



Harworth Group

Land at Hay Green Lane, Birdwell, Barnsley

ECOLOGICAL APPRAISAL

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1.0 NON-TECHNICAL SUMMARY

- 1.1 Development comprising up to 118 new residential dwellings is proposed at land off Hay Green Lane, Birdwell. A desk study to search for records of designated sites and protected species recorded locally was completed and an extended Phase 1 Habitat and preliminary protected species survey was carried out on 26th June 2019 to inform a planning application for the proposals.
- 1.2 The site is dominated by semi-improved grassland with hedgerows both bordering a number of the site boundaries and dividing the field compartments. Areas of dense scrub and allotments are in the west of site. A public footpath borders the east of site. Two non-statutory designated sites were recorded within 1km of the site: Short Wood and Rockley Woods. Amongst the records of protected and notable species in proximity to the site are, great crested newt, three bat species and hedgehog. The proposed development is not expected to negatively impact on any statutory and non-statutory designated sites within the local area due to its small scale.
- 1.3 Bat surveys undertaken in summer and autumn 2019 and spring 2020, show at least five species of bat using the site, predominantly foraging along the hedgerows. A single tree with high bat roost potential was noted on site. An initial emergence survey was conducted in May 2020, during which no roosting bats were recorded. Current proposals seek to retain and buffer this tree, however should impacts change (ie through increased lighting, or pruning/felling works). then further surveys of this tree will be required. A single building was identified to provide low bat roost potential. A nocturnal emergence survey was conducted in May 2020 during which no roosting bats were recorded. As such bats do not represent a material constraint to the demolition of this building.
- 1.4 The grassland fields, trees and buildings provided suitable nesting and foraging habitats for birds and as a result any vegetation clearance should be completed outside of the bird breeding season (March – August inclusive).
- 1.5 The site is dominated by poor semi-improved grassland, which is of negligible value to great crested newts (GCN). Some suitable habitat for this species is present along the boundary features and hedgerows but these are limited in extent. There are no on-site ponds though there are five off site ponds within 500m. Two records of great crested newts were found within 1km of the site. Due to the proximity and connectivity of some of the ponds to the site, GCN surveys were undertaken in 2020. No GCN were recorded during these surveys.
- 1.6 The site provides largely sub-optimal habitat for reptiles with large areas of poor semi-improved grassland which are unsuitable for reptile species. Habitats such as compost heaps and muck heaps may provide some suitable habitat for reptiles and therefore removal of these areas should be performed under a watching brief to prevent disturbance.
- 1.7 A hedgehog was noted during a bat survey, a species listed on Section 41 of the NERC Act. The provision of hedgehog houses and inclusion of gaps beneath garden fences will provide additional habitat and connectivity for this species throughout the area.

Table 1: Recommended Future Surveys

Species	Survey Required
Bats	Tree T2– additional nocturnal surveys if impacted.
Birds	Nesting bird checks prior to vegetation or building clearance
Badger	Pre-commencement badger survey

2.0 INTRODUCTION

- 2.1 The following report has been prepared by FPCR Environment & Design Ltd. on behalf of the Harworth Group and provides an Ecological Appraisal of a site off Hay Green Lane, Birdwell, Barnsley. The initial survey was undertaken on 26th June 2019 and comprised an extended Phase 1 Habitat Survey including initial observations of any suitable habitats for, or evidence of, protected species. In addition, the results of three bat activity surveys, and two bat emergence surveys, carried out in 2019 and 2020 are provided within the report. The results of the GCN surveys undertaken in 2020 are summarised, with full details in the associated GCN Survey Report for the site, which should be read in conjunction with this report.

Site Location and Context

- 2.2 The site is located south of Hay Green Lane at the southern edge of Birdwell village and comprises grazed and mown field compartments, an area of dense scrub and allotments and is approximately 3.6 hectares in size. It is surrounded by agricultural land to the south, residential estates to the north and woodland to the west and east. The site is bordered by native species hedgerows and Hay Green Lane and associated properties make up the northern boundary.

Site Proposals

- 2.3 The proposals include the construction of up to 118 houses. Along with the dwellings, associated green infrastructure, retained hedgerows, attenuation features and public footways are proposed. Hedgerows along the site boundary are to be retained although small sections will require removal to facilitate site and pedestrian access. Vehicular and emergency access to the site will be provided off Hay Green Lane at two locations.

3.0 METHODOLOGY

Desk Study

- 3.1 In order to compile existing baseline information, relevant ecological information was requested from the following consultees-
- Barnsley Biological Records Centre (BBRC) - hosted by Sheffield City Council and accessed via Sheffield Biological Records Centre (SBRC),
 - South Yorkshire Bat Group,
 - South Yorkshire Badger Group.
- 3.2 In addition, the following resources were checked for additional information and context:
- Multi Agency Geographic Information for the Countryside (MAGIC) website¹;
 - Colour 1:25,000 OS base maps²;
 - Aerial photographs from Google Earth³.
- 3.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 10km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
 - 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs) and species records (e.g. protected, Local Biodiversity Action Plan (LBAP) or notable species).
 - 1km around the application site for sites of County Importance (e.g. Biological Heritage Sites (BHS)).

Habitats/Flora

- 3.4 Survey methods followed the extended Phase 1 Survey technique as recommended by Natural England⁴. This involved a systematic walk over of the site to classify the broad habitat types and identify any 'Habitats of Principal Importance' for the conservation of biodiversity as listed within Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006. Surveys were undertaken by Helen Feetham (FISC level 4), and James Hutchison (FISC level 3.)
- 3.5 Where it was considered appropriate, hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS)⁵. This method of assessment includes noting down canopy species composition, associated ground flora and climbers, structure of the hedgerow including height, width and gaps, along with associated features such as; the number and species of mature trees, banks, ditches and grass verges.

¹ [Online]. <http://magic.defra.gov.uk/>

² [Online]. www.ordnancesurvey.co.uk

³ [Online]. www.maps.google.co.uk

⁴ JNCC (2010). *Handbook for Phase 1 habitat survey – a technique for environmental audit*. Peterborough: JNCC

⁵ Clements, D. & Toft, R. (1992). *Hedgerow Evaluation and Grading System (HEGS) – a methodology for the ecological survey, evaluation and grading of hedgerows*. Countryside Planning and Management

3.6 Each hedgerow is given a grade using HEGS with the suffixes '+' and '-', representing the upper and lower limits of each grade respectively. These grades represent a continuum on a scale from 1+ (the highest score and denoting hedges of the greatest nature conservation priority) to 4- (representing the lowest score and hedges of the least nature conservation priority) as follows:

Grade 1 – High to very high value;

Grade 2 – Moderately high to high value;

Grade 3 – Moderate value;

Grade 4 – Low value.

Hedgerows graded 1 or 2 are considered to be a priority for nature conservation.

3.7 Also, where appropriate, hedgerows were broadly assessed against the Wildlife and Landscape criteria contained within The Hedgerow Regulations 1997 to determine whether they qualified as 'Important Hedgerows'. This was achieved using a methodology in accordance with both the Regulations and DEFRA guidance.

Condition assessments

3.8 DEFRA has developed a metric based on evaluating each individual habitat's value. While the DEFRA metric is still under development and subject to future review, a 'beta test' version 2.0 is available for use.

3.9 In order to provide compatibility, on-site habitats were also defined under UK Habitat Classification (provided in brackets, following the Phase 1 classification type) with further information provided on condition as set out by the technical documentation for the Biodiversity metric 2.0.

Fauna

3.10 During the initial extended Phase 1 Habitat survey, observations, identification and signs of any species protected under the following list of Acts and Regulations were noted:

- Part 1 of the Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Conservation of Habitats and Species Regulations 2016;
- The NERC Act 2006 – S41 Species of Principal Importance for the conservation of biodiversity.

Bats

Visual Building Assessment

3.11 The exteriors of the existing buildings were examined to determine any potential access points and roost sites on 6th April 2020 (Tenants use of the allotments expired on the 1st April 2020). Structural features with the potential for use by roosting bats were recorded and suitable access points such as small gaps under eaves/soffit boards, raised or missing ridge tiles and gaps at gable ends were identified. Evidence that potential access points were used by bats was also recorded where found. Such evidence includes staining from urine and/or fur and the presence of bat droppings in and around features. Indicators that potential access points had not recently been used included the

presence of heavy cob-webbing and general detritus around these points. The visual assessment was carried out following a period of dry weather to maximise recording of visible evidence.

- 3.12 The interior of the buildings including any roof voids (where accessible), were also visually assessed for evidence of bat activity and/or for the potential to be used by bats. Evidence of a roost would be determined by the presence of a dead or live bat(s), concentrated piles or scattered droppings, food remains such as insect wing fragments as well as scratch marks and/or staining.
- 3.13 The above surveys were undertaken by a licensed bat ecologist from FPCR (Sam Arthur Natural England Survey Licence Number 2015-19188- CLS) and an assistant (James Hutchison).

Building Nocturnal Surveys

- 3.14 Following the results of the initial survey, which indicated that building B1 was of 'low' suitability, a single emergence (dusk) survey was completed by a suitably experienced ecologist (Ed Selvey) from FPCR on 19th May 2020. During the survey the surveyor was positioned such that all potential roosting features could be observed. The emergence survey was undertaken from approximately 15 minutes before sunset to 1.5 hours following sunset.
- 3.15 Over the emergence (dusk) survey the location and species of any bat observed emerging from the building was recorded.
- 3.16 Surveyors used Echo Meter Touch® (Wildlife Acoustics, Inc.) bat detectors in conjunction with Echo Meter Touch® app during the survey to detect bats and aid species identification.
- 3.17 The survey was conducted in appropriate conditions, i.e. ambient temperature above 10°C with little wind and no rain (see Table 1 for a summary).
- 3.18 The survey methodology described above is based on guidelines set out in 'The Bat Mitigation Guideline (Natural England, 2004)'⁶ and 'Bat Survey Good Practise Guidelines (Bat Conservation Trust, 2016)'⁷.

Table 1: Nocturnal Survey Conditions

Date	Potential roosts surveyed	Sunset/Sunrise	Wind (0-5)	Temperature at start °C	Cloud Cover %	Rain (mm)
19.05.2020	B1, T2	21:07	0	16	10	0

Tree Assessment

- 3.19 Tree assessments were undertaken from ground level, with the aid of a torch and binoculars (where appropriate). These surveys were undertaken on 27th June 2019 by a suitably experienced ecologist (James Hutchison). During the survey Potential Roosting Features (PRF) for bats such as the following were sought (Based on P16, British Standard 8596:2015 Surveying for bats in trees and woodland, October 2015):
- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.

⁶ English Nature (2004) Bat Mitigation Guidelines

⁷ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

- Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems).
 - Woodpecker holes.
 - Cracks/splits in stems or branches (horizontal and vertical).
 - Partially detached, loose or bark plates.
 - Cankers (caused by localised bark death) in which cavities have developed.
 - Other hollows or cavities, including butt rots.
 - Compression of forks with occluded bark, forming potential cavities.
 - Crossing stems or branches with suitable roosting space between.
 - Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
 - Bat or bird boxes.
 - Other suitable places of rest or shelter.
- 3.20 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features may enhance or reduce the potential value.
- 3.21 Trees were classified into general bat roost potential groups based upon the presence of these features. Table 2 (below) broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in Bat Surveys for Professional Ecologists: Good Practice Guidelines (J., Collins (Bat Conservation Trust), 2016).
- 3.22 Although the British Standard 8596:2015 document groups trees with moderate and high potential, these have been separated below (as per Table 4.1 in The Bat Conservation Trust Guidelines) to allow more specific survey criteria to be applied.

Table 2: Classification and Survey Requirements for Bats in Trees

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	A Natural England derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence.

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey work / Actions
		<p>Works to tree undertaken under supervision in accordance with the approved good practice method statement provided within the licence.</p> <p>However, where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.</p>
High Potential	<p>A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.</p>	<p>Aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, tree may be upgraded or downgraded based on findings.</p> <p>If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from Natural England will be required.</p> <p>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.</p>
Moderate Potential	<p>A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.</p>	<p>A combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August).</p> <p>Following additional assessments, tree may be upgraded or downgraded based on findings.</p> <p>After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.</p> <p>If a roost site/s is confirmed a licence from Natural England will be required.</p>
Low Potential	<p>A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or</p>	<p>No further survey required but a precautionary working method statement may be appropriate.</p>

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey work / Actions
	features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.	
Negligible/No potential	Negligible/no habitat features likely to be used by roosting bats	None.

* The Conservation of Habitats & Species Regulations 2010 (as amended) affords protection to "breeding sites" and "resting places" of bats. The EU Commission's Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC, February 2007 states that these are places "where there is a reasonably high probability that the species concerned will return".

Aerial Tree Inspections

- 3.23 On the 6th April 2020, aerial inspections were completed (where required) on trees identified during the ground level inspection as providing features suitable to be used as a bat roost. Each feature suitable for roosting bats was visually inspected using torches and/or endoscopes as appropriate. The characteristic of each feature was considered to assess its suitability to support roosting bats. The size and exposure to the elements of each was additionally taken into account, as were features such as dense cobwebs or the habitation of a feature by other species (e.g. woodpeckers, squirrels, wasps etc.).
- 3.24 All FPCR tree climbers are NPTC Certified to Climb Trees (J/101/2449) and Perform Aerial Rescue (A/101/2450)–Level 2. The climbing methodology used follows that detailed within the Arboriculture and Forestry Advisory Group (AFAG) Tree Climbing Operations Leaflet (AFAG401). Climbing equipment was inspected following guidelines outlined in the Lifting Operations and Lifting Equipment Regulations 1998. The aerial tree inspections were completed by Natural England bat Licence holder 2015-19188- CLS (Sam Arthur) and an assistant (James Hutchison).

