

Infinity Garden Village (Wragley Way)

ENVIRONMENTAL STATEMENT

Volume 3

Appendices and Figures to the Main Technical Studies

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**Hallam Land
Management**



Hallam Land Management Ltd

Infinity Garden Village (Wragley Way), Derby

ECOLOGICAL APPRAISAL

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1.0 NON-TECHNICAL SUMMARY

- 1.1 No internationally designated sites were located within 5km of the site boundary but two statutory sites were located within 2km of the site boundary, Sinfin Moor Local Nature Reserve (LNR) and Sunnydale Park LNR which were located adjacent to the north-eastern site boundary of the site boundary and 1.92km north of the site boundary respectively. Due to the proximity of Sinfin Moor LNR to the site boundary it is considered that it could experience adverse effects including increased pollution during construction and an increase in recreational pressure post-construction. However, it is considered that there is unlikely to be a significant increase in recreational pressure due to the extensive Green Infrastructure (GI) being incorporated into the development and with the implementation of best practice construction protocols this LNR should not experience a significant increase in pollution. It is considered that due to the intervening distance between the proposed development site and Sunnydale Park LNR that it is highly unlikely that this LNR will suffer any significant negative impacts as a consequence of the development.
- 1.2 There were a total of 12 non-statutory sites and two other sites of interest located within 1km of the site boundary. Sinfin Moor Park LWS is located in the same location as Sinfin Moor Park LNR and therefore if the mitigation recommended for Sinfin Moor LNR is implemented it is considered that the site will not be significantly affected by the proposed development. Sinfin Moor Lane Stream LWS is located adjacent to the north-eastern boundary of the site and is designated for supporting water vole. Due to the proximity of this LWS to the site it could potentially be adversely affected by the proposed development. However if practical measures are incorporated into the drainage strategy for the development to reduce the run-off into the local watercourses during the construction and operational phases then it is considered that this LWS will not be significantly affected. Due to the intervening distance between the remaining LWS sites and the pLWS sites and the proposed development site it is not considered that these sites will experience significant negative impacts as a consequence of the development, particularly with the implementation of Best Practice construction protocols. Willow Wood and Drains is identified as a Site of Interest and is located on-site, this is largely to be retained under current proposals. With the implementation of best practice protocols as outlined as above together with a best practice drainage scheme to reduce the effects of the development on the ditches and drains it is considered that this site of interest will not be significantly affected by the development.
- 1.3 The site predominantly comprised arable land which was considered to be of low ecological value and therefore its loss is not considered to represent a constraint to development. The habitats deemed to be of higher value comprise the hedgerows with associated mature trees, the ponds and the semi-natural woodland which are largely to be retained under proposals.
- 1.4 The hedgerows, woodland and scrub offer suitable habitat for nesting birds and dependent on cropping type arable land could provide potential habitat for ground nesting birds. Since the site covers a large area of farmland with the potential to support notable bird species, breeding bird surveys were undertaken in 2016 and 2018. The results of these surveys are presented in a separate breeding bird report. Any removal of woody vegetation including trees and scrub should therefore occur outside of the bird breeding season (March to August inclusive) to minimise the risk of disturbance to breeding birds. If this is not possible, such vegetation should be checked prior to removal by a suitably experienced ecologist.

- 1.5 The majority of the site, comprising arable land, is considered to be of low value to the local bat population, however, the small areas of woodland and the hedgerows offer commuting and foraging potential to bats. The site is considered to be of 'Low' value to bats and commensurate with the guidance seasonal transects were undertaken during 2016, 2017 and 2018. On each survey occasion a single static detector was deployed for a minimum of five nights. The results of these surveys are presented in a separate bat report.
- 1.6 There were four ponds (P1-4) present on-site and although a number of ditches were present on-site, the majority were dry during the great crested newt (GCN) survey season and were therefore considered unsuitable for this species. There were an additional twelve ponds identified within 500m of the site boundary (P5-16). During the 2018 survey season GCN surveys were undertaken on ponds P1-5, P9-P16 and ditch D27 and during the 2017 survey season GCN surveys were undertaken on ditches D2, D4 and D32 following a positive eDNA result on these ditches in 2016. The results of these surveys are detailed in a separate GCN report.
- 1.7 The arable land and improved grassland were considered to be of low value to reptiles lacking the structure that these species typically require. The woodland, hedgerow bases, ditches, scrub and arable margins were considered to be of higher value to these species offering suitable commuting, foraging and refuge/hibernation habitat and consequently surveys were undertaken in 2017 and 2018. The results of these surveys are detailed in a separate reptile report.
- 1.8 The majority of the ditches present on-site were considered to be of negligible value to water vole as they were dry for the majority of the year and lacked marginal and aquatic vegetation. However, some of the ditches held water for the majority of the year supporting marginal vegetation and therefore offering suitable habitat for this species. Surveys for this species were undertaken in 2018, the results of which are detailed in a separate water vole report.

2.0 INTRODUCTION

- 2.1 The following report provides an Ecological Appraisal undertaken by FPCR Environment and Design Ltd. on behalf of Hallam Land Management Ltd., for a proposed residential development on land off Wragley Way Road, Derby (central OS grid reference: SK 336 304).
- 2.2 A Phase 1 Habitat and initial protected species survey was undertaken in March 2018 and a walkover survey was undertaken in April 2019. These surveys were commissioned in order to provide baseline ecological information and to assess the potential for the site to support protected species. The assessment highlights any potential ecological constraints associated with the proposed development and provides recommendations for mitigation measures to ensure that the development complies with relevant legislation. The site is been subject to a number of Phase 1 Habitat surveys previously with surveys undertaken in 2005 (Golders Associates), 2011 (URS), 2013 (URS), 2014 (URS) and 2016 (FPCR).

Site Context

- 2.3 The site, which is 146ha in size, largely comprised arable land with improved grassland and semi-improved grassland also present on-site. Other habitats present comprise semi-natural broadleaved woodland, broadleaved plantation woodland, hedgerows, dense scrub and ruderal vegetation.

- 2.4 The site is located on the southern periphery of Derby, with residential development lying to the north of the site with pasture and arable fields present to the south, east and west of the site.

Development Proposals

- 2.5 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

3.0 METHODOLOGY

- 3.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including:

- Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk);
- Derbyshire Wildlife Trust (DWT)

- 3.2 Further inspection of colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.

- 3.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:

- 5km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
- 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR)).
- 1km around the application site for sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINC) / Local Wildlife Sites (LWS) and species records (e.g.: protected, Species of Principal Importance as listed on Schedule 41 of the Natural Environment and Rural Communities Act 2006¹ (NERC) or other notable species).

Habitats

- 3.4 The extended Phase 1 habitat surveys were undertaken on 23rd/24th June 2016, 13th July 2016 and on the 14th and 20th March 2018 using the standard Phase I Habitat Survey methodology² as recommended by Natural England, to identify specific habitats and features of ecological interest. A walkover survey was subsequently undertaken on 26th April 2019 to update the baseline information. Habitats were marked on a base plan and an inspection of the site for the presence of any invasive weed species was also carried out. The standard survey methodology was extended to assess the potential presence of protected species, with features such as buildings and trees or specific habitats considered for their ecological value and potential to provide suitable habitats for protected species.

¹ The Natural Environment and Rural Communities Act 2006. [Online]. Available from: <http://www.legislation.gov.uk/ukpga/2006/16/contents>

² JNCC. 2010. *Handbook for Phase 1 habitat survey – a technique for environmental audit*. Peterborough: JNCC

- 3.5 Hedgerows were surveyed individually using the Hedgerow Evaluation and Grading System (HEGS)³ to enable identification and evaluation of hedgerows of nature conservation importance within the site. Hedgerows were graded on a scale of 1-4, within which grades 1 and 2 are generally considered to be of nature conservation priority:
- 1 = high to very high value
 - 2 = moderately high to high value
 - 3 = moderate value
 - 4 = low value.
- 3.6 Hedgerows were also considered against the Hedgerow Regulations 1997 Wildlife and Landscape Criteria⁴, to identify any hedgerows, which would be classified as “important” for nature conservation under this part of the act. Under this methodology, hedgerows are assessed according to the average number of woody species present within 30m survey sections, and the presence of additional features such as mature trees, ditches and hedge banks.
- 3.7 Hedgerows may also qualify as “important” under the Archaeological and History Criteria of this Act, which is beyond the scope of this assessment.

Fauna

- 3.8 During the survey of the site, observations, signs of or suitable habitat for any species protected under Part 1 of the Wildlife and Countryside Act 1981 (as amended), the Conservation of Habitats and Species Regulations 2010 (as amended)⁵ and the Protection of Badgers Act 1992⁶ were noted with particular attention being given to the potential presence of bats, reptiles, great crested newt *Triturus cristatus*, and badger *Meles meles*. Throughout the survey consideration was also given to the existence and use of the site by other notable species such as Local Biodiversity Action Plan (LBAP) or Red Data Book (RDB), Birds of Conservation Concern (BoCC) red & amber listed bird species or Species of Principal Importance listed under S41 of the NERC Act 2006.

Badgers

- 3.9 As part of the survey all hedgerows, woodlands and other suitable habitats within the site and immediately adjacent, were searched for evidence of badger activity. Full details of the survey methodology is provided in a separate confidential badger report which should be read in conjunction with this report.

