damage to the breezeblocks around wooden door frame on southern elevation, creating several crevices; and
- Multiple utility holes drilled through the external walls.

3.5.18 Multiple external PRFs were identified, offering potential access into the pitched roof space. The buildings use as a changing area and drying room likely results in a stable, warm temperature within the roof voids, making them more attractive to roosting bats. Building 1 was therefore assessed as having **moderate** potential for roosting bats.

3.5.19 Building 1 was assessed as having **negligible** potential for hibernating bats due to the warm temperature internally which would not allow successful hibernation.

### ***Building 2 – Slurry pits***

3.5.20 Building 2 comprised two large circular steel reinforced concrete tanks. The tanks were crossed by steel scraper bridge gantries each running to a central column. A large steel gantry crossed both tanks at a height of c.8m, with access via steel steps running between the tanks. The tanks were not in use and had naturally filled with rainwater to c.1m from the top. Multiple flat steel plates were present on the external walls of the tanks, some of which were bolted through the main concrete structure. In some instances, the securing bolts were found to be missing, creating a narrow circular tunnel c.5-10cm in diameter passing through the wall of the tank.

3.5.21 The following PRFs were identified within Building 2 and photographs are provided in **Appendix D**:

- Gaps between the external metal plates and the tank walls;
- Narrow tunnels c.5-10cm in diameter present in several locations where the central bolt fixing the external plates to the tank wall were missing. These extend back the full depth of the tank wall; and
- Several areas of damaged concrete around the rim of the tank, offering crevices of varying size and shape.

3.5.22 The PRFs identified had varying degrees of suitability for roosting bats and all were only suitable to support individual bats. There are no roosting opportunities internally as the tanks are almost full of water. Building 2 was therefore assessed as having **low** potential for roosting bats.

- 3.5.23 Building 2 was assessed as having **negligible** potential for hibernating bats as all PRFs would be relatively exposed to the elements and temperature fluctuation is therefore likely.

### ***Building 3 – Slurry pit pump room***

- 3.5.24 Building 3 was a small single storey structure adjoining the northern slurry tank on its south eastern aspect. The building was a simple single skin concrete structure, with a flat felt roof. There were fully boarded metal framed windows on the southern aspect. The boards on the windows on the northern aspect had been removed, creating open access into the building. There was a damaged wooden door on the eastern aspect, which was found to be propped open.
- 3.5.25 Internal inspection revealed the building had a basement level, indicated by a metal staircase and walkway. However, the building was flooded to an unknown depth and the staircase was completely submerged. The building appeared to have been previously used as a pump house and still contained redundant machinery. Steel beams ran the length of the ceiling internally, from east to west, in addition to a perforated metal cable tray. The internal walls and ceiling were covered with large areas of thick flaking paint, some of which may offer adequate shelter to crevice dwelling bats.
- 3.5.26 The following PRFs were identified within Building 3 and photographs are provided in **Appendix D**:
- Open window frame on the northern aspect and open door on the eastern aspect offer internal access, with a relatively open and direct flightline, which is favoured by horseshoe bats. The open window frame of the northern aspect was only partially obscured by willow scrub;
  - Internal steel beams, perforated cable trays and individually secured cables ran across the ceiling offer potential roosting opportunities for free hanging bats; and
  - Thick chunks of flaking paint may offer suitable shelter for individual crevice dwelling bats.
- 3.5.27 No PRFs were identified on the exterior of the building but the un-boarded windows on the northern aspect and the damaged door on the eastern aspect provide internal access with relatively unobstructed flight lines. This makes the building potentially attractive to free hanging bats, such as the lesser horseshoe bat (*Rhinolophus hipposideros*) and greater horseshoe bat (*Rhinolophus ferrumequinum*), which could use the internal beams and cable trays for roosting. It should be noted that there is a low likelihood of greater horseshoe bat presence in the Site due to its northern location and low numbers of records in the BDS. The water within the building is likely to aid with temperature stability whilst also creating a more humid atmosphere, similar to that of a natural cave. Building 3 is considered to offer suitability for hibernating void dwelling bats due to the presence of large access points, flaking paint which horseshoe bats could utilize to hang and flooded basement. Overall, the building offers limited opportunities for crevice dwelling bats due to the absence of PRFs. Furthermore, the building is located within the centre of the cement works and is surrounded by

buildings, roads or footpaths. There are some areas of amenity grassland and scrub but these are small in size and there are no vegetated corridors leading to the building. Furthermore, the building is subject to noise from the surrounding cement works.

- 3.5.28 Taking into account the surrounding habitat, limited PRFs, open access points and flooded basement, the building was assessed as having negligible potential for summer roosting bats. However, the building was assessed as having low potential for hibernating bats as the flooded basement would create suitable temperature and humid conditions for hibernating bats.

#### ***Building 4 – Disused office***

- 3.5.29 Building 4 was a disused office and toilet block lying immediately south of cement mill houses three and four. The building was of a simple single skin breezeblock construction, with a flat felt roof and wooden fascia boards on all aspects. There were timber framed windows on all aspects with several wooden doors on the southern aspect. There was a recess where the office building met the toilet block, with the roof of the toilet block overhanging the building on the southern aspect.
- 3.5.30 Internally the building was found to be in poor condition, with the roof having completely collapsed in several places. There were therefore very few suitable internal roosting features present and roosting opportunities were largely limited to external features.
- 3.5.31 The following PRFs were identified within Building 4 and photographs are provided in **Appendix D**:
- Visible gap present between top line of breezeblocks on the southern aspect, accessible via a gap between the fascia board and the external wall;
  - Lifted section of felt on the flat roof of the western elevation, opportunity for an individual crevice roosting bat; and
  - Multiple gaps present at roof level in the recess where the office building met the adjoining toilet block, including an open section of wooden boxing used for cable access.
- 3.5.32 There were very limited roosting opportunities internally due to the collapsed roof. PRFs were present externally but all were relatively small crevices suitable for individual bats. The building was therefore assessed as having **low** potential for roosting bats.
- 3.5.33 The building was assessed as having **negligible** potential for hibernating bats due to the collapsed roof and external nature of the identified PRFs. The building contained no PRFs that would maintain a stable temperature throughout winter.

#### ***Building 5 – Garage one***

- 3.5.34 Building 5 was a single storey brick garage with five wooden shutter doors on the northern aspect. The building was of double brick construction with a sloped roof, which appeared to be constructed of asbestos cement sheeting. The garage was also clad above the doors on the northern aspect with the same asbestos cement sheeting, behind which there was a visible gap between the sheeting and the main structure.

Dense ivy cover had developed on north-eastern corner of the building and had started to spread onto the roof.

3.5.35 There was no access to the eastern, western or southern aspects for more detailed inspection due to dense scrub. Internal access was gained to three of the five garages on 15 December 2022 by Emily Shaw. Internally, the walls were in good condition and the roofs were unlined. Temperatures are anticipated to fluctuate within the garages and there was frost on the walls and roof at the time of the survey. Evidence of rats was recorded within the garages but no evidence of bats was recorded. No PRFs were noted internally and no specific access points were noted.

3.5.36 The following PRFs were identified within Building 5 and photographs are provided in **Appendix D**:

- Dense ivy cover on the north-eastern corner of the garage may offer roosting opportunities behind and between the ivy stems; and
- There was a gap between the external asbestos cement cladding on the northern aspect and the main structure behind, creating a crevice with potential for use by roosting bats.

3.5.37 There were very few roosting opportunities present within Building 5 and those identified would only be suitable for use by individual bats. No potential access points were observed that would allow access to any internal roosting opportunities. Building 5 was therefore assessed as having **low** potential for roosting bats.

3.5.38 Building 5 contained no external PRFs suitable for hibernation. An internal inspection was not possible but not potential access points were noted. The building was therefore assessed as having **negligible** potential for hibernating bats.

### ***Building 6 – Garage two***

3.5.39 Building 6 was a garage of identical construction to Building 5, although it appeared to be joined to Building 7 at its northern aspect though it was not possible to determine if the interior of the two buildings were also joined. The roof was covered with dense overhanging growth of Virginia-creeper (*Parthenocissus quinquefolia*), which is an invasive non-native species listed under Schedule 9 of the [Wildlife and Countryside Act 1981 \(as amended\)](#)<sup>50</sup>.

3.5.40 There was no access to the western or southern aspects for more detailed inspection due to dense scrub, but this is likely to reduce suitability for bats as it is extremely cluttered. Internal access was gained to one of the garages on 15 December 2022 by Emily Shaw. Internally, the walls were in good condition and the roofs were unlined. Temperatures are anticipated to fluctuate within the garages and there was frost on the walls and roof at the time of the survey. Evidence of rats was recorded within the garages but no evidence of bats was recorded. No PRFs or access points were noted internally.

3.5.41 The following PRFs were identified within Building 6 and photographs are provided in **Appendix D**:

<sup>50</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

- There was a gap between the external asbestos cement cladding on the western aspect and the main structure behind, creating a crevice with potential for use by roosting bats.

3.5.42 The building contained only a single PRF, and no potential access points were observed that would allow access to any internal roosting opportunities. The PRF present has limited potential for use by only individual bats. Therefore, it is considered reasonably unlikely that the building is utilized by roosting bats and Building 6 was therefore assessed as having **negligible** potential for roosting bats.

3.5.43 Building 6 contained no external PRFs suitable for hibernation. An internal inspection was not possible but not potential access points were noted. The building was therefore assessed as having **negligible** potential for hibernating bats.

### ***Building 7 - Garage three***

3.5.44 Building 7 was a two-storey garage of double brick construction with no cavity. The building was attached on its southern aspect to Building 6 though it was not possible to determine if the interior of the two buildings were also joined. The building had a pitched slate roof with a wooden fascia on the southern aspect. There were timber framed windows on the southern aspect, with large double wooden doors on the eastern aspect.

3.5.45 There was no access to the northern and western aspects, due to secured metal fencing. The northern aspect was directly bordered by an area of dense scrub. Dense Ivy growth had spread across the northern aspect up to roof level and onto the eastern aspect of the building above the main double timber doors. The condition of the northern aspect was therefore difficult to accurately assess. An internal inspection was not possible as all the doors were secured with padlocks.

3.5.46 The following PRFs were identified within Building 7 and photographs are provided in **Appendix D**:

- Several lifted and slipped roof slates on the southern aspect;
- Visible gaps behind wooden fascia boards on the southern aspect;
- Missing brick on the southern aspect, creating an opening which may give access to other crevices;
- Gaps present along the top of the wooden double doors on the eastern aspect; and
- Dense ivy cover on the northern and eastern aspects which may offer suitable roosting features between and behind stems.

3.5.47 Building 7 contained multiple external PRFs, some of which may be suitable for use by multiple, but low, numbers of bats. It was therefore assessed as having **moderate** potential for roosting bats. However, an internal inspection would help confirm the roosting potential of Building 7 as the slipped and lifted tiles may provide access to a roof void which could be suitable for larger numbers of bats.



3.5.48 As an internal inspection could not be undertaken it is assumed that the building does offer suitability for hibernating bats. As such the building will be demolished in accordance with Reasonable Avoidance Measures (RAMs).

### ***Building 8 - Garage four***

3.5.49 Building 8 was a two-storey garage with two distinct sections. The southern section was of a simple double brick construction, with an asbestos cement sheet roof and asbestos cement ridge tiles. The southern aspect had a missing wooden fascia board on the gable end, which had exposed damaged brickwork beneath. The asbestos cement ridge tile at the gable end was open ended, creating a further potential entry point for roosting bats. The eastern aspect had a wooden fascia board, with some thin ivy growth up the external wall to roof level.

3.5.50 The northern section of the building was higher than the southern section, had no wooden fascia boards and had a slate roof and central ridge. The roof was largely obscured by overgrown vegetation other than on its eastern side.

3.5.51 There was no access to the western aspect as the area was fenced off. The western aspect was directly bordered by an area of dense willow scrub and was covered with dense ivy, extending to roof level. An internal inspection was not possible as all the doors were secured with padlocks and the key holder was not present.

3.5.52 The following PRFs were identified within Building 8 and photographs are provided in **Appendix D**:

- Damaged brickwork at gable end ridge, exposed by a missing fascia board;
- Southern gable end ridge tile was not capped off leaving the end open;
- Missing brick on southern elevation midway between roller shutter door and roof;
- Missing mortar between asbestos cement sheeting and timber fascia where the southern and northern sections of the building join;
- Missing brick on eastern elevation close to corner with northern wall; and
- Dense ivy growth on western aspect, extending up the walls and across the roof. This may be obscuring features beneath and the ivy itself may offer roosting opportunities behind and between the stems.

3.5.53 Building 8 contained multiple external PRFs, some of which may be suitable for use by multiple, but low, numbers of bats. It was therefore assessed as having **moderate** potential for roosting bats. However, an internal inspection would help confirm the roosting potential of Building 8 as some of the features e.g. open ended gable ridge, may provide access to a roof void which could be suitable for larger numbers of bats.

3.5.54 As an internal inspection could not be undertaken it is assumed that the building does offer suitability for hibernating bats. As such the building will be demolished in accordance with Reasonable Avoidance Measures.

### ***Building 9 – Padeswood Hall***

- 3.5.55 Building 9 was an abandoned two-storey residential dwelling used for offices with three distinct sections. The building was of a simple brick construction, with a mix of hipped and pitched roof, slate ridge tiles and five chimneys. Additionally, lead was present on the hipped roof ridge. There were UPVC framed windows on all aspects with one wooden door on the northern aspect. Soffit wooden eaves were present on all aspects and
- 3.5.56 The roof's southern section was in good condition, but a small number of lifted ridge tiles were noted and the boxed soffit was damaged. The northern section of the building had lead flashing which is lifted in several places and a number of lifted tiles were noted. There was a single-storey extension located on the eastern section of the building with several lifted roof tiles, missing mortar, and some roof damage. The western section of the building was generally in good condition, but a small number of gaps were noted below ridge tiles where mortar was missing.
- 3.5.57 Internally the building was found to be in poor condition and has been disused for several years. There was a single accessible roof void that was inspected 09 May 2023 by Emily Shaw. The roof was a king post design, constructed from timber beams. structure and featured blanket insulation. The roof was lined with bitumen roofing felt and on some sections of the roof the bitumen felt was coated with what appeared to be asbestos. The height of the floor to ridge height was approximately 1.5m and the floor was lined with blanket insulation. However, the roof void could only be observed from the hatch due to health and safety constraints (presence of asbestos and unsafe ceiling). During the assessment, no evidence of roosting bats was recorded within the roof void.
- 3.5.58 The following PRFs were identified within Building 9 and photographs are provided in **Appendix D**:
- Broken soffit box;
  - Lifted roof and ridge tiles on most aspects; and
  - Gaps below ridge tiles on extension on the eastern aspect of the building.
- 3.5.59 Building 9 contained several external PRFs, some of which may be suitable for use by several bats. Furthermore, the loft provides a stable temperature so is suitable to support roosting bats. However, the building is unheated and has not been used for a number of years, which reduces its suitability to support a maternity roost. It was therefore assessed as having moderate potential for roosting bats.

### ***Building 10 – Padeswood Hall - outbuilding***

- 3.5.60 Building 10 was a single storey brick-built outbuilding which is used as a garage. There are four separate garages present. The building had a pitched roof with asbestos cement sheeting, there are slight gaps on the eastern aspect below the sheeting which may lead to the wall plate. The northern aspect of the building is in good condition, with wooden shutter doors. However, one door was broken door allowing bat access into the building.

- 3.5.61 There was no access to the eastern and southern aspects, due to secured metal fencing. Internal access was gained to the three of the four garages on 09 May 2023 by Emily Shaw. Internally the building was cluttered. One garage was lined with bitumen and gaps were noted which lead to the wall plate. However, no evidence of roosting bats was recorded. The other garages roofs were not lined and no evidence of roosting bats was recorded.
- 3.5.62 The following PRFs were identified within Building 8. Photographs are provided in **Appendix D**:
- Gaps leading to the wall plate; and
  - Gaps between concrete sheeting and bitumen roofing felt.
- 3.5.63 Building 10 contained few PRFs, some of which may be suitable for use by low numbers of bats. It was therefore assessed as having **low** potential for roosting bats.
- 3.5.64 Building 10 contained no external or internal PRFs suitable for hibernation, as it is likely to fluctuate in temperature and is relatively exposed. The building was therefore assessed as having **negligible** potential for hibernating bats.

#### ***Building 11 – Padeswood Hall Farm***

- 3.5.65 Building 11 was a two-storey residential dwelling built in 1905. The lower half of the building was of simple brick construction and the top half was covered in concrete render, with a pitched roof, slate ridge tiles and one chimney. Additionally, lead was present on the pitched roof ridge. There were wooden windows on all aspects with one wooden door on the southern aspect. Overhanging eaves were present on all aspects.
- 3.5.66 The southern aspect had numerous gaps in the corner points where the eave and the gable cladding meet. Additionally, there was a crack in the wooden cladding measuring approximately 6cm. In the middle of the eaves, there was an old wasp nest. The southwestern corner of the eave was damaged. The northern section of the building had gaps in the gable end and a hole in the top of the pitched gable end. There was a single-storey brick garage extension on the western aspect of the building with two well-sealed wooden shutter doors, and several raised slate tiles. There was one surface hole at the top of the building.
- 3.5.67 There were two accessible roof voids and one basement that were inspected on 19 May 2023 by Lewis Wright. The first roof void was located on the western section of the building. The void roof was lined with felt, and no access points to the roof void were found. No evidence of bats was found during the inspection.
- 3.5.68 The second roof void was lined with felt and the floors were lined with blanket insulation. However, a thorough inspection of the roof void was not possible due to unsafe conditions.
- 3.5.69 The basement was in the northern section of the building. It was accessible from the inside of the house via a staircase. The basement had a low level of water present and was able to be inspected fully.
- 3.5.70 The following PRFs were identified within Building 11 and photographs are provided in **Appendix D**:

- Damaged eave;
- Gaps in corner points between the eave and the gable cladding;
- Crack in wooden cladding;
- Raised slate tiles; and
- Surface hole.

3.5.71 Building 11 contained several external PRFs, some of which may be suitable for use by a low number of bats. Furthermore, the loft provides a stable temperature, so it is suitable to support roosting bats. However, the building has no access points to the roof void. It was therefore assessed as having **moderate** potential for roosting bats.

3.5.72 Building 11 was assessed as having **negligible** potential for hibernating bats as there are no access points into the basement.

### ***Building 12 – Office building***

3.5.73 Building 12 was a single storey office building which was operational at the time of survey. The walls comprised bricks covered by plaster and were generally in good condition. The roof comprised large tiles which appeared to be covered by flashing.

3.5.74 The building contained one central tower, on which plaster was crumbling away, exposing brickwork underneath. This tower appeared to have a bitumen roof, which was also deteriorating, leaving cavities around the edges. Photographs are provided in **Appendix D**.

3.5.75 Building 12 contained one substation room in which access was not established. Access points to this room comprised of metal slats above the door.

3.5.76 An open-faced metal bike shed was attached to the building, which offered no suitability for roosting bats due to a lack of suitable roosts within.

3.5.77 Building 12 contained several external PRFs, some of which may be suitable for use by a low number of bats. It was therefore assessed as having **low** potential for roosting bats.

3.5.78 The substation room within Building 12 was assessed as having potential for hibernating bats, as there were suitable access points to the room above the metal door on the west side of the building. As an internal inspection was not undertaken it is assumed that the building does offer suitability for hibernating bats. As such the building will be demolished in accordance with Reasonable Avoidance Measures.

### ***Building 13 – Sports Pavilion***

3.5.79 Building 13 was a small, disused single storey building. The building was previously used as the clubhouse for the sports team which played on the adjacent sports pitches within the Castle Cement Limited landholding to the north.

3.5.80 The building comprised stone walls and a felt-lined roof, and was in good general condition. Crevices were present between the wooden fascia and the stone wall around the entire building.

- 3.5.81 A wooden shed was present adjacent west of the main building. This shed was dilapidated, and the felt-lined roof had fallen through, leaving the inside of the shed highly exposed to wind and rain.
- 3.5.82 Photographs of both structures are provided in **Appendix D**.
- 3.5.83 Building 13 contained several external PRFs, some of which may be suitable for use by a low number of bats. It was therefore assessed as having **low** potential for roosting bats. The wooden shed was considered to have **negligible** potential to support roosting bats due to its exposed nature and lack of suitable roosting locations.
- 3.5.84 As an internal inspection was not undertaken on the sports pavilion it is assumed that the building does offer suitability for hibernating bats. As such the building will be demolished in accordance with Reasonable Avoidance Measures.

### ***Emergence Surveys***

- 3.5.85 Three confirmed roosts were identified during the emergence surveys. One emergence of a common pipistrelle was recorded on 7 June 2023 from a cavity beneath a roof tile on the south-eastern corner of Building 7.
- 3.5.86 Two emergences were recorded from Building 9 on 7 June 2023. Both bats were common pipistrelles. One bat emerged from a crevice beneath a lifted roof tile on the eastern aspect of the main building, and one bat emerged from a south-facing gap in the brickwork of a chimney.
- 3.5.87 Infra-red photographs of the identified roosts are provided in **Table 16** below:

**Table 16 Bat emergence locations**

Building	Photograph of emergence location
7	



Building	Photograph of emergence location
9 (lifted rooftile)	
9 (brickwork crevice in chimney)	


## 3.6 Water vole



### Habitat assessment


- 3.6.1 The BDS returned historic (2002) records of water vole. Habitat assessments were undertaken of eight habitat features within the Ecological Survey Area: four ditches, two ponds and two stretches of stream. Of these, two ditches, one pond and both stretches of stream were assessed as being of marginal suitability for water vole. The remaining features were assessed as unsuitable. The full results of this assessment are shown in **Table 17** below.