Nocturnal Surveys

- 3.25 On the 19th May 2020 a nocturnal dusk emergence survey was completed by suitably experienced ecologists (James Hutchison and James Leonard) from FPCR on tree T2. The two surveyors were positioned at various aspects of the trees from approximately 15 minutes prior to sunset to 90 minutes after sunset. The number and species of bats observed emerging or entering the tree was recorded.
- 3.26 Wildlife Acoustics Inc. Echo Meter Touch[®] bat detectors in conjunction with the Echo Meter Touch[®] app and either an Apple Inc. iPad[®] or a Samsung S5 Neo were used by surveyors to aid in identification. All of the nocturnal surveys were conducted in appropriate conditions, i.e. ambient temperature exceeding 10°C and little wind/rain (Table 1).

Transect Surveys

- 3.27 Seasonal dusk transect surveys were completed by suitably experienced ecologists from FPCR on 13th June 2019 (Leanne Watret and Anastasia Spencer), 18th September 2019 (Molly Foulds and Hollie Fisher), and 5th May 2020 (James Hutchison and Ben Atherton) . Transects were undertaken in accordance with current statutory and best practice guidelines (Natural England⁸, Bat Conservation Trust⁹ and JNCC¹⁰). The primary objective of the transect surveys was to identify foraging areas, commuting routes and to gain understanding of species utilisation of the site.
- 3.28 The transect route was determined prior to surveys in order to ensure appropriate coverage of representative habitats within the majority of the site and included 7 point count stops (each approximately 10 minutes in duration) to identify activity levels around the features of potential value to bats and those that are most likely to be affected by proposals (i.e. hedgerows and/or tree lines scheduled for removal). Figures 5 through 7 show the transect route and location of point count stops.
- 3.29 The dusk transects commenced at approximately sunset and continued for two hours in duration. Each transect was walked at a steady pace and when a bat passed by, the species, time noted, and behaviour was recorded on a site plan. This information provides a general view of the bat activity present on site and identifies the key foraging areas and commuting routes. Wildlife Acoustics, Inc. Echo Meter Touch[®] bat detectors were utilised in conjunction with Echo Meter Touch[®] app and Apple, Inc. iPad[®] to provide back-up information and enable confirmatory identification of bats encountered. The results of these surveys were used to assess the level of bat activity across the site in relation to the abundance of individual species foraging and commuting.
- 3.30 Transect surveys were undertaken during suitable conditions (i.e. when there was little wind and no rain).
- 3.31 Post-survey bat calls were analysed using Wildlife Acoustics, Inc Kaleidoscope software taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. This analysis was completed by a suitably experienced ecologist. From this, the level of bat activity across the site in relation to the abundance of individual species foraging and commuting along habitats was assessed. A summary of the conditions for each survey is shown in Table 3 below:

Table 3: Summary of Transect Survey Dates and Conditions

Date (dusk survey unless otherwise stated)	Sunset	Start / finish time	Temperature	Rain	Wind (Beaufort)	% Cloud Cover
Survey 1 - 13.06.2019	21:35	21:35/23:35	9°C	0	0	70
Survey 2 – 18.09.2019	19:15	19:15/21:15	15°C	0	0	75
Survey 3 – 05.05.2020	20:44	20:44/22:44	10°C	0	1	10

⁸ English Nature (2004) Bat Mitigation Guidelines

⁹ Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust

¹⁰ JNCC (1999) Bat Workers Manual

Static Monitoring

- 3.32 Passive (static) monitoring was undertaken using an automated logging system Song Meter® SM4BAT+ bat detectors (Wildlife Acoustics Inc.) with its output saved to an internal storage device. SM4BAT+ devices were positioned to record bat contacts at those static locations for five consecutive nights per season. This information was used to derive an index of activity and species composition at different points within the site. SM4BAT+ devices were placed along features considered to be of value to bats, such as along river corridors hedgerows, scrub, woodland edge and tree lines.
- 3.33 Devices were placed in each location for an extended period of time of suitable weather conditions (little no rain/wind and temperatures above 10°C). Detectors were programmed to activate 30 minutes before dusk and recorded continuously until 30 minutes following sunrise. The output from this detector was subjected to computer analysis using the Kaleidoscope software package (Wildlife Acoustics Inc.). The analysis of the SM4BAT+ files recorded can highlight the presence of more than one bat if recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximity for an extended period. Therefore, each sound file is counted as a single bat registration. The number of bat registrations does however reflect the relative importance of the location of the detector by calculating the bat registrations per hour.
- 3.34 Table 4 below provides the survey timings and weather conditions. Figure 4 illustrates the locations where the units were deployed.

Table 4: Static Survey Timings and Conditions

Date	Survey type	Area covered
13.06.2019 – 18.06.2019	Static SM4BAT Recording Unit 2	Hedgerow H1 along eastern field compartment
25.09.2019 – 30.09.2019	Static SM2BAT Recording Unit 8	Hedgerow H5 corner of southern site boundary
05.05.2020- 10.05.2020	Static SM4BAT Recording Unit 1	Allotments in north west of site

Additional Fauna

- 3.35 Any sightings, evidence of or suitable habitats for other protected fauna or notable species including breeding birds were recorded during the site visit.

Survey limitations

- 3.36 During the spring and summer transects, surveyors were unable to proceed through the scrub area due to the impassable nature of the vegetation and risk to health and safety. As such surveyors were required to access the site from two different points. This was considered unlikely to have significantly affected the survey results or assessments made and as such is not considered to be a constraint.

RESULTS

Desk Study

- 4.1 The site is located within the Dearne Valley nature improvement area (NIA) which is a national, landscape-scale nature conservation designation and is subject to requirements set out within the Barnsley local plan supplementary planning document: Biodiversity and Geodiversity.
- 4.2 Consultation with the LPA returned Preliminary Ecological Assessments produced for Local Plan purposes relating for 2 adjacent sites which share some of the same boundary features. These are sites 217/HN6A and 217/H9.

Statutory Sites

- 4.3 There were no statutory sites recorded within 10km of the site boundary.

Non-statutory Sites

- 4.4 There are two Local Wildlife Sites (LWS) within 1km of the site boundary: Short Wood and Hay Green and Rockley Woods.
- 4.5 Short Wood and Hay Green is approximately 250m east of the site boundary. It is designated due to inclusion on Natural England's Ancient Woodland Inventory and the presence of several ancient woodland indicator species. The LWS includes the ancient woodland and additional parcels of plantation woodland, semi-improved grassland and areas characterised by tall ruderal vegetation and scrub. There are public footpaths along the northern and southern ends of the site, but the interior is not currently accessible to the general public.
- 4.6 Rockley Woods is approximately 700m west of the site boundary. It is designated due to its wide range of native trees with many areas on the ancient woodland inventory. There is a network of footpaths around and through the site which give public access to many of the areas of semi-natural broadleaved woodland.

Protected/Notable Species

- 4.7 A number of species records were returned from the Sheffield Biological Records Centre (SBRC) and the South Yorkshire Bat Group (see Figure 2: Notable Species Plan).
- 4.8 Up to three species of bat were recorded within 1km of the site, with a pipistrelle species (either common pipistrelle *Pipistrellus pipistrellus* or soprano pipistrelle *Pipistrellus pygmaeus*) on site, a soprano pipistrelle located approximately 45m west of site and a Leisler's bat *Nyctalus leisleri* located approximately 750m north of site.
- 4.9 Two records of Great Crested Newt *Triturus cristatus* were recorded within 1km of the site, with the closest being approximately 380m south-east of the site boundary. Other records of amphibian included common frog, common toad and smooth newt.
- 4.10 Four records of notable invertebrate species were recorded within 1km of the site, with small heath *Coenonympha pamphilus* 300m east of the site, dingy skipper *Erynnis tages* 650m south of the site and cinnabar moth *Tyria jacobaeae* 350m south of the site. These were all associated with southern and eastern woodland.

- 4.11 One record of European Hedgehog *Erinaceus europaeus* was recorded within the residential area of Birdwell village, approximately 750m north of the site.
- 4.12 A total of 21 bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), Section 41 of the NERC Act 2006 as Species of Principal Importance or included on the Birds of Conservation Concern (BoCC) red and amber list were highlighted within 1km of the site boundary. The closest of which was a house sparrow *Passer domesticus* recorded approximately 100m to the east of the site. The majority of the records were located in association with the residential areas or woodland to the south of the site. The details of all birds recorded within 1km of site can be found in Appendix A.

Habitats/Flora

- 4.13 The locations of the habitats described below are illustrated in Figure 3: Phase 1 Habitat Plan. A botanical species list is provided in Appendix B.

Poor Semi-improved Grassland (Modified Grassland G4) with ruderal herbs

- 4.14 The majority of the site was poor semi-improved grassland managed by regular grazing or mowing. The field compartments largely contained horses and supported a short-grazed grassland. Those compartments without livestock at time of survey supporting a taller sward (c.30cm). All fields were broadly of similar composition being dominated by palatable grasses (>75% cover) and herb species including those typical of neutral soil conditions. Perennial ryegrass *Lolium perenne* characterised the fields with dominant or abundant distributions, the levels of which are indicative of improvement, while cock's foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, rough meadow grass *Poa trivialis* and smooth meadow grass *Poa pratensis* were generally frequent to abundant. Herbs were confined to common and widespread forbs and tall herbs typical of such grassland habitats and generally included frequent to abundant meadow buttercup *Ranunculus acris*, white clover *Trifolium repens* and ribwort plantain *Plantago lanceolata*.
- 4.15 Small areas of ruderal herbs were scattered throughout the site in association with marginal areas of the poor semi-improved grassland. Common nettle and broad-leaved dock *Rumex obtusifolius* predominated with additional associates including creeping thistle *Cirsium arvense* and coarse grass species such as false oat grass.
- 4.16 The grassland was assessed as comprising agricultural grassland managed through regular mowing and grazing. The swards were characterised by fast growing grasses, predominantly perennial rye-grass, with frequent to abundant white clover. Wildflowers and indicator species for priority neutral grassland did not occur at high densities or frequencies (such as: meadow vetchling *Lathyrus pratensis*, bird's-foot Trefoil *Lotus corniculatus*, ox-eye daisy *Leucanthemum vulgare*, lady's bedstraw *Galium verum*, cowslip *Primula veris*, black knapweed *Centaurea nigra*, rough hawkbit *Leontodon hispidus*, bulbous buttercup *Ranunculus bulbosus*). No sedges such as might be found in better quality or priority grassland were recorded. Undesirable species varied in abundance but species noted were white clover, common ragwort, common nettle, creeping thistle, spear thistle, broad-leaved dock and creeping buttercup.
- 4.17 Preliminary Ecological Assessments produced for Local Plan purposes for sites 217/HN6A and 217/H9 record the adjoining fields to the east and south as improved grassland. These are under comparable management and support the above assessment.

Scrub (Mixed Scrub H3D / H3H)

- 4.18 Dense bramble scrub occurs south of the allotments on the southern boundary of the site. Bramble was the dominant species, with locally dominant patches of annual meadow grass *Poa annua*, common nettle *Urtica dioica* and cleavers *Galium aparine*. Abundant false oat grass *Arrhenatherum elatius* and creeping thistle *Cirsium arvense*, formed an understory alongside locally abundant areas of red fescue *Festuca rubra* and rosebay willowherb *Chamerion angustifolium*.
- 4.19 Scattered scrub was present in the field and allotment peripheries and was characterised by bramble and travellers joy *Clematis vitalba*.
- 4.20 The scrub present on site is categorised as having low distinctiveness, being characterised as bramble or mixed scrub. The scrub was dominated by bramble with other woody species present being recorded as rare or occasional. Scrub areas did not have a diverse age range or structure with no clearings or glades, and no well-developed edges. Instead there were sharp transitions to grazed fields, managed amenity grassland and an abutting hedgerow. No invasive species were noted within the canopy or ground layers, however there was a high density of both common nettle and creeping thistle which were recorded a locally dominant and abundant.

Arable (Allotments c 910)

- 4.21 To the west of site there was an area of allotments, largely occupied until the recent past. As of April 2020, these were no longer in use and fly tipping was apparent. Vegetative encroachment by early coloniser species into newly unmanaged areas was evident alongside longer term scrub encroachment. The allotment area contained no notable diversity of habitats, no notable species were recorded, and there was no evidence of management for biodiversity.

Buildings (Developed land U)

- 4.22 A number of single storey agricultural sheds and wooden stables were noted in association with the allotments and livestock grazing.

Hedgerows

- 4.23 Seven hedgerows were present on site; four (H2, H4, H6 and H7) forming parts of the northern and southern site boundary, with the remaining three (H1, H3 and H5) internally dividing the field compartments.
- 4.24 The hedgerows were considered to provide potential commuting habitat for wildlife. Hedgerows H1-H6 were typically dominated by hawthorn with other species including alder, elm, ash, sycamore, holly *Ilex aquifolium* and blackthorn. H7 consisted almost solely of garden privet *Ligustrum ovalifolium*. A summary is provided in Table 5 below.

Table 5: Hedgerow Evaluation

Hedgerow ref.	Species composition ¹¹	Ave. no. species per 30m section	Associated features/ comments	HEGS Score	Habitat of Principal Importance under NERC Act (2006)	Important under wildlife and landscape criteria of Hedgerow REGS
H1	<i>Fe, Cm, Ca, Sn, Ap, Ia, Rf</i>	2	None	2+	Yes	No

Hedgerow ref.	Species composition ¹¹	Ave. no. species per 30m section	Associated features/ comments	HEGS Score	Habitat of Principal Importance under NERC Act (2006)	Important under wildlife and landscape criteria of Hedgerow REGS
H2	<i>Cm, Sn, Rf, Rc, Ia</i>	3	None	3	Yes	No
H3	<i>Ia, Cm, Rf, Sn, Fe, Bp</i>	2	None	3	Yes	No
H4	<i>Cm, Sn, Ia, Rf, Rc</i>	2	None	-2	Yes	No
H5	<i>Cm, Sn, Fe, Rf</i>	4	None	-3	Yes	No
H6	<i>Ac, Cm, Ia, Rf, Fe, Sn, Cs</i>	4	None	-2	Yes	No
H7	<i>Lo, Ap</i>	2	None	3	No	No

Cm *Crataegus monogyna* Hawthorn, Sn *Sambucus nigra* Elder, Ps *Prunus spinosa* Blackthorn, Fe *Fraxinus excelsior* Ash, Ap *Acer pseudoplatanus* Sycamore, Rc *Rosa canina* Dog rose, Rf *Rubus fruticosus* agg. Bramble, Qr *Quercus robur* Pedunculate oak, Ia *Ilex aquifolium* Holly, Ag *Alnus glutinosa* Alder, Ca *Corylus avellana* Hazel, Pc *Prunus* sp. Cherry, Fs *Fagus sylvatica* Beech, Lo *Ligustrum ovalifolium*.