³ Clements, D. & Toft, R. 1992. *Hedgerow Evaluation and Grading System (HEGS) – a methodology for the ecological survey, evaluation and grading of hedgerows*. Countryside Planning and Management

⁴ *The Hedgerow Regulations 1997 – Statutory Instrument 1997 No. 1160*. [Online]. London: HMSO. Available from: <http://www.legislation.gov.uk/ukSI/1997/1160/contents/made>

⁵ *The Conservation of Habitats and Species Regulations (as amended 2012)*. [Online]. Available from: <http://www.legislation.gov.uk/ukSI/2010/490/contents/made> [Accessed 11/11/2013]

⁶ *The Protection of Badgers Act 1992 (as amended)*. London: HMSO [Online]. Available from: <http://www.legislation.gov.uk/ukpga/1992/51/contents> [Accessed 03/05/2013].

Bats

Building Assessment

- 3.10 The exterior of the buildings were visually assessed for potential access points and evidence of bat activity. Features such as small gaps under barge/soffit/fascia boards, raised or missing ridge tiles and gaps at gable ends, which have potential as access points/roost sites, were sought and the abundance of these access points was recorded. Evidence that bats actively used potential access points/roost sites includes staining within gaps and bat droppings or urine staining under gaps, a note being made wherever these were present. Indicators that potential access points/roost sites had not recently been used included the presence of cobwebs and general detritus within potential access points. The visual assessment was carried out following periods of dry weather to maximise recording of visible evidence.
- 3.11 The interior of the buildings, including its roof voids, was also visually assessed (if accessible) for evidence of bat activity and/or for the potential to be used by bats. Evidence of a roost was determined as the presence of a dead or live bat(s), concentrated piles or scattered droppings, food remains such as insect wing fragments as well as scratch marks and/or staining. In addition, any basement/cellar areas were also inspected for the above features.

Visual tree assessment

- 3.12 Tree assessments were undertaken from ground level at the time of the Phase 1 survey. During the survey Potential Roosting Features (PRF) for bats such as the following were sought (Based on P16, British Standard 8596:2015 Surveying for bats in trees and woodland, October 2015):
- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
 - Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems).
 - Woodpecker holes.
 - Cracks/splits in stems or braches (horizontal and vertical).
 - Partially detached, loose or bark plates.
 - Cankers (caused by localised bark death) in which cavities have developed.
 - Other hollows or cavities, including butt rots.
 - Compression of forks with included bark, forming potential cavities.
 - Crossing stems or branches with suitable roosting space between.
 - Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
 - Bat or bird boxes.
 - Other suitable places of rest or shelter.

- 3.13 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features may enhance or reduce the potential value.
- 3.14 Trees were classified into general bat roost potential groups based upon the presence of these features. Table 1 (below) broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in Bat Surveys for Professional Ecologists: Good Practice Guidelines (J., Collins (Bat Conservation Trust), 2016).
- 3.15 Although the British Standard 8596:2015 document groups trees with moderate and high potential, these have been separated below (as per Table 4.1 in The Bat Conservation Trust Guidelines) to allow more specific survey criteria to be applied.

Table 1: Classification and Survey Requirements for Bats in Trees

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	A Natural England derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence. Works to tree undertaken under supervision in accordance with the approved good practice method statement provided within the licence. However, where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.
High Potential	A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	Aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August). Following additional assessments, tree may be upgraded or downgraded based on findings. If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from Natural England will be

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
		required. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.
Moderate Potential	A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat but unlikely to support a roost of high conservation status (i.e. larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.	A combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August). Following additional assessments, tree may be upgraded or downgraded based on findings. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate. If a roost site/s is confirmed a licence from Natural England will be required.
Low Potential	A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.	No further survey required but a precautionary working method statement may be appropriate.
Negligible/No potential	Negligible/no habitat features likely to be used by roosting bats	None.

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

Great Crested Newts

Habitat Suitability Index

- 3.16 A Habitat Suitability Index (HSI)⁷ assessment was undertaken on any accessible waterbodies on-site or 500m from the site boundary, with suitable habitat connections, where these were accessible. This assessment provides a measure of the likely suitability that a waterbody has for supporting newts. Whilst not a direct indication of whether or not a pond will support great crested newts, generally, those with a higher score are more likely to support great crested newts (GCN) than those with a lower score and there is a positive correlation between HSI scores and ponds in which GCN are recorded. Ten separate attributes are assessed for each pond to calculate the suitability of the ponds to support GCN:

- Geographic location
- Pond area
- Pond drying
- Water quality
- Shade
- Presence of water-fowl
- Presence of fish
- Number of linked ponds
- Terrestrial habitat
- Macrophytic coverage

- 3.17 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the scale set out in Table 2 below. Using the index score the predicted presence of GCN being found within a pond can be made, based on the proportion of ponds typically occupied at that suitability level.

Table 2: HSI Score and suitability for supporting great crested newts

HSI score	Pond Suitability
<0.5	Poor
0.5 - 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
>0.8	Excellent

4.0 RESULTS

Desk Study

Designated Sites

The locations of all statutory and non-statutory designated sites described in the subsequent two sections are shown in Figure 1.

⁷ Amphibian and Reptile Groups of the United Kingdom (2010). ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.

Statutory Designated Sites

- 4.1 The MAGIC website indicates that there are no internationally designated sites within 5km of the site boundary. Two statutory sites were located within 2km of the site boundary; Sinfin Moor Local Nature Reserve (LNR) is located adjacent to the north-eastern site boundary and Sunnydale Park LNR located approximately 1.92km north of the site boundary. Sinfin Moor LNR supports woodland, scrub, grassland and ponds whilst Sunnydale Park LNR supports semi-natural woodland, wet woodland, semi-natural grassland and ponds.

Non-statutory Designated Sites

- 4.2 Six Local Wildlife Sites (LWS), six potential Local Wildlife Sites (pLWS) and two sites of interest are located within 1km of the site boundary, details of which are presented in Table 2 below.

Table 2: Non-Statutory Sites

Site Name	Designation	Relative Location	Size (ha)	Reasons for Designation
Sinfin Moor Lane Stream	LWS	Adjacent to site boundary	1.6147	Water vole
Sinfin Moor Park	LWS	Adjacent to site boundary	7.3227	Habitat mosaic
Sinfin Moor Lane Meadows	LWS	265m north	9.1232	Habitat mosaic
Hell Meadow Wood	LWS	230m north-west	10.1227	Secondary broadleaved woodland
Arlaston Canal & Pond	LWS	250m south	3.8173	Habitat mosaic
Barrow Bridge Wet Woodland	pLWS	220m south	4.2277	Wet woodland
Trent and Mersey Canal	pLWS	230m south	19.3104	Standing open water
Stenson Junction	pLWS	435m south-west	1.3544	Semi-improved grassland
Kirby's Triangle	LWS	445m south-west	0.5118	Lowland swamp
Cardales Wildflower Meadow	pLWS	490m south-west	1.2357	None provided
Possible Extension to Kirby's Triangle	pLWS	550m south-west	1.0542	None provided
Possible Extension to Kirby's Triangle	pLWS	800m south-west	0.7643	None provided
Willow Wood and Drains	Site of Interest	On-site	0.71	None provided
Ash plantation	Site of Interest	320m west	1.83	None provided

Protected / Notable Species

- 4.3 Several records of protected or notable species, such as those of principal importance or local BAP species are present within 1km of the site. A summary of these are provided in Table 3 with their locations shown on Figure 1.

Table 3: Notable and Protected Species Recorded within 1km of the Site Boundary

Name	Designation	Location
Common pipistrelle <i>Pipistrellus pipistrellus</i>	W&CA, NERC	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 340m south of the site boundary (2011). No records of roosts were returned.
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	W&CA, NERC, LBAP	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 550m south-west of the site boundary (2012). One record of a small roost was returned approximately 475m north of the site boundary (2013).
Unidentified Pipistrelle Bat <i>Pipistrellus sp</i>	W&CA, NERC	Two records were returned within 1km of the site, the nearest of which was approximately 980m south-west of the site boundary.
Brown Long-eared Bat <i>Plecotus auritus</i>	NERC, W&CA, LBAP	Several records of brown long-eared bats were returned within 1km of the site boundary, the nearest of which was approximately 475m north of the site boundary (2013).
Unidentified <i>Myotis sp.</i>	NERC, W&CA, LBAP	Two records were returned located approximately 420m and 750m south-west of the site boundary (2015). No details about these records were provided.
Whiskered Bat <i>Myotis mystacinus</i>	W&CA, NERC	A single record was returned approximately 1km north of the site boundary (2010).
Whiskered Bat <i>Myotis mystacinus</i> / Brandt's Bat <i>Myotis brandti</i>	W&CA, NERC	A record of a roost was returned from the main farmhouse of Ashlea Farm located within the site boundary (2005).
Water Vole <i>Arvicola amphibius</i>	W&CA, NERC, LBAP	Several records returned within Sinfin Moor Lane Stream LWS, the nearest of which is approximately 100m east of the site boundary (2000) and a record returned within Stenson Bubble Marina approximately 280m south (2007).
Brown Hare <i>Lepus europaeus</i>	NERC, LBAP	One record returned approximately 950m south-west of the site boundary (2016).
Yellowhammer <i>Emberiza citrinella</i>	NERC, LBAP	Two records returned, one of which was located approximately 40m north of the site boundary (unknown date) and the other record was located approximately 1km north-east of the site boundary (2000).
Song Thrush <i>Turdus philomelos</i>	NERC, LBAP	Several records returned within 1km of the site boundary, the closest of which was located approximately 335m north of the site boundary (2002).
Reed Bunting <i>Emberiza schoeniclus</i>	NERC, LBAP	One record returned approximately 445m north of the site boundary (2010).

Key LBAP – Local Biodiversity Action Plan. NERC – Natural Environment and Rural Communities Act 2006, W&CA – Wildlife and Countryside Act 1981.

