

Bat Transect Surveys

IAMP

Ecology Solutions Ltd.

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**Durham Wildlife Services
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Bat Transect Survey Report
International Advanced Manufacturing Plant (IAMP)

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1.0 EXECUTIVE SUMMARY

- 1.0.1 Durham Wildlife Services (DWS) were commissioned by Ecology Solutions Ltd in May 2022 to undertake a range of ecological surveys on an area of land north of Nissan Car Manufacturing Plant, in Sunderland. The approximate National Grid Reference for the centre of the site is **NZ335598**. The area covered by the site is the Ecological and Landscape Mitigation Area (ELMA) of the International Advanced Manufacturing Park (IAMP) ONE site.
- 1.0.2 A number of surveys have already been completed across the IAMP ONE and TWO sites by several ecological companies including White Young and Green (WYG) in 2014 and 2015, ARUP in 2016-2017, Dendra in 2017/2018 and DWS in 2018 - 2020. These reports should be read in conjunction with this one. This report focuses on bats within IAMP ONE ELMA.
- 1.0.3 Transect data shows a level of bat activity across the site, varying across the bat activity season, with a peak in July. Activity was mostly recorded along lines of trees and hedgerows, particularly along the western elevation of site.
- 1.0.4 Static detectors show highest levels of activity were recorded at Location 1, along the River Don, with similar levels of activity recorded at Location 2, along a line of trees in the centre of the site. Activity was lowest around the southern detector (Location 3) during each survey. Connecting habitat around this area of site is poor compared to other areas, therefore this is to be expected.
- 1.0.5 A total of 88% of bats recorded on transects and 99% of those recorded on static detectors were common pipistrelles. The remaining 12% of bats recorded on transect were noctules, all recorded during transect 2. Other species picked up on static detectors make up less than 1% each.
- 1.0.6 Any loss of linear habitats across site will have a detrimental impact on bat populations utilising site. These habitats have been shown to be used for foraging and, mostly, commuting. Therefore, the loss of hedgerows and tree lines would lead to valuable habitat loss and increase fragmentation for bats within the local area. Depending on works due to be carried out, there is likely to be a slight impact on local populations of bats.
- 1.0.7 Cumulative impacts may occur in line with works already carried out within the IAMP ONE site, coupled with other proposed works due to take place in the surrounding

area as part of IAMP ONE, and IAMP TWO. Any additional deterioration of habitats within the IAMP areas will lessen opportunities on site for bat species.

2.0 INTRODUCTION

2.1 Background

2.1.1 Durham Wildlife Services (DWS) were commissioned by Ecology Solutions Ltd in May 2022 to undertake a range of ecological surveys on an area of land north of Nissan Car Manufacturing Plant, in Sunderland. The approximate National Grid Reference for the centre of the site is NZ335598. The area covered by the site is the Ecological and Landscape Mitigation Area (ELMA) of the International Advanced Manufacturing Park (IAMP) ONE site.

2.1.2 A number of surveys have already been completed across the IAMP ONE and TWO sites by several ecological companies including White Young and Green (WYG) in 2014 and 2015, ARUP in 2016-2017, Dendra in 2017/2018 and DWS in 2018 - 2020. These reports should be read in conjunction with this one. This report focuses on bats within the IAMP ONE ELMA.

2.2 Site Description

2.2.1 The site is a mixture of arable and pasture farmland, located to the north of the Nissan Car Manufacturing Plant, in Sunderland. The Usworth Burn and River Don flows along the northern site boundary. The site includes the now disused North Moor Farm. Hylton Bridge, which includes residential and farming buildings, is adjacent to the north-east site boundary. The A19 is approximately 840 metres east, with housing beyond this. The site is bordered by new industrial buildings erected as part of IAMP ONE, and areas around the south boundary are currently undergoing development works. (Figure 1, Appendix A).

2.3 Survey Objectives

2.3.1 Transects, and static detector surveys were carried out to establish the presence / absence of bat activity, including the usage of habitats across the site.

3.0 METHODOLOGY

3.1 Desk Study

3.1.1 A request was issued to Environmental Record Information Centre North East (ERIC NE) for any information regarding protected/controlled species on, or in the direct vicinity of the site.

3.2 Transect Surveys

3.2.1 A walked transect survey involves defining a pre-determined route based upon proposed development areas and expected higher risk areas for encountering bats, whereby bats can be observed directly in flight, heard using detection equipment and recorded. A walked transect was carried out seasonally, during suitable weather conditions in May, July and September 2022 by surveyors equipped with BatBox Duet bat detectors and Echo Meter Touch recording devices. It is recommended that dusk activity surveys are undertaken from sunset and should continue for 2 – 3 hours after sunset (BCT, 2016).

3.2.2 During the transect surveys the main objective was to cover all the main habitat features on the site and the proposed development areas. Static points were included in the transect for focusing survey effort, whereby ecologists paused for approximately three minute intervals. The routes taken were varied to account for the limitation caused by this method since a lot of activity can be missed depending on the time of evening, location and sunset/sunrise times. The transect routes and listening points are shown in Appendix A, Figure 2.

3.2.3 Table 1 Transect Survey dates and personnel

Transect Number	Date Times &	Weather Conditions	Surveyors
1	11/05/2022 Dusk Start: 21.04 End: 23.06	No wind, dry. Start 14.1°C End 9.3°C	Karen Devenney (Licence no. 2015-11466-CLS-CLS) Jodi Bell (Licence no. 2019-39978-CLS-CLS)
2	11/07/2022 Dusk Start: 21.40 End: 23.45	No wind, dry. Start 26°C End 21°C	Karen Devenney (Licence no. 2015-11466-CLS-CLS) Ian Craft (Licence no. 2015-15085-CLS-CLS)

3	21/09/2022 Dusk Start: 19.07 End: 21.06	Briefly gusty at with wind dropping quickly (3 – 1 Beaufort) Start 17°C End 15°C	Karen Devenney (Licence no. 2015-11466-CLS-CLS) Victoria Telford (licence no. 2022-10265-CL18-BAT)
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3.3 Static Detector Surveys

3.3.1 To supplement data collected during the transect surveys, three Song Meter Mini static detectors were deployed within the proposed development area in May, July, and September 2022. These locations were fixed throughout the period (Table 1 below, Figure 3, Appendix A). The detectors were left out for a minimum of 5 nights. The data from the detectors was then downloaded and analysed using Analoek Insight software. The locations of the detectors were determined by trying to represent the full range of habitats present across the site, as well as taking into account constraints such as risk of theft or trampling by livestock.

3.3.2 Table 2 Detailing Static Detector Locations

Location Number	Grid Reference	Location Description
1	NZ 32707 59225	Within hedgerow adjacent to River Don.
2	NZ 32769 58928	Within treeline along path, surrounded by pasture fields.
3	NZ 32990 58717	Within defunct hedgerow, adjacent to development site.

3.3.3 Table 3 Dates Detectors were in Situ

Survey	Date Deployed	Date Collected
1	11/05/2022	25/05/2022
2	11/07/2022	17/07/2022
3	21/09/2022	28/09/2022

3.3.4 Table 4 Weather Conditions during static detector surveys

Survey	Night of	Weather
1	11/05/2022	Dry, 10-11 MPH winds, lows of 5°C
	12/05/2022	Dry, 12 MPH winds, lows of 8°C
	13/05/2022	Dry, 8-11 MPH winds, lows of 14°C
	14/05/2022	Dry, 5-7 MPH winds, lows of 8°C
	15/05/2022	Rain, lows of 10°C
	16/05/2022	Some light rain, 3-4 MPH winds, lows of 9°C