- 4.25 The only consistent negative condition indicator was a lack of undisturbed ground running adjacent to the hedge. Plant species indicative of soil enrichment were present but did not reach the densities which would impact the value of the hedges.
- 4.26 It should be noted that hedgerows may also qualify as Important under the Archaeology and History criteria of the Hedgerow Regulations 1997 Act, which is beyond the scope of this assessment.

Fauna

Bats

Buildings

- 4.27 Buildings on site were a mix of allotment sheds and small stable blocks.
- 4.28 The stable blocks were of wooden construction with a mix of both flat and pitched roofs. Potential access was provided through open doorways, windows and structural gaps between walls and roofs. However, they lacked any suitable roosting features or evidence of bat use.
- 4.29 The allotment sheds were of varied construction and permanency, with greenhouses, sheds and temporary structures in various states of repair. Tenants use of the allotments expired on the 1st April 2020.
- 4.30 With the exception of a single building on the allotments (building B1), the on-site buildings were considered to provide negligible potential to support roosting bats due to a lack of suitable features and no recorded evidence of bat use.

Internal & External Building Assessment

- 4.31 Building B1 was considered to provide low bat roost potential.

- 4.32 This single storey allotment shed had a composite roof consisting of a corrugated metal base covered with chip board panels and an outer felt membrane layer. Potential roosting features were record as void spaces which were accessible where the edges of the roof had been damaged.
- 4.33 No evidence of bat use was recorded during the internal/external inspection.



Photograph 1: Building B1 with gappy composite roof.

Nocturnal survey- B1

- 4.34 No bats were observed emerging or re-entering the building during the nocturnal survey.
- 4.35 Species recorded during the survey were common pipistrelle, soprano pipistrelle, and noctule bats.

Tree Assessment

- 4.36 The trees on site were a mix of young to mature specimens and of varying structural state. A comprehensive list of trees and tree groups is provided in Appendix D, with tree reference listings reflecting those within the arboriculture reports for clarity. (It should be noted that ecological and arboricultural survey and assessment methodologies and aims differ).
- 4.37 Two trees (T2 and T14) were identified during the ground assessment as having potential for roosting bats. Details of these features are in Table 6 below.
- 4.38 T2 was located within hedgerow H1 which formed the eastern site boundary. T14 was located within an area of dense scrub in the west of site.
- 4.39 Following aerial inspection, tree T14 was downgraded to negligible potential. The feature was a rot hole cavity measuring approximately 15cm long and 3cm in diameter. It was open to the elements above and was not of significance to roosting bats.



Photograph 1: Rot hole cavity in tree T14.

- 4.40 The features in T2 could not be fully assessed by aerial inspection due to the location of some cavity features on inaccessible areas of the tree. The roost potential of this tree remains as high.



Photograph 3: Ash Tree T2.



Photograph 4: Oak Tree T14.

Table 6: Trees with Bat Potential

Tree ref number	Species	Potential bat roost features (distance above ground and aspect where appropriate)	Final Bat Roost Potential Category (as prescribed in Table 1)	Further Work Required
T2	Ash	W: Large tear in branch. 5m high. SE: A natural knot. 6m high. SE: Large tear in branch. 12m high. E: Vertical split in trunk. 3m high.	High	Nocturnal assessment (if impacted by development)
T14	English Oak	E: 15cmx3cm long rot hole within trunk. 2m high. Feature open to elements from above.	Negligible	No further work required

Nocturnal survey- T2

- 4.41 No bats were observed emerging or re-entering the building during the nocturnal survey.
- 4.42 Species recorded during the survey were common pipistrelle, noctule and myotis bats.

Activity Surveys

- 4.43 The transect route, locations of where bats were recorded, and the tabulated results are provided in Figures 5 through 7.

Summer – 13th June 2019

- 4.44 During the summer transect, the majority of bat activity, including sustained periods of foraging behaviour from common pipistrelle was concentrated along H5. However, bat activity was recorded throughout the site.
- 4.45 A total of three bat species were recorded during the survey: common pipistrelle, a myotis species and noctule. The first bat recorded was a foraging noctule at 21:40, five minutes after sunset.

Autumn – 18th September 2019

- 4.46 During the autumn transect, the majority of bat activity was recorded in the east of the site, associated with hedgerows and features.
- 4.47 A total of two bat species were recorded during the survey: common pipistrelle and a myotis species. The first bat recorded was a commuting common pipistrelle at 19:34, nineteen minutes after sunset.

Spring – 5th May 2020

- 4.48 During the spring transect, bat activity was relatively low with four bats recorded.
- 4.49 A total of two bat species were recorded during the survey: common pipistrelle and noctule. The first bat recorded was a commuting common pipistrelle at 21:05, twenty-one minutes after sunset.

Static Detector Monitoring

- 4.50 A summary of the static bat detector monitoring data obtained across the 2019/2020 survey season is provided in Table 7. Full details of the static bat detector data can be found in Appendix A. The locations of the static detector units are shown on Figure 4.

Table 7: SM4 Survey Results Summary

Static detector reference (unit number)	Avg. registrations per hour	Total registrations	Most recorded species (number of registrations)	Other species recorded (number of registrations)
1 (Unit 2)	89.9	3589	Common pipistrelle (3331)	Soprano Pipistrelle (200) Noctule (34) <i>Myotis</i> Species (14) Brown Long-eared (6) <i>Pipistrellus</i> Species (4)
2 (Unit 8)	11.5	757	Common pipistrelle (622)	<i>Myotis</i> Species (109) Soprano Pipistrelle (15) Noctule (7) Brown Long-eared (3) <i>Pipistrellus</i> Species (1)
3 (Unit 1)	21.2	998	Common pipistrelle (974)	Noctule (18) Soprano Pipistrelle (4) <i>Myotis</i> Species (2)

Summer

- 4.51 Static detector 1 (Unit 2) was deployed from 13th June to 18th June 2019 with the unit recording unremarkable levels of activity and common species assemblages. Common pipistrelle was the most frequently recorded bat. Unit 2 was positioned within H1 on the east of site. Table 8 and 9 below highlight the distribution of registrations during the survey period.

Table 8: June 2019 Bat Registrations Nightly Distribution

Survey Night	Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	Brown long-eared	<i>Myotis</i> species
13/06/2019 - 14/06/2019	370	14	2	5	2	0
14/06/2019 - 15/06/2019	587	47	0	21	1	3
15/06/2019 - 16/06/2019	417	34	2	2	1	0
16/06/2019 - 17/06/2019	1090	64	0	1	0	2
17/06/2019 - 18/06/2019	867	41	0	5	2	9

Table 9: June 2019 Bat Registration Temporal Distribution (sunset 21:36-21:37, sunrise 04:36)

Species	21:00-22:00	22:00-23:00	23:00-0:00	0:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
Common Pipistrelle	128	1273	302	275	123	114	858	258
Soprano Pipistrelle	18	81	11	12	14	4	40	20
Noctule	6	18	0	0	0	1	2	7
Myotis Species	0	11	1	0	1	1	0	0
Brown Long-eared	0	1	2	2	0	1	0	0
Pipistrelle Species	1	0	0	2	0	0	1	0

Autumn

- 4.52 One static detector 2 (Unit 8) was deployed from 18th September to 23rd September 2019 with the unit recording low levels of activity and common species assemblages. Common pipistrelle was the most frequently recorded bat. Unit 8 was positioned within H5 adjacent to the scrub area. Table 10 and 11 below highlight the distribution of registrations during the survey period.

Table 10: September 2019 Bat Registrations Nightly Distribution

Survey Night	Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	Brown long-eared	Myotis species
25/09/2019 - 26/09/2019	360	5	0	1	0	29
26/09/2019 - 27/09/2019	36	0	0	1	1	7
27/09/2019 - 28/09/2019	39	0	0	1	0	12
28/09/2019 - 29/09/2019	111	6	0	0	0	0
29/09/2019 - 30/09/2019	76	4	1	4	2	61

Table 11: September 2019 Bat Registration Temporal Distribution (sunset 18:45-18:55, sunrise 06:59-07:06)

Species	19:00-20:00	20:00-21:00	21:00-22:00	22:00-23:00	23:00-0:00	0:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00	5:00-6:00	6:00-7:00
Common Pipistrelle	240	124	107	10	37	18	40	1	1	3	14	27
Myotis Species	4	5	16	0	5	29	7	13	11	13	6	0
Soprano Pipistrelle	3	0	3	0	0	2	0	0	0	0	2	5
Noctule	2	2	0	0	0	1	0	0	0	0	0	2
Brown Long-eared	1	0	0	0	0	0	0	1	0	1	0	0
Pipistrelle Species	0	0	0	0	0	0	0	0	0	0	0	1

Spring

- 4.53 One static detector 3 (Unit 1) was deployed from 5th May to 10th May 2020 with the unit recording low levels of activity and common species assemblages. Common pipistrelle was the most frequently recorded bat making up 97.5% of all calls. Unit 1 was positioned within the allotments. Table 12 and 13 below highlight the distribution of registrations during the survey period.

Table 12: May 2020 Bat Registrations Nightly Distribution

Survey Night	Common pipistrelle	Soprano pipistrelle	Noctule	Myotis Species
05/05/2020 - 06/05/2020	0	0	1	0
06/05/2020 - 07/05/2020	137	0	2	0
07/05/2020 - 08/05/2020	486	0	7	0
08/05/2020 - 09/05/2020	165	1	3	2
09/05/2020 - 10/05/2020	186	3	5	0

Table 13: May 2020 Bat Registration Temporal Distribution (sunset 20:45-20:52, sunrise 05:11-05:18)

Species	20:00-21:00	21:00-22:00	22:00-23:00	23:00-0:00	0:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	4:00-5:00
Common Pipistrelle	0	315	217	142	124	82	59	22	13
Noctule	3	7	3	2	2	0	0	0	1
Soprano Pipistrelle	0	0	0	1	3	0	0	0	0
Myotis Species	0	0	2	0	0	0	0	0	0

Static Monitoring Summary

4.54 Some calls could not be identified to species level, for example due to the lower quality of those recordings or where there are similarities between species echolocation calls (particularly for *Myotis* and *Nyctalus* species bats) making a definite identification difficult. Based on the features displayed by the calls when analysed using the Kaleidoscope data analysis software package and taking in to account the geographical location of the site and the habitats present, it was therefore considered that:

- Pipistrelle species bats were likely to be either common or soprano pipistrelle;
- *Myotis* species bats were likely to be whiskered/Brandt's *Myotis mystacinus/Brandtii*, Natterer's *Myotis nattereri* or Daubenton's *Myotis daubentonii*.

4.55 At least five different bat species were recorded utilising the site (sonograms for *Pipistrellus sp* were midpoints between those identified to species level). Common pipistrelle bats accounted for the majority of bat activity within the site, comprising 92.2% of the total bat registrations recorded over the whole survey period. Soprano pipistrelle were the next most frequently recorded species within the site accounting for 4.1% of the total bat registrations recorded. Relative usage of the site per species, as shown by percentage of all bat registrations recorded over the duration of the static monitoring period is shown in Table 14 below.

Table 14: Breakdown of Species Recorded

Species	Count	Percentage
Common Pipistrelle	4927	92.2%
Soprano Pipistrelle	219	4.1%
Myotis Species	125	2.4%
Noctule	59	1.1%
Brown Long-Eared	9	0.2%
Pipistrelle Sp.	5	0.1%
Total	5344	100%

Habitat Suitability

- 4.56 The hedgerows and trees provide suitable foraging and commuting habitats for bats. The poor semi-improved fields which form the core of the site are considered to offer negligible value for foraging and commuting bats.

Birds

- 4.57 The trees and hedgerows provided suitable foraging and nesting habitats for birds.
- 4.58 All on site buildings were accessible to wildlife and provided potential nesting opportunities for a range of urban edge bird species.
- 4.59 During the nocturnal surveys, a little owl *Athene noctua* was recorded roosting within the main trunk hollow of tree T2.

Badgers

- 4.60 Please see Appendix E- Confidential species report

Great Crested Newts

- 4.61 The majority of the habitats on site (semi-improved grassland) were considered to be sub-optimal for supporting great crested newt *Triturus cristatus* (GCN), providing little opportunity for rest of shelter, although the hedgerows and ruderal margins were considered to provide some suitable terrestrial and movement habitat.
- 4.62 The dense scrub area in the south west of site provided some suitable shelter for GCN, while the surrounding allotments provided limited shelter in the form of overgrown vegetation and compost heaps.
- 4.63 Examination of the OS map and aerial photos identified five waterbodies within 500m of the site, one of which occurs within 250m. A drainage ditch was also located within 250m of the site using aerial mapping, however, previous assessments have shown this to be a dry ditch which would not be suitable as aquatic habitat for GCN. Distances from the site to the pond are recorded below in Table 9. The locations of these five waterbodies are illustrated in Figure 8: Pond Location Plan.