**Table 17 Water vole habitat assessment results.**


Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
Ditch 1 W.1.A	75% incline on both banks	Earth and some hardstanding	Depth varies between c.0.1 - 0.3m. Slow moving stream unlikely to fully dry out	No aquatic vegetation, some perennial herbs on the bank, but limited. Colt's-foot ( <i>Tussilago farfara</i> ) present	Unlikely to fully dry out	85 - 90% shaded	Marginal	

Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
Ditch 2 W.1.C	20% incline on both banks	Earth	Depth varies between c.0.1 – 1.5m	Little vegetation on bank, no visible aquatic vegetation. Perennial herbs present	Width of c.0.25m. Unlikely to dry	1.5m stretch of bare bank comprised of shale	Marginal	 

Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
Ditch 3 W.1.D	15% incline on both banks, very poor	Western bank - shale and hardstanding. Southern bank - primarily earth	Depth unknown due to density of Reed Canary-grass ( <i>Phalaris arundinacea</i> )	Aquatic vegetation limited to Bulrush ( <i>Typha latifolia</i> ). Bank vegetation contains Smooth-rush ( <i>Juncus effusus</i> ), Common Reed ( <i>Phragmites australis</i> ), Horsetail ( <i>Equisetum</i> sp.), Ragged-Robin ( <i>Silene flos-cuculi</i> ), Early-purple Orchid ( <i>Orchis mascula</i> ) and perennial herbs	Marshy rather than wet. Very likely to fully dry out	None	Unsuitable	

Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
Ditch 4 W.1.E	10% - 15% incline on both banks	Earth	Depth unknown due to density of Reed Canary-grass ( <i>Phalaris arundinacea</i> )	Aquatic vegetation limited to Bulrush ( <i>Typha latifolia</i> ). Bank vegetation contains Smooth-rush ( <i>Juncus effusus</i> ), Common Reed ( <i>Phragmites australis</i> ), Horsetail ( <i>Equisetum</i> sp.) and perennial herbs	Marshy rather than wet. Very likely to fully dry out	None	Unsuitable	
Pond 1	50 - 70% incline on both banks	Earth	Depth unknown but estimated >2m. Unlikely to ever dry out	All banks dominated by Canary Reed-grass ( <i>Phalaris arundinacea</i> ), interspersed with Rosebay Willowherb ( <i>Chamaenerion angustifolium</i> ), Bulrush ( <i>Typha</i>	Will not dry out due to depth, size and type of vegetation present	c.42m x 60m. Heavily shaded on all banks, by hedgerow on the western side and by dense Reed Canary-grass	Marginal	

Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
				<i>latifolia</i> ), Yellow Iris ( <i>Iris pseudacorus</i> ) and perennial herbs		( <i>Phalaris arundinacea</i> )		
Pond 2	Varies between 20% and 70% incline	Mixed shale and hardstanding	Unknown depth.	Very little vegetation, minor amounts of perennial herbs, some Kidney Vetch ( <i>Anthyllis vulneraria</i> ) and Reed Canary-grass ( <i>Phalaris arundinacea</i> )	Area of c.83m <sup>2</sup> . Will likely not dry out	No suitable features noted	Unsuitable	
Stream 1 W.1.B	20% incline on both banks	Earth	Where visible, depth was consistent c. 0.25m – 0.5m	Dense perennial herbs	Slow moving stream, unlikely to dry out	Restricted access due to Site boundary fences and dense vegetation	Marginal	

Ditch/pond no.	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photos
	Bank profile	Bank substrate	Variation in water level					
Stream 2 W.2.B	70% incline on both banks	Earth	Some areas only damp with minimal water, others up to c.0.25m depth	No aquatic vegetation. Banks dominated by Ivy ( <i>Hedera helix</i> ). 95% shade cover	Fairly dry, possibility to completely dry in places.	A continuation of Stream 1 (W.1.B), however the habitats differ significantly and so have been split into separate subsections	Marginal	



### Presence / likely absence surveys

- 3.6.2 The results of the presence-absence surveys for all habitat features are detailed in **Table 18** below. Features deemed to still be unsuitable for water voles were not surveyed for field signs and are marked with 'N/A' in the table below.

**Table 18 Water vole presence / likely absence survey results**

Location	Habitat Classification	June 2022 Results	August 2022 Results
Ditch 1	Marginal	Negative	Negative
Ditch 2	Marginal	Negative	Negative
Ditch 3	Unsuitable	N/A	N/A
Ditch 4	Unsuitable	N/A	N/A
Pond 1	Marginal	Negative	Negative
Pond 2	Unsuitable	N/A	N/A
Stream 1	Marginal	Negative	Negative
Stream 2	Marginal	Negative	Negative

## 3.7 Badger

- 3.7.1 The BDS returned records of badger off the Site, most recently from 2021, however no evidence of badgers was recorded on the Site or within 30m of it (where access allowed). Woodland, scrub and hedgerows provide suitable habitat for sett building and grassland fields provide extensive foraging habitat.
- 3.7.2 During the aerial tree inspections undertaken in June 2023, a badger sett considered to be active was found within the wider site, within 30m of the ancillary works footprint. Evidence of badger activity was also found within the surrounding area, including snuffle holes and latrines.
- 3.7.3 The specific locations of badger setts are confidential. Badgers are a mobile species and it remains possible that badgers could establish a new sett at any time, and hence the results reported here are reflective of the conditions at the date of survey.

## 3.8 Other species of principal importance

- 3.8.1 No incidental observations of polecat, hedgehog or brown hare, or any other notable species, were recorded in the Ecological Survey Area.

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**Figure 2 – Reptile Survey Areas**

**Figure 3a – Breeding Bird Survey Results – May 2022 (Visit 1)**

**Figure 3b – Breeding Bird Survey Results – May 2022 (Visit 2)**

**Figure 3c – Breeding Bird Survey Results – June 2022 (Visit 3)**

**Figure 3d – Breeding Bird Survey Results – June 2022 (Visit 4)**

**Figure 3e – Breeding Bird Survey Results – July 2022 (Visit 5)**

**Figure 3f – Breeding Bird Survey Results – July 2022 (Visit 6)**

**Figure 4 – Bat Tree Assessment**

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**Figure 6a – Bat Activity Transect 1 Route and Monitoring Points**

**Figure 6b – Bat Activity Transect 2 Route and Monitoring Points**

**Figure 7a – Bat Activity Transect Results - June (May) 2022**

**Figure 7b – Bat Activity Transect Results - June 2022**

**Figure 7c - Bat Activity Transect Results – July 2022**

**Figure 7d – Bat Activity Transect Results – August 2022**

**Figure 7e – Bat Activity Transect Results - September 2022**

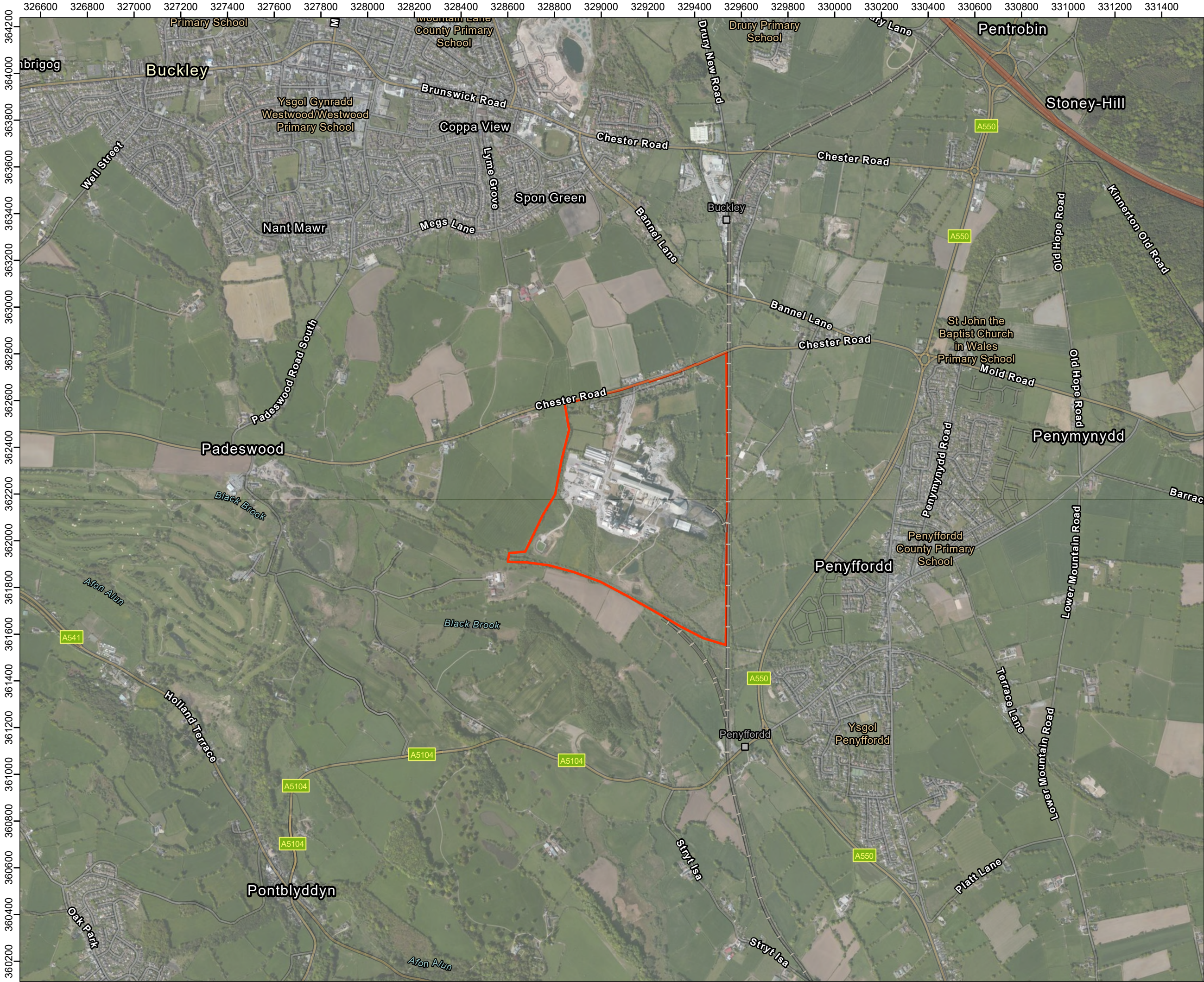
**Figure 7f – Bat Activity Transect Results – October 2022**

**Figure 8 – Water Vole Survey Results**

**Figure 9 – Badger sett Location (CONFIDENTIAL)**

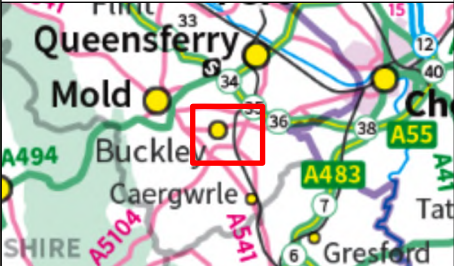
**Figure 10 – GCN pond locations**






Legend:

Site Boundary



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Rev	Date	Description	Drn	Chk	App

**Padeswood Carbon Capture and Storage Project**



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EXPERTS IN ECOLOGY

TITLE: Volume 4, Technical  
Appendix 5.2, Figure 1:  
Site Location Plan

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**Legend:**

● Reptile Trap Locations

**Reptile Refuge Paths**

- Area 1
- Area 2
- Area 3
- Area 4
- Area 5

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**Padeswood Carbon Capture and Storage Project**

TITLE: Volume 4, Technical Appendix 5.2,  
Figure 2: Reptile Survey Areas

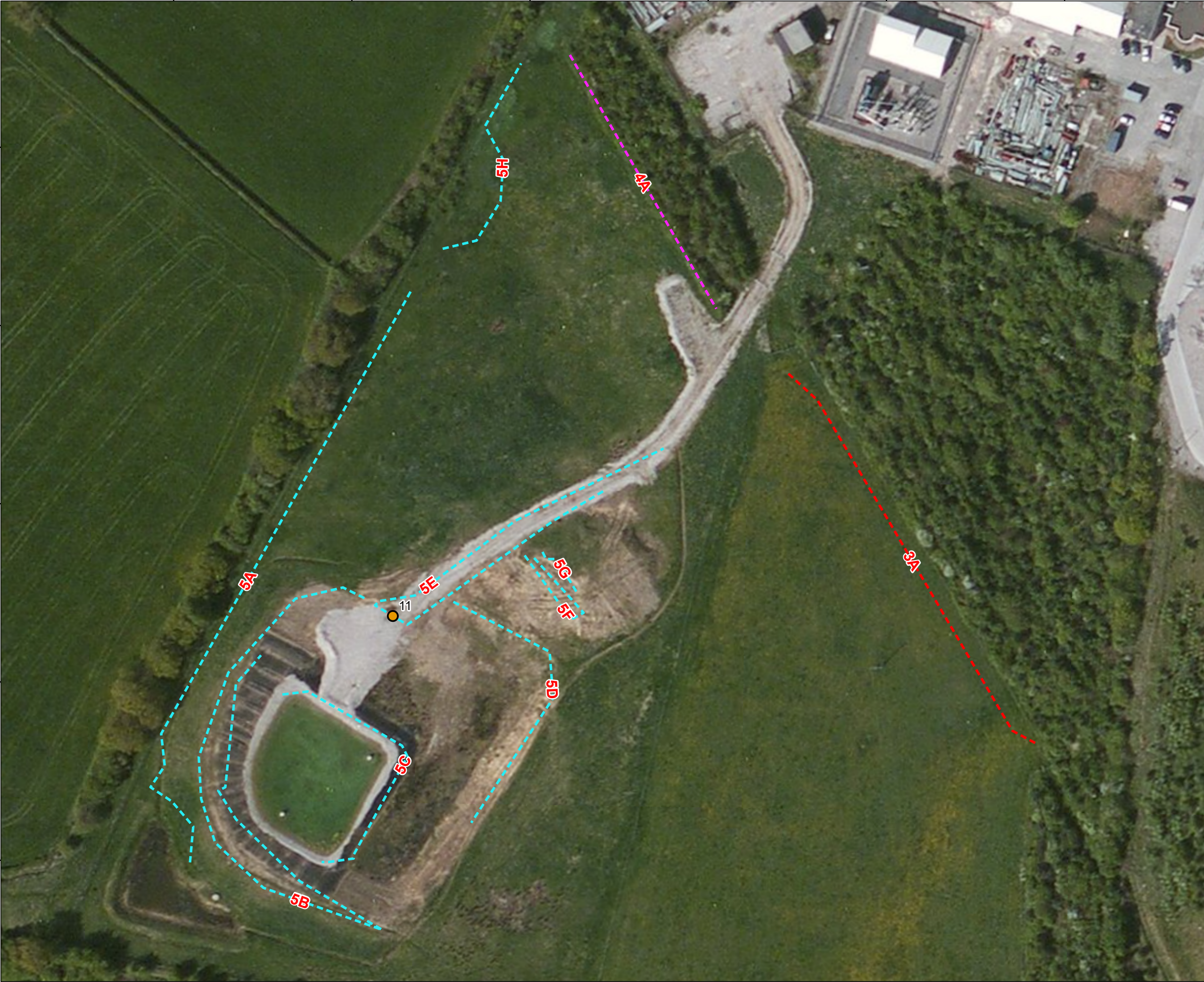
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**Legend:**

● Reptile Trap Locations

Reptile Refuge Paths

- Area 1
- Area 2
- Area 3
- Area 4
- Area 5

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TITLE: Figure 2:

Reptile Survey Areas  
Page 2 of 2

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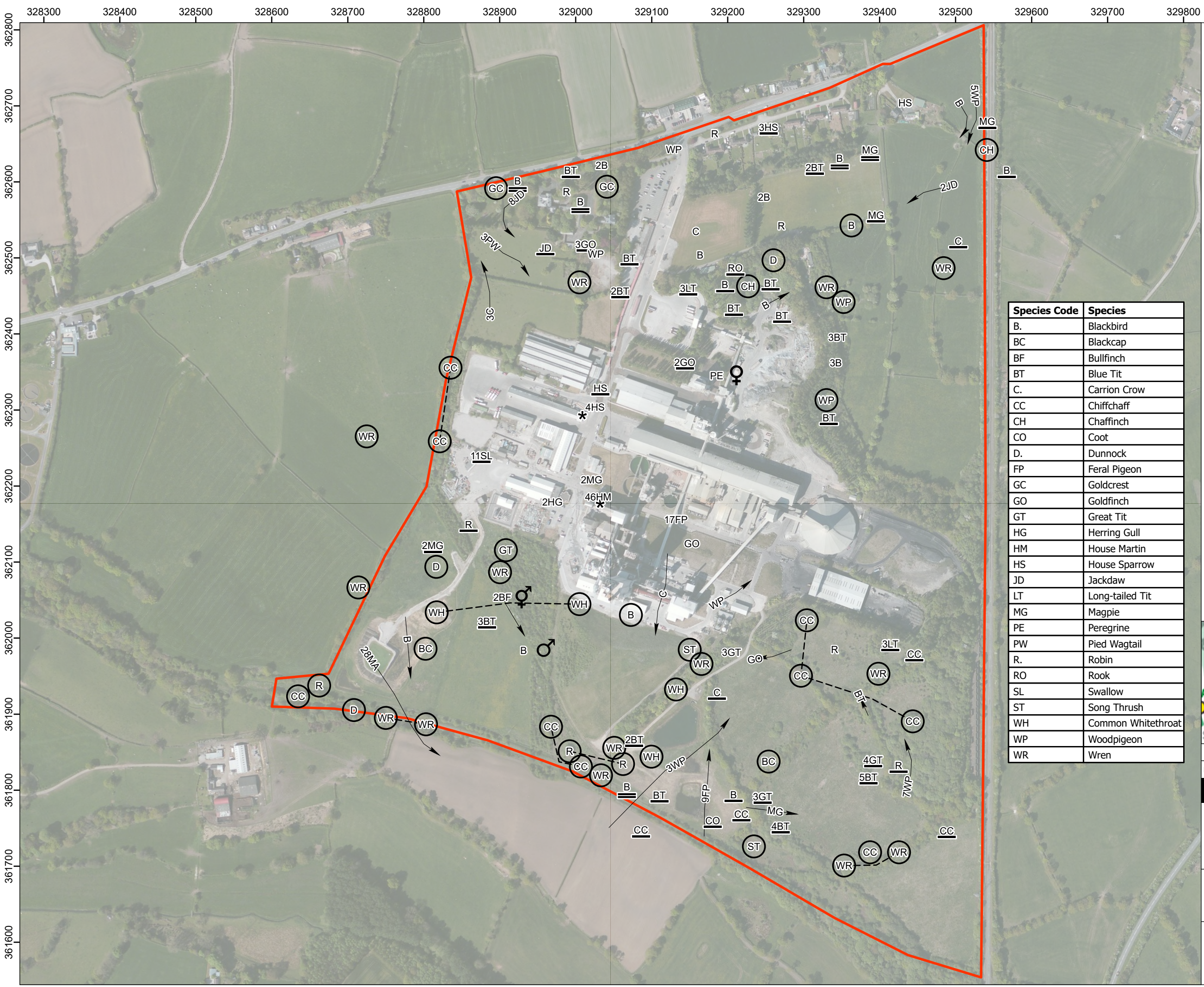
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World Imagery (Clarity): This work is licensed under the Esri Master License Agreement.View Summary | View Terms of UseExport: This layer is not intended to be used to export tiles for offline. Data Collection and Editing: This layer may be used in various ArcGIS apps to support data collection and editing, with the results used internally or shared with others, as described for these use cases.  
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Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2483540 - CCS Project Padeswood\03 - APRX\2483540 - CCS Project Padeswood - Figure x - Reptile Survey Areas.aprx









**Legend:**

Site Boundary

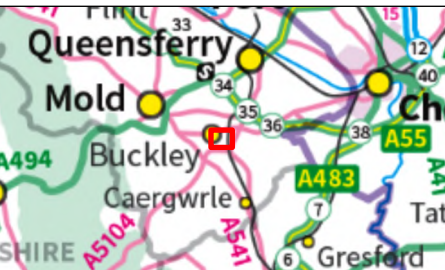
**Bird Activity**

- Flying Away
- Flying In
- Flying Over
- Simultaneous - Different Registration
- Alarm Call
- Calling
- Nest
- Singing

**Sex**

- Female
- Male
- Pair

Species Code	Species
B.	Blackbird
BC	Blackcap
BF	Bullfinch
BT	Blue Tit
C.	Carrion Crow
CC	Chiffchaff
CH	Chaffinch
CO	Coot
D.	Dunnock
FP	Feral Pigeon
GC	Goldcrest
GO	Goldfinch
GT	Great Tit
HG	Herring Gull
HM	House Martin
HS	House Sparrow
JD	Jackdaw
LT	Long-tailed Tit
MG	Magpie
PE	Peregrine
PW	Pied Wagtail
R.	Robin
RO	Rook
SL	Swallow
ST	Song Thrush
WH	Common Whitethroat
WP	Woodpigeon
WR	Wren



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Rev	Date	Description	Drn	Chk	App

Padeswood Carbon Capture and Storage Project



TITLE: Volume 4, Technical Appendix 5.2,  
Figure 3b: Breeding Bird Survey  
Results - May 2022 (Visit 2)

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**Legend:**

Site Boundary

**Bird Activity**

✕→ Flying Away

→✕ Flying Over

--- Simultaneous - Different Registration

— Calling

✱ Nest

○ Singing

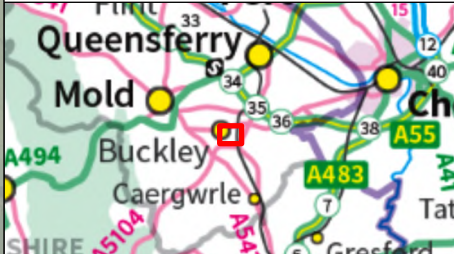
**Sex**

♂ Male

**Age**

Juv Juvenile

Species Code	Species
B.	Blackbird
BC	Blackcap
BF	Bullfinch
BT	Blue Tit
C.	Carrian Crow
CC	Chiffchaff
CH	Chaffinch
D.	Dunnock
FP	Feral Pigeon
GC	Goldcrest
GO	Goldfinch
GS	Great Spotted Woodpecker
GT	Great Tit
HG	Herring Gull
HM	House Martin
HS	House Sparrow
M.	Mistle Thrush
MA	Mallard
MG	Magpie
PE	Peregrine
PW	Pied Wagtail
R.	Robin
RN	Raven
SL	Swallow
ST	Song Thrush
TC	Treecreeper
WH	Common Whitethroat
WP	Woodpigeon
WR	Wren



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Rev	Date	Description	Drn	Chk	App

Padeswood Carbon Capture and Storage Project



TITLE: Volume 4, Technical Appendix 5.2,  
Figure 3d: Breeding Bird Survey  
Results - June 2022 (Visit 4)