	17/05/2022	Dry, 7-9 MPH winds, lows of 10°C
	18/05/2022	Rain, 7-14 MPH winds, lows of 7°C
	19/05/2022	Dry, 2-7 MPH winds, lows of 7°C
	20/05/2022	Dry, 6-8 MPH winds, lows of 9°C
	21/05/2022	Dry, 4-8 MPH winds, lows of 10°C
	22/05/2022	Dry, 6 MPH winds, lows of 10°C
	23/05/2022	Dry, 7-10 MPH winds, lows of 9°C
	24/05/2022	Dry, 6-15 MPH winds, lows of 8°C
	25/05/2022	Dry, 18-19 MPH winds, lows of 8°C
2	11/07/2022	Dry, 5 MPH winds, lows of 19°C
	12/07/2022	Dry, 10-13 MPH winds, lows of 12°C
	13/07/2022	Dry, 8-11 MPH winds, lows of 12°C
	14/07/2022	Dry, 7-8 MPH winds, lows of 13°C
	15/07/2022	Dry, 2-6 MPH winds, lows of 10°C
	16/07/2022	Dry, 2-3 MPH winds, lows of 13°C
	17/07/2022	Dry, 2-3 MPH winds, lows of 15°C
3	21/09/2022	Dry, 6-11 MPH winds, lows of 13°C
	22/09/2022	Light rain, 6-9 MPH winds, lows of 11°C
	23/09/2022	Dry, 4-8 MPH winds, lows of 12°C
	24/09/2022	Dry, 9-13 MPH winds, lows of 10°C
	25/09/2022	Light rain, 14-15 MPH winds, lows of 13°C
	26/09/2022	Dry, 18 MPH winds, lows of 9°C
	27/09/2022	Dry, 15 MPH winds, lows of 9°C
	28/06/2022	Dry, 12 MPH winds, lows of 11°C

3.4 Surveyor Experience

3.4.1 Karen Devenney MSc MCIEEM (Bat Licence 2015-11466-CLS-CLS)

Karen is a Principal Ecologist at DWS with around twenty years experience of working in an ecological field, in addition to a degree in Zoology and Masters in Wildlife Conservation and Management both from Newcastle University. She has extensive experience in surveying for a wide variety of protected and notable species, including water vole, otter, Barn Owls, brown hare and badger. She has carried out a large number of PEA's/extended Phase 1 habitat surveys and botanical surveys within her current role at DWS and one of her roles within DWT involved carrying out BAP habitat mapping and condition assessments on Local Wildlife Sites. Since 2006 she has been a member of Durham Bat Group, through which she gained her bat licence in 2008. She has also held numerous development EPSM bat licences, including the licences for Usworth Cottages, Elliscope Farm and West Moor Farm. She also holds a class mitigation licence for bats as well as being part of the Earned Recognition pilot for bats. Karen currently holds a great crested newt survey licence, and bat survey licence (Level 2). Karen achieved a BatAbility Certificate of Bat Acoustics Analysis: Technician Level Grade B after attending this online course in acoustic analysis.

3.4.2 Jodi Bell (Bat Licence no. 2019-39978-CLS-CLS)

Jodi is an Ecologist at DWS, having been working in the ecological sector since 2009 in various roles including as a freelance bat surveyor and seasonal employee at various consultancies in the north-east of England. Jodi holds a BSc in Environmental Science and a MSc in Environmental Consultancy, both gained from Newcastle University. Jodi has experience in carrying out bat transect and vantage point surveys at both dawn and dusk, bat sound call analysis and bat risk assessments. She holds Natural England a great crested newt survey licence and a Class 2 Bat licence. Current projects include preliminary ecological assessments and protected/notable species surveys for bats, great crested newts, barn owl, otter, badger, red squirrel, water vole and reptiles. She currently volunteers in her spare time as a bat carer for both Northumberland and Durham bat groups of which she is a current and active member and has also been involved in volunteering with Northumberland Wildlife Trust.

3.4.3 Ian Craft (Licence no. 2015-15085-CLS-CLS)

Ian has held a bat licence for around 12 years and has been carrying out commercial bat surveys for around 15 years. During this time he has carried out on average around 20-30 risk assessments each year and 50-100 nocturnal surveys for projects ranging from wind farms to large scale housing developments and individual barn conversions. He holds a low impact licence for bats and has held a large number of EPSM bat licences for a range of developments.

3.4.4 Victoria Telford (Licence no. 2022-10265-CL18-BAT)

Victoria has gained extensive knowledge and experience of bats and their behaviour over the past seven years, including use of bat detectors, static detection equipment, analysis and interpretation of data as well as searching for evidence of presence of bats within built structures and trees. Victoria also has experience of bat mitigation programmes and assists in producing mitigation method statements for licensable works.

4.0 SURVEY RESULTS

4.1 Desk Study and Consultation Response

4.1.1 *Bats*

ERIC NE provided 25 bat records within 2km of the site. A large number of these are from Washington Wildfowl and Wetland Centre, which lies 2km away, and Elliscope Farm, which is around 400m north. Records include previously recorded bats roosts resulting from DWS' previously surveys of the IAMP 2 area. 80+ of the returned records are for common pipistrelle *Pipistrellus pipistrellus* bats, with soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, and brown long-eared *Plecotus auritus* bat also recorded. Bats have been noted foraging and commuting with 2km of site with foraging records noted to be around wetland habitats and Elliscope Farm. Roost records are almost all from DWS and are from IAMP TWO surveys; roosts have been recorded within Usworth Cottages, and Elliscope Farm (both now demolished). A brown long-eared bat has been recorded roosting within a farm at Wardley.

4.2 Habitat Description

4.2.1 The wider IAMP site is a mixture of arable and pasture, as well as pockets of woodland and mature trees, particularly along the River Don and Usworth Burn that flow through the site. Overall, some good foraging habitat is present, with connectivity via the River Don corridor. Cottages and farm holdings are scattered across the site.

4.2.2 Outside of the site boundary lies additional farmland to the north, and west, with housing beyond this. The Nissan Car Manufacturing UK is situated to the south. To the east is the A19 dual carriageway, with farmland and housing beyond this. The river corridor provides some foraging habitat, but this quickly becomes very urban. Limited woodland lies beyond the IAMP TWO area, with small pockets of woodland within Nissan (400 metres away), along with some large ponds and Barmston Lake lies south-west of Nissan. The River Wear lies just over 2km to the south, which is tree lined. (Figure 1, Appendix A).

4.3 Transect Surveys

4.3.1 The dates, start and end times, and weather conditions are all provided in Tables 1 & 4 above. Low to moderate activity was recorded on site. Species were mostly common pipistrelle with some noctule recorded. Although bats noted across the site, activity was mostly concentrated along tree lines, particularly to the western extent of site.

4.3.2 Survey 1 (Figure 4a, Appendix A)

11/05/2022 – Dusk

Low levels of activity with only 4 common pipistrelles heard. Most bats were noted within the western extent of site, along tree lines, and close to the River Don. One bat was recorded close to North Moor Farm.

4.3.3 Survey 2 (Figure 4b, Appendix A)

11/07/2022 – Dusk (reverse)

Higher level of activity than previous survey with 20 bats recorded. Species were common pipistrelle and noctule. Most activity was attributed to commuting but some feeding was recorded between stops 7 and 6, along the south-eastern part of site, in arable land. Bats were recorded across the site, mostly associated with linear features such as hedgerows and lines of trees.

4.3.4 Survey 3 (Figure 4c, Appendix A)

21/09/2022 – Dusk (reverse)

Sixteen bats recorded in total, all of which were common pipistrelle. Almost all activity attributed to commuting activity; two foraging bats recorded, between points 10 & 11 (western extent of site). Bats were mostly recorded along the tree line bordering the entrance road to North Moor Farm, and to the western extent of site, along the treeline.

