South Caldecotte, Milton Keynes

Ecological Appraisal

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Executive Summary

i) **Introduction.** Aspect Ecology was commissioned by Hampton Brook in September 2017 to undertake an Ecological Appraisal in respect of proposed development of land at South Caldecotte, Milton Keynes.

ii) **Proposals.** The proposals are for new strategic employment development, including nine new warehouses, with offices, parking, and associated access and infrastructure.

iii) **Survey.** The site was surveyed in October 2017 based on standard extended Phase 1 methodology. In addition, a general appraisal of faunal species was undertaken to record the potential presence of any protected, rare or notable species. Specific surveys were also conducted in respect of bats, Badger, Water Vole, Otter, Reptiles, Great Crested Newt and birds during 2017 and 2018. Detailed botanical surveys of the woodland and pastoral fields were carried out in 2018.

iv) **Ecological Designations.** A Milton Keynes Wildlife Corridor is partially located within the west of the site. Although its width may be reduced under the proposals, the on-site habitats will ultimately be enhanced within a linear park along the western boundary, therefore retaining the function of the designation. A Milton Keynes Wildlife Corridor is also located adjacent to the north of the site along the railway, and will be retained and protected under the proposals. Other designations in the local area are well separated from the site.

v) **Habitats.** The site comprises a mix of pastoral and arable agricultural land bound by hedgerows, scrub and tree lines, and a parcel of land containing a residential dwelling, associated buildings, two ponds, small orchard and plantation woodland. The majority of the habitats on-site do not constitute important ecological features. The poor quality lowland meadow, hedgerows, mature Black Poplar trees, woodland and stream do form important ecological features. As such, losses of these habitats will be mitigated/compensated for, including through new habitat creation, and the stream will be re-routed with enhanced habitat created. New and retained habitats will be subject to appropriate long-term management.

vi) **Protected Species.** Low numbers of Brown Long-eared Bats, Common Pipistrelle and Soprano Pipistrelle are roosting within a number of the on-site buildings. These and other bat species also utilise the site for foraging and commuting. Badgers utilise the site for foraging, although no setts have been recorded on-site. Common Lizard and a single juvenile Slow-worm have been recorded on-site, as well as a range of bird species. Outline mitigation strategies have therefore been presented for these species within this report.

vii) **Enhancements.** The proposals present the opportunity to secure a number of biodiversity benefits, including new landscape planting, and faunal specific enhancements such as the provision of hibernacula for reptiles.

viii) **Summary.** The proposals have sought to minimise adverse effects on biodiversity, but where harm to biodiversity is unavoidable the development has sought to mitigate and/or compensate for its loss in accordance with relevant planning policy and promote biodiversity within retained and newly created habitats.

1 Introduction

1.1 Background & Proposals

1.1.1 Aspect Ecology was commissioned by Hampton Brook in September 2017 to undertake an Ecological Appraisal in respect of proposed development of land at South Caldecotte, Milton Keynes, centred at grid reference SP 8923 3419 (see Plan 5263/ECO1).

1.1.2 The outline proposals are for new strategic employment development, including nine new warehouses, with offices, parking, and associated access and infrastructure.

1.2 Site Overview

1.2.1 The site is located in an urban edge location on the outskirts of Milton Keynes. The site is bound to the west by the A5 dual carriageway, beyond which is a mix of agricultural land and residential and commercial properties. To the north the site is bound by a railway line and embankment, beyond which is Caldecotte Lake, residential dwellings and commercial properties. The site is bound to the east by V10 Brickhill Street and agricultural land. The A5 and V10 Brickhill Street connect at a roundabout adjacent to the south of the site.

1.2.2 The site itself comprises a mix of arable and pastoral agricultural land, as well as a residential property with numerous outbuildings. The individual fields within the site are bound by hedgerows, tree lines and areas of dense scrub. Mature trees, two small woodland parcels and an area of plantation woodland are present, as well as a stream, two garden ponds and an ephemeral waterbody.

1.3 Purpose of the Report

1.3.1 This report documents the methods and findings of the baseline ecology surveys and desktop study carried out in order to establish the existing ecological interest of the site, and subsequently provides an appraisal of the likely ecological effects of the proposals. The importance of the habitats and species present is evaluated. Where necessary, avoidance, mitigation and compensation measures are proposed so as to safeguard any significant existing ecological interest within the site and where appropriate, opportunities for ecological enhancement are identified with reference to national conservation priorities and local Biodiversity Action Plans (BAPs).

2 Methodology

2.1 Desktop Study

2.1.1 In order to compile background information on the site and its immediate surroundings the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) was contacted, with data requested on the basis of a search radius of 2km. Where information has been received from the above organisation this is reproduced on Plan 5263/ECO2, where appropriate.

2.1.2 Information on statutory designations was obtained from the online Multi-Agency Geographic Information for the Countryside (MAGIC) database, which utilises data provided by Natural England, with an extended search radius (15km). In addition, the MAGIC database was searched to identify the known presence of any Priority Habitats within or adjacent the site.

2.1.3 In addition, the Woodland Trust database was searched for any records of veteran trees within or adjacent to the site.

2.2 Habitat Surveys

Phase 1 Habitat Survey

2.2.1 The site was surveyed in October 2017 in order to ascertain the general ecological value of the land contained within the boundaries of the site and to identify the main habitats and ecological features present.

2.2.2 The site was surveyed based on standard Phase 1 Habitat Survey methodology[1], whereby the habitat types present are identified and mapped, together with an assessment of the species composition of each habitat. This technique provides an inventory of the basic habitat types present and allows identification of areas of greater potential which require further survey. Any such areas identified can then be examined in more detail through Phase 2 surveys. This method was extended, in line with the Guidelines for Preliminary Ecological Appraisal[2] to record details on the actual or potential presence of any notable or protected species or habitats.

2.2.3 Using the above method, the site was classified into areas of similar botanical community types, with a representative species list compiled for each habitat identified. The nomenclature used for plant species is based on the Botanical Society for the British Isles (BSBI) Checklist.

Woodland Survey

2.2.4 Due to the suboptimal time at which the Phase 1 habitat survey was completed, the areas of woodland on-site were subject to a botanical survey during May 2018. During this survey, species presence and abundance were recorded, with particular attention paid to the presence of ancient woodland indicator species.

1 Joint Nature Conservation Committee (2010) *'Handbook for Phase 1 habitat survey: A technique for environmental audit.'*

2 Chartered Institute for Ecology and Environmental Management (CIEEM) (2013) '*Guidelines for Preliminary Ecological Appraisal.'*

Grassland Botanical Survey

2.2.5 A National Vegetation Classification (NVC) survey was completed in July 2018 of the two fields recorded on the MAGIC database as comprising the Priority Habitat type lowland meadow (fields F3 and F4 on Plan 5263/ECO3). The survey was carried out according to standard methodology[3], using five 2m x 2m quadrats to record species present and cover values using the Domin scale. Each field was considered to be homogenous therefore quadrats were distributed evenly across the fields. Quadrats were located within stands of homogenous vegetation, i.e. avoiding localised patches of ruderal vegetation or disturbed ground, but with the precise quadrat locations otherwise selected at random. In addition a general species audit was also undertaken.

2.2.6 The data collected was entered into the Modular Analysis of Vegetation Information System (MAVIS) computer program designed by Simon Smart from the Centre for Ecology and Hydrology in order to classify the type of grassland community present.

2.2.7 In addition, due to the suboptimal time at which the Phase 1 habitat survey was completed, the remainder of the pastoral grassland within fields F1-F7, F12 and F13 were subject to a walkover survey during July 2018. This survey allowed a better assessment of the grassland's character and as a result it was concluded that these fields did not exhibit the same characteristics as F3 and F4 and therefore were not included within the NVC survey.

2.3 Faunal Surveys

2.3.1 General faunal activity, such as mammals or birds observed visually or by call during the course of the surveys was recorded. Specific attention was also paid to the potential presence of any protected, rare or notable species, and specific consideration was given to bats, Badger, Water Vole, Otter, Retiles, Great Crested Newt and birds, as described below.

Bats[4]

Visual Inspection Surveys

2.3.2 **Buildings.** The buildings within the site were subject to specific internal and external inspection surveys using ladders, torches and binoculars where necessary in October 2017.

2.3.3 During the external inspections, particular attention was given to any potential roost features or access points, such as broken or lifted roof tiles, lifted lead flashing, soffit boxes, weatherboarding, hanging tiles, etc. and for any external signs of use by bats such as accumulations of bat droppings or staining. Binoculars were used to inspect any inaccessible areas more closely where appropriate.

2.3.4 During the internal inspections, evidence for the presence of bats was searched for with particular attention paid to any loft voids and relevant potential roost features and locations, such as ridge boards, rafters, purlins, gable walls, and mortise joints. Specific searches were made for bat droppings that can indicate present or past use and extent of use, whilst other signs that can indicate the possible presence of bats were also searched for, e.g. presence of stained areas, feeding remains, corpses, etc. Any droppings collected during the course of the surveys were visually assessed and attributed to a species where possible on the basis

[3] Joint Nature Conservation Committee (2010) *'Handbook for Phase 1 habitat survey: A technique for environmental audit.'*
[4] Based on: English Nature (2004) '*Bat Mitigation Guidelines'*

of size/shape/texture[5]. Where appropriate, samples of similar droppings were collected with gloved hands and put into labelled eppendorfs, and forwarded to the University of Warwick for DNA analysis.

2.3.5 **Trees**. Trees were assessed for their potential to support roosting bats based on the presence of features such as holes, cracks, splits or loose bark. The suitability for roosting bats was categorised based on best practice guidance[6] as:

- High;
- Moderate;
- Low; or
- Negligible.

2.3.6 Any potential roost features identified were also inspected for any signs indicating possible use by bats, e.g. staining, scratch marks, bat droppings, etc.

Dusk Emergence / Dawn Re-entry Surveys

2.3.7 Dusk emergence and dawn re-entry surveys were carried out between May and July 2018 to identify any bats roosting in the buildings and trees identified to have potential to support roosting bats.

2.3.8 Surveyors employed Bat Box Duet hand-held electronic detectors and Echo Meter EM3 or Eco Meter Touch recording equipment to aid identification of any bats observed. At dusk, surveyors were in position 15 minutes prior to sunset, remaining in place for approximately 1.5 - 2 hours. At dawn, surveyors were in place approximately 1.5 – 2 hours before sunrise and remained in place until ~15 minutes after sunrise. This survey method aims to identify any roosting bats emerging from or returning to potential roost sites.

2.3.9 Dusk emergence / dawn re-entry survey work was carried out during suitable weather conditions, as set out in Tables 2.1 and 2.2 below. The surveys were completed by fully trained surveyors, including a number of licence holders, under the overall direction of licence holder 2015-13630-CLS-VLS.

[5] Stebbings, RE, Yalden DW and Herman, JS (2007). '*Which bat is it? A guide to bat identification in Great Britain and Ireland.*' The Mammal Society

[6] Bat Conservation Trust (2016) '*Bat Surveys for Professional Ecologists: Good Practice Guidelines*.'

Table 2.1. Building emergence/ re-entry survey details. BF0 = calm, BF12 = hurricane force.

Date	Start & end times & time of sunset/ sunrise	Structure reference / location	Number of surveyors	Equipment used	Weather
10/05/2018 (Dusk)	Start time: 20.25 End time: 22.20 Sunset: 20.42	B1, B5, B6,	8	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Dry, 50-80% cloud, BF1, 13°C
11/05/2018 (Dawn)	Start time: 03.45 End time: 05.30 Sunrise: 05.16	B1, B5, B6,	8	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Dry, 10% cloud, BF1, 6°C
24/05/2018 (Dusk)	Start time: 20.45 End time: 23.03 Sunset: 21.03	B2	4	Bat Box Duet and Echo Meter EM3	Dry, 20%-100% cloud, BF2, 15°C
14/06/2018 (Dusk)	Start time: 21.09 End time: 23.02 Sunset: 21.24	B1, B5, B6,	8	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Dry, 0% cloud, BF2, 19°C
15/06/2018 (Dawn)	Start time: 03.12 End time: 04.57 Sunrise: 04.42	B2, B3, B4	8	Bat Box Duet, Echo Meter Touch and Echo Meter EM3	Dry, 0% cloud, BF1, 9°C
18/06/2018 (Dusk)	Start time: 21.11 End time: 22.56 Sunset: 21.26	B1b, B3, B7	5	Bat Box Duet, Echo Meter EM3	Very light intermittent drizzle from 22.00, 100% cloud, BF6, 19°C

Table 2.2. Tree emergence / re-entry survey details. BF0 = calm, BF12 = hurricane force.

Date	Start & end times & time of sunset/ sunrise	Structure reference / location	Number of surveyors	Equipment used	Weather
04/06/2018 (Dusk)	Start time: 21:00 End time: 23:15 Sunset: 21.16	T2, T3, T4, T5, T10, T27	6	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Very light drizzle 22:15, 100% cloud, BF4, 14°C
05/06/2018 (Dawn)	Start time: 03.00 End time: 05.01 Sunset: 04.46	T14, T19, T22, T23, T24, T33	6	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Very light drizzle, 100% cloud, BF3, 12°C
19/06/2018 (Dawn)	Start time: 03.12 End time: 04.57 Sunrise: 04.42	T3, T5, T10, T19, T22,	5	Bat Box Duet, Echo Meter Touch	Dry, 100% cloud, BF5, 16°C
02/07/2018 (Dusk)	Start time: 21.11 End time: 23.26 Sunset: 21.26	T14, T19, T22, T23, T24, T33	6	Bat Box Duet, Echo Meter EM3and Echo Meter Touch	Dry, 0% cloud, BF2, 21°C
03/07/2018 (Dawn)	Start time: 03.18 End time: 05.03 Sunrise: 04.48	T2, T3, T4, T5, T10, T27	6	Bat Box Duet, Echo Meter EM3 and Echo Meter Touch	Dry, 0% cloud, BF2, 13°C

Activity Surveys

2.3.10 Walked transect surveys were undertaken during October 2017, May 2018 and July 2018 to ascertain the level of usage of the site by foraging and commuting bats. This survey method involves walking planned transect routes with key listening points (see Plan 5263/BAT1), specifically covering habitats / features with particular potential for commuting or foraging bats. Bat Box Duet hand-held electronic detectors were employed together with Echo Meter EM3 recording equipment to aid identification of any bats observed. Each transect was walked from sunset, for approximately 2 hours, with a 5 minute stop at each listening point. This methodology was repeated for approximately 2 hours prior to sunrise to complete the dawn survey.

2.3.11 Over half of the site comprises a large arable field which does not provide good quality bat foraging habitat. Furthermore, the site is fragmented from off-site foraging and commuting habitat by the surrounding road network. As such, it was considered that carrying out manual walked transect surveys every month during the active bat season would be disproportionate and unlikely to influence the overall findings of the survey work. The first walked transect survey and static detector survey supported this conclusion and did not record higher than expected levels of activity, or high numbers of rarer bat species. Therefore, a walked activity transect survey was carried out seasonally, supplemented by monthly static detector surveys. This approach was discussed with the Milton Keynes Council Countryside Officer who agreed that this was a proportionate methodology appropriate for the site.

2.3.12 Activity survey work was carried out during suitable weather conditions, as set out in Table 2.3 below.

Table 2.3. Walked transect survey details. BF0 = calm, BF12 = hurricane force.

Date	Start & end times & time of sunset / sunrise	Transect / location	Equipment used	Weather
26/10/2017 (Dusk)	Start time: 17.47 End time: 20.25 Sunset: 17.47	Transect A and B	Bat Box Duet and Echo Meter EM3	Dry, 100% cloud, BF2, 12°C
27/10/2017 (Dawn)	Start time: 05.21 End time: 07.48 Sunrise: 07.48	Transect A and B	Bat Box Duet and Echo Meter EM3	Dry, 100% cloud, BF2, 12°C
01/05/2018 (Dusk)	Start time: 20.27 End time: 23.14 Sunset: 20.27	Transect A and B	Bat Box Duet and Echo Meter EM3	Dry, 75% cloud, BF4, 10°C
16/07/2018 (Dusk)	Start time: 21.16 End time: 23.19 Sunset: 21.16	Transect A and B	Bat Box Duet and Echo Meter EM3	Dry, 80% cloud, BF3, 21°C
17/07/2018 (Dawn)	Start time: 02.57 End time: 05.03 Sunrise: 05.03	Transect A and B	Bat Box Duet and Echo Meter EM3	Dry, 40% cloud, BF2, 15°C
Comments: The survey was undertaken by 2 surveyors per transect under direction of licence holder 2015-13630-CLS-VLS.				

2.3.13 Automated static detector surveys were also carried out during which Song Meter 2 (SM2) or Song Meter 4 (SM4) detectors were positioned at the same four locations within the site in October 2017 and between May 2018 and September 2018 to record any bat activity (static detector location shown on Plan 5263/BAT1). Detector 1 was situated on the south-western boundary within the hedgerow adjacent to the A5. Detector 2 was located adjacent to the stream and close to a hedgerow within the pastoral land. Detector 3 was situated within the driveway of the residential property and near to V10 Brickhill Street. Detector 4 was located at the southern edge of the small copse of trees within the arable field towards the north of the site. The detectors were set to switch on approximately 30 minutes before sunset and switch off approximately 30 minutes after sunrise. The weather conditions during the static detector surveys are provided in Table 2.4 overleaf.

Table 2.4. Weather conditions during automated static bat detector surveys.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(ᶜ)	Cloud Cover (%)	Precipitation
01/05/2018	3	7	0	Dry
02/05/2018	4	10	75	Occasional Light Rain
03/05/2018	2	9	50	Dry
04/05/2018	2	15	75	Dry
05/05/2018	2	17	0	Dry
06/05/2018	3	17	0	Dry
16/05/2018	5	12	75	Dry
17/05/2018	4	13	0	Dry
18/05/2018	2	11	75	Dry
19/05/2018	2	17	0	Dry
20/05/2018	4	15	25	Dry
21/05/2018	4	15	75	Occasional Light Rain
30/05/2018	2	13	75	Dry
31/05/2018	3	17	50	Dry
01/06/2018	1	16	50	Dry
02/06/2018	3	18	75	Dry
03/06/2018	4	17	50	Dry
04/06/2018	3	15	75	Dry
15/06/2018	3	19	0	Dry
16/06/2018	5	17	100	Occasional Light Rain
17/06/2018	4	17	75	Dry
18/06/2018	4	22	75	Dry
19/06/2018	3	22	75	Dry
20/06/2018	4	21	75	Dry
21/06/2018	3	17	25	Dry
22/06/2018	2	20	0	Dry
23/06/2018	3	17	0	Dry
24/06/2018	2	21	0	Dry
16/07/2018	3	25	0	Dry
17/07/2018	3	22	25	Dry
18/07/2018	3	24	0	Dry
19/07/2018	2	25	0	Dry
20/07/2018	3	24	75	Dry
21/07/2018	2	26	0	Dry
22/07/2018	3	23	75	Dry
23/08/2018	3	20	25	Dry
24/08/2018	4	15	25	Dry
25/08/2018	3	14	25	Dry
26/08/2018	4	14	100	Occasional Light Rain
27/08/2018	4	17	100	Dry
11/09/2018	3	17	75	Dry
12/09/2018	1	11	75	Occasional Light Rain
13/09/2018	2	10	0	Dry
14/09/2018	4	12	0	Dry
15/09/2018	3	16	100	Occasional Light Rain
16/09/2018	4	19	100	Occasional Light Rain

Analysis of Bat Survey Recordings

2.3.14 All bat calls were analysed using BatSound v.3.30© and Analook W v3.9 to verify the species recorded during the survey work. Where recordings could not be reliably attributed to species (such as for Myotis species) or where overlaps between otherwise distinguishable species occur (such as in Pipistrelle bat calls around 40kHz or 50kHz) calls were identified to genus level; in the case of calls which could not be distinguished between *Nyctalus* sp. and Serotine *Eptesicus serotinus*, these were labelled as 'unidentified big bat' species.

Otter (Lutra lutra)[7]

2.3.15 The watercourse within the site was thoroughly searched for signs of Otter in May 2018 and May 2019. Such signs include holts (underground chambers used for lying up), spraints, prints, paths and slides. The banks of the watercourse were examined thoroughly from both sides (where accessible) and from the watercourse itself where scrub and water depth allowed.

Water Vole (*Arvicola amphibious)*[8]

2.3.16 The watercourse within the site was thoroughly searched for signs of Water Vole in May 2018 and May 2019. Such signs include latrines, tunnels, lawns (small areas of vegetation grazed by Water Vole) and footprints. The banks of the watercourse were examined thoroughly from both sides (where accessible) and from the watercourse itself where scrub and water depth allowed.

Badger (*Meles meles*)[9]

2.3.17 A detailed Badger survey was carried out in October 2017. The survey comprised two main elements. The first element involved searching for evidence of Badger setts. For any setts that were encountered, each sett entrance was noted and mapped. The following information was recorded:

- Number and location of well used / active entrances; these are clear from any debris or vegetation and are obviously in regular use and may, or may not, have been excavated recently;
- Number and location of inactive entrances; these are not in regular use and have debris such as leaves and twigs in the entrance or have plants growing in or around the edge of the entrance;
- Number of disused entrances; these have not been in use for some time, are partly or completely blocked and cannot be used without considerable clearance. If the entrance has been disused for some time all that may be visible is a depression in the ground where the hole used to be and the remains of the spoil heap.

2.3.18 The second element involved searching for signs of Badger activity such as well-worn paths and push-throughs, snagged hair, footprints, latrines and foraging signs, so as to build up a picture of any use of the site by Badger.

7 Surveys based on: Life in UK Rivers (2003) *'Monitoring the Otter - Conserving Natura 2000 Rivers*'. Monitoring Series No. 10

8 Surveys based on: Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) '*Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.*

9 Based on: Mammal Society (1989) '*Occasional Publication No. 9 – Surveying Badgers*'

Reptiles[10]

2.3.19 Given the presence of potentially suitable reptile habitat within the site, a specific survey was undertaken to establish the presence/ likely absence of common reptile species between May and June 2018.

2.3.20 A total of 235 50x50cm sheets of thick roofing felt were placed within suitable areas across the site to act as artificial refugia, which represents a density of approximately 15 refugia per hectare of suitable reptile habitat (see Plan 5263/ECO4 for refugia locations). The refugia, or 'tins', provide shelter and heat up more quickly than their surroundings in the morning and can remain warmer than their surroundings in the late afternoon. Being ectothermic (cold blooded), reptiles use them to bask under and raise their body temperature, which allows them to forage earlier and later in the day. Therefore, checking the refugia at appropriate times of the day (morning and evening) enables the presence/absence of common reptiles to be determined.

2.3.21 The refugia remained undisturbed for approximately 2 weeks to allow reptiles to find and start using them. Following this initial bedding-in period, refugia were checked at appropriate times of the day on seven occasions during suitable weather conditions, as set out below in Table 2.5.

Table 2.5. Reptile survey dates and weather conditions.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°)	Cloud Cover (%)	Precipitation
04/05/2018	4	16	100	Dry
11/05/2018	4	14	20	Dry
16/05/2018	5	12	60	Occasional drizzle
18/05/2018	3	10	20	Dry
22/05/2018	3	17	20	Dry
04/06/2018	2	18	100	Dry
15/06/2018	4	18	80	Dry

BF0 = calm, BF12 = hurricane force

2.3.22 In addition, reptiles basking in the open or partial cover were actively searched for in suitable locations across the site through direct observation. Existing natural objects (e.g. logs and rocks) and artificial refugia (e.g. debris, tyres, etc.) were also searched, where present, for reptiles or evidence of reptiles (e.g. sloughed skin).

Great Crested Newt (*Triturus cristatus)*

Habitat Suitability Index (HSI)

2.3.23 As a first step in identifying the potential presence of Great Crested Newt at the site, a Habitat Suitability Index (HSI) study was undertaken of relevant water bodies within 250m[11] of the site boundary (based on a review of Ordnance Survey mapping and satellite imagery), where access was gained. Guidance set out within Natural England's Method Statement template, to be used when applying for a Great Crested Newt development licence, states that surveys of ponds within 500m of the site boundary are only required when '(a) data

[10] Surveys based on: Froglife Advice Sheet 10 (1999) '*Reptile Survey - an introduction to planning, conducting and interpreting surveys for snake and lizard conservation.*'

[11] 250m is the typical maximum migratory range of this species, see English Nature (2004) '*An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt* Triturus cristatus'. English Nature Research Report 576

indicates that the pond(s) has potential to support large Great Crested Newt population, (b) the footprint contains particularly favourable habitat, (c) the development would have a substantial negative effect on that habitat and (d) there is an absence of dispersal barriers.' Given that in this instance, ponds located between 250m and 500m from the site are located beyond partial barriers to dispersal, it is considered that survey of ponds within 500m of the site boundary is not required, and that survey of ponds within 250m represents adequate survey effort.

2.3.24 An HSI study is used to assess the potential of water bodies to support Great Crested Newt. It is undertaken by attributing a score to a number of factors that can affect the presence or absence of this species. Ten factors are utilised in an HSI assessment, as described below:

- *SI1 Location.* The location of the water body within Great Britain;
- *SI2 Pond area.* The size of the water body;
- *SI3 Permanence.* How often the water body dries out;
- *SI4 Water Quality.* The water quality, based primarily on invertebrate diversity;
- *SI5 Shade.* The percentage of the perimeter of the water body that is shaded;
- *SI6 Fowl.* The presence or absence of water fowl;
- *SI7 Fish.* The presence or absence of fish;
- *SI8 Pond Count.* The number of water bodies within 1km of the surveyed water body (not counting those on the far side of major barriers such as roads);
- *SI9 Terrestrial.* The quality of terrestrial habitat surrounding the water body;
- *SI10 Macrophytes.* The percentage cover of the surface area of the water body covered by macrophytes.

2.3.25 The overall suitability of the water body is then determined by entering these figures into an equation devised by Oldham *et al*. (2000)[12]. The suitability of water bodies is classed into one of five categories, either 'poor', 'below average', 'average', 'good' or 'excellent'.

2.3.26 This HSI study was undertaken in line with the guidelines developed by Oldham *et al.* and subsequently adapted by ARG UK (2010)[13]. A suitably experienced ecologist undertook the assessment in line with these guidelines, with the study also supplemented by desktop research where appropriate.

Environmental DNA (eDNA)

2.3.27 An eDNA survey was carried out to determine the presence / absence of Great Crested Newt within two on-site ponds (P1 and P2 on Plan 5263/ECO3) and one off-site pond (P4). Water samples were collected on the 25th April 2018 following the procedure outlined in the methods manual prepared for DEFRA by Biggs *et al*. (2014)[14]. The survey fell within the acceptable seasonal window set out by Natural England (15th April to 30th June)[15]. Samples were collected by suitably experienced Aspect Ecology staff. The water samples were sent for laboratory analysis which was conducted by 'Fera' and also followed the procedure set out by Biggs *et al.* (2014)[14].

[12] Oldham RS, Keeble J, Swan MJS & Jeffcote M (2000) '*Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)'*. Herpetological Journal 10 (4), 143-155

[13] Amphibian & Reptile Groups of the UK (2010) '*ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index*'

[14] Biggs J., Ewald N., Valentini A., Gaboriaud C., Griffiths R.A., Foster J., Wilkinson J., Arnett A., Williams P. and Dunn F. (2014). '*Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA*'. Freshwater Habitats Trust, Oxford.

[15] Natural England (2015) '*Great crested newts: surveys and mitigation for development projects. Standing advice for local planning authorities who need to assess the impacts of development on great crested newts*'. Last updated at www.gov.uk on 24/12/2015.

2.3.28 Other off-site waterbodies were either considered unsuitable for Great Crested Newt breeding or access was not available for conducting eDNA surveys.

Wintering Birds[16]

2.3.29 A wintering bird survey was conducted at the site in 2017/2018 based around the methodology set out in Scottish Natural Heritage (SNH) Guidance, which although relating specifically to onshore windfarms sets out a number of methodologies for bird surveys that are applicable to a wide range of situations.

2.3.30 Four visits were made to the site during suitable weather between October 2017 and February 2018. On each survey an experienced ornithologist walked a circuitous route that took in all field margins. Most surveys either started or ended in the hours of darkness in order to record nocturnal species such as owls. The dates of each survey, together with a summary of the weather conditions are given in Table 2.6 below.

Table 2.6. Winter bird survey dates and weather conditions.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°c)	Cloud Cover (%)	Precipitation
28/10/2017	1	9	80%	Dry
26/11/2017	2	6	60%	Dry
16/12/2017	1	3	100%	Light showers
20/01/2018	1	8	100%	Light rain

Breeding Birds[17]

2.3.31 The use of the site by breeding birds was assessed over three survey visits, (on separate days) in April, May and June 2018. Birds present within the site were recorded using a method modified from the British Trust for Ornithology's (BTO's) Common Bird Census technique.

2.3.32 This involved walking a route over the site and recording all 'registrations' of birds either seen or heard. The sightings or 'registrations' were recorded on a site plan using standard BTO codes for each bird species and appropriate abbreviations.

2.3.33 This survey methodology has the advantage over other survey methods of mapping each registration to a specific point within the site and this therefore illustrates those areas containing the highest density and diversity of bird species. The dates of each survey, together with a summary of the weather conditions are given in Table 2.7 below.

Table 2.7. Breeding bird survey dates and weather conditions.

Survey Date	Weather Conditions			
	Wind (BF)	Temp(°c)	Cloud Cover (%)	Precipitation (0-5)
25/04/2018	2	8	20%	Dry
26/05/2018	1	13	100% (foggy)	Dry
16/06/2018	1	13	100%	Dry

[16] Scottish Natural Heritage (2005) '*Survey Methods for the use in assessing the Impacts of Onshore Windfarms on Bird Communities*'

[17] Surveys based on methodology within: Baille *et al*. RA (2010) '*Breeding Birds in the Wider Countryside: their conservation status*', BTO Research Report No. 385, BTO, Thetford.

2.4 Survey Constraints/Limitations

2.4.1 All of the species that occur in each habitat would not necessarily be detectable during survey work carried out at any given time of the year, since different species are apparent during different seasons. The Phase 1 habitat survey was undertaken at the end of the relevant seasonal period for botanical work and outside of the optimal season for grassland and woodland surveys. However, a grassland NVC survey and walkover and botanical survey of the woodland were subsequently completed within the optimal survey seasons. The nature of the habitats within the remainder of the site allowed for a robust assessment of the intrinsic ecological interest to be made.

2.4.2 Attention was paid to the presence of any invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). However, the detectability of such species varies due to a number of factors, e.g. time of year, site management, etc., and hence the absence of invasive species should not be assumed even if no such species were detected during the Phase 1 survey.

2.4.3 A recognised limitation of the bat activity surveys is that bat detectors can only provide an index of activity rather than absolute numbers of bats. Therefore, the results of the bat activity surveys should only be considered indicative of the amount of use bats make of an area rather than the abundance of bats. In addition, some bat species, e.g. Brown Long-eared Bat, are difficult to detect due to their quiet echolocation calls.

2.4.4 Remote static bat detector surveys were planned for October 2017 and monthly from April 2018 to September 2018. However, technical problems with the static bat detectors resulted in them failing to record on a number of occasions. Nevertheless, static detector data was collected during six survey periods between May and September 2018, providing data spread across spring, summer and autumn. The data for early May is not directly comparable across the four detectors as the one at location 4 had to be redeployed in a separate week. The static detector at location 1 did not record any bat calls in July or September, however noise was recorded throughout indicating the detectors were operational.

2.4.5 Access was requested to off-site ponds within 250m of the site, however this was not granted for five ponds (P5-7, P9 and P10). Ponds P5-P7 could be viewed from public roads and therefore a HSI assessment was completed (P5 and P6 found to be 'good' and P7 'below average' suitability), however an eDNA survey was not carried out. No HSI assessment or eDNA survey could be completed for ponds P9 and P10. This is discussed further within Chapter 4 below.

2.5 Principles of Ecological Evaluation

2.5.1 The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)[18], which involves identifying 'important ecological features' within a defined geographical context (i.e. international, national, regional, county, district, local or site importance). For full details refer to Appendix 5263/1.

[18] CIEEM (2018) '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*', Chartered Institute of Ecology and Environmental Management, Winchester

2.6 National Policy Approach to Biodiversity in the Planning System

2.6.1 The National Planning Policy Framework (NPPF)[19] describes the Government's national policies on 'conserving and enhancing the natural environment' (Chapter 15). NPPF is accompanied by Planning Practice Guidance on 'Biodiversity, ecosystems and green infrastructure' and ODPM Circular 06/2005[20].

2.6.2 NPPF takes forward the Government's strategic objective to halt overall biodiversity loss[21], as set out at Paragraph 170, which states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'*minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*'

2.6.3 The approach to dealing with biodiversity in the context of planning applications is set out at Paragraph 175:

'When determining planning applications, local planning authorities should apply the following principles:

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

b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

2.6.4 The above approach encapsulates the 'mitigation hierarchy' described in British Standard BS 42020:2013[22], which involves the following step-wise process:

- **Avoidance –** avoiding adverse effects through good design;

[19] Ministry of Housing, Communities & Local Government (2018) '*National Planning Policy Framework*'
[20] ODPM (2006) '*Circular 06/2005: Planning for Biodiversity and Geological Conservation – A Guide to Good Practice*'
[21] DEFRA (2011) '*Biodiversity 2020: A strategy for England's wildlife and ecosystem services*'
[22] British Standards Institution (2013) '*Biodiversity – Code of practice for planning and development*', BS 42020:2013

- **Mitigation –** where it is unavoidable, mitigation measures should be employed to minimise adverse effects;
- **Compensation –** where residual effects remain after mitigation it may be necessary to provide compensation to offset any harm; and
- **Enhancement –** planning decisions often present the opportunity to deliver benefits for biodiversity, which can also be explored alongside the above measures to resolve potential adverse effects.