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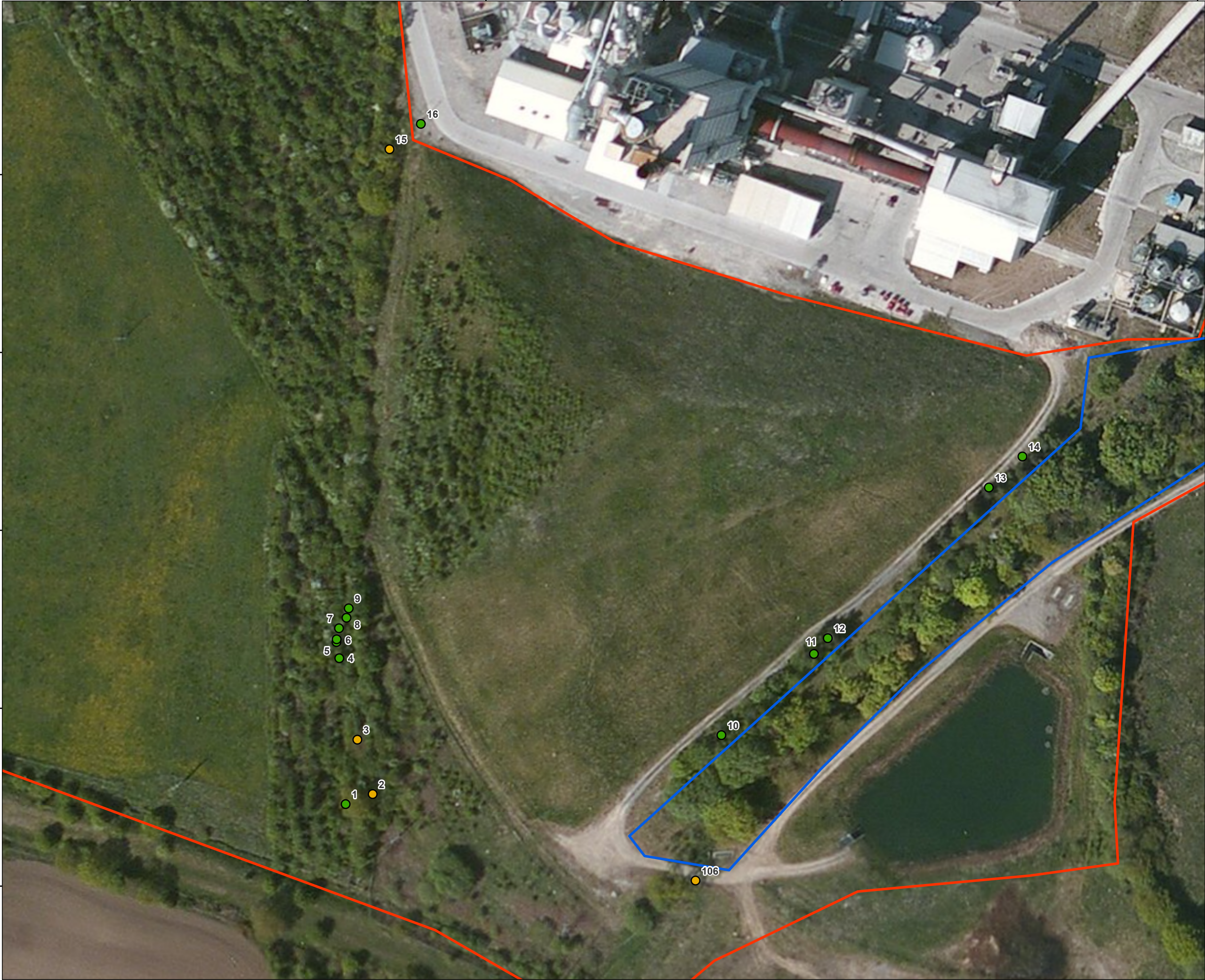












Legend:

- Site Boundary
- Area Excluded from GLTA
- GLTA Tree Suitability
  - High
  - Moderate
  - Low

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Rev	Date	Description	Drn	Chk	App

Padeswood Carbon Capture and Storage Project

EXPERTS IN ECOLOGY

TITLE: Volume 4, Technical Appendix 5.2,  
Figure 4: Bat Tree Assessment

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Metres

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**Legend:**

Site Boundary

**GLTA Tree Suitability**

- High
- Moderate
- Low

00	28/07/2023	2483540	TG	SP	RR
Rev	Date	Description	Drn	Chk	App

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**biocensus**  
EXPERTS IN ECOLOGY

TITLE: Figure 4:

**Bat Tree Assessment**  
Page 2 of 4

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SCALE: 1:1,000 @ A3

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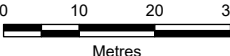



Legend:

Site Boundary

GLTA Tree Suitability

- High
- Moderate
- Low

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Rev	Date	Description	Drm	Chk	App
CCS Project Padeswood					
 EXPERTS IN ECOLOGY					
TITLE: Figure 4:					
Bat Tree Assessment Page 3 of 4					
 SCALE: 1:1,000 @ A3			 REV 00		




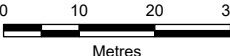



Legend:

Site Boundary

GLTA Tree Suitability

- High
- Moderate
- Low

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Rev	Date	Description	Drn	Chk	App
CCS Project Padeswood					
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TITLE: Figure 4:					
Bat Tree Assessment Page 4 of 4					
 SCALE: 1:1,000 @ A3			 REV 00		



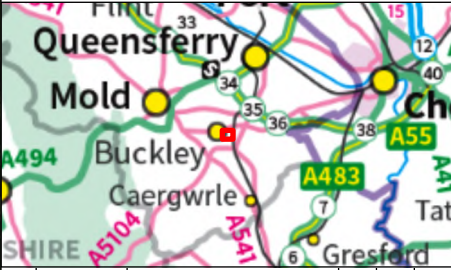


**Legend:**

Site Boundary

**PRA Results**

- Moderate Potential for Summer Roosting Bats
- Low Potential for Both Summer Roosting and Hibernating
- Low Potential for Summer Roosting Bats
- Negligible Potential for Summer Roosting Bats
- No PRA Completed - May Contain Features Suitable for Roosting Bats




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TITLE: Volume 4, Technical Appendix 5.2,  
Figure 5: Bat Building Assessment



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- Legend:
- Site Boundary
  - Transect 1
  - Stopping point
  - Static location

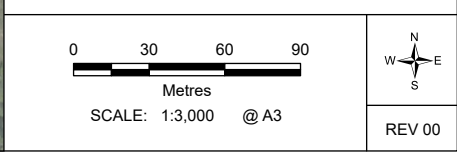


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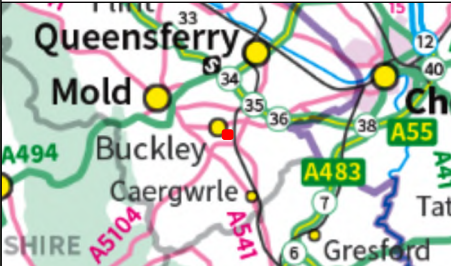
TITLE: Volume 4, Technical Appendix 5.2,  
Figure 6a: Bat Activity Transect  
Route 1 Route and Monitoring Points







- Legend:
- Site Boundary
  - Transect 2
  - Stopping Point
  - Static Location

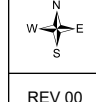
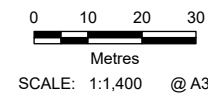


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TITLE: Volume 4, Technical Appendix 5.2,  
Figure 6b: Bat Activity Transect Route  
2 Route and Monitoring Points

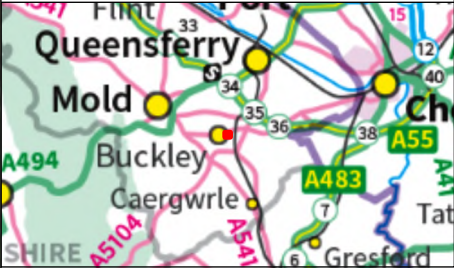


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- Legend:
- Transect Route 1
  - Route 1 Stopping point
- Route 1 Species
- Pipistrellus pipistrellus

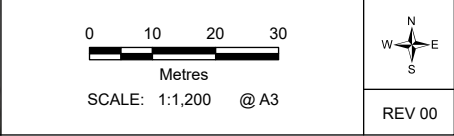


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TITLE: Volume 4, Technical Appendix 5.2,  
Figure 7a: Bat Activity Transect  
Results - June (May) 2022







- Legend:
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2



00	28/07/2023	2483540	TG	SP	RR
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TITLE: Figure 7a:  
Bat Activity Transect Results -  
June (May) 2022  
Page 2 of 4

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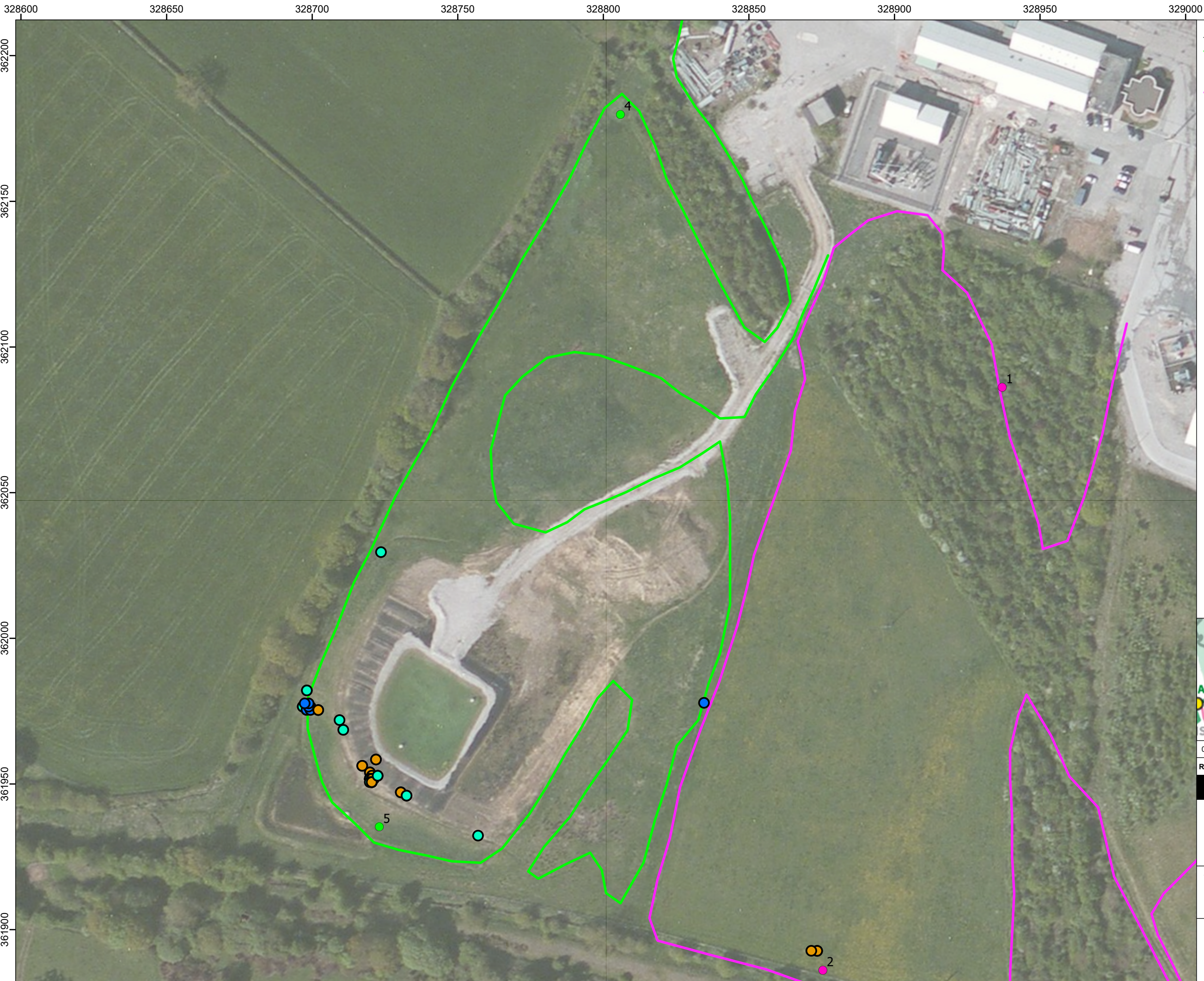
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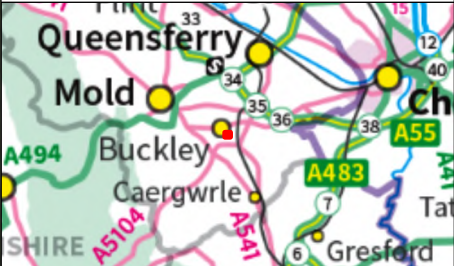
- Transect Route 1
- Route 1 Stopping point
- Transect Route 2
- Route 2 Stopping Point

**Route 1 Species**

- Nyctalus noctula
- Pipistrellus pipistrellus
- Pipistrellus pygmaeus


**Route 2 Species**

- Nyctalus Species
- Soprano Pipistrelle



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TITLE: Figure 7a:  
Bat Activity Transect Results -  
June (May) 2022  
Page 3 of 4

0102030

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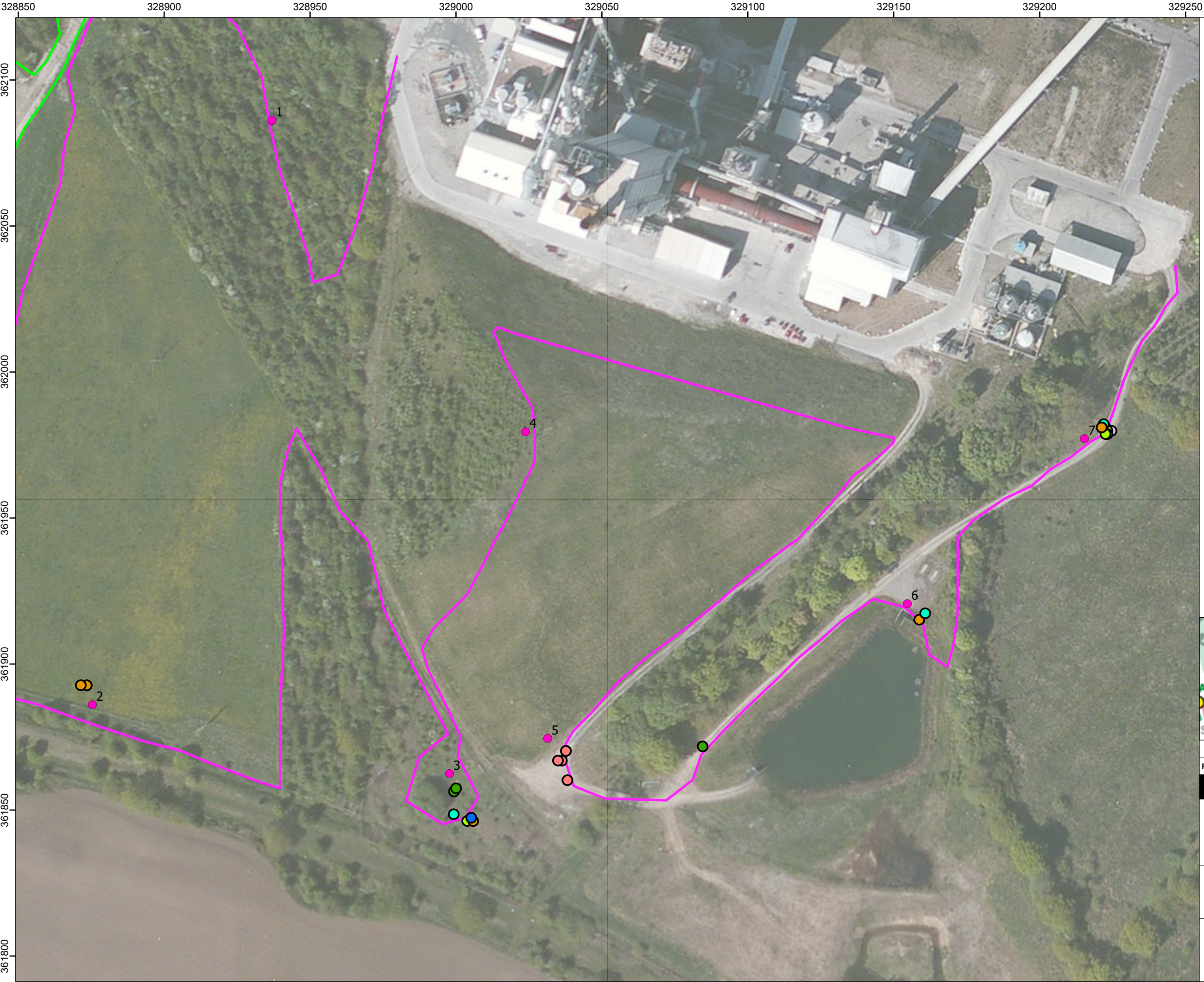
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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
- Route 2 Species**
- Common Pipistrelle
  - Daubentons Bat
  - Lesser Horseshoe Bat
  - Myotis Species
  - Nathusius's Pipistrelle
  - Nyctalus Species
  - Soprano Pipistrelle



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Rev	Date	Description	Drn	Chk	App

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TITLE: Figure 7a:  
Bat Activity Transect Results -  
June (May) 2022  
Page 4 of 4

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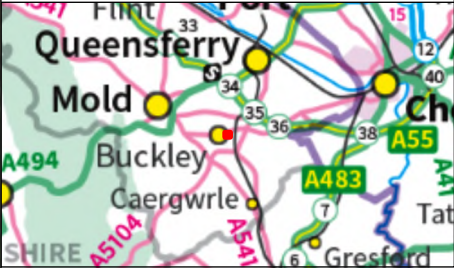


**Legend:**

- Transect Route 1
- Route 1 Stopping point

**Route 1 Species**

- Nyctalus noctula
- Pipistrellus pipistrellus



00	28/07/2023	2483540	TG	SP	RR
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Padeswood Carbon Capture and Storage Project



TITLE: Volume 4, Technical Appendix 5.2,  
Figure 7b: Bat Activity Transect  
Results - June 2022

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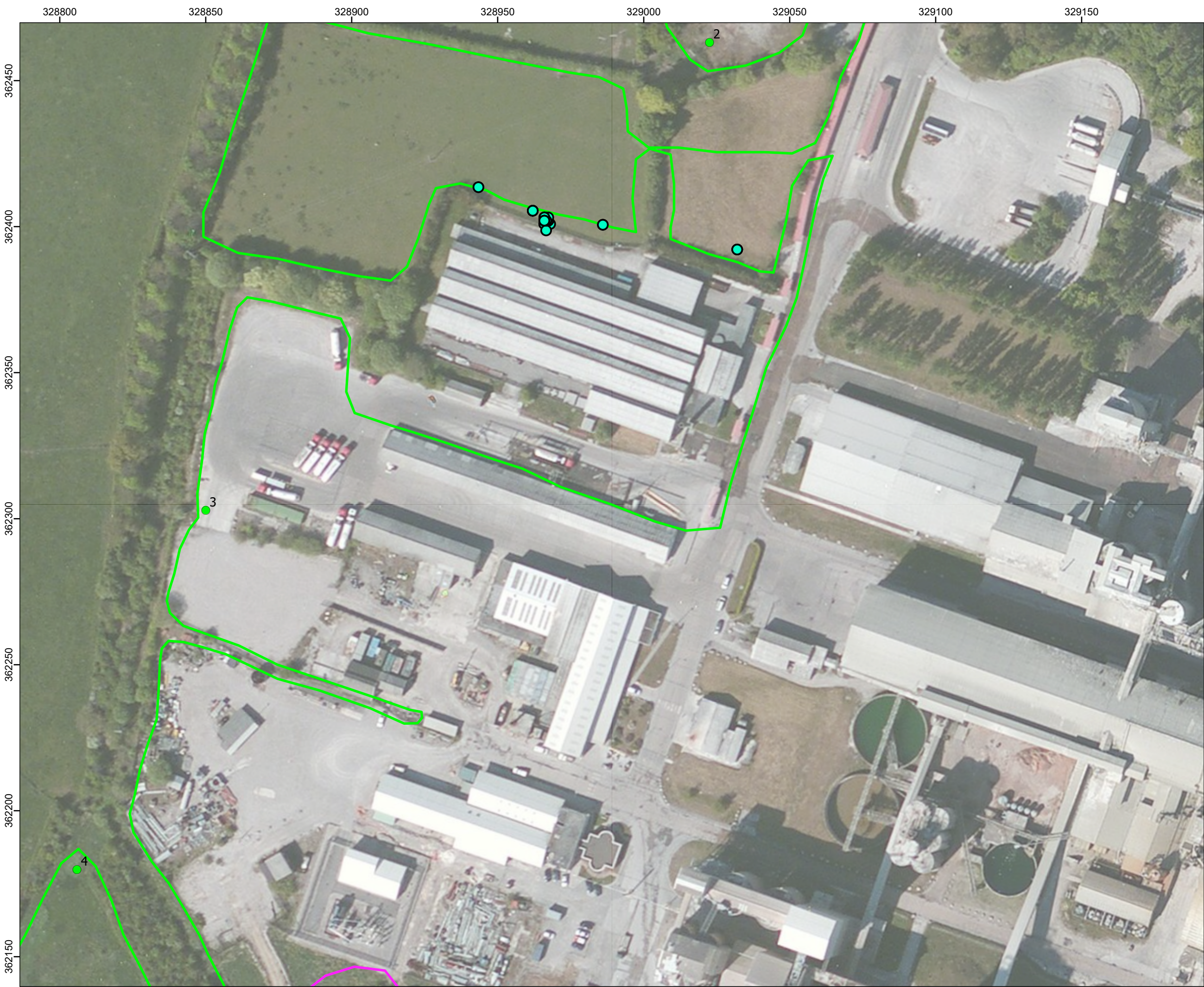
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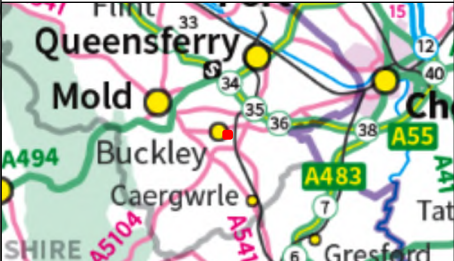