Table 15: Distance of waterbodies from site boundary

Pond Number	Distance From Site (m)	Location
Ponds within 250m		
P1	182	Large pond surrounded by pasture
Ponds within 500m		
P2	287	Large pond surrounded by pasture
P3	298	Large pond surrounded by pasture and woodland
P4	306	Small pond surrounded by pasture and woodland
P5	347	Large pond to the east of a large industrial estate

- 4.64 Two records of GCN were highlighted during the desk study, one in association with pond P5 and a further record south of Dearne Valley Parkway. Other amphibian records include common frog, common toad and smooth newt.
- 4.65 No GCN were recorded during the surveys conducted in 2020. Full details are provided in the associated GCN report.

Reptiles

- 4.66 The habitats on site were generally considered to be sub-optimal for reptiles due to the large amounts of horse grazed grassland which offers little vegetative cover and structural variation. Hedgerows provide limited connectivity and refuge throughout the site, Allotments and dense scrub, as well as equestrian equipment provide some suitable refuge habitats for reptiles, particularly in areas with compost heaps or muck heaps.
- 4.67 No reptile records were noted in the desk study.

Other Protected/Notable Species

- 4.68 During the June bat survey, a hedgehog was recorded just outside the southern boundary of the site.

5.0 DISCUSSION AND RECOMMENDATIONS

- 5.1 The degree to which habitats and species receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within a specific policy, for example veteran trees, ancient woodland and linear habitats within the National Planning Policy Framework (NPPF);
 - A non-statutory site designation (e.g. Local Wildlife Site);
 - Habitats considered as Habitats of Principal Importance for the conservation of biodiversity and species considered as Species of Principal Importance for the conservation of biodiversity as listed within Section 41 of the NERC Act (2006);
 - Habitats identified as being a Priority Habitat and species identified as being a Priority Species within the local Biodiversity Action Plan.

National Planning Policy Framework (NPPF) and Local Planning Documents

- 5.2 Following publication of the revised NPPF in July 2018 the premise of 'presumption in favour of sustainable development' embedded within the previous NPPF has been carried forward to the current version. The NPPF considers that to achieve this, the planning system has three overarching objectives: economic, social and environmental. It considers these to be interdependent with a need for them to be mutually supportive of one another.
- 5.3 The Barnsley Local Plan (January 2019) includes the following policies of relevance:
- 5.4 Section 9 – HS59 Land south of Hay Green Road: requires a detailed ecology report is produced.
- 5.5 Section 17 Green Infrastructure and Green Space – Policy GI1 – Green Infrastructure: notes the need for an integrated network of connected and multifunctional GI throughout the area, linking with key identified GI corridors and features, including, the Dearne Valley Nature Improvement Area (NIA). Policy GS1 Green Space – seeks to ensure a range of valuable green areas for differing needs, including those for wildlife and biodiversity. Policy BIO1 – Biodiversity and Geodiversity: policy seeks to protect and enhance existing habitats, species and sites of ecological value and maximise and provide biodiversity within new developments.
- 5.6 The above policies are further supported by the Barnsley Local Plan Supplementary Planning Document: Biodiversity and Geodiversity, which states:
- The LPA will not support applications that would damage the ecological network and cause a net-loss in biodiversity in line with the NPPF.*
- 5.7 With specific reference to sites located within the Nature Improvement Area the above document states:
- Within the NIA (Nature Improvement Area) we require specific biodiversity enhancements with developments over and above the minimum mitigation/ compensation measures.....*
-Such quantifiable, significant benefits could include:*
- *New woodland;*
 - *New wetland;*
 - *Enhancing areas of poor environmental quality;*

- *Improving public access, or*
- *Improving the management of existing habitats.*

Desk Study

- 5.8 Impacts and recommendations are based on indicative proposals for the development (Illustrative Masterplan, JRP April 2020, drawing number 17 5085 12 Rev D).

Adjacent Sites

- 5.9 Local council produced preliminary ecological appraisals cover the boundary features to the east (site ref: HN6A) and to the south (site ref: H9). These highlight hedgerows as important features and recommend the retention of mature trees. The site proposals retain boundary hedgerows and trees in line with these recommendations. Their long-term management, including gapping up with native species, should be included within a landscape and ecological management plan. This will ensure that ecological connectivity to these adjacent sites is maintained.

Designated Sites

- 5.10 Two local wildlife sites, designated for their ancient woodland, lie within 1km of the site. The development is not expected to significantly impact these sites. The sites are sufficiently distant that they would not be impacted during construction. While there may be some increase in visitor pressure to these sites, it is not expected to be a significant impact, given the size of the development and the presence of a number of existing public footpaths in the local area, offering a range of walking routes. Birdwell recreation ground is located immediately adjacent to the development site and will be directly linked to by a new footpath from the development. This can be expected to provide much more easily accessible public open space, relative to the local wildlife sites.
- 5.11 Concerns over potential increases in fly tipping were raised by the Yorkshire Wildlife Trust. To help combat this, details of local recycling centres should be included in new householder information packs. The two nearest household waste recycling centres are Worsborough approximately 2 miles north and Greaves Lane approximately 3 miles west.

Habitats

- 5.12 Habitats present within the site are limited both in their range with poor semi-improved grassland predominating and floristic diversity, comprising a small number of common and widespread species. The grassland habitat, including the ruderal field margins and area of dense scrub are considered to be of limited nature conservation value. All species recorded are common and widespread within the surrounding area and characteristic of their habitat types, which are also widespread and common. The loss of these is not considered to be significant.
- 5.13 None of the hedgerows were classified as 'Important' under Hedgerow Regulations 1997, however all but one hedgerow supported >80% native species and therefore qualified as a Habitat of Principal Importance under NERC Act 2006. Indicative proposals indicate that all hedgerows will be retained, although internal hedgerows H3 and H5 will be breached by the internal access road. Hedgerow H5 will additionally be subject to the loss of its northern extent (approximately 30m).

Suitable compensation through new hedgerow planting will be undertaken using native species, providing a net gain in biodiversity value.

- 5.14 Furthermore, all hedgerows are likely to be of value to local wildlife for foraging commuting and shelter/nesting. The enhancement of existing hedgerows through a commitment towards their long-term management with the aim of maximising their biodiversity value should be undertaken. The existing gap between hedgerow H6 and H7 will be filled in with native species, and this amalgamated hedge will be further lengthened along the site boundary to improve its value to local wildlife for foraging, commuting and shelter/nesting habitat.
- 5.15 In order to retain the integrity of the retained hedgerows and avoid their degradation through individual residential management (i.e. removal of hedgerow sections, excessive cutting by homeowners) it is recommended hedgerows are not incorporated into gardens and instead are managed as part of the site wide green infrastructure.
- 5.16 During construction works, all hedgerows and trees would be protected through the implementation of appropriate measures including root protection areas and protective fencing in accordance with BS 5837 (2012) Trees in Relation to Design, Demolition and Construction and/or as indicated by any Arboricultural Assessment.

Protected and/or Notable Species

- 5.17 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981(as amended) and the Conservation of Habitats and Species Regulations 2017. Some species, for example badgers, also have their own protective legislation (Protection of Badger Act 1992). The impact that this legislation has on the Planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their Impact within the Planning System.
- 5.18 In addition to protected species, there are those that are otherwise of conservation merit, such as Species of Principal Importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. The implications that various identified species or those that are thought reasonably likely to occur may have for developmental design and programming considerations are outlined below.

Bats

- 5.19 Bats and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2018 (as amended). In summary this makes it an offence to damage destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat. Seven bat species are listed as Species of Principal Importance under the provisions of the NERC Act 2006 of which three were recorded on site; soprano pipistrelle, noctule and brown long-eared.

Building Surveys

- 5.20 All buildings are expected to be lost as part of the proposals. Internal and external assessments of bat roost potential were made on all on site buildings. A single building (B1) was identified to provide low bat roosting potential and was subsequently subject to a nocturnal survey.in accordance with best practice guidelines issued by the Bat Conservation Trust.

- 5.21 No roosting bats were recorded during this survey. No further surveys of building B1 are required in accordance with best practice guidelines issued by the Bat Conservation Trust. Bats do not present a constraint to the removal of this building.

Tree Surveys

- 5.22 Following aerial inspection, a single tree (T2) was considered to provide potential roosting opportunities for bats.
- 5.23 T2 is to be retained and buffered within the development, which aims to avoid causing any direct impact to this tree.
- 5.24 In support of this application an initial nocturnal survey was conducted on tree T2. No bats were recorded roosting within T2 during this survey.
- 5.25 Should the impacts to tree T2 alter, or should any work be required to cut sections of this tree back for Health and Safety requirements, then nocturnal surveys would be required and potentially a European Protected Species Licence (EPSL) to allow for disturbance.
- 5.26 In order to avoid indirect impacts of light spill to boundary features, including tree T2, the guidance for a sensitive lighting scheme as detailed below should be implemented. This should include details of how downlighting will be used at the boundaries and POS areas to protect bats, including a plan showing where ground will be directly lit.

Activity Surveys

- 5.27 Bat activity surveys, both transect and static, were undertaken in the summer and autumn of 2019 with a further spring survey in 2020.
- 5.28 The five bat species or species-groups recorded on site are common bat species for the county (the Pipistrellus species group was used for calls which overlapped parameters for both common and soprano pipistrelle, both of which were recorded on site). Common pipistrelle accounted for 92% of all bat registrations recorded using the remote recording detectors.
- 5.29 Whilst Myotis bats include Bechstein's, no records of this species exist for the county of south Yorkshire and so this species cannot be included within the Myotis grouping for this site. A total of 125 Myotis bat registrations over 153 survey hours demonstrates that the site does not provide a significant foraging resource for the species and will not affect the favourable conservation status of the species group.
- 5.30 Activity levels were generally low with consistent species assemblages recorded throughout the separate recording periods with the peak bat activity being recorded on unit 2 within the summer period, reflective of the peak seasonal activity noted within the transect surveys. It is considered that the level of activity recorded was not exceptional given the largely rural setting of the site, with common and widespread species accounting for the majority of the bat activity.
- 5.31 Only a small number of commuting bats were recorded during transect surveys (2 in September and 5 in May). This correlates with the peaks in bat activity recorded following a lag from sunset or prior to sunrise on all statics. This strongly suggests that the site's boundaries do not form part of any significant commuting route/s, which would be typified by clusters of the same species utilising identical features consistently over consecutive nights in proximity to sunset /sunrise.

- 5.32 The onsite habitats are abundant in the wider landscape, including adjacent land. Furthermore, areas of more optimal habitat including woodland and edge habitats are also widely present. Loss of onsite habitats is therefore not considered likely to adversely affect the favourable conservation status of the local bat population.
- 5.33 All hedgerows are to be retained (with the exception of small breaches and the loss of 30m at the north of hedgerow H5). New hedgerow planting will compensate for losses and reinforce the existing network to maintain connectivity around and out of the site.
- 5.34 Illumination either of external lighting or light spill from the development may impact on bats commuting and foraging along the retained site boundaries, and newly-created habitats. The lighting and layout of the proposed development will be designed to minimise light-spill onto habitats both within and adjacent to it that are used by the local bat population foraging or commuting. This will be achieved by ensuring that the design of lighting is based upon guidelines presented in the Bat Conservation Trust and Institution of Lighting Professionals Guidance Note 08/18 'Bats and artificial lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'. Therefore, the lighting scheme will include the following[MMB1] [SAR2] :
- The strategic use of landscaping and planting to avoid light spill on sensitive habitats. New woodland planting will buffer the north, south and east retained boundaries to create dark corridors around the site;
 - The avoidance of direct lighting of existing trees, scrub, woodland, or proposed areas of habitat creation / landscape planting;
 - Unnecessary light spill will be controlled through a combination of directional lighting, low lighting columns, hooded / shielded luminaires or strategic planting;
 - All new column mounted car park luminaires shall be fitted with flat glass where appropriate to aid 0% upward light discharge;
 - Where appropriate, luminaires on the site boundary will be fitted with light baffles to prevent light spill.
- 5.35 It is recommended that a range of bat boxes are incorporated within the site design. Ideally these would be placed on suitable trees on the site's periphery. The bat boxes should be mounted at least 3m from the ground and on south, east and west aspects. The bat boxes should be a variety of designs to encourage different environmental conditions and to be suitable for a range of species. Any external lighting will be applied sensitively with no lights above or adjacent to access points on bat boxes.
- 5.36 Newly created grassland and wetland habitats within the site should be managed to enhance biodiversity. This would ensure continued foraging opportunities for bats.
- 5.37 With the implementation of the mitigation proposed above residual effects on the local population of bats are considered to be negligible.

Birds

- 5.38 The site offered opportunities for foraging and nesting birds within the trees and hedgerows with additional areas of open farmland, woodland and trees adjacent to the site. Given the small size of the site and, expanse of similar habitat locally, its loss is unlikely to result in any significant impacts to local bird populations. As such no further survey is recommended to establish the bird assemblage on site.
- 5.39 As a result of the special protection afforded to breeding birds, in the event that any removal of woody vegetation (including trees and scrub) is necessary, it is recommended that this takes place outside of the bird breeding season (March to August inclusive) to minimise the risk of disturbance to breeding birds. If this is not possible, such vegetation should be checked prior to removal by a suitably experienced ecologist. If active nests are found, vegetation should be left untouched and suitably buffered from works until all birds have fledged. Specific ecological advice should be sought prior to undertaking the clearance.
- 5.40 Sheds and stables should be removed outside of the breeding bird season to minimise the risk to birds such as barn swallow which may nest within these buildings. If this is not possible, buildings should be checked prior to demolition. Specific ecological advice should be sought before clearance begins.
- 5.41 It is recommended that a variety of bird boxes are installed on the existing mature trees throughout the development. These would be installed facing north and east, thus avoiding strong sunlight and wet winds.

Badger

- 5.42 Please see Appendix E- Confidential species report.