2.6.5 The measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development (BS 42020:2013, section 5.5).

2.7 Local Policy

2.7.1 Milton Keynes District Council's planning policies are set out within Plan:MK, adopted March 2019, and replace the Core Strategy (2013) ad saved policies of the Local Plan (2005). Four policies relate to ecology, namely NE1-4, which are reproduced below:

2.7.2 **Policy NE1: Protection of Sites**

`A. Development proposals which would likely cause harm to the nature conservation or geological interest of internationally (RAMSAR sites, SACs and SPAs) important sites will not be permitted unless:

1. *There is no suitable alternative to the development;*
2. *There are imperative reasons of overriding public interest;*
3. *All reasonable possibilities for mitigation have been put in place; and*
4. *Compensatory provision in line with the mitigation hierarchy can be secured to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.*

B. Development proposals which would likely cause harm to a National Nature Reserve, Site of Special Scientific Interest or irreplaceable habitats such as Ancient Woodland will not be permitted unless:

1. *There is no suitable alternative to the development;*
2. *The benefits of the development, at this site, clearly outweigh the adverse impacts on the site;*
3. *All reasonable possibilities for mitigation have been put in place; and*
4. *Compensatory provision in line with the mitigation hierarchy to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.*

C. Development proposals which would be likely to harm the biodiversity or geological conservation value of a site of countywide or local importance [(37)] as shown on the Policies Maps or which serve as a 'biodiversity offset site' will only be permitted where:

1. *The local development needs significantly outweigh the biodiversity or geological conservation value of the site;*
2. *All reasonable possibilities for mitigation have been put in place; and*
3. *Compensatory provision in line with the mitigation hierarchy can be secured to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.`*

2.7.3 Policy NE2: Protected Species and Priority Species and Habitats

`A. Where there is a reasonable likelihood of the presence of statutorily protected species or their habitats development will not be permitted unless it has been demonstrated that the proposed development will not result in a negative impact upon those species and habitats.

B. Where the site contains priority species or habitats, development should wherever possible promote their preservation, restoration, expansion and/or re-creation in line with Policy NE3.
Priority Habitats are shown on the Policies Map accompanying this plan.`

2.7.4 Policy NE3: Biodiversity and Geological Enhancement

`A. Development proposals will be required to maintain and protect biodiversity and geological resources, and wherever possible result in a measurable net gain in biodiversity, enhance the structure and function of ecological networks and the ecological status of water bodies in accordance with the vision and principles set out by the Buckinghamshire and Milton Keynes NEP.

B. If significant harm to biodiversity resulting from a development cannot be avoided, adequately mitigated or, as a last resort, compensated for then planning permission should be refused.

C. Development proposals of 5 or more dwellings or non-residential floorspace in excess of 1,000 sq. m will be required to use the Defra metric or locally approved Biodiversity Impact Assessment Metric to demonstrate any loss or gain of biodiversity.

D. Mitigation, compensation and enhancement measures must be secured and be maintained for the lifetime of the development. Enhancement and compensatory measures should seek opportunities for habitat protection, restoration and creation to meet the objectives of the UK and Bucks & Milton Keynes Biodiversity Action Plan and aims of the Biodiversity Opportunity Areas. These measures should also create and enhance habitats to help wildlife adapt to the impact of climate change.`

2.7.5 Policy NE4: Green Infrastructure

*`A. The network of green infrastructure throughout the Borough will be protected, extended and enhanced for its biodiversity, recreational, accessibility, health and landscape value and for the contribution it makes towards combating climate change. This is in accordance with the vision and principles (and the large-scale zone maps of Green Infrastructure Opportunity**(39)**) set out by the Buckinghamshire and Milton Keynes NEP.*

B. Development proposals will provide new green infrastructure or, if it is not possible, will contribute to the enhancement and strengthening of existing green infrastructure to provide wellbeing benefits to people through access to nature.

C. Development proposals will ensure that existing ecological networks are identified and wherever possible maintained to avoid habitat fragmentation, and that ecological corridors, including water courses, form an essential component of their green infrastructure provision to support habitat connectivity.

D. *Green infrastructure protection, improvements and creation must be prioritised in locations where it can deliver most benefits. It should be multi-functional to deliver as many ecosystem services as the site requires, for example flood mitigation, access to nature (wellbeing benefits), plants for pollinators, carbon sequestration, and habitat for wildlife.*

E. *The existing network of linear parks and linked parks and green spaces will be extended into the urban extensions and along the Ouse and Ouzel Valleys to the north to provide a well connected network of green infrastructure that:*
   1. *Is strategically planned.*
   2. *Is attractive and enhances the surrounding landscape.*
   3. *Is safe and well used for recreation.*
   4. *Meets the needs of existing and future residents.*
   5. *Is designed to provide a range of ecosystem services e.g. manage flood risk or provide flower rich habitats that supports a diverse range of pollinators.*
   6. *Is designed to support mitigation and adaptation to climate change e.g. through vegetation for carbon uptake (carbon sequestration).*
   7. *Achieves a net gain in biodiversity.*
   8. *Is managed into the long-term.*
   9. *Where possible improves connectivity with other green infrastructure networks e.g. by linkages to the urban parks.*
   10. *Where appropriate explores economic opportunities that will support the network's sustainability – for example in conservation, agriculture, renewable energy or outdoor environmental education or recreation; such activity must not result in a negative impact to the integrity of the network, the ecosystem services provided or on biodiversity.*

F. *Where green infrastructure is provided outside the linear parks system, applicants should detail how it will address the above requirements.`*

2.7.6 The site has been allocated for employment development within Plan:MK, with further guidance on development of the site being provided through the South Caldecotte Development Framework Supplementary Planning document (SPD).

3 Ecological Designations

3.1 Statutory Designations

Description

3.1.1 The statutory designations of ecological importance that occur within the local area are shown on Plan 5263/ECO2. The nearest statutory designation is Blue Lagoon Local Nature Reserve (LNR), located approximately 2.3km south-west of the site. The LNR has been created from a former clay pit and contains a deep lake, with exceptionally clean water rich in fauna. Surrounding the lake are smaller ponds and the natural colonisation of spoil heaps has formed species-rich grassland and scrub. Species typical of chalk downland, but rare in north Buckinghamshire, are present.

3.1.2 The next nearest statutory designation of ecological importance is Wavendon Heath Ponds Site of Special Scientific Interest (SSSI), located approximately 3.3km to the east of the site. The SSSI is designated for the presence of three ponds fed by a wet flush, representing areas of acidic mire and supporting plant communities uncommon in eastern England. In addition there are meadows of unimproved and semi-improved acid grassland, damp birch woodland and a small stream.

3.1.3 Natural England has developed Impact Risk Zones (IRZs) as an initial tool to help assess the risk of developments adversely affecting SSSIs, taking into account the type and scale of developments. The site is not located within any IRZs which apply to the proposed development.

3.1.4 No statutory designations of European or international importance are present within 20km of the site.

Evaluation

3.1.5 The site itself is not subject to any statutory ecological designations. All statutory ecological designations in the surrounding area are well separated from the site by existing development or agricultural land and are therefore highly unlikely to be directly impacted by the proposals.

3.1.6 With regard to potential indirect effects on statutory designations, the nature of the development proposals would not result in increased recreational pressure on nearby designations as no new residential units will be provided. The site is located downstream of Wavendon Heath Ponds SSSI, and either within a different catchment or downstream of other local designations. As such, the nearby statutory designations will not be influenced by any potential changes in water quality, or quantity, as a result of the proposals.

3.1.7 Traffic on main routes in the local area would increase as a result of the proposals. Most statutory designations in the local area are well separated from the main road network, however, the Kings and Bakers Woods and Heaths SSSI and King's Wood and Rushmere NNR are located approximately 90m from the A5 at its closest point. There is therefore the potential for increased traffic flow to adversely impact air quality and increase nitrogen deposition on the designations in the area closest to the A5. However, the site does not fall within any IRZs with development restrictions which relate to the proposals and the SSSI habitats of greatest sensitivity to a reduction in air quality (i.e. heathland) are located more

than 200m from the A5. Furthermore, the air quality assessment for the proposals[23] considers the change in predicted pollutant concentrations as a result of the proposals to be 'negligible' 1km south of the site on the A5. Accordingly, at 4.3km from the site at which the A5 is closest to the SSSI (~90m), any increase in predicted pollutant concentrations from emissions on the A5 is expected to be nugatory.

3.1.8 Overall, considering the distance between the site and nearby statutory designations, it is considered unlikely that there would be significant adverse impacts as a result of the proposals on any statutory designations.

3.2 Non-Statutory Designations

Description

3.2.1 The western edge of the site is included within a Milton Keynes Wildlife Corridor along the A5. The section of the wildlife corridor within the site comprises pastoral fields bound by hedgerows and scrub, as well as a small section of arable land. Adjacent to the northern site boundary is another Milton Keynes Wildlife Corridor along the Marston Vale railway line. Adjacent to the site the railway embankment comprises rough grassland with areas of tall ruderal vegetation and scattered scrub, providing an area of relatively undisturbed foraging and commuting habitat for a range of fauna. The Milton Keynes Wildlife Corridors provide linear habitat corridors and are given the same status as Milton Keynes Wildlife Sites, of County importance, within planning policy.

3.2.2 The next closest non-statutory designation is the Caldecotte Lake Local Wildlife Site (LWS), located approximately 35m north of the site, beyond the railway corridor. The LWS comprises a large mesotrophic lake created as a balancing reservoir for Milton Keynes with now well established vegetation along large stretches of the shoreline. This LWS is also included within a Milton Keynes Wet Wildlife Corridor, along the River Ouzel.

3.2.3 Other LWS and BNS designations in the surrounding area are located at least 400m from the site and are separated from the site by agricultural or urban land use.

Evaluation

3.2.4 The majority of the Milton Keynes Wildlife Corridor along the A5 will be included within green space under the proposals. Although there will likely be short term impacts on the Wildlife Corridor through loss of habitat, in the longer term, new enhanced habitat will be created along the corridor, including lowland meadow, scrub, woodland pockets, aquatic habitat, and enhanced boundary hedgerows. As such, although the width of the A5 Wildlife Corridor will likely be reduced, subject to the implementation of a sensitive lighting scheme and drainage strategy (see Chapter 6 below), the proposals are highly unlikely to significantly impact the biodiversity value of the Wildlife Corridor or damage its viability.

3.2.5 The Railway Corridor adjacent to the northern site boundary will be retained and protected under the proposals, and during construction best practice measures will be implemented to safeguard the corridor from adverse pollution impacts (see Chapter 6). Subject to the implementation of a sensitive lighting strategy (see Chapter 6), the viability of the corridor will therefore not be impacted as a result of the proposals. Furthermore, the creation of

[23] BWB Consulting (2018) *South Caldecotte Air Quality Assessment*

green space at the northern site boundary will over the long-term enhance the existing corridor by removing intensive agricultural management and increase its effective width.

3.2.6 Caldecotte Lake LWS and the River Ouzel Wildlife Corridor will not be directly impacted by the proposals and construction safeguards will prevent adverse pollution impacts on the designations.

3.3 Priority Habitats, Ancient Woodland and Notable Trees

Description

3.3.1 Two of the pastoral fields on-site are recorded as 'lowland meadow' Priority Habitat on the MAGIC database and by the BMERC. There are no areas of ancient woodland within or adjacent to the site. The closest area of ancient woodland is Downs Covert and Back Wood, approximately 0.9km to the east of the site. A record for a single Black Poplar *Populus nigra* originating within the site was returned from the data search, dated to 2000, and was confirmed during on-site surveys.

Evaluation

3.3.2 An evaluation of the lowland meadow habitat and the impacts of the proposals is provided in Chapter 4 below. The impacts of the proposals on Black Poplar are similarly discussed within the relevant habitat section below. There are unlikely to be any significant impacts of the proposals on ancient woodland or veteran trees.

4 Habitats and Ecological Features

4.1 Background Records

4.1.1 Information returned from the BMERC includes a single record of Black Poplar *Poplus nigra*, adjacent to the stream within the site and a single record for Quaking Grass *Briza media* within one of the on-site pastoral fields, dated to 1993. Surveys confirmed the presence of three mature Black Poplar, located along the watercourse at the south-east of the site (see Plan 5263/ECO3). Quaking Grass was not recorded during the habitat surveys on-site.

4.2 Overview

4.2.1 The habitats and ecological features present within the site are described below and evaluated in terms of intrinsic ecological value, such as in relation to the presence of rare plant communities or individual plant species of elevated interest. The value of habitats for the fauna they may support is considered separately in Section 5 below.

4.2.2 The following habitats/ecological features were identified within/adjacent to the site:

- Arable;
- Lowland Meadow;
- Semi-improved Grassland;
- Improved Grassland;
- Rough Grassland;
- Hedgerows;
- Ditches;
- Trees;
- Dense and Scattered Scrub;
- Tall Ruderal;
- Woodland;
- Orchard;
- Stream;
- Ponds;
- Amenity Grassland and Planting; and
- Buildings and Hardstanding.

4.2.3 The locations of these habitat types and features are illustrated on Plan 5263/ECO3 and described in detail below.

4.3 Priority Habitats

4.3.1 Section 40 of the Natural Environment and Rural Communities (NERC) Act 2006 places duties on public bodies to have regard to the conservation of biodiversity in the exercise of their normal functions. In particular, Section 41 of the NERC Act requires the Secretary of

State to publish a list of habitats which are of principal importance for conservation in England. This list is largely derived from the 'Priority Habitats' listed under the former UK Biodiversity Action Plan (BAP), which continue to be regarded as priority habitats under the subsequent country-level biodiversity strategies.

4.3.2 Of the habitats within the site, many of the hedgerows, two of the woodland patches, and two of the pastoral fields are considered to qualify as Priority Habitats and therefore constitute important ecological features. This is discussed further in the relevant habitat sections below.

4.4 Arable

Description

4.4.1 Over half of the site comprises two arable fields (F8 and F13) bound by hedgerows. In addition, a small section of three arable fields is included within the site boundary to the east of V10 Brickhill Street (F16-F18). At the time of the Phase 1 survey the fields had been recently ploughed and few weed species had begun to recolonise the bare ground. Narrow field margins are present, the majority of which are between approximately 1-2m wide (e.g. Photograph 1). The field margin widens to approximately 3m, including an informal trampled footpath, south of hedgerow H10, and up to 7m adjacent to the ditch at the north of field F8a. A public right of way is also present at the northern margin of field F8a.

4.4.2 The field margins comprise rough grassland with a sward height varying between approximately 20-50cm. Grass species present include Perennial Rye-grass *Lolium perenne*, Cock's-foot *Dactylis glomerata*, Common Couch *Elytrigia repens*, False Oat-grass *Arrhenatherum elatius*, Meadow Grass *Poa* sp., Tufted Hair-grass *Deschampsia cespitosa*, Black-grass *Alopecurus myosuroides*, Soft Brome *Bromus hordeaceus* and Barren Brome *Anisantha sterilis.* Herb species present include Daisy *Bellis perennis*, Prickly Lettuce *Lactuca serriola*, Dandelion *Taraxacum officinale* agg., Greater Plantain *Plantago major*, Knotgrass *Polygonum aviculare*, Nettle *Urtica dioica*, Cow Parsley *Anthriscus sylvestris*, Hogweed *Heracleum sphondylium*, Creeping Thistle *Cirsium arvense*, Cleavers *Galium aparine*, Ground-ivy *Glechoma hederacea*, Herb-robert *Geranium robertianum*, Horsetail *Equisetum* sp., Dove's-foot Crane's-bill *Geranium molle*, Great Willowherb *Epilobium hirsutum*, Scentless Mayweed *Tripleurospermum inodorum*, Lesser Stitchwort *Stellaria graminea*, Groundsel *Senecio vulgaris*, Scarlet Pimpernel *Anagallis arvensis*, White Dead-nettle *Lamium album*, Bittersweet *Solanum dulcamara*, Pendulous Sedge *Carex pendula*, Hedge Bindweed *Calystegia sepium*, Mugwort *Artemisia vulgaris*, Wild Teasel *Dipsacus fullonum*, Wood Avens *Geum urbanum*, Charlock *Sinapis arvensis*, Garlic Mustard *Alliaria petiolata*, Red Campion *Silene dioica*, Bristly Oxtongue *Picris echioides*, Burdock *Arctium* sp., Canadian Fleabane *Conyza canadensis* and Shepherd's-purse *Capsella bursa-pastoris*. Occasional patches of Bramble *Rubus fruticosus* agg. scrub are present within the field margins.

Evaluation

The arable fields are subject to intensive agricultural management and thus support a very limited diversity and abundance of plant species. The field margins are all relatively narrow and do not appear to be managed for biodiversity, such that the margins are not classified as the Priority Habitat type 'Arable Field Margins'. In addition, whilst there is a good diversity of herb species present, the majority are not recorded in high abundance. The species present are common and widespread at a local and national level. Overall, the arable fields are therefore not considered to be an important ecological feature. As such, the loss of the arable habitat and field margins to the proposals is of negligible ecological

significance. New species-rich meadow habitat will be created on-site which will include species currently present within the field margins.

4.5 Lowland Meadow

Description

4.5.1 Fields F3 and F4 are identified on the MAGIC database as comprising the Priority Habitat type lowland meadow. As such an NVC survey was conducted, the detailed results of which are shown in Appendix 5263/2. At the time of the NVC survey and the Phase 1 survey both fields were under cattle grazing, with a sward height of approximately 5-15cm. Localised areas of heavier cattle poaching were apparent. Historic ridge and furrow patterns are visible within field F3.

4.5.2 Field F3 is dominated by Perennial Rye-grass throughout, which had a Domin cover score of 8 (51-75%) in all quadrats. Other constant species across the five quadrats were Crested Dog's-tail *Cynosurus cristatus*, Bird's-foot Trefoil *Lotus corniculatus*, Red Clover *Trifolium pratense*, Yarrow *Achillea millefolium*, White Clover *Trifolium repens* and Ribwort Plantain *Plantago lanceolata*, with the latter three species being more frequent overall. Between 14 and 17 species were recorded per quadrat, indicating the sward is relatively species rich.

4.5.3 The Modular Analysis of Vegetation Information System (MAVIS) computer program was used to determine the probability of the on-site grassland fitting a number of recognised grassland community types. The closest match was for MG6a *Lolium perenne – Cynosurus cristatus* grassland, typical sub-community at 56.92%. However, other variations of MG6 grassland, as well as MG5 (*Cynosurus cristatus – Centaura nigra*) grassland also had between 50-56% matches. All of these communities have a relatively poor goodness of fit to the survey data.

4.5.4 Field F4 is similar to field F3, being dominated by Perennial Rye-grass. Similar constant species were present within the quadrats as in field F3, but with the addition of Yorkshire-fog *Holcus lanatus* which was not recorded during the NVC survey of field F3. The MAVIS analysis indicates the grassland in field F4 is very similar to that of F3, although community OV23c (*Lolium perenne – Dactylis glomerata*, *Plantago major - Trifolium repens* sub-community) had the best match with 55.24% (see Table 4.1). This was followed by communities MG6a, MG5a, MG6 and MG5b. The sward is relatively species rich, with between 16 and 18 species recorded per quadrat.

Table 4.1. MAVIS output for fields F3 and F4

NVC Community	Match
Field F3	
MG6a	56.92
MG5b	55.90
MG5a	55.88
MG5	54.71
MG6	54.47
Field F4	
OV23c	55.24
MG6a	52.46
MG5a	50.54
MG6	50.19
MG5b	49.72

Evaluation

4.5.5 Fields F3 and F4 support a grassland with characteristics of the Priority Habitat lowland meadow. However, the dominance of Perennial Rye-grass and areas of disturbance caused by cattle poaching reduce the value of the habitat. This is demonstrated clearly by the NVC analysis which indicates that although the sward has characteristics of MG5 communities, it is also matched with MG6 communities and OV23c. MG6 communities are dominated by Perennial Rye-grass with varying amounts of Crested Dog's-tail. MG6 grassland is common in lowland England, particularly on dairy pasture, as hay and silage crops, and on road verges, lawns and village greens. Community OV23c is an open habitat type, typically associated with disturbance, waste ground and verges. The MG6 and OV23 communities are widespread across lowland England and are of lower botanical value than MG5 communities which typically have a higher species diversity.

4.5.6 The MAGIC data for this land parcel (see Appendix 5263/3) states that an NVC survey was conducted in 1993 which found '*MG5b and MG5/6 - reasonably close similarity to NVC type MG5b although the low diversity of much of the field suggests affinities to MG6.'* This accords with the findings of the 2018 NVC survey. Therefore, overall the grassland in fields F3 and F4 is considered to represent a fairly poor quality example of the lowland meadow habitat type.

4.5.7 Nationally, lowland meadow habitats are declining, primarily due to intensive agriculture, with losses of 2-10% per annum recorded in some parts of England[24]. It is estimated that less than 15,000ha of species-rich neutral grassland remains across the UK, with approximately 10,000ha of this in England. Within Milton Keynes and Buckinghamshire there is only approximately 382ha of Lowland Meadow[25], of which fields F3 and F4 account for 6.12ha (1.6%). Therefore, despite the low quality of this habitat on site, it is considered to be of District level value and forms an important ecological feature.

4.5.8 The two fields containing lowland meadow are located within the development footprint, and due to the extent and nature of the proposed development it would not be practicable to retain this habitat *in situ*. As such, the proposals include new meadow creation of at least 2ha, within the linear park at the west of the site (see Chapter 6). Considering the high abundance of Perennial Rye-grass within the existing lowland meadow habitat, as well as the localised effects of cattle poaching, it is expected that the new meadow creation and management would create an enhanced habitat, with greater floral diversity in the long-term. As such, the loss of the existing poor quality on-site lowland meadow is considered to be of minor to moderate ecological significance.

4.6 Semi-improved Grassland

Description

4.6.1 Fields F1, F2, F5-7, and F15 are under the same ownership as fields F3 and F4. Cattle were recorded on occasion in fields F1 and F5-F7, although these fields are also used for silage. At the time of survey field F15 had been recently harvested for hay or silage.

4.6.2 Field F2 is heavily disturbed by the farm access, resulting in a dominance of Perennial Rye-grass and Curled Dock *Rumex crispus*. The species diversity is poor and other species recorded include Rough Meadow-grass *Poa trivialis*, Creeping Thistle, Pineappleweed

[24] JNCC (2011) *UK Biodiversity Action Plan Priority Habitat Descriptions: Lowland Meadows*. Ed. Maddock A.
[25] Buckinghamshire and Milton Keynes Natural Environment Partnership. Forward to 2020: Buckinghamshire and Milton Keynes Biodiversity Action Plan.

Matricaria discoidea, Ribwort Plantain, Greater Plantain, White Clover, Creeping Buttercup *Ranunculus repens*, Cat's-ear *Hypocaeris radicata*, Selfheal *Prunella vulgaris* and Red Clover.

4.6.3 Fields F1, F5-F7 and F15 are subject to much lower levels of disturbance. Fields F1 and F5-F7 are dominated by Perennial Rye-grass, with Yorkshire-fog and Rough Meadow-grass also frequent, in addition to Soft Brome *Bromus hordeaceus* locally within field F7. Other grass species present include Cock's-foot, Creeping Bent *Agrostis stolonifera*, Meadow Foxtail *Alopecurus pratensis* and infrequent crested Dog's-tail and Sweet Vernal-grass *Anthoxanthum odoratum*. Hairy Sedge *Carex hirta* is also locally present in field F7. Field F15 is dominated by a mix of grasses, including Common Couch, Meadow Foxtail, Creeping Bent, Yorkshire-fog, Cock's-foot, Perennial Rye-grass, False Oat-grass, Tufted Hair-grass, Timothy *Phleum pratense* and Red Fescue *Festuca rubra*.

4.6.4 Fields F1, F5-F7 and F15 have a moderate species diversity but the herb coverage is less than approximately 20% throughout and much lower in places. Species present include White Clover, Red Clover, Tufted Vetch *Vicia cracca*, Common Knapweed *Centaurea nigra*, Yarrow, Ribwort Plantain, Bird's-foot-trefoil, Cat's-ear, Creeping Buttercup, Creeping Cinquefoil *Potentilla reptans*, Common Vetch, Dove's-foot Crane's-bill, Common Mouse-ear *Cerastium fontanum*, Curled Dock, Creeping Thistle, Greater Bird's-foot-trefoil *Lotus pedunculatus* and Goat's-beard *Tragopogon pratensis*. In disturbed areas utilised by farm vehicles and towards the margins of F15 additional species such as Horsetail, Bristly Oxtongue, Mugwort, False-oat Grass, Wild Teasel, Hogweed, Cleavers, Nettle, and Silverweed *Potentilla anserina* are present. Meadowsweet *Filipendula ulmaria* occurs near the stream edge and Hard Rush near a drain in F15.

Evaluation

4.6.5 Fields F1, F2, F5-F7 and F15 are dominated by common grass species, with a relatively low herb abundance. Based on the type and abundance of species present, these fields can be classified as moderately species-rich semi-improved grassland[26]. Although a low number of lowland meadow indicator species are present (e.g. Common Knapweed, Bird's-foot Trefoil, Goat's-beard, Meadowsweet and Greater Bird's-foot Trefoil), these are very localised and not sufficiently abundant for the grassland to qualify as a Priority Habitat.

4.6.6 The grassland is considered not to constitute an important ecological feature. Nonetheless, the loss of the semi-improved grassland will be partially offset through new species-rich meadow planting within the proposed landscape buffers. Therefore, the proposed loss of the existing grassland would be of minor ecological significance.

4.7 Improved Grassland

Description

4.7.1 Fields F9 and F10 are used for Alpaca grazing. Field F9 was under grazing at the time of survey and had a sward height of approximately 5-10cm; field F10 was not grazed and had a sward height of approximately 10cm. The sward is dominated by grasses, including Perennial Rye-grass, Cock's-foot, Meadow-grass and Tufted Hair-grass. Herb species present include Creeping Buttercup, Common Mouse-ear, Dock and Spear Thistle *Cirsium vulgare*.

4.7.2 Fields F11 and F12 are sheep grazed, creating a sward height of between approximately 5cm and 15cm. A historic ridge and furrow pattern is visible within both fields, although is

[26] Natural England (2010) 'Higher Level Stewardship – Farm Environment Plan (FEP) Manual', 3rd Edition

less defined in field F12. The sward is dominated by grasses, including Yorkshire Fog, Fescue, Common Bent *Agrostic capillaris*, Creeping Bent, Perennial Rye-grass, Cock's-foot, Meadow Foxtail, Fescue, Tufted Hair-grass and Rough Meadow-grass. A low coverage of herbs is present within the sward, including Creeping Buttercup, Dove's-foot Crane's-bill, Yarrow, Wood Avens *Geum urbanum*, Nettle, Creeping Thistle, Common Mouse-ear, Vetch, Soft Rush *Juncus effusus*, Lesser Stitchwort, Common Sorrel *Rumex acetosa*, Cut-leaved Crane's-bill *Geum dissectum*, Hairy Tare *Vicia hirsuta*, Groundsel and Ragwort *Senecio* sp. Tall ruderal species are more common towards the field margins, including Nettle, Bristly Oxtongue, Spear Thistle and Prickly Sow-thistle. In addition the furrows contain marginally damper soil and a higher proportion of tall ruderal species are present.

Evaluation

4.7.3 Fields F9-F12 contain a low diversity of common and widespread species and based on the type and abundance of species present they can be classified as species-poor improved grassland[27]. This is a habitat type likely to be widely replicated in the surrounding agricultural landscape. The grassland is agriculturally improved and therefore does not meet the Priority Habitat definition of lowland meadows / pasture[28]. As such, the grassland is considered not to form an important ecological feature. The loss of this habitat as a result of the proposals would be of negligible ecological significance.

4.8 Rough Grassland

Description

4.8.1 At the north of the site is a relatively small field (F13) containing rough grassland (Photograph 4). The sward is tussocky in nature and approximately 30-70cm in height, with no apparent management regime in place. False Oat-grass is abundant within the sward. Other species present include Yorkshire Fog, Fescue, Meadow Foxtail, Cock's-foot, Nettle, Creeping Thistle, Cow Parsley, Ground Ivy *Glechoma hederacea*, Cleavers, Creeping Buttercup, Sorrel, Vetch *Vicia* sp., Hogweed and Lesser Stitchwort. Bramble scrub is encroaching on the grassland from the margins.

4.8.2 Two small areas of rough grassland are associated with the residential property on-site, neither of which appear to have been recently managed and have a sward height of approximately 20-30cm. Species present include False Oat-grass, Cock's-foot, Meadow-grass, Bent, Perennial Rye-grass, Tufted Hair-grass, Creeping Buttercup, Groundsel, Hedge Bindweed Cleavers, Dove's-foot Crane's-bill, Creeping Cinquefoil, Common Mallow *Malva neglecta*, Hogweed, Cow Parsley, Nettle, Red Campion, Broad-leaved Dock, Burdock, White Dead-nettle, Mugwort, Green Alkanet *Pentaglottis sempervirens*, Greater Plantain and Dandelion.

Evaluation

4.8.3 The rough grassland at the north of the site is species-poor and dominated by broad-leaved grass species. The small areas of rough grassland within the curtilage of the residential property contain a greater abundance of herb species, particularly the section close to the woodland, however the species present remain common and widespread. There is considerable Bramble scrub at the edges of field F13, which without management will encroach further, reducing the area of the grassland and its ecological value. Considering the small area of this habitat type and the likely presence of better quality grassland within

[27] Natural England (2010) '*Higher Level Stewardship – Farm Environment Plan (FEP) Manual*', 3rd Edition

[28] Based on: Biodiversity Reporting and Information Group (2011) '*UK Biodiversity Action Plan (BAP) Priority Habitat Descriptions'*, ed. Ant Maddock

the local area, overall the rough grassland is considered not to form an important ecological feature. The loss of the small areas of rough grassland as a result of the proposals would be of negligible ecological significance.

4.9 Hedgerows

Description

4.9.1 Numerous hedgerows bound the fields within the site (see H1-H32 on Plan 5263/ECO3) and are described in more detail in Appendix 5263/4. The hedgerows bordering fields F1 to F7 at the south of the site (H1-H7) are generally tall (3-6m), relatively wide (1-3m) and unmanaged (e.g. Photograph 5). These hedgerows contain frequent Hawthorn *Crataegus monogyna* and Blackthorn *Prunus spinosa*, as well as Dog-rose *Rosa canina*, Field Maple *Acer campestre*, Ash *Fraxinus excelsior*, Elder *Sambucus nigra*, Hazel *Corylus avellana*, Elm *Ulmus* sp., Oak *Quercus* sp., Apple *Malus* sp. and Willow *Salix* sp. These hedgerows contain a number of semi-mature to mature trees. One hedgerow (H6) is considered defunct as it contains large gaps colonised by Bramble and tall ruderal species. Overall, these seven hedgerows form a connected network across the south-western portion of the site.

4.9.2 The hedgerows bordering the arable fields at the north of the site (H8 – H12 and H20-23) are generally tall (3-6m) and not intensively managed (e.g. Photograph 1). These hedgerows are largely dominated by Elm, but also include Hawthorn, Blackthorn, Dog-rose, Ash, Field Maple, Oak and Elder. Other hedgerows bounding V10 Brickhill Street and Station Road (H30-32) and those bounding the arable fields east of V10 Brickhill Street (H25-28) are generally more intensively managed and shorter in height.

4.9.3 Associated with the residential property are four short sections of hedgerow (H13-H16). Two of these (H13 and H14) are adjacent to the road, relatively tall (2-4m), narrow (1-2m) and not intensively managed. The other two are garden hedgerows (H15 and H16) which are lightly pruned. Hedgerow H15 is largely comprised of Wild Privet *Ligustrum vulgare*, whilst hedgerow H16 contains a diverse mix of native species.

4.9.4 At the south of the site, bordering fields F11 and F12 are three defunct hedgerows (H17-H19), with large gaps overgrown with tall ruderal species (e.g. Photograph 6). Woody species present include Hawthorn, Blackthorn, Elm, Oak, Dog-rose, Field Maple and Ash. Several mature trees are present within hedgerow H18.

4.9.5 The ground flora of all of the hedgerows is dominated by Bramble and species occurring within the adjacent grassland fields or arable margins, with few woodland species recorded. The majority of the hedgerows are associated with ditches.

Evaluation

4.9.6 From a preliminary appraisal, hedgerows H2, H5, H13, H16 and H23 are considered to be species-rich[29], although only H5 may meet criteria under the Hedgerows Regulations 1997 to be deemed ecologically `important`. All of the other hedgerows within the site are unlikely to qualify as ecologically important under the regulations due to poor species diversity.