4.3.5 Table 5 Showing Numbers of Each Species Each Month across all Transects

Number of Passes	Month			Total
Species	May	July	September	
Common Pipistrelle	4	15	16	35
Noctule	0	5	0	5
Total	4	20	16	40

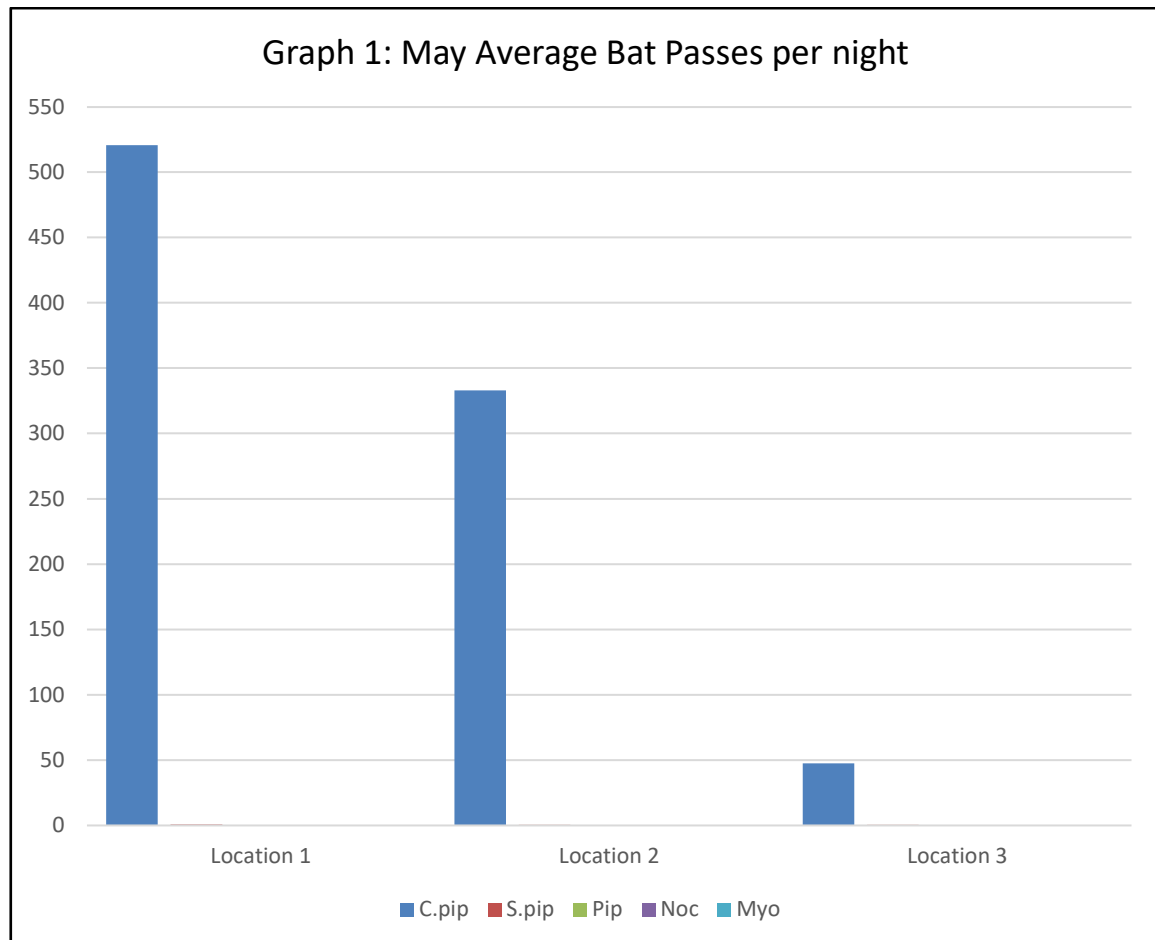
4.3.6 Table 5 above provides details on overall numbers of each species recorded on the transect surveys. 35 of 40 bats recorded were common pipistrelles (88%). The remaining 12% were noctules. Lower activity was recorded in May, with similar levels across July and September. Weather in May was colder, which may account for this difference.

4.4 Static Detector Surveys

4.4.1 Three Song Meter Mini detectors were deployed on three separate occasions within the proposed development area to supplement data collected during the transect surveys. Dates can be found in Table 2 with weather conditions in Table 4 (see section 3.3 of this report). The subsequent data has been analysed using Analook Insight software by Karen Devenney and illustrated using excel spreadsheet pivot tables and graphs.

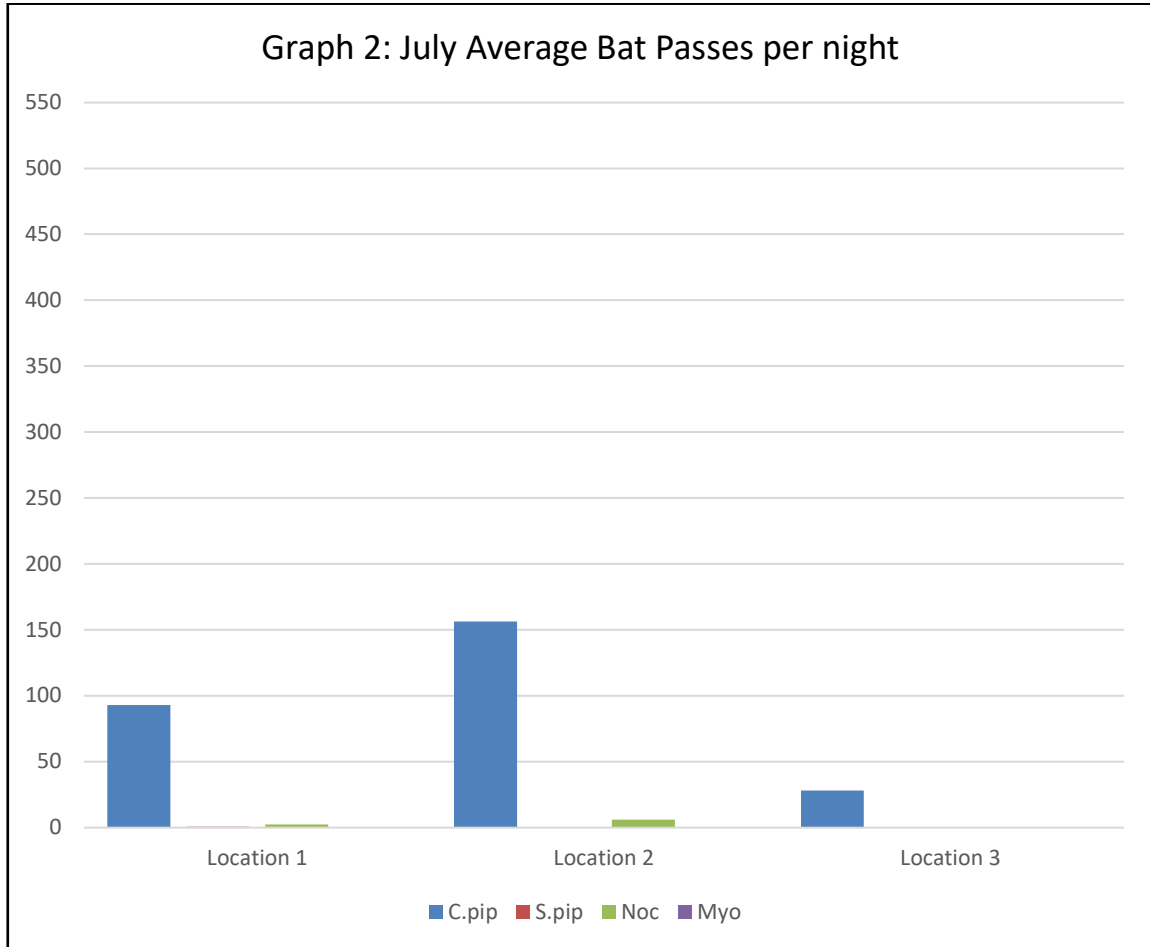
4.4.2 Table 6 May Average Bat Passes Per Night

Species	Location		
	1	2	3
Common Pipistrelle	520.8	333	47.4
Soprano Pipistrelle	0.5	0.4	0.4
Pipistrelle sp.	0.0	0.2	0.0
Noctule	0.1	0.0	0.0
<i>Myotis</i> sp.	0.1	0.0	0.1