Habitats Overview

- 4.4 The site predominantly comprised arable land with areas of improved grassland, poor semi-improved grassland, semi-natural broadleaved woodland, marshy grassland and broadleaved plantation woodland. Other habitats present included wet ditches, dry ditches, scrub, ponds, hedgerows and mature trees.
- 4.5 The locations of the habitats described and Target Notes (TN) referred to in the following sections can be found on Figures 2a and 2b: Phase I Habitat Plan. Full vegetative species-lists are provided in Appendix A.

Semi-natural Broadleaved Woodland

- 4.6 A small area of semi-natural broadleaved woodland was located in the north of the central section of the site (BLW1). This was predominantly composed of willow carr comprising crack willow *Salix fragilis* with ash *Fraxinus excelsior* and pedunculate oak *Quercus robur* also recorded amongst the canopy. The understorey comprised predominantly of dense hawthorn *Crataegus monogyna* with field maple *Acer campestre*, bramble *Rubus fruticosus* agg. blackthorn *Prunus spinosa*, hazel *Corylus avellana* and immature oak. The ground flora was limited in terms of its diversity and extent with ivy *Hedera helix*, cleavers *Galium aparine*, common nettle *Urtica dioica*, wood avens *Geum urbanum*, herb Robert *Geranium robertianum* and cow parsley *Anthriscus sylvestris* recorded. There were fallen trees, branches and deadwood piles located throughout the woodland. This area of woodland forms part of the Willow Wood and Drains Site of Interest.

Broadleaved Plantation Woodland

- 4.7 A linear belt of immature broadleaved plantation woodland was present adjacent to the A50 which was likely to have been planted during its construction in which a diverse mix of tree species was recorded including oak, silver birch *Betula pendula*, beech *Fagus sylvatica*, ash, lime *Tilia x europaea*, sweet chestnut *Castanea sativa*, alder *Alnus glutinosa*, rowan *Sorbus aucuparia*, field maple, hazel and sycamore *Acer pseudoplatanus*. The understorey was limited comprising field maple and hazel and the ground flora was dominated by cow parsley with common nettle and false oat-grass *Arrhenatherum elatius* also recorded.
- 4.8 The majority of the eastern boundary of the site was formed of mature broadleaved plantation woodland principally composed of hybrid black poplar *Populus x canadensis* with hawthorn also recorded.

Scrub

- 4.9 There were localised areas of scrub located throughout the site including an area of scattered hawthorn and blackthorn scrub in the south-east of the site within which there was a pile of deadwood (TN1). Additionally, there was a small area of dense bramble in the southern section of the site lying adjacent to hedgerow H46.

Improved Grassland

- 4.10 Two improved grassland field compartments was recorded in the south-eastern section of the site which supported heavily grazed grassland which was dominated by coarse grasses including perennial rye-grass *Lolium perenne*, false oat-grass and cock's-foot *Dactylis glomerata*. Forb diversity was limited with creeping buttercup *Ranunculus repens*, dandelion *Taraxacum officinale*, and ribwort plantain *Plantago lanceolata* recorded.

Poor Semi-improved Grassland

- 4.11 Two poor semi-improved grassland field compartments were located in the eastern section of the site to the west of Deep Dale Lane. Compartment 1 was dominated by false oat-grass with cow parsley and red fescue also recorded. Forb diversity was limited with locally frequent chickweed *Stellaria media*, frequent creeping buttercup with spear thistle *Cirsium vulgare*, broad-leaved dock *Rumex obtusifolius*, common ragwort *Senecio jacobaea* and meadow crane's-bill also

recorded. A small stand of reed canary grass *Phalaris arundinacea* was located on the eastern boundary of this field compartment. Compartment 2 was largely composed of cock's-foot with perennial rye-grass and false oat-grass also recorded here. Forb diversity was limited with creeping buttercup, dandelion, cleavers and cow parsley recorded.

- 4.12 A third compartment of poor semi-improved grassland was located immediately west of the area of semi-natural broadleaved woodland. This area of grassland was dominated by cock's-foot with creeping bent and crested dog's-tail *Cynosurus cristatus* also recorded here. Forb diversity was limited with meadow crane's-bill, common ragwort, white clover, spear thistle and rosebay willowherb *Chamerion angustifolium* recorded.

Marshy Grassland

- 4.13 An area of marshy grassland was present to the west of the semi-natural broadleaved woodland in the north of the middle section of the site within a poor semi-improved grassland field. This area of grassland was dominated by soft rush *Juncus effusus* with rank grasses including cock's-foot and creeping bent *Agrostis stolonifera* with crested dog's-tail also recorded. Forb diversity was limited with creeping buttercup frequent amongst the sward, other species recorded here include white clover *Trifolium repens*, meadow crane's-bill and ragwort. This area contains a series of sporadic pools which are likely to hold water seasonally during the year.

Standing Water

- 4.14 There were four ponds located within the site boundary (P1-4). Pond P1 was a collection of small pools located within an area of marshy grassland in the central section of the site, these pools were devoid of aquatic vegetation but supported marginal vegetation comprising soft rush. Pond P2 was located adjacent to the central section of hedgerow H36 and was fully covered by common duckweed *Lemna minor* with no other aquatic or marginal vegetation recorded. Pond P3 was located within the centre of an arable field in the north-west of the site located within a small area of broadleaved woodland. This pond was heavily shaded, with aquatic vegetation limited to common duckweed and floating sweet-grass *Glyceria fluitans*. No marginal vegetation was recorded, with bankside vegetation dominated by dense bramble scrub. Pond P4 was located in the south-western corner of the site and was devoid of aquatic and marginal vegetation aside from common duckweed. Dense bramble partially bordered the pond on its western aspect with an arable field located immediately to the east.
- 4.15 Additionally, there were four ditches present on-site which held standing water at the time of survey (D5, D8, D12 and D29) which contained shallow water (<5cm deep) and lacked marginal and aquatic vegetation at the time of survey.

Running Water

- 4.16 There were seven ditches present on-site which possessed running water (D1-3, D6-7, D9-10 and D27). Ditches D1, D2 and D3 are a continuation of a single ditch, ditch D1 contained very shallow water (approx. one inch in depth) with no aquatic or marginal vegetation recorded whilst ditch D2 contained shallow water (approx. 10cm in depth) and supported common reed *Phragmites australis*. Ditch D3 was approximately 2m wide with a water depth of approximately 0.5m and supported bulrush *Typha latifolia*, reed canary grass *Phalaris arundinacea* and common water-starwort *Callitriche stagnalis*.

- 4.17 Ditch D6, which flowed adjacent to hedgerow H11 and H26, contained shallow water (approx. 5cm) which flowed in an easterly direction and lacked aquatic and marginal vegetation.
- 4.18 Ditch D7, which forms part of Barrow Drain, contained shallow water approximately 5cm in depth and supported dense common reed but lacked aquatic vegetation. Ditches D9-10 also formed part of Barrow Drain and both contained very shallow water (approx. 5cm) and flowed slowly in an easterly direction. Both ditches were largely absent of aquatic and marginal vegetation.
- 4.19 Ditch D28 contained water in its western section approx. 50cm in depth but was largely absent of aquatic and marginal vegetation. The ditch flowed in an easterly direction and became progressively shallower with a depth of approx. 5cm at its eastern extent. This ditch forms part of Willow Wood and Drains Site of Interest.

Arable

- 4.20 The majority of the site comprised arable land with margins which were largely 1-2m in width largely comprising poor semi-improved grassland and tall ruderal vegetation. The species composition of these margins was relatively consistent throughout the site dominated by false oat-grass with red fescue *Festuca rubra*, cock's-foot and perennial rye-grass also recorded. Forb cover and diversity was limited with cow parsley, bristly oxtongue *Helminthotheca echioides*, dove's-foot crane's-bill, red dead nettle *Lamium purpureum* and ragwort.

Hedgerows

- 4.21 There are 60 hedgerows present on site, details of canopy compositions in addition to the physical characteristics of the hedgerows (profile, length, % gaps etc.) are presented in Table 4.

Table 4: Hedgerow Composition and Descriptions

Ref	Canopy Species	Length	Notes	HEGS grade / value
H1	<i>Cm, Rf, Ps</i>	220m	No gaps, 0 mature trees, 4 connections.	-3 / moderate
H2	<i>Ps, Rf</i>	180m	0-10% gaps, 5 mature trees, 4 connections	-2 / moderately high to high
H3	<i>Ps, Rf</i>	110m	10-30% gaps, 0 mature trees, 4 connections	3+ / moderate
H4	<i>Ps, Rf, Rc</i>	30m	0-10% gaps, 0 mature trees, 2 connections	3 / moderate
H5	<i>Ca, Cm, Ps, Rf</i>	230m	0-10% gaps, 0 mature trees, 2 connections	3 / moderate
H6	<i>Cm, Ps, Rf</i>	175m	0-10% gaps, 0 mature trees, 4 connections	-3 / moderate
H7	<i>Cm, Rf</i>	150m	0-10% gaps, 0 mature trees, 3 connections	4 / low
H8	<i>Ca, Ps, Rf</i>	100m	No gaps, 3 mature trees, 3 connections	2+ / moderately high to high
H9	<i>Ca, Cm, Ps, Rf</i>	210m	No gaps, 5 mature trees	2+ / moderately high to high
H10	<i>Cm, Ps, Rf</i>	110m	10-30%, 0 mature trees, 4 connections	4+ / low
H11	<i>Ac, Ca, Cm, Ia, Ps, Qr, Rf</i>	450m	No gaps, 7 mature trees, 4 connections	-2 / moderately high to high