**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Transect Route 2

**Route 1 Species**

- Pipistrellus pipistrellus



00	28/07/2023	2483540	TG	SP	RR
Rev	Date	Description	Drm	Chk	App

CCS Project Padeswood



TITLE: Figure 7b:  
Bat Activity Transect Results -  
June 2022  
Page 2 of 4

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Metres

SCALE: 1:1,200 @ A3

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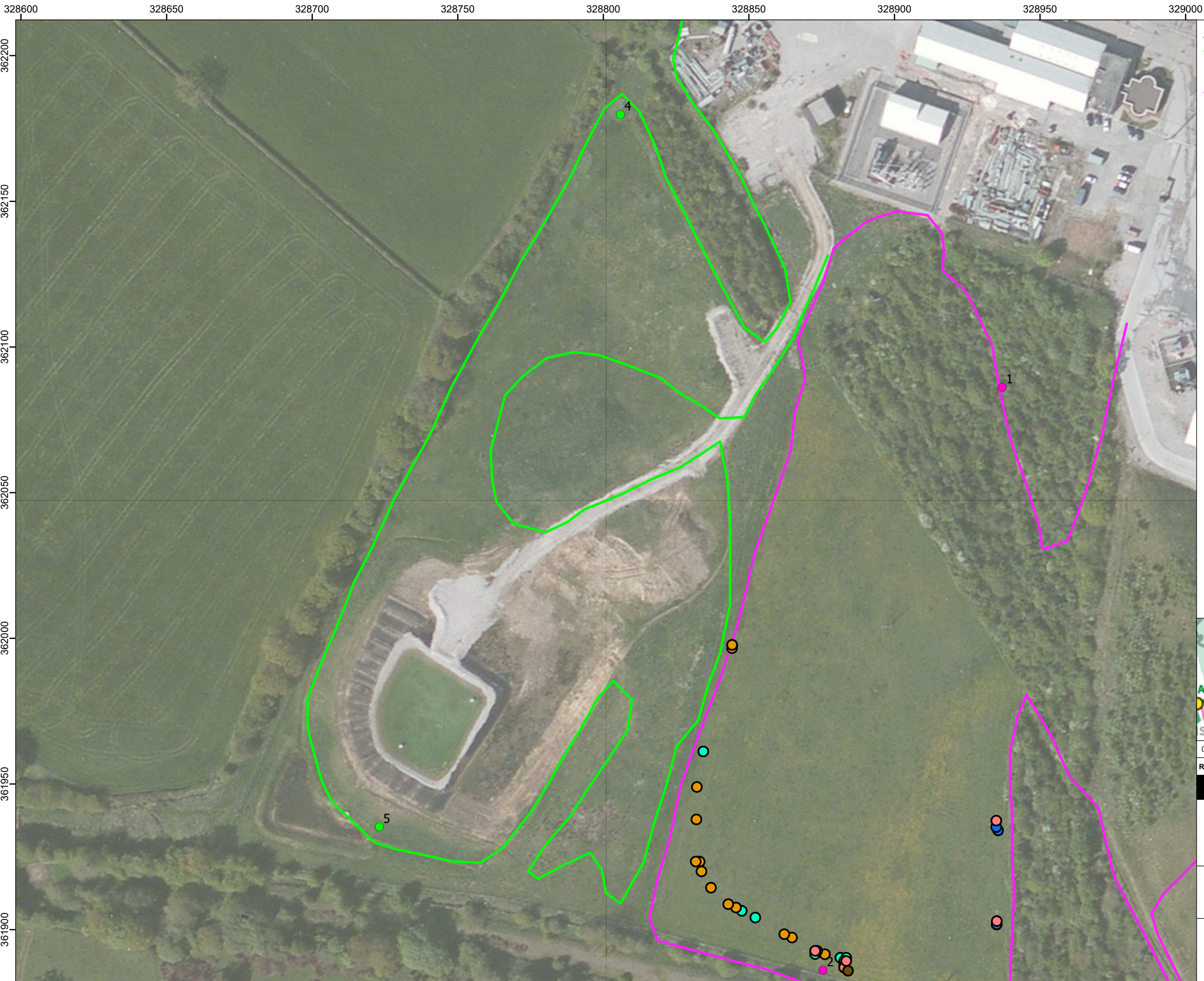
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**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Transect Route 2
- Route 2 Stopping Point

**Route 2 Species**

- Brown Long-eared Bat
- Common Pipistrelle
- Myotis Species
- Nyctalus Species
- Soprano Pipistrelle

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Rev	Date	Description	Drn	Chk	App

**CCS Project Padeswood**

**TITLE:** Figure 7b:  
Bat Activity Transect Results -  
June 2022  
Page 3 of 4

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Metres

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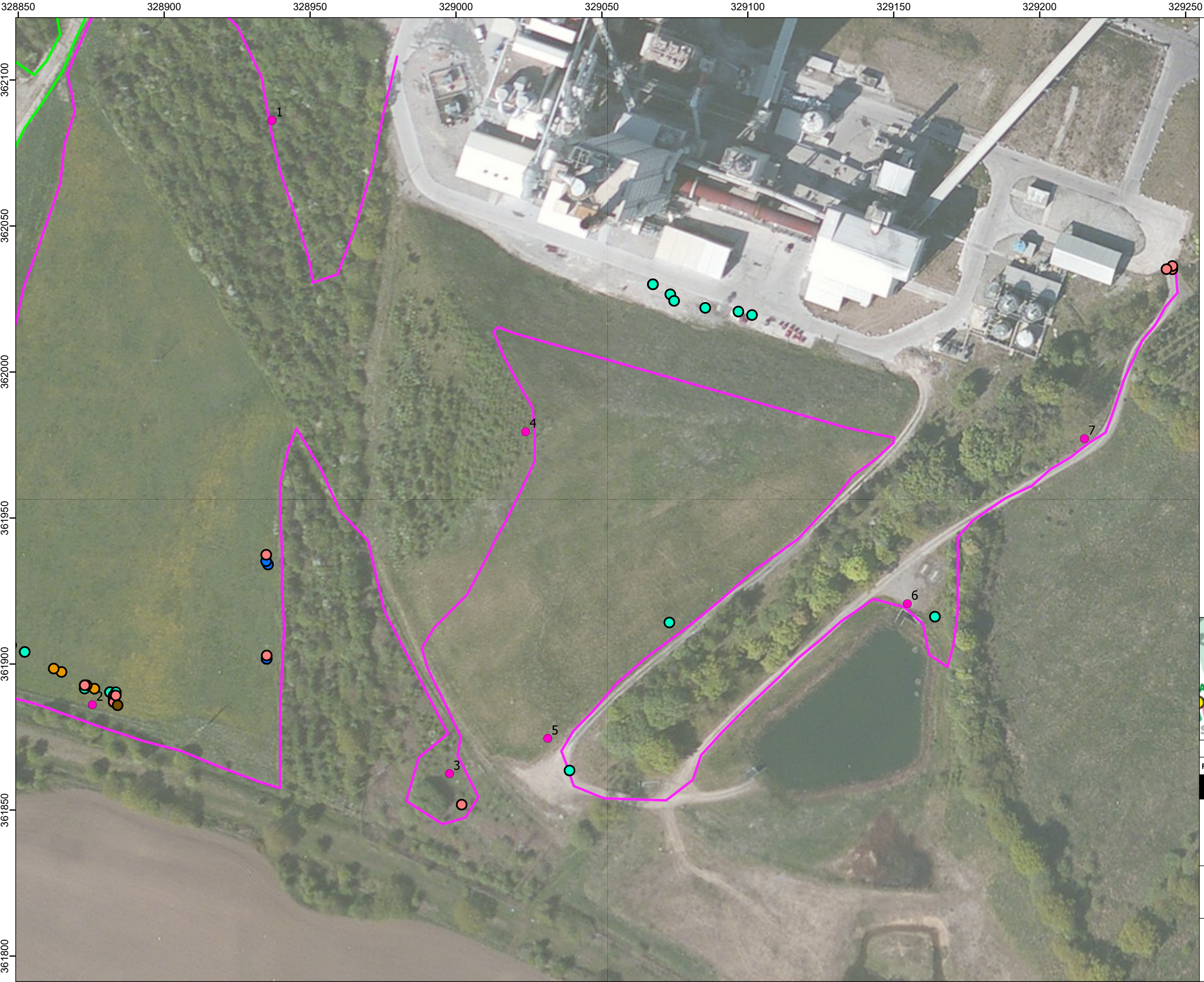
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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
- Route 2 Species**
- Brown Long-eared Bat
  - Common Pipistrelle
  - Myotis Species
  - Nyctalus Species
  - Soprano Pipistrelle

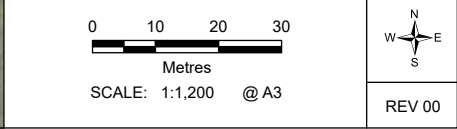


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TITLE: Figure 7b:  
Bat Activity Transect Results -  
June 2022  
Page 4 of 4







**Legend:**

- Transect Route 1
- Route 1 Stopping point

**Route 1 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Noctule Bat
- Lesser Horseshoe Bat

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Rev	Date	Description	Drm	Chk	App

**Padeswood Carbon Capture and Storage Project**

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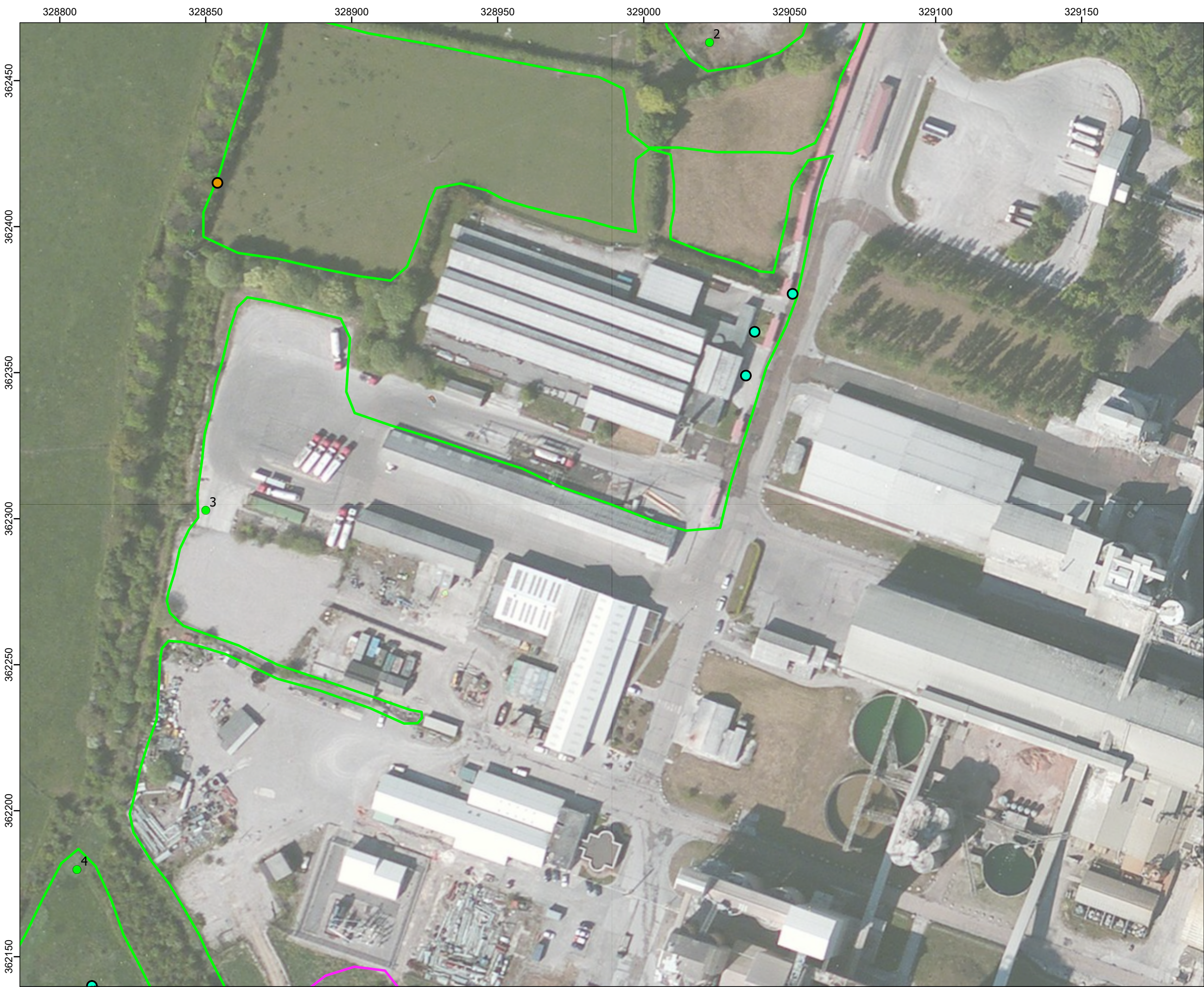
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Figure 7c: Bat Activity Transect  
Results - July 2022

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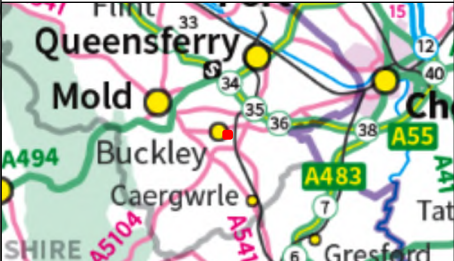
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- Legend:**
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2
- Route 1 Species**
- Common Pipistrelle
  - Soprano Pipistrelle
  - Noctule Bat

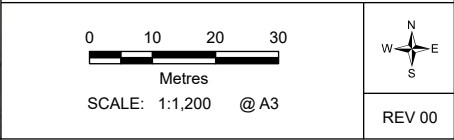


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Rev	Date	Description	Drm	Chk	App

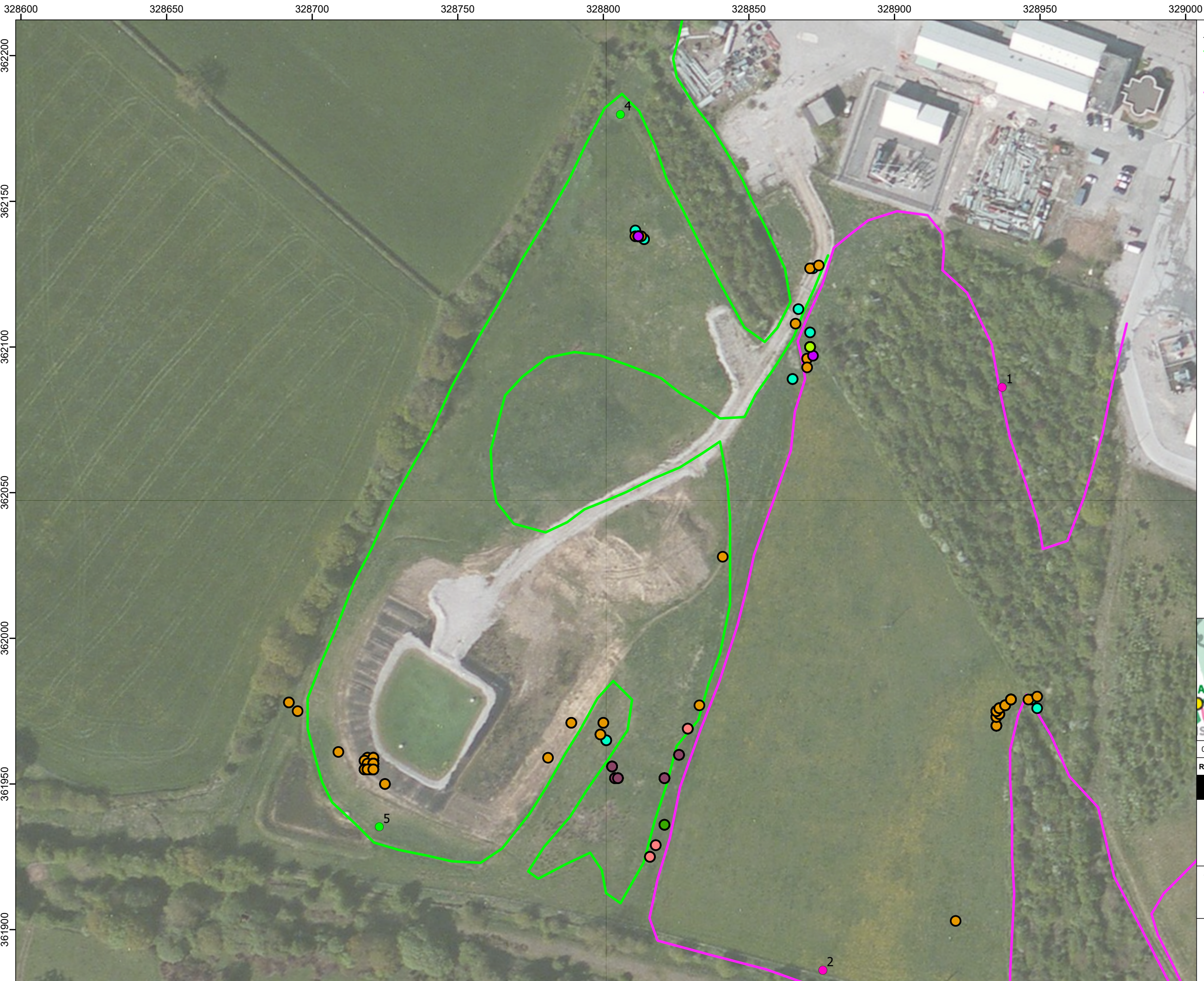
CCS Project Padeswood



TITLE: Figure 7c:  
Bat Activity Transect Results -  
July 2022  
Page 2 of 4







**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Transect Route 2
- Route 2 Stopping Point

**Route 1 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Myotis Species
- Daubentons's Bat
- Noctule Bat
- Brandt's/Whiskered Bat
- Lesser Horseshoe Bat

**Route 2 Species**

- Common Pipistrelle
- Soprano Pipistrelle

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TITLE: Figure 7c:  
Bat Activity Transect Results -  
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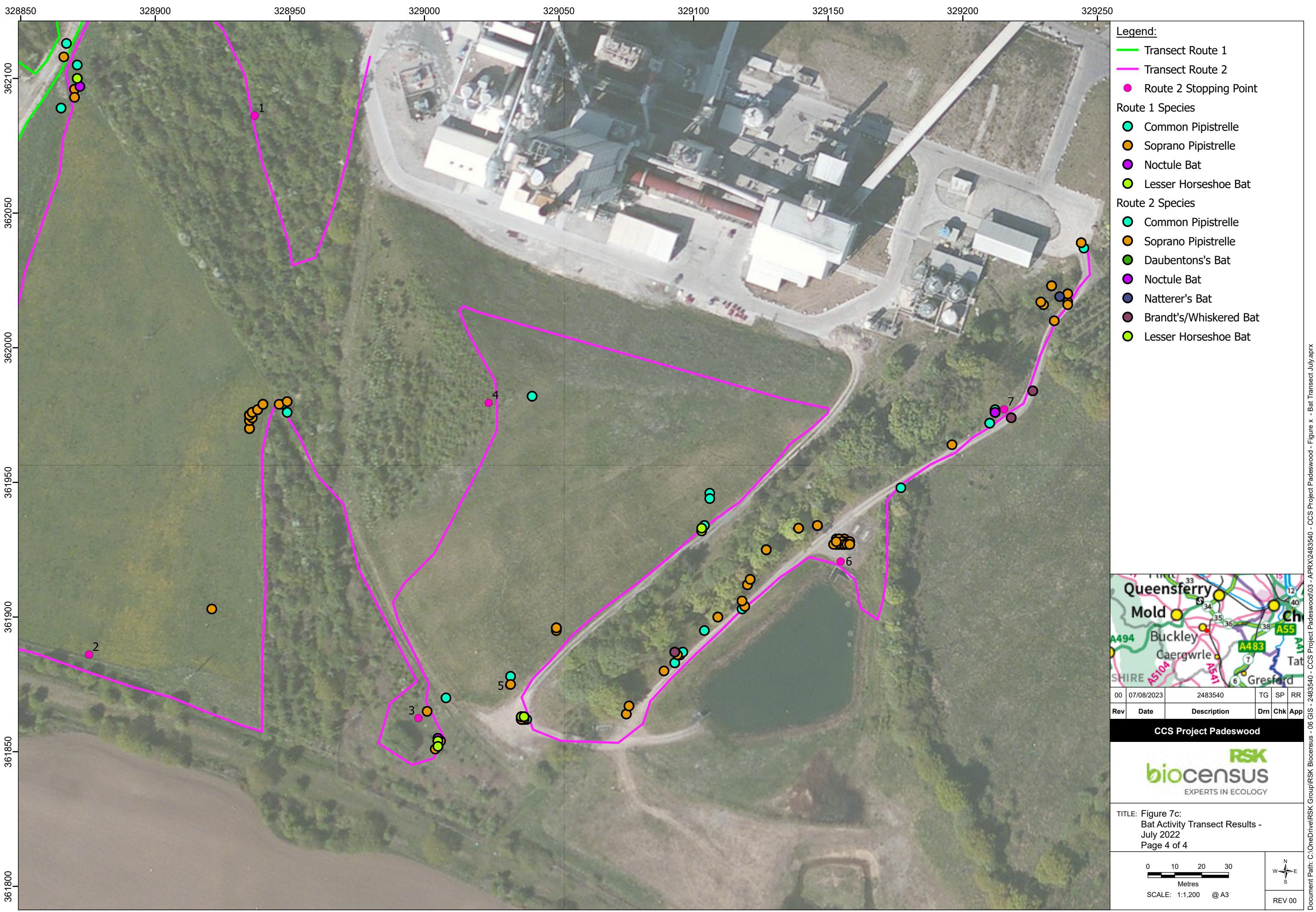
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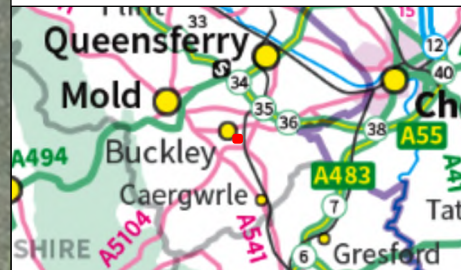
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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
- Route 1 Species**
- Common Pipistrelle
  - Soprano Pipistrelle
  - Noctule Bat
  - Lesser Horseshoe Bat
- Route 2 Species**
- Common Pipistrelle
  - Soprano Pipistrelle
  - Daubenton's Bat
  - Noctule Bat
  - Natterer's Bat
  - Brandt's/Whiskered Bat
  - Lesser Horseshoe Bat