Great Crested Newts

- 5.43 No waterbodies were present on site although one pond was recorded within 250m of the site boundary and a further four within 500m of site. The hedgerow bases, woodland and associated ruderal margins provide some suitable terrestrial habitat for GCN, however these were generally limited in extent and are to be retained. The poor semi-improved grassland, which dominates the site is considered to be of negligible value for GCN, due to its homogenous nature and lack of features that may provide shelter.
- 5.44 Presence/absence surveys conducted by FPCR in 2020 recorded no GCN, and although not all ponds were fully accessible to survey, the species is not considered to be a constraint due to various factors including distance from site and presence of more suitable habitat closer to the ponds. Details are provided in the separate GCN report, which should be read in conjunction with this report.
- 5.45 Two onsite ponds are to be created. The first is linked to the swale features and the second pond is proposed as a SUDS attenuation basin. These will be designed and managed to provide suitable habitat for amphibians and other wildlife, including appropriate native species planting.
- 5.46 New hedgerow planting and gapping up will assist in maintaining habitat connectivity across the site and the wider landscape, providing dense ground cover for wildlife. Hedgerows and other habitats on site should be managed and maintained for biodiversity enhancement.

- 5.47 The provision of artificial hibernacula and refugia would provide an additional resource for amphibians. These could include log or rubble piles, positioned within close proximity to the new ponds in marginal habitat or tussocky grassland or scrub.

Reptiles

- 5.48 No reptile records were returned as part of the consultation process and the habitats on site were generally considered to be sub-optimal for supporting reptiles due to fields being horse grazed and lacking the typical varied habitat structure required by reptiles. As such reptiles are not considered a constraint to the proposed development.

Other Protected/Notable Species

- 5.49 One European hedgehog was recorded during the June bat transect survey and the site provides suitable habitat for this species, as well as species such as brown hare (both SPI under Section 41 of the NERC Act (2006)). As such, features such as suitable areas of grassland and scrub, and gaps beneath fences should be incorporated into the design to allow these species to move across the site.
- 5.50 Dead wood piles at suitable marginal areas would provide potential habitat for a range of species.
- 5.51 Insect houses would provide further enhancements.

Habitat Enhancements

- 5.52 Design of the development will enable a net gain in terms of both area of habitats and linear features, calculated using the Defra Biodiversity Metric 2.0 as agreed with the local planning authority. Details of this will be provided in a separate technical report.
- 5.53 Of particular relevance to this assessment is the location of the development within the Dearne Valley Green Heart Nature Improvement Area, as well as the nearby presence of two locally designated sites, protected species and ancient woodland. Enhancement and creation of linkages are encouraged to support the policy aims, alongside habitat creation. As well as ensuring a net gain of biodiversity, developments within the NIA should include quantifiable, significant benefits such as
- New woodland;
 - New wetland;
 - Enhancing areas of poor environmental quality;
 - Improving public access, or
 - Improving the management of existing habitat
- 5.54 In order to conform to local and national planning policy, proposals seek to include biodiversity enhancements. In addition to those included above made above, additional boundary planting will provide a strengthened wildlife corridor around the site, as well as providing connections through the development. Areas of informal grassland should seek to use an herb-rich mix suitable for the local area, with more formal areas using a flowering lawn mix as an alternative to a standard rye grass mix. New habitat creation proposals aim to increase the diversity of habitats present and provide structural diversity, with new tree planting, and managed wetland and grassland areas.

The attenuation ponds will be designed to maximise benefits to local wildlife, specifically amphibians and will include use of appropriate native species planting.

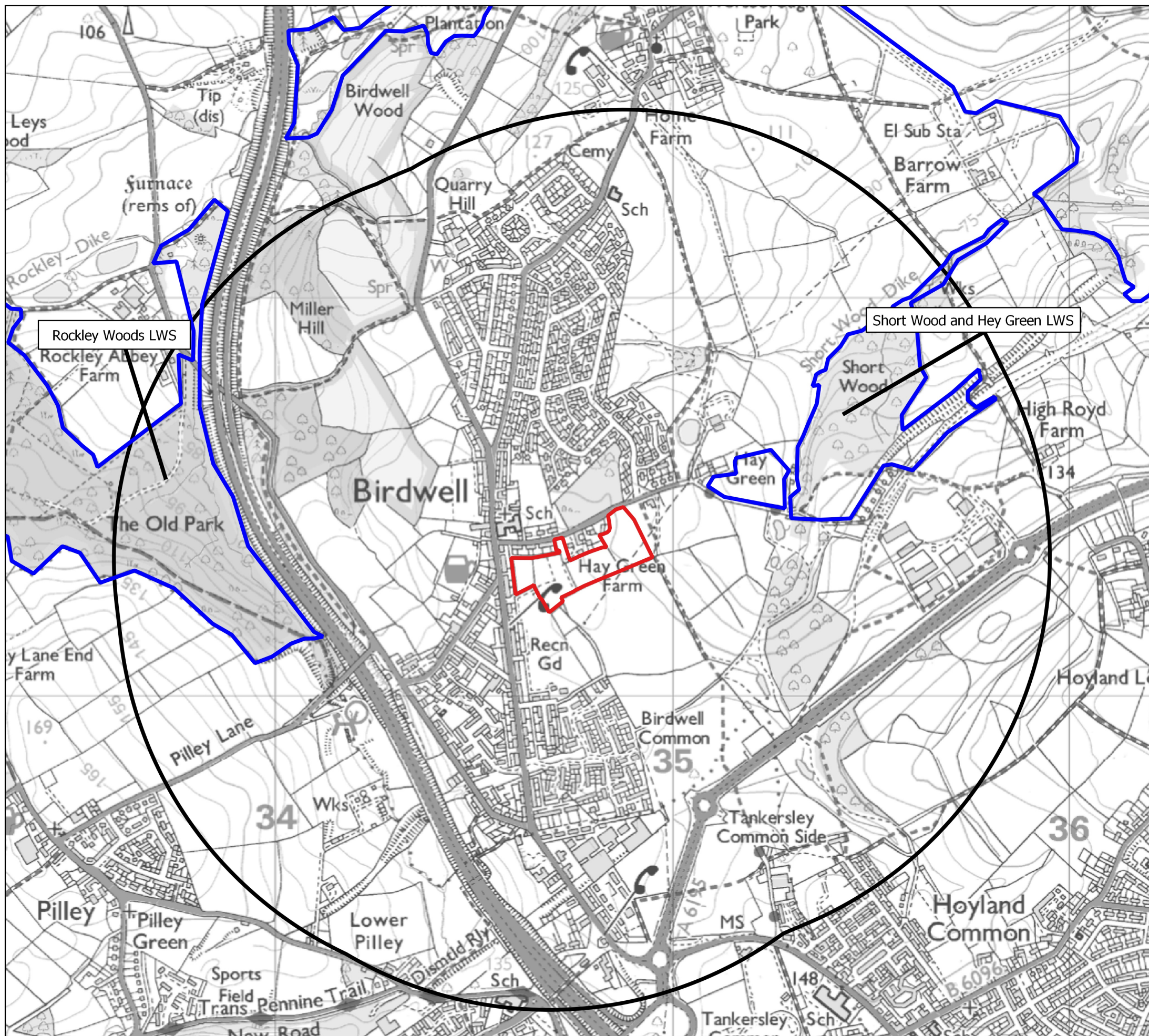
- 5.55 It is recommended that the delivery and ongoing management of the retained and new habitats is secured through a suitably worded condition.

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Key

- Site Boundary
- 1km buffer
- Local Wildlife Site (LWS)



client
Harworth Group PLC

project
Hay Green Lane
Birdwell, Barnsley

drawing title
Site Location and Designated Sites Plan

scale @ A3
1:10000

drawn
HJF/JDH

issue
16/4/2020

drawing / figure number
Figure 1

rev
9063-E-01

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Key




 Site Boundary  1km buffer

Species Records


Bats

-  Leisler's
-  Soprano pipistrelle
-  Unidentified Bat Species


Amphibians

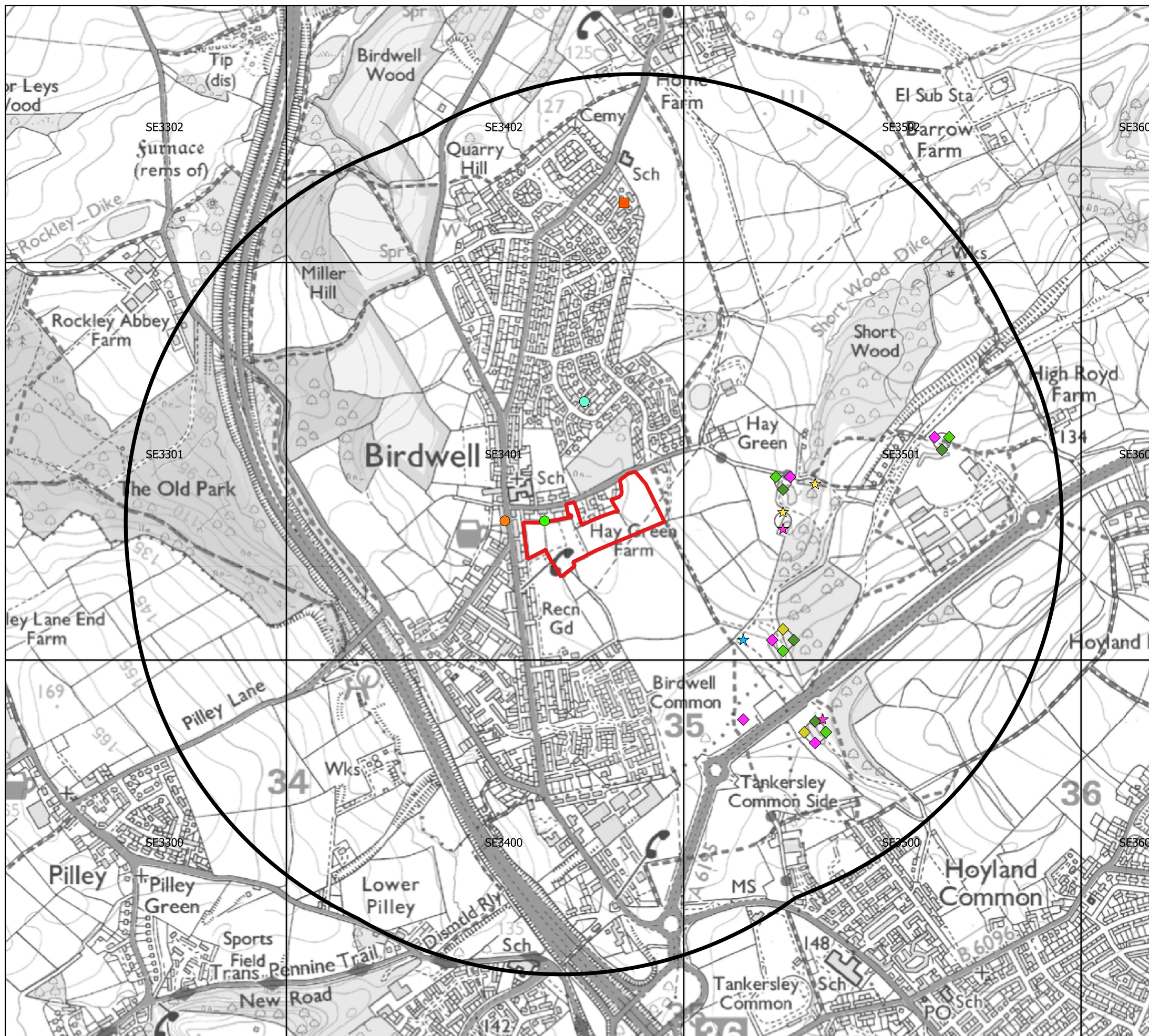
-  Common Frog
-  Smooth Newt
-  Great Crested Newt

Insects

-  Cinnabar
-  Dingy Skipper
-  Small Heath

Mammals

-  Erinaceus europaeus



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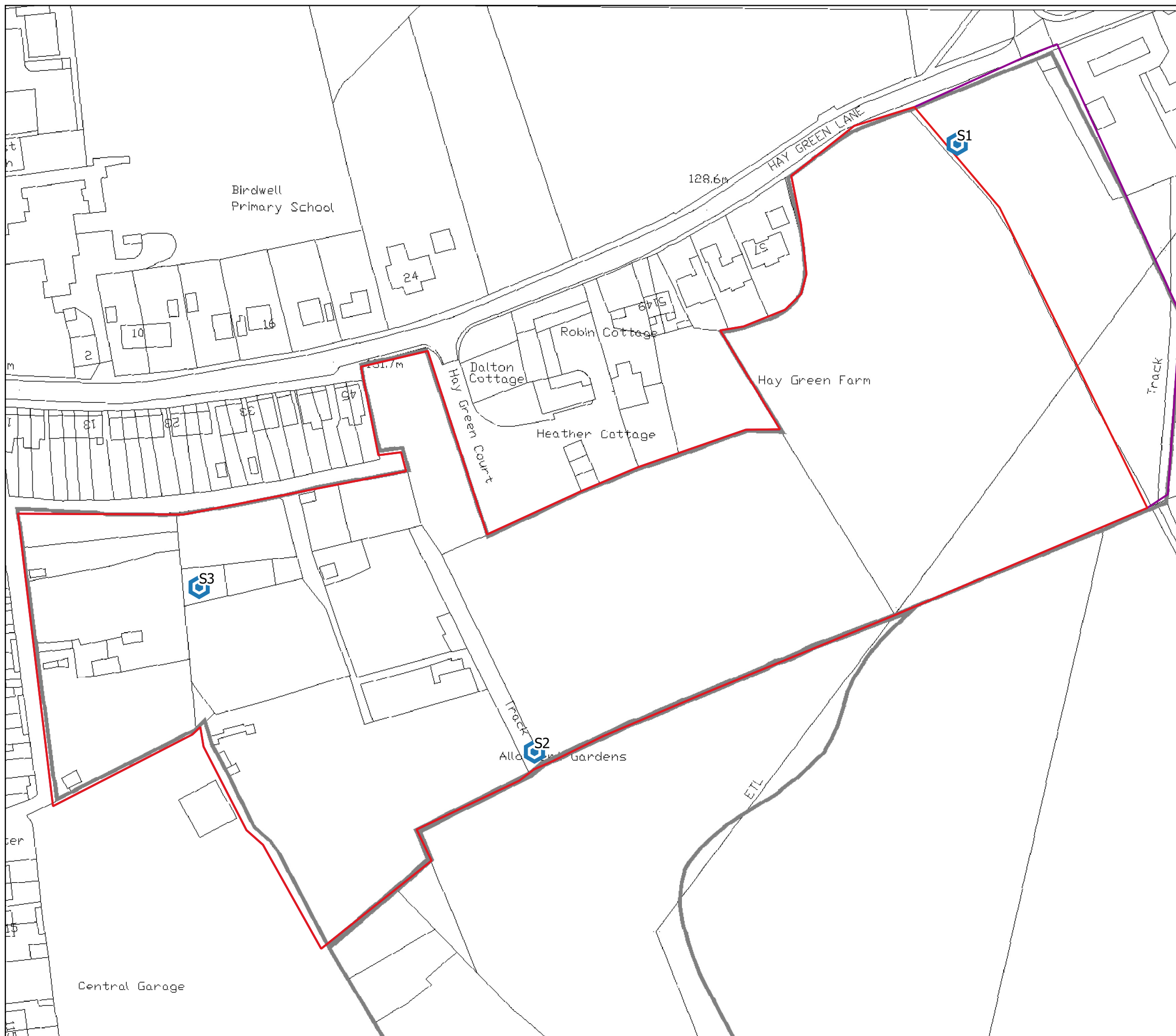
Key