Ref	Canopy Species	Length	Notes	HEGS grade / value
H12	<i>Ca, Cm, Ia, Ps, Rf</i>	120m	0-10% gaps, 1 mature tree, 4 connections	-2 / moderately high to high
H13	<i>Cm, Ps, Rf</i>	350m	0-10% gaps, 4 mature trees, 4 connections	-2 / moderately high to high
H14	<i>Cm, Ps, Rf</i>	100m	0-10% gaps, 0 mature trees, 3 connections	4+ / low
H15	<i>Cm, Ps</i>	285m	No gaps, 2 mature trees, 3 connections	-3 / moderate
H16	<i>Ca, Cm, Ps, Qr, Rf</i>	150m	>30% gaps, 0 mature trees, 3 connections	4+ / low
H17	<i>Ac, Cm, Ps</i>	315m	0-10% gaps, 0 mature trees, 4 connections	3 / moderate
H18	<i>Cm, Ps, Rf</i>	175m	0-10% gaps, 0 mature trees, 4 connections	-3 / moderate
H19	<i>Cm, Ps, Rf</i>	40m	0-10% gaps, 1 mature tree, 4 connections	-2 / moderately high to high
H20	<i>Ca, Cm, Rf</i>	250m	No gaps, 0 mature trees, 4 connections	-3 / moderate
H21	<i>Ps, Rf, Sf</i>	235m	0-10% gaps, 2 mature trees, 4 connections	-2 / moderately high to high
H22	<i>Ac, Ca, Cm, Ps, Rf</i>	370m	No gaps, 0 mature trees, 4 connections	-3 / moderate
H23	<i>Cm, Ps, Qr, Rf</i>	230m	0-10% gaps, 0 mature trees, 4 connections	-3 / moderate
H24	<i>Ac, Ca, Cm, Ps, Rf</i>	215m	No gaps, 0 mature trees, 4 connections	-3 / moderate
H25	<i>Ca, Cm, Qr</i>	260m	0-10% gaps, 0 mature trees, 3 end connections	4+ / low
H26	<i>Ac, Ca, Cm, Fe, Ps, Qr, Rf</i>	250m	0-10% gaps, 3 mature trees, 4 end connections	-2 / moderately high to high
H27	<i>Ac, Ca, Cm, Ia, Ps, Qr, Rf</i>	275m	0-10% Gaps, 24 mature trees, 3 end connections	2+ / moderately high to high
H28	<i>Cm, Ps</i>	100m	0-10% gaps, 0 mature trees, 3 end connections	4+ / low
H29	<i>Ac, Ca, Cm, Ps</i>	300m	0-10% gaps, 0 mature trees, 4 end connections	-2 / moderately high to high
H30	<i>Ca, Cm, Ps, Rf, Sn</i>	240m	0-10% gaps, 2 mature trees, 4 end connections	-2 / moderately high to high
H31	<i>Cm, Ps, Rf</i>	100m	0-10% gaps, 1 mature tree, 4 end connections	-2 / moderately high to high
H32	<i>Ac, Fe, Ps, Rf</i>	60m	No gaps, 11 mature trees, 3 end connections	2+ / moderately high to high
H33	<i>Cm, Ps, Qr, Rf</i>	350m	No gaps, 3 mature trees, 4 end connections	2+ / moderately high to high
H34	<i>Ps, Rf</i>	70m	No gaps, 2 mature trees, 4 end connections	-2 / moderately high to high
H35	<i>Cm, Ps, Rf</i>	120m	No gaps, 4 mature trees, 4 end connections	2+ / moderately high to high
H36	<i>Cm, Ps, Rf</i>	145m	No gaps, 7 mature trees, 4 end connections	-2 / moderately high to high

Ref	Canopy Species	Length	Notes	HEGS grade / value
H37	<i>Cm, Ps, Rf</i>	240m	0-10% gaps, 3 mature trees, 3 end connections	3+ / moderate
H38	<i>Ac, Ca, Cm, Rf</i>	345m	0-10% gaps, 0 mature trees, 3 end connections	3+ / moderate
H39	<i>Cm, Ps</i>	210m	0-10% gaps, 0 mature trees, 1 end connection	3 / moderate
H40	<i>Ac, Cm, Ps, Rf</i>	330m	0-10% gaps, 5 mature trees, 4 end connections	-2 / moderately high to high
H41	<i>Ac, Cm, Ps, Rf</i>	410m	0-10% gaps, 3 mature trees, 4 end connections	-2 / moderately high to high
H42	<i>Cm, Rf</i>	520m	No gaps, 4 mature trees, 4 end connections	-2 / moderately high to high
H43	<i>Ac, Ca, Cm, Ps, Rf</i>	440m	0-10% gaps, 0 mature trees, 4 end connections	-2 / moderately high to high
H44	<i>Ac, Ca, Cm, Qr, Rf</i>	460m	0-10% gaps, 0 mature trees, 4 end connections	-2 / moderately high to high
H45	<i>Ac, Cm, Rf</i>	180m	No gaps, 0 mature trees, 4 end connections	-2 / moderately high to high
H46	<i>Cm, Ps, Rf</i>	150m	0-10% gaps, 0 mature trees, 2 end connections	3 / moderate
H47	<i>Ac, Ca, Cm, Ps, Rf</i>	590m	0-10% gaps, 0 mature trees, 4 end connections	-2 / moderately high to high
H48	<i>Cm, Ps, Rf</i>	110m	0-10% gaps, 0 mature trees, 3 end connections	4+ / low
H49	<i>Cm, Rf, Ps</i>	110	0-10% gaps, 0 mature trees, 2 end connections	4 / low
H50	<i>Cm, Rf, Ps</i>	290	0-10% gaps, 1 mature tree, 2 end connections	3 / moderate
H51	<i>Cm, Rc, Sn</i>	230m	No gaps, 0 mature trees, 3 end connections	3 / moderate
H52	<i>Ag, Cm, Rc, Sn</i>	190m	No gaps, 0 mature trees, 3 end connections	3 / moderate
H53	<i>Cm, Ps, Sn</i>	190m	No gaps, 0 mature trees, 3 end connections	-3 / moderate
H54	<i>Cm, Sn</i>	230m	0-10% gaps, 0 mature trees, 1 end connection	4 / low
H55	<i>Ac, Cm, Sn</i>	160m	No gaps, 1 mature tree, 2 end connections	3+ / moderate
H56	<i>Ac, Cm, Ps, Qr</i>	580m	No gaps, no mature trees, 3 end connections	4+ / low
H57	<i>Ac, Cm, Fe, Ps, Qr, Ug</i>	510m	0-10% gaps, 0 mature trees, 3 connections	3 / moderate
H58	<i>Cm, Fe, Qr, Ug</i>	210m	0-10% gaps, 0 mature trees, 3 connections	3 / moderate
H59	<i>Ac, Cm, Fe, Ps, Ug,</i>	270m	Non gaps, 0 mature trees, 4 connections	4+ / low
H60	<i>Cm, Sn</i>	55m	No gaps, 0 mature trees, 2 connections	3- / moderate

Key to hedgerow species: Ac *Acer campestre* Field Maple, Ag *Alnus glutinosa* Alder Ca *Corylus avellana* Hazel, Cm *Crataegus monogyna* Hawthorn, Fe *Fraxinus excelsior* Ash, Ia *Ilex aquifolium* Holly, Qr *Quercus robur* Pedunculate Oak, Rc *Rosa canina* Dog-rose, Rf *Rubus fruticosus* agg. Bramble, Sf *Salix fragilis* Crack Willow, Sn *Sambucus nigra* Elder, Ug, *Ulmus glabra* Wych elm

- 4.22 All hedgerows contain over 80% native species and are therefore identified as Habitats of Principal Importance under Section 41 of the NERC Act. None of the hedgerows qualify as important under the wildlife and landscape criteria of the Hedgerow Regulations 1997. Twenty-five of these hedgerows were considered to be of nature conservation priority, scoring grade 2 or above under HEGS.

Ditch

- 4.23 There were 16 dry ditches present on-site (D13-26 and D30-31) which were largely without marginal and aquatic vegetation. These ditches were generally colonised by coarse grasses including cock's-foot and false-oat grass with ruderal species also present, such as broad-leaved dock, cow parsley and rosebay willowherb with bramble also recorded. Ditches D24 and D25 forms part of Willow Wood and Drains Site of Interest.

Invasive Species

- 4.24 Himalayan balsam, which is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), was recorded in ditch D6.

Field Results - Fauna

Bats

- 4.25 The woodland, ponds, ditches, scrub and hedgerows present on-site offer suitable foraging and commuting habitat for bats, however, the arable land, poor semi-improved grassland and improved grassland are likely to be of low value to bats.

Buildings

- 4.26 Twelve buildings were present on-site (B1-B12).
- 4.27 Building B1 was a two-storey brick-built farm building with a clay tile pitched roof. A soffit box was present around the whole of the building which was in good condition and well-sealed. Potential access points included slipped tiles, small gaps under the flashing on the west aspect and small gaps under the flashing on the three chimneys.
- 4.28 A roof void was present in the form of a loft void, it had wooden beams and had recently been lined with bitumen felt. No gaps were recorded within the roof void and there was evidence of the cavity wall having been recently filled in. No evidence of bats was found and was found to have low potential to support roosting bats.
- 4.29 Building B2 was a set of three farm storage buildings made from breeze block with two sections of the building being two storey and one section being one storey, the roof was composed of metal corrugated sheeting. Potential access points included gaps under the flashing and fascia on the east aspect with ventilation gaps on the ridge section of the roof. Many of the windows

were broken and one section of the building was open and exposed. The inside of the building comprised steel and wooden support beams.