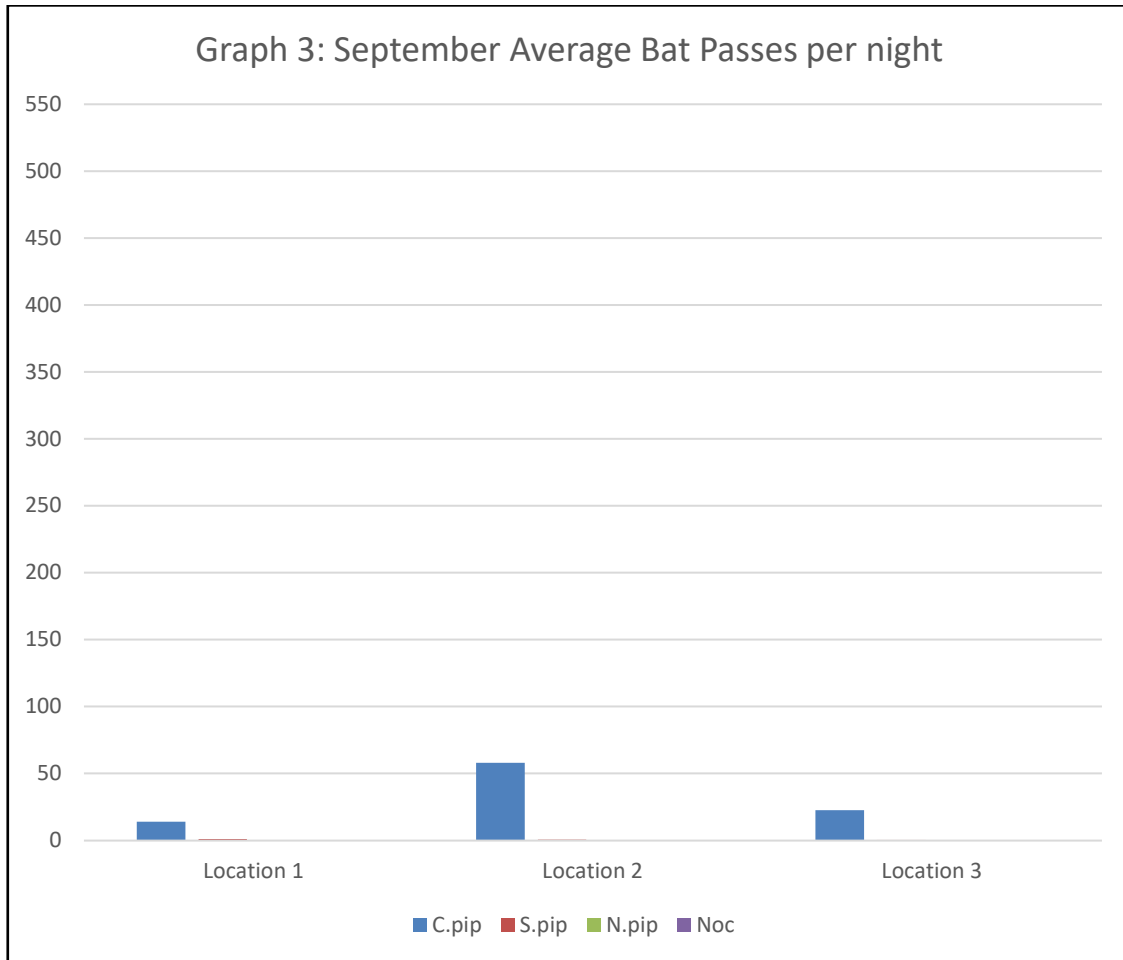
4.4.3 Table 7 July Bat Passes Per Night

Species	Location		
	1	2	3
Common Pipistrelle	92.9	156.3	28
Soprano Pipistrelle	0.7	0	0.4
Noctule	2.4	5.9	0.0
<i>Myotis</i> sp.	0	0	0.1



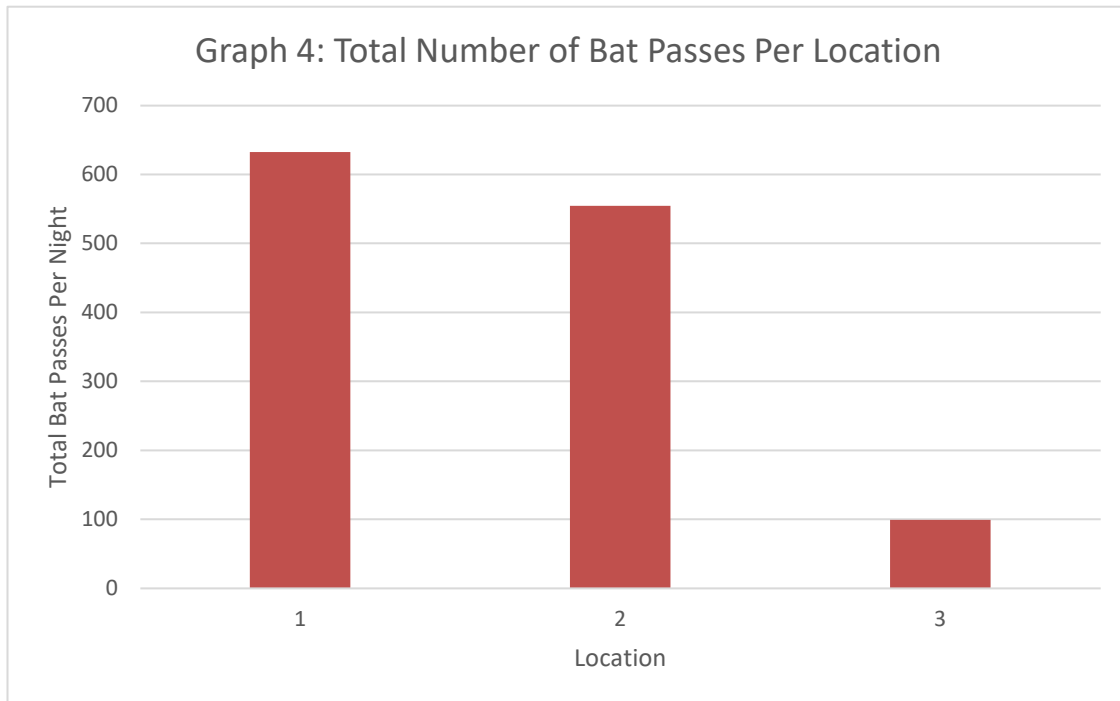
4.4.4 Table 8 September Bat Passes Per Night

Species	Location		
	1	2	3
Common Pipistrelle	14	57.9	22.6
Soprano Pipistrelle	1	0.6	0.3
Nathusius' Pipistrelle	0	0.1	.0
Noctule	0	0.1	0



4.4.5 Table 9 Total Bat Passes Per Location Per Species

Species	Location			Total
	1	2	3	
Common Pipistrelle	627.7	547.2	98	1272.9
Soprano Pipistrelle	2.2	1	1.1	4.3
Pipistrelle sp.	0	0.2	0	0.2
Noctule	2.5	6	0	8.5
<i>Myotis</i> sp.	0.1	0	0.2	0.3
Nathusius' Pipistrelle	0	0.1	0	0.1
Total	632.5	554.5	99.3	1286.3



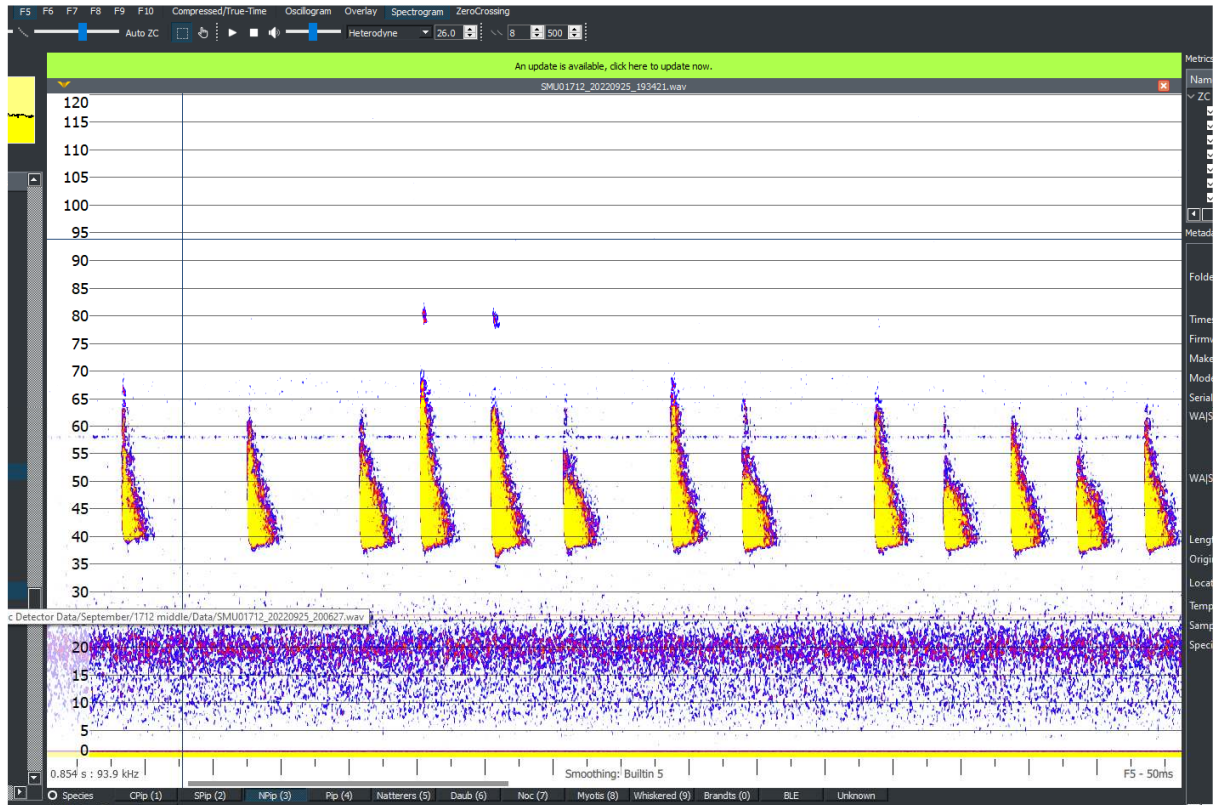
4.4.6 Tables and graphs above show a peak of activity in May 2022, with most activity recorded around the most northern detector, adjacent to the River Don. During July and September, less recordings were picked up in total and the busiest area for bat passes was at Location 2 – along the tree line within the middle of site. Each survey shows that least activity was recorded towards the south of site (Table 8 and Graph 4).