- Site Boundary
- Buildings
- Built Environment: Buildings/hardstanding
- Cultivated/disturbed land - arable (allotments)
- Poor semi-improved grassland
- Scrub - dense/continuous
- Intact hedge - species-poor
- Intact hedge - native species-rich
- Fence
- Scrub - scattered
- Tree with bat potential
- Target notes- see species lists
- Broadleaved tree



client
Harworth Group PLC
 project
Haygreen Lane,
Birdwell, Barnsley
 drawing title
PHASE 1 HABITAT PLAN

scale @ A3
1:1250
 drawing / figure number
Figure 3
 drawn
HJF/JDH
 issue
9/10/2020
 rev
A

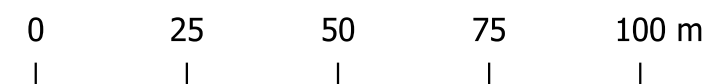


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Key:

- Site Boundary
- Additional Survey Area
- S Static Location (with ref)



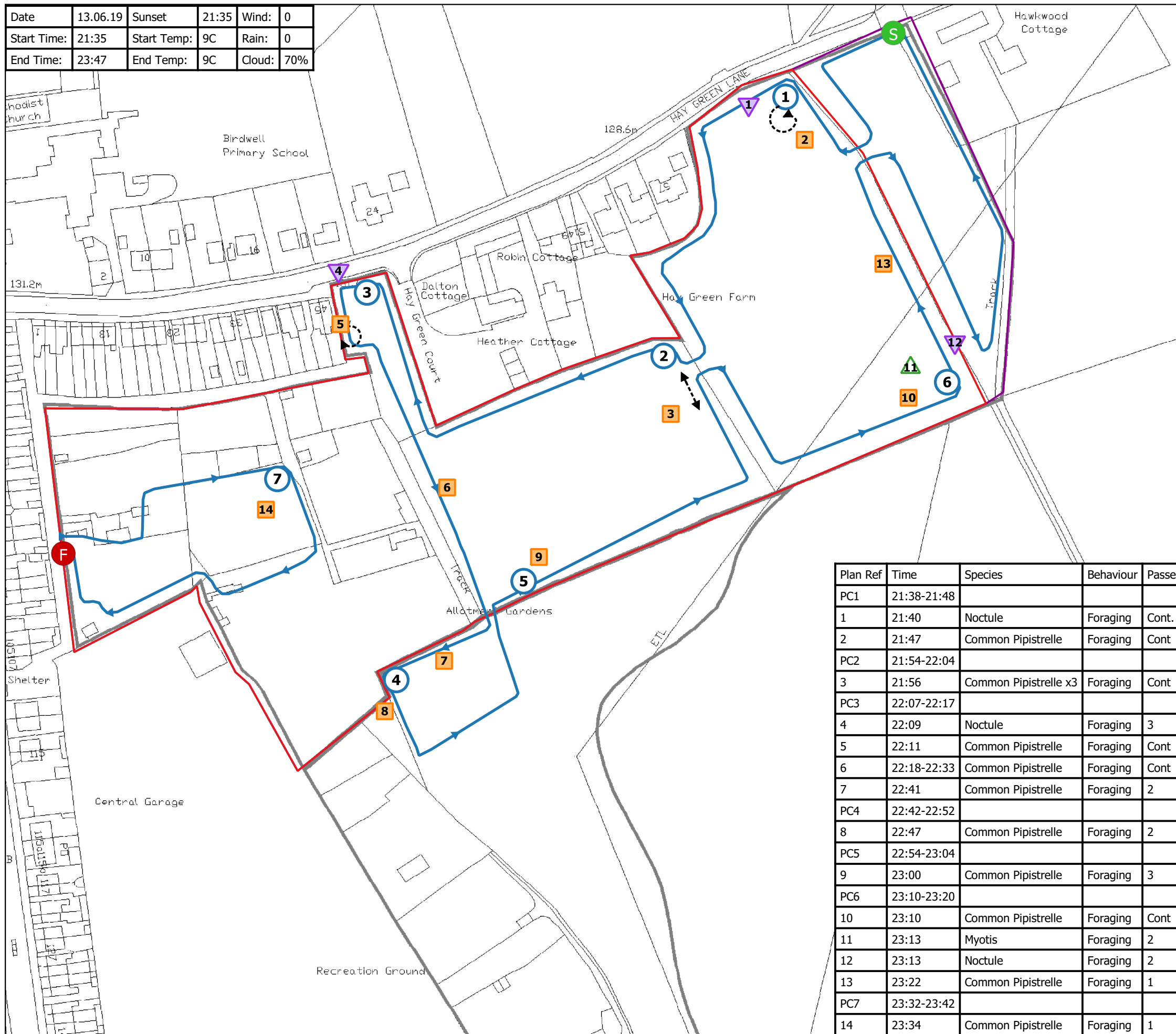
client
Harworth Group PLC
 project
**Haygreen Lane,
Birdwell, Barnsley**
 drawing title
STATIC DETECTOR LOCATION PLAN

scale @ A3
1:1250
 drawn
HJF/JDH
 issue
26/5/2020

drawing / figure number
Figure 4
 rev
9063-E-04



Date	13.06.19	Sunset	21:35	Wind:	0
Start Time:	21:35	Start Temp:	9C	Rain:	0
End Time:	23:47	End Temp:	9C	Cloud:	70%



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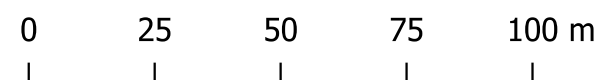
Key:

- Site Boundary
- Additional Survey Area
- S Start point
- F Finish point
- 1 Point Count (with ref.)
- Transect Route
- Flight Path

Bat Contacts

- Common Pipistrelle
- Myotis Species
- Noctule

Plan Ref	Time	Species	Behaviour	Passes
PC1	21:38-21:48			
1	21:40	Noctule	Foraging	Cont.
2	21:47	Common Pipistrelle	Foraging	Cont.
PC2	21:54-22:04			
3	21:56	Common Pipistrelle x3	Foraging	Cont.
PC3	22:07-22:17			
4	22:09	Noctule	Foraging	3
5	22:11	Common Pipistrelle	Foraging	Cont.
6	22:18-22:33	Common Pipistrelle	Foraging	Cont.
7	22:41	Common Pipistrelle	Foraging	2
PC4	22:42-22:52			
8	22:47	Common Pipistrelle	Foraging	2
PC5	22:54-23:04			
9	23:00	Common Pipistrelle	Foraging	3
PC6	23:10-23:20			
10	23:10	Common Pipistrelle	Foraging	Cont.
11	23:13	Myotis	Foraging	2
12	23:13	Noctule	Foraging	2
13	23:22	Common Pipistrelle	Foraging	1
PC7	23:32-23:42			
14	23:34	Common Pipistrelle	Foraging	1



client
Harworth Group PLC

project
**Haygreen Lane,
Birdwell, Barnsley**

drawing title
BAT TRANSECT PLAN (13.06.19)

scale @ A3
1:1500

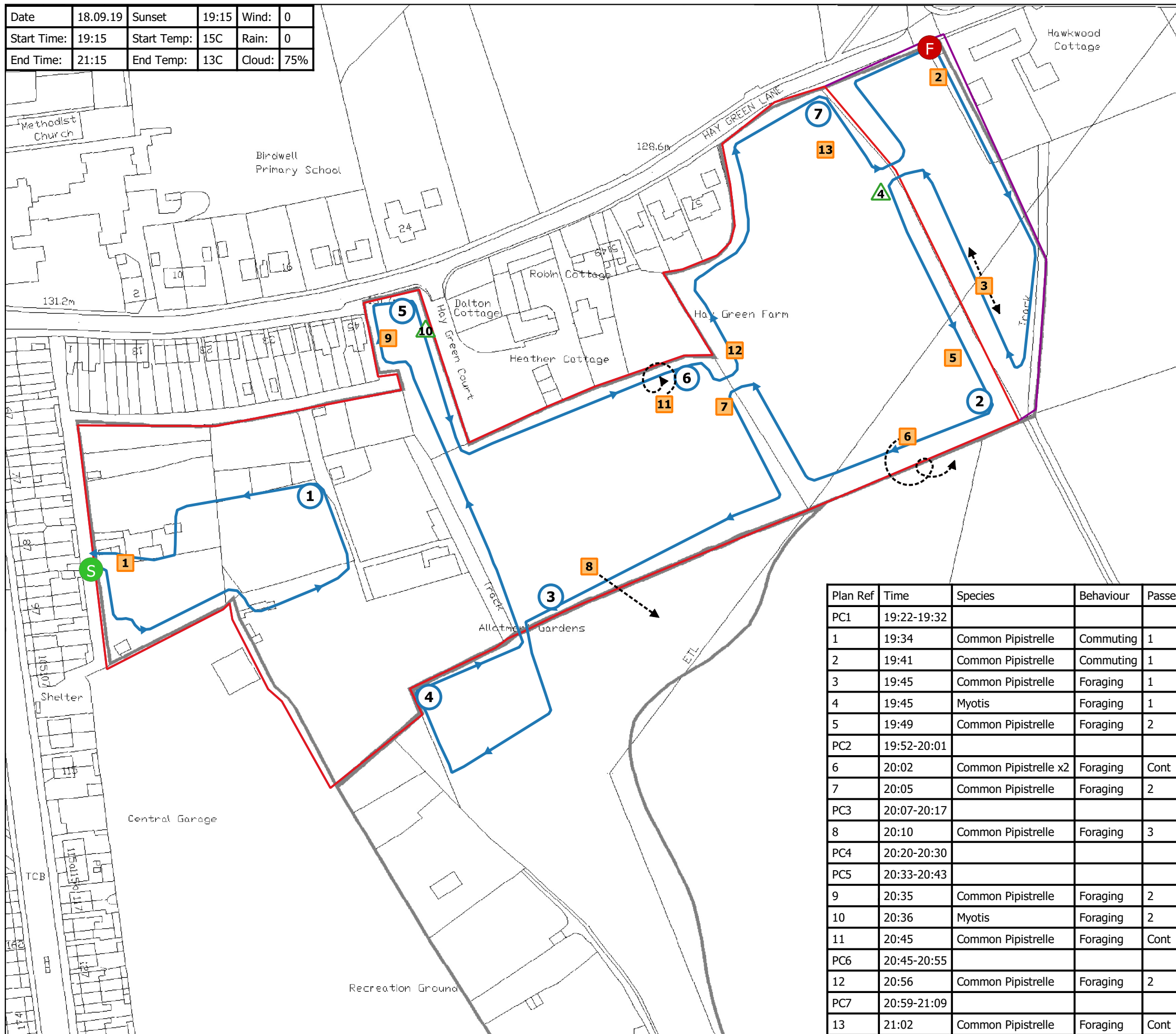
drawn
HJF/JDH

issue
26/5/2020

drawing / figure number
Figure 5

rev
9063-E-05

Date	18.09.19	Sunset	19:15	Wind:	0
Start Time:	19:15	Start Temp:	15C	Rain:	0
End Time:	21:15	End Temp:	13C	Cloud:	75%



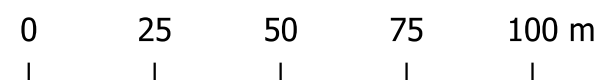
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Key:

- Site Boundary
- Additional Survey Area
- S Start point
- F Finish point
- 7 Point Count (with ref.)
- Transect Route
- Flight Path
- 1 Bat Contacts (with ref.)
- 1 Common Pipistrelle
- Myotis Species