- 4.30 No roof void was present as the loft had been converted and incorporated into the second storey and as such was well lit. No evidence of bats was recorded and was found to have negligible potential to support roosting bats.
- 4.31 Building B3 was a single storey breeze block farm storage building with corrugated sheet roofing. Potential access points were in ventilation gaps in the ridge of the metal sheeting and where areas of cement between the bricks had come away.
- 4.32 No roof void was present and no evidence of roosting bats was recorded. The building had negligible potential to support roosting bats.
- 4.33 Building B4 was a single storey grain store composed of breeze block and metal corrugated sheet roofing, the building was open and exposed. No roof void was present and no evidence of roosting bats was recorded. The building had negligible potential to support roosting bats.
- 4.34 Building B5 was a large hay barn which was open sided with steel support pillars and a corrugated metal sheet roof. No roof void or cavities were present and the building provided negligible potential to support roosting bats.
- 4.35 Building B6-B11 were single storey wooden chicken sheds with metal corrugated sheet roofs. There were numerous access points in the form of doors, roof shafts and wall vents. Internally the sheds were dark but with no roof voids or cavities. No evidence of bats was recorded and the buildings were considered to have negligible potential to support roosting bats.
- 4.36 Building B12 was a port-a-cabin with a flat roof. No access points or roof void were recorded. The building was considered to provide negligible potential to support roosting bats.

Trees

- 4.37 Thirty-five trees considered to offer bat roosting potential were identified on-site which were largely associated the woodland and hedgerows. Details of these trees are provided in Table 5 below.

Table 5: Trees with Bat Potential

Tree ref	Species	Feature(s)	Category
T1	Crack Willow <i>Salix fragilis</i>	1 x south-west facing knot hole approx. 1.5m high South-east facing broken branches approx. 1-2m high Multiple west-facing broken branches approx. 3-4m high	Moderate
T2	Crack Willow <i>Salix fragilis</i>	1 x west facing vertical split approx. 2m high	Moderate

Tree ref	Species	Feature(s)	Category
T3	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split on a south-facing branch approx. 2.5m high	Low
T4	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split on south-east facing branch approx. 2m high	Moderate
T5	Crack Willow <i>Salix fragilis</i>	1 x west-facing rot hole approx. 3m high	Moderate
T6	Crack Willow <i>Salix fragilis</i>	Vertical split in stem approx. 2-3m high	Moderate
T7	Crack Willow <i>Salix fragilis</i>	1 x south-facing vertical split approx. 1m high	Low
T8	Crack Willow <i>Salix fragilis</i>	1 x south-facing knot hole approx. 1.5m high	Low
T9	Crack Willow <i>Salix fragilis</i>	1 x south-facing rot hole approx. 2m high	Moderate
T10-T12	Crack Willow <i>Salix fragilis</i>	Large vertical cracks to the main stems as a consequence of storm damage	Moderate
T13	Pedunculate Oak <i>Quercus Robur</i>	1 x west-facing knot hole located approximately 1.5m high	Moderate
T14	Crack Willow <i>Salix fragilis</i>	1 x west-facing knot hole approx. 5m high 1 x west facing horizontal split approx. 5m high 1 x branch split approx. 6m high 3 x broken branches approx. 5-6m high	Moderate
T15	Crack Willow <i>Salix fragilis</i>	1 x west-facing rot hole approx. 1.5m high Multiple west-facing split branches approx. 4m high Multiple patches of loose bark	Moderate

Tree ref	Species	Feature(s)	Category
T16	Crack Willow <i>Salix fragilis</i>	1 x north-east facing branch split approx. 5m high Multiple patches of loose bark	Moderate
T17	Pedunculate Oak <i>Quercus Robur</i>	1 x south-west facing know hole approx. 3m high	Low
T18	Pedunculate Oak <i>Quercus Robur</i>	1 x north-west facing branch split approx. 5m high	Moderate
T19	Crack Willow <i>Salix fragilis</i>	1 x east-facing vertical split in main stem approx. 1m high	Moderate
T20	Pedunculate Oak <i>Quercus Robur</i>	1 x south-facing branch split approx. 7m high	Moderate
T21	Crack Willow <i>Salix fragilis</i>	1 x north-facing branch tear-out approx. 2m high	Moderate
T22	Ash <i>Fraxinus excelsior</i>	1 x north-facing rot hole approx. 2m high	Moderate
T23	Crack Willow <i>Salix fragilis</i>	1 x east-facing branch split approx. 5m high	Low
T24	Pedunculate Oak <i>Quercus Robur</i>	1 x east-facing branch split approx. 6m high	Moderate
T25	Ash <i>Fraxinus excelsior</i>	6 x north-facing knot holes between 2-6m high	Moderate
T26	Ash <i>Fraxinus excelsior</i>	1 x north-facing branch tear out approx. 5m high	Moderate
T27	Beech <i>Fagus sylvatica</i>	1 x east-facing rot hole approx. 1.5m high 1 x south-facing vertical split in the main stem approx. 4m high	Low
T28	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split along an east-facing branch approx. 6m high 1 x south-east facing rot hole 3.5m high	Moderate
T29	Pedunculate Oak	1 x north-facing knot	Moderate

Tree ref	Species	Feature(s)	Category
	<i>Quercus Robur</i>	hole approx. 1.5m high 1 x north-facing knot hole approx. 4.5m high 1 x south-east facing knot hole approx. 2.5m high	
T30	Pedunculate Oak <i>Quercus Robur</i>	1 x south-facing rot hole approx. 1.5m high 1 x south-facing vertical branch split approx. 2.5m high 1 x north-facing cavity at the base of two branches approx. 4m high	Moderate
T31	Pedunculate Oak <i>Quercus Robur</i>	1 x vertical split in the main stem from ground level to approx. 3m high	Moderate
T32	Pedunculate Oak <i>Quercus Robur</i>	1 x north-west facing knot hole approx. 2.5m high	Moderate
T33	Pedunculate Oak <i>Quercus Robur</i>	Multiple east-facing knot holes	Moderate
T34	Ash <i>Fraxinus excelsior</i>	Small areas of south-easting loose bark	Low
T35	Ash <i>Fraxinus excelsior</i>	1 x west-facing branch split approx. 4m high	Moderate

Breeding birds

- 4.38 Habitats within the site are considered to be of potential value to farmland and woodland birds which may provide a source of shelter, foraging and nesting opportunities comprise the woodland and hedgerows. Dependent on cropping type, arable land could provide potential habitat for ground nesting birds.

Great Crested Newts

- 4.39 Suitable terrestrial habitat was present on-site in the form of woodland, hedgerows, scrub and field margins which offer suitable commuting, foraging and refuge/hibernation habitat. The arable land, improved grassland and semi-improved grassland are of limited/negligible value to this species to their poor structure. There were four on-site ponds (P1-P4) and four on-site ditches (D2, D4, D28 and D32) which supported water and could provide potential breeding habitat for

this species. In addition there were 12 waterbodies (P5-16) present within 500m of the site boundary as identified on Figure 3. An HSI Assessment was undertaken on these ponds which were considered to have connectivity to the site and ditches which are provided in Table 6 below.

Table 6: HSI Summary

Pond Ref.	HSI score	Pond suitability	Predicted presence
P1	0.48	Poor	3%
P2	0.56	Below Average	20%
P3	0.72	Good	79%
P4	0.58	Below Average	20%
P5	0.78	Good	79%
P8	0.66	Average	55%
P9	0.86	Excellent	55%
P10	0.64	Average	55%
P11	0.80	Good	79%
P12	0.61	Average	55%
P13	0.69	Average	55%
P14	0.76	Good	79%
P15	0.61	Average	55%
D2	0.73	Good	79%
D4	0.77	Good	79%
D27	0.55	Below Average	20%

Reptiles

- 4.40 Similarly, the arable land and improved grassland were considered to be of low value lacking the structure that this species group typically requires. The woodland offered suitable hibernation habitat and the hedgerows and scrub offered suitable commuting, foraging and refuge habitat. Additionally the field margins offered suitable commuting and foraging habitat whilst the ditches offered suitable commuting habitat for grass snake. Marshy grassland, situated in close proximity also provided some potential foraging habitat for grass snake.

Water Vole and Otter

- 4.41 Ditches D13-26 and D29-31 are likely to be dry for the majority of the year only holding water seasonally, these ditches had no marginal and aquatic vegetation and were therefore considered to be unsuitable for water vole. Ditches D1, D5-7, D8-11 and D27-28 held water seasonally but were largely absent of aquatic and marginal vegetation and were therefore considered to be of sub-optimal value to water vole and otter. Ditches D2-D4 held permanent water as well as

supporting marginal and aquatic vegetation and were therefore considered to offer suitable habitat for these species.

5.0 DISCUSSION AND RECOMMENDATIONS

Statutory Sites

- 5.1 There were no sites of international importance within 5km of the site boundary. There were two statutory sites located within 2km of the site boundary Sinfin Moor LNR is located adjacent to the north-eastern site boundary and Sunnysdale Park LNR located approximately 1.92km north of the site boundary. Due to the proximity of Sinfin Moor LNR to the proposed development, it is considered that in the absence of mitigation it could experience adverse effects including increased pollution during construction and an increase in recreational pressure post-construction. However, due to the extensive GI proposed on site including in the area of greenspace immediately south of this LNR as well as along the southern boundary, it is considered that it is unlikely that this LNR would experience a significant increase in recreational pressure. Through the implementation of best practice construction protocols, including the use of mist spray to dampen down haul roads, this LNR should not suffer a significant increase in pollution. It is considered that due to the intervening distance between the proposed development site and Sunnysdale Park LNR that it is highly unlikely that this LNR will suffer any significant negative impacts as a consequence of the development.