4.9.7 All of the hedgerows within the site are likely to qualify as a Priority Habitat based on the standard definition[30], which includes all hedgerows (>20m long and <5m wide) consisting

[29] i.e. five or more native woody species within a 30m length (or four or more in Northern England) – FEP Manual

[30] Based on: Biodiversity Reporting and Information Group (2011) '*UK Biodiversity Action Plan (BAP) Priority Habitat Descriptions'*, ed. Ant Maddock

predominantly (≥80%) of at least one native woody species. It has been estimated that approximately 84% of countryside hedgerows in Great Britain qualify as a Priority Habitat under this definition.[30]

4.9.8 Many of the on-site hedgerows are mature habitats which provide linear connectivity within the site, although off-site connectivity is limited by the adjacent road network. Although the majority of on-site hedgerows have a low species richness, being heavily dominated by Elm, Hawthorn or Blackthorn, the low intensity management enhances their value. In addition, although hedgerows are a common feature within the agricultural landscape to the east of the site, this is not the case to the west. Overall, it is therefore considered that the on-site hedgerow network is of Local to District level value and form an important ecological feature.

4.9.9 The vast majority of boundary hedgerows will be retained under the proposals, however the internal hedgerows (H2-H7, H9-H11, H15, H16 and H18) and associated trees will be lost to facilitate the development. In addition, hedgerows H13, H14 and H26 will require removal for construction of the access, in addition to a proportion of H25, H27 and H28.

4.9.10 The hedgerows bounding the semi-improved grassland and lowland meadow in the west of the site (H2-H7), in addition to the connected hedgerow H9, are relatively tall and wide mature features. Hedgerows H2 and H5 are species-rich, whilst the latter is also likely to qualify as ecologically important. The loss of this hedgerow network is therefore likely to be of moderate ecological significance. Other hedgerows to be lost are not of particularly high quality and their loss would be of minor ecological significance, in particular, hedgerows H13-H16 are short sections of garden hedgerow which are readily replaceable, whilst hedgerows H25-H28 are species-poor, narrow, heavily managed arable field boundary hedgerows, and H18 is defunct.

4.9.11 New species-rich hedgerows will be included within the scheme design to partially compensate for proposed losses. In addition, the retained boundary hedgerows will be enhanced through bolstering where appropriate and buffered within a wide area of green space. The current intensive agricultural management regime will be replaced by low intensity rotational cutting to allow dense, bushy hedgerows to develop. Therefore, although there will be a reduction in hedgerow length on-site, there will be an enhancement in quality. Overall, the partial loss of the hedgerow network on-site is considered to be of minor ecological significance.

4.10 Ditches

Description

4.10.1 The majority of the on-site hedgerows have adjacent dry ditches (see Plan 5263/ECO3). These ditches do not contain aquatic or marginal vegetation and the banks are largely colonised by tall ruderal and hedgerow ground flora species. One of the dry ditches had been recently cleared, however none of the others show signs of any recent management.

4.10.2 A wet ditch is present to the west of hedgerow H1 (D1). The ditch is approximately 1m wide with 0.5-1m high steep earth banks. The ditch is heavily shaded and the banks are mostly bare, with some hedgerow ground flora species present. Less than 5cm of water depth was present at the time of survey, with no perceptible flow. A wet ditch is also present at the northern site boundary (D2), with a water depth of less than 5cm and a slow flow. The ditch has steep earth banks colonised with rough grassland and tall ruderal vegetation, as well as Ivy and Hart's-tongue *Phyllitis scolopendrium*.

Evaluation

4.10.3 The dry ditches contain common and widespread grassland and hedgerow plant species and do not appear to hold water for a substantial period of time. The wet ditches only contain shallow water and no aquatic or marginal plant species were recorded. Due to the isolated nature of the site by roads and the railway, the network of ditches does not appear to extend off-site. The ditches are therefore considered not to form an important ecological feature. The proposed loss of these ditches is therefore of negligible ecological significance.

4.11 Trees

Description

4.11.1 Few standard trees are present within the site. The trees are largely associated with the hedgerows, although occasional trees are present within field interiors and a number of trees are associated with the residential property. The on-site trees range from young to fully mature in age and include native and non-native species. Species frequently present include Willow, Ash, Field Maple, Pedunculate Oak *Quercus robur* and Apple. Trees associated with the residential property include Cherry *Prunus* sp., Oak, Sycamore *Acer pseudoplatanus*, Pear *Pyrus* sp., Lombardy Poplar *Populus nigra 'Italica'*, Silver Birch *Betula pendula*, and Norway Maple *Acer platanoides.* Three mature Black Poplar *Populus nigra*, a nationally declining species, are located along the stream corridor within the south-east of the site.

4.11.2 Several tree lines are present associated with the residential property on site, as described in Table 4.2 overleaf.

Evaluation

4.11.3 Numerous trees within the hedgerows and tree lines, as well as standard trees within fields F3 and F4 are mature in nature. Many of these trees are of a substantial size, whilst a number of these are likely to be of considerable age. Accordingly, these more mature trees are of some ecological interest in their own right due to the habitat provided for associated species, such as fungi and lichens. The tree-lines also provide linear habitat features providing connectivity within the site, and many are fenced from adjacent grazing land providing relatively undisturbed refuge habitat. However, the surrounding landscape, particularly along the River Ouzel valley to the south and west of the site, is likely to include numerous mature trees. The majority of trees on-site are therefore considered to be of limited ecological value and their loss is of minor ecological significance and will be offset through new tree planting.

4.11.4 Three mature Black Poplar are present on site. This is a declining species in England and therefore the on-site trees are of District level value and form an important ecological feature. The loss of these trees would be of moderate ecological significance. However, new tree planting will include several Black Poplar specimens, of local provenance, to provide replacement planting with a ratio of at least 2:1.

Table 4.2. Tree line descriptions (mat = mature, S.M. = semi mature)

Number	Width	Woody Species	Ground Flora	Comments
TL1	~10m	Willow, Field Maple, Cherry, Apple, Blackthorn, Hawthorn	Bramble scrub and tall ruderal species, including Nettle, Dock, Creeping Thistle, Ground Ivy, Herb-robert	Belt of semi mature trees and scrub between two fields, with stock fences both sides. Brash present.
TL2	~2m	Layland Cypress *Cupressus leylandii*.	Sparse – Ivy and occasional tall ruderal species.	Unmanaged
TL3	~1m	S.M. Silver Birch, with occasional Willow, Cherry, Lilac and Lonicera	Tall ruderal species.	-
TL4	~1m	Young – S.M. Pine	Tall Ruderal, particularly Nettle.	Pollarded and coppiced Willow and young Willow adjacent.
TL5	~5m	Double row of Lombardy Poplar at south. To north Silver Birch, Oak.	Annual Meadow-grass, Yorkshire Fog, Nettle, Cow Parsley, Cleavers, Creeping Buttercup, Lady's Mantle *Alchemilla* sp.	Double tree line with central grass path.
TL6	~10m	Young to semi-mature Ash planting	Very sparse, grassland species	Livestock fence surrounds
TL7	~15m	Willow, Sycamore, Black Poplar, Field Maple, Cherry, Blackthorn, Rowan, Hazel	Bramble, Yorkshire Fog, Cow Parsley, Bristly Oxtongue, Cock's-foot, Ragwort, Creeping Thistle, Pendulous Sedge, Tufted Hair-grass	Young to mature trees and scrub fenced on both sides from fields.
TL8	~6m	Ash, Willow, Hawthorn, Blackthorn	Cock's-foot, Yorkshire Fog, Tufted Hair-grass, Hogweed, Creeping Buttercup, Broad-leaved Dock, Bindweed	Semi-mature to mature trees and scrub fenced from adjacent fields.

4.12 Dense and Scattered Scrub

Description

4.12.1 Several areas of dense and scattered scrub are present on-site, dominated by Bramble. Other species present include Hawthorn, Blackthorn, Dogwood, Crab Apple *Malus sylvestris*, Elm, Elder, Silver Birch, Willow, Hazel and Dog-rose. Towards the south of the site there are areas of scrub between fields, fenced off from grazing. Within these areas a ground flora of tall ruderal and rough grassland has been allowed to develop, including False Oat-grass, Cock's-foot, Meadow-grass, Nettle, Creeping Thistle, Herb-robert, Creeping buttercup, Dock, Ground Ivy, Hogweed, Red Campion and Cleavers.

Evaluation

4.12.2 This habitat type comprises a limited range of native species that are common and widespread in the local and national context. The majority of dense scrub comprise a single species, namely Bramble or Blackthorn. The habitat is therefore considered not to form an important ecological feature. The loss of the relatively small areas of scrub on-site due to the proposals would be of negligible ecological significance and will be more than compensated for through new native shrub planting.

4.13 Tall Ruderal

Description

4.13.1 Several areas dominated by tall ruderal species are present within the site. Species present include Nettle, Creeping thistle, Dock, Hogweed, Cleavers, Burdock, Green Alkanet, Cow Parsley, Garlic Mustard, White Dead-nettle, Wild Teasel, Bittersweet, Greater Willowherb and Comfrey *Symphytum* sp.

Evaluation

4.13.2 The tall ruderal habitat comprises common and widespread species at a local and national level. This habitat is typical of high nutrient levels and unmanaged ground and is readily replaceable. As such the small areas of tall ruderal habitat on-site are considered to not form an important ecological feature. As such, the loss of this habitat due to the proposals would be of negligible ecological significance.

4.14 Woodland

Description

4.14.1 **Plantation Woodland W1.** A small area of plantation woodland is present to the north of the residential property on site (see W1 on Plan 5263/ECO3 and Photograph 7). At the east of the woodland rows of young to semi-mature Silver Birch, Ash, Cherry and Pedunculate Oak are present with closely spaced specimens (~2m gaps). Occasional Rowan, Field Maple, Hawthorn, Cherry and Bramble scrub is present in small patches, but overall there is very little understorey. Within the west of the woodland the canopy is more open with less linear tree planting, although the tree species remain the same and very little understorey is present. Semi-mature to mature Willow and Sycamore trees are present along the stream at the north of the woodland and at the pond (P2) edge.

4.14.2 The ground flora of woodland W1 is dominated by grassland and tall ruderal species, with frequent Cow Parsley, Red Campion and Creeping Bent. Species present include Ground Ivy, Forget-me-not *Myosotis*, Hogweed, Cleavers, Garlic Mustard, Thyme-leaved Speedwell *Veronica sepyllifolia*, Nettle, Spear Thistle, Meadow Buttercup, Rough Meadow-grass, Yorkshire Fog, Cock's-foot, Dog's Mercury *Mercurialis perennis,* Green Alkanet, Three-nerved Sandwort *Moehringa trinerva*, Dock, Herb-robert, Dandelion and Bittersweet. The canopy opens towards the south-east of the woodland where a bonfire site is present and tall ruderal species have become dominant.

4.14.3 **Broadleaved Woodland W2.** Between the arable fields F8 and F13 there is a small triangular section of broadleaved woodland (W2) dominated by mature Pedunculate Oak and Ash. The understorey is well developed and includes Elm, Dog-rose, Bramble, Hawthorn and Elder. The ground flora includes Ivy, Cleavers, Cow Parsley, Nettle, Lords-and-Ladies *Arum maculatum*, Garlic Mustard, Hairy Brome *Bromopsis ramosa*, Red Campion, Three-nerved

Sandwort, Hedge Woundwort *Stachys sylvatica*, Wood Millet *Milium effusum*, Lesser Celandine *Ranunculus ficaria*, Hogweed, Dock, Herb-robert and False-brome *Brachypodium sylvaticum*. Standing and fallen deadwood is present within the woodland, which appears to not receive any active management.

4.14.4 **Broadleaved Woodland W3.** A small area of open woodland (W3) is present within arable field F8 at the western end of hedgerow H10 (see Photograph 8). The woodland parcel comprises semi-mature to mature trees dominated by Ash and Pedunculate Oak. Bramble and Elm scrub is present within the south-west corner of the woodland. However, the majority of the canopy is open with no understorey, such that the ground flora comprises rough grassland and tall ruderal species including Barren Brome, Perennial Rye-grass, False Oat-grass, Cock's-foot, Meadow Foxtail, Nettle, Cleavers, Cow Parsley, Common Chickweed *Stellaria media*, Annual Meadow-grass, White Dead-nettle and Red Campion. A large chopped log pile and small brash pile are present and a fire had been lit within the centre prior to the May 2018 survey.

Evaluation

4.14.5 The areas of woodland on-site are small in size and comprise a limited diversity of woodland species. The three woodland parcels are discussed further below.

4.14.6 **Plantation Woodland W1.** The plantation woodland is relatively newly planted and no woodland is present on historical aerial imagery from 1945 or mapped on historical OS mapping back to 1881. As such, the ground flora is dominated by grassland and tall ruderal species. Three-nerved Sandwort is the only ancient woodland indicator species for the south of England recorded within woodland W1 and this was not found in a high abundance.

4.14.7 **Broadleaved Woodland W2.** The triangle of broadleaved woodland W2 has a more developed woodland structure and ground flora than the other woodland areas on-site. Mature trees are present and historic mapping indicates that this small area has been wooded since at least 1880, albeit within this time it has not been any larger than at present (~0.1ha). A low number of ancient woodland indicator species (Wood Millet, Three-nerved Sandwort, Hairy Brome, False-brome) are present, generally in low abundance, although Wood Millet is more frequent. However, no ancient or veteran trees are present and the woodland is not recorded on the ancient woodland inventory. The woodland is very small and as such has a high abundance of tall ruderal and field margin species due to its close proximity to arable land.

4.14.8 **Broadleaved Woodland W3.** The area of open woodland W3 comprises a limited diversity of tree and scrub species, with very little understorey. The ground flora is more typical of the arable field margins than woodland, being dominated by coarse grass species.

4.14.9 **Summary.** Woodlands W2 and W3 would qualify as the Priority Habitat type lowland mixed deciduous woodland. However, they are small examples of this habitat type and woodland W3 is a poor example of this habitat type. Furthermore, much larger areas of woodland are present within the local area, including areas of ancient woodland to the east of the site. Overall, the on-site woodland is therefore considered to be of local level value and woodlands W2 and W3 form important ecological features.

4.14.10 All three areas of woodland will be lost as a result of the proposals. Two of these are of limited ecological value; while W2 is of relatively greater ecological value it is still limited by its very small size and the influence of the adjacent arable farmland. The proposals will seek to include new woodland copses within the linear park, including a range of native tree and shrub species to create a varied vegetation structure. This will include fruit and nut bearing

species, such as Crab Apple, Hazel, Walnut, Hawthorn and Dogwood. Overall, the loss of the on-site wooded areas is of minor to moderate ecological significance.

4.15 Orchard

Description

4.15.1 A small orchard is associated with the residential property, located adjacent to pond P1. Four mature Apple, two mature Cherry and two young Apple trees are present. The orchard is heavily shaded by the adjacent hedgerow and the tall Leyland Cyprus tree line TL2. The heavy shading has resulted in the ground being predominantly bare. Away from the hedgerow and tree line is a small area of grass. The sward is short at approximately 5-10cm in height. Species present include Meadow-grass, Cow Parsley, Dock, Creeping Buttercup, Wood Avens, Hogweed, Nettle, Daisy, Bugle *Ajuga reptans* and Ground Elder *Aegopodium podagraria*.

Orchard

4.15.2 Traditional orchards are a Priority Habitat type where they are managed in a low intensity way. The on-site orchard may potentially meet the definition of this Priority Habitat as it does not appear to be intensively managed. However, the trees appear to be regularly managed to remove fallen branches so that little dead wood is allowed to accumulate and the grassland is likely to be mown relatively frequently as part of the garden setting. Furthermore, it is not recorded as a Priority Habitat on Natural England's MAGIC database. Overall, the orchard is considered to be of limited ecological value, largely due to its very small size, and does not form an important ecological feature. Its loss would therefore be of negligible ecological significance and will be offset by new fruit tree planting.

4.16 Stream

Description

4.16.1 A small stream flows from east to west across the site at field boundaries and is a tributary of the River Ouzel. The stream appears to have a natural sinuous form with earth banks and a silt and gravel substrate. The water depth is approximately 10-20cm and the flow is moderate. Areas of aquatic plants are present, including Fool's-water-cress *Apium nodiflorum* and Brooklime *Veronica beccabunga*. Where the stream passes through the pastoral field it is fenced off from the livestock (Photograph 9), except in one 7m section allowing access for cattle to drink. The bank tops adjacent to the pastoral fields largely comprise grassland and tall ruderal species, including Cock's-foot, False Oat-grass, Pendulous Sedge, Bittersweet, Greater Willowherb, Meadowsweet, Horsetail, Nettle, Bindweed, Vetch and Hard Rush *Juncus inflexus*. Bramble, Gorse *Ulex* sp., Hawthorn and Rose scrub and occasional mature Willow trees also line the stream bank tops.

4.16.2 Where the stream flows adjacent to the arable field F8, there is no fence and only a 2m field margin. Additional bankside species present in this section include Tufted Hair-grass and Hedge Woundwort. Where the stream enters the plantation woodland (W1) it is lined with semi-mature trees and scrub.

Evaluation

4.16.3 The stream section within the site appears to be semi-natural, contains aquatic and marginal macrophytes and has well vegetated banks and bank tops where not within woodland. The stream forms a linear wildlife corridor providing connectivity with the local

landscape, including downstream to the River Ouzel. As such, the stream is considered to be of value at the District level and forms an important ecological feature.

4.16.4 The stream will be diverted under the proposals. Although in the short term this will have an adverse impact on the habitat, over the long term, marginal vegetation will become established through seeding and natural colonisation. A management regime will be implemented to ensure that the stream does not become over-shaded along long sections, enhancing the habitat compared to the existing situation. In addition, the existing agricultural management will be removed, potentially resulting in an increase in water quality in the long term.

4.16.5 The re-routed stream will be safeguarded during the operational phase of the proposal through the implementation of a new SuDS scheme to manage run-off from the built development. Pollution control measures such as filter drains or petrol / water interceptors will also be used to minimise the risk of polluted surface water runoff entering local watercourses. Culverting of the watercourse should be avoided wherever practicable, and if short sections of culverting is required this should comprise culverts which are designed to maintain the natural river bed level, slope and width, with consideration given to the provision of fish resting places and mammal ledges. Overall, the re-routing of the watercourse and the associated temporary impact on habitat quality, is expected to be of minor ecological significance.

4.17 Ponds

Description

4.17.1 Three ponds are recorded on OS mapping within the site (see Plan 5263/ECO3). A lined garden pond (P1) is located adjacent to the residential property (B1), and is approximately 10m wide and 15m long (Photograph 10). The eastern and northern edges of the pond abut wooden decking adjacent to the building, while the other two edges have natural shallow earth banks. A garden footpath is located to the south of the pond between trees, scrub and hedgerows and a small orchard is present to the west of the pond. The pond is stocked with ornamental fish and there is netting over half of the pond area. Lilies are present within the pond and areas of marginal vegetation include Brooklime and Pendulous Sedge.

4.17.2 A second pond (P2) is present on OS mapping associated with the north of the residential property at the edge of the plantation woodland, within an area of scrub. During the Phase 1 survey in October 2017 no standing water was present within P2, although the ground was damp. However the landowner, advised Aspect Ecology that this pond was cleared out over winter. On a return visit in May 2018 the pond was recorded to hold water; Yellow Iris *Iris pseudacorus* dominated the pond, with other species present including Bittersweet and Greater Willowherb.

4.17.3 A third on-site pond (P3) is recorded on OS mapping within the north-west corner of field F13. No standing water was present at the time of survey, and this feature appears to be a seasonally wet depression. Reed Canary-grass *Phalaris arundinacea* and Floating Sweet-grass *Glyceria fluitans* were present within the depression. Scrub and trees surround the depression.

Evaluation

4.17.4 The garden pond (P1) supports marginal, submerged and floating aquatic vegetation, however the extent is limited by the presence of wooden decking on two aspects. The ecological value of the pond is further limited by the presence of stocked fish, due to their

potential predatory impact on other aquatic fauna. Pond P2 is more natural in appearance and habitat, however, it has only recently been cleared to contain standing water and therefore is likely to be of relatively limited ecological value.

4.17.5 The other on-site waterbody (P3) shown on OS mapping at most only contains water ephemerally. This damp depression supports a limited diversity of flora and is of limited ecological value. Overall, the waterbodies on-site are considered not to form an important ecological feature. As such, their loss to the proposals would be of minor ecological significance. The scheme design will seek to incorporate open water habitats where practicable.

4.18 Amenity Grassland and Planting

Description

4.18.1 Relatively small areas of amenity grassland are present associated with the residential property on-site, and at the corner of V10 Brickhill Street and Station Road. The sward is mown short to approximately 5cm or less. Species present include Perennial Ryegrass, Meadow-grass, Cock's-foot, Yorkshire-fog, False Oat-grass, Creeping Buttercup, White Clover, Daisy, Dandelion, Wood Avens, Creeping Cinquefoil, Spear Thistle, Curled Dock, Ragwort, Cleavers, Yarrow, Creeping Thistle, Lesser Celandine *Ranuncullus ficaria*, Greater Plantain and Crane's-bill.

4.18.2 Areas of amenity planting are associated with the residential property, including Cherry Laurel *Prunus laurocerasus*, Apple, Box *Buxus sempervirens*, Hazel, Cherry, Rose, Dogwood, Holly *Ilex aquifolium,* Firethorn *Pyracantha* sp. and Snowberry *Symphoricarpos albus*. Amenity tree planting includes Cherry, Silver Birch, Oak, *Acer* sp. and Norway Maple.

Evaluation

4.18.3 The amenity grassland comprises a limited diversity of common and widespread species and is managed regularly to keep the sward short. This habitat is likely to be common within the nearby residential areas. The areas of amenity planting within the site comprise a range of common native and non-native species, managed for amenity rather than biodiversity value. Accordingly, this habitat is considered to not form an important ecological feature. As such, the loss of this habitat to the proposals would be of negligible ecological significance and in any case similar habitat will be created within the more formal areas of proposed landscaping.

4.19 Buildings and Hardstanding

Description

4.19.1 A residential property with a number of associated buildings, including garages, farm sheds and converted barns are present within the east of the site. Associated with these are areas of gravel hardstanding and a patio. An abandoned outdoor swimming pool is present.

4.19.2 Some of the gravel hardstanding has vegetation colonising, including Feverfew *Tanacetum parthenium*, Red Dead-nettle *Lamium purpureum*, White Clover, Annual meadow-grass *Poa annua*, Shepherd's Purse, Germander Speedwell *Veronica chamaedrys*, Nettle, Groundsel, Vetch, Creeping Thistle, Green Alkanet, Spurge, Ragwort, Bristly Oxtongue, Crane's-bill, Dandelion, Hogweed and Nipplewort *Lapsana communis*.

Evaluation

4.19.3 The buildings and hardstanding support limited vegetation, comprising common and widespread species. As such these habitats are not to form an important ecological feature, such that their loss would be of negligible ecological significance.

4.20 Habitat Evaluation Summary

4.20.1 On the basis of the above, the following habitats within and adjacent to the site are considered to form important ecological features:

Table 4.3. Evaluation summary of habitats forming important ecological features.

Habitat	Level of importance
Lowland Meadow	District
Hedgerows	Local - District
Mature Black Poplar	District
Woodlands	Local
Stream	District

4.20.2 Other habitats present within the site include arable, semi-improved and improved grassland, rough grassland, ditches, tall ruderal, orchard, trees, ponds, scrub, amenity grassland, buildings and hardstanding. However, these habitats do not form important ecological features.

5 Faunal Use Of The Site

5.1 Overview

5.1.1 During the survey work, general observations were made of any faunal use of the site with specific attention paid to the potential presence of protected or notable species (see Appendix 5263/5 for relevant legislation). Specific survey work was undertaken in respect of bats, Badger, Water Vole, Otter, reptiles, Great Crested Newt and birds, with the results described below.

5.2 Bats

5.2.1 **Background Records.** Information returned from BMERC did not include any records for bat species within or adjacent to the site. The closest records are for Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *P. pygmaeus*, Daubenton's Bat *Myotis daubentonii* and Noctule *Nyctalus noctula* located approximately 0.4km north-west of the site in 2004.

Survey Results

Visual Inspection Surveys

Buildings

5.2.2 A detailed visual inspection was undertaken of all the buildings within the site, the results of which are detailed at Appendix 5263/6 and summarised below.

5.2.3 **Building B1a** contains evidence of roosting bats within the loft void, in the form of low numbers of bat droppings. The droppings are characteristic of Brown Long-eared Bat, however DNA analysis was inconclusive. The two single storey extensions (**B1b**) also have low suitability to support crevice roosting bats.

5.2.4 **Building B2** has moderate suitability to support roosting bats, due to the opportunities provided between the wooden baton framework and the roof tiles and in crevices between the wooden weatherboarding and wall structure. No evidence of roosting bats was recorded.

5.2.5 **Building B3** contained evidence of roosting bats in the form of very low numbers of droppings along the central line of the building, attributed to Brown Long-eared Bat through DNA analysis. This building is very light and has limited opportunities for roosting bats.

5.2.6 **Building B4** has limited features of value to roosting bats. However, considering its location in close proximity to woodland, a stream and other buildings with roosting bats recorded, building B4 is considered to be of low suitability for roosting bats. No evidence of roosting bats was recorded.

5.2.7 **Building B5** contained three bat droppings close to the gable ends of the building, attributed to Brown Long-eared Bat through DNA analysis. In addition, gaps in the wooden weatherboarding provide access to a cavity between this and internal plywood walls.

5.2.8 **Building B6a** has low suitability to support roosting bats due to warped weatherboarding providing access to a cavity space in the walls. No evidence of roosting bats was recorded.

5.2.9 **Building B6b** is open fronted and therefore light and draughty. A single bat dropping was recorded within the building.

5.2.10 **Building B7** has low suitability to support roosting bats as sections of the corrugated bitumen felt roof are in poor condition, providing potential access to crevice space. No evidence of roosting bats was recorded.

Trees

5.2.11 A number of mature trees are present within the site which contain features suitable for roosting bats, as summarised in Table 5.1 below and shown on Plan 5263/ECO3.

Dusk and Dawn Surveys

Emergence / re-entry surveys (buildings)

5.2.12 Evidence of roosting bats was recorded during the inspection surveys of buildings B1, B3, B5 and B6, whilst the remaining buildings were found to have potential to support roosting bats. As such, all buildings on-site were subject to further survey work in the form of dusk emergence and/or dawn re-entry surveys, the results of which are summarised in Table 5.2 below and shown on Plan 5263/BAT2. Bats were recorded emerging from or re-entering buildings B1, B2, B4 and B6.

Table 5.1. Results of the tree inspection survey results.

Tree No.	Species	Age	Potential Roost Features	Suitability
T1	Willow	Mature	Broken limb with peeling bark	Low
T2	Ash	Over-mature	Large rot hole extending up one of main limbs. Entrance approx. 1m above ground	Moderate
T3	Ash	Mature	Numerous rot holes, split main limb with potential crevice, woodpecker hole.	High
T4	Willow	Mature	Hollow and split limbs located very low to the ground (0.5-1m high)	Moderate
T5	Willow	Mature	Large cavity in main limb extending up and down for unknown distance	High
T6	Willow	Mature	Split in main trunk with potential crevices	Low
T7	Pear	Mature	Small rot hole	Low
T8	Field Maple	Mature	Small rot holes	Low
T9	Oak	Mature	Some peeling bark and splits in limbs	Low
T10	Ash	Mature	Two woodpecker holes, split and broken limbs, cavity in main trunk	High
T11	Oak	Mature	Peeling bark and dead limbs	Low
T12	Ash	Dying	Small rot holes and split limb	Low
T13	Oak	Mature	Limb fold, peeling bark and split limb	Low
T14	Ash	Mature	Multiple woodpecker holes	Moderate
T15	Oak	Mature	Low number of rot holes	Low
T16	Oak	Mature	Rot hole and potential crevice at limb fold	Low
T17	Ash	Mature	Rot hole	Low
T18	Unknown	Dead	One rot hole	Low
T19	Ash	Mature	Multiple woodpecker holes and rot holes	High
T20	Ash	Semi-mature	Thick ivy cover on stem may obscure potential roosting features	Low
T21	Ash	Mature	Rot hole and torn limb	Low
T22	Ash	Mature	Four woodpecker holes	High
T23	Apple	Mature	Rot hole in main limb appears to enter cavity	Moderate
T24	Willow	Mature	At least three rot holes	Moderate
T25	Black Poplar	Mature	Small rot hole	Low
T26	Pedunculate Oak	Mature	Some peeling bark, dead and split limbs	Low
T27	Ash	Mature	At least one woodpecker hole	Moderate
T28	Oak	Mature	Split and dead limbs	Low
T29	Oak	Mature	Peeling bark and areas of dense Ivy cover that may obscure potential features	Low
T30	Oak	Mature	Limb fold with possible crevice	Low
T31	Oak	Mature	Dead limb with upwards facing crack	Low
T32	Oak	Mature	Ivy cover may obscure potential features	Low
T33	Black Poplar	Mature	Rot hole and limb tare with cavity	Moderate
T34	Willow	Semi-mature	Rot hole approximately 1.5m off ground extends upwards in main limb	Low

Table 5.2. Building Emergence / re-entry survey results.

Building	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
B1	10 May 2018 (dusk)	Sunset: 20.42	None	Occasional to frequent passes Common and Soprano Pipistrelle both sides of building. Very low number of passes *Myotis* sp., Noctule and Long-eared Bat
	11 May 2018 (dawn)	Sunrise: 05.16	None	Very low activity – singular passes of Common Pipistrelle and Soprano Pipistrelle to east of house
	14 June 2018 (dusk)	Sunset: 21:24	**Probable emergence of single Common Pipistrelle from weatherboarding of B1b on eastern elevation at 22:08**	Occasional to frequent passes by Common Pipistrelle and Soprano Pipistrelle, with most activity to the north-east of the house. Very occasional passes of Noctule, Long-eared Bat and *Myotis* sp.
	18 June 2018 (dusk)	Sunset: 21.26	None	Very low number of passes of Common and Soprano Pipistrelle.
B2	24 May 2018 (dusk)	Sunset: 21.03	**Two Soprano Pipistrelle emerged from the western elevation of the building at 21.21 and 21.23. Single Common Pipistrelle re-entered building in similar location at 21.52**	Frequent passes of Common and Soprano Pipistrelle on western and northern side of building, fewer on south-eastern side. Low number of passes of Noctule and *Myotis* sp., with very few Long-eared Bat passes.
	15 June 2018 (dawn)	Sunrise: 04.42	None	Very occasional passes by Common Pipistrelle, Soprano Pipistrelle, *Myotis* sp. and Noctule.
B3	15 June 2018 (dawn)	Sunrise: 04.42	None	Very occasional passes by Common Pipistrelle and Soprano Pipistrelle, as well as a single Noctule and two Long-eared Bat passes.
	18 June 2018 (dusk)	Sunset: 21.26	None	Occasional passes by Common Pipistrelle and Soprano Pipistrelle, as well as rare *Myotis* sp. passes.
B4	15 June 2018 (dawn)	Sunrise: 04.42	**Single Common Pipistrelle re-entry at 03:49 and single Soprano Pipistrelle re-entry at 03:50. Both entered building through Barn Owl box entry.**	Occasional passes by Common Pipistrelle and Soprano Pipistrelle, as well as a single *Myotis* sp. Long-eared Bat passes. Activity concentrated to the south of the building.
B5	10 May 2018 (dusk)	Sunset: 20.42	None	Occasional to frequent passes Common and Soprano Pipistrelle, very low number of passes *Myotis* sp., Noctule and Long-eared Bat. Two Barbastelle passes recorded by surveyor located to the north of the building.
	11 May 2018 (dawn)	Sunrise 05.16	None	Very low number of Soprano Pipistrelle passes north of building
	14 June 2018 (dusk)	Sunset: 21:24	None	Occasional passes by Common Pipistrelle and Soprano Pipistrelle, as well as very low numbers of passes of *Myotis* sp., Noctule, Long-eared Bat. Single passes of Barbastelle and Nathusius' Pipistrelle to west of building.
	10 May 2018 (dusk)	Sunset: 20.42	None	Occasional to frequent passes of Common and Soprano Pipistrelle passes both sides of building, very low number of Long-eared Bat, Noctule and *Myotis* sp. passes. Single Barbastelle pass recorded by surveyor west of building.
B6	11 May 2018 (dawn)	Sunrise 05.16	None	Very low number of Soprano Pipistrelle passes east of building
	14 June 2018 (dusk)	Sunset: 21:24	**Single Soprano Pipistrelle emergence at eaves on eastern elevation at 21:49. Single *Myotis sp.* entered the barn through open door at 22:11 and then exited. At 22:12 a single unidentified bat (no call recorded) emerged through the door from the barn.**	Occasional passes by Common Pipistrelle and Soprano Pipistrelle, particularly foraging west of the building. Rare Noctule and *Myotis* sp. passes.
B7	18 June 2018 (dusk)	Sunset: 21.26	None	Very low number of passes of Common and Soprano Pipistrelle.

Table 5.3. Tree Emergence / re-entry survey results.