00	07/08/2023	2483540	TG	SP	RR
Rev	Date	Description	Drn	Chk	App

CCS Project Padeswood



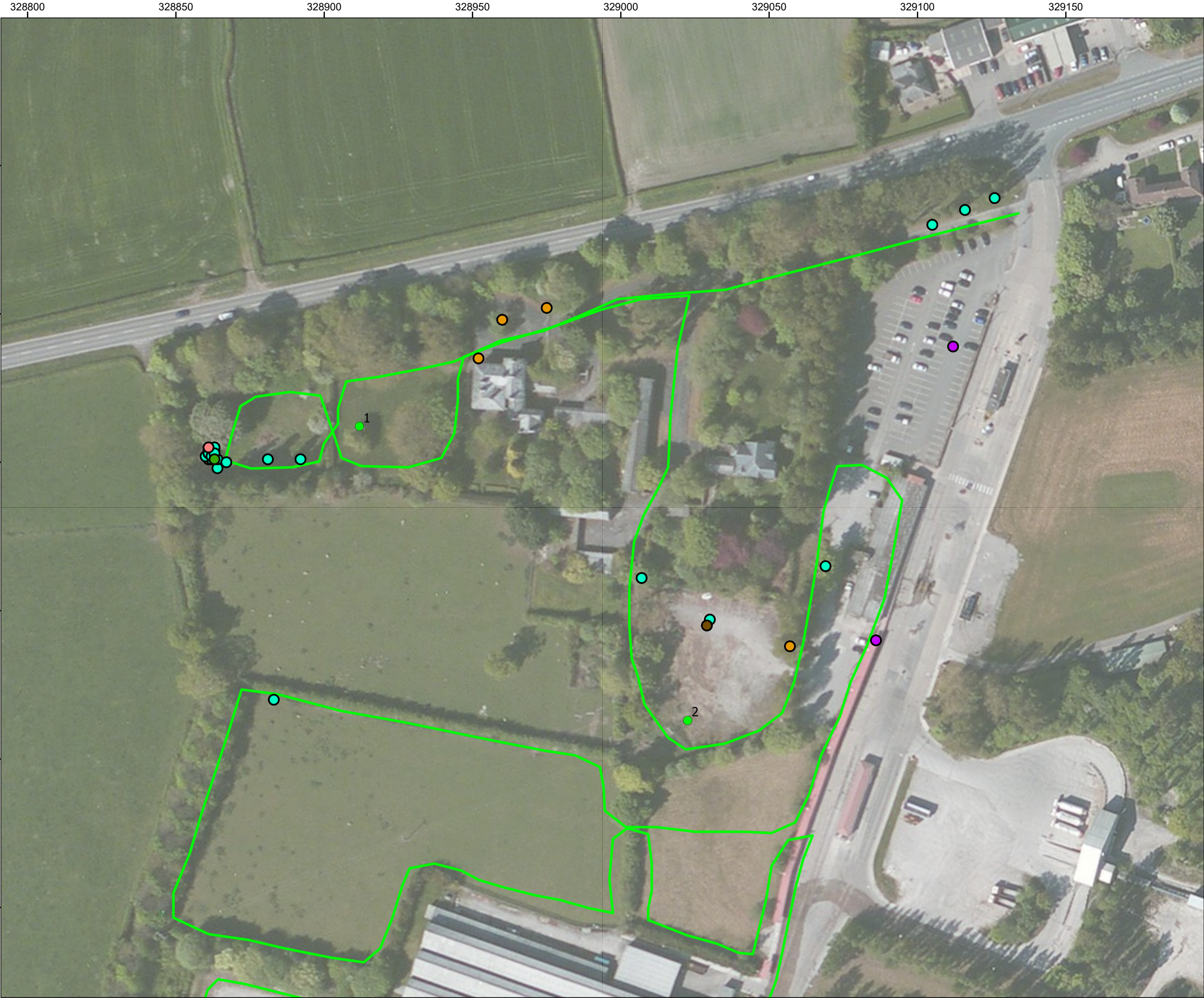
TITLE: Figure 7c:  
Bat Activity Transect Results -  
July 2022  
Page 4 of 4

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Metres  
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**Legend:**

- Transect Route 1
- Route 1 Stopping point

**Route 1 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Noctule Bat
- Myotis Species
- Daubentons's Bat
- Brown Long-eared Bat

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Rev	Date	Description	Drm	Chk	App

**Padeswood Carbon Capture and Storage Project**

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TITLE: Volume 4, Technical Appendix 5.2,  
Figure 7d: Bat Activity Transect  
Results - August 2022

0102030

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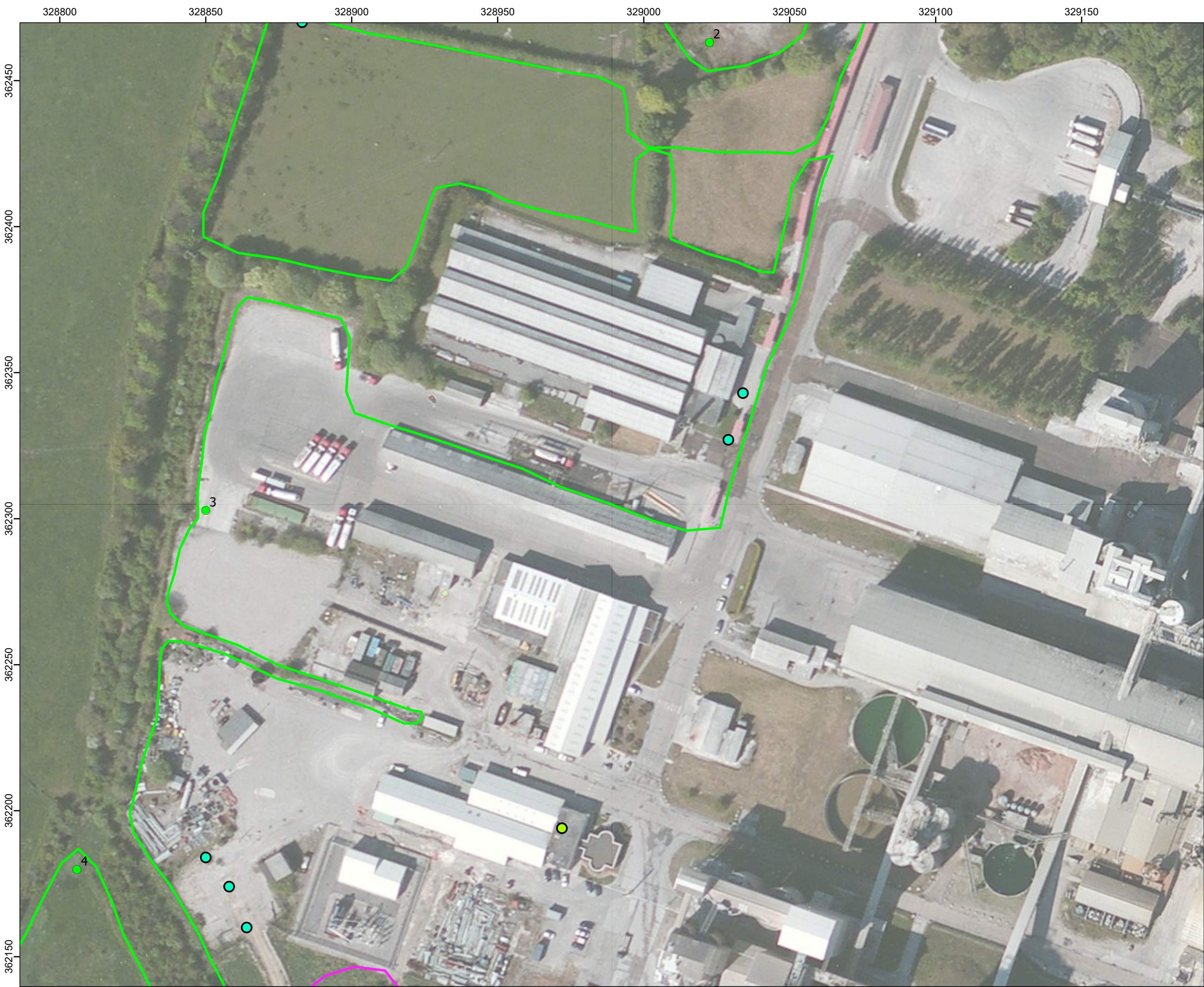
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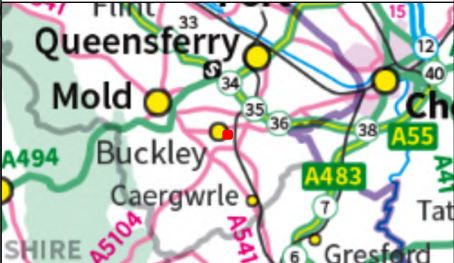
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- Legend:
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2
- Route 1 Species
- Common Pipistrelle
  - Lesser Horseshoe Bat

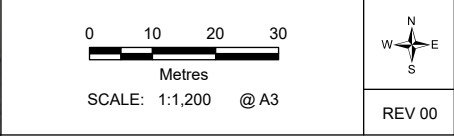


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Rev	Date	Description	Drm	Chk	App

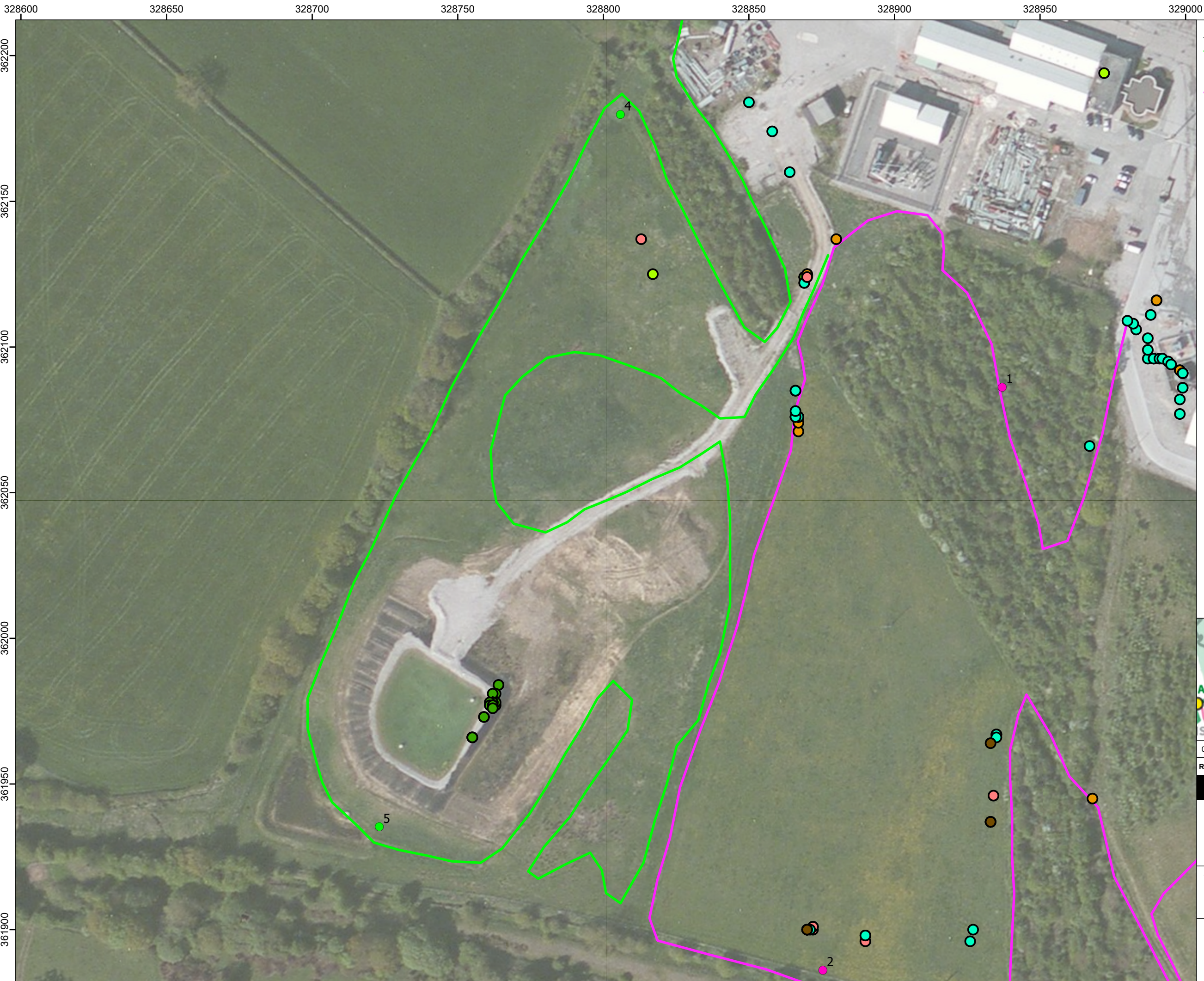
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TITLE: Figure 7d:  
Bat Activity Transect Results -  
August 2022  
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**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Transect Route 2
- Route 2 Stopping Point

**Route 1 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Myotis Species
- Daubentons's Bat
- Lesser Horseshoe Bat

**Route 2 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Myotis Species
- Daubentons's Bat
- Brown Long-eared Bat

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**CCS Project Padeswood**

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Bat Activity Transect Results -  
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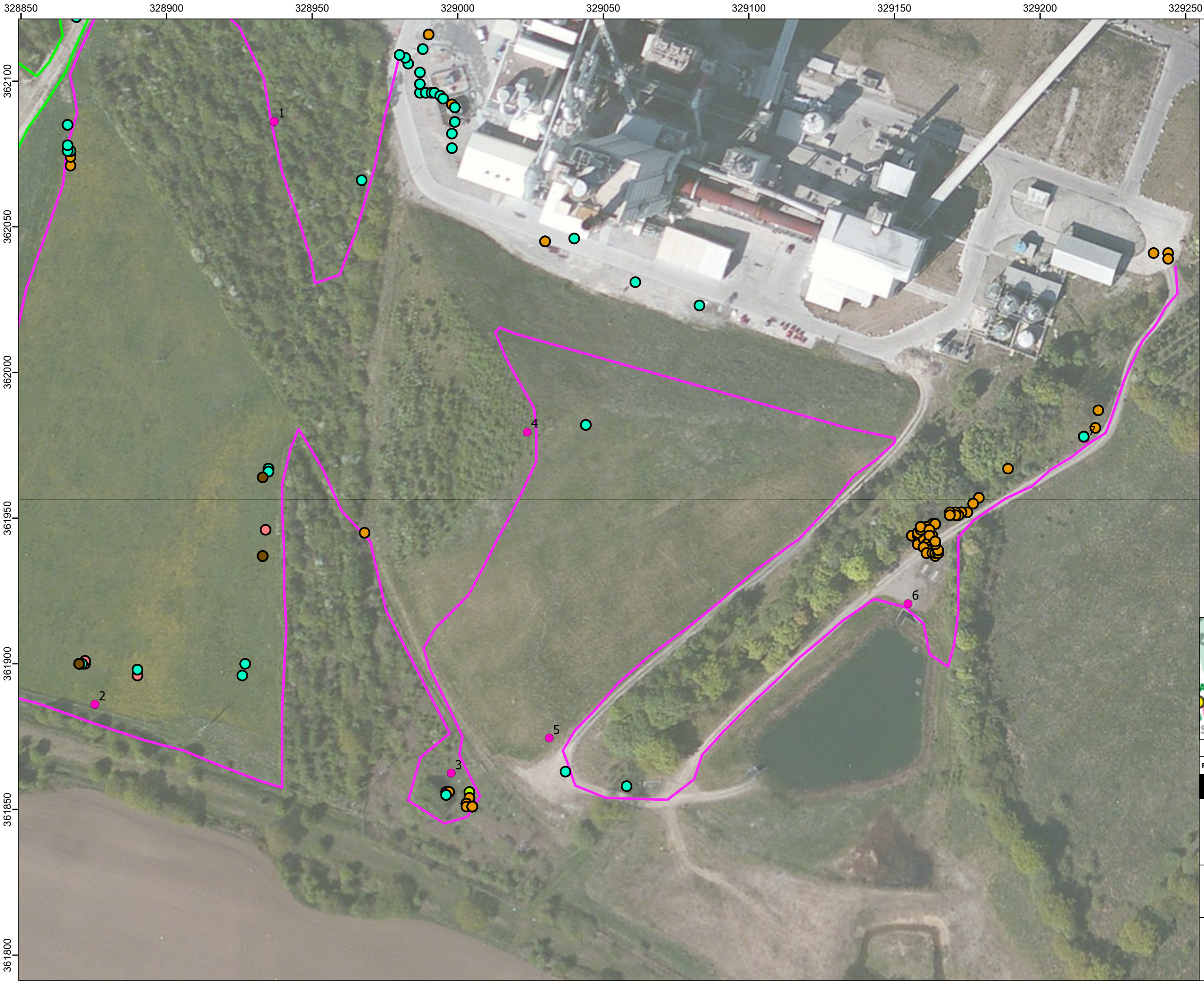
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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
- Route 2 Species**
- Common Pipistrelle
  - Soprano Pipistrelle
  - Noctule Bat
  - Myotis Species
  - Daubentons's Bat
  - Brown Long-eared Bat
  - Lesser Horseshoe Bat

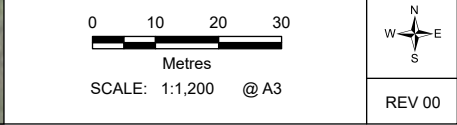


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TITLE: Figure 7d:  
Bat Activity Transect Results -  
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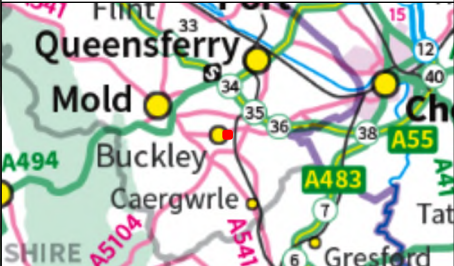


**Legend:**

- Transect Route 1
- Route 1 Stopping point

**Route 1 Species**

- Common Pipistrelle
- Soprano Pipistrelle
- Lesser Horseshoe Bat



00	08/08/2023	2483540	TG	SP	RR
Rev	Date	Description	Drm	Chk	App

Padeswood Carbon Capture and Storage Project



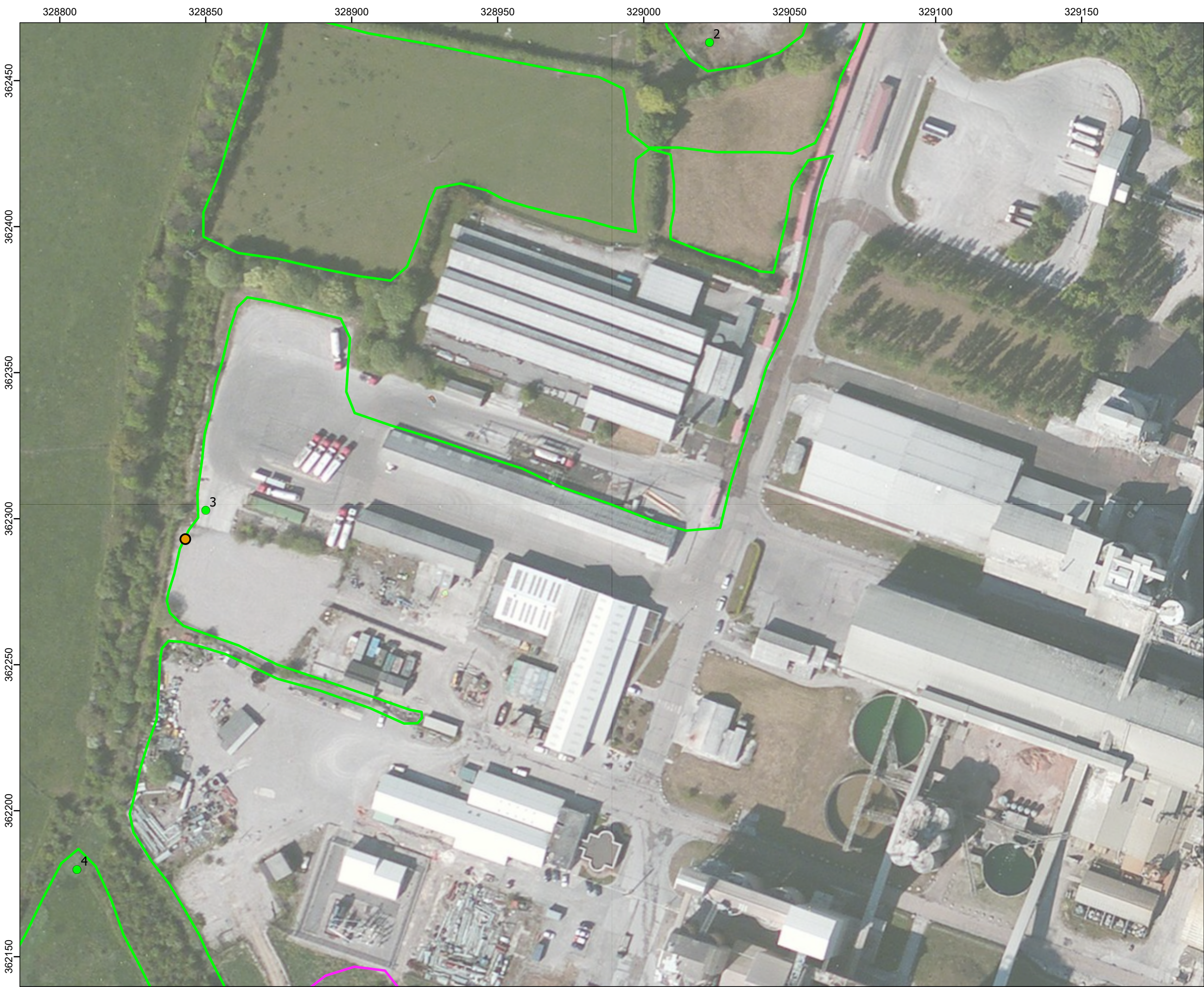
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Appendix 5.2, Figure 7e:  
Bat Activity Transect Results  
- September 2022

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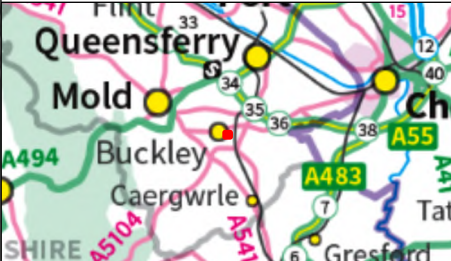
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- Legend:
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2
- Route 1 Species
- Soprano Pipistrelle



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TITLE: Figure 7e:  
Bat Activity Transect Results -  
September 2022  
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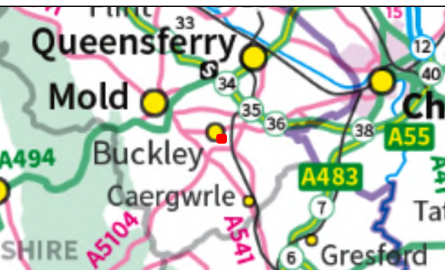




- Legend:**
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2
  - Route 2 Stopping Point

- Route 1 Species**
- Common Pipistrelle
  - Soprano Pipistrelle
  - Noctule Bat
  - Daubentons's Bat
  - Myotis Species

- Route 2 Species**
- Soprano Pipistrelle
  - Lesser Horseshoe Bat



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TITLE: Figure 7e:  
Bat Activity Transect Results -  
September 2022  
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Metres