Non-statutory Sites

- 5.2 There were a total of 12 non-statutory sites and two other sites of interest within 1km of the site boundary. Sinfin Moor Park LWS is located in the same location as Sinfin Moor LNR adjacent to the north-eastern boundary of the site and if the mitigation recommended for this LNR is implemented it is considered that Sinfin Moorpark LWS will not be significantly affected by the proposed development. Sinfin Moor Lane Stream LWS is located adjacent to the north-east of the site and is designated for supporting water vole. Due to the proximity of this LWS to the site it could potentially be adversely affected by the proposed development. Practical measures should be incorporated into the drainage strategy for the development to reduce the run-off into the local watercourses during the construction and operational phases to minimise the effects of the development on this LWS.
- 5.3 Due to the intervening distance between the remaining LWS sites and the pLWS sites and the proposed development site it is not considered that these sites will experience significant negative impacts as a consequence of the development, particularly with the implementation of Best Practice construction protocols.
- 5.4 Willow Wood and Drains, which is located on-site, is identified as a Site of Interest and is largely to be retained under current proposals. With the implementation of best practice protocols as outlined as above together with a best practice drainage scheme to reduce the effects of the development on the ditches and drains it is considered that this site of interest will not be significantly affected by the development.

Habitats/Flora

- 5.5 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:
- Inclusion within specific policy (e.g. veteran trees, ancient woodland and linear habitats in NPPF, or non-statutory site designation),
 - Identification as a habitat of principal importance for biodiversity under Natural Environment and Rural Communities Act (NERC) 2006 and consequently identification as a Priority Habitat within England and the local area.
- 5.6 The majority of the site comprises arable land which is considered to be of negligible conservation value whilst the improved grassland and poor semi-improved grassland are considered to be of low conservation value due to their lack of species diversity. It is not considered that the loss of these habitats to the proposed development poses a constraint to development. The semi-natural broadleaved woodland, ponds and ditches are of higher ecological value which are set to be retained of current proposals (Illustrative Masterplan, drawing number 13.060/18, P&DG Ltd).
- 5.7 The existing network of hedgerows and trees within the site is largely continuous with relatively few gaps and provides good connectivity between habitats both around the site and within the immediate landscape, notably to the east and to a lesser extent on other sides, where the site is largely bound by a mix of roads and existing development. Under NPPF, development should seek to contribute a net gain in biodiversity with an emphasis on improving ecological networks and linkages where possible. All hedgerows are to be retained under current proposals with the exception of the breaches in several hedgerows to allow road access. Proposals indicate that additional hedgerow planting will be incorporated into the design which will largely be in association with newly created roads.
- 5.8 Existing hedgerows will be enhanced through gapping up, planting with additional native species and managed appropriately (see below) enhancing the hedgerow structures and overall ecological value. The enhancement to existing hedgerows is considered to compensate for the small sections of hedgerow to be lost.
- 5.9 Retained and newly created hedgerows should be managed to maximise their nature conservation potential. This would involve trimming on a three year rotational basis once established, with any existing gaps planted up with native berry bearing tree and shrub species. Where feasible, hedgerows will benefit from the creation of 1-2m wide headlands to promote the establishment of woodland indicator species where these are absent or poorly represented and to allow for the development of a diverse tussocky grassland habitat which would increase the value of the hedgerows as wildlife corridors. Measures will be put in place to ensure hedgerows are safeguarded from direct impacts during the construction phase.
- 5.10 Design indicates that extensive green infrastructure will be incorporated into the design which will largely be focused along the southern boundary and along the eastern section of the site which appears to be a combination of structural planting and grassland areas. Habitats in less formal areas of the GI should be managed extensively to promote their biodiversity in the long term.
- 5.11 Preference should be given within the planting scheme to the use of locally native woody species, with an emphasis on species bearing nectar, berries, fruit and nuts, as these enhance

the foraging opportunities for local wild fauna including birds and invertebrates. Suitable small tree species for inclusion in hedgerow and garden planting schemes include field maple *Acer campestre*, silver birch *Betula pendula*, wild cherry *Prunus avium*, bird cherry *P. padus*, holly *Ilex aquifolium*, crab apple *Malus sylvestris* and rowan *Sorbus aucuparia*. Other shrub species suitable for inclusion within the soft landscaping design include hawthorn *Crataegus monogyna*, hazel, blackthorn, dog-rose *Rosa canina*, honeysuckle *Lonicera periclymenum*, guelder-rose *Viburnum opulus* and wild privet *Ligustrum vulgare*.

- 5.12 Where possible, planting within the site should seek to provide additional habitat for urban and suburban wildlife. While native species are often of value to biodiversity, many cultivated varieties and exotic plants are also good for wildlife provided that their flowers are not too complex. Hybrid varieties, which may produce little or no pollen or nectar and so are not of interest to bees, butterflies or other pollinating insects are not recommended. The planting strategy, both within private and public areas should therefore combine a range of native species and, where appropriate such as gardens and more formal areas, a range of ornamental species with an accepted value for biodiversity. A range of small shrubs, low growing woody species, grasses and perennials, would provide a range of forms, sizes and finer scale variation to enhance the future structural and three dimensional complexity of the site post-development which would benefit wildlife.
- 5.13 Several attenuation features are proposed around the site within the GI. At this stage it is unknown whether this attenuation features will be designed to hold permanent water or if they are to hold water seasonally. It is recommended that they are designed to maximise its biodiversity whether dry or wet and planted with native species and sensitively managed to increase their ecological value for the local wildlife, such as nesting birds. Where possible, it would be beneficial if areas of permanent water could be created to maximise its biodiversity value. Further details can be provided once the type of facilities are known.

Invasive Species

- 5.14 Himalayan Balsam was recorded within ditches D6. This species is listed under Schedule 9 Part 2 of the Wildlife and Countryside Act 1981 (amended) as non-native invasive species. Under Section 14 (2) of the above act it is an offence to cause to grow in the wild a Schedule 9 plant. It is recommended that this species is removed in a manner which will prevent its spread on and off-site.

Fauna

- 5.15 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2010 (as amended). Some species, for example badgers, also have their own protective legislation (Protection of Badgers Act 1992). The impact that this legislation has on the planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory obligations and their impact within the Planning System.
- 5.16 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to

the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions.

- 5.17 In addition to protected species, there are those that are otherwise of conservation merit, such as species of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. These are recognised in the NPPF which advises that when determining planning applications, LPA's should aim to conserve and enhance biodiversity by applying a set of principles including:

- *If significant harm resulting from a development cannot be avoided....., adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *Development proposals where the primary objective is to conserve or enhance biodiversity should be encouraged.*

Bats

- 5.18 All bat species and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended). In summary these make it an offence to damage, destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat.
- 5.19 There is one record of a roosting Whiskered/Brandt's bat within the main farmhouse of Ashlea Farm in 2005. There are also numerous records of bats within 1km of the site boundary including common pipistrelle, soprano pipistrelle, brown long-eared bats, Brandt's bat *Myotis brandtii*, whiskered bat *Myotis mystacinus* and unidentified *Myotis* sp. bats.
- 5.20 The arable land, poor semi-improved grassland and improved grassland are considered to provide only limited suitability for bat use and their loss is considered to have a negligible impact on the Favourable Conservation Status of the local bat population. However, the hedgerows and woodland do provide foraging and commuting habitat for the local bat population, the majority of these features are to be retained as part of the proposals with the exception sections of a number of hedgerows which are to be lost to allow road access.
- 5.21 Following the Bat Survey Good Practice Guidelines 2016 (Bat Conservation Trust 2016) this site is considered to have 'Low' suitability for bats. In accordance with the guidelines seasonal surveys (spring, summer and autumn) were conducted to provide sufficient information upon which to base likely impacts on the local bat population and ensure sufficient mitigation is provided to ensure the favourable conservation status of the local population. On each survey occasion a single static detector was deployed and left out for a minimum of five nights with the detector being placed in different locations on each survey occasion. The details of these surveys will be provided in a separate bat report.
- 5.22 To ensure development does not affect the local population of bats, light spill on potential bat flight-lines or foraging habitats should be minimised. Sensitive design of the site's lighting scheme will be of particular benefit to bats, which use features such as hedgerows, the woodland and trees for both foraging and commuting, and are listed as species of Principal Importance in England under S41 of the NERC Act (2006).
- 5.23 This will be achieved by a combination of the following steps:

- The direct lighting of existing woodland, trees, hedgerows, or proposed landscape planning and areas of open standing water would be avoided;
- Road and flood lighting would use low pressure sodium or high pressure sodium instead of mercury or metal halide lamps,
- Lighting will be directional and light spillage will be avoided;
- Lighting columns would in general be as short as possible, although in some locations taller columns would allow reduced horizontal spill;
- Lighting levels would be as low as guidelines permit and only used where required for public safety.

5.24 Additional measures that could be used include the provision of 'hop-overs' at strategic breaches of hedgerows, where access is required.

Buildings

5.25 There were 12 buildings located in the south-east of the site in association with Ashlea Farm with buildings B2-B12 considered to have negligible potential to support roosting bats and consequently no further surveys were undertaken and the demolition of these buildings do not pose a constraint to development.. Evidence of a bat roost was recorded in building B1 during an internal building survey and subsequently three nocturnal surveys were undertaken in 2018, the details of which are provided in a separate bat report.

Trees

5.26 Thirty-five trees (T1-T35) were identified as possessing bat roosting potential which were largely associated with the hedgerows and semi-natural broadleaved woodland. A number of these trees are likely to be removed (T2, T5, T15-16, T17 and T29) as part of these proposals and therefore it is necessary that these trees are subject to further surveys. This would include an aerial assessment of the trees and if any of these trees are found to possess evidence of a bat roost they would require nocturnal surveys. Any trees found to support a bat roost would likely require a European Protected Species Licence (EPSL) from Natural England to allow their removal. Trees in which no evidence of a bat roost is recorded would require no further surveys and can be removed without constraint if they are removed within six months of the survey, otherwise an updated survey would be required to determine whether a roost is present. During the walkover survey undertaken in April 2019 it was noted that tree T28 had been removed.