Tree	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
T2	4 June 2018 (dusk)	Sunset: 21.16	None	Occasional passes by Common and Soprano Pipistrelle, dominated by foraging along hedgerow H2
	3 July 2018 (dawn)	Sunrise: 04.48	None	Occasional passes by Common and Soprano Pipistrelle. Foraging nearby.
T3	4 June 2018 (dusk)	Sunset: 21.16	None	Occasional to frequent passes of Common and Soprano Pipistrelle including foraging activity.
	19 June 2018 (dawn)	Sunrise: 04.42	None	Occasional to frequent passes by Common and Soprano Pipistrelle. Low number of Noctule and two Barbastelle passes.
	3 July 2018 (dawn)	Sunrise: 04.48	None	Occasional passes of Common Pipistrelle and low number of Soprano Pipistrelle passes.
T4	4 June 2018 (dusk)	Sunset: 21.16	None	Low number of passes of Common and Soprano Pipistrelle
	3 July 2018 (dawn)	Sunrise: 04.48	None	Very low number of Common Pipistrelle passes
T5	4 June 2018 (dusk)	Sunset: 21.16	None	Frequent passes of Common Pipistrelle, Soprano Pipistrelle and *Myotis* sp. Single pass of Noctule. Activity along watercourse and hedgerow.
	19 June 2018 (dawn)	Sunrise: 04.42	None	Occasional passes by Common Pipistrelle, Soprano Pipistrelle and *Myotis* sp.
	3 July 2018 (dawn)	Sunrise: 04.48	None	Very occasional passes by Common Pipistrelle, Soprano Pipistrelle and *Myotis* sp.
T10	19 June 2018 (dawn)	Sunrise: 04.42	None	Occasional passes by Common and Soprano Pipistrelle. Low number of passes of Noctule. Most activity on southern side of the hedgerow.
	3 July 2018 (dawn)	Sunrise: 04.48	None	Very low number of Common Pipistrelle, Soprano Pipistrelle, *Myotis* sp. and Noctule passes.
	4 June 2018 (dusk)	Sunset: 21.16	None	Very few passes of Common and Soprano Pipistrelle.
T14	2 July 2018 (dusk)	Sunset: 21.26	None	Occasional passes of Common and Soprano Pipistrelle.
	5 June 2018 (dawn)	Sunrise: 04.46	None	Single pass of Common Pipistrelle
T19	5 June 2018 (dawn)	Sunrise: 04.46	None	Low number of Common and Soprano Pipistrelle passes. Single passes of Noctule and *Myotis* sp.
	19 June 2018 (dawn)	Sunrise: 04.42	None	Low number of passes of Common and Soprano Pipistrelle, Myotis sp. and Noctule
	2 July 2018 (dusk)	Sunset: 21.26	None	Frequent passes of Common and Soprano Pipistrelle. Occasional *Myotis* sp. passes and low number of Noctule passes. Single pass of Leisler's Bat also recorded. High activity north of tree.
T22	5 June 2018 (dawn)	Sunrise: 04.46	None	Occasional passes by Common Pipistrelle, low number Soprano Pipistrelle and single pass of Noctule. Activity focused on hedgerow H11.
	19 June 2018 (dawn)	Sunrise: 04.42	None	Low number of passes by Common Pipistrelle, Soprano Pipistrelle, and *Myotis* sp. Single Long-eared Bat and Noctule passes.
	2 July 2018 (dusk)	Sunset: 21.26	None	Occasional to frequent passes of Common Pipistrelle, Soprano Pipistrelle and *Myotis* sp. Two passes of Noctule.
T23	2 July 2018 (dusk)	Sunset: 21.26	None	Low number of passes by Common Pipistrelle and Soprano Pipistrelle.
	5 June 2018 (dawn)	Sunrise: 04.46	None	Single pass by Soprano Pipistrelle

Tree	Date	Sunset/ sunrise	Emergence/ re-entry	Summary of other activity
T24	2 July 2018 (dusk)	Sunset: 21.26	None	Frequent passes of Common Pipistrelle, Soprano Pipistrelle and *Myotis* sp. Activity concentrated to south around TL6.
	5 June 2018 (dawn)	Sunrise: 04.46	None	Occasional passes Common Pipistrelle and low number passes Soprano Pipistrelle and *Myotis* sp. largely along tree line TL3
T27	4 June 2018 (dusk)	Sunset: 21.16	None	Low number of Common Pipistrelle passes and single Soprano Pipistrelle pass.
	3 July 2018 (dawn)	Sunrise: 04.48	None	Very low number of Common Pipistrelle passes
T33	5 June 2018 (dawn)	Sunrise: 04.46	None	Very low number of Common Pipistrelle passes
	2 July 2018 (dusk)	Sunset: 21.26	None	Low number of passes of Common Pipistrelle, Soprano Pipistrelle, *Myotis* sp. and Noctule.

Commuting and Foraging Habitat

5.2.13 Roosting bats have been recorded associated with several of the on-site buildings, and these bats are likely to utilise the site for foraging and commuting. The site provides good opportunities for foraging and commuting bats towards the south of the site, including numerous cattle grazed fields with a good hedgerow network and a stream corridor. These habitats are likely to support a relatively good abundance of invertebrates and also provide linear features which offer potential commuting links with the wider landscape. Accordingly, bat activity surveys have been completed to determine the level of use of the site by this species group.

5.2.14 **Manual walked transect surveys.** The detailed activity survey results are illustrated on Plans 5263/BAT3 and 5263/BAT4 and summarised in Table 5.4 below. The highest levels of activity were generally recorded along the watercourse and nearby hedgerows at the south-west of the site, along the hedgerow adjacent to the A5, and along the hedgerow at the southern boundary of the large arable field (F8). Lower levels of activity were recorded associated with hedgerows throughout the site.

5.2.15 During all of the activity surveys Common Pipistrelle and Soprano Pipistrelle were the most commonly recorded species, albeit in varying proportions over the survey dates. Low numbers of Noctule, *Myotis* sp. and Long-eared Bat were also recorded during the surveys.

Table 5.4. Results of the walked transect surveys.

Species	Number of Passes Recorded	Approximate % of Total Passes Recorded
Dusk 26/10/2017		
Common Pipistrelle	21	21
Soprano Pipistrelle	76	76
Noctule	2	2
Long-eared Bat	1	1
Total	**100**	**100**
Dawn 27/10/2017 – No bats		
Dusk 01/05/2018		
Common Pipistrelle	91	59
Soprano Pipistrelle	54	35
Myotis sp.	9	6
Total	**154**	**100**
Dusk 16/07/2018		
Common Pipistrelle	57	33
Soprano Pipistrelle	59	35
Myotis sp.	12	7
Noctule	43	25
Total	**171**	**100**
Dawn 17/07/2018		
Common Pipistrelle	19	46
Soprano Pipistrelle	15	37
Myotis sp.	7	17
Total	**41**	**100**

5.2.16 **Remote Detector Surveys.** The results of the automated static bat surveys are summarised in Table 5.5 below and Appendix 5263/7.

Table 5.5. Summary of the static bat detector survey results.

Species	Static Detector Location				Number of Registrations	Percentage of Total
	1	2	3	4		
Common Pipistrelle	1,426	2,412	1,886	4,262	**9,986**	**54.9**
Soprano Pipistrelle	394	2,085	1,025	1,733	**5,237**	**28.8**
Myotis sp.	46	1,152	40	493	**1,731**	**9.5**
Noctule	51	232	264	236	**783**	**4.3**
Nathusius' Pipistrelle	1	175	54	42	**272**	**1.5**
Long-eared Bat	12	30	47	32	**121**	**0.7**
Barbastelle	8	2	5	20	**35**	**0.2**
Big Bat species	4	11	2	13	**30**	**0.2**
Total	**1,942**	**6,099**	**3,323**	**6,831**	**18,195**	**100**

5.2.17 Overall, the highest level of activity was recorded at static detector locations 2 and 4 (see Plan 5263/BAT1). Static detector location 2 consistently recorded a relatively high number of bat registrations per survey period, whereas the total for detector location 4 was heavily skewed by an unusually high number of registrations (2,904) of Common Pipistrelle in early May 2018.

5.2.18 A range of bat species were recorded at all static detector locations, albeit the vast majority were attributed to Common and Soprano Pipistrelle. *Myotis* species were recorded in relatively high numbers at location 2. Other species recorded during the remote detector surveys include a moderate number of registrations of Noctule, as well as low numbers of Long-eared Bat, Nathusius' Pipistrelle and Barbastelle.

Evaluation

Roosting

Buildings

5.2.19 **Building B1** contains a low number of bat droppings within the loft void of the main house (B1a). However, no emergences or re-entries were recorded from this part of the building during the dusk and dawn surveys. Due to the limited evidence of roosting bats recorded, it is likely that the loft void is used on occasion as a summer non-breeding roost by Brown Long-eared Bat. In addition, a single Common Pipistrelle was recorded emerging on one survey, likely from behind the wooden weatherboarding on the eastern aspect of the single storey section (B1b). No emergences or re-entries were recorded on other survey visits from this part of the building, indicating that the building is likely used occasionally as a summer non-breeding roost by a very low number of Common Pipistrelle. A Natural England mitigation licence will therefore be required prior to demolition.

5.2.20 **Building B2** provides a number of crevice roosting opportunities. Indeed two Soprano Pipistrelle were observed emerging from the building soon after sunset on one survey visit, followed by a Common Pipistrelle apparently re-entering the building in a similar location. No bats were observed emerging from or re-entering the building on the subsequent dawn survey visit. It is likely that the building is used occasionally as a summer non-breeding roost by a low number of Pipistrelle bats and a mitigation licence will be required prior to demolition.

5.2.21 **Building B3** contained a very low number of Brown Long-eared Bat droppings, however no emergence or re-entries of bats was recorded during the further survey work. The building is of low suitability for roosting bats due to the light conditions and poor insulating properties of the construction materials. However, it is possible that the building is used as an occasional roost during the summer months, especially considering the close proximity of confirmed roosts. It is therefore recommended that this building also be included within the Natural England licence application.

5.2.22 **Building B4** provides limited suitability for roosting bats, however, a single Common Pipistrelle and single Soprano Pipistrelle were recorded re-entering the building during the dawn survey. The exact roosting point could not be verified as the two bats appeared to enter the main building through the Barn Owl box located on the southern gable end. These bats were not observed emerging from the building subsequently and therefore it is assumed a crevice opportunity is provided by the building materials. It is likely that the building is used as a summer non-breeding roost by a low number of Pipistrelle bats and a mitigation licence will therefore be required prior to demolition.

5.2.23 **Building B5** contained a very low number (three recorded) of Brown Long-eared Bat droppings during the inspection survey results and limited bat roosting opportunities are provided by the building. However, no emergence or re-entries were recorded during the dusk and dawn survey visits. It is therefore considered likely that the very small number of droppings present internally were the result of exploratory behaviour and it is reasonably unlikely that a roost is present. Nevertheless, considering the close proximity of confirmed

roosts and the potential for individual bats to make use of the building on occasion, it is recommended that precautionary safeguards are implemented during demolition of this building and that is included within the licence application.

5.2.24 **Building B6a** has low suitability to support roosting bats and no evidence of roosting bats was recorded during the inspection survey or dusk and dawn surveys. However, a single Soprano Pipistrelle emerged from the eastern elevation of **building B6b** during one of the dusk surveys. On the same survey visit a *Myotis* sp. flew into the barn through an open door but quickly exited again and no other evidence of *Myotis* sp. roosting in the building was recorded. A single unidentified bat also exited the barn through the open doorway on the same survey; no call was recorded on either the duet or EM3 bat detector and was therefore likely a Brown Long-eared Bat as their calls are typically very quiet. No emergences or re-entries were recorded on the other two survey visits and therefore it is considered likely that this building is used as a non-breeding summer roost for Soprano Pipistrelle and potentially Brown Long-eared Bat. Due to the connected nature of buildings B6a and B6b it is recommended that appropriate mitigation and licencing be applied to both halves of the building.

5.2.25 **Building B7** has very limited potential to support roosting bats and no evidence of roosting bats was recorded during the survey work undertaken. As such, no specific mitigation or licencing will be required prior to demolition. Nonetheless, bats have been recorded roosting within nearby buildings and are dynamic animals and as such it remains possible that individuals could roost within the building in the future. Accordingly precautionary mitigation measures are recommended.

5.2.26 In summary, buildings B1, B2, B4 and B6 have been confirmed to support low numbers of roosting bats. Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared Bat are the most common bat species in England and are widely distributed across the country. Overall, considering the number and species of roosting bats recorded, the on-site buildings are considered to be of value at the local level to roosting bats.

Trees

5.2.27 Several trees on site have suitability to support roosting bats, however no evidence to confirm roost presence was recorded during the survey work undertaken. Bats are however highly mobile and dynamic mammals, such that they could utilise these trees in the future.

Impact of Proposals

5.2.28 At least four of the on-site buildings (B1, B2, B4 and B6) are likely to be used as summer (non-breeding) roosts by common and widespread bat species, such that the roosts are deemed to be of low conservation significance in accordance with best practice guidance[31]. Accordingly, the loss of the roosts to the proposals is considered to be a low scale impact, and like-for-like roost replacement is not required, although suitable alternative roosting opportunities will need to be provided as part of the mitigation strategy (see Chapter 6).

5.2.29 Due to the loss of Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared Bat summer roosts a Natural England mitigation licence will be required prior to demolition, with appropriate mitigation measures implemented to safeguard bats. An outline mitigation strategy is set out in Chapter 6 below, which will be provided in more detail

[31] English Nature (2004) '*Bat Mitigation Guidelines*'

within the licence application method statement. The mitigation strategy will ensure the conservation status of the local bat population is maintained under the proposals.

Foraging/ Commuting

5.2.30 Static detector location 2, adjacent to the stream within pastoral land, recorded relatively high numbers of bat registrations during each survey period. This is reflective of its location adjacent to a number of potential features suitable for bat foraging and commuting, including the stream, hedgerow network and cattle pasture. Although detector location 4 (wooded parcel within large arable field) recorded the highest number of bat registrations overall, this is heavily influenced by an unusually high number of Common Pipistrelle registrations during the early May survey period. The manual walked transect surveys did not record high levels of bat activity in the vicinity of static detector location 4 on any occasion. Overall, the manual and static detector data indicate that although bats utilise the entire site, the southern pastoral fields tend to support the highest levels of activity across the active season.

5.2.31 The static detectors at locations 1 (hedgerow adjacent to A5) and 3 (driveway off of V10 Brickhill Street) recorded far lower levels of bat activity than the other two detectors. The total registrations at detector location 1 are influenced by the absence of any bat registrations recorded in July and September 2018 (see section 2.4), however activity in other months was also low. These two detector locations were adjacent to the site boundaries where main roads are located. In particular the A5 adjacent to detector location 1 is a well-lit dual carriageway, which is likely to reduce the number of bats utilising the boundary hedgerows.

5.2.32 The vast majority of bat activity recorded on site (84% of total registrations) was attributed to Common and Soprano Pipistrelle, the two most common bat species in Britain[32]. At the peak, registrations of Common Pipistrelle averaged approximately 116 per hour. However, more frequently registrations of Common and Soprano Pipistrelle were less than 20 per hour and regularly less than 10 per hour. Overall, levels of Common and Soprano Pipistrelle at the site are not considered to be high for the habitats present, especially as these species are known to roost on-site and the site provides foraging opportunities in close proximity to the roosts, as well as connectivity to the local area.

5.2.33 Very low numbers of Long-eared Bat species registrations were recorded in total across all four bat detectors (121) and during the manual walked transect surveys. Long-eared Bat are known to have quiet calls which are not always recorded on bat detectors, such that given Brown Long-eared Bat droppings have been confirmed as present within two of the on-site buildings, it is expected that the site supports higher levels of activity of this species than recorded; albeit activity levels for Brown Long-eared Bat at the site are not likely to be high.

5.2.34 Relatively high numbers of *Myotis* sp. registrations were recorded at static detector location 2 (1,152 in total), albeit registrations of this species group were relatively low at other locations. Detector location 2 was adjacent to the stream and the higher levels of *Myotis* sp. registrations recorded here were anticipated as a number of *Myotis* species are known to forage along watercourses. Indeed, *Myotis* species were observed foraging along the stream during manual walked transect surveys and emergence surveys of nearby trees. Elsewhere within the site *Myotis* species registrations were significantly lower.

5.2.35 Noctule registrations were recorded across the site in relatively low numbers. Noctule are uncommon in England and most often roost within woodland habitat. Foraging is associated

[32] Natural England (2011) *Focus on bats: discovering their lifestyle and habitats.*

with woodland, meadows, waterbodies and hedgerows. Overall, Noctule were recorded in highest levels at detector location 2, where foraging opportunities are likely provided by the surrounding pastoral fields and hedgerows. Noctule registrations were also recorded at all other static detector locations in relatively low numbers, albeit in noticeably higher numbers during August at detector locations 3 and 4. Noctule may commute across the site and utilise areas for foraging, however due to the open nature of the northern part of the site and the distance at which Noctule calls can be detected, it is unknown precisely which features of the site are utilised by the species. The site as a whole is considered to be of limited value to this species and the area of greatest relative value is within the south-west pastoral fields.

5.2.36 Low numbers of Nathusius' Pipistrelle registrations were recorded at all four static detector locations, albeit only one was recorded at detector location 1 (adjacent to the A5) on one night. This species is rare in England and favours woodland habitat and waterbodies for foraging. As expected, the highest number of registrations were recorded at detector location 2, adjacent to the stream within the pastoral fields. The majority of registrations of Nathusius' Pipistrelle at this location were in late May/early June, with none recorded in three of the survey periods. Considering the low number of registrations, the site as a whole is deemed to be of low value for this species.

5.2.37 Very low numbers of Barbastelle registrations were recorded on occasional nights (<8 per night) at all four detector locations. At all locations, there were some survey periods where no Barbastelle were recorded. This species prefers deciduous woodland and tends to forage close to vegetation, although it also utilises pastoral fields, wet meadows and waterbodies. The low number of registrations of Barbastelle on few nights indicate that the site is not of high value to this species, although their detection at all static detector locations indicates they may occasionally pass across the site as well as utilise areas for foraging whilst on commute.

Summary

5.2.38 The static detector at location 2 recorded consistently high levels of bat activity, albeit detector location 4 at the north of the site recorded unusually high levels of activity in May 2018 and moderate activity levels overall. The site supports a range of common and rare bat species. Considering the bat species recorded on-site and the levels of bat activity, in combination with the habitats present on site and the urban edge location, the site is considered to be of value to bats at the District level.

Impact of the Proposals

5.2.39 The proposals will result in the loss of large areas of sub-optimal habitat for foraging/ commuting bats, in the form of arable fields and improved grassland. Good quality foraging/ commuting habitat will also be lost, particularly towards the south of the site where hedgerows including mature trees, cattle pasture and the stream are present. This temporary loss of foraging habitat will be at least partially compensated for through the new habitat creation at the site boundaries, particularly within the linear park. This will aim to provide aquatic, grassland and wooded habitat of value to the range of bats recorded on-site (see Chapter 6 below).

5.2.40 In terms of connectivity, although potential commuting routes through the centre of the site would be lost, the retention of the boundary hedgerows would retain connectivity around the site. Connectivity with off-site habitats will not be adversely impacted by the proposals, which is already fragmented by the adjacent road network. Commuting routes could be impacted along the eastern site boundary through the creation of the access road.

However, bat activity surveys did not record notable high levels of bat activity in this location, such that this is not expected to have a significant impact on an important commuting route.

5.2.41 Accordingly, subject to the implementation of the recommendations outlined at Chapter 6 below, along with other ecological enhancements, it is considered that the conservation status of local bat populations will be safeguarded under the scheme.

5.3 Badger

5.3.1 **Background Records.** A single record for Badger was returned from within the site, near to the residential property, dated to 2011. No details on this record were provided to specify whether it was an individual, sett or sign. Several other records for Badger were returned within the local area.

5.3.2 **Survey Results and Evaluation.** No Badger setts were found within or immediately adjacent to the site. Several mammal scrapes were recorded within field F5, potentially caused by Badger and occasional dung pits were recorded within the pastoral fields F1-F7 during other survey visits. The site offers potential foraging habitat for this species within the pastoral and arable land. However, no evidence was recorded to indicate that the site provides an important foraging resource for the local Badger population. Overall, the site is considered to be of local level value for Badger.

5.3.3 Potential Badger foraging and commuting habitat will be lost under the proposals, however new foraging habitat will be created with the inclusion of fruiting shrubs and lowland meadow within the scheme design. Connectivity will be retained around the site boundaries except for access provision at the eastern boundary. As the only signs of Badger activity were recorded in the west of the site, this fragmentation at the eastern boundary is unlikely to significantly impact Badgers. As such, the proposals are unlikely to have a significant impact on local Badger populations.

5.4 Water Vole

5.4.1 **Background Records.** No specific records of Water Vole within or adjacent to the site were returned from the desktop study. Three records for Water Vole were returned within the wider search area, the closest of which is associated with Mount Farm Lake, approximately 1km north-west of the site in 1998.

5.4.2 **Survey Results.** The stream within the site does not provide optimal habitat for Water Vole due to the shallow water depth (~10-20cm), however, Water Vole will use very shallow watercourses[33]. The section of the stream fenced off from the cattle pasture provides good vegetation cover for Water Vole grazing. As such, a specific Water Vole survey was undertaken.

5.4.3 Footprints characteristic of Water Vole were present within silt, in May 2018, at the stream edge towards the eastern end of fields F3 and F4 and where the stream is tree lined at the east of the site. In addition, during the same survey a number of burrows characteristic of Water Voles were recorded, albeit it was not possible to conclude whether the burrows were created by, or in current use by this species. However, no latrines or feeding stations were recorded, and therefore the survey was unable to confirm whether Water Vole currently occupy the stream. Considering the lack of firm evidence of Water Vole

[33] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).* Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

occupation, it is concluded that if present they are at a very low density. Anecdotal evidence was later received in 2018, from the landowner, who stated that Mink *Neovison vison*, a voracious predator of Water Vole, had been observed along the watercourse.

5.4.4 An update survey was undertaken in May 2019 to provide further assurance as to the presence/absence of Water Vole along the on-site section of the stream. Whilst the burrows within the banks were still present, no other signs to indicate the presence of Water Voles were recorded. Based on the survey work undertaken, it would appear Water Vole has historically been present along the stream, albeit (should the anecdotal evidence be correct) a local population is having difficulty re-establishing due to predation by mink; this would explain the presence of the footprints recorded in May 2018, potentially from dispersing individuals, but lack of evidence indicating the presence of Water Voles resident along the on-site section of stream. On this basis, the on-site section of stream is considered unlikely to support a resident Water Vole population, and any individual creatures which disperse to or through the site are likely to be dispatched by the mink. Regardless, precautionary measures, as outlined in Chapter 6, will be undertaken in accordance with best practice to avoid Water Vole being harmed under the proposals.

5.5 Otter

5.5.1 **Background Records.** A single record for Otter was returned from the desktop study, associated with the River Ouzel. The record is dated 2009 and located approximately 1.1km south-west of the site.

5.5.2 **Survey Results and Evaluation.** The on-site stream provides sub-optimal habitat for Otter. However, the stream is connected to the River Ouzel where Otter have been recorded, and it may therefore be utilised by commuting Otter and for occasional foraging. The terrestrial habitat on-site offers limited terrestrial sheltering opportunities for this species within scrub and tree lines, however the vast majority of the site does not contain tall and dense vegetation of value to this species. No evidence of Otter was recorded during the specific survey of the stream in 2018 and 2019 and therefore it is considered highly unlikely that Otter regularly utilise the site. As such, the proposals are highly unlikely to have a significant impact on this species.

5.6 Other Mammals

5.6.1 **Background Records.** No specific records of other mammals from within or adjacent to the site were returned from the desktop study. A single record for Brown Hare *Lepus europaeus* and a number of records of Hedgehog *Erinaceus europaeus* (Priority Species) were returned from within the search area around the site.

5.6.2 **Survey Results and Evaluation.** No evidence of any other protected, rare or notable mammal species was recorded within the site. Deer tracks were recorded in field F8 and numerous mammal paths were present in field F14. Deer and other mammal species likely to utilise the site, such as Fox *Vulpes Vulpes* and Rabbit remain common in both a local and national context, and as mentioned above do not receive specific legislative protection in a development context. As such, these species are not a material planning consideration.

5.6.3 No records of Dormouse in the local area were returned in the desktop study and although the on-site hedgerow network provides potential habitat for this species, the hedgerows are generally species poor and the site is isolated from any woodland. It is therefore considered highly unlikely this species utilises the site.

5.6.4 The desktop study returned background records of Hedgehog within the surrounding area. Hedgehog is a Priority Species, albeit this species remains common and widespread in England. The site offers potential opportunities for this species, particularly in the form of areas of denser scrub, rough grassland, tall herbs and the large residential garden. The site also offers potential opportunities for Brown Hare, which have been recorded in the local area, albeit larger areas of suitable habitat are likely to be present within the surrounding landscape east and south of the site.

5.6.5 Overall, the habitats on-site are likely to be widely replicated in the surrounding agricultural landscape and there is no evidence to suggest the site would be of more than local level value for this species group. The proposals will result in the loss of habitat of potential value for mammal species, including Hedgehog, in particular the wooded areas and hedgerows, and to a lesser extent the grassland. However, there is no evidence to suggest the proposals will significantly affect local populations of this species. The proposed linear park and other green space will provide alternative areas of suitable habitat for Hedgehog and other mammals. It is however recommended that precautionary safeguards are put in place to minimise the risk of harm to Hedgehog, and other mammals, in the event this species is present, as detailed in Chapter 6 below.

5.7 Reptiles

5.7.1 **Background Records.** No records for reptiles were returned from BMERC within or adjacent to the site. A low number of records for Slow-worm *Anguis fragilis* and Common Lizard *Zootoca vivipara* were returned from the wider search area, albeit all located more than 1km from the site.

5.7.2 **Survey Results.** The site contains suitable reptile foraging habitat in the form of the longer sward grassland and potential refuge and commuting habitat along the wide tree lines and hedgerows. The arable field margins are narrow and therefore of limited potential for reptiles, however the adjacent off-site railway, and associated wildlife corridor, provides a dispersal route and therefore individuals may enter the site and utilise these field margins on occasion. Accordingly, specific survey work for reptiles was completed to determine the presence or likely absence of reptiles on-site, the results of which are summarised in Table 5.6 below and illustrated on Plan 5263/ECO5.

Table 5.6. Reptile survey results summary.

Visit	Date	Common Lizard		Slow Worm		Grass Snake		Other Species
		Adult	Juv.	Adult	Juv.	Adult	Juv.	
1	11/05/2018	1	0	0	0	0	0	Common Toad
2	16/05/2018	0	0	0	0	0	0	Common Toad
3	18/05/2018	4	0	0	0	0	0	0
4	22/05/2018	5	2	0	0	0	0	Common Toad
5	30/05/2018	1	0	0	1	0	0	Common Toad
6	04/06/2018	1	1	0	0	0	0	Common Toad, Common Shrew
7	15/06/2018	0	0	0	0	0	0	Common Toad, Common Shrew, Mole
Peak Count		**5**		**0**		**0**		

5.7.3 **Evaluation.** A peak count of five adult Common Lizard and a low number of juveniles were recorded during the seven survey visits. The majority of Common Lizard were recorded along the northern site boundary adjacent to the railway line. Occasional Common Lizard

were also recorded within the margins of the smaller arable field F13. A single juvenile Slow-worm was recorded at the southern site boundary, within field F12. This individual may have been dispersing from off-site habitat, or Slow-worm may be present on-site in very low numbers.

5.7.4 The area of suitable reptile habitat at the site measures c.15ha and therefore the peak count equates to a population of less than 1 Common Lizard per hectare, which would be classified as a low population under the standard guidance[34]. No adult Slow-worm were recorded on-site although a juvenile was recorded on one occasion at the southern site boundary. As such, it is considered that the population of reptiles supported by the site is of importance at the local level only.

5.7.5 The majority of reptiles were recorded outside of the development footprint along the northern site boundary associated with the railway corridor. However, occasional individuals were also recorded within field margins and grassland within the development footprint, and as such, reptiles within these areas would be at risk of injury from construction activities such as vegetation clearance and tracking of vehicles. As the majority of the site will be cleared to facilitate the development, there will be a temporary loss in suitable reptile habitat on-site. However, the northern boundary, where the majority of reptiles were recorded, will be enhanced for reptiles. In addition, other areas of green space within the site will provide enhanced reptile habitat through the removal of intensive agricultural management and the creation of species-rich lowland meadow and scrub habitat. Connectivity will also be retained at the site boundaries, and importantly with the off-site railway corridor to the north. Therefore, subject to the implementation of appropriate mitigation measures and habitat enhancements (see Chapter 6), it is considered that the proposals would not significantly impact the conservation status of the local reptile populations.

5.8 Amphibians

5.8.1 **Background Records.** No specific records of Great Crested Newt from within or adjacent to the site were returned from the desktop study. A number of records of Great Crested Newt and Common Toad were returned from the search area surrounding the site, with the closest record of Great Crested Newt located approximately 0.7km to the north of the site.

5.8.2 An Ecological Appraisal of nearby land completed by Aspect Ecology in 2010[35] included the results of Great Crested Newt surveys for a number of ponds in the local area, including ponds P5-P7. Two surveys of each pond were completed in May 2010 and no Great Crested Newt, or other amphibians were recorded in any of these ponds.

5.8.3 **Survey Results.** Three waterbodies are present on site (P1-P3), which are described above in Section 4.17. In addition, eight off-site waterbodies have been identified within 250m of the site (see Plan 5263/ECO6 for waterbody locations). Waterbody P4 is located within pastoral fields fenced off from livestock, with minimal management input. As such, scrub and tall ruderal vegetation surround the pond and emergent vegetation including Yellow Iris is present. Waterbody P11 is connected to waterbody P4 by a wet ditch and provides additional storage during periods of wet weather. Waterbody P11 is relatively small (approximately 4m x 10m) and was blanketed by Duckweed *Lemna* sp. at the time of survey. Cattle pasture is located adjacent to the north of the pond, a hedgerow to the east and an

[34] Herpetofauna Groups of Britain and Ireland (1998) 'Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards'

[35] Aspect Ecology (2010) Caldecotte Lake Business Park, Milton Keynes: Ecological Survey and Assessment under BREEAM Offices 2006

active farmyard to the south and west. Marginal vegetation is dominated by Great Willowherb and Bittersweet.

5.8.4 Waterbodies P5-P7 are a series of connected ornamental ponds adjacent to Caldecotte Lake Drive. There is a slow flow from east to west and ornamental weirs and bridges are present. Amenity grassland and formal footpaths surround the ponds, although there is a fringe of vegetation within approximately 1-2m of the pond edges which receive only low intensity management and have a longer sward. Reed Canary-grass, Great Reedmace *Typha latifoli*, Gypsywort *Lycopus europaeus* and Willow scrub are present. Aquatic and marginal species are present, including Arrowhead *Sagittaria sagittifolia*, Ivy-leaved Pondweed *Lemna trisulcar* and Waterlily *Nymphaeaceae*. Small shoals of fish were observed within the ponds as were low numbers of waterfowl, including Mute Swan, Mallard and Coot. Ponds P5 and P6 are designed with natural looking sinuous earth banks, whilst pond P7 is a round feature with concrete edges, surrounded by hardstanding to form a seating area.

5.8.5 Waterbody P8 is a large lake which supports a range of waterfowl and is used for water-sports. The lake forms the majority of Caldecotte Lake BNS (see Section 3). The majority of the bank sides are natural, with reed beds present in small areas. However, some sections have concrete banksides for boat launching. The lake is surrounded by amenity grassland and footpaths, with discrete areas of rough grassland, trees and scrub. The lake is open to anglers and stocked with coarse fish. The lake appears to be connected to ponds P5-P7 through a reedbed to the west of P7, however the presence of weirs and unknown conditions beneath the roads may restrict the movement of fish upstream from the lake.

5.8.6 An initial appraisal of each pond, to which access was granted, was made using the HSI system to identify potential suitability to support Great Crested Newt, see Table 5.7, below.

Table 5.7: HSI survey results.

Pond	Suitability Indices										HSI Score	Suitability
	SI 1 Location	**SI 2** Pond Area	**SI 3** Pond Drying	**SI 4** Water Quality	**SI 5** Shade	**SI 6** Water Fowl	**SI 7** Fish	**SI 8** Ponds	**SI 9** Terrestrial Habitat	**SI 10** Macrophytes		
Onsite Ponds												
P1	1	0.2	0.9	1	0.7	1	0.33	0.9	0.67	0.5	**0.65**	*Average*
P2	1	0.05	1	1	0.6	1	1	0.9	1	0.6	**0.66**	*Average*
P3	Dry											
Offsite Ponds												
P4	1	0.25	0.9	1	1	1	0.33	0.85	1	0.5	**0.71**	*Good*
P5	1	0.9	0.9	1	1	0.67	0.33	0.9	0.33	0.5	**0.70**	*Good*
P6	1	0.9	0.9	1	1	0.67	0.33	0.9	0.33	0.5	**0.70**	*Good*
P7	1	0.35	0.9	0.67	1	0.67	0.33	0.9	0.33	0.35	**0.59**	*Below Average*
P8	1	-	0.9	0.67	1	0.67	0.01	0.9	0.67	0.35	**0.46**	*Poor*
P9	Not surveyed											
P10	Not surveyed											
P11	1	0.05	0.1	0.33	1	1	1	0.96	0.67	0.4	**0.46**	*Poor*

5.8.7 In summary, of the on-site ponds, P1 and P2 were found to be of 'average' suitability for Great Crested Newts, and P3 dry. Of the off-site ponds which could be accessed, ponds P4-P6 were found to be of 'good' suitability, pond P7 of 'below average' suitability and ponds P8 and P11 of poor suitability.