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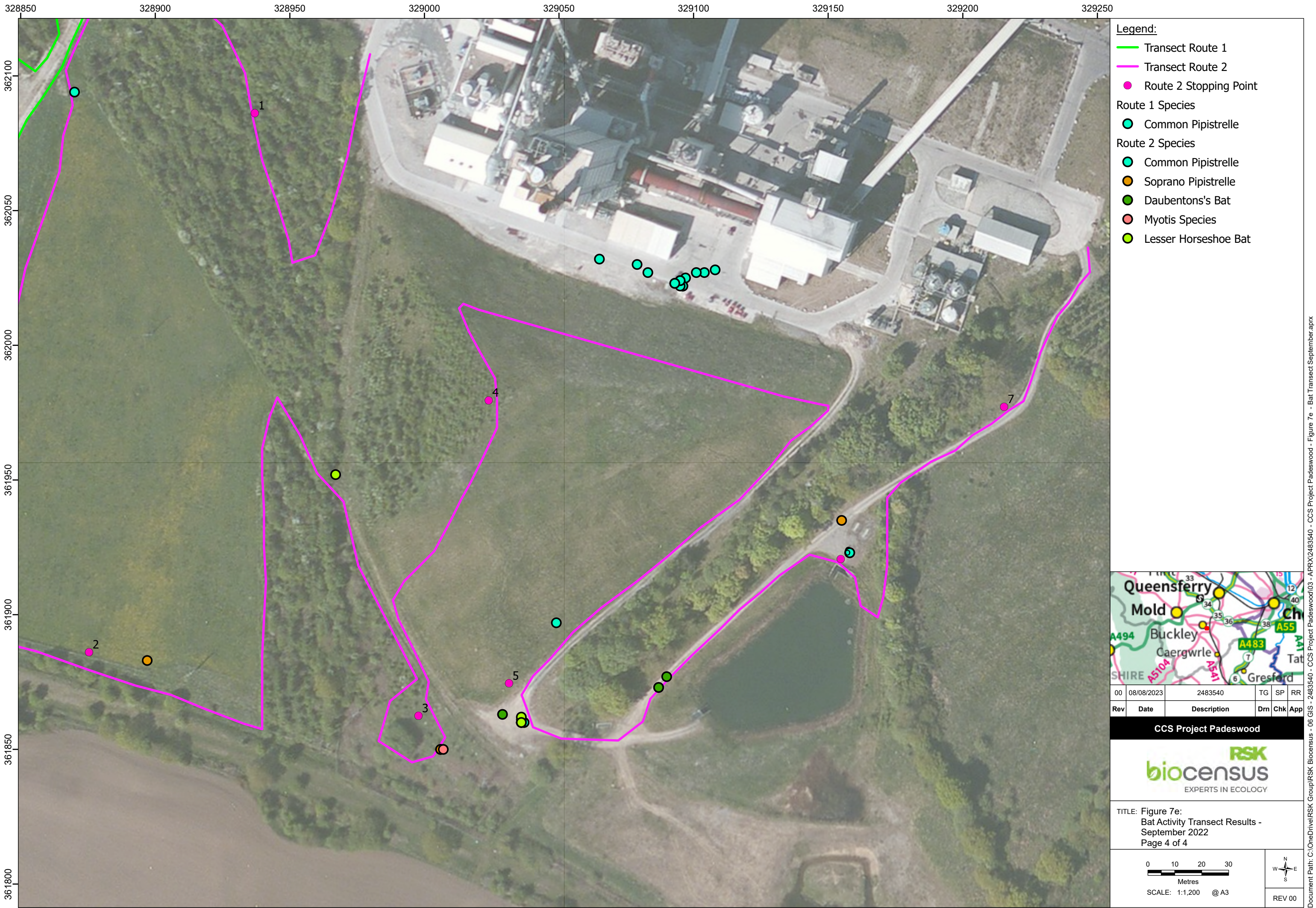
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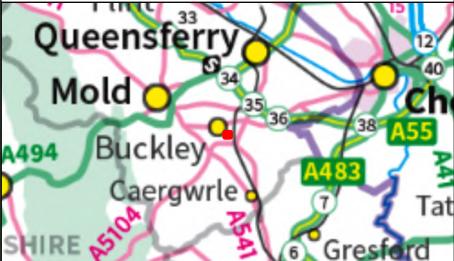
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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
  - Route 1 Species
    - Common Pipistrelle
  - Route 2 Species
    - Common Pipistrelle
    - Soprano Pipistrelle
    - Daubentons's Bat
    - Myotis Species
    - Lesser Horseshoe Bat



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Bat Activity Transect Results -  
September 2022  
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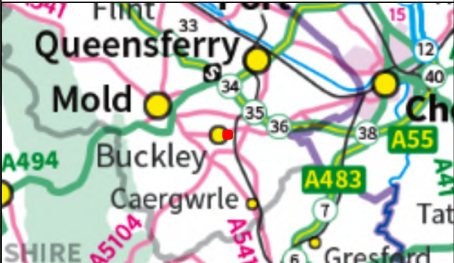
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**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Route 1 Species
  - Common Pipistrelle
  - Soprano Pipistrelle



00	08/08/2023	2483540	TG	SP	RR
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Padeswood Carbon Capture and Storage Project



TITLE: Volume 4, Technical Appendix 5.2,  
Figure 7f: Bat Activity Transect  
Results - October 2022  
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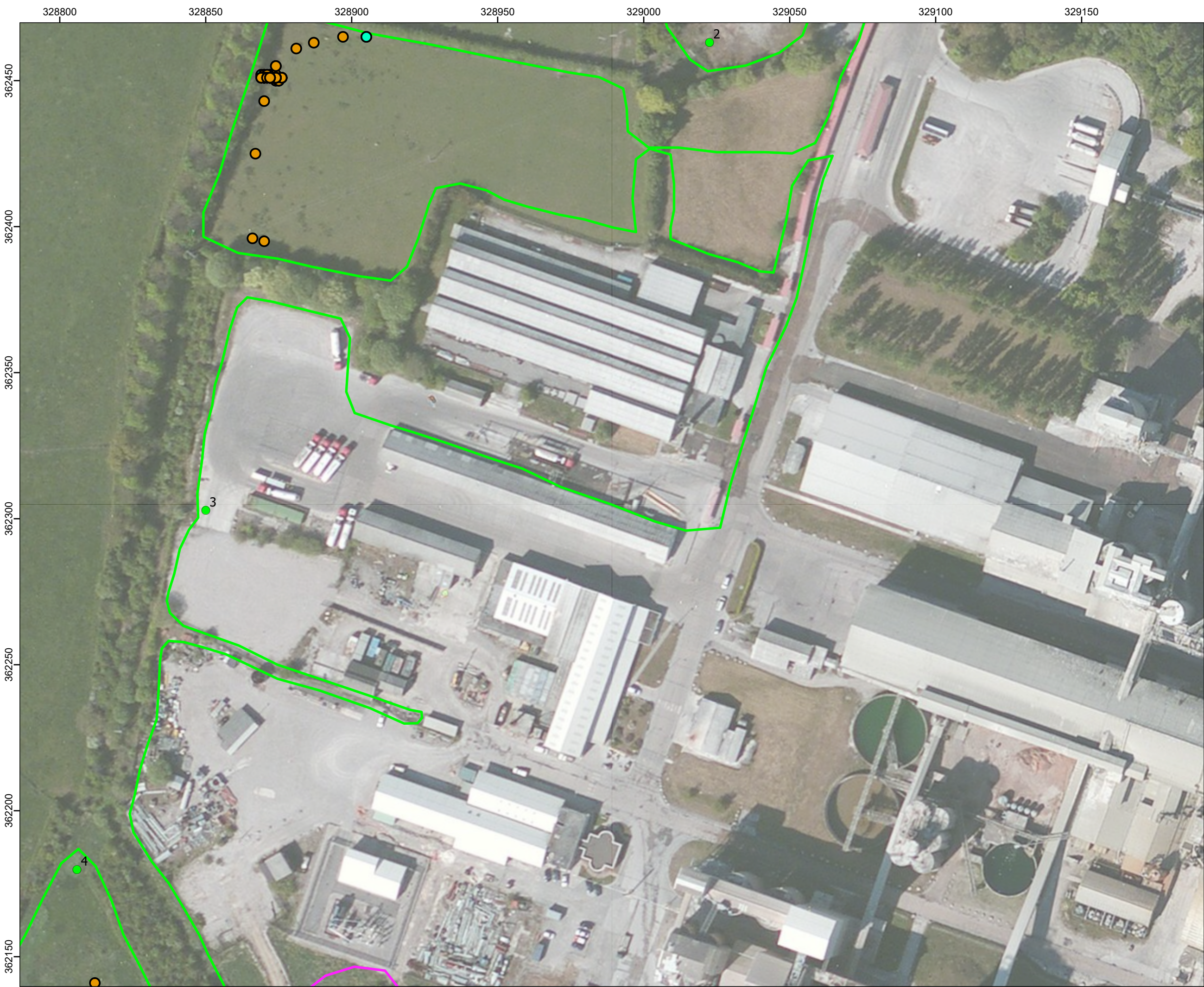
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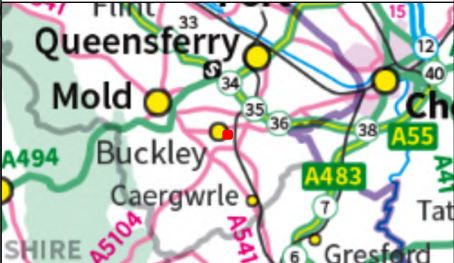
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- Legend:
- Transect Route 1
  - Route 1 Stopping point
  - Transect Route 2
- Route 1 Species
- Common Pipistrelle
  - Soprano Pipistrelle

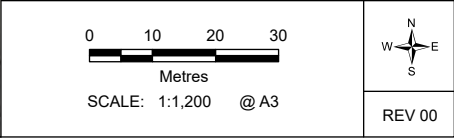


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Rev	Date	Description	Drn	Chk	App

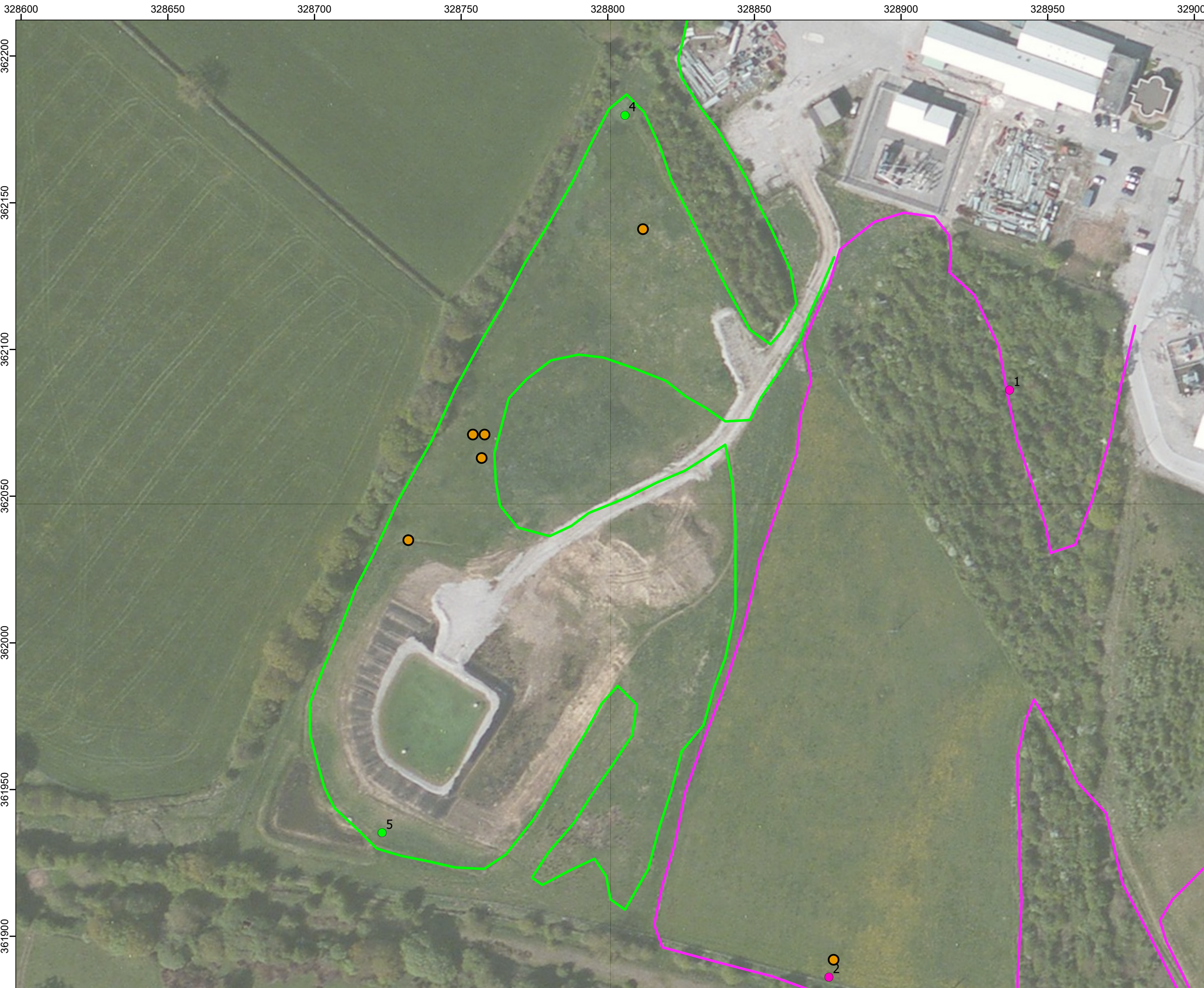
CCS Project Padeswood



TITLE: Figure 7f:  
Bat Activity Transect Results -  
October 2022  
Page 2 of 4







**Legend:**

- Transect Route 1
- Route 1 Stopping point
- Transect Route 2
- Route 2 Stopping Point

Route 1 Species

- Soprano Pipistrelle

Route 2 Species

- Soprano Pipistrelle

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Rev	Date	Description	Drn	Chk	App

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TITLE: Figure 7f:  
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Metres

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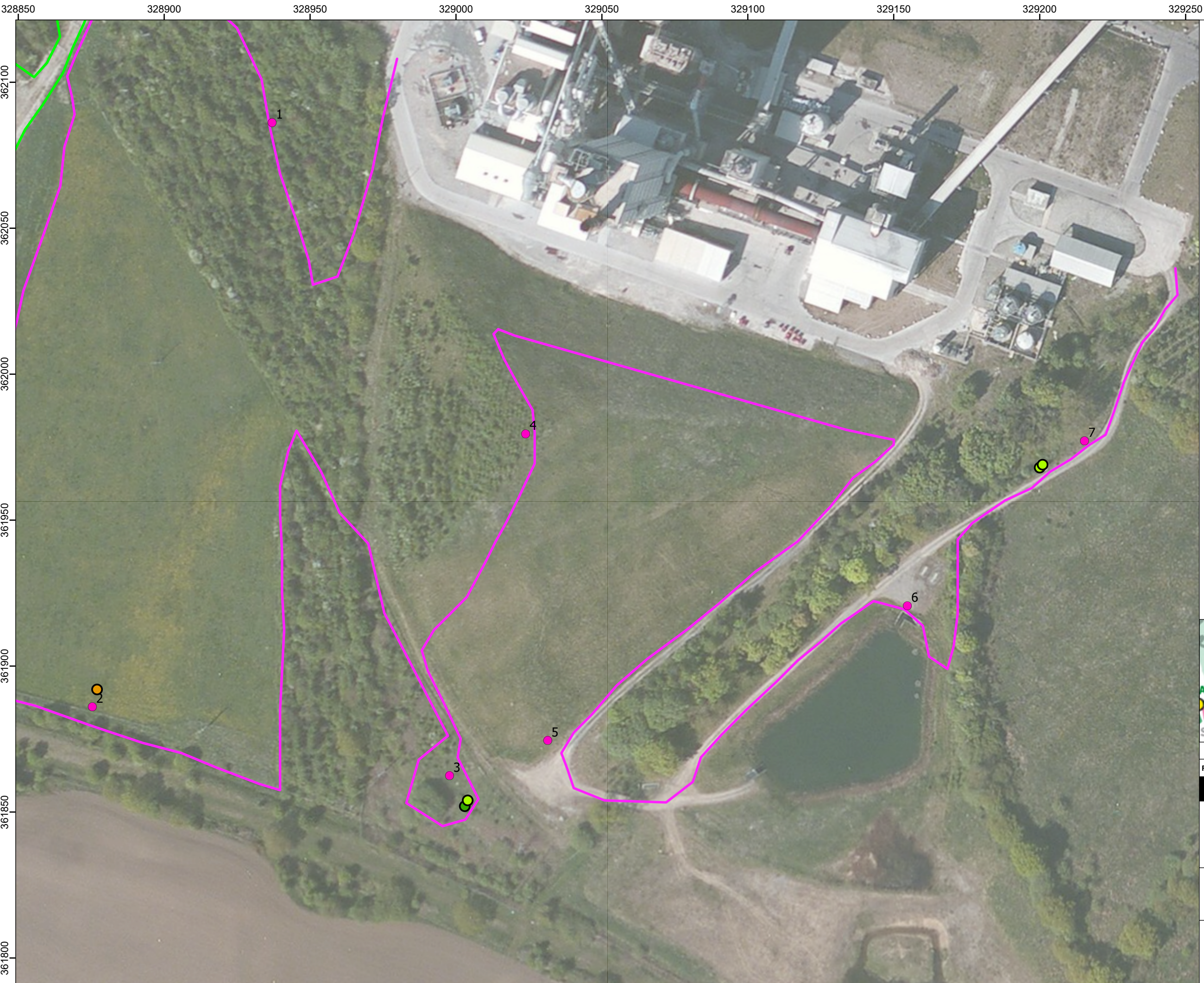
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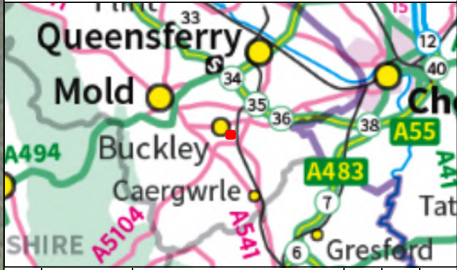
Contains Ordnance Survey data © Crown copyright and database right 2023  
World Imagery (Clarity): This work is licensed under the Esri Master License Agreement.View Summary | View Terms of UseExport: This layer is not intended to be used to export tiles for offline. Data Collection and Editing: This layer may be used in various ArcGIS apps to support data collection and editing, with the results used internally or shared with others, as described for these use cases.  
OS Open Rasters: Contains OS data © Crown Copyright and database right 2022

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- Legend:**
- Transect Route 1
  - Transect Route 2
  - Route 2 Stopping Point
- Route 2 Species**
- Soprano Pipistrelle
  - Daubentons's Bat
  - Lesser Horseshoe Bat