Birds

- 5.1 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them while they are next building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.
- 5.2 Any removal of woody vegetation should occur outside the bird breeding season (March to August inclusive) to minimise the risk of disturbance to breeding birds. If this is not possible, vegetation should be checked prior to removal by a suitably experienced ecologist. If active nests

are found, vegetation should be left untouched and suitably buffered from works until all birds have fledged.

- 5.3 The majority of habitats of value to breeding birds including the boundary trees, hedgerows and woodland are to be retained and enhanced within the proposals. The site covers a large area of farmland with the potential to support notable bird species. Consequently, the site was subject to breeding bird surveys which were undertaken on a monthly basis between April and June 2018 inclusive to assess the breeding assemblage using the site and identify any mitigation needed. The results of these surveys are presented in a separate breeding bird report.
- 5.4 Given the habitats recorded, proximity to existing development and lack of sites designated for their importance to wintering birds in the local area, it is considered unlikely that the site provides a significant resource for over-wintering species and no further surveys are recommended for this group.
- 5.5 The nesting resources within the site could be further enhanced through the provision of bird boxes installed on the existing mature trees and/or incorporated into the built fabric of the residential properties.

Great Crested Newts

- 5.6 No records of GCN were returned on-site but records were returned within 1km of the site boundary. There were four on-site ponds (P1-P4) and five on-site ditches (D1-D2, D4, D28 and D32) which contained water and offered suitable breeding habitat for this species. In addition there were nine waterbodies (P5-P16) present within 500m of the site boundary. Suitable terrestrial habitat was present on-site in the form of woodland, hedgerows, scrub and field margins which offer suitable commuting, foraging and refuge/hibernation habitat. The arable land, improved grassland and semi-improved grassland are of limited/negligible value to this species due to their poor structure.
- 5.7 Further surveys were undertaken on all four on-site ponds, and nine off-site pond (P5 and P8-P15) and ditch D28 in 2018. Additionally surveys were undertaken on ditches D1-D2, D4 and D32 in 2017 where no GCN were recorded following eDNA surveys undertaken in 2016 where a positive result for GCN was returned for these ditches. The remaining on-site ditches were dry during the survey period and therefore no further surveys were undertaken on them. The results of these surveys are presented in a separate GCN report.
- 5.8 No further surveys were considered necessary on pond P6 as it was separated from the site by the busy A50 which was considered to be a significant barrier to dispersal.
- 5.9 No further surveys were undertaken on pond P7 due to the intervening distance (approximately 210m) with limited connecting habitat between this pond and the site. Additionally, an area of woodland is present approximately 65m north of this pond which represents optimal terrestrial habitat for this species providing suitable foraging, refuge and hibernation habitat for this site. It is considered highly likely that, should GCN be present in this pond, they would either remain in very close proximity to the pond during the terrestrial phase of their lifecycle since this pond is surrounded by trees which offer suitable terrestrial habitat or they would commute north into the woodland rather than commute onto the site where largely sub-optimal habitats are present. Consequently, no further surveys were considered necessary on this pond.

- 5.10 No further surveys were undertaken on pond P16 due to the intervening distance (approx. 365m) from the site. Additionally, the site is separated from pond P8 by a residential development and consequently should GCN be present in this pond they would not be able to directly commute to the site, if a realistic route was considered it is likely that GCN would have to commute in excess of 400m to reach the site. Findings within published literature by Franklin, 1993; Oldham and Nicholson 1986; Jehle (2000) determined a terrestrial zone of 63m, within which 95% of summer refuges were located. In addition to this Jehle and Arntzen, (2000)⁸ discovered that following the breeding season 64% of newts were recorded within 20m of the pond edge.
- 5.11 This is supported by research conducted by English Nature (now Natural England) in 2004 (English Nature Research Report Number 576) to assess the value of different habitats for GCN states in the non-technical summary that
- 'By far the most captures were recorded within 50 m of ponds and few animals were captured at distances greater than 100 m.'*
- It also goes on to say:
- 'Captures on fences (and by other methods) at distances between 100 m and 200 – 250 m from breeding ponds tended to be so low as to raise serious doubts about the efficacy of this as an approach, although a small number of projects did report captures on significant linear features at distances approximately 150 – 200 m from ponds.'*
- 5.12 It is considered likely that GCN would remain in the vicinity of the pond during the terrestrial phase of their lifecycle since the pond is surrounded by trees which offer suitable foraging, refuge and hibernation habitat. Furthermore, immediately to the north and west of the pond there is amenity grassland and residential buildings are present immediately to the south and east of the pond which are of sub-optimal and negligible value to GCN respectively. Consequently it was considered that no further surveys were necessary on this pond.

Reptiles

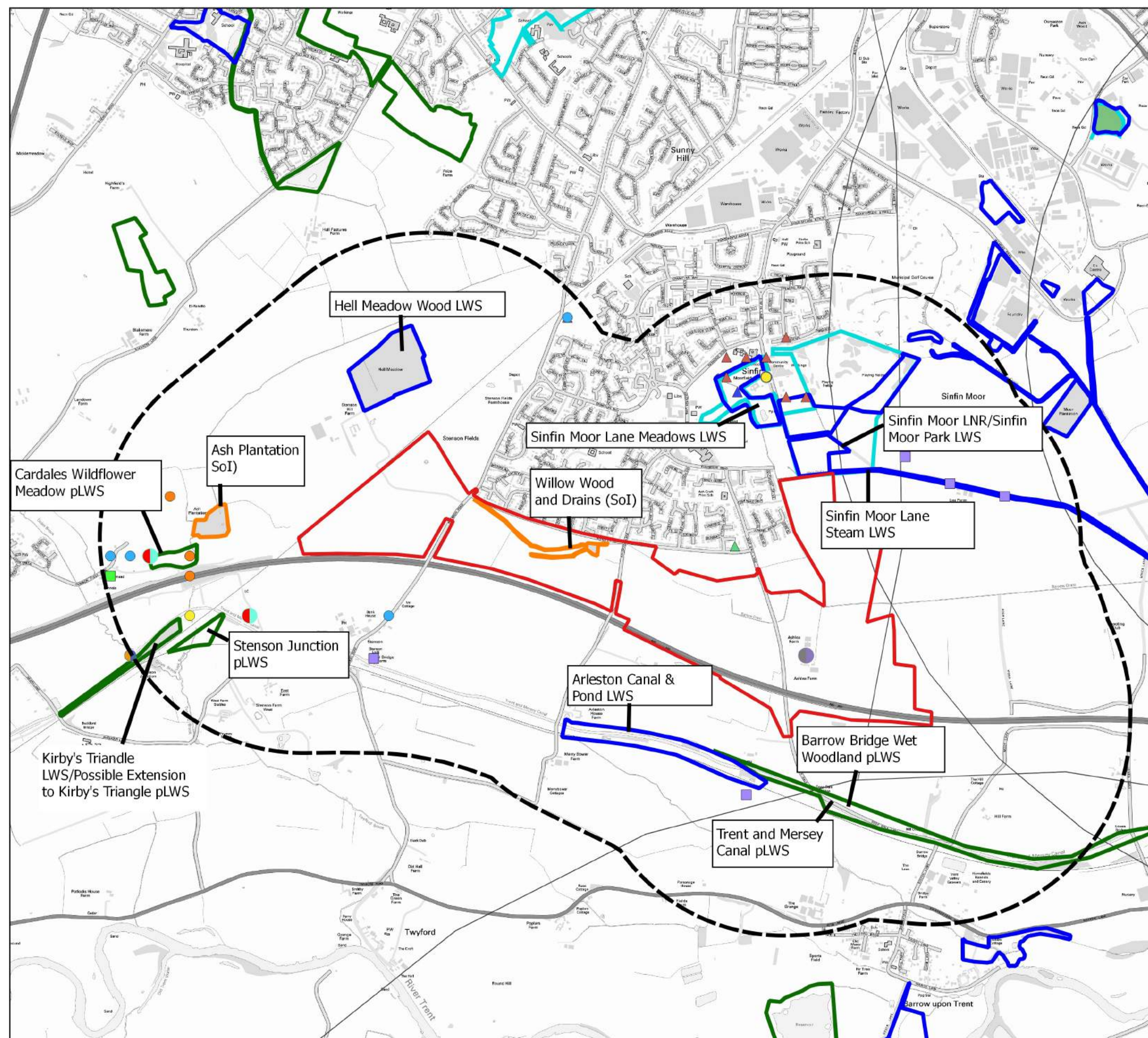
- 5.13 No records of reptiles were returned within 1km of the site boundary. The site was considered to offer some suitable habitat for reptiles in the form of hedgerow bases, woodland, scrub, ditches and field margins which offer refuge/hibernation, commuting and foraging habitat. The arable land was of negligible value due its lack of structure which reptiles require whilst the areas of poor semi-improved grassland and improved grassland were considered to be of low value to reptiles due to their poor structure. Due to the availability of suitable habitat present on-site for these species reptile surveys were undertaken during the 2017 and 2018 survey season, the results of which are presented in a separate reptile report.

Water Vole and Otter

- 5.14 Many of the on-site ditches were considered to be unsuitable for water vole and of limited value to otter due to being dry for the majority of the year as well as lacking aquatic and marginal vegetation which this species requires. However, some of the on-site ditches contain water most of the year and support marginal vegetation thus offering suitable habitat for these species.