4.4.7 Almost all activity can be attributed to common pipistrelles, with 1272.9 out of 1286.3 bat passes (99%). Other species recorded were soprano pipistrelle, a

possible Nathusius' pipistrelle *Pipistrellus nathusii*, noctule, and *Myotis* species *Myotis sp.* These all account for less than 1% of the remaining records.

4.4.8 The possible Nathusius' pipistrelle was a single file where the peak frequency of the call was consistently below 40kHz (see below). All *Myotis* recordings were not clear enough to identify to species level.

4.4.9 Photograph 1 Possible Nathusius' Pipistrelle call.



4.4.10 Activity levels largely tie in with linear habitat on site, with most activity recorded within the hedgerow adjacent to the River Don in May, and along the line of trees/overgrown hedgerow within the middle of site, in July and September. The fact that least activity was recorded in Location 3 (Table 8 and Graph 4) is not unexpected as the detector is within a defunct, gappy hedgerow, and adjacent to a development site.

5.0 IMPACT ASSESSMENT

5.1 Constraints to Survey

5.1.1 Between the July and September surveys, construction on site had begun to move the pylons on site. This resulted in small areas being fenced off as compounds/working areas and these areas slightly impacted the transect route. These adjustments were very minor and no listening spots were impacted. There was no additional lighting impacts except at the farm itself.

5.2 Legislation

5.2.1 *Bats*

All bat species and their roosts in Britain are protected under the Wildlife and Countryside Act 1981 (as amended) (WCA) through their inclusion on Schedule 5. The implementation of the Countryside and Rights of Way Act 2000 (CRoW 2000) has amended the WCA 1981 to include 'reckless' damage to, or destruction of a roost, and disturbance of bats whilst in a roost.

5.2.2 Bats are also included on Annex IV of Council Directive 92/43/EEC of 21st May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (known as the Habitats Directive). As a result of the United Kingdom ratifying this directive, all British bats are protected under The Conservation of Habitats and Species Regulations 2017 (as amended). Combined, these make it an offence to kill, injure, capture or disturb bats or obstruct access to, damage or destroy roosts.

5.2.3 Paragraph 43 of the Regulations states: A person who deliberately disturbs wild animals of any such (European Protected) species, is guilty of an offence. For the purposes of this paragraph, the disturbance of animals includes in particular any disturbance which is likely: -

- a. to impair their ability-
 - i. To survive, to breed or reproduce, or to rear or nurture their young, or
 - ii. 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.

5.2.4 Under the law, a bat roost is any structure or place used for shelter or protection e.g. a building, bridge or tree. Bats use many roost sites and feeding areas throughout the year, and they tend to re-use the same roosts for generations.

5.3 National Planning Policy Framework

5.3.1 The NPPF outlines government planning policies and how they should be applied within local authorities. The framework places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. The NPPF states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

5.4 UK and Local Biodiversity Action Plans (BAP)

5.4.1 Noctule, soprano pipistrelle and brown long-eared bats are listed as UK priority species (UKBAP, 2007). Actions for conservation effort have been identified for each of these species, which include consideration of the effects of land use, the promotion of habitat creation, enhancement and improvement and the protection of roosts via the implementation of legislation and policy. South Tyneside and Sunderland have a generic local BAP that aims to cover all species of bats recorded within this area as species of conservation concern (DBAP, 2006).

5.5 Natural Environment and Rural Communities (NERC) Act

5.5.1 The Natural Environment and Rural Communities (NERC) Act (2006) identifies a list of habitats and species which are of principal importance for the conservation of biodiversity in England. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decisionmakers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions. The UKBAP species list was used to create the S41 list of priority species. Several species of bat relevant to this area are listed as Species of Principal Importance under Section 41 of the NERC Act (2006) including soprano pipistrelle, and brown long-eared.

5.6 Likely Impact

5.6.1 The likely impact of the proposed works is evaluated against criteria in Table 10 below which is based on NATA (New approach to appraisal). The evaluation is based on no mitigation works being implemented.

5.6.2 **Table 10 Impact Assessment**

Impact Magnitude	Nature Conservation Importance				
	Negligible	Local	County	National	European
Beneficial Effect	Non-Significant	Non-Significant	Non-Significant	Non-Significant	Non-Significant
Nil Effect	Non-Significant	Non-Significant	Non-Significant	Non-Significant	Non-Significant
Minor (short term or reversible effects)	Non-Significant	Non-Significant	Slight	Moderate	Moderate
Moderate (deterioration of feature)	Non-Significant	Slight	Moderate	Severe	Severe
High (loss of feature)	Non-Significant	Slight	Moderate	Severe	Severe

5.6.3 Nature conservation importance is based on:

European

- Habitats which are listed in Annexe 1 of the Habitats Directive or are included as candidate or proposed Special Areas of Conservation
- Species which are listed under Schedule 2 of the Habitats Directive and form a population which would qualify the site for consideration as a Special Protection Area (SPA) or SAC.

National

- Habitats which meet the criteria for designation of or occur within a Site of Special Scientific Interest (SSSI)
- Species which are protected under national wildlife legislation such as the Wildlife and Countryside Act or are listed in a national Red Data Book or that are part of a population or assemblage that would meet the criteria for the site being designated as a SSSI.

County

- Habitats that are rare or uncommon in the County that would meet the criteria or are included in a second tier nature conservation site (SINC/LWS) or which for part of a local Biodiversity Action Plan (BAP) or Habitat Action Plan (HAP).

- Species that are rare or uncommon within the County or form part of a population or assemblage that would meet the criteria for inclusion in a SINC.

Local

- Habitats that are uncommon or threatened in the local area.
- Species that are uncommon or threatened in the local area.

Negligible

- Habitats or species that do not fall into any of the categories listed above.

5.7 Bats – Foraging and Commuting Habitat

5.7.1 Transect data shows a level of bat activity across the site, varying across the bat activity season, with a peak in July, which was a very warm night during a heatwave. Activity was mostly recorded along lines of trees and hedgerows, particularly along the western edge of site.

5.7.2 Static detectors show highest levels of activity were recorded at Location 1, along the River Don. Location two, along a line of trees/overgrown hedgerow, fell just short of this, and recorded the highest levels of activity in July and September. Activity was lowest around the southern detector (Location 3) during each survey. Connecting habitat around this area of site is poor compared to other areas, therefore this is to be expected.

5.7.3 A total of 88% of bats recorded on transects and 99% of those recorded on static detectors were common pipistrelles. The remaining 12% of bats recorded on transect were noctules, all recorded during transect 2. Other species picked up on static detectors make up less than 1% each.

5.7.4 Long-term impacts: habitat loss, fragmentation, and isolation

Any loss of linear habitats across site will have a detrimental impact on bat populations utilising site. As habitats have been shown to be used for foraging and, mostly, commuting, loss of hedgerows and trees lines would lead to valuable habitat loss and increase fragmentation for bats within the local area. Depending on works due to be carried out, impacts are expected to range from moderate to high (deterioration or loss of feature), impacting a local population of bats and therefore having a slight impact.