00	08/08/2023	2483540	TG	SP	RR
Rev	Date	Description	Drn	Chk	App

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TITLE: Figure 7f:  
Bat Activity Transect Results -  
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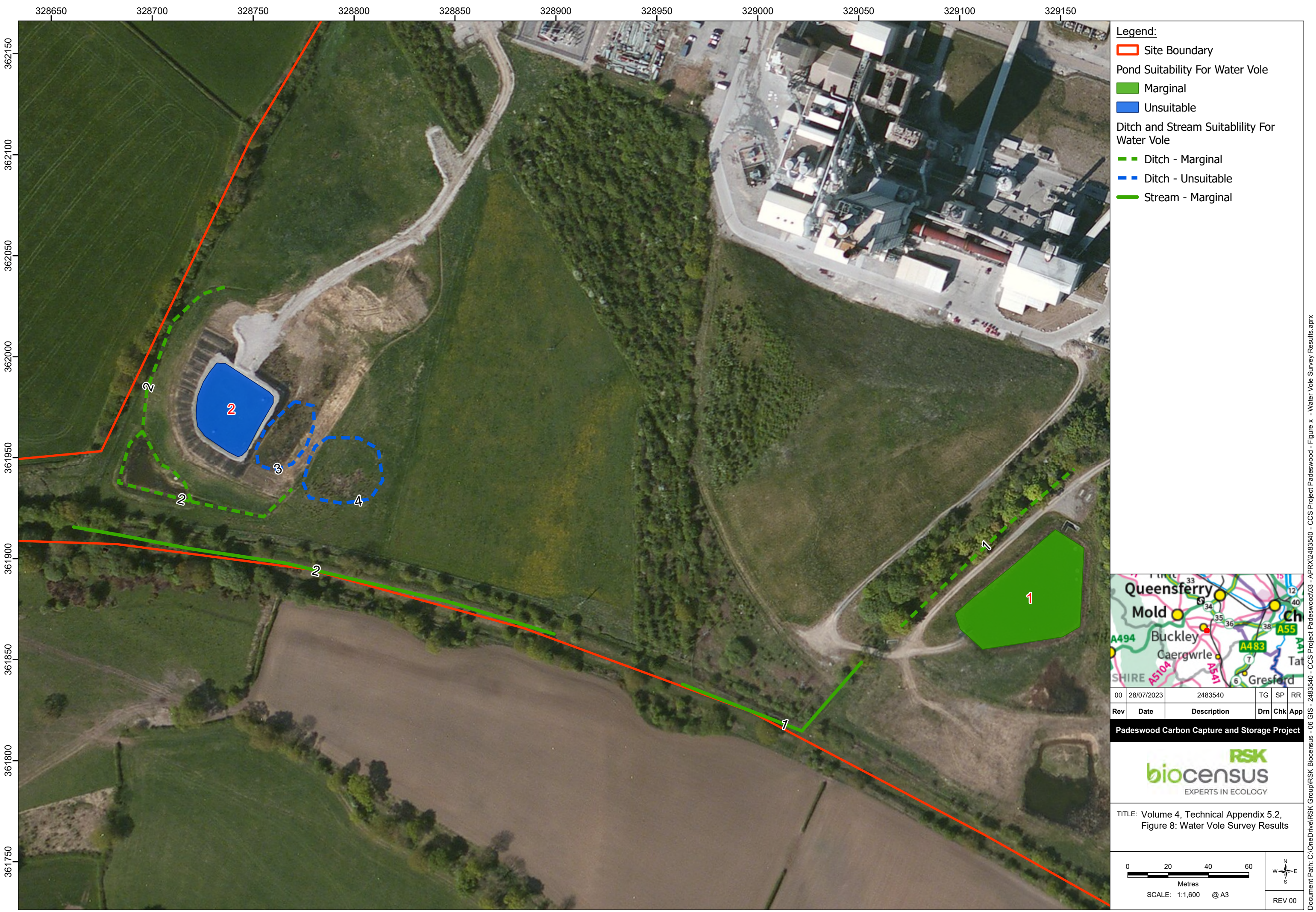
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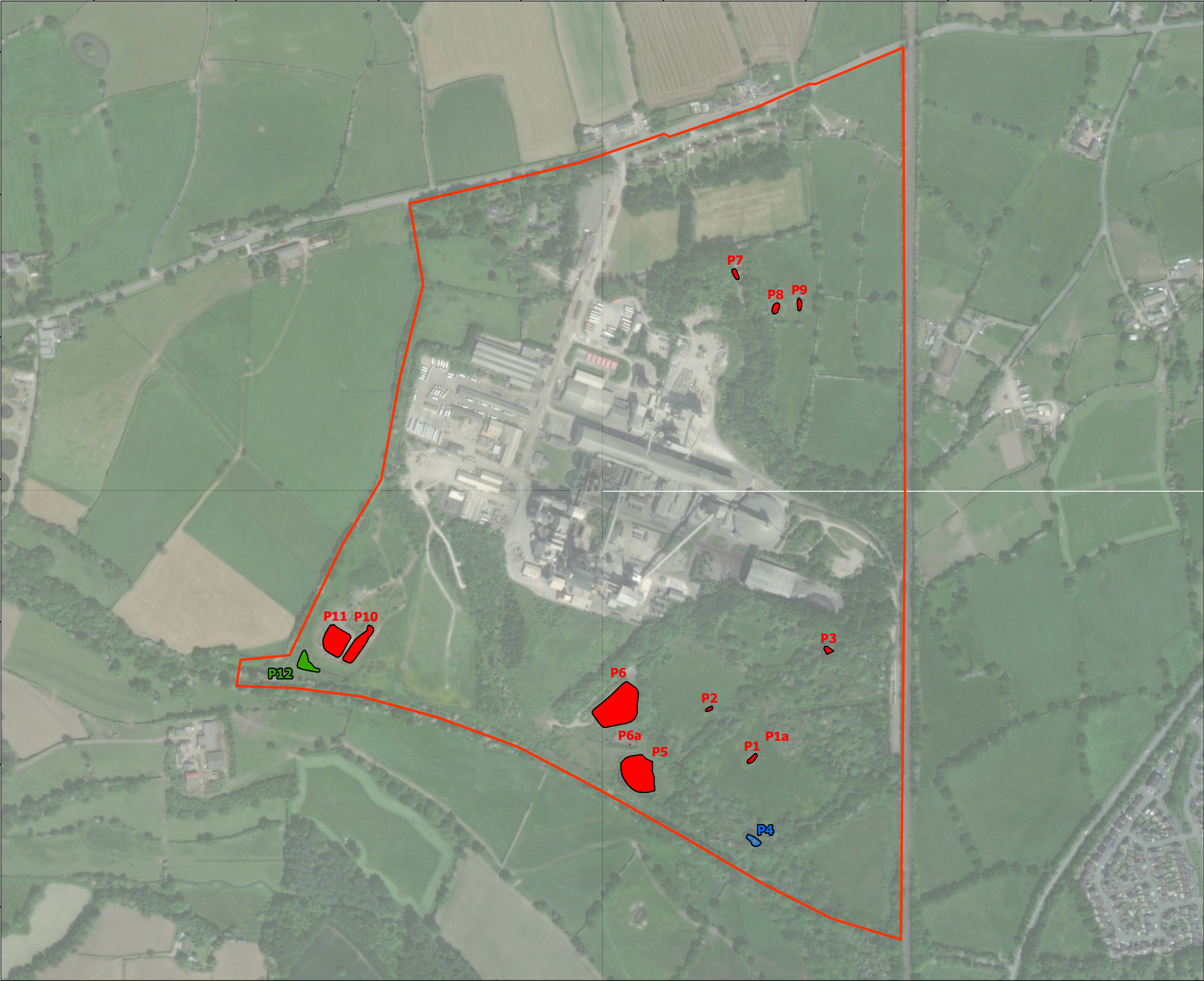
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Legend:

- Site boundary
- Pond dry
- Pond negative for GCN
- Pond positive for GCN

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Rev	Date	Description	Drn	Chk	App

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TITLE: Volume 4, Technical Appendix 5.2,  
Figure 10: GCN Pond Locations

0 60 120 180  
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## APPENDIX A – PROTECTED AND NOTEWORTHY SPECIES RECORDS

Species that are protected by law under Schedules 2 and 5 of [The Conservation of Habitats and Species Regulations 2017](#)<sup>51</sup>, Schedules 2, 5 and 8 of [The Wildlife and Countryside Act 1981](#)<sup>52</sup> or [The Protection of Badgers Act 1992](#)<sup>53</sup> and have been recorded in the search area are listed in **Table 19** (excluding species protected only against collection for sale). These species records were obtained from [Cofnod – North Wales Environmental Information Service](#)<sup>54</sup>. The Latin and common names for species are given, along with the year of the most recent record and their level of designation.

**Table 20** displays all noteworthy species that were returned within the search area. If a species is not included in the tables below it does not necessarily mean the species is absent from the search area, but rather that data-holding organizations do not have records of it in these locations.

**Table 19 Protected species records within 2km of the Site boundary.**

Scientific name	Common name	Designation	Year
<b>Amphibians</b>			
<i>Triturus cristatus</i>	great crested newt	EPS(Sch2), WCA5, S7	2021
<b>Reptiles</b>			
<i>Anguis fragilis</i>	slow-worm	WCA5, S7	2020
<i>Natrix helvetica</i>	grass snake	WCA5, S7	2013
<i>Vipera berus</i>	adder	WCA5, S7	2003
<i>Zootoca vivipara</i>	common lizard	WCA5, S7	2022
<b>Birds</b>			
<i>Alcedo atthis</i>	kingfisher	WCA1.1	2020
<i>Anser anser</i>	greylag goose	WCA1.2, Amber	2020
<i>Charadrius dubius</i>	little ringed plover	WCA1.1	2020
<i>Circus cyaneus</i>	hen harrier	WCA1.1, S7, Red, GB RDB(VU)	2014
<i>Falco peregrinus</i>	peregrine	WCA1.1	2016
<i>Falco subbuteo</i>	hobby	WCA1.1	2020
<i>Fringilla montifringilla</i>	brambling	WCA1.1	2010
<i>Jynx torquilla</i>	wryneck	WCA1.1	2013
<i>Loxia curvirostra</i>	crossbill	WCA1.1	2011
<i>Milvus milvus</i>	red kite	WCA1.1	2020
<i>Pandion haliaetus</i>	osprey	WCA1.1, Amber	2022
<i>Phoenicurus ochruros</i>	black redstart	WCA1.1, Amber, GB RDB(EN)	2018

<sup>51</sup> <https://www.legislation.gov.uk/ukxi/2017/1012/contents/made>

<sup>52</sup> <https://www.legislation.gov.uk/ukpga/1981/69>

<sup>53</sup> <http://www.legislation.gov.uk/ukpga/1992/51/contents>

<sup>54</sup> <https://www.cofnod.org.uk/Home>



Scientific name	Common name	Designation	Year
<i>Tringa ochropus</i>	green sandpiper	WCA1.1, Amber, GB RDB(EN)	2019
<i>Turdus iliacus</i>	redwing	WCA1.1, Amber, GB RDB(CR)	2020
<i>Turdus pilaris</i>	fieldfare	WCA1.1, Red, GB RDB(EN)	2021
<i>Tyto alba</i>	barn owl	WCA1.1	2020
<b>Mammals</b>			
<i>Arvicola amphibius</i>	European water vole	WCA5, S7, GB RDB(EN)	2002
<i>Chiroptera</i>	unidentified bat species	EPS(Sch2)	2019
<i>Lutra lutra</i>	otter	EPS(Sch2), WCA5, S7	2009
<i>Meles meles</i>	Eurasian badger	BA	2021
<i>Myotis</i>	<i>Myotis</i> bat species	EPS(Sch2), WCA5	2021
<i>Myotis mystacinus</i>	whiskered bat	EPS(Sch2), WCA5	2019
<i>Nyctalus noctula</i>	noctule bat	EPS(Sch2), WCA5, S7	2014
<i>Pipistrellus</i>	pipistrelle bat species	EPS(Sch2), WCA5, S7	2018
<i>Pipistrellus pipistrellus</i>	common pipistrelle	EPS(Sch2), WCA5, S7	2021
<i>Pipistrellus pygmaeus</i>	soprano pipistrelle	EPS(Sch2), WCA5, S7	2021
<i>Plecotus auritus</i>	brown long-eared bat	EPS(Sch2), WCA5, S7	2012
<i>Rhinolophus hipposideros</i>	lesser horseshoe bat	EPS(Sch2), WCA5, S7	2014

**Table 20 Noteworthy species records within 2km of the Site boundary**

Scientific name	Common name	Designation
<b>Plants</b>		
<i>Apium inundatum</i>	Lesser Marshwort	GB RDB(VU)
<i>Carex vesicaria</i>	Bladder-sedge	GB RDB(VU)
<i>Cichorium intybus</i>	Chicory	GB RDB(VU)
<i>Cicuta virosa</i>	Cowbane	NS
<i>Galeopsis speciosa</i>	Large-flowered Hemp-nettle	S7, GB RDB(VU)
<i>Helleborus foetidus</i>	Stinking Hellebore	NS
<i>Hyacinthoides non-scripta</i>	Bluebell	WCA8
<i>Meconopsis cambrica</i>	Welsh Poppy	NS
<i>Pinus sylvestris</i>	Scots Pine	NS
<i>Tilia platyphyllos</i>	Large-leaved Lime	NS
<b>Invertebrates</b>		
<i>Acronicta psi</i>	grey dagger	S7
<i>Acronicta rumicis</i>	knot grass	S7
<i>Allophytes oxyacanthae</i>	green-brindled crescent	S7
<i>Amphipyra tragopoginis</i>	mouse moth	S7



Scientific name	Common name	Designation
<i>Arctia caja</i>	garden tiger	S7
<i>Atethmia centrugo</i>	centre-barred sallow	S7
<i>Brachylomia viminalis</i>	minor shoulder-knot	S7
<i>Coenonympha pamphilus</i>	small heath	S7
<i>Diarsia rubi</i>	small square-spot	S7
<i>Ennomos erosaria</i>	September thorn	S7
<i>Ennomos fuscantaria</i>	dusky thorn	S7
<i>Erynnis tages</i>	dingy skipper	S7, GB RDB(VU)
<i>Eulithis mellinata</i>	spinach	S7
<i>Graphiphora augur</i>	double dart	S7
<i>Hepialus humuli</i>	ghost moth	S7
<i>Hipparchia semele</i>	grayling	S7, GB RDB(VU)
<i>Hydraecia micacea</i>	rosy rustic	S7
<i>Lasiommata megera</i>	wall	S7
<i>Macaria wauaria</i>	v-moth	S7
<i>Omphiscola glabra</i>	mud pond snail	S7, NS
<i>Orthonama vittata</i>	oblique carpet	S7
<i>Pyrgus malvae</i>	grizzled skipper	S7, GB RDB(VU)
<i>Scotopteryx chenopodiata</i>	shaded broad-bar	S7
<i>Spilosoma lubricipeda</i>	white ermine	S7
<i>Spilosoma lutea</i>	buff ermine	S7
<i>Timandra comae</i>	blood-vein	S7
<i>Tmeticus affinis</i>	n/a	NS
<i>Tyria jacobaeae</i>	cinnabar	S7
<b>Fish</b>		
<i>Anguilla anguilla</i>	eel	S7, OSPAR
<i>Salmo salar</i>	Atlantic salmon	S7, OSPAR
<i>Salmo trutta</i>	brown/sea trout	S7
<b>Amphibians</b>		
<i>Bufo bufo</i>	common toad	WCA5, S7
<i>Lissotriton helveticus</i>	palmate newt	WCA5
<i>Lissotriton vulgaris</i>	smooth newt	WCA5
<i>Rana temporaria</i>	common frog	WCA5
<b>Birds</b>		
<i>Acanthis cabaret</i>	lesser redpoll	S7
<i>Accipiter nisus</i>	sparrowhawk	Amber
<i>Acrocephalus schoenobaenus</i>	sedge warbler	Amber
<i>Actitis hypoleucos</i>	common sandpiper	Amber, GB RDB(VU)
<i>Alauda arvensis</i>	skylark	S7, Red
<i>Anas crecca</i>	teal	Amber
<i>Anas platyrhynchos</i>	mallard	Amber
<i>Anthus pratensis</i>	meadow pipit	Amber
<i>Anthus trivialis</i>	tree pipit	S7, Red
<i>Apus apus</i>	swift	Red, GB RDB(EN)
<i>Aythya ferina</i>	pochard	Red, GB RDB(EN)



Scientific name	Common name	Designation
<i>Chloris chloris</i>	greenfinch	Red, GB RDB(EN)
<i>Chroicocephalus ridibundus</i>	black-headed gull	S7, Amber, GB RDB(VU)
<i>Cinclus cinclus</i>	dipper	Amber
<i>Columba palumbus</i>	woodpigeon	Amber
<i>Corvus frugilegus</i>	rook	Amber
<i>Delichon urbicum</i>	house martin	Red, GB RDB(VU)
<i>Emberiza citrinella</i>	yellowhammer	S7, Red
<i>Amberiza schoeniclus</i>	reed bunting	S7, Amber
<i>Falco tinnunculus</i>	kestrel	S7, Amber, GB RDB(VU)
<i>Gallinago gallinago</i>	snipe	Amber
<i>Gallinula chloropus</i>	moorhen	Amber, GB RDB(VU)
<i>Larus argentatus</i>	herring gull	S7, Red, GB RDB(EN)
<i>Larus canus</i>	common gull	Amber
<i>Larus fuscus</i>	lesser black-backed gull	Amber
<i>Larus marinus</i>	great black-backed gull	Amber, GB RDB(EN)
<i>Linaria cannabina</i>	linnet	S7, Red
<i>Locustella naevia</i>	grasshopper warbler	S7, Red
<i>Mareca penelope</i>	wigeon	Amber
<i>Motacilla cinerea</i>	grey wagtail	Amber
<i>Muscicapa striata</i>	spotted flycatcher	S7, Red
<i>Numenius arquata</i>	curlew	S7, Red, GB RDB(EN)
<i>Oenanthe oenanthe</i>	wheatear	Amber
<i>Passer domesticus</i>	house sparrow	S7, Red
<i>Perdix perdix</i>	grey partridge	S7, Red, GB RDB(VU)
<i>Phylloscopus trochilus</i>	willow warbler	Amber
<i>Podiceps cristatus</i>	great crested grebe	GB RDB(VU)
<i>Poecile palustris</i>	marsh tit	S7, Red, GB RDB(VU)
<i>Prunella modularis</i>	dunnock	S7, Amber
<i>Pyrrhula pyrrhula</i>	bullfinch	S7, Amber
<i>Scolopax rusticola</i>	woodcock	Red, GB RDB(VU)
<i>Sturnus vulgaris</i>	starling	Red, GB RDB(VU)
<i>Tadorna tadorna</i>	shelduck	Amber, GB RDB(EN)
<i>Tringa totanus</i>	redshank	Amber, GB RDB(VU)
<i>Troglodytes troglodytes</i>	wren	Amber
<i>Turdus philomelos</i>	song thrush	S7, Amber
<i>Turdus viscivorus</i>	mistle thrush	Red, GB RDB(VU)
<i>Vanellus vanellus</i>	lapwing	S7, Red, GB RDB(EN)
<b>Mammals</b>		



Scientific name	Common name	Designation
<i>Erinaceus europaeus</i>	West European hedgehog	S7, GB RDB(VU)
<i>Lepus europaeus</i>	brown hare	S7
<i>Mustela putorius</i>	polecat	S7

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## APPENDIX B - ABBREVIATIONS

Table 21 displays abbreviations of protected species legislation.

**Table 21 Glossary of abbreviations used in this report**

Code	Full Title	Explanation
Amber	Amber list	Amber listed species have a population status in the UK of medium conservation concern.
BA	The Protection of Badgers Act 1992	Legislation making it an offence to kill, injure or take a badger, or to damage or interfere with a sett unless a licence is obtained from a statutory authority.
LBAP	Local Biodiversity Action Plan	A plan that identifies threats to significantly important species and habitats, and sets out targets and actions to enhance or maintain biodiversity.
ENG BSBI RDB	A Vascular Plant Red List for England	A list published in 2014 by the Botanical Society of Britain and Ireland of the red list status of plants in England. Measured against standardised IUCN criteria.
ENG BSBI RDB(CR)	Critically Endangered	A BSBI Red List designation for species at an extremely high risk of extinction.
ENG BSBI RDB(EN)	Endangered	A BSBI Red List designation for species at a very high risk of extinction.
ENG BSBI RDB(VU)	Vulnerable	A BSBI Red List designation for species at high risk of extinction.
EPS (Sch 2)	European Protected Species (Schedule 2)	European protected species (listed on Schedules 2 of The Conservation of Habitats and Species Regulations 2017)
EPS (Sch 5)	European Protected Species (Schedule 5)	European protected species (listed on Schedules 5 of The Conservation of Habitats and Species Regulations 2017)
GB RDB	Red Data Book Species	Species identified in one of the UK Red Data 2001.
GB RDB(CR)	Critically Endangered	An IUCN Red List designation for species at an extremely high risk of extinction.
GB RDB(EN)	Endangered	An IUCN Red List designation for species at a very high risk of extinction.
GB RDB(VU)	Vulnerable	An IUCN Red List designation for species at high risk of extinction.



Code	Full Title	Explanation
IUCN	International Union for Conservation of Nature and Natural Resources (also known as The World Conservation Union)	A worldwide partnership and conservation network to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.
LBAP	Local Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in species action plans and habitat action plans to enhance or maintain biodiversity at the county or regional level.
LHAP	Local Habitat Action Plan	A plan that identifies threats to a locally important priority habitat and sets out targets and actions to enhance or maintain that habitat.
Notable	Scarce and threatened invertebrates	Invertebrate species which are estimated to occur within the range of 16 to 100 10km squares but subdivision into Notable A and Notable B categories is not possible as there is insufficient information available).
Notable:A	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.
Notable: B	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.
NS	National Scarce	Species in 16-100 hectares in Great Britain.
OSPAR	OSPAR	Species listed on The Convention for the Protection of the Marine Environment of the North-East Atlantic
Red	Red List	Red listed species have a population status in the UK with high conservation concern.



Code	Full Title	Explanation
WCA	<i>The Wildlife and Countryside Act 1981 (as amended)</i>	Containing 4 Parts and 17 Schedules, the Act covers protection of wildlife (birds, and some animals and plants), the countryside, National Parks, and the designation of protected areas, and public rights of way. All wild plants in Britain are protected from intentional uprooting by an unauthorized person, but land owners, land occupiers, persons authorized by either of these or persons authorized in writing by the Local Authority for the area are exempt. Protection for some species may be limited to certain Sections of the Act (e.g. S13(2)).
WCA1	Schedule 1 of <i>The Wildlife and Countryside Act 1981 (as amended)</i>	This Schedule lists birds protected by special penalties at all times, but virtually all wild birds have some protection in law. Acts which are prohibited for all wild birds (except derogated 'pest' species) include intentional killing, injuring or taking; taking, damaging or destroying nests in use or being built; taking or destroying eggs; possessing or having control of (with certain exceptions but including live for dead birds, parts or derivative); setting or permitting certain traps, weapons, decoys or poisons. Selling, offering or exposing for sale, possessing or transporting for sale any live wild bird, egg or part of an egg or advertising any of these for sale, or dead wild bird including parts or derivatives are also prohibited. Many birds must be formally registered and ringed if kept in captivity. Schedule I WCA birds are additionally protected from intentional or reckless disturbance while building a nest, or when such a bird is in, on or near a nest containing eggs or young, or intentional or reckless disturbance of dependent young.
WCA5	Schedule 5 of <i>The Wildlife and Countryside Act 1981 (as amended)</i>	Schedule 5 animals are protected from intentional killing, injuring or taking; possessing (including parts or derivatives); intentional or reckless damage, destruction or obstruction of any structure or place used for shelter or protection; selling, offering or exposing for sale, possessing or transporting



Code	Full Title	Explanation
		for the purpose of sale (alive or dead, including parts or derivatives). Protection of some species is limited to certain Sections of the Act (e.g. S9(1), S9(4a), S9(4b), S9(5)).
WCA8	Schedule 8 of <i>The Wildlife and Countryside Act 1981</i> (as amended)	Plants and fungi protected from intentional picking, uprooting, destroying, trading (including parts or derivatives), etc.

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## APPENDIX C – NATURE CONSERVATION LEGISLATION AND POLICY

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### International Legislation

The following international conventions and directives apply to biodiversity protection in the UK. Post-‘Brexit’, even though European Union (EU) directives no longer directly apply to the UK, the provisions therein are enshrined in both domestic legislation and international agreements. Legislation has been enacted to ensure the regulations derived from these remain in force<sup>55</sup>.

#### **The Convention on Biological Diversity 1992 *et seq.***

This multilateral treaty (<https://www.cbd.int/doc/legal/cbd-en.pdf>), signed by 150 government leaders at the 1992 Rio Earth Summit, has three main goals, of which one is the conservation of biological diversity. Article 6 requires countries to develop national biodiversity strategies, plans or programmes. In response, the UK developed the UK Biodiversity Action Plan (BAP) 1994 (<https://jncc.gov.uk/our-work/uk-bap/>) as well as county-specific BAPs. Subsequent to this, parties of the convention agreed the supplementary Nagoya Protocol 2010 (available at <https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf>), adopting the Strategic Plan for Biodiversity 2011-2020. The purpose of this Strategic Plan was to provide a framework for establishing national and regional biodiversity targets (<https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf>).

#### **Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (Birds Directive) 2009**

<https://www.legislation.gov.uk/eudr/2009/147>

The Birds Directive 2009 relates to the conservation of all species of naturally occurring birds in their wild state in the territory of the EU Member States (MSs) to which the treaty applies. Under the Birds Directive, the most suitable areas of conservation of the Annex I species are to be designated as Special Protection Areas (SPAs), as part of the European Natura 2000 network. Post Brexit, SPAs are no longer considered part of Natura 2000 and are instead components of the UK’s ‘national site network’, but their highly protected status is unchanged. Maintaining a coherent network of protected sites with overarching conservation objectives is still required in order to fulfil the commitment made by government to maintain environmental protections and continue to meet the UK’s international legal obligations.