5.8.8 Ponds P9 and P10 could not been accessed. From aerial imagery pond P9 appears to be approximately 150m^2, located within an agricultural field but within a fenced square and surrounded by trees/scrub. Pond P10 appears to be approximately 50m^2, located within a residential garden, surrounded by trees/shrubs and grassland.

5.8.9 The two on-site ponds containing water (P1 and P2), as well as the off-site pond P4, were surveyed using eDNA techniques to determine presence/ absence of Great Crested Newts. The results for all three ponds were returned as negative (see Plan 5263/ECO6 for summary of GCN survey results). Waterbodies P8 and P11 have 'poor' suitability to support Great Crested Newt and no further survey was considered necessary. Access was not gained to ponds P5-P7, P9 and P10.

5.8.10 Smooth Newt eggs were recorded within the on-site ponds during eDNA surveys and Common Toad, a Priority Species, were recorded on-site during the reptile surveys.

5.8.11 **Evaluation.** The longer sward grassland, tall ruderal, scrub and tree lines on-site offer potential foraging, refuge and commuting habitat for Great Crested Newts. However, the extent of these habitats on-site is limited and the arable fields and short grazed grassland which dominate the site offer negligible suitability for Great Crested Newt.

5.8.12 Great Crested Newt were confirmed as absent from the on-site ponds, as well as one off-site pond. A number of off-site waterbodies could not be accessed for survey. However, ponds P5-P7 have reduced suitability for Great Crested Newt due to the presence of fish and none were recorded during specific surveys in 2010. Furthermore, these ponds are separated from the site by buildings and roads within Caldecotte Lake Business Park, and the section of the site in closest proximity to these ponds is dominated by a large arable field of limited value to amphibians. Waterbody P9 is separated from the site by V10 Brickhill Street and no Great Crested Newt were recorded in 2010. Waterbody P10 is separated from the site by the A5 dual carriageway, although a number of farm underpasses and the stream culvert are present.

5.8.13 Overall, considering the absence of Great Crested Newt in the surveyed waterbodies, including on-site ponds, the absence of records for this species within 500m of the site, the partial isolation of the site by the road network, and the absence of Great Crested Newt recorded during on-site reptile surveys, it is considered unlikely that this species utilises the site. As such, the proposals are highly unlikely to impact local populations of this species and specific mitigation measures will not be required. However, as the on-site ponds would be lost under the proposals, precautionary measures are advised during their destruction (see Chapter 6) to ensure any amphibians present are safeguarded. In addition, the reptile mitigation strategy would also safeguard amphibians utilizing terrestrial habitat on-site. In the unlikely event that Great Crested Newt are encountered during this exercise, works would cease and further ecological advice would be provided.

5.9 Birds

5.9.1 **Background Records.** Information returned from BMERC returned a single record for Red Kite *Milvus milvus* (Schedule 1) within the site in 2015. Records for numerous bird species were included within the vicinity of the site, including Red Listed and Priority Species. The closest of such records are for Skylark *Alauda arvensis* located approximately 0.3km north

of the site in 2000 and a range of waterfowl, including Kingfisher *Alcedo atthis* and Bittern *Botaurus stellaris*, associated with Caldecotte Lake.

5.9.2 **Survey Results.** A total of 47 species of bird were recorded on-site during the wintering and breeding bird surveys. Of these, 22 species are considered to be breeding or probably breeding and three possibly breeding (i.e. habitat suitable to support the species is present). The remaining 25 species were either recorded in adjacent areas or flying over the site, or were represented by non-breeding individuals, including 13 that were only recorded over the winter months. A summary of observations for each species is included in Appendix 5263/8 and on Plan 5263/ECO7.

5.9.3 No Barn Owls were recorded on-site during any of the survey visits, including bird surveys and bat surveys of the buildings and no evidence of Barn Owl roosts was recorded within any of the on-site buildings. Swallow *Hirundo rustica* were recorded nesting within one of the on-site converted barns (B6b).

5.9.4 **Evaluation.** No significant numbers of notable species were recorded at the site during the wintering bird survey. The Red Listed and Priority Species Starling, Redwing, Fieldfare and Linnet were recorded foraging on-site, however the numbers recorded were not high and these species are widespread and commonly recorded in large flocks during the winter months. The majority of bird activity during November, December and January was associated with the network of hedgerows. During October, species including Stock Dove, Woodpigeon, Rook, Starling, Fieldfare, Pied wagtail and Linnet were recorded as late autumn migrants foraging on-site, including within the arable land at the north. Greylag Geese and Canada Geese were recorded foraging within the arable fields on-site over winter. However, no rare or notable wetland bird species were recorded on-site.

5.9.5 The majority of breeding bird activity at the site is associated with the network of hedgerows, particularly in the south of the site. Species recorded breeding within the hedgerows include the Red Listed species Song Thrush and Amber listed Dunnock, both of which are also Priority Species. In addition, four Skylark territories, a pair of Yellowhammers and possibly Yellow Wagtail were recorded breeding within the large arable field at the north of the site. These three species are included on the RSPB Red List having undergone major declines in their UK populations over 25 years and are also Priority Species. All three species nevertheless remain common and widespread, both locally and nationally and large areas of agricultural land are present to the east and south of the site.

5.9.6 Overall, the site does not appear to be of particular ornithological interest, or afford superior opportunities for wintering or breeding birds than the local area. The proposed development will result in the permanent loss of arable fields and numerous hedgerows and trees, which will result in a reduction in nesting habitat for a range of bird species. However, only low numbers of mostly common and widespread bird species were recorded on-site and the creation of new habitat adjacent to the site boundaries will provide new nesting and foraging opportunities for a range of species.

5.9.7 A pair of Yellowhammer, potentially Yellow Wagtail, and four Skylark territories were recorded breeding within the large arable field at the north of the site as well as a single pair of breeding Yellowhammer east of V10 Brickhill Street. Yellow Wagtail and Skylark are ground nesting birds and the loss of the arable fields will result in the permanent loss of potential breeding habitat for these species on-site, albeit only a very low number of breeding territories would be impacted. Arable habitat and hedgerows will be largely retained to the east of V10 Brickhill Street where there is only a minor infringement for road improvements.

The proposals will result in the loss of hedgerow, woodland, arable fields and barns which could potentially affect any nesting birds that may be present at the time of works. Accordingly, a number of safeguards in respect of nesting birds are proposed, as detailed in Chapter 6 below. The majority of wintering and breeding bird activity at the site was recorded in association with the hedgerow network, particularly within the south of the site. Although there will be a loss in hedgerow habitat, new hedgerow, tree and scrub planting will be more diverse than the existing species-poor hedgerows, providing benefits for many bird species. The proposals are unlikely to have a significant impact on local bird populations in the long term.

5.10 Invertebrates

5.10.1 **Background Records.** No specific records of invertebrates were returned from within or adjacent to the site. A number of records for Priority Species and notable invertebrates were returned from the wider search area, the closest of which are for Small Heath *Coenonympha pamphilus* and Essex Skipper *Thymelicus lineola* butterflies, located less than 0.1km from the site in 1991.

5.10.2 **Survey Results and Evaluation.** No evidence for the presence of any protected, rare or notable invertebrate species was recorded within the site. The semi-improved pastoral fields, stream, hedgerows and the more mature trees are likely to support a range of invertebrate species. However, the site contains relatively few micro-habitats that would typically indicate elevated potential for invertebrates[36], such as a variable topography with areas of vertical exposed soil, areas of species-rich semi-natural vegetation; variable vegetation structure with frequent patches of tussocks combined with short turf; free-draining light soils; walls with friable mortar or fibrous dung. Accordingly, given the habitat composition of the site and lack of adjacent sites designated for significant invertebrate interest, it is considered unlikely that the site would be of more than local level value for invertebrates. It is therefore unlikely that the proposals will result in significant harm to any protected, rare or notable invertebrate populations.

5.11 Summary

5.11.1 On the basis of the above, a summary of fauna forming important ecological features is provided below:

Table 5.7. Evaluation summary of fauna forming important ecological features.

Species / Group	Supported by or associated with the site	Level of Importance
Bats – Roosting	Confirmed presence on site in buildings	Local
Bats – Foraging / Commuting	Confirmed presence on site	Local to District
Badger	Confirmed foraging on-site	Local
Dormouse	Likely absent	Negligible
Water Vole	Likely absent	Negligible
Otter	Likely absent	Negligible
Great Crested Newt	Confirmed absent in on-site ponds and likely absent (although potential habitat present)	Negligible
Reptiles	Confirmed presence on site	Local

[36] Natural England (2010) 'Higher Level Stewardship – Farm Environment Plan (FEP) Manual', 3rd Edition

Species / Group	Supported by or associated with the site	Level of Importance
Birds	Confirmed presence on site	Local

5.11.2 Other fauna supported by the site include non-priority species of mammals, amphibians and invertebrates. However, these species do not form important ecological features.

6 Mitigation Measures and Ecological Enhancements

6.1 Mitigation

6.1.1 Based on the habitats, ecological features and associated fauna identified within / adjacent to the site, it is proposed that the following mitigation measures (**MM1 – 23**) are implemented under the proposals. Further, detailed mitigation strategies or method statements can be secured via suitably-worded planning conditions, as recommended by relevant best practice guidance (BS 42020:2013).

Milton Keynes Wildlife Corridor

6.1.2 **MM1 – Wildlife Corridor Protection.** A proportion of the A5 Wildlife Corridor is located within the west of the site and a Railway Corridor is located adjacent to the north of the site. The retained habitats will be protected during construction through the erection of protective fencing, including standard good practice dust control and abatement measures. A sensitive lighting scheme (see MM8 in relation to bats) will ensure that a dark corridor is retained within the green space at the west and north of the site. In the long term the corridors will be enhanced through new diverse habitat creation.

Hedgerows, Trees and Woodland

6.1.3 **MM2 – Hedgerow Protection.** All hedgerows to be retained within the proposed development shall be protected during construction in line with standard arboriculturalist best practice (BS5837:2012) or as otherwise directed by a suitably competent arboriculturalist. This will involve the use of protective fencing or other methods appropriate to safeguard the root protection areas of retained hedgerows.

6.1.4 **MM3 – Hedgerow Planting and Management.** To mitigate for the proposed loss of hedgerows on-site, new native species-rich hedgerows with standard trees will be included within the scheme design. New and existing native hedgerows will be trimmed every 2-3 years and kept above a height and width of 2m, to create dense, well-structured hedgerows. Any gaps would be re-planted with native species.

6.1.5 **MM4 – Black Poplar Planting.** To compensate for the loss of the three Black Poplar on-site, at least six Black Poplar will be planted along the re-routed stream corridor. These specimens will be of local provenance.

6.1.6 **MM5 – Woodland Planting.** To mitigate the loss of existing woodland, new woodland pockets should be created with a range of native tree and shrub species to create a varied vegetation structure. It is recommended this include fruit and nut bearing species, such as Crab Apple, Hazel, Walnut, Hawthorn and Dogwood.

Meadow

6.1.7 **MM6 – New Lowland Meadow Creation.** The loss of the existing lowland meadow will be partially compensated through new meadow creation of ~2ha within the linear park at the west of the site. New lowland meadow habitat would be created through seeding of an appropriate meadow mixture, including species recorded within the on-site grassland such as Common Knapweed, Rough Hawkbit and Common Bird's-foot-trefoil.

6.1.8 The area proposed for new meadow creation is in close proximity to the existing meadow, at the same elevation, and currently managed mostly as pasture or hay meadows. The soil conditions are therefore expected to be similar and lowland meadow creation should be

achievable. An appropriate long-term meadow management regime will be implemented and monitoring will take place to ensure a good quality lowland meadow habitat is created. Detailed methods on meadow creation, management and monitoring can be included within an Ecological Management Plan.

Stream

6.1.9 **MM7 – Rerouted Stream Corridor.** The new watercourse will be designed to provide a natural profile, with earth banksides supporting riparian vegetation. Although natural colonisation with vegetation will occur, to supplement this process, seeding or plug planting with native marginal vegetation could also take place. The stream will be managed to ensure extensive over-shading does not occur in the long term.

6.1.10 **MM8 – Pollution Prevention.** In order to safeguard the on-site, or any connected, watercourse against any potential run-off or pollution events during construction, the following safeguards will be implemented:

- Storage areas for chemicals, fuels, etc. will be sited well away from the watercourse (minimum 10m), and stored on an impervious base within an oil-tight bund with no drainage outlet. Spill kits with sand, earth or commercial products approved for the stored materials shall be kept close to storage areas for use in case of spillages;
- Where possible, and with prior agreement of the sewage undertaker, silty water should be disposed of to the foul sewer or via another suitable form of disposal, e.g. tanker off-site;
- Water washing of vehicles, particularly those carrying fresh concrete and cement, mixing plant, etc. will be carried out in a contained area as far from the watercourse as practicable (minimum 10m), to avoid contamination; and
- Refuelling of plant will take place in a designated area, on an impermeable surface, away from the watercourse (minimum 10m).

6.1.11 The re-routed stream will be safeguarded during operation through the implementation of a new SuDS scheme to manage run-off from the built development. Pollution control measures such as filter drains or petrol / water interceptors will also be used to minimise the risk of polluted surface water runoff entering local watercourses.

Bats

6.1.12 **MM9 – Update Survey.** Should any considerable time (e.g. >2 years) elapse between the survey work detailed above and any development works, a further survey of the buildings with potential to support roosting bats should be undertaken prior to the commencement of works to confirm the continued absence of bats.

6.1.13 **MM10 – Building Demolition.** Survey work has identified roosts of low conservation significance with at least four of the on-site buildings to be lost as part of the proposals. As such, works will need to be carried out under a European Protected Species (EPS) development licence obtained from Natural England, with implementation of an appropriate mitigation strategy; this strategy will be detailed within the method statement accompanying the licence application. In summary, mitigation measures will include the following:

- Replacement Roosting Opportunities. Due to the number of roosts to be lost, replacement roosting opportunities should include a purpose designed bat hut within the linear park or along the northern site boundary, as well as bat boxes mounted on

retained trees or on poles. A proportion of the replacement roosting opportunities will need to be provided prior to the loss of existing roosts.

- Pre-works Check. A pre-demolition inspection of the buildings will be undertaken to search for the presence of roosting bats. Should roosting bats be present these will be relocated to the pre-erected bat hut/ bat boxes.

- Soft Demolition of Buildings supporting bat roosts. Removal of structures with potential to support or conceal roosting bats (e.g. wooden weatherboarding, roof tiles, soffit boxes), should be undertaken by hand, or with the careful use of hand tools, during favourable weather conditions (e.g. not during heavy rain, high winds or unseasonable low temperatures) under a Natural England mitigation licence and ecological supervision. It is advised that works are conducted outside the summer season, when the roosts are expected to be active, and ideally during spring or autumn, which are considered the less sensitive seasons for bats.

6.1.14 **MM11 – Tree Felling.** Numerous on-site trees have bat roosting potential. Although no bat roosts were confirmed present during specific presence/ absence surveys, the use of roosting features by bats can be sporadic and transitory, such that potential roosting features could be utilised in the future. Furthermore, new roosting features could develop (e.g. as a result of wind damage and woodpecker activity within trees). As such, although current information indicates there will be no loss of bat roosts in trees, it is necessary to adopt a precautionary approach to ensure bats are safeguarded during tree felling works. It is therefore recommended that all trees with low, moderate or high suitability to support roosting bats be felled using a soft-felling method. This would involve slowly lowering and cushioning any limbs and tree sections that exhibit features (such as peeling bark, split limbs, etc.) considered potentially suitable for bats, thereby reducing the impact on these tree sections as they are brought to the ground.

6.1.15 **MM12 – Sensitive Lighting.** Light-spill onto retained and newly created habitat, in particular the retained boundary hedgerows and new linear park, will be minimised in accordance with good practice guidance[37] to reduce potential impacts on light-sensitive bats (and other nocturnal fauna). This may be achieved through the implementation of a sensitively designed lighting strategy, with consideration given to the following key factors:

- **Light exclusion zones –** ideally no lighting should be used in areas likely to be used by bats. Light exclusion zones or 'dark corridors' may be used to provide interconnected areas free of artificial illumination to allow bats to move around the site;

- **Variable Lighting Regimes –** VLRs can be employed, which involve switching off/dimming lights for periods during the night, for example when human activity is generally low (e.g. 12.30 – 5.30am). The use of VLRs may be particularly beneficial during the active bat season (April to October). Motion sensors can also be used to limit the time lighting is operational;

- **Light barriers –** new planting (e.g. hedgerows and trees) or fences, walls and buildings can be strategically positioned to reduce light spill;

- **Spacing and height of lighting units –** increasing spacing between lighting units will minimise the area illuminated and allow bats to fly in the dark refuges between

[37] Stone, E.L. (2013) '*Bats and lighting: Overview of current evidence and mitigation guidance*.' ILP (2011) '*Guidance notes for the reduction of obtrusive light*' Institution of Lighting Professionals, GN01:2011; and Bat Conservation Trust (2014) '*Artificial Lighting and Wildlife – Interim Guidance: Recommendations to help minimise the impact of artificial lighting*'.

lights. Reducing the height of lighting will also help decrease the volume of illuminated space and give bats a chance to fly over lighting units (providing the light does not spill above the vertical plane). Low level lighting options should be considered for any parking areas and pedestrian / cycle routes, e.g. bollard lighting, handrail lighting or LED footpath lighting;

- **Light intensity –** light intensity (i.e. lux levels) should be kept as low as possible to reduce the overall amount and spread of illumination. The type of light should also be considered, for example lights with high ultraviolet content (e.g. metal halide or mercury lights) should be avoided or fitted with UV filters; and
- **Directionality –** to avoid light spill lighting should be directed only to where it is needed. Particular attention should be paid to avoid the upward spread of light so as to minimise trespass and sky glow.

Water Vole

6.1.16 **MM13 – Pre-commencement Survey.** Prior to the commencement of works, in accordance with best practice, an update survey will be undertaken of the on-site section of stream to determine whether Water Vole have successfully established. This survey should take place between mid-April and September. Should Water Vole be confirmed as present, a suitable mitigation strategy will need to be devised, such as that outlined at MM15 below.

6.1.17 **MM14 – Habitat Provision.** The survey work undertaken to date indicates Water Vole are utilising the on-site section of the watercourse to disperse, but are not establishing an on-site population; potentially due to mink. Nonetheless, the re-routed watercourse will have design elements suitable for Water Vole; including steep earth banks (approaching 1:1 gradient), lush marginal vegetation to provide food and cover, and established bank top vegetation to provide a corridor of suitable habitat facilitating future dispersal through the site. Native species plug planting as well as seeding should be utilised to establish species-rich marginal, bank-side and bank-top vegetation quickly. Where road crossings are required, bridges, or appropriately designed culverts would be installed to prevent habitat fragmentation. Any culverting that is necessary would need to be as short as possible and appropriately designed to retain connectivity.

6.1.18 **MM15 – Water Vole Translocation (IF REQUIRED).** Survey work undertaken to date indicate Water Vole are not resident along the on-site section of watercourse. However, should the pre-commencement survey confirm the presence of Water Vole, a Natural England licence for displacement would be required, the application for which would include a detailed mitigation strategy likely involving a translocation exercise, the key points of which are summarised below.

6.1.19 Prior to translocation occurring a suitable receptor site would need to be identified with connectivity to the wider local area; the re-routed watercourse will incorporate design elements suitable for Water Vole and therefore could potentially be appropriate, subject to the vegetation being sufficiently mature at the time of translocation. Water Vole would be trapped from the existing stream section and relocated to the receptor site under a site-specific licence. The optimal period for this exercise is between 1st March and 15th April, although if necessary translocation can occur during the autumn (15th September to 30th November).

Other Mammals

6.1.20 **MM16 – Badger Update Survey.** Given that no evidence of Badgers has been recorded within or adjacent to the site it is considered that Badgers do not currently pose a constraint

to development. Nonetheless, Badgers are dynamic animals and levels of Badger activity can rapidly change at a site, with new setts being created at any time. It is therefore recommended that an update survey be carried out prior to commencement of site works in order to confirm the current status of Badgers at the site.

6.1.21 **MM17 – Mammal Construction Safeguards.** In order to safeguard Badger, Hedgehog and other mammals, should they enter the site during construction works, the following measures will be implemented:

- Any trenches or deep pits within the site that are to be left open overnight will be provided with a means of escape should a mammal enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water;
- Any temporarily exposed open pipes (>150mm outside diameter) should be blanked off at the end of each working day so as to prevent mammals gaining access as may happen when contractors are off-site;
- Any trenches/pits will be inspected each morning to ensure no mammals have become trapped overnight. Should a Badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, forming a temporary sett. Should a trapped Badger be encountered a suitably qualified ecologist will be contacted immediately for further advice;
- The storage of topsoil or other 'soft' building materials in the site will be given careful consideration. Badgers will readily adopt such mounds as setts. So as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections with consideration given to temporarily fencing any such mounds to exclude Badgers;
- The storage of any chemicals at the site will be contained in such a way that they cannot be accessed or knocked over by any roaming mammals;
- Fires will only be lit in secure compounds away from areas of Badger activity and not allowed to remain lit during the night; and
- Unsecured food and litter will not be left within the working area overnight.

Amphibians

6.1.22 **MM18 – Pond Draining.** It is recommended that the on-site ponds be drained down during the winter period when amphibians are less likely to be present. Should this not be possible, the ponds will be drained down carefully, under ecological supervision, and any amphibians (e.g. Common Toad) present capture and released within suitable habitat.

Reptiles

6.1.23 **MM19 - Habitat Management.** It is advised that habitat management (e.g. arable management and grazing) continues leading up to development to prevent the extent of suitable habitat increasing. An update habitat assessment will be required to inform a detailed mitigation strategy.

6.1.24 **MM20 - Reptile Receptor Area.** A reptile receptor area will be created at the north of the site, adjacent to the off-site railway corridor, where the majority of reptiles were recorded on-site. At present, there is an area of rough grassland at the far north-east corner of the site, measuring approximately 0.6ha. This area could be enhanced for reptiles through grassland management, control of scrub encroachment and the creation of hibernacula. To

ensure the success of the reptile mitigation strategy, the reptile receptor area will be prepared prior to mitigation beginning.

6.1.25 **MM21 – Habitat Manipulation and Destructive Search.** Due to low number of reptiles recorded and the relatively small areas of suitable reptile habitat available on site, mitigation will focus on habitat manipulation and destructive searches. As the majority of Common Lizard were recorded at the northern site boundary, adjacent to the railway corridor, within a 2m wide field margin, it is assumed that there is a resident population along this Wildlife Corridor. Should the field margin be temporarily lost to facilitate the development, it would be subject to a habitat manipulation exercise. This will involve cutting of vegetation using hand tools in a two-stage process (i.e. to around 15 cm, then to ground level) to encourage reptiles to disperse towards the receptor area and off-site Wildlife Corridor. Following the habitat manipulation exercise, reptile exclusion fencing would be installed to prevent recolonization of the development footprint during construction works.

6.1.26 Elsewhere within the site, areas with potential to support reptiles will be subject to sensitive vegetation clearance using hand tools and under ecological supervision, and destructive searches. Any reptiles found will be relocated to the receptor area. Habitat manipulation and destructive searches should be carried out under the supervision of a competent ecologist during the active reptile season (generally March/April to September/October, depending on prevailing weather).

6.1.27 **MM22 – New Habitat Creation.** Areas of grassland, focused along the northern site boundary where reptiles are present, will be seeded with an appropriate mixture (e.g. Emorsgate's EM10), including tussock forming grasses and wildflowers. This will provide an enhanced grassland habitat for invertebrates, small mammals, reptiles, amphibians and birds. Areas of new tussock grassland will be cut every 2-3 years on rotation, to create a tussocky structure. Hibernacula will also be created within the proposed green space to provide enhanced overwintering habitat for reptiles on-site.

Nesting Birds

6.1.28 **MM23** – **Timing of Works.** To avoid a potential offence under the relevant legislation, no clearance of suitable vegetation or buildings should be undertaken during the bird-nesting season (1st March to 31st August inclusive). If this is not practicable, any potential nesting habitat to be removed should first be checked by a competent ecologist in order to determine the location of any active nests. Any active nests identified would then need to be cordoned off (minimum 5m buffer) and protected until the end of the nesting season or until the birds have fledged. These checking surveys would need to be carried out no more than three days in advance of vegetation clearance.

6.2 Ecological Enhancements

6.2.1 The National Planning Policy Framework (NPPF) encourages new developments to maximise the opportunities for biodiversity through incorporation of enhancement measures. The proposals present the opportunity to deliver ecological enhancements at the site for the benefit of local biodiversity, thereby making a positive contribution towards the broad objectives of national conservation priorities and the local Biodiversity Action Plan (BAP). The recommendations and enhancements summarised below are considered appropriate given the context of the site and the scale and nature of the proposals. Through implementation of the following ecological enhancements (**EE1** – **EE6**), the opportunity exists for the proposals to deliver a number of biodiversity benefits at the site.

Habitat Creation and Management

6.2.2 **EE1 – Landscape Planting.** It is recommended that where practicable, new planting within the site be comprised of native species of local provenance, including trees and shrubs appropriate to the local area. Suitable species for inclusion within the planting could include native trees such as Oak, Birch *Betula pendula* and Field Maple, whilst native shrub species of particular benefit would likely include fruit and nut bearing species which would provide additional food for wildlife, such as Blackthorn, Hawthorn, Crab Apple *Malus sylvestris*, Hazel *Corylus avellana* and Elder. Where non-native species are proposed within more formal areas of landscaping, these should include species of value to wildlife, such as varieties listed on the RHS' 'Plants for Pollinators' database, providing a nectar source for bees and other pollinating insects.

Bats

6.2.3 **EE2 - Bat Boxes.** A number of bat boxes will be incorporated within the proposed development. The provision of bat boxes will provide new roosting opportunities for bats in the area, such as Soprano Pipistrelle, a national Priority Species. So as to maximise their potential use, the bat boxes should ideally be situated on suitable retained trees, erected as high up as possible and sited in sheltered wind-free areas that are exposed to the sun for part of the day, facing a south-east, south or south-westerly direction. The precise number and locations of boxes / roost features should be determined by a competent ecologist, post-planning once the relevant final development design details have been approved.

Badger

6.2.4 **EE3 – Habitat Opportunities.** It is suggested that earth mounds are provided within the linear park, which would provide opportunities for natural Badger sett creation on-site. In addition, the planting of fruiting trees and shrubs will provide an enhanced foraging resource for this species.

Reptiles

6.2.5 **EE4 - Habitat Creation.** Rough grassland and scrub habitat will be created at the north of the site, adjacent to the railway corridor where reptiles have been recorded. In addition, suitable reptile habitat will be provided within the linear park at the west of the site, including wildflower-rich grassland, scrub and hibernacula. The creation of earth mounds will provide south facing slopes of benefit to basking reptiles.

Birds

6.2.6 **EE5 - Bird Boxes**. A number of bird nesting boxes are to be incorporated within the proposed development, thereby increasing nesting opportunities for birds at the site. This will include boxes suitable for notable species recorded on site, such as Starling and Dunnock. Ideally, the bird boxes will have greater potential for use if sited on suitable, retained trees, situated as high up as possible. The precise number and locations of boxes should be determined by a competent ecologist, post-planning once the relevant final development design details have been approved.

Invertebrates

6.2.7 **EE6 – Habitat Piles.** A proportion of any deadwood arising from vegetation clearance works should be retained within the site in a number of wood piles located within areas of new scrub planting or areas of wildflower grassland in order to provide potential habitat opportunities for invertebrate species, which in turn could provide a prey source for a range

of other wildlife. In addition, the provision and management of new native landscape planting will likely provide additional opportunities for invertebrates at the site in the long term.

7 Conclusions

7.1 Aspect Ecology has carried out an Ecological Appraisal of the proposed development, based on the results of a desktop study, Phase 1 habitat survey and a number of detailed protected species surveys.

7.2 The available information confirms that no statutory nature conservation designations are present within or adjacent to the site. A Milton Keynes Wildlife Corridor is partially located on-site, however new habitat creation within the linear park will retain the function of this corridor and provide long term enhancements. The Wildlife Corridor located adjacent to the north of the site will be protected under the proposals.

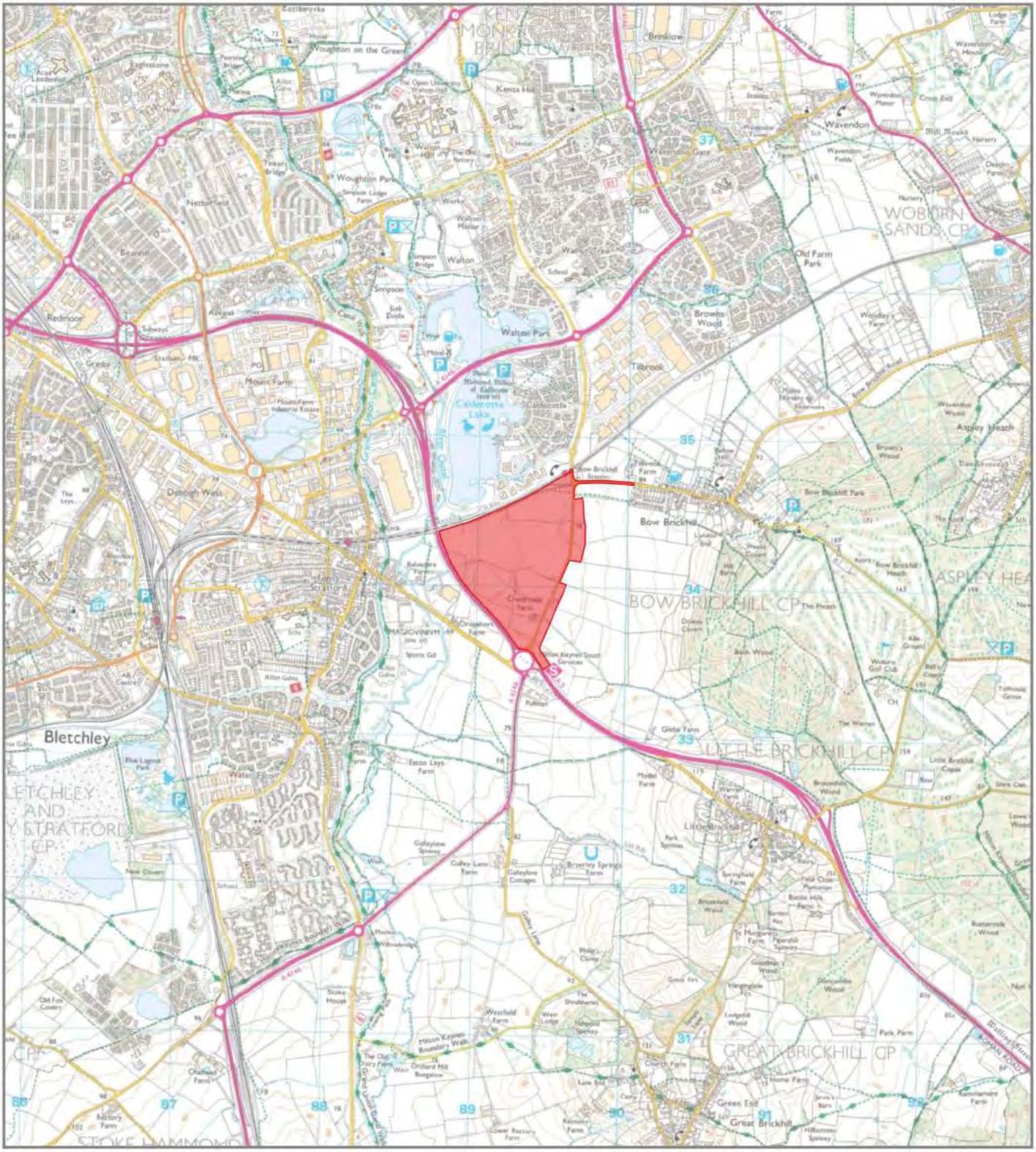
7.3 The Phase 1 habitat survey has established that the site is dominated by habitats not considered to be of ecological importance. However, the hedgerows, lowland meadow, Black Poplar and wooded areas are of elevated value and their loss will be mitigated/compensated, at least in part, through new habitat creation in conjunction with the landscape proposals. The on-site stream will be re-routed as part of the proposals, although in the long term this habitat will be enhanced.

7.4 The habitats within the site support several protected species, including species protected under both national and European legislation. Accordingly, a number of mitigation measures have been proposed to minimise the risk of harm to protected species, with compensatory measures proposed, where appropriate, in order to maintain the conservation status of local populations.

7.5 In conclusion, the proposals have sought to minimise adverse effects on biodiversity, but where harm to biodiversity is unavoidable the development has sought to mitigate and/or compensate for its loss in accordance with relevant planning policy and promote biodiversity within retained and newly created habitats.