5.7.5 Cumulative Impacts

Cumulative impacts may occur in line with works already carried out within the IAMP ONE site, and other works due to take place in the surrounding area, as part of IAMP ONE, and IAMP TWO. Any additional deterioration of habitats within the IAMP areas will lessen opportunities on site for bat species.

6.0 AVOIDANCE, COMPENSATION AND MITIGATION MEASURES

6.0.1 The following section outlines the measures required to avoid, minimise or compensate for the impacts detailed in section 5 above by applying the mitigation hierarchy in accordance with the NPPF paragraph 118 which states:

6.0.2 'If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort compensated for, then planning permission should be refused.'

6.0.3 Table 11 below shows the recommended avoidance, mitigation and compensation that should minimise the impacts on the ecological receptors described above.

6.0.4 **Table 11** Avoidance, compensation and mitigation measures

Ecological Receptor	Likely impacts during construction and post construction	Avoidance, Mitigation and Compensation Measures
Bat Foraging Habitat	<p>Static detectors and transects have highlighted key areas for foraging and commuting bats (Figure 5, Appendix A).</p> <p>Namely hedgerows and lines of trees across the site.</p>	<p>Proposals should keep damage/loss to a minimum. Particularly retaining to lines of trees and hedgerows. Lighting schemes should avoid lighting areas used by foraging and commuting bats both during construction and operational phases.</p> <p>Good quality foraging habitat should be created, including woodland/scrub planting, wetland creation, and hedgerow creation and enhancements.</p>

7.0 RECOMMENDATIONS

7.1 Survey Conclusions

7.1.1. Bat survey data indicates use of the entire ELMA site by a relatively small number of bats, mostly relating to common pipistrelles. However, a total of 5 species have been identified using site. Most activity during transects was in relation to commuting bats but foraging behaviours have also been recorded. Both transect and static detector data shows bats make use of linear habitat features on site including lines of trees and hedgerows. Hedgerows within the western section of site, and close to the River Don seem to be particularly favourable. Static detectors also showed a high level of use of the line of trees at Location 2, within the middle of the site.

7.1.2. Loss or deterioration of linear features on site will likely lead to a slight impact on the local bat populations which could be worsened by the cumulative impacts of other works due to take place as part of the overall IAMP development.

7.2 Mitigation and Enhancement Measures - Bats

7.2.1 Mitigation for any loss or deterioration of habitat should be provided. However, in the first instance avoidance of loss of habitat should be prioritised. Hedgerows and lines of trees should be retained where possible. Should any linear habitats suffer deterioration or loss as part of works, these must be replaced with habitat of higher quality to ensure the retention of commuting features across site.

8.0 REFERENCES

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APPENDIX A

Figures



Legend

 Site Boundary

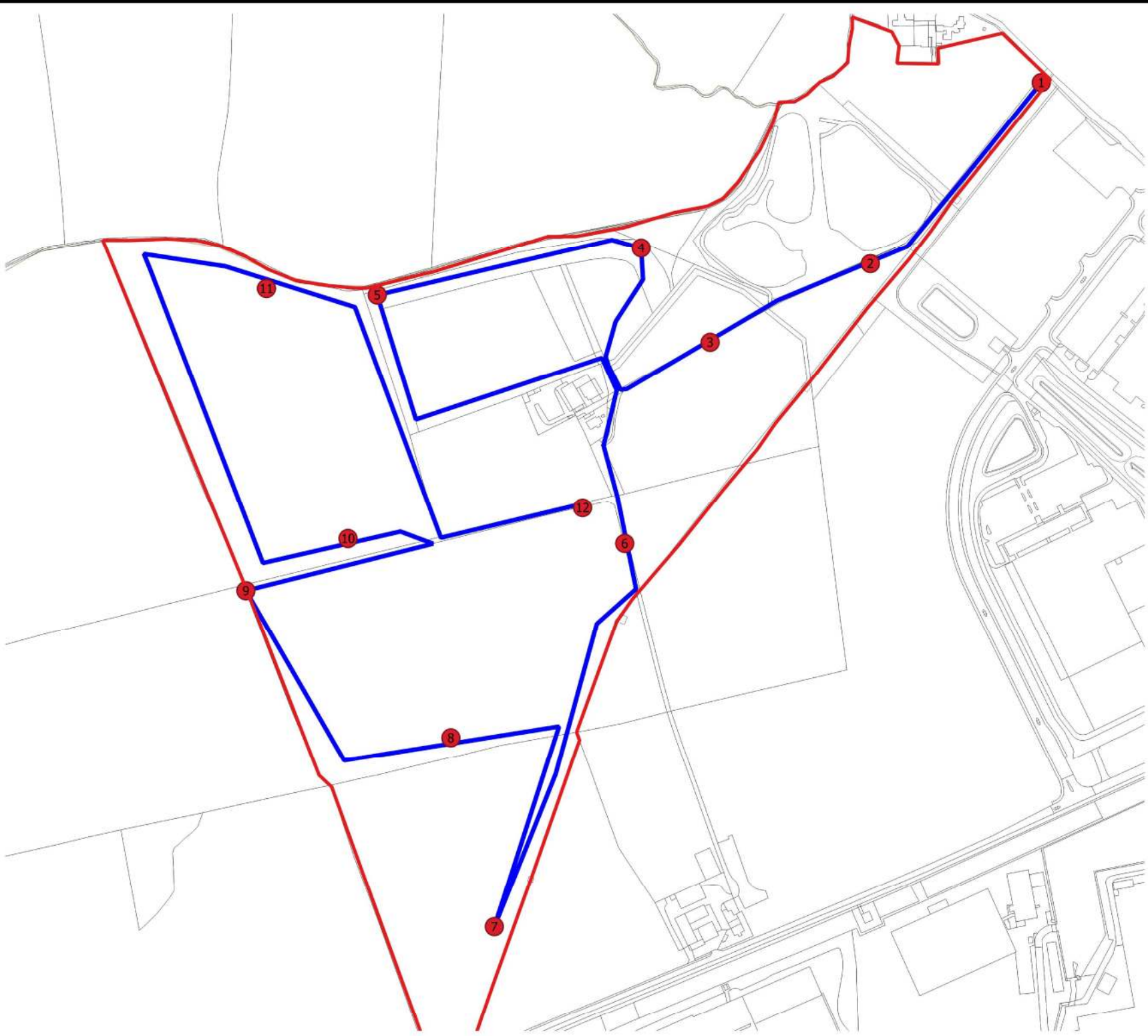
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Project	IAMP ONE
Title	Aerial Habitat View
Client	Ecology Solutions Ltd
Date	25/10/2022
Ref	Figure 1



Legend

- ▭ Site Boundary
- ▬ Transect Route
- Listening Stops

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Project	IAMP ONE
Title	Transect Route
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 2