#### **Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) 1992**

<https://www.legislation.gov.uk/eudr/1992/43>

The Habitats Directive 1992 requires EU MSs to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest, which are listed under Annex I, II, IV and/or V. Species listed under Annex IV are known as

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<sup>55</sup> Further information relating to England and Wales can be found here: <https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017>. A similar exercise has been undertaken in Scotland and Northern Ireland.



'European Protected Species' (EPS), and have retained their protected status in UK domestic legislation post-Brexit.

Under the Habitats Directive, EU Member States are required to contribute to the Natura 2000 network through the designation of Special Areas of Conservation (SACs) for natural habitat types listed in Annex I and habitats of species listed in Annex II. Post Brexit, SACs are no longer considered part of the European Natura 2000 network and are instead components of the UK's 'national site network', but their highly protected status is unchanged.

### **The Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971: the Ramsar Convention**

Accessible via <https://jncc.gov.uk/our-work/ramsar-convention/>

The Ramsar Convention is an intergovernmental treaty focused on the conservation and sustainable use of wetland, primarily as habitats for water birds. Under the convention, each ratified country is required to identify and designate sites (Ramsar sites) that meet the criteria for identifying a wetland of international importance, i.e. containing representative, rare or unique wetland types. In addition, the convention promotes international co-operation to promote the wise use of all wetlands and their resources.

### **Habitats Regulations Assessment (HRA): a note**

There is a requirement under the EU nature directives, and enshrined in country-specific domestic legislation<sup>56</sup> (see below), to undertake a screening exercise to determine whether any sites that form part of the 'national site network' (formerly Natura 2000) are likely to be significantly affected by any proposal (project or plan). The assessment must consider the proposals alone and also in combination with other plans and projects, if they result from activities that are not directly connected with, or necessary to, the management of the designated sites. If significant effects are likely, an Appropriate Assessment (AA) will need to be carried out. The screening, any AA, and any subsequent assessment, are collectively known as a Habitats Regulations Assessment (HRA). The HRA needs to take into account each of the 'Qualifying Features' (habitats or species) that justified the Site being designated. Ramsar sites are treated in the same way as SACs and SPAs in HRAs, as sites which have not been fully adopted i.e. candidate SACs (cSACs) and potential SPAs (pSPAs).

### **The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979**

Accessible via: <https://jncc.gov.uk/our-work/the-convention-on-the-conservation-of-migratory-species-of-wild-animals/#convention-summary>

The Bonn Convention was adopted in 1979 and came into force in 1985. Contracting Parties work together to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix I of the Convention), concluding multilateral agreements for the conservation and management of migratory species which require or would benefit from international cooperation (listed in Appendix II), and by

<sup>56</sup> In England and Wales: the Conservation of Habitats and Species Regulations 2017 (as amended).  
In Scotland: the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).  
In Northern Ireland: the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended).  
In the UK offshore area: the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended).



undertaking cooperative research activities. The UK Government ratified the Bonn Convention in 1985. The current legally-binding Agreements under the Convention include EUROBATS<sup>57</sup>.

### **The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979**

<https://www.coe.int/en/web/bern-convention>

The principal aims of the Bern Convention 1979 are to ensure the conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to regulate the exploitation of those species (including migratory species) listed in Appendix III. To this end, the Bern Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species. The UK Government ratified the Bern Convention in 1982.

### **National Legislation**

The following pieces of domestic legislation apply to biodiversity protection in the UK.

#### **The Wildlife and Countryside Act (WCA) 1981**

<https://www.legislation.gov.uk/ukpga/1981/69>

The Wildlife and Countryside Act 1981 (as amended) is the primary piece of legislation relating to nature conservation in the UK, though it has been adapted in different ways in the devolved administrations. It was initially enacted to implement the Bern Convention, Bonn Convention and the Birds Directive (described above).

The act is supplemented by provisions in the Countryside and Rights of Way (CRoW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, and extended in Scotland by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2011). Its equivalent in Northern Ireland is the Wildlife (Northern Ireland) Order 1985 (as amended and similarly extended). In addition to the Habitat Regulations (described below), the WCA provides protection for species listed in Schedules 1 (birds), 5 (other animals) and 8 (plants) of the Act. It provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) in England and Wales<sup>58</sup>. It also sets out, in other schedules, important and invasive species which are legally protected or require management.

All species of bird are protected under the WCA. The legislation makes it an offence to intentionally:

- a) kill, injure or take any wild bird;
- b) take, damage, or destroy the nest of any wild bird while that nest is in use or being built; or
- c) take or destroy an egg of any wild bird.

Those species of birds listed on Schedule 1 of the WCA are afforded additional protection, which deems it an offence to intentionally or recklessly:

<sup>57</sup> More information available at <https://jncc.gov.uk/our-work/agreement-on-the-conservation-of-populations-of-european-bats-eurobats>

<sup>58</sup> Duty replaced by the Nature Conservation (Scotland) Act 2004 (as amended) and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (as amended) in those countries.



- a) disturb any wild bird included in Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or
- b) disturb dependent young of such a bird.

Under Section 9 of the WCA, for animals listed on Schedule 5, it is an offence in England and Wales to intentionally or recklessly:

- kill, injure or take any wild animal listed on Schedule 5;
- possess or control any live or dead those wild animals or anything derived from it;
- damage or destroy any structure or place which wild animals listed on Schedule 5 uses for shelter or protection;
- disturb any such animal while it is occupying a structure or place of shelter or protection;
- obstruct access to any structure or place used by any such animal for shelter or protection; and
- sell, offer or expose for sale, or have in their possession or transports for the purpose of sale, any live or dead wild animal listed on Schedule 5 or any part of, or anything derived from such an animal.

In addition to EPS, species commonly found on development sites include water voles (*Arvicola amphibius*) and widespread species of reptiles: common lizard (*Zootoca vivipara*); slow-worm (*Anguis fragilis*); grass snake (*Natrix helvetica*); and adder (*Vipera berus*). These four reptile species receive partial protection, which prevents the intentional or deliberate killing and injuring of reptiles or offering them for sale.

Section 14(2)<sup>59</sup> states that it is an offence to plant or otherwise cause to grow any plant in the wild at a place outside its native range.

There is no provision within the Act for derogation licences to be issued for the purposes of development, although Section 10 provides a defence in cases that may be considered to be: *“the incidental result of a lawful operation and could not reasonably have been avoided”* if certain conditions are met.

Section 16(i) of the Act does make provision for derogation licences to be issued *“for the purposes of preserving public health or public ... safety”*. For confirmation of this, it would be appropriate to consult the relevant statutory nature conservation body (SNCB)<sup>60</sup>.

**The Conservation of Habitats and Species Regulations (Habitat Regulations) 2017**  
<https://www.legislation.gov.uk/ukSI/2017/1012> England and Wales

The Habitats Regulations 2017 consolidated the various amendments made to the 1994 Habitat Regulations, which were developed to implement the Birds Directive and Habitats Directive (see above) at a national level, though this consolidation only applies in England and Wales. As noted above, in Scotland and in Northern Ireland, the original versions of the Regulations in each region have been retained and amended to include protections for EPS that were initially provided under the WCA (or its equivalent).

<sup>59</sup> In Scotland, as amended by Section 14 of the Wildlife and Natural Environment (Scotland) Act 2011.

<sup>60</sup> SNCBs are - in England: Natural England; in Wales: Natural Resources Wales; in Scotland: NatureScot; in Northern Ireland: Department of Agriculture, Environment and Rural Affairs (DAERA).



The Regulations (as amended) provide for the designation and protection of the national site network (formerly 'Natura 2000 sites'), the adaptation of planning and other controls for those sites, and the protection of EPS (listed on Schedules 2 and 5).

The 2017 Regulations (England and Wales, Reg. 43) deems it an offence to:

- a) deliberately capture, injure or kill a wild animal of a EPS,
- b) deliberately disturb wild animals of any such species,
- c) deliberately take or destroy the eggs of such an animal, or
- d) damage or destroy a breeding site or resting place of such an animal.

For the purposes of paragraph (b), disturbance of animals includes in particular any disturbance which is likely to:

- a) impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- b) to affect significantly the local distribution or abundance of the species to which they belong.

There are also restrictions on transport, possession and sale.

It is possible to obtain a derogation licence from the relevant SNCB<sup>60</sup> to permit activities which would otherwise contravene the regulations above, including for development purposes, when certain conditions are met. Failure to satisfy the Regulations and obtain a licence where required could result in prosecution and lead to fines and possible imprisonment.

Currently (2021), all EPS are also listed on Schedule 5 of the WCA (outlined above), as it applies in England and Wales. EPS often encountered on development sites include GCN (*Triturus cristatus*), all species of bats, dormice (*Muscardinus avellanarius*) and otters (*Lutra lutra*).

### **Countryside and Rights of Way Act 2000**

<https://www.legislation.gov.uk/ukpga/2000/37>

The Countryside and Rights of Way (CRoW) Act 2000 provides for public access on foot to certain land types, amends the law for public rights of way, increases protection for SSSIs, and strengthens wildlife enforcement legislation. It applies only in England and Wales.

### **The Natural Environment and Rural Communities (NERC) Act 2006; The Environment (Wales) Act 2016**

<https://www.legislation.gov.uk/ukpga/2006/16>

The Natural Environment and Rural Communities (NERC) Act 2006, Section 40 requires that any public body or statutory undertaker in England must have regard to the purpose of conservation of biological diversity in a manner that is consistent with the exercise of their normal functions. This may include enhancing, restoring or protecting a population or a habitat. The intention is to help ensure that biodiversity becomes an integral consideration in the development of policies, and that decisions of public bodies work with the grain of nature and not against it. In Wales, a similar duty has been moved to Section 6 of the Environment (Wales) Act 2016.

As part of this duty, statutory undertakers must have regard to the list of habitats and species which are of principal importance for the purpose of maintaining and enhancing biodiversity. For England, the duty to compile such a list is captured under Section 41 of the NERC Act; in



Wales, under Section 7 of the Environment (Wales) Act. The lists for England are accessible online via the National Archive<sup>61</sup>; for Wales via <https://www.biodiversitywales.org.uk/>.

### **Protection of Badgers Act 1992**

<https://www.legislation.gov.uk/ukpga/1992/51>

Badgers and their setts are protected under the Protection of Badgers Act 1992 (England, Wales and Scotland). The key part of this legislation in relation to the proposed development are in Section 3, which deems it an offence to:

- c) damage a badger sett or any part of it;
- d) destroy a badger sett;
- e) obstruct access to, or any entrance of, a badger sett;
- f) disturb a badger when it is occupying a badger sett,
- g) intend to do any of those things or be reckless as to whether those actions would have any of the consequences listed above.

Derogation licences may be obtained from the relevant SNCB<sup>60</sup> under Section 10 of the Act for the purpose of development, to permit activities which would otherwise be unlawful.

Note: there are additional provisions relating to badgers under the WCA Section 11 (Prohibition of certain methods of killing or taking wild animals).

### **The Wild Mammals (Protection) Act 1996**

<https://www.legislation.gov.uk/ukpga/1996/3>

All wild mammals are protected by The Wild Mammals (Protection) Act 1996 (as amended). This makes it an offence to mutilate, kick, beat, nail, or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal.

### **Invasive Alien Species (Enforcement and Permitting) Order 2019**

<https://www.legislation.gov.uk/uksi/2019/527/contents/made>

The Invasive Alien Species (Enforcement and Permitting) Order applies principally in England and Wales and the UK's offshore marine area, but also controls imports and exports from the UK (including Scotland and Northern Ireland). It lists species of concern which cannot be imported, kept, bred/grown, transported, sold, used, allowed to reproduce, or released into the environment. This Order replaces some elements relating to invasive species in the Wildlife and Countryside Act 1981 (as amended).

### **National, regional and local policy and guidance of relevance**

Planning policy relating to ecology and nature conservation is set out below.

### **Government's 25-Year Environment Plan 2018**

Accessed via: <https://www.gov.uk/government/publications/25-year-environment-plan>

The Government's 25-Year Environment Plan 2018 sets out how the UK Government intends to improve the natural health of the UK through improving land, air and water quality, as well as setting out how the effects of climate change will be tackled. The plan promotes the creation or restoration of wildlife-rich habitat outside the protected site network and seeks to recover threatened, iconic or economically important species of animals, plants and fungi, and where

<sup>61</sup>

<https://webarchive.nationalarchives.gov.uk/ukgwa/20140712055944/http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>



possible to prevent human induced extinction or loss of known threatened species in England. The plan sets out a number of goals and corresponding policies that look at managing land sustainably, improving and enhancing landscapes and biodiversity for both marine and terrestrial environments, improving resource efficiency and reducing waste and pollution, whilst also examining the UK's contribution to improving the global environment.

#### **Flintshire County Council Unitary Development Plan 2000-2015**

Accessed via: [http://www.cartogold.co.uk/flintshire/text/english/00\\_contents.htm](http://www.cartogold.co.uk/flintshire/text/english/00_contents.htm)

Flintshire Council's Unitary Development Plan contains Policies WB1 to WB6 which set out measures to conserve sites of nature conservation value and prevent loss of important species and habitats, and to enhance and create new wildlife habitats and nature conservation resources.

A new Flintshire Local Plan is currently being consulted on but has not been adopted yet. It is likely to contain similar policies relating to biodiversity.



## APPENDIX D – PRA PHOTOGRAPHS

Description	Photographs
<p><b>Building 1</b> – Western aspect, showing the two porch extensions to the main building. Under the furthest porch extension there is a significant gap present between the top of the breezeblock wall and the roof.</p>	
<p><b>Building 1</b> – Western aspect, showing the gap between the timber fascia and the main building wall, allowing potential access into the roof void.</p>	
<p><b>Building 1</b> – Northern aspect, showing timber vent slats offering potential access point into the western roof void, also present on the eastern roof void.</p>	



**Building 1** – Showing the double pitched roof, eastern and southern aspects visible. Eastern aspect has timber fascia boards, similar to western aspect. A slipped tile was identified just above the guttering on the south eastern corner. Timber roof vents are again present on the southern aspect as on the northern aspect.



**Building 1** – Southern aspect, showing missing mortar and slipped tiles on the gable end of the eastern roof pitched roof



**Building 1** – Southern aspect, showing gaps in breezeblock work around timber doorframe offering potential roosting crevices for bats.





**Building 1** – Internal, showing the loft access hatch in the main locker room, which would allow access to the western roof void.



**Building 1** – Internal loft void within main locker room. Approximately 2m high and trussed design. Roof lined with bitumen roofing felt.





**Building 1** – Internal, showing office space in the eastern half of the building. A false ceiling is in place, with no evidence of a hatch similar to that on the western side of the building.



**Building 2** – Showing the south slurry tank, steel supporting plates are visible around the rim of the tank, these were found to offer crevices behind of varying size and potential usefulness for roosting bats.





**Building 2** – Southern tank (eastern aspect), showing one of the external metal plates around the rim of the tank, which has lifted away from the tank wall leaving a crevice behind.



**Building 2** – Northern tank, showing the steel gantry adjoining both tanks and scraper bridge running to central column.



**Building 2** – Northern tank (western aspect) showing damage to the concrete rim of the tank and the external metal plates, some of which are bolted to the tank wall. On several plates the central bolt was missing, leaving a smooth tunnel through the wall of the tank c. 5-10cm in diameter.





**Building 2** – Northern tank, showing external metal plate where central bolt has been removed, creating a smooth tunnel through the wall of the tank.



**Building 2** – Northern tank (western aspect) showing damaged concrete at tank rim, which has created a crevice between the internal steel reinforcement.



**Building 2** – Northern tank (internal) showing how the tank has naturally filled with rainwater





**Building 3** – Northern aspect, showing metal framed window with wooden board removed, creating an open access point for bats.



**Building 3** – View inside the building from missing window, shows the open door on the eastern aspect and internal beams and ducting offering potential roosting places for free hanging bats.





**Building 3** – View inside from the open doorway on the eastern aspect, showing the extent of internal flooding of the basement level. This will likely aid internal humidity and temperature stability.



**Building 3** – View inside from the open doorway on the eastern aspect. Taken in December when water had been partially pumped out to enable access.





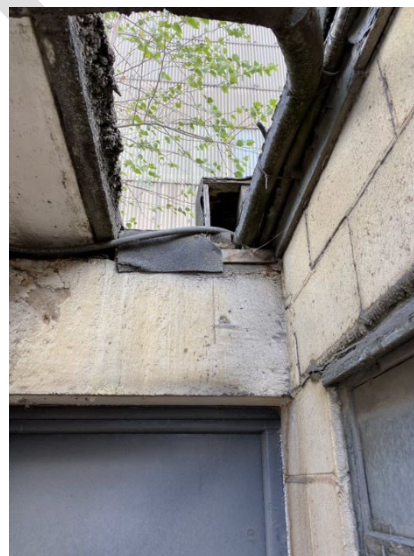
**Building 4** – Southern aspect, showing the disused main office/workshop building, which has timber doors and windows, wooden fascia's and a felted flat roof. The flat roof was found to be in poor condition and has collapsed through internally in several areas.



**Building 4** – Showing the gaps between the timber fascias and the wall of the building, offering potentially suitable sheltered crevices at the top of the breezeblock wall.



**Building 4** – Southern aspect, showing the recess between the office/workshop on the right and the adjoining toilets on the left. A section of open boxing can be seen which serves as a route for an electrical cable. This may allow access to a small sheltered section of the roof space.





**Building 4** – View from inside shows the poor internal condition of the building. The roof has completely collapsed in places, making internal conditions far less favourable for roosting bats.



**Building 4** – View from inside at the eastern end of the main building, some potentially suitable crevices between the chipboard ceiling and the tops of the walls.





**Building 4** – View across the roof from the northern aspect, showing the wooden boxing visible from the recess on the southern aspect, several areas of peeling or lifted felt noted.



**Building 5** – Northern aspect, showing the timber doors and asbestos cement sheet cladding attached to the front of the building, to the left of the picture ivy can be seen growing over the eastern wall of the building and onto the roof.



**Building 5** – Northern aspect, showing the gap present between the asbestos cement sheet cladding and the main wall of the building and at the top of the timber garage doors.

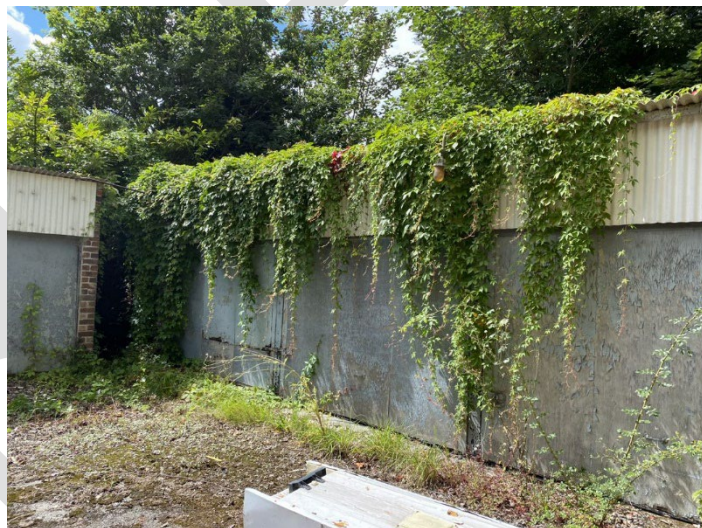




**Building 5** – View within one of the garages.



**Building 6** – Eastern aspect, showing the extensive growth of the invasive non-native plant Virginia creeper, across the roof. Similar features found to be present as for building 5 above between the asbestos cement sheet cladding and the main wall of the building.





**Building 7** – Southern aspect, showing lifted roof slate above floodlight and spalled brickwork directly below floodlight, where a substantial proportion of the mortar is missing.



**Building 7** – Closer view of the spalled brickwork on the southern aspect.





**Building 7** – Eastern aspect (left of image), showing the large double timber doors and extensive ivy growth which has spread across the roof from the northern aspect.



**Building 8** – Southern aspect, showing missing wooden fascia at gable end, which has uncovered damaged brickwork immediately below the roof line. The gable end ridge tile is open and above the garage door there is a brick missing from the wall. The metal roller shutter door has been left partially open.





**Building 8** – Southern aspect a closer view showing the missing fascia which has exposed damaged brickwork beneath, a missing brick can also be seen on the wall beneath. The central ridge tile directly above the gable end is also open ended.



**Building 8** – Eastern aspect, showing the distinctly different northern and southern sections of the building. The taller northern section has a slate roof, whereas the southern section has an asbestos cement sheet roof and asbestos cement tiled ridge.





**Building 8** – Eastern aspect, showing missing mortar between asbestos cement roof sheeting and the timber fascia immediately below at the join between the southern and northern sections of the building.



**Building 8** – Eastern aspect, showing a missing brick in the external wall, this was at lower level less <2m above ground.



**Building 8** – Eastern aspect, slipped and partially lifted roof tiles noted towards the northeast corner, some eroded mortar immediately below roof line.





**Building 8** – Western aspect, showing extensive ivy growth over the walls and roof of the building, immediately adjacent the western walls is a dense stand of willow.





**Building 8** – Northern aspect, largely in a reasonable standard of repair, some ivy growth has begun the spread up the main external wall, with visible growth at roof level coming from the western aspect.





**Building 9** – An example of lifted roof and ridge tiles that was present on most aspects.



**Building 9** – Southern aspect, showing the boxed soffit damage.



**Building 9** – The single-storey extension on the eastern section of the building.





**Building 9** – Eastern aspect, showing roof damage.



**Building 9** – Eastern aspect, showing gaps below ridge tiles on the building extension.





**Building 9** – View from inside shows the poor internal condition of the building. The floor has collapsed in places.



**Building 9** – Internal void within the building. Approximately 1.5m high and king post design. Roof lined with bitumen felt and coated in asbestos in some sections.





**Building 9** – Internal void within the building. Showing the floor lined with blanket insulation.



**Building 10** – Northern aspect, showing the three wooden shutter doors and one broken door.





**Building 10 – View within one of the garages.**



**Building 10 – Northern aspect, showing gaps between the wooden shutter doors and the wall.**



**Building 10 – Eastern aspect, showing gaps below the cement sheeting which may lead to the wall plate.**





**Building 10** – View from inside the garage with a broken door, showing gaps between concrete sheeting and bitumen felt.



**Building 11** – Flooded basement with no evidence of roosting bats



**Building 11** - Apex of northern face of the property





**Building 11** – Gap under roof tile on southern face of the property



**Building 12** – Crevices around exposed bricks and under roof tiles on office building



**Building 12** – Exposed cavities under roof tiles on office





**Building 13** – Sports pavilion shed with roof fallen through



**Building 13** – Cavities under fascia on sports pavilion