Plan Ref	Time	Species	Behaviour	Passes
PC1	19:22-19:32			
1	19:34	Common Pipistrelle	Commuting	1
2	19:41	Common Pipistrelle	Commuting	1
3	19:45	Common Pipistrelle	Foraging	1
4	19:45	Myotis	Foraging	1
5	19:49	Common Pipistrelle	Foraging	2
PC2	19:52-20:01			
6	20:02	Common Pipistrelle x2	Foraging	Cont
7	20:05	Common Pipistrelle	Foraging	2
PC3	20:07-20:17			
8	20:10	Common Pipistrelle	Foraging	3
PC4	20:20-20:30			
PC5	20:33-20:43			
9	20:35	Common Pipistrelle	Foraging	2
10	20:36	Myotis	Foraging	2
11	20:45	Common Pipistrelle	Foraging	Cont
PC6	20:45-20:55			
12	20:56	Common Pipistrelle	Foraging	2
PC7	20:59-21:09			
13	21:02	Common Pipistrelle	Foraging	Cont



client
Harworth Group PLC

project
**Haygreen Lane,
Birdwell, Barnsley**

drawing title
BAT TRANSECT PLAN (18.09.19)

scale @ A3
1:1500

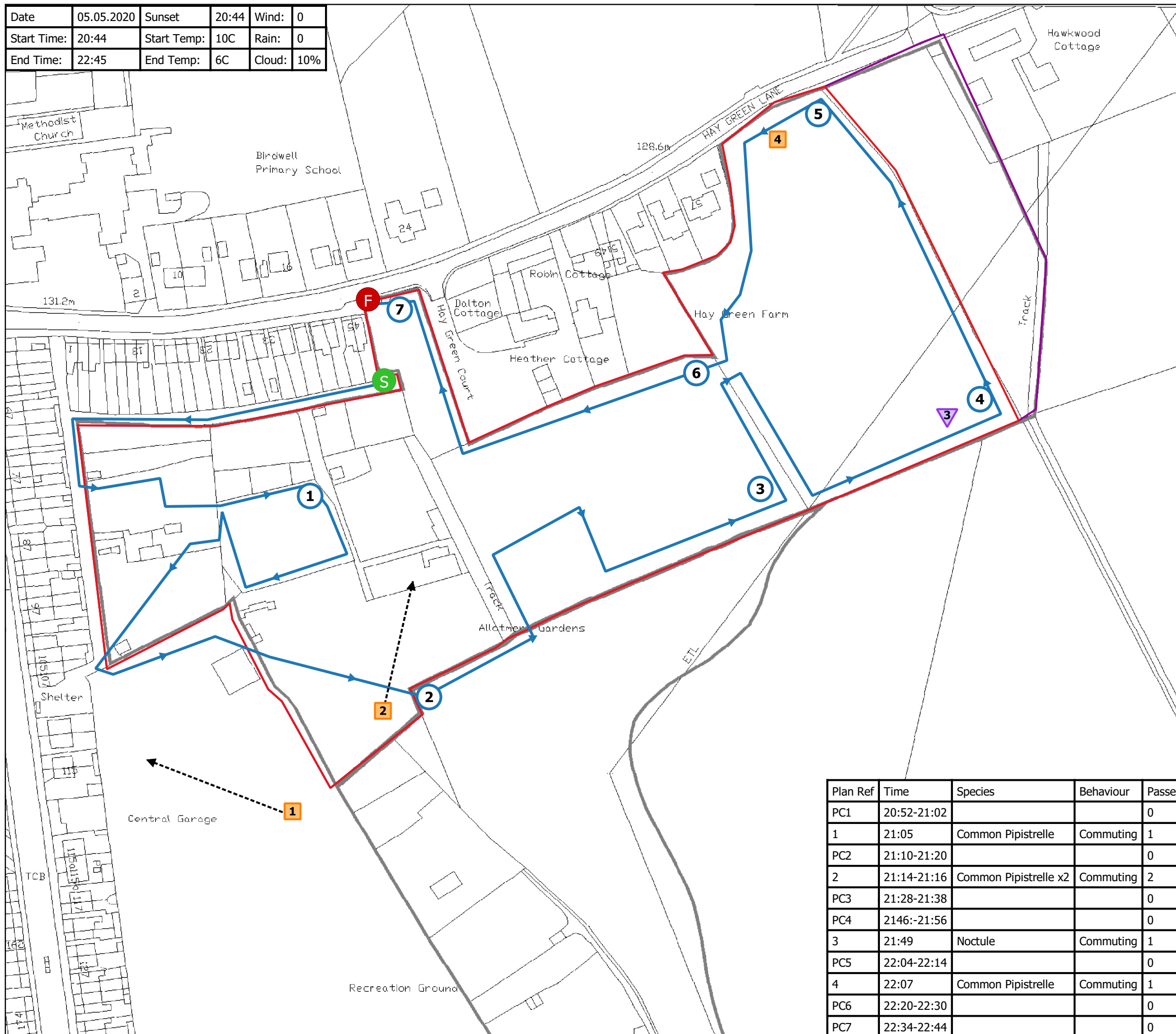
drawn
HJF/JDH

issue
26/5/2020

drawing / figure number
Figure 6

rev
-

Date	05.05.2020	Sunset	20:44	Wind:	0
Start Time:	20:44	Start Temp:	10C	Rain:	0
End Time:	22:45	End Temp:	6C	Cloud:	10%



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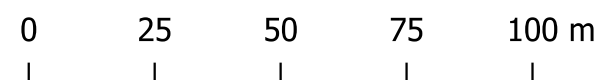
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Key:

- Site Boundary
- Additional Ownership
- S Start point
- F Finish point
- 1 Point Count (with ref.)
- Transect Route
- Flight Path

- Bat Contacts (with ref)**
- 1 Common Pipistrelle
 - 3 Noctule

Plan Ref	Time	Species	Behaviour	Passes
PC1	20:52-21:02			0
1	21:05	Common Pipistrelle	Commuting	1
PC2	21:10-21:20			0
2	21:14-21:16	Common Pipistrelle x2	Commuting	2
PC3	21:28-21:38			0
PC4	21:46-21:56			0
3	21:49	Noctule	Commuting	1
PC5	22:04-22:14			0
4	22:07	Common Pipistrelle	Commuting	1
PC6	22:20-22:30			0
PC7	22:34-22:44			0



client
Harworth Group PLC

project
**Haygreen Lane,
Birdwell, Barnsley**

drawing title
BAT TRANSECT PLAN (05.05.20)

scale @ A3
1:1500

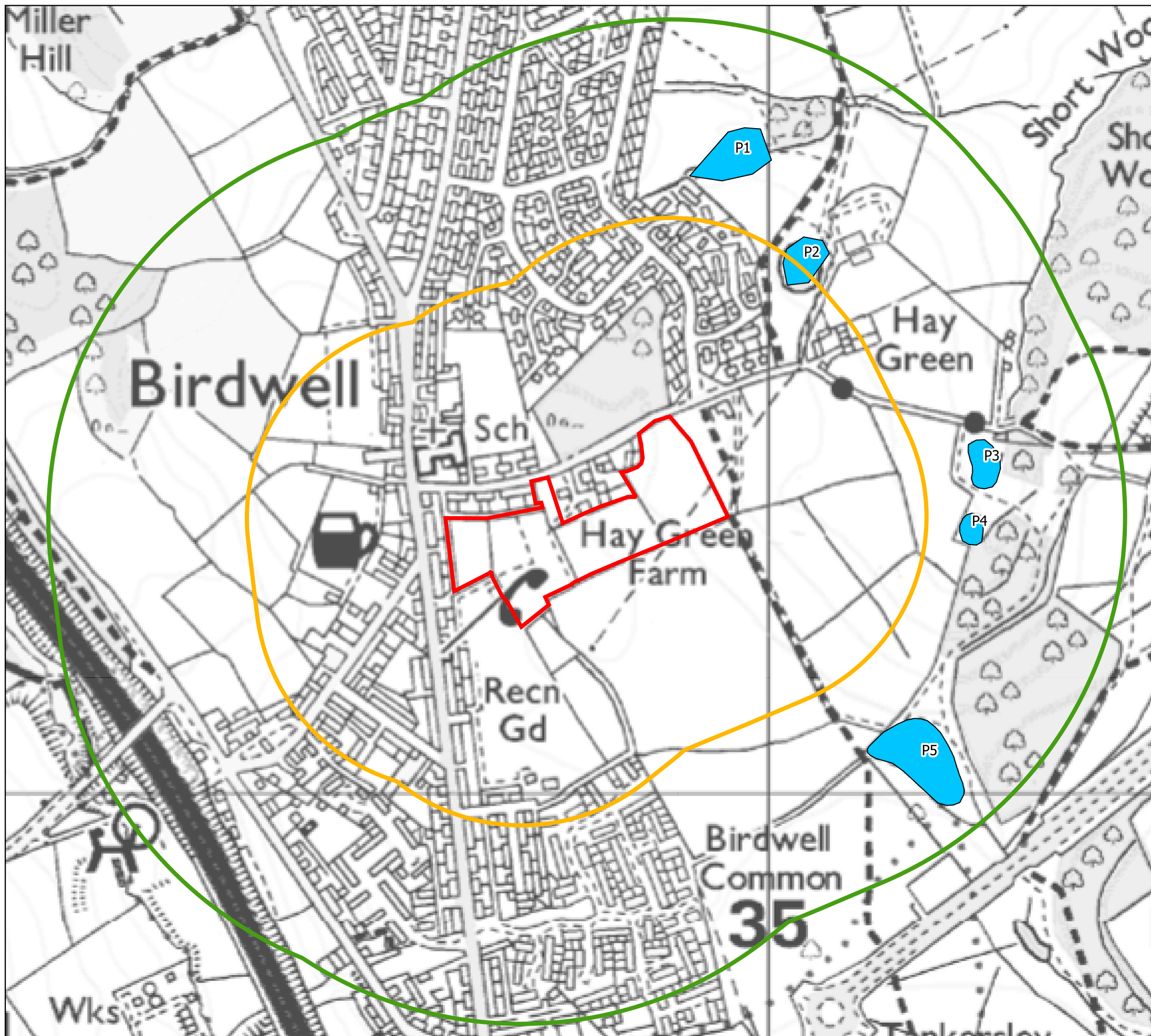
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JDH

issue
26/5/2020

drawing / figure number
Figure 7

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-

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Key

- Site Boundary
- 500m Buffer
- 250m Buffer
- Pond (with reference)

client
Harworth Group

project
Hay Green Lane, Birdwell,
Barnsley

drawing title
Pond Location Plan



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drawn
LTW/JDH

issue
26/5/2020

drawing / figure number
Figure 8

rev
9063

APPENDIX A: SPECIES LIST**Poor Semi Improved Grassland**TN1 Managed Field (no livestock at time of survey)

Common Name	Scientific Name	DAFOR
Barren Brome	<i>Anisantha sterilis</i>	O
Bramble	<i>Rubus fruticosus</i> agg.	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	O
Bush Vetch	<i>Vicia sepium</i>	O
Cat's-ear	<i>Hypochaeris radicata</i>	O
Charlock	<i>Sinapis arvensis</i>	R
Cleavers	<i>Galium aparine</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	A
Common Mouse-ear	<i>Cerastium fontanum</i>	R
Common Nettle	<i>Urtica dioica</i>	O
Common Ragwort	<i>Senecio jacobaea</i>	O
Cow Parsley	<i>Anthriscus sylvestris</i>	O
Creeping Buttercup	<i>Ranunculus repens</i>	O
Creeping Thistle	<i>Cirsium arvense</i>	F
Crested Dog's-tail	<i>Cynosurus cristatus</i>	F
Cut-leaved Crane's-bill	<i>Geranium dissectum</i>	O
Dandelion	<i>Taraxacum officinale</i> agg.	O
False Oat-grass	<i>Arrhenatherum elatius</i>	O
Good King Henry	<i>Chenopodium bonus-henricus</i>	O
Great Willowherb	<i>Epilobium hirsutum</i>	O
Lesser Trefoil	<i>Trifolium dubium</i>	O
Meadow Buttercup	<i>Ranunculus acris</i>	O
Meadow Foxtail	<i>Alopecurus pratensis</i>	F
Perennial Rye-grass	<i>Lolium perenne</i>	A
Perennial Sow-thistle	<i>Sonchus arvensis</i>	R
Pineapple Weed	<i>Matricaria discoidea</i>	O
Red Bartsia	<i>Odontites vernus</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	F
Rough Meadow-grass	<i>Poa trivialis</i>	F
Shepherd's-purse	<i>Capsella bursa-pastoris</i>	O
Smooth Meadow-grass	<i>Poa pratensis sens.lat.</i>	F
Soft-brome	<i>Bromus hordeaceus</i>	O
Spear Thistle	<i>Cirsium vulgare</i>	O
White Clover	<i>Trifolium repens</i>	A
Yorkshire-fog	<i>Holcus lanatus</i>	F

TN2 Horse Grazed Field

Common Name	Scientific Name	DAFOR
a common knapweed	<i>Centaurea nigra</i> ssp. <i>nigra</i>	F

Annual Meadow-grass	<i>Poa annua</i>	O
Bramble	<i>Rubus fruticosus</i> agg.	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	LA
Common Mouse-ear	<i>Cerastium fontanum</i>	F
Common Nettle	<i>Urtica dioica</i>	LF
Common Ragwort	<i>Senecio jacobaea</i>	O
Common Sorrel	<i>Rumex acetosa</i>	O
Creeping Buttercup	<i>Ranunculus repens</i>	F
Creeping Thistle	<i>Cirsium arvense</i>	O
Crested Dog's-tail	<i>Cynosurus cristatus</i>	O
False Oat-grass	<i>Arrhenatherum elatius</i>	O
Greater Plantain	<i>Plantago major</i>	O
Knotgrass	<i>Polygonum aviculare</i> sens.str.	R
Meadow Buttercup	<i>Ranunculus acris</i>	A
Meadow Foxtail	<i>Alopecurus pratensis</i>	O
Perennial Rye-grass	<i>Lolium perenne</i>	D
Pineapple Weed	<i>Matricaria discoidea</i>	O/LA
Prickly Sow-thistle	<i>Sonchus asper</i>	R
Red Clover	<i>Trifolium pratense</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	A
Selfheal	<i>Prunella vulgaris</i>	R
White Clover	<i>Trifolium repens</i>	A
Yorkshire-fog	<i>Holcus lanatus</i>	F