Plan 5263/ECO1:

Site Location



Key:

Site Location

aspect ecology

Aspect Ecology Limited - West Court - Hardwick Business Park
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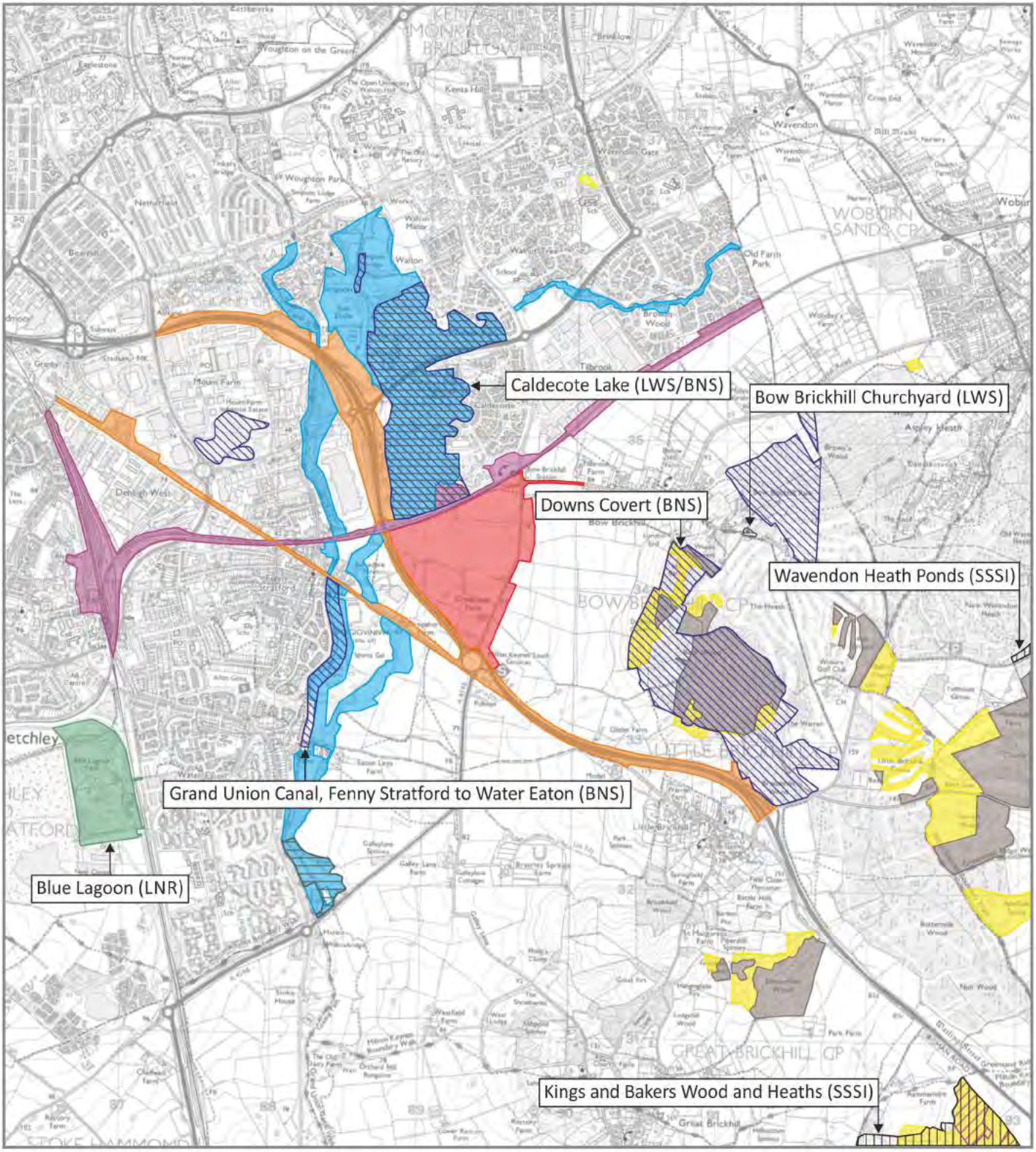
01295 276066 - info@aspect-ecology.com - www.aspect-ecology.com

South Caldecotte, Milton Keynes	PROJECT
Site Location	TITLE
5263/ECO1	DRAWING NO.
-	REV.
October 2018	DATE

Plan 5263/ECO2:

Ecological Designations



Key:

- Site Location
- Sites of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)
- Ancient & Semi - Natural Woodland (ASW)
- Ancient Replanted Woodland (ARW)
- Local Wildlife Site (LWS)
- Biological Notification Site (BNS)
- MK Railway Corridors
- MK Road Corridors
- MK Wetland Corridors

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South Caldecotte, Milton Keynes — PROJECT

Ecological Designations — TITLE

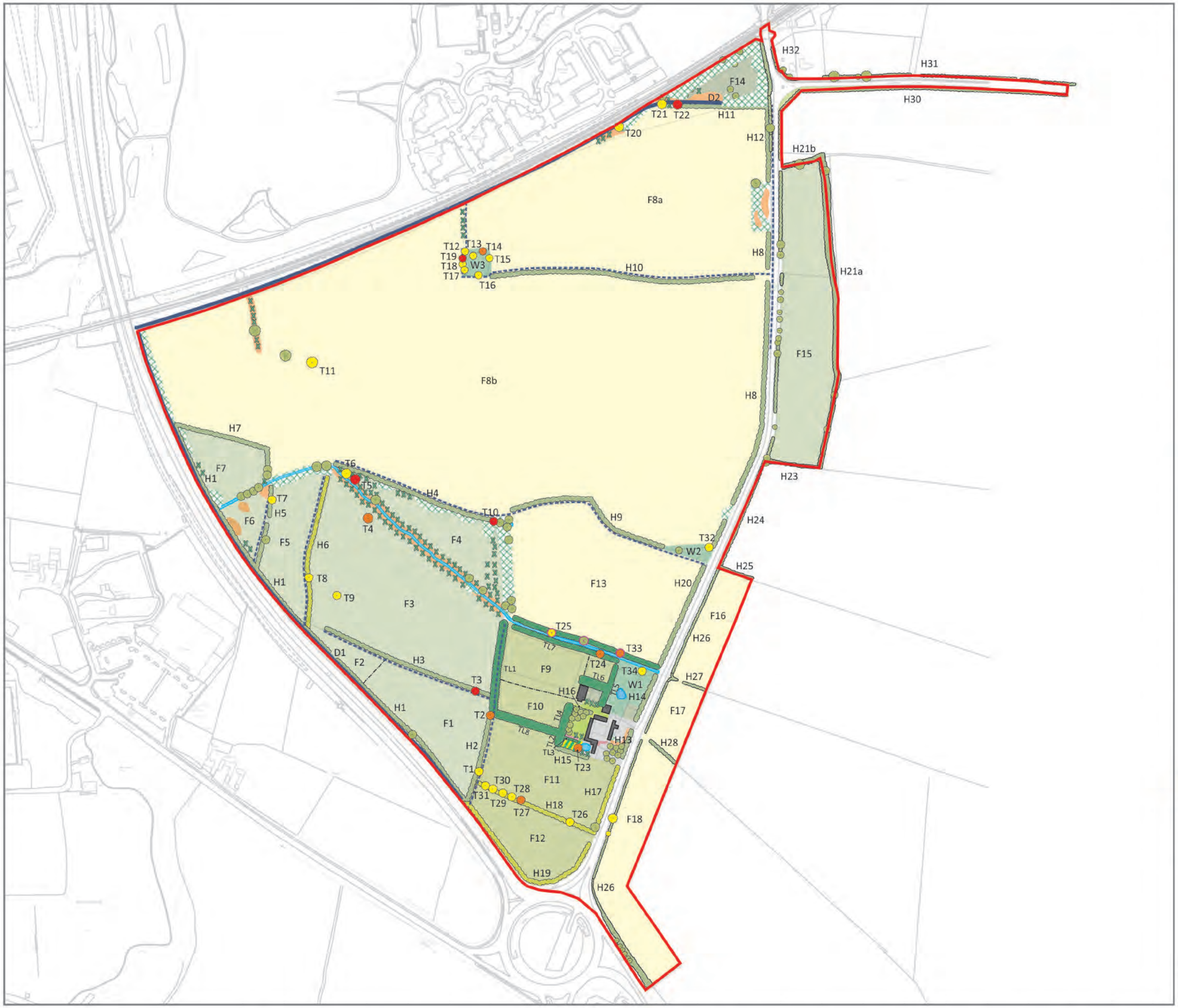
5263/ECO2 — DRAWING NO.

\- — REV.

October 2018 — DATE

Plan 5263/ECO3:

Habitats and Ecological Features



Key:

- Site Boundary
- Arable
- Amenity Grassland
- Semi Improved Grassland
- Improved Grassland
- Rough Grassland
- Orchard
- Amenity Planting
- Tall Ruderal Vegetation
- Woodland
- Dense Scrub
- Scattered Scrub
- Tree
- Tree with Low Potential to Support Roosting Bats
- Tree with Moderate Potential to Support Roosting Bats
- Tree with High Potential to Support Roosting Bats
- Mature Black Poplar
- Treeline
- Hedgerow
- Defunct Hedgerow
- Pond
- Stream
- Dry Ditch
- Wet Ditch
- Fence
- Hardstanding
- Building

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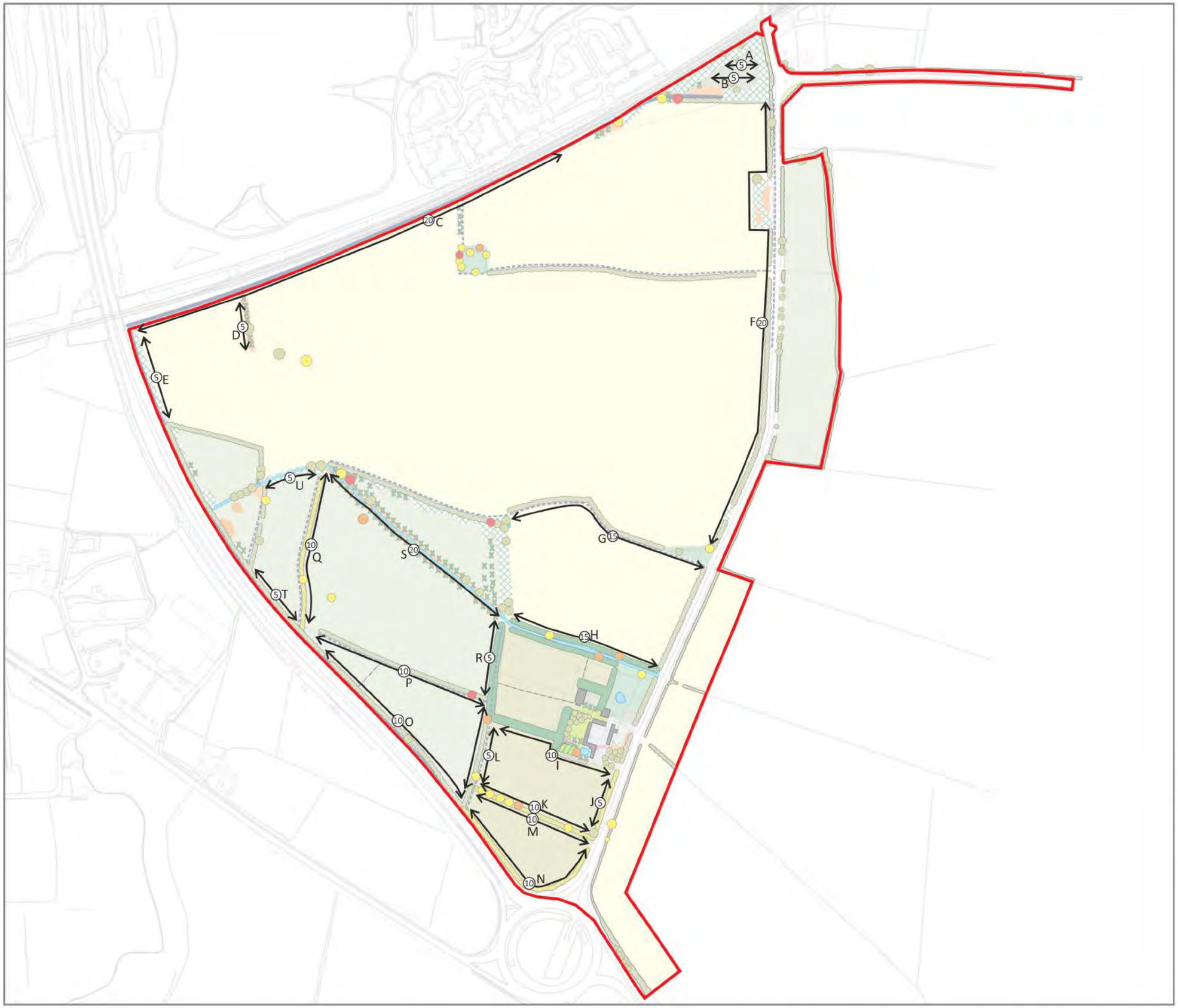
South Caldecotte, Milton Keynes	PROJECT
Habitats and Ecological Features	TITLE
5263/ECO3	DRAWING NO.
A	REV.
October 2018	DATE

Plan 5263/ECO4:

Reptile Survey Transects



Key:

Site Boundary

Reptile Transect, Transect Letter and Number of Mats

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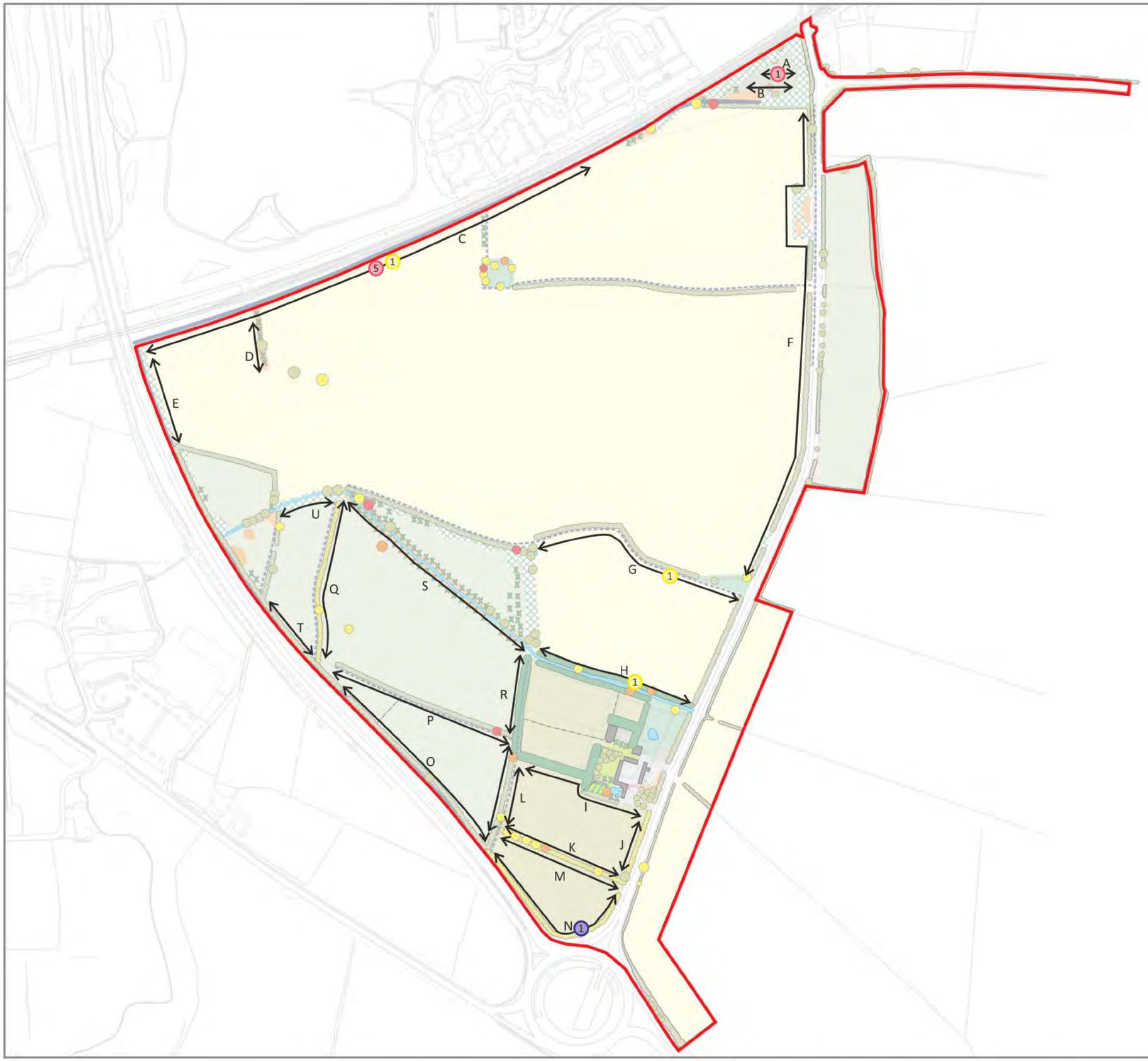
South Caldecotte, Milton Keynes	PROJECT
Reptile Survey Transects	TITLE
5263/ECO6	DRAWING NO.
-	REV.
October 2018	DATE

Plan 5263/ECO5:

Reptile Survey Results



Key:

- Site Boundary
- A — Reptile Transect, Transect Letter

Peak Count of Reptiles Recorded per Transect

- Adult Common Lizard
- Juvenile Common Lizard
- Juvenile Slow Worm

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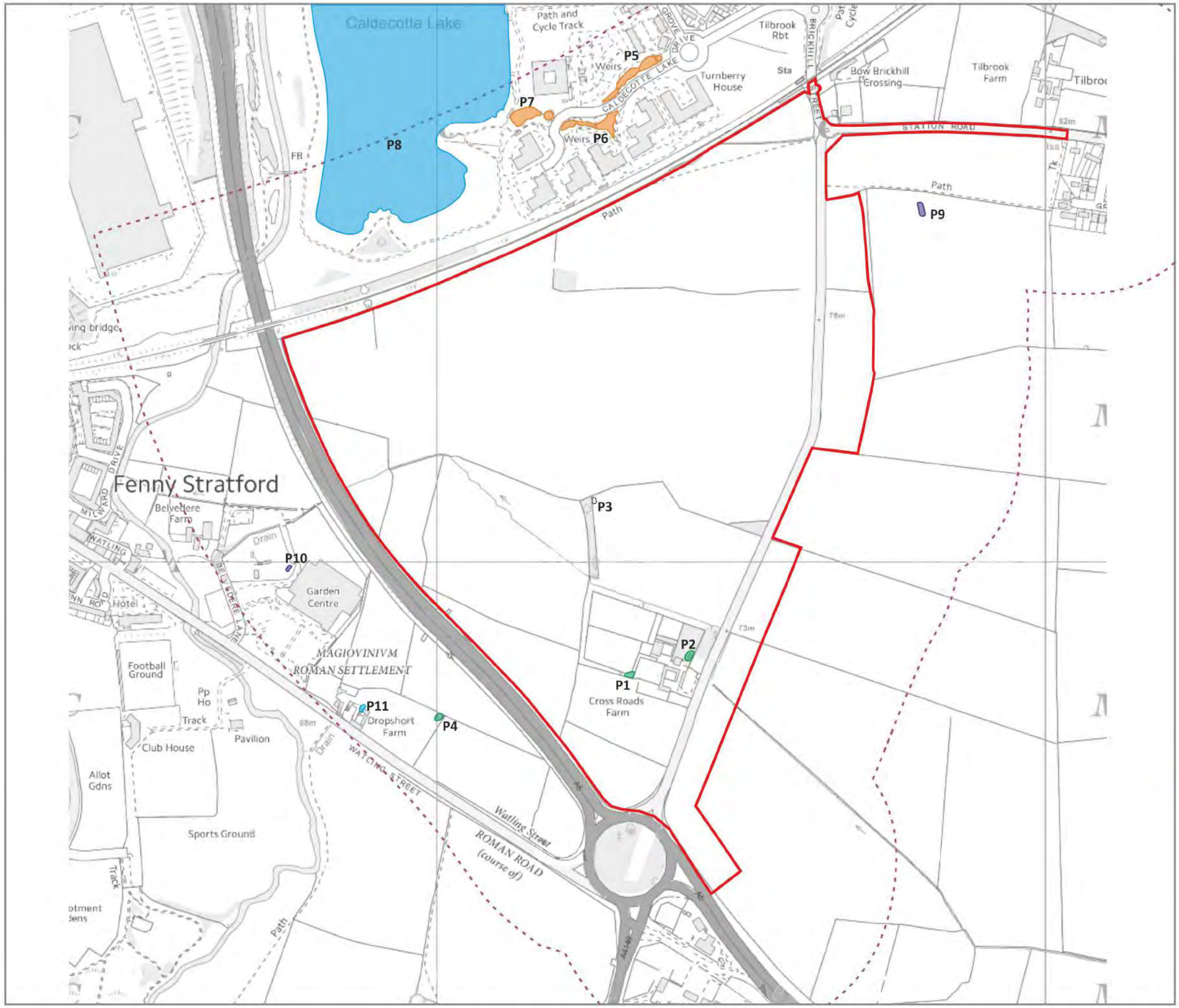
South Caldecotte, Milton Keynes	PROJECT
Reptile Survey Transects	TITLE
5263/ECO6	DRAWING NO.
-	REV.
October 2018	DATE

Plan 5263/ECO6:

Pond Locations and Survey Results



Key:

- Site Boundary
- Pond dry - not suitable for GCN breeding
- HSI 'poor' suitability for GCN - no further survey required
- Negative eDNA result - no further survey required
- HSI completed, access not granted for presence/ absence survey
- Approximate 250m Buffer
- No access granted for survey

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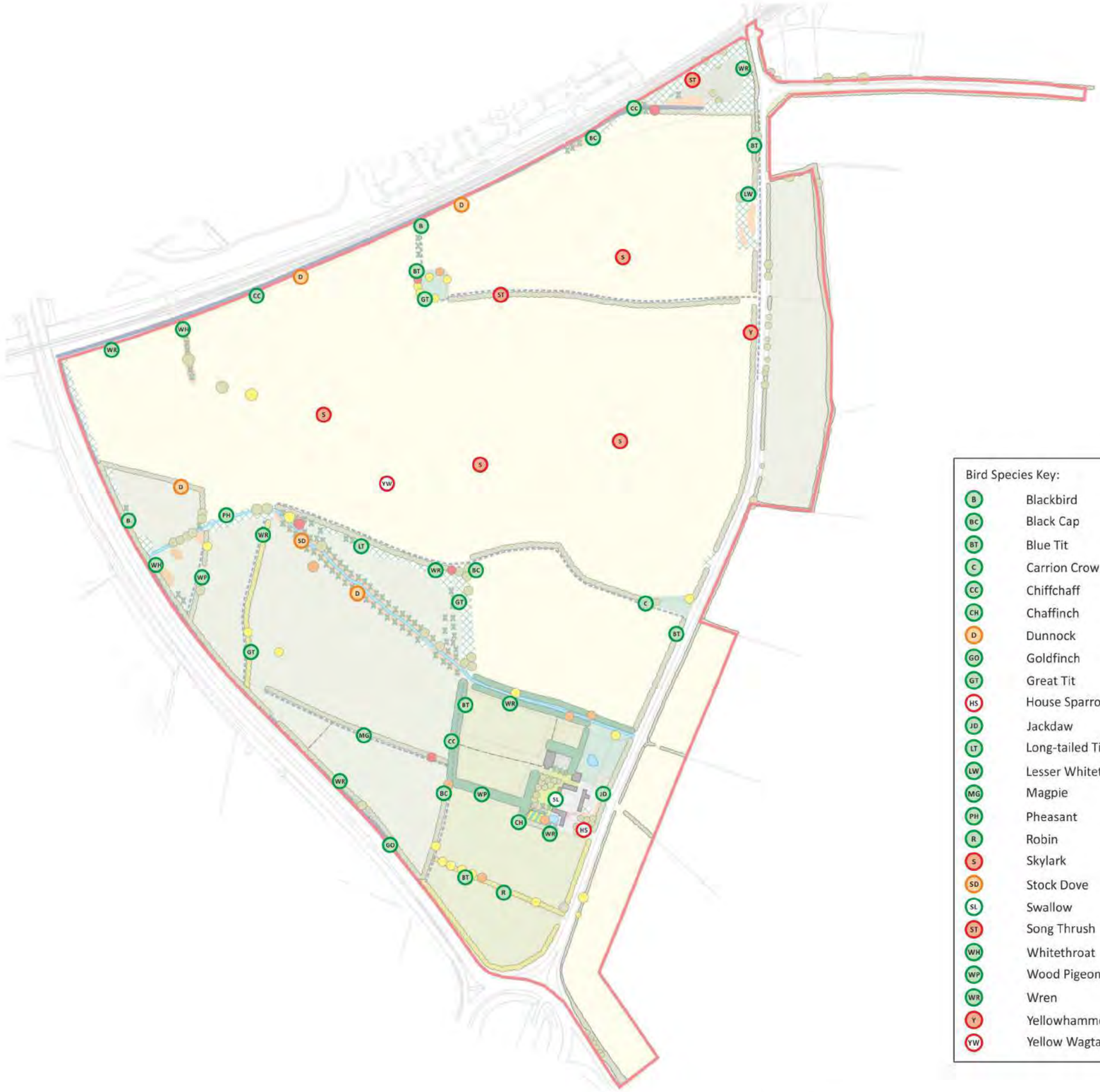
South Caldecotte, Milton Keynes	PROJECT
Pond Locations and eDNA results	TITLE
5263/ECO6	DRAWING NO.
	REV.
October 2018	DATE

Plan 5263/ECO7:

Breeding Bird Survey Results



Bird Species Key:

B	Blackbird
BC	Black Cap
BT	Blue Tit
C	Carrion Crow
CC	Chiffchaff
CH	Chaffinch
D	Dunnock
GO	Goldfinch
GT	Great Tit
HS	House Sparrow
JD	Jackdaw
LT	Long-tailed Tit
LW	Lesser Whitethroat
MG	Magpie
PH	Pheasant
R	Robin
S	Skylark
SD	Stock Dove
SL	Swallow
ST	Song Thrush
WH	Whitethroat
WP	Wood Pigeon
WR	Wren
Y	Yellowhammer
YW	Yellow Wagtail

KEY:

- Site Boundary
- Breeding / Probable Breeding (BOCC Red List)
- Possible Breeding (BOCC Red List)
- Breeding / Probable Breeding (BOCC Amber List Species)
- Possible Breeding (BOCC Amber List Species)
- Breeding / Probable Breeding (BOCC Green List - Not Threatened)
- Possible Breeding (BOCC Green List - Not Threatened)

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South Caldecotte, Milton Keynes — PROJECT

Breeding Bird Survey Results — TITLE

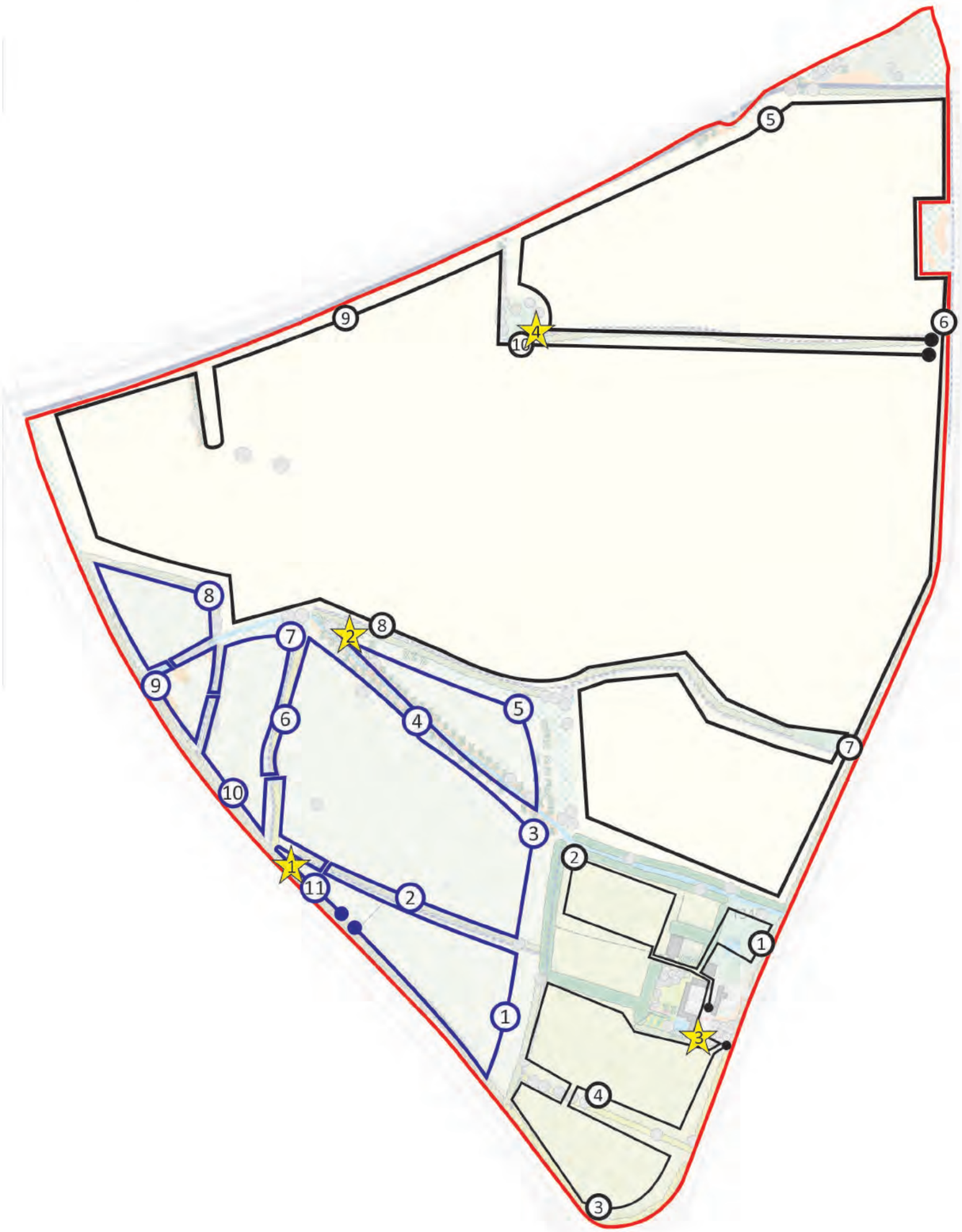
5263/ECO7 — DRAWING NO.

\- — REV.