Legend

- Site Boundary
- Static Detector Locations

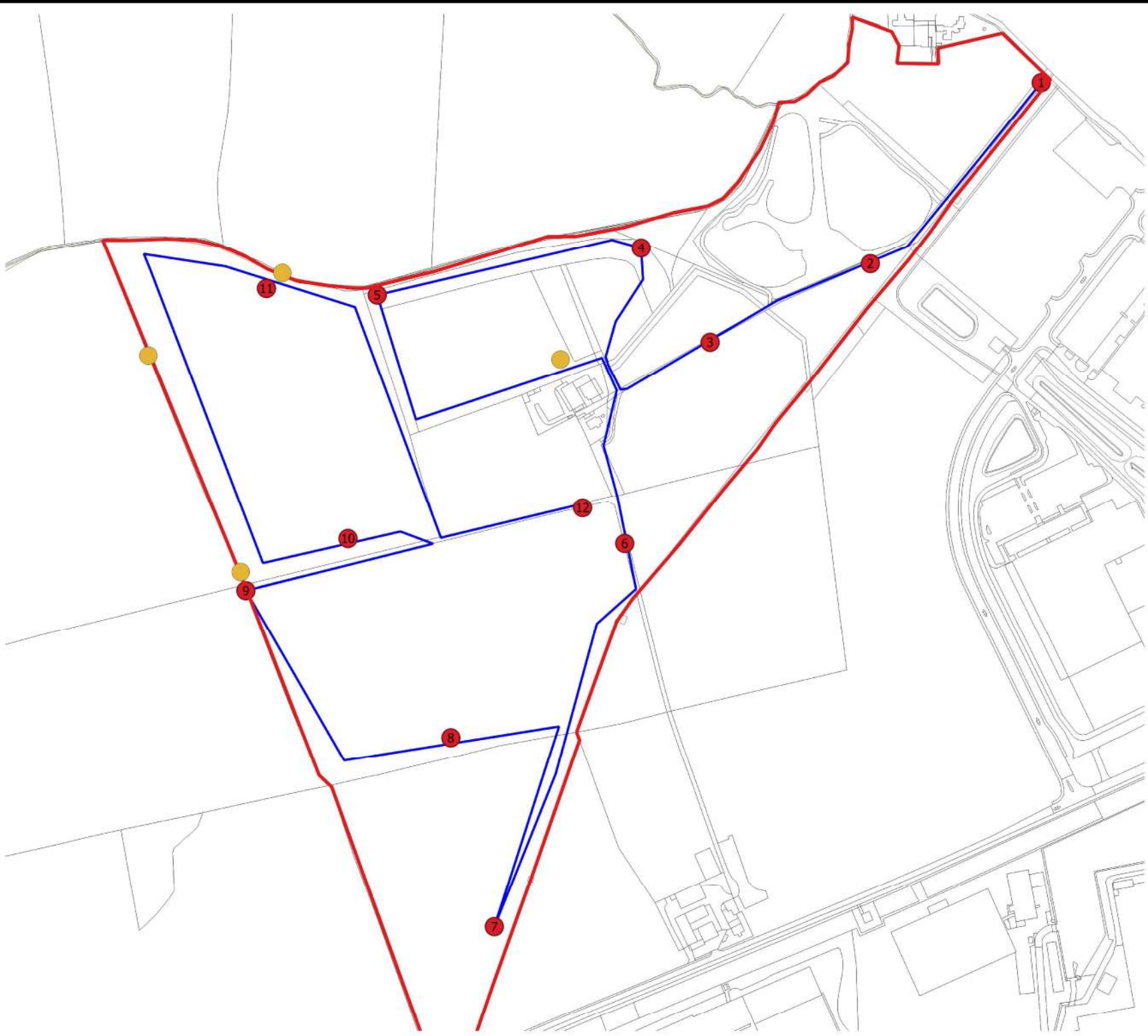
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Project	IAMP ONE
Title	Static Bat Detector Locations
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 3



Legend

- ▭ Site Boundary
- Transect Route
- Listening Stops
- Common Pipistrelle Not Seen

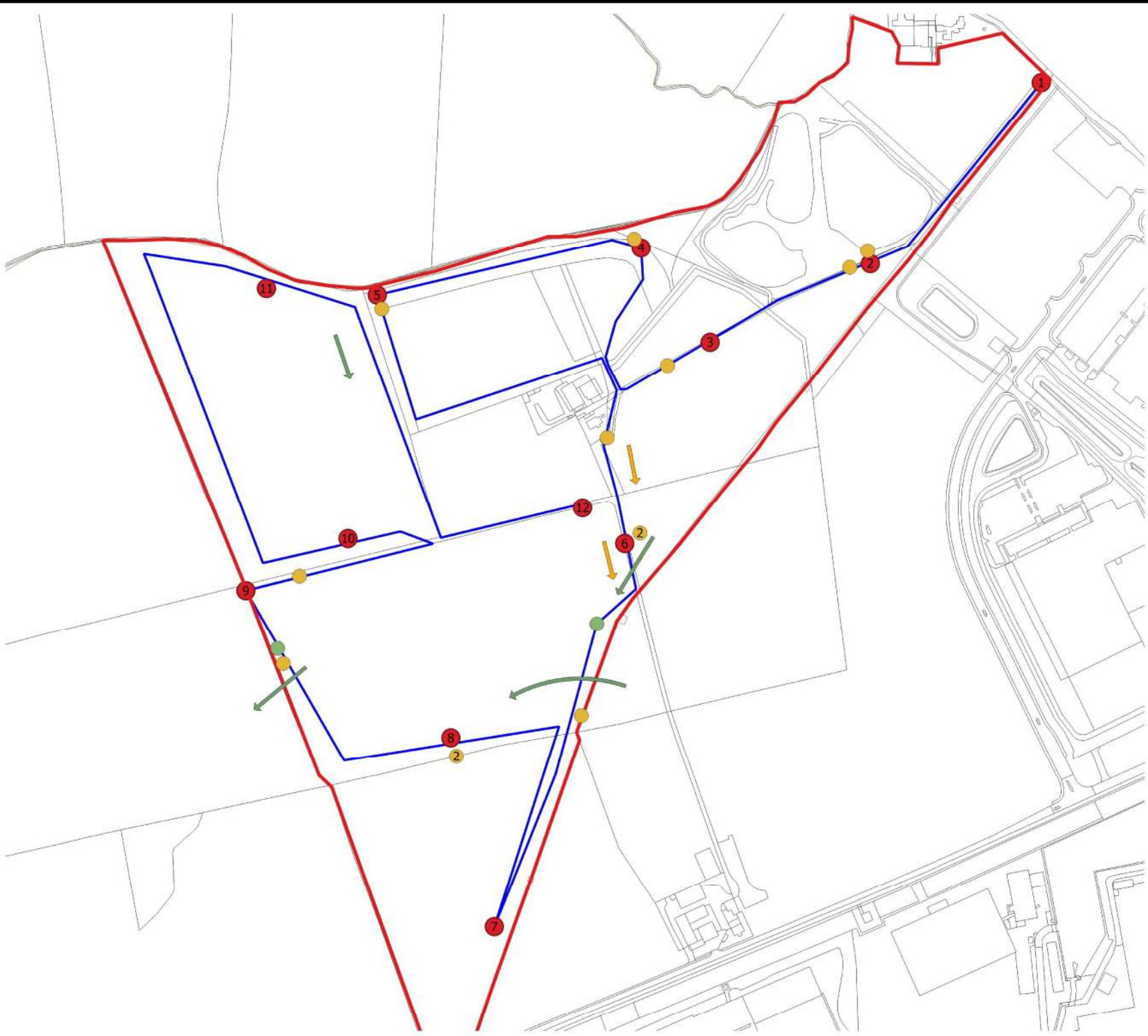
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Project	IAMP ONE
Title	Dusk Transect 11/05/2022
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 4a



Legend

- ▭ Site Boundary
- Transect Route
- Listening Stops
- Common Pipistrelle Not Seen
- Noctule Not Seen
- Noctule
- Common Pipistrelle

More than one pass is the number recorded within the circle.