TN3 Managed Field (no livestock at time of survey)

Common Name	Scientific Name	DAFOR
Broad-leaved Dock	<i>Rumex obtusifolius</i>	F
Bush Vetch	<i>Vicia sepium</i>	R
Chickweed	<i>Stellaria media</i> agg.	O
Cleavers	<i>Galium aparine</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	F
Common Nettle	<i>Urtica dioica</i>	F
Common Ragwort	<i>Senecio jacobaea</i>	R
Creeping Thistle	<i>Cirsium arvense</i>	O
Elder	<i>Sambucus nigra</i>	R
False Oat-grass	<i>Arrhenatherum elatius</i>	F
Hedge Bindweed	<i>Calystegia sepium</i>	R
Knotgrass	<i>Polygonum aviculare</i> sens.str.	O
Meadow Buttercup	<i>Ranunculus acris</i>	F
Perennial Rye-grass	<i>Lolium perenne</i>	A
Perennial Sow-thistle	<i>Sonchus arvensis</i>	R
Pineapple Weed	<i>Matricaria discoidea</i>	A/LD
Red Clover	<i>Trifolium pratense</i>	R
Ribwort Plantain	<i>Plantago lanceolata</i>	A
Shepherd's-purse	<i>Capsella bursa-pastoris</i>	O
Soft-brome	<i>Bromus hordeaceus</i>	O

White Clover *Trifolium repens* LD

TN4 Horse Grazed Field

Common Name	Scientific Name	DAFOR
Annual Meadow-grass	<i>Poa annua</i>	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	O
Bush Vetch	<i>Vicia sepium</i>	R
Charlock	<i>Sinapis arvensis</i>	F
Chickweed	<i>Stellaria media agg.</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	F
Common Mouse-ear	<i>Cerastium fontanum</i>	O
Common Nettle	<i>Urtica dioica</i>	O
Common Ragwort	<i>Senecio jacobaea</i>	F
Creeping Buttercup	<i>Ranunculus repens</i>	F
Creeping Thistle	<i>Cirsium arvense</i>	F
Cut-leaved Crane's-bill	<i>Geranium dissectum</i>	R
Dandelion	<i>Taraxacum officinale agg.</i>	O
False Oat-grass	<i>Arrhenatherum elatius</i>	O
Greater Plantain	<i>Plantago major</i>	O
Hedge Mustard	<i>Sisymbrium officinale</i>	F
Hogweed	<i>Heracleum sphondylium</i>	R
Lesser Stitchwort	<i>Stellaria graminea</i>	R
Lesser Trefoil	<i>Trifolium dubium</i>	O
Meadow Buttercup	<i>Ranunculus acris</i>	F
Meadow Foxtail	<i>Alopecurus pratensis</i>	F
Parsley Piert	<i>Aphanes arvensis agg.</i>	R
Perennial Rye-grass	<i>Lolium perenne</i>	D
Pineapple Weed	<i>Matricaria discoidea</i>	LA
Red Clover	<i>Trifolium pratense</i>	R
Red Fescue	<i>Festuca rubra agg.</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	F
Rough Meadow-grass	<i>Poa trivialis</i>	A
Timothy	<i>Phleum pratense sens.lat.</i>	O
White Clover	<i>Trifolium repens</i>	A
Yorkshire-fog	<i>Holcus lanatus</i>	A

TN5 Mixed Grazing Field

Common Name	Scientific Name	DAFOR
Annual Meadow-grass	<i>Poa annua</i>	F
Bramble	<i>Rubus fruticosus agg.</i>	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	F
Chickweed	<i>Stellaria media agg.</i>	O
Common Nettle	<i>Urtica dioica</i>	LD
Common Ragwort	<i>Senecio jacobaea</i>	O

Creeping Buttercup	<i>Ranunculus repens</i>	O
Crested Dog's-tail	<i>Cynosurus cristatus</i>	O
Dandelion	<i>Taraxacum officinale agg.</i>	F
Foxglove	<i>Digitalis purpurea</i>	R
Greater Plantain	<i>Plantago major</i>	O
Knotgrass	<i>Polygonum aviculare sens.str.</i>	F
Meadow Buttercup	<i>Ranunculus acris</i>	F
Perennial Rye-grass	<i>Lolium perenne</i>	A
Red Fescue	<i>Festuca rubra agg.</i>	O
Shepherd's-purse	<i>Capsella bursa-pastoris</i>	O
White Clover	<i>Trifolium repens</i>	A

TN6 Mixed Grazing Field

Common Name	Scientific Name	DAFOR
Barren Brome	<i>Anisantha sterilis</i>	O
Bramble	<i>Rubus fruticosus agg.</i>	O
Broad-leaved Dock	<i>Rumex obtusifolius</i>	F
Cleavers	<i>Galium aparine</i>	O
Cock's-foot	<i>Dactylis glomerata</i>	A
Common Mouse-ear	<i>Cerastium fontanum</i>	O
Common Nettle	<i>Urtica dioica</i>	LD/F
Common Vetch	<i>Vicia sativa</i>	R
Creeping Thistle	<i>Cirsium arvense</i>	O
Dandelion	<i>Taraxacum officinale agg.</i>	O
False Oat-grass	<i>Arrhenatherum elatius</i>	F
Hawthorn	<i>Crataegus monogyna</i>	O
Hedge Mustard	<i>Sisymbrium officinale</i>	O
Hogweed	<i>Heracleum sphondylium</i>	R
Meadow Buttercup	<i>Ranunculus acris</i>	O
Perennial Rye-grass	<i>Lolium perenne</i>	D
Perennial Sow-thistle	<i>Sonchus arvensis</i>	O
Red Clover	<i>Trifolium pratense</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	O/LF
White Clover	<i>Trifolium repens</i>	A
Yorkshire-fog	<i>Holcus lanatus</i>	F

Dense Scrub (TN7)

Common Name	Scientific Name	DAFOR
Annual Meadow-grass	<i>Poa annua</i>	LD
Apple	<i>Malus domestica</i>	O
Ash	<i>Fraxinus excelsior</i>	O
Bramble	<i>Rubus fruticosus agg.</i>	D
Cleavers	<i>Galium aparine</i>	LD
Common Nettle	<i>Urtica dioica</i>	LD

Common Sorrel	<i>Rumex acetosa</i>	O
Common Vetch	<i>Vicia sativa</i>	R
Cow Parsley	<i>Anthriscus sylvestris</i>	O
Creeping Cinquefoil	<i>Potentilla reptans</i>	LF
Creeping Thistle	<i>Cirsium arvense</i>	A
Dandelion	<i>Taraxacum officinale agg.</i>	O
Elder	<i>Sambucus nigra</i>	O
False Oat-grass	<i>Arrhenatherum elatius</i>	A
Field Bindweed	<i>Convolvulus arvensis</i>	O/LF
Hawthorn	<i>Crataegus monogyna</i>	O
Hedge Woundwort	<i>Stachys sylvatica</i>	R
Hogweed	<i>Heracleum sphondylium</i>	O
Horse-radish	<i>Armoracia rusticana</i>	R
Ivy	<i>Hedera helix</i>	LF
Meadow Vetchling	<i>Lathyrus pratensis</i>	R
Pedunculate Oak	<i>Quercus robur</i>	O
Red Fescue	<i>Festuca rubra agg.</i>	LA
Rosebay Willowherb	<i>Chamerion angustifolium</i>	LA
Rowan	<i>Sorbus aucuparia</i> <i>Symphytum asperum x</i> <i>officinale (S. x</i> <i>uplandicum)</i>	R
Wall Barley	<i>Hordeum murinum</i>	R

Appendix B: Static Detector Results Summary Data

Recording Period	Unit No.	Start Date	End Date	Survey Hours	Total Av. per hour	Total Registrations	Common Pipistrelle			Soprano Pipistrelle			Myotis Species			Noctule			Brown Long-eared			Pipistrelle Species		
							Period Total	Peak Count	Av. Per Hour	Period Total	Peak Count	Av. Per Hour	Period Total	Peak Count	Av. Per Hour	Period Total	Peak Count	Av. Per Hour	Period Total	Peak Count	Av. Per Hour	Period Total	Peak Count	Av. Per Hour
Spring	1	05/05/2020	10/05/2020	47:10:48	21.153	998	974	486	20.644	4	3	0.085	2	2	0.042	18	7	0.382	0	0	0.000	0	0	0.000
Summer	2	13/06/2019	18/06/2019	39:55:44	89.885	3589	3331	1090	83.423	200	64	5.009	14	9	0.351	34	21	0.852	6	2	0.150	4	2	0.100
Autumn	8	25/09/2019	30/09/2019	66:02:40	11.462	757	622	360	9.418	15	6	0.227	109	61	1.650	7	4	0.106	3	2	0.045	1	1	0.015
Totals:				153:09:13	34.893	5344	4927	1090	32.170	219	64	1.430	125	61	0.816	59	21	0.385	9	2	0.059	5	2	0.033

Appendix C: Surveyor Details

Surveyor	Degree	Seasons Consultancy Experience	Additional Details
Anastasia Spencer (Assistant Ecologist)	BSc (Hons) Wildlife Conservation	2	Tree Climbing and Aerial Rescue (NPTC Level 2)
Ben Atherton (Assistant Ecologist)	BSc (Hons) Environmental Science	1	
Ed Selvey (Assistant Ecologist)	BSc (Hons) Zoology, MSc Conservation Science and Policy	2	
James Hutchison (Ecologist)	BSc (Hons) Ecology, MRes Ecology and Environmental Biology, PhD Animal and Plant Sciences	4	GradCIEEM Tree Climbing and Aerial Rescue (NPTC Level 2) FISC Level 3 GCN License 2019-41008-CLS-CLS Barn Owl License CL29/00489
James Leonard (Assistant Ecologist)	BSc (Hons) Biology with Biochemistry	1	Q CIEEM
Helen Feetham (Principal Ecologist)	BSc(Hons) Botany, MSc Plant Diversity	14	MCIEEM FISC Level 4 GCN License 2015-18534-CLS-CLS
Hollie Fisher (Assistant Ecologist)	BSc (Hons) Wildlife Conservation	2	Q CIEEM
Leanne Watret (Assistant Ecologist)	BSc Biology (Hons), MSc Endangered Species Recovery and Conservation	3	GCN License 2019-444052-CLS-CLS
Molly Foulds (Assistant Ecologist)	Combined Master of Zoology (MZool)	2	Q CIEEM GCN License 2019-43610-CLS-CLS
Sam Arthur (Associate Ecologist)	BSc (Hons) Environmental Science, MSc Environmental Consultancy	9	MCIEEM C.ENV Tree Climbing and Aerial Rescue (NPTC Level 2) GCN License WML-CL08 (Level1) (CLS02268) Barn Owl License CL29/00182 Bat Licenses 2015-19188- CLS (level 2), 2017-31081-CLS (level 4)

Appendix D: Tree List

Tree No	Description	Height (m)	Approx Stem Dia. (mm)	Arboriculture Notes	Bat Roost Potential
T1	Multi-stem, semi-mature sycamore.	9	110, 230, 150, 210	Browsing damage noted on main stem Crossing and rubbing branches Minor dead wood evident in the crown (<75mm) Multi stemmed from base	Negligible
T2	Mature ash tree within H1. Multiple cavity features.	20	1000	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Large cavity on west side of stem	High
T3	Hedgerow H3 emergent, semi-mature holly	7	100, 2x80	Base obscured Characteristic for species	Negligible
T4	Hedgerow H3 emergent, semi-mature holly	5	100 2x80	Base obscured Characteristic for species	Negligible
T5	Offsite, established ash located in residential garden	8	260 330	Bark wounds noted Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Loss of most bark on southern stem	Not assessed
T6	Hedgerow H5 emergent multi-stem, semi-mature ash	7	7x 150	Set in hedgerow Base obscured	Negligible
T7	Multi-stem, semi-mature elder	6	7x 120	Characteristic for species No major defects were noted	Negligible
T8	Multi-stem, semi-mature elder	5	10x 80	Characteristic for species No major defects were noted	Negligible
T9	Semi-mature ash at edge of scrub area	7	250, 3 x 100	Set in hedgerow Typical form	Negligible
T10	Semi-mature sycamore at edge of allotments	8	3 x 150	No live growth present Manure stacked at base	Negligible
T11	Hedgerow H6 emergent, semi-mature sycamore	9	7x 150	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	Negligible
T12	Established field maple at edge of scrub area	12	7x 180	Dense undergrowth at the base Multi stemmed from base No major defects were noted	Negligible
T13	Semi-mature goat willow at edge of scrub area	5	3 x 70	Growing around fence	Negligible
T14	Mature oak in scrub area. Cavity feature at 2m.	15	950	Bark wounds noted Basal cavity observed Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Loss of bark and cavity at base with decay present	Negligible (Downgraded from moderate following aerial inspection)
G1	Offsite cluster of mature sycamores located in residential garden, adjacent to	21	550	Minor dead wood evident in the crown (<75mm) No major defects were noted	Not assessed

Tree No	Description	Height (m)	Approx Stem Dia. (mm)	Arboriculture Notes	Bat Roost Potential
	existing street light.				
G2	Hedgerow H1	6	120	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible
G3	Hedgerows H2 and H4	4	50	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible
G4	Hedgerow H3	4	50	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible
G5	Offsite established ash trees in residential garden	5	130, 180, 170, 150	Base obscured Branch stubs evident Minor dead wood evident in the crown (<75mm) Situated offsite	Not assessed
G6	Hawthorns in north west scrub corner	6	180	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible
G7	Hawthorns in western fields	6	180	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible
G8	Hedgerows H6 and H7	6	7x 50	Outgrown hedgerow	Negligible
G9	Main scrub area	5	150	Self set material Scrappy forms No active management observed	Negligible
G10	Hedgerow H5	4	50	Branch stubs evident Flail damage evident Outgrown hedgerow	Negligible