September 2018 — DATE

Plan 5263/BAT1:

Bat Activity Transects and Static Detector Locations



Key:

- Site Boundary
- Bat Activity Transect 1 and Listening Points A
- Bat Activity Transect 2 and Listening Points B
- Automated Detector Location

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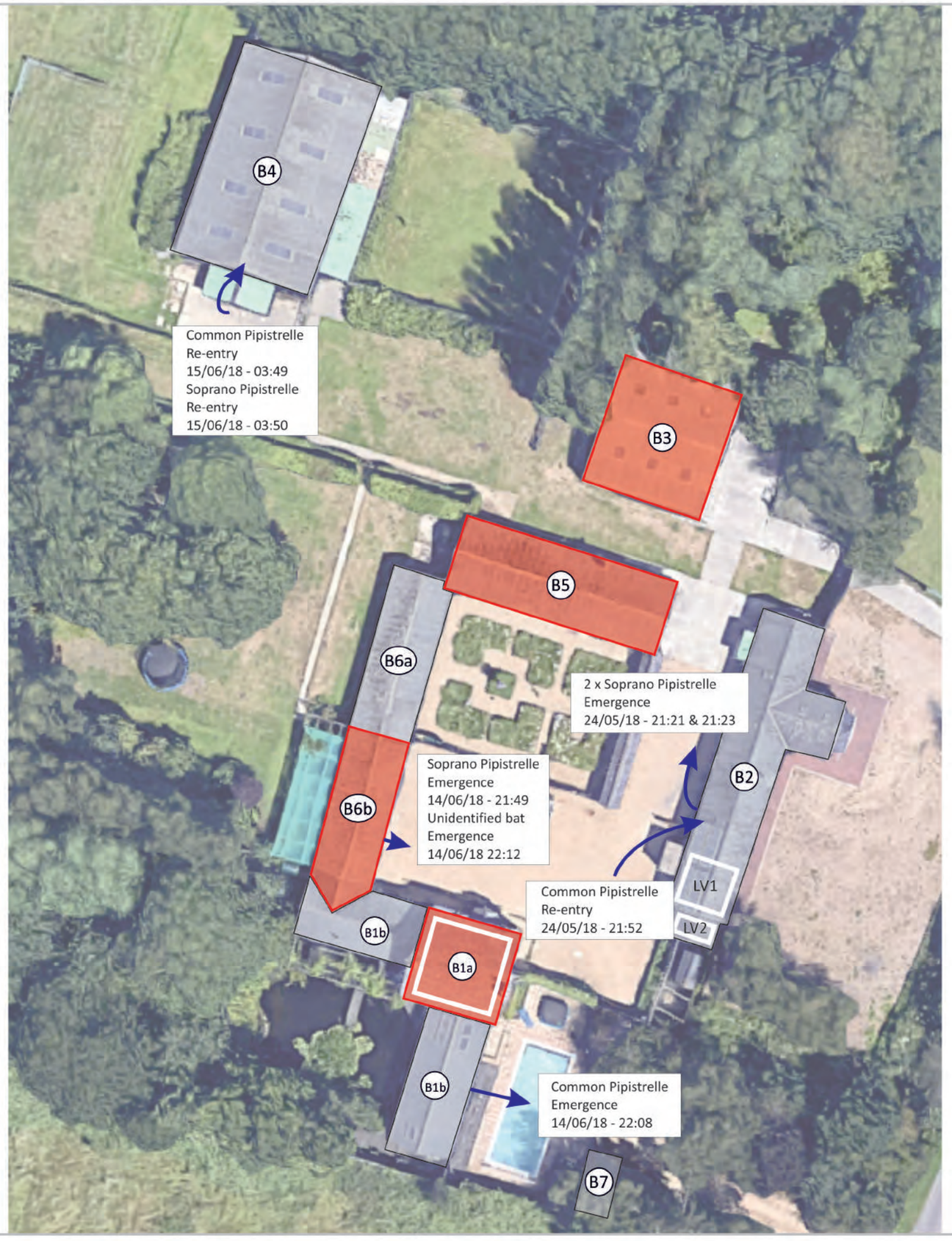
South Caldecotte, Milton Keynes	PROJECT
Bat Activity Transects and Static Detector Locations	TITLE
5263/BAT1	DRAWING NO.
-	REV.
September 2018	DATE

Plan 5263/BAT2:

Results of the Bat Emergence/ Re-entry Surveys



Key:

- Loft Void
- Bat Droppings Recorded 16/10/2017
- Bat Emergence / Re-entry

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Caldecotte, Milton Keynes	PROJECT
Bat Emergence and Re-entry Survey Results	TITLE
5263-01/BAT2	DRAWING NO.
-	REV.
October 2018	DATE

Plan 5263/BAT3:

Results of the Manual Walked Bat Activity Surveys – Transect 1

KEY:

- Site Boundary
- No Activity
- Low (0-4 registrations)
- Medium (5-9 registration)
- High (10+ registrations)
- No Activity
- Low (0-4 registrations)
- Moderate (5-9 registrations)
- High (10+ registrations)

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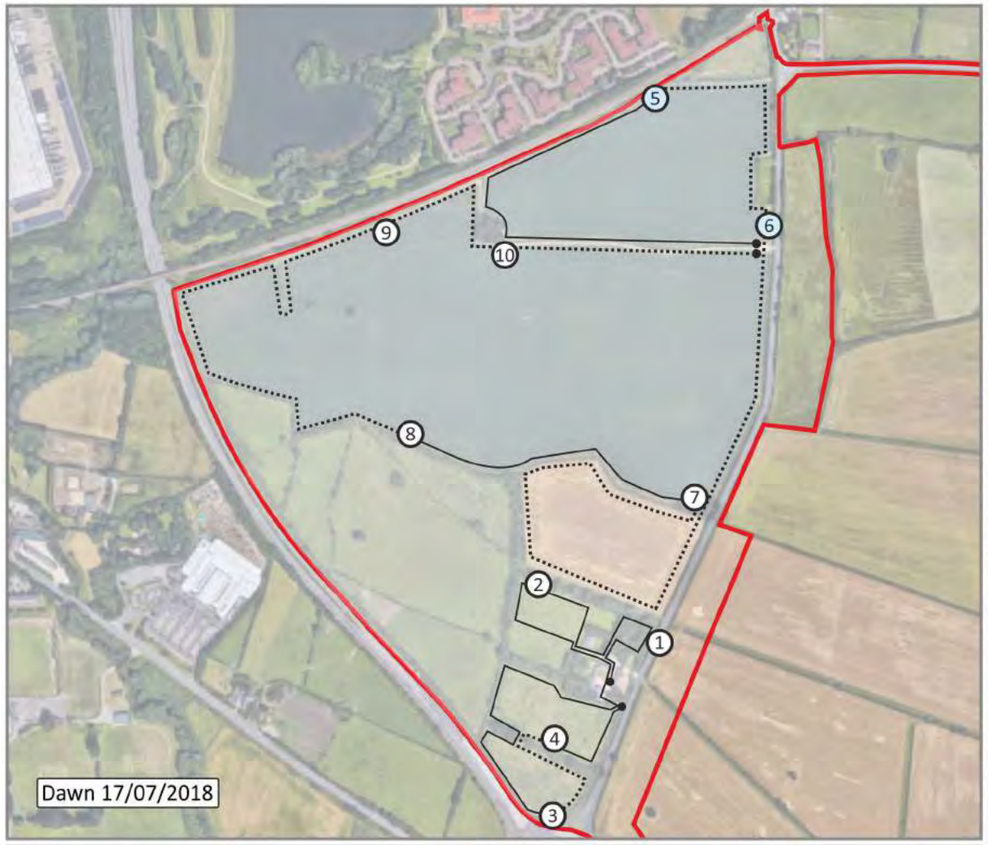
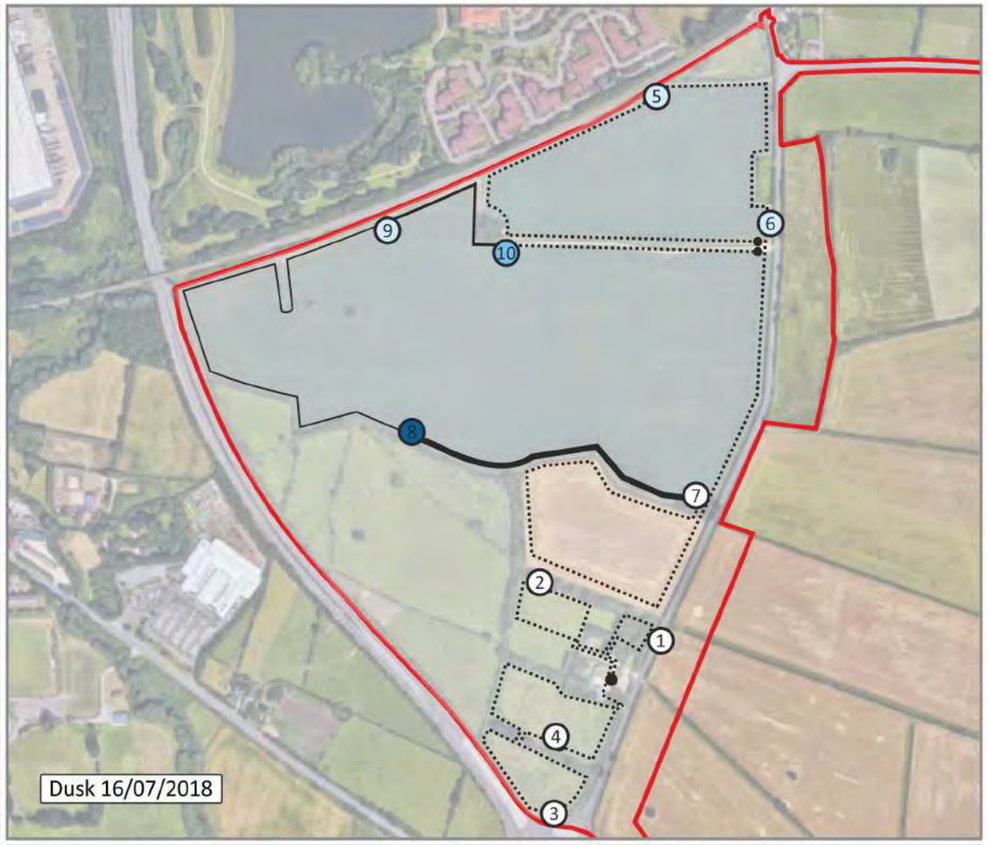
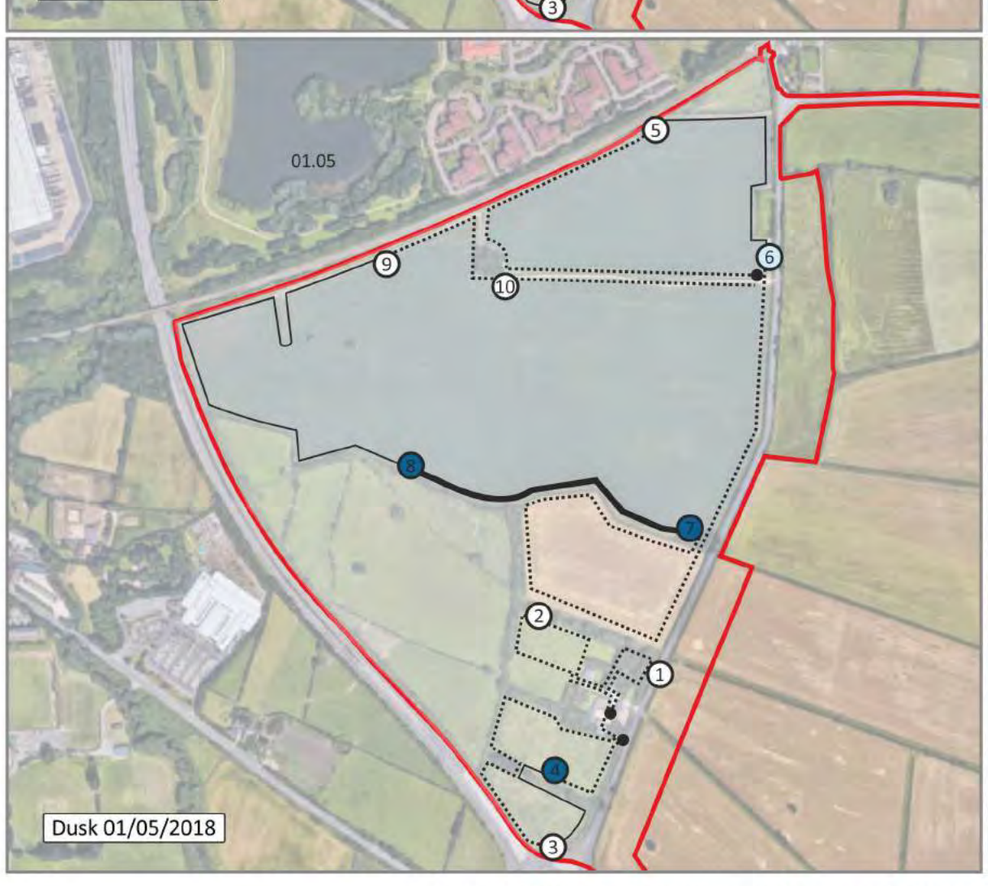
Caldecotte, Milton Keynes	PROJECT
Results of the Manual Walked Bat Activity Surveys - Transect 1	TITLE
5263/BAT3	DRAWING NO.
-	REV.
August 2018	DATE

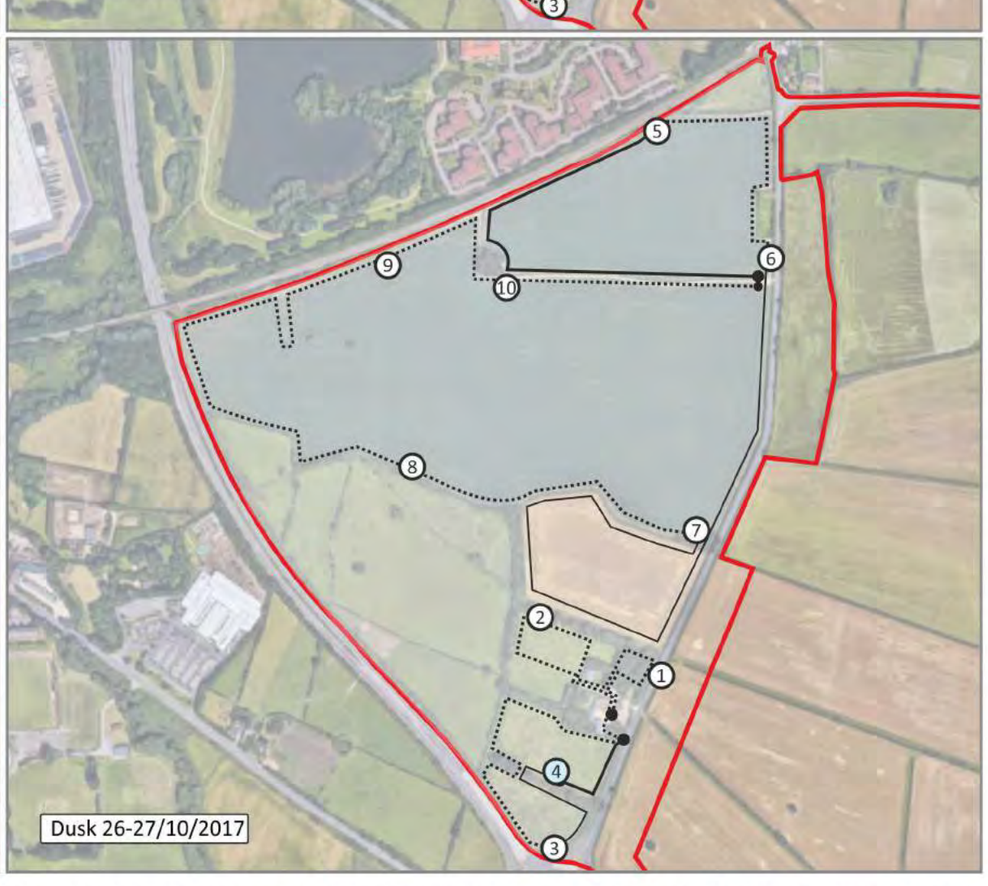
Plan 5263/BAT4:

Results of the Manual Walked Bat Activity Surveys – Transect 2









KEY:

- Site Boundary
- No Activity
- Low (0-4 registrations)
- Medium (5-9 registration)
- High (10+ registrations)
- No Activity
- Low (0-4 registrations)
- Moderate (5-9 registrations)
- High (10+ registrations)

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Caldecotte, Milton Keynes	PROJECT
Results of the Manual Walked Bat Activity Surveys - Transect 2	TITLE
5263/BAT4	DRAWING NO.
-	REV.
November 2018	DATE

Photographs

Photograph 1 : Arable Field F8 and Hedgerow H8

Photograph 2 : Field F5

Photograph 3 : Field F7

Photograph 4 : Rough Grassland Within Field F13

Photograph 5 : Hedgerow H5

Photograph 6 : Defunct Hedgerow H17

Photograph 7 : Plantation Woodland W1

Photograph 8 : Open Woodland W3

Photograph 9 : Stream corridor between F3 and F4

Photograph 10 : Pond P1

Photograph 11 : Waterbody P2

Photograph 12 : Waterbody P6

Appendix 5263/1:

Assessment Methodology

Principles of Ecological Evaluation

1. The evaluation of ecological features and resources is based on professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described by the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2016)[1].

Importance of Ecological Features

2. Various characteristics contribute to the importance of ecological features, including:

- Naturalness;
- Animal or plant species, sub-species or varieties that are rare or uncommon, either internationally, nationally or more locally, including those that may be seasonally transient;
- Ecosystems and their component parts, which provide the habitats required by important species, populations and/or assemblages;
- Endemic species or locally distinct sub-populations of a species;
- Habitat diversity;
- Habitat connectivity and/or synergistic associations;
- Habitats and species in decline;
- Rich assemblages of plants and animals;
- Large populations of species or concentrations of species considered uncommon or threatened in a wider context;
- Plant communities (and their associated animals) that are considered to be typical of valued natural/semi-natural vegetation types, including examples of naturally species-poor communities; and
- Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change.

3. As an objective starting point for identifying important ecological features, European, national and local governments have identified sites, habitats and species which form a key focus for biodiversity conservation in the UK, supported by policy and legislation. These are summarised by CIEEM guidance as follows:

Designated Sites

- Statutory sites designated or classified under international conventions or European legislation, for example World Heritage Sites, Biosphere Reserves, Wetlands of International Importance (Ramsar sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA);
- Statutory sites designated under national legislation, for example Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR);
- Locally designated wildlife sites, e.g. Local Wildlife Sites (LWS).

[1] Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*'

Biodiversity Lists

- Habitats and species of principal importance for the conservation of biodiversity in England and Wales (largely drawn from UK BAP priority habitats and priority species), often referred to simply as Priority Habitats / Species;
- Local BAP priority species and habitats.

Red Listed, Rare, Legally Protected Species

- Species of conservation concern, Red Data Book (RDB) species;
- Birds of Conservation Concern;
- Nationally rare and nationally scarce species;
- Legally protected species.

4. In addition to this list, other features may be considered to be of importance on the basis of local rarity, where they enable effective conservation of other important features, or play a key functional role in the landscape.

<u>Assigning Level of Importance</u>

5. The importance of an ecological feature should then be considered within a defined geographical context. Based on CIEEM guidance, the following frame of reference is used:

- International (European);
- National;
- Regional;
- County;
- District;
- Local (e.g. Parish or Neighbourhood);
- Site (not of importance beyond the immediate context of the site).

6. Features of 'local' importance are those considered to be below a district level of importance, but are considered to appreciably enrich the nature conservation resource or are of elevated importance beyond the context of the site.

7. Where features are identified as 'important' based on the list of key sites, habitats and species set out above, but are very limited in extent or quality (in terms of habitat resource or species population) and do not appreciably contribute to the biodiversity interest beyond the context of the site, they are considered to be of site importance.

8. In terms of assigning the level of importance, the following considerations are relevant:

Designated Sites

9. For designated sites, importance should reflect the geographical context of the designation (e.g. SAC/SPA/Ramsar sites are designated at the international level whereas SSSIs are designated at the national level). Consideration should be given to multiple designations as appropriate (where an area is subject to differing levels of nature conservation designations).

Habitats

10. In certain cases, the value of a habitat can be measured against known selection criteria, e.g. SAC selection criteria, 'Guidelines for the selection of biological SSSIs' and the Hedgerows Regulations 1997. However, for the majority of commonly encountered sites, the most relevant habitat evaluation will be at a more localised level and based on relevant factors such as antiquity, size, species-diversity, potential, naturalness, rarity, fragility and typicalness (Ratcliffe, 1977). The ability to restore or re-create the habitat is also an important consideration, for example in the case of ancient woodland.

11. Whether habitats are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Habitats of Principal Importance' or 'Priority Habitats', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular habitat under a BAP does not in itself imply any specific level of importance.

12. Habitat inventories (such as habitat mapping on the MAGIC database) or information relating to the status of particular habitats within a district, county or region can also assist in determining the appropriate scale at which a habitat is of importance.

Species

13. Deciding the importance of species populations should make use of existing criteria where available. For example, there are established criteria for defining nationally and internationally important populations of waterfowl. The scale within which importance is determined could also relate to a particular population, e.g. the breeding population of common toads within a suite of ponds or an otter population within a catchment.

14. When determining the importance of a species population, contextual information about distribution and abundance is fundamental, including trends based on historical records. For example, a species could be considered particularly important if it is rare and its population is in decline. With respect to rarity, this can apply across the geographic frame of reference and particular regard is given to populations where the UK holds a large or significant proportion of the international population of a species.

15. Whether species are listed as priorities for conservation at a national level in accordance with Sections 41 and 42 of the Natural Environment and Rural Communities Act (NERC) 2006, so called 'Species of Principal Importance' or 'Priority Species', or within regional or local Biodiversity Action Plans (BAPs) is also relevant, albeit the listing of a particular species under a BAP does not in itself imply any specific level of importance.

16. Species populations should also be considered in terms of the potential zone of influence of the proposals, i.e. if the entire species population within the site and surrounding area were to be affected by the proposed development, would this be of significance at a local, district, county or wider scale? This should also consider the foraging and territory ranges of individual species (e.g. bats roosting some distance from site may forage within site whereas other species such as invertebrates may be more sedentary).

Appendix 5263/2:

Results of the NVC Survey

Table 1. Field F3 NVC survey results

Species		Domin Cover Value per Quadrat					
Common Name	**Scientific Name**	**1**	**2**	**3**	**4**	**5**	**Constancy**
Perennial Rye-grass	*Lolium perenne*	8	8	8	8	8	5
Crested Dog's-tail	*Cynosurus cristatus*	5	2	1	1	3	5
Common Bird's-foot-trefoil	*Lotus corniculatus*	4	3	4	1	5	5
Red Clover	*Trifolium pratense*	3	2	1	2	2	5
Yarrow	*Achillea millefolium*	4	4	4	4	4	5
White Clover	*Trifolium repens*	3	5	5	4	5	5
Ribwort Plantain	*Plantago lanceolata*	5	4	3	3	3	5
Creeping Bent	*Agrostis stolonifera*	4		3	4	5	4
Annual Meadow-grass	*Poa annua*	4	2	1	1		4
Cat's-ear	*Hypochaeris radicata*	3		4	3	2	4
Rough Hawkbit	*Leontodon hispidus*	2	2	1		1	4
Common Sorrel	*Rumex acetosa*	1	2		3	1	4
Dandelion	*Taraxacum agg.*	2	1			1	3
Common Knapweed	*Centaurea nigra*	1		1		1	3
Autumn Hawkbit	*Leontodon autumnalis*	4		1			2
Field Wood-rush	*Luzula campestris*				2	2	2
Meadow Buttercup	*Ranunculus acris*				1	1	2
Creeping Buttercup	*Ranunculus repens*		4	1			2
Creeping Cinquefoil	*Potentilla reptans*		3				1
Smaller Cat's-tail	*Phleum bertolonii*		1				1
Agrostis Sp.	*Agrostis [spp]*		1				1
Rough Meadow-grass	*Poa trivialis*					2	1
Greater Plantain	*Plantago major*		1				1
Selfheal	*Prunella vulgaris*		2				1
Creeping Thistle	*Cirsium arvense*				1		1
Thyme-leaved Speedwell	*Veronica serpyllifolia*				1		1

Other Species recorded within field: Shepherd's Purse, Pineapple Weed, Spear Thistle, Nettle, Yorkshire-for, False Oat-grass.

Table 2. Field F4 NVC Survey Results

Species		Domin Cover Value per Quadrat					
Common Name	**Scientific Name**	**1**	**2**	**3**	**4**	**5**	**Constancy**
Crested Dog's-tail	*Cynosurus cristatus*	5	5	3	3	5	5
Perennial Rye-grass	*Lolium perenne*	8	8	8	8	8	5
Red Clover	*Trifolium pratense*	1	2	4	3	4	5
White Clover	*Trifolium repens*	4	3	4	2	5	5
Ribwort Plantain	*Plantago lanceolata*	5	6	4	4	5	5
Yarrow	*Achillea millefolium*	3	3	3	4	3	5
Creeping Bent	*Agrostis stolonifera*	5	4	3	3	4	5
Yorkshire-Fog	*Holcus lanatus*	3	4	4	5	3	5
Selfheal	*Prunella vulgaris*	1	2	1	2	2	5
Cock's-foot	*Dactylis glomerata*		4	3	3	3	4
Rough Hawkbit	*Leontodon hispidus*	3	3	1	3		4
Creeping Buttercup	*Ranunculus repens*	2	1	2		1	4
Greater Plantain	*Plantago major*	1		2	1	1	4
Cat's-Ear	*Hypochaeris radicata*		2	1	2	1	4
Rough Meadow-Grass	*Poa trivialis*	1		2	1		3
Common Bird's-Foot-Trefoil	*Lotus corniculatus*	1			4	3	3
Common Knapweed	*Centaurea nigra*			2	1	2	3
Meadow Grass	*Poa [spp]*		1			1	2
Common Field-speedwell	*Veronica persica*	1					1
Creeping Cinquefoil	*Potentilla reptans*	1					1
Sedge	*Carex sp.*	1					1
Hop trefoil	*Trifolium campestre*		1				1
Annual Meadow-grass	*Poa annua*		2				1
Thyme-leaved Speedwell	*Veronica serpyllifolia*			1			1
Sweet Vernal-grass	*Anthoxanthum odoratum*					1	1
Hedge Bedstraw	*Galium Mollugo*					2	1

Other species recorded within field: Common Mouse-ear, Creeping Thistle, Spear Thistle, Nettle.

Appendix 5263/3:

Extract from MAGIC Priority Habitat Inventory

Site Check Report Report generated on Fri Aug 31 2018
You selected the location: Centroid Grid Ref: SP89143400
The following features have been found in your search area:

Counties, Metropolitan Districts and Unitary Authorities (GB)

Name	Milton Keynes (B)
Geographic Level	Unitary Authority
Hectares	30862.673

Priority Habitat Inventory - Lowland Meadows (England)

Main Habitat Present	Lowland meadows
Confidence in Main Habitat Classification	Medium
Name of 1st Data Source	Unimproved Grassland Survey EN (paper) 1993
Date of 1st Data Source	Null
Habitat Class of 1st Data Source	National Vegetation Classification
Habitat Type of 1st Data Source	MG5
Name of 2nd Data Source	Aerial photos 2003 (digitised)
Date of 2nd Data Source	01/01/2003
Habitat Class of 2nd Data Source	none
Habitat Type of 2nd Data Source	uncoded
Name of 3rd Data Source	Null
Date of 3rd Data Source	Null
Habitat Class of 3rd Data Source	Null
Habitat Type of 3rd Data Source	Null
Habitats Directive Annex 1	Null
Other Priority Habitats Present	Null
Identified Candidate Habitats	Main habitat: LMEAD (INV > 50%)
Decision Made By Rulesets	Null
Determination Comment for Main Habitat	NVC survey report 1993 states MG5b and MG5/6 - 'reasonably close similarity to NVC type MG5b although the low diversity of much of the field suggests affinities to MG6'.NVC report also states cattle grazing. Survey map easy to interpret.
Area (Hectares)	6.124933
Unique Parcel Reference Number (OS Grid Reference of centre point)	SP8911734017

Appendix 5263/4:

Hedgerow Descriptions

	Height, Width & Management	Woody Species	Ground Flora	Assoc'd Features	Comments	Likely to qualify as Ecologically Important?
H1	6m H x 1.5m W Unmanaged	Hawthorn, Dog-rose, Blackthorn, s.m. Ash, Oak Willow (6)	Bramble, Herb-robert, Bittersweet, Ivy, Cleavers, Horsetail, Ground Ivy, plus species from adjacent grassland.	<1 tree per 50m, connected to five other hedgerows.	Hawthorn dominant therefore not species-rich. Mature and becoming leggy. Dry ditch to south.	N
H2	3-5m H x 2m W Unmanaged	Blackthorn, Hawthorn, Field Maple, Elm, Elder, Dog-rose, mat. Willow, s.m. Field Maple (7)	Bramble, Ivy, Ground Ivy, Greater Willowherb, field species.	Connected to four hedgerows, <10% gaps, 1 standard tree per 50m.	Dry ditch to east. Some Bramble outgrowth into field.	N
H3	4m H x 1m W Unmanaged	Hawthorn, Blackthorn, Dog-rose, Apple, Elm, Field Maple (6)	Bramble, Red Campion, Greater Willowherb.	<10% gaps, connected to two hedgerows.	Leggy in places, ditch to south side.	N
H4	6m H x 3m W Unmanaged	Blackthorn, Hawthorn, Elm, Buckthorn, Field Maple (5)	Bramble, Ground Ivy, Bindweed. Very heavily shaded by outgrowth.	Connected to two hedgerows	Blackthorn dominant and large areas of Blackthorn and Bramble scrub outgrowth, up to 7m wide. Dry ditch.	N
H5	6m H x 2m W Unmanaged	Blackthorn, Hawthorn, Hazel, Dogwood. Mature Apple, Willow, Field Maple. (7)	Bramble, grassland species.	Connected to two hedgerows, <10% gaps, 1 standard tree per 50m.	Becoming leggy with short gaps filled with Bramble. Dry ditch to west.	Y
H6	Defunct hedgerow 2-5m H x 2m W Unmanaged	Hawthorn, Elm, Elder, mature Field Maple. (4)	Lesser Stitchwort, Red Campion, Ground Ivy, Greater Willowherb, Colt's-foot, Nettle, Yarrow.	Connected to 3 hedgerows.	Defunct hedgerow with gaps up to 10m wide filled with Bramble and tall ruderal species. Dry ditch to west.	N
H7	6m H x 2m W Unmanaged	Hawthorn, Blackthorn, Dog-rose, Hazel, Prunus sp. (5)	Bramble, Ivy, Nettle.	Connected to 2 hedgerows.	Becoming leggy and gappy.	N
H8	1.5-2m H x 1m W at north, changing to 3m H towards south. Managed to box shape, although not this season.	Elm, Hawthorn, Dog-rose, Blackthorn, Ash, Field Maple, Oak (7)	Bramble, field margin species.	Connected to 1 hedgerow and small woodland.	Elm frequent, therefore not species-rich. Northern section historically laid.	N
H9	3-4m H x 2m W Box shape but not managed this season.	Elm, Hawthorn, Dog-rose, Blackthorn (4)	Bramble, Garlic Mustard.	Connected to 1 hedgerow and small woodland.	Elm frequent, dry ditch to south. Historically laid.	N

	Height, Width & Management	Woody Species	Ground Flora	Assoc'd Features	Comments	Likely to qualify as Ecologically Important?
H10	4m H x 2m W Box shape, not managed this season	Elm, Dog-rose, Blackthorn, Field Maple, Hawthorn, Elder (6)	Bramble, field margin species.	Connected to 1 hedgerow, gaps <10%	Elm frequent, dry ditch to north.	N
H11	5m H x 1.5m W Unmanaged	Elm, Hawthorn, Dog-rose (3)	Bramble, field margin species.	Connected to 1 hedgerow	Wet ditch to north.	N
H12	3m H x 2m W Unmanaged	Elm, Hawthorn, Elder, mature Ash (4)	Bramble, Ground Ivy, field margin species.	Connected to 1 hedgerow.	Elm dominant, dry ditch to east.	N
H13	2-4m H x 1-2m W Unmanaged	Hawthorn, Elder, Elm, Blackthorn, young Willow (5)	Garlic Mustard, Green Alkanet.	Connected to one hedgerow and woodland.	Central dry ditch.	N
H14	4m H x 1m W Box shape but now ~2m outgrowth	Hawthorn, Elm (2)	Bramble, Cow Parsley, Nettle, Ground Ivy, Herb Robert, Dog's Mercury.	Connected to one hedgerow and woodland.	Two dry ditches west and east.	N
H15	5m H x 1m W Lightly pruned	Wild Privet, Elder, young Beech, Cherry (4)	Mostly bare ground due to heavy shading hedgerow and adjacent trees.		Garden hedgerow.	N
H16	3-4m H x 1m W pruned to box shape	Hawthorn, Field Maple, Wild Privet, Hazel, Dogwood, Dog-rose, Elm, Blackthorn, Willow (9)	Honeysuckle, amenity grassland species.		Species-rich garden hedgerow.	N
H17	Defunct hedgerow 1.5m Hx 2-3m W Unmanaged	Elm, Hawthorn, Oak, Blackthorn, mature Oak (5)	Bittersweet, Nettle, Creeping thistle, Cleavers, Bramble.	Connected to 2 hedgerows.	Remnant hedgerow overgrown with tall ruderal species.	N
H18	Defunct hedgerow 2-3m H x 2m W Unmanaged	Hawthorn, Blackthorn, Elm, Dog-rose, mature Oak, Ash (6)	Bramble, grassland species.	Connected to three hedgerows, >1 tree per 50m.	Remnant hedgerow overgrown with tall ruderal species and with scrub outgrowth.	N
H19	1-1.5m H x 1-2m W Unmanaged	Blackthorn, Hazel, Hawthorn, Elm, Dog-rose, Field Maple (6)	Garlic Mustard, Cleavers, Bittersweet.	Connected to 3 hedgerows.	Remnant hedgerow. Historically laid but considerable outgrowth top and numerous gaps.	N
H20	3m H x 2.5m W Box shape but no recent management	Elm, Elder, Hawthorn, Holly, Pedunculate Oak, Blackthorn, Prunus sp. (7)	Bramble, field margin species	Connected to 2 hedgerows and woodland pockets	Elm dominant, dry ditch east side.	N
H21a	8.5m H x 3.5m W	Hawthorn, Blackthorn, Elm, Field Maple, Oak	Field margin species.	Connects to 3 hedgerows	Unmanaged.	N
H21b	6m H x 3m W	Hawthorn, Blackthorn, Field Maple, Elm	Bramble, field margin species.	Connects to 2 hedgerows	Unmanaged, gappy. Dry ditch (1m W x 0.75m D)	N
H22	6m H x 2.5m W	Hawthorn, Blackthorn, Elm, Crab Apple	Roadside species.	Connects to 2 hedgerows, >1 tree per 50m	Unmanaged, gappy. Dry ditch (1m W, 0.75m D)	N

H23	2-3m H x 2m W	Hawthorn, Blackthorn, Field Maple, Elm, Crab Apple	Field margin species.	Connects to two hedgerows	Unmanaged on site side – flail cut to box shape off-site. Dry ditch (1m W x 0.75m D)	N
H24	2m H x 2m W	Elm, Hawthorn	Roadside species.	Connects to several hedgerows	Flail cut to box shape on roadside.	N
H25	2m H x 1.5m W	Hawthorn, Elm	Bramble, field margin species.	Connects to hedgerow	Dry ditch in hedge (2m W x 1m D)	N
H26	2.5m H x 1.5m W	Hawthorn, Blackthorn, Elder, Elm, Snowberry, Sycamore	Roadside species.	Connects to several hedgerows	Flail cut to box shape on roadside. Dry ditch in hedge (2m W x 1m D)	N
H27	2m H x 1.5m W	Hawthorn, Blackthorn, Elm, Elder	Field margin species.	Connects to hedgerow	Dry ditch (2m W x 1m D)	N
H28	2m H x 1.5m W	Hawthorn, Blackthorn, Elm, Elder	Field margin species.	Connects to hedgerow	Flail cut to box shape. Dry ditch (2m W x 1m D)	N
H30	2m H x 2.5m W	Hawthorn, Blackthorn, Elm, Ash, Willow	Roadside species and amenity grassland species.	Connects to hedgerow	Unmanaged. Wet ditch (1m W x 0.5m D)	N
H31	2m -2.5m H x 2.5m W	Hawthorn, Field Maple		Connects to hedgerow	Property boundary.	N
H32	2.5m H x 1m W	Beech, Lawson Cyprus, Laurel, Blackthorn, Snowberry		Connects to hedgerow	Property boundary.	N

Appendix 5263/5:

Legislation Summary

LEGISLATION SUMMARY

1. In England and Wales primary legislation is made by the UK Parliament, and in Scotland by the Scottish Parliament, in the form of Acts. The main piece of legislation relating to nature conservation in the UK is the Wildlife and Countryside Act 1981 (as amended).