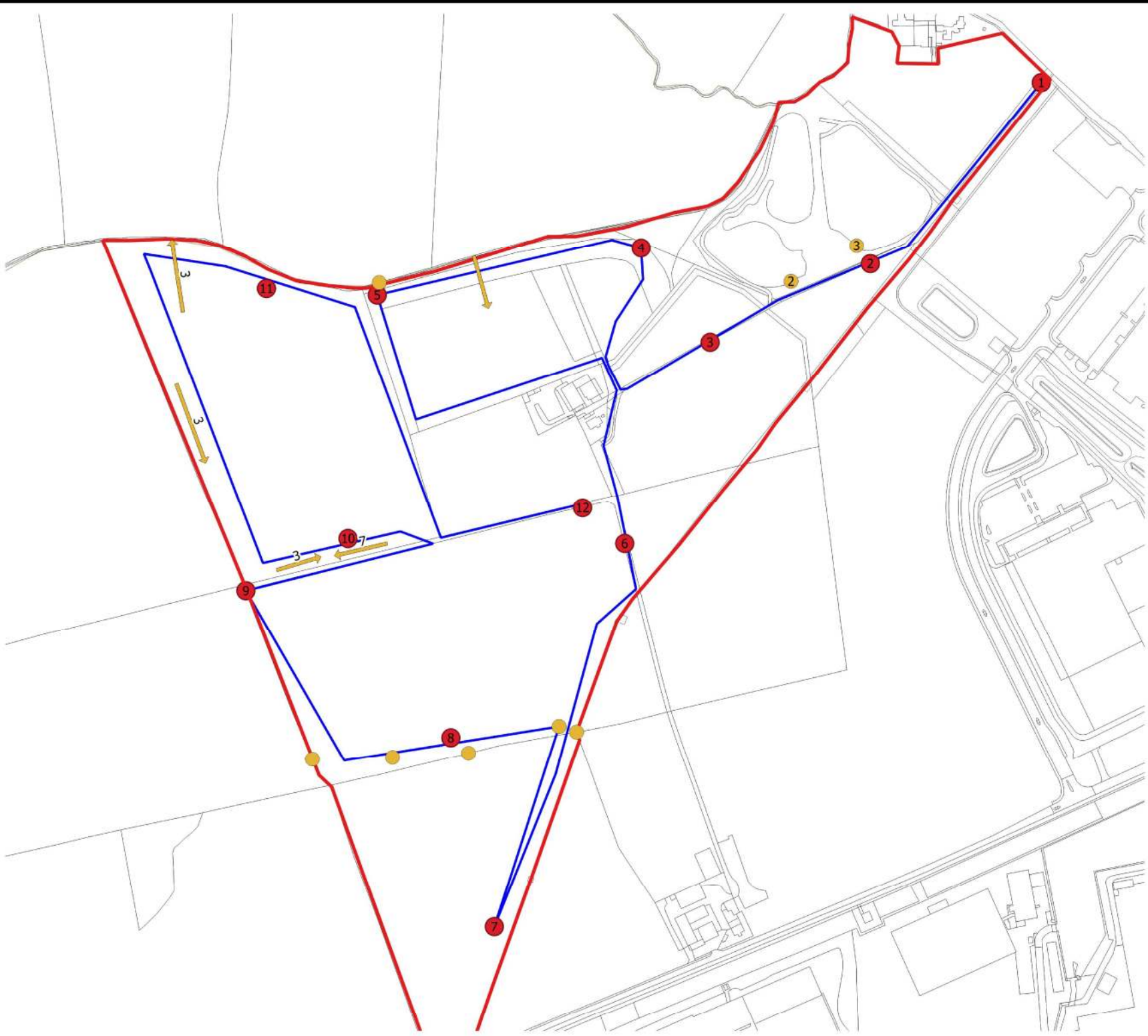
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Project	IAMP ONE
Title	Reverse Dusk Transect 11/07/2022
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 4b



Legend

- ▭ Site Boundary
- Transect Route
- Listening Stops
- Common Pipistrelle Not Seen
- Common Pipistrelle

More than one pass is the number recorded within the circle/adjacent to the arrow.

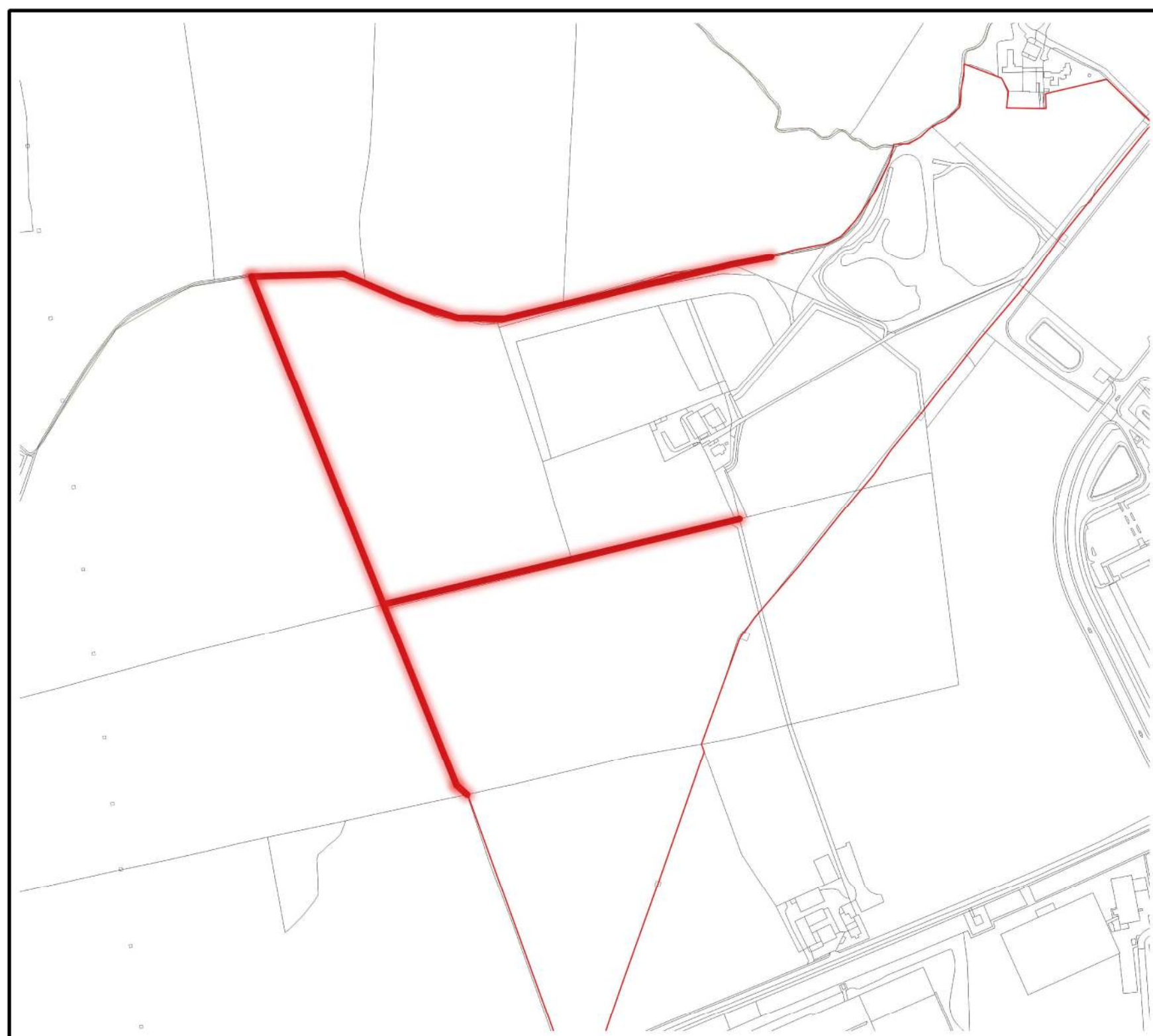
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Project	IAMP ONE
Title	Reverse Dusk Transect 21/09/2022
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 4c



Legend

- Site Boundary
- Key Foraging & Commuting Features

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Project	IAMP ONE
Title	Key Foraging and Commuting Areas
Client	Ecology Solutions Ltd.
Date	25/10/2022
Ref	Figure 5

APPENDIX B
Report Conditions

Durham Wildlife Services Ltd

REPORT CONDITIONS IAMP ONE ELMA

This report is produced solely for the benefit of Ecology Solutions Ltd. and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

Unless otherwise instructed any records collected will be submitted to the body holding environmental records for the area.

This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Durham Wildlife Services Ltd. In time improved practices, fresh information or amended legislation may necessitate a re-assessment. Opinions and information provided in this report are on the basis of Durham Wildlife Services Ltd using due skill and care in the preparation of the report.

This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

This report is limited to those aspects reported on, within the scope and limits agreed with the client under our appointment. It is necessarily restricted and no liability is accepted for any other aspect. It is based on the information sources indicated in the report. Some of the opinions are based on unconfirmed data and information and are presented as the best obtained within the scope for this report.

Reliance has been placed on the documents and information supplied to Durham Wildlife Services Ltd by others but no independent verification of these has been made and no warranty is given on them. No liability is accepted or warranty given in relation to the performance, reliability, standing etc of any products, services, organisations or companies referred to in this report.

Whilst skill and care have been used, no investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather related conditions.

Although care is taken to select monitoring and survey periods that are typical of the environmental conditions being measured, within the overall reporting programme constraints, measured conditions may not be fully representative of the actual conditions. Any predictive or modelling work, undertaken as part of the commission will be subject to limitations including the representativeness of data used by the model and the assumptions inherent within the approach used. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions.

The potential influence of our assessment and report on other aspects of any development or future planning requires evaluation by other involved parties.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. Durham Wildlife Services Ltd accept no liability for issues with performance arising from such factors.

February 2008