2. Acts of Parliament confer powers on Ministers to make more detailed orders, rules or regulations by means of secondary legislation in the form of statutory instruments. Statutory instruments are used to provide the necessary detail that would be too complex to include in an Act itself[1]. The provisions of an Act of Parliament can also be enforced, amended or updated by secondary legislation.

3. In summary, the key pieces of legislation relating to nature conservation in the UK are:

    - Wildlife and Countryside Act 1981 (as amended)
    - Protection of Badgers Act 1992
    - Hedgerows Regulations 1997
    - Countryside and Rights of Way (CRoW) Act for England and Wales 2000
    - Natural Environment and Rural Communities Act 2006
    - Conservation of Habitats and Species Regulations 2017

4. A brief summary of the relevant legislation is provided below. The original Acts and instruments should be referred to for the full and most up to date text of the legislation.

5. **Wildlife and Countryside Act 1981 (as amended)**. The WCA Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) identified for their flora, fauna, geological or physiographical features. The Act contains strict measures for the protection and management of SSSIs.

6. The Act also refers to the treatment of UK wildlife including protected species listed under Schedules 1 (birds), 5 (mammals, herpetofauna, fish, invertebrates) and 8 (plants).

7. Under Section 1(1) of the Act, all wild birds are protected such that is an offence to intentionally:

    - Kill, injure or take any wild bird;
    - Take, damage or destroy the nest of any wild bird whilst in use* or being built;
    - Take or destroy an egg of any wild bird.

    * The nests of birds that re-use their nests as listed under Schedule ZA1, e.g. Golden Eagle, are protected against taking, damage or destruction irrespective of whether they are in use or not.

8. Offences in respect of Schedule 1 birds are subject to special, i.e. higher, penalties. Schedule 1 birds also receive greater protection such that it is an offence to intentionally or recklessly:

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

[1] http://www.parliament.uk/business/bills-and-legislation/secondary-legislation/statutory-instruments/

9. Under Section 9(1) of the Act, it is an offence to:

- Intentionally kill, injure or take any wild animal included in Schedule 5.

10. In addition, under Section 9(4) it is an offence to intentionally or recklessly:

- Obstruct access to, any structure or place which any wild animal included in Schedule 5 uses for shelter or protection; or
- Disturb any wild animal included in Schedule 5 while occupying a structure or place which it uses for that purpose.

11. Under Section 13(1) it is an offence:

- To intentionally pick, uproot or destroy any wild plant listed in Schedule 8; or
- Unless the authorised person, to intentionally uproot any wild plant not included in Schedule 8.

12. The Act also contains measures (S.14) for preventing the establishment of non-native species that may be detrimental to native wildlife, prohibiting the introduction into the wild of animals (releases or allows to escape) and plants (plants or causes to grow) listed under Schedule 9.

13. **Protection of Badgers Act 1992.** The Act aims to protect the species from persecution, rather than being a response to an unfavourable conservation status, as the species is in fact common over most of Britain. It should be noted that the legislation is not intended to prevent properly authorised development. Under the Act it is an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat* a Badger, or attempt to do so;
- To intentionally or recklessly interfere with a sett# (this includes disturbing Badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it).

* the intentional elimination of sufficient foraging area to support a known social group of Badgers may, in certain circumstances, be construed as an offence

\# A sett is defined as "*any structure or place which displays signs indicating current use by a Badger*". Natural England advice (June 2009) is that a sett is protected so long as such signs remain present, which in practice could potentially be for some time after the last actual occupation by Badger. Interference with a sett includes blocking tunnels or damaging the sett in any way

14. Licences can be obtained from the Statutory Nature Conservation Organisation (SNCO) for development activities that would otherwise be unlawful under the legislation, provided there is suitable justification. The SNCO for England is Natural England.

15. **Hedgerows Regulations 1997**. 'Important' hedgerows (as defined by the Regulations) are protected from removal (up-rooting or otherwise destroying). Various criteria specified in the Regulations are employed to identify 'important' hedgerows for wildlife, landscape or historical reasons.

16. **Countryside and Rights of Way (CRoW) Act for England and Wales 2000.** The CRoW Act provides increased measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation. Schedule 12 of the Act amends the species provisions of the WCA 1981, strengthening the legal protection for threatened species. The Act also introduced a duty on Government to have regard to the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.

17. **Natural Environment and Rural Communities Act 2006.** Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species that are of principal importance for the conservation of biodiversity in England. The S41 list is used to guide decision-makers such as local planning authorities, in implementing their duty under Section 40 of the Act, to have regard to the conservation of biodiversity in England, when exercising their normal functions. 56 habitats and 943 species of principal importance are included on the S41 list. These are all the habitats and species in England that were identified as requiring action in the UK Biodiversity Action Plan (BAP).

18. **Conservation of Habitats and Species Regulations 2017.** The Regulations enact the European Union's Habitats Directive (92/43/EEC) in the UK. The Habitats Directive was designed to contribute to the maintenance of biodiversity within member states through the conservation of sites, known in the UK as Special Areas of Conservation (SACs), containing habitats and species selected as being of EC importance (as listed in Annexes I and II of the Habitats Directive respectively). Member states are required to take measures to maintain or restore these natural and semi-natural habitats and wild species at a favourable conservation status.

19. The Regulations also require the compilation and maintenance of a register of European sites, to include SACs and Special Protection Areas (SPAs)[2] classified under Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). These sites constitute the Natura 2000 network. The Regulations impose restrictions on planning decisions likely to significantly affect SPAs or SACs.

20. The Regulations also provide protection to European Protected Species of animals that largely overlaps with the WCA 1981, albeit the provisions are generally stricter. Under Regulation 43 it is an offence, *inter alia*, to:

- Deliberately capture, injure or kill any wild animal of a European Protected Species;
- Deliberately disturb any wild animals of any such species, including in particular any disturbance likely to impair their ability to survive, to breed or reproduce, to rear or nurture their young, to hibernate or migrate, or which is likely to affect significantly their local distribution or abundance;
- Deliberately take or destroy the eggs of such an animal;
- Damage or destroy a breeding site or resting place of such an animal.

21. Similar protection is afforded to European Protected Species of plants, as detailed under Regulation 47.

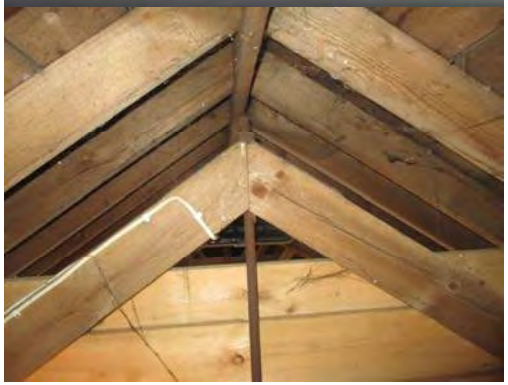
22. The Regulations do provide a licensing system that permits otherwise illegal activities in relation to European Protected Species, subject to certain tests being fulfilled.

[2] Special Protection Areas (SPAs) are protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (79/409/EEC) (aka the Birds Directive), which came into force in April 1979. SPAs are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species.

Appendix 5263/6:

Building Inspection Survey Results

Building	Photographs	Description	Features providing bat roosting potential	Evidence of bats
B1a	 	Two storey residential building constructed of red brick, with wooden framed windows. The exterior walls have been rendered with plaster. The roof is pitched, tiled with slate and has concrete ridge tiles. There are two red brick chimneys. To the frontage of the building is a single storey porch of red brick construction with wooden weatherboarding. A single loft void (~7m W x 10m L x 2m H) is present within the main building. The loft has wooden rafters and wooden sarking. Deep pile insulation is present. The loft contains a plastic water tank and is used for the storage of insulation, but is otherwise uncluttered. Light could be seen entering the loft from the eastern gable end and the southern eaves, although the size of the holes could not be verified.	The main body of the house has a large uncluttered loft void providing potential roosting opportunities. Access to the void appears possible through small holes at the eaves and the gable end. The roof of the main body of the building has a small number of lifted tiles on the western end of the southern elevation. There is also some lifted lead flashing around the chimney breast providing potential opportunities for crevice dwelling bat species.	Evidence of roosting bats was recorded in the loft void, in the form of approximately 30 scattered droppings below the apex of the roof and towards the gable ends of the loft space.
B1b		Two single storey extensions extend from the western and southern aspects of building B1a. Both are of red brick construction with wooden weatherboarding surround. The roofs of the extensions are pitched with slate tiles. Some skylights are present in the southern extension. Internally the extensions are open to the roof with queen post roof trusses visible.	The extensions are well maintained with opportunities limited to small crevices created by warping of the wooden weatherboards. These extensions have low suitability to support roosting bats.	No evidence of roosting bats recorded. The residents advised that a bat was found flying internally in 2017.
B2		Single storey building of red brick construction covered by wooden weatherboarding surround, with wooden framed windows and wooden doors. The pitched roof is clad with slate and ridge tiles. Wooden soffits extend the perimeter of the eves of the building. Skylights are present. The building is currently used as a gym and living space. Two loft voids are present at the southern end of the building. Both voids have wooden rafters, ridge beams and sarking, with	LV1 has limited suitability for roosting bats due to the light and disturbance from the adjacent room. LV2 is likely to be less disturbed, although the cupboard door appears to be left open at least on some occasions. LV2 could not be fully inspected. Externally there are gaps present at the eaves of the building between the wooden baton framework supporting the roof tiles. Several crevices are also present beneath the wooden weatherboarding. The soffit	No evidence of bats recorded.

Building	Photographs	Description	Features providing bat roosting potential	Evidence of bats
	 	no insulation. The northern most loft void (LV1) is uncluttered except for some storage of insulation material. This void has an open section to the main building space to the north. As such LV1 is reasonable well lit. The southern loft void (LV2) is connected to LV1 via a small hole. LV2 is open to a ground floor cupboard, which contains a water heater and electrics. This void contains numerous pipes and cables and was inaccessible for survey. At the time of survey the cupboard door was open making the loft void fairly light.	box at the southern gable end has a large hole in the corner. The building is considered to be of moderate suitability for roosting bats.	
B3		Single storey building with steel framework. 1m of red brick and breezeblock at the base with wooden panel walls above. Wooden ridge beams and purlins present. The roof is constructed from corrugated metal with corrugated plastic skylights. The building is currently used for storage. Internally the building is very light. A bird was observed inside during the survey.	Numerous holes in the wooden structure of the building provide potential for bats to access the building. However, the building is light and the construction materials do not provide insulating properties.	Evidence of bats was recorded in the form of <10 scattered Brown Long-eared droppings below the central ridge beam, most close to the northern gable end. No evidence of feeding remains recorded.

Building	Photographs	Description	Features providing bat roosting potential	Evidence of bats
B4		Single storey building with steel framework. 1m of red brick and breezeblock at the base with wooden panel walls above. Many sections have internal plywood walls, and the northern aspect has corrugated metal cladding on the upper section. The roof is pitched corrugated metal with corrugated plastic skylights. The building is currently used predominantly as a livestock shelter, with hay present on the floor. Small internal rooms are present at the northern end. A single storey lean-to shelter extends the length of the western aspect and is constructed of a wooden framework, with a corrugated plastic roof.	The building is very open, draughty and light. No evidence of gaps allowing potential access to the crevice between the external and internal wall structure was recorded. However, internal access points are present and small crevice opportunities may be available. Taking into account the location of the building, it is considered to be of <u>low suitability</u> for roosting bats.	No evidence of bats recorded.
B5		Single storey building with ~1m high red brick base, above which is wooden weatherboarding and internal plywood walls. The roof is pitched and clad with corrugated asbestos. The roof is supported by wooden rafters. Internally, a section of the roof is clad with wooden sarking, but the majority is open to the concrete asbestos. Internally the building comprises two rooms. The eastern room has several windows and is therefore relatively light. This room is largely uncluttered. The eastern room has no windows, therefore is dark and is currently used for storage of motorbikes.	A large hole is visible in the western gable end providing potential access into the building. Externally there are a small number of gaps beneath the wooden weatherboarding providing access to a cavity space approximately 15cm wide.	<u>Very low numbers of Brown Long-eared droppings</u>. A single dropping was found in the western room of the building beneath the gap in the gable end. Two droppings were found within the room in the east of the building, towards the southern aspect. No feeding remains recorded.
B6a		Single storey building with a red brick base. Above the red brick are internal walls clad with wooden weatherboarding. The roof is pitched and constructed from glass panels on the western aspect and asbestos on the eastern aspect with an internal foil sheet. Concrete ridge tiles are present. The building is currently in use as a gym.	The building is very light with no internal features of potential for roosting bats. Warping in the weatherboarding on the eastern aspect of the building provides potential access to a cavity space approximately 15cm wide in the wall. Concrete ridge tiles are partially lifted providing a small crevice space. Overall, the building is considered to be of <u>low suitability</u> for roosting bats.	No evidence of bats recorded.

Building	Photographs	Description	Features providing bat roosting potential	Evidence of bats
B6b		Single storey building used as a garage and shed with a red brick base. Above the red brick are wooden panel walls. The roof is pitched and clad with corrugated concrete asbestos. Internal wooden walls are present. Double doors were open at the time of survey.	Some gaps are present at the eaves of the building and within the wooden walls and there is a hole in the roof on the western aspect, allowing potential access to the building. Internally the building is likely to have highly fluctuating climatic conditions due to the building materials and is subject to disturbance and light during the day.	A single dropping was recorded within the building, close to a doorway. No feeding remains recorded.
B7		Single storey wooden shed previously used as a shower facility; now not in use. The pitched roof is clad with corrugated bitumen felt roof, with internal boarding. The walls are clad with tiles on the northern elevation, although no internal cladding is present on the southern half of the building.	Sections of the bitumen felt roof are coming away from the roof structure, allowing potential access to space between the bitumen felt and the internal ceiling. The building is considered to have low suitability for roosting bats	No evidence of bats recorded.

Appendix 5263/7:

Results of the Remote Static Detector Surveys

Table 1: Results of the remote detector survey from 01/05/2018 to 06/05/2018 (+single static from 16/05/2018 to 21/05/2018)

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
01/05/2018	223	10	0	0	6	0	0	1
02/05/2018	2	6	0	2	1	0	0	0
03/05/2018	287	42	0	4	4	0	0	0
04/05/2018	165	15	0	0	4	0	0	0
05/05/2018	100	14	0	1	1	0	0	0
06/05/2018	103	24	0	3	3	0	0	0
Total Registrations	**880**	**111**	**0**	**10**	**19**	**0**	**0**	**1**
Approximate % of total registrations	**86.2**	**10.9**	**0.0**	**1.0**	**1.9**	**0.0**	**0.0**	**0.1**
Location 2								
01/05/2018	14	13	0	1	3	0	0	0
02/05/2018	11	56	0	4	27	0	0	0
03/05/2018	144	91	0	6	16	0	2	1
04/05/2018	110	105	1	4	54	0	1	0
05/05/2018	97	60	0	9	38	0	1	0
06/05/2018	80	35	0	10	27	0	0	0
Total Registrations	**456**	**360**	**1**	**34**	**165**	**0**	**4**	**1**
Approximate % of total registrations	**44.7**	**35.3**	**0.1**	**3.3**	**16.2**	**0.0**	**0.4**	**0.1**
Location 3								
01/05/2018	2	2	0	1	0	0	0	0
02/05/2018	0	20	0	2	0	0	0	0
03/05/2018	29	49	0	2	1	0	1	0
04/05/2018	21	57	0	5	1	0	0	0
05/05/2018	22	32	0	3	1	0	0	0
Total Registrations	**74**	**160**	**0**	**13**	**3**	**0**	**1**	**0**
Approximate % of total registrations	**29.5**	**63.7**	**0.0**	**5.2**	**1.2**	**0.0**	**0.4**	**0.0**
Location 4								
16/05/2018	962	146	11	9	8	0	0	1
17/05/2018	224	99	6	9	61	1	1	0
18/05/2018	560	53	4	0	30	0	4	0
19/05/2018	637	46	1	2	12	0	0	0
20/05/2018	518	38	1	4	28	1	1	0
21/05/2018	3	1	1	0	1	0	0	0
Total Registrations	**2904**	**383**	**24**	**24**	**140**	**2**	**6**	**1**
Approximate % of total registrations	**83.4**	**11.0**	**0.7**	**0.7**	**4.0**	**0.1**	**0.2**	**0.0**

Table 2: Results of the remote detector survey from 30/05/2018 to 05/06/2018

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
30.05.18	85	31	0	0	0	0	0	0
31.05.18	67	16	0	3	3	0	1	1
01.06.18	85	22	0	2	3	0	0	1
02.06.18	25	8	0	0	3	0	1	0
03.06.18	62	12	1	1	4	0	1	0
04.06.18	4	1	0	0	2	0	0	0
Total Registrations	**328**	**90**	**1**	**6**	**15**	**0**	**3**	**2**
Approximate % of total registrations	**73.7**	**20.2**	**0.2**	**1.3**	**3.4**	**0.0**	**0.7**	**0.4**
Location 2								
30.05.18	168	71	52	2	47	0	1	0
31.05.18	83	73	45	6	41	0	2	0
01.06.18	175	56	53	4	60	0	3	0
02.06.18	56	58	2	1	77	0		0
03.06.18	46	49	6	3	57	0	1	1
04.06.18	38	31	7	0	20	0		0
Total Registrations	**566**	**338**	**165**	**16**	**302**	**0**	**7**	**1**
Approximate % of total registrations	**40.6**	**24.2**	**11.8**	**1.1**	**21.6**	**0.0**	**0.5**	**0.1**
Location 3								
30.05.18	128	65	14	7	2	0	4	0
31.05.18	133	45	21	12	1	1	4	0
01.06.18	51	38	8	11	0	1	2	0
02.06.18	55	34	2	1	1	0	0	0
03.06.18	134	37	7	3	5	0	6	0
04.06.18	319	44	2	1	5	0	2	1
Total Registrations	**820**	**263**	**54**	**35**	**14**	**2**	**18**	**1**
Approximate % of total registrations	**67.9**	**21.8**	**4.5**	**2.9**	**1.2**	**0.2**	**1.5**	**0.1**
Location 4								
30.05.18	346	110	12	3	50	0	2	0
31.05.18	74	50	1	1	31	0	1	0
01.06.18	183	358	1	2	40	0	1	0
02.06.18	119	64	1	1	35	0	0	0
03.06.18	27	22	0	1	32	0	0	0
04.06.18	34	19	0	1	6	0	0	0
Total Registrations	**783**	**623**	**15**	**9**	**194**	**0**	**4**	**0**
Approximate % of total registrations	**48.1**	**38.3**	**0.9**	**0.6**	**11.9**	**0.0**	**0.2**	**0.0**

Table 3: Results of the remote detector survey from 15/06/2018 to 21/06/2018 (+ single static from 19/06/2018 to 24/06/2018)

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
15.06.18	44	40	0	2	0	0	0	0
16.06.18	37	22	0	0	1	0	0	0
17.06.18	28	13	0	0	1	0	0	0
18.06.18	48	16	0	1	0	0	0	0
19.06.18	23	36	0	0	4	0	0	0
20.06.18	2	8	0	0	2	0	0	0
Total Registrations	**182**	**135**	**0**	**3**	**8**	**0**	**0**	**0**
Approximate % of total registrations	**55.5**	**41.2**	**0.0**	**0.9**	**2.4**	**0.0**	**0.0**	**0.0**
Location 2								
19.06.18	273	137	0	10	62	0	0	0
20.06.18	17	55	0	13	38	2	1	1
21.06.18	21	63	0	9	47	0	0	0
22.06.18	25	38	0	0	67	0	0	0
23.06.18	15	43	0	0	48	0	1	0
24.06.18	71	44	0	6	65	0	1	0
Total Registrations	**422**	**380**	**0**	**38**	**327**	**2**	**3**	**1**
Approximate % of total registrations	**36.0**	**32.4**	**0.0**	**3.2**	**27.9**	**0.2**	**0.3**	**0.1**
Location 3								
15.06.18	195	30	0	0	1	0	0	0
16.06.18	26	22	0	0	1	0	1	0
17.06.18	15	13	0	0	0	0	0	0
18.06.18	13	7	0	3	0	0	0	0
19.06.18	229	35	0	10	3	0	8	0
20.06.18	116	31	0	10	1	0	0	0
Total Registrations	**594**	**138**	**0**	**23**	**6**	**0**	**9**	**0**
Approximate % of total registrations	**77.1**	**17.9**	**0.0**	**3.0**	**0.8**	**0.0**	**1.2**	**0.0**
Location 4								
15.06.18	10	13	0	5	3	0	0	0
16.06.18	1	3	0	0	3	0	0	0
17.06.18	2	1	0	4	1	0	0	1
18.06.18	0	0	0	0	5	0	0	0
19.06.18	5	6	0	0	4	0	0	0
20.06.18	65	126	0	1	26	0	0	2
Total Registrations	**83**	**149**	**0**	**10**	**42**	**0**	**0**	**3**
Approximate % of total registrations	**28.9**	**51.9**	**0.0**	**3.5**	**14.6**	**0.0**	**0.0**	**1.0**

Table 4: Results of the remote detector survey from 16/07/2018 to 22/07/2018

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
16.07.18	No bats recorded							
17.07.18								
18.07.18								
19.07.18								
20.07.18								
21.07.18								
22.07.18								
Total Registrations								
Approximate % of total registrations								
Location 2								
16.07.18	107	134	0	22	47	0	0	1
17.07.18	168	127	0	4	46	0	1	2
18.07.18	77	67	0	14	42	0	6	0
19.07.18	127	121	0	0	33	0	0	2
20.07.18	0	0	0	0	0	0	0	0
21.07.18	0	0	0	0	0	0	0	0
22.07.18	0	0	0	0	0	0	0	0
Total Registrations	**479**	**449**	**0**	**40**	**168**	**0**	**7**	**5**
Approximate % of total registrations	**41.7**	**39.1**	**0.0**	**3.5**	**14.6**	**0.0**	**0.6**	**0.4**
Location 3								
16.07.18	49	37	0	4	1	1	0	0
17.07.18	54	47	0	5	4	0	3	0
18.07.18	67	32	0	8	1	0	1	0
19.07.18	84	53	0	8	3	0	1	1
20.07.18	19	19	0	2	2	0	0	0
21.07.18	0	0	0	0	0	0	0	0
22.07.18	0	0	0	0	0	0	0	0
Total Registrations	**273**	**188**	**0**	**27**	**11**	**1**	**5**	**1**
Approximate % of total registrations	**54.0**	**37.2**	**0.0**	**5.3**	**2.2**	**0.2**	**1.0**	**0.2**
Location 4								
16.07.18	35	16	0	2	9	0	0	0
17.07.18	15	9	0	5	5	0	0	0
18.07.18	22	6	0	6	5	0	2	1
19.07.18	61	33	0	3	6	0	0	1
20.07.18	153	159	0	2	30	0	0	4
21.07.18	29	10	0	9	3	0	0	2
22.07.18	28	11	0	2	4	0	1	1
Total Registrations	**343**	**244**	**0**	**29**	**62**	**0**	**3**	**9**
Approximate % of total registrations	**49.7**	**35.4**	**0.0**	**4.2**	**9.0**	**0.0**	**0.4**	**1.3**

Table 5: Results of the remote detector survey from 23/08/2018 to 28/08/2018

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
23.08.18	5	12	0	2	2	2	4	0
24.08.18	0	0	0	0	0	0	0	0
25.08.18	7	11	0	17	0	2	0	0
26.08.18	8	11	0	1	0	3	1	1
27.08.18	16	24	0	12	2	1	4	0
Total Registrations	**36**	**58**	**0**	**32**	**4**	**8**	**9**	**1**
Approximate % of total registrations	**24.3**	**39.2**	**0.0**	**21.6**	**2.7**	**5.4**	**6.1**	**0.7**
Location 2								
23.08.18	12	44	0	5	21	0	1	1
24.08.18	1	21	0	0	23	0	0	0
25.08.18	7	76	0	27	42	0	1	1
26.08.18	71	70	0	12	14	0	1	0
27.08.18	40	91	0	35	36	0	1	1
Total Registrations	**131**	**302**	**0**	**79**	**136**	**0**	**4**	**3**
Approximate % of total registrations	**20.0**	**46.1**	**0.0**	**12.1**	**20.8**	**0.0**	**0.6**	**0.5**
Location 3								
23.08.18	30	50	0	4	1	0	0	0
24.08.18	0	9	0	0	0	0	0	0
25.08.18	5	16	0	3	0	0	0	0
26.08.18	16	25	0	11	0	0	2	0
27.08.18	48	107	0	16	3	0	1	0
Total Registrations	**99**	**207**	**0**	**34**	**4**	**0**	**3**	**0**
Approximate % of total registrations	**28.5**	**59.7**	**0.0**	**9.8**	**1.2**	**0.0**	**0.9**	**0.0**
Location 4								
23.08.18	8	17	0	4	6	0	0	0
24.08.18	3	17	0	4	10	0	0	0
25.08.18	6	14	0	3	7	0	0	0
26.08.18	55	15	0	96	1	0	0	0
27.08.18	26	15	0	26	4	0	0	0
Total Registrations	**98**	**78**	**0**	**133**	**28**	**0**	**0**	**0**
Approximate % of total registrations	**29.1**	**23.1**	**0.0**	**39.5**	**8.3**	**0.0**	**0.0**	**0.0**

Table 6: Results of the remote detector survey from 11/09/2018 to 17/09/2018

	Pip45	Pip55	PipNaths	Noctule	Myotis	Barb	LE	Big Bat
Location 1								
11.09.2018	No bats recorded							
12.09.2018								
13.09.2018								
14.09.2018								
15.09.2018								
16.09.2018								
Total Registrations								
Approximate % of total registrations								
Location 2								
11.09.2018	24	36	0	5	9	0	2	0
12.09.2018	8	51	0	0	16	0	0	0
13.09.2018	22	63	1	10	20	0	2	0
14.09.2018	7	11	0	4	2	0	0	0
15.09.2018	195	70	2	4	3	0	0	0
16.09.2018	102	25	6	2	4	0	1	0
Total Registrations	**358**	**256**	**9**	**25**	**54**	**0**	**5**	**0**
Approximate % of total registrations	**50.6**	**36.2**	**1.3**	**3.5**	**7.6**	**0.0**	**0.7**	**0.0**
Location 3								
11.09.2018	7	15	0	1	0	1	2	0
12.09.2018	3	12	0	22	0	0	1	0
13.09.2018	3	12	0	27	1	0	4	0
14.09.2018	2	9	0	2	0	0	1	0
15.09.2018	7	10	0	14	1	0	1	0
16.09.2018	4	11	0	66	0	1	2	0
Total Registrations	**26**	**69**	**0**	**132**	**2**	**2**	**11**	**0**
Approximate % of total registrations	**10.7**	**28.5**	**0.0**	**54.5**	**0.8**	**0.8**	**4.5**	**0.0**
Location 4								
11.09.2018	11	95	0	3	5	4	2	0
12.09.2018	5	18	3	1	3	7	2	0
13.09.2018	11	19	0	9	11	3	4	0
14.09.2018	0	84	0	1	2	0	6	0
15.09.2018	24	33	0	12	3	4	3	0
16.09.2018	0	7	0	5	3	0	2	0
Total Registrations	**51**	**256**	**3**	**31**	**27**	**18**	**19**	**0**
Approximate % of total registrations	**12.6**	**63.2**	**0.7**	**7.7**	**6.7**	**4.4**	**4.7**	**0.0**

Appendix 5263/8:

Results of the Wintering Bird and Breeding Bird Surveys

Species (and BTO species code)	RSPB listed	O	N	D	J	Est. no. pairs	Notes
Greylag goose (GJ) *Anser anser*	Feral	-	-	-	100	0	Feeding in the larger fields.
Canada goose (CG) *Branta canadensis*	Feral	-	-	-	2	0	With greylags or flying over.
Pheasant (PH) *Phasianus colchicus*	Feral	3	1	1	4	1	
Cormorant (CA) *Phalacrocorax carbo*		-	-	-	1	-	Flying over.
Buzzard (BZ) *Buteo buteo*		-	1	-	1	0	
Red kite (KT) *Milvus milvus*		1	-	-	-	-	Flying over.
Black-headed gull (BH) *Chroicocephalus ridibundus*	Amber	9	5	5	28	-	Most flying over, a few foraging in cattle fields.
Common gull (CM) *Larus canus*	Amber	1	-	1	-	-	Both flying over.
Lesser black-backed gull (LB) *Larus fuscus*	Amber	-	-	1	-	0	Flying over.
Feral pigeon (FP) *Columba livia*	Feral	1	-	-	-	-	
Stock dove (SD) *Columba oenas*	Amber	13	-	-	-	1	Foraging in the large field in October.
Woodpigeon (WP) *C. palumbus*		160	33	2	38	2	Foraging in fields and resting in trees.
Swift (SI) *Apus apus*	Amber	-	-	-	-	0	Recorded flying over.
Green woodpecker (G.) *Picus viridis*		2	2	1	-	0	
Great spotted woodpecker (GS) *Dendrocopos major*		-	1	-	-	0	Random visits in November and June.
Magpie (MG) *Pica pica*		7	4	3	7	1	
Jackdaw (JD) *Corvus monedula*		30	10	300	10	1	Most recorded flying over, but also nesting at the house.
Rook (RO) *Corvus frugilegus*		50	-	-	-	0	Foraging in the large field or flying over.
Carrion crow (C.) *Corvus corone*		17	2	-	2	1	
Goldcrest (GC) *Regulus regulus*		2	2	1	-	-	In hedgerows in the south.
Blue tit (BT) *Cyanistes caeruleus*		4	2	2	3	5	
Great tit (GT) *Parus major*		-	-	-	3	3	
Skylark (S.) *Alauda arvensis*	Red	2	-	-	1	4	In the large arable fields.
Swallow (SL) *Hirundo rustica*		-	-	-	-	0-1	Possibly nesting in an out-building.
Long-tailed tit (LT) *Aegithalos caudatus*		-	-	-	-	1	
Chiffchaff (CC) *Phylloscopus collybita*		-	-	-	-	3	
Blackcap (BC) *Syvia atricapilla*		-	-	-	-	4	
Whitethroat (WH) *Sylvia communis*		-	-	-	-	2	
Lesser whitethroat (LW) *Sylvia curruca*		-	-	-	-	1	

Species (and BTO species code)	RSPB listed	O	N	D	J	Est. no. pairs	Notes
Wren (WR) *Troglodytes troglodytes*		4	2	-	-	8	
Starling (SG) *Sturnus vulgaris*	Red	21	-	4	-	-	Foraging in October, flying over in December.
Blackbird (B.) *Turdus merula*		3	7	5	4	2	
Redwing (RE) *Turdus iliacus*	Red	1	-	39	2	-	In hedgerows/pasture.
Song thrush (ST) *Turdus philomelos*	Red	2	6	7	2	2	
Fieldfare (FF) *Turdus pilaris*	Red	100	1	3	-	-	A flock of c.100 flew west in October; others in hedgerows.
Robin (R.) *Erithacus rubecula*		7	3	4	6	1	
Dunnock (D.) *Prunella modularis*	Amber	5	4	6	1	4	
House sparrow (HS) *Passer domesticus*	Red	-	-	-	-	0-1	Present at the house.
Pied wagtail (PW) *Motacilla alba*		6	-	-	-	-	Foraging in cattle fields.
Yellow wagtail (YW) *Motacilla flava*	Amber	-	-	-	-	0-1	One present in April.
Meadow pipit (MP) *Anthus pratensis*	Amber	1	-	-	-	-	In the large arable field.
Chaffinch (CH) *Fringilla coelebs*		1	1	-	1	1	
Bullfinch (BF) *Pyrrhula pyrrhula*	Amber	2	2	-	-	-	In hedgerows in the south.
Linnet (LI) *Linaria cannabina*	Red	100	-	-	-	-	A flock in the large arable field.
Greenfinch (GR) *Chloris chloris*		-	-	-	-	0	Recorded flying over.
Goldfinch (GO) *Carduelis carduelis*		-	3	-	6	1	
Yellowhammer (Y.) *Emberiza citrinella*	Red	-	-	-	-	1	Also another territory in adjacent farmland.

Numbers of birds recorded at Caldecotte. A dash indicates that the species was not recorded, whereas a zero indicates that the species was recorded, but not breeding.

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