⁸ Jehle, R. & Arntzen, J. W. Post-breeding migrations of newts with contrasting ecological requirements. *Journal of Zoology, London*, 251, pp 297-306

Subsequently water vole and otter surveys were undertaken in September 2018 on ditches D1-D3, D7, D9-10 and D28. The results of which are presented in a separate water vole and otter report.



Key

- Site Boundary
- 1 km buffer
- Local Nature Reserves (LNR)
- Local Wildlife Sites (LWS)
- Potential Local Wildlife Site (pLWS)
- Sites of Interest (SoI)
- Common pipistrelle
- Soprano pipistrelle
- Unidentified Pipistrelle Species
- Brown long-eared bat
- Unidentified Myotis sp Bat
- Whiskered Bat
- Whiskered/Brandt's
- Brown Hare
- Water Vole
- ▲ Reed Bunting
- ▲ Song Thrush
- ▲ Yellowhammer

Hallam Land Management
Infinity Garden Village (Wragley Way),
Site Location and Consultation Results Plan



1:20,000

APR / JD

29/5/2019

Figure 1

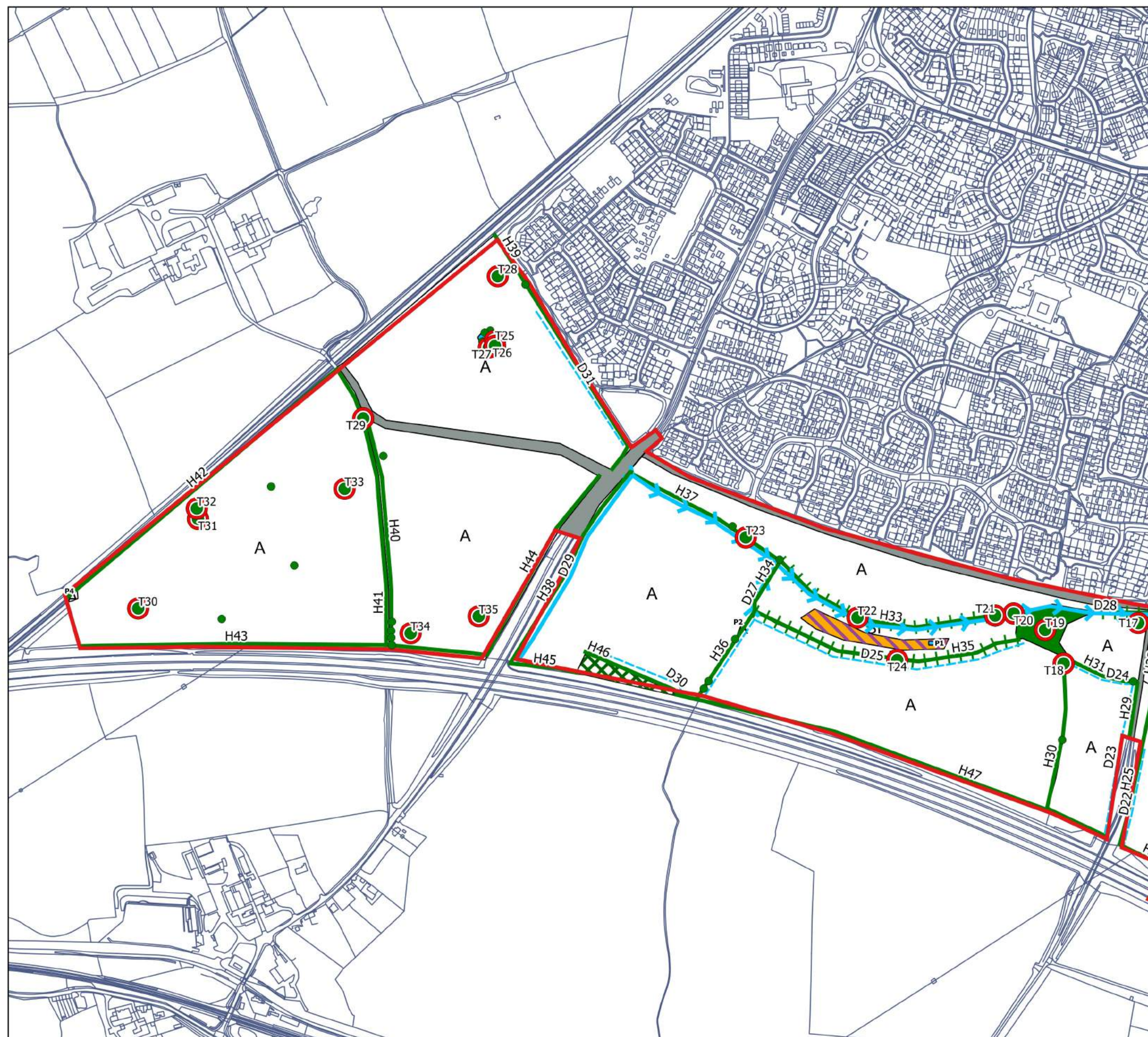
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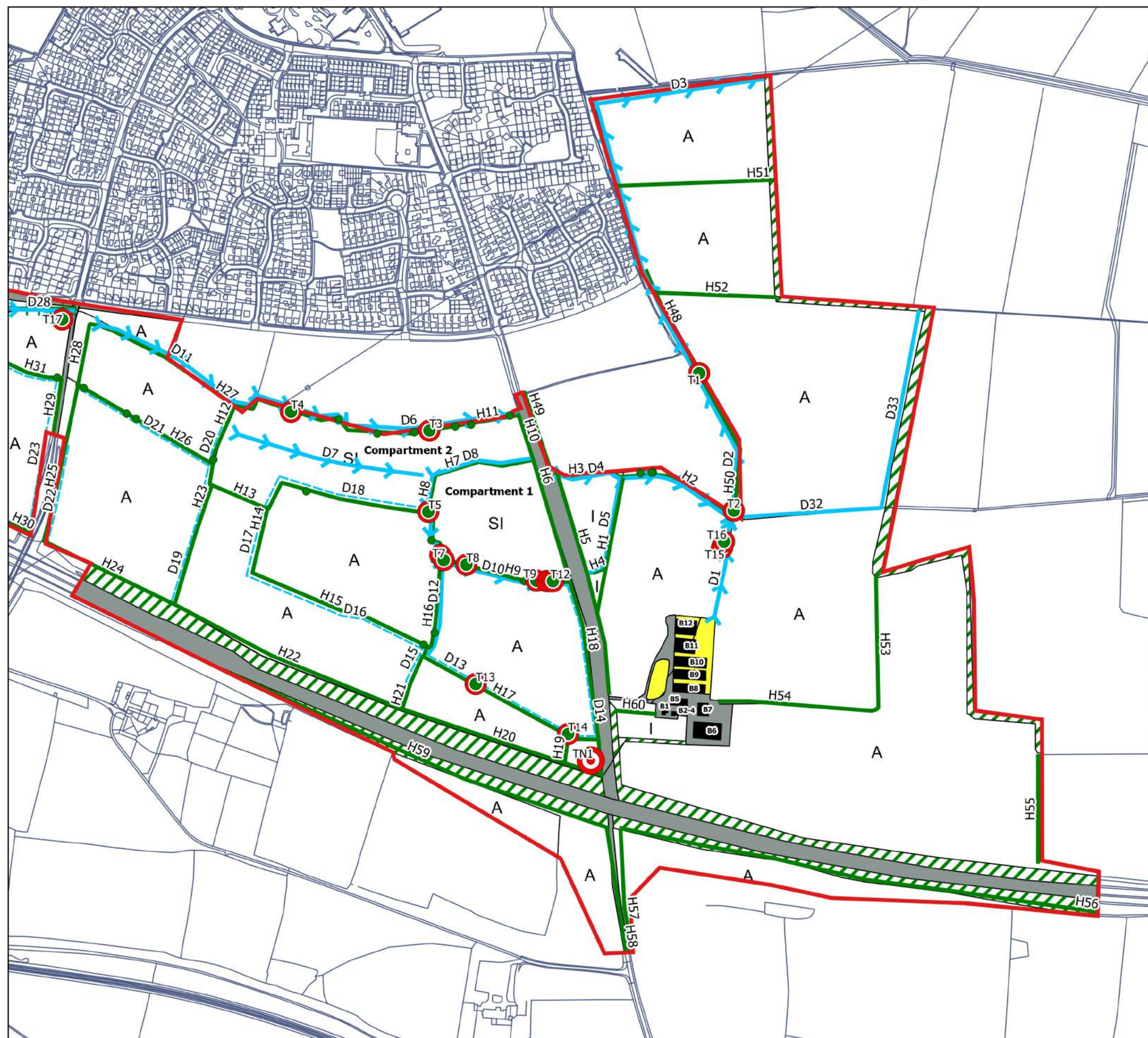
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Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Marsh/marshy grassland
- Standing water
- Scrub - dense/continuous
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Intact hedge - species-poor (with ref)
- Hedge with trees - species-poor (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree





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Key

- Built Environment: Buildings/hardstanding
- Buildings (with ref)
- Broadleaved woodland - plantation
- Scrub - scattered
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Hedgerow (with ref)
- Hedgerow with trees (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree

client
Hallam Land Management Ltd

project
Infinity Garden Village (Wragley Way),
Derby

PHASE 1 HABITAT PLAN

drawing title

scale
1:6,000

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Figure 2b

APPENDIX A – BOTANICAL SPECIES LIST

The DAFOR values used in the report correspond to the following ranges of percentage cover:

Dominant (D)	75-100% cover
Abundant (A)	25-75% cover
Frequent (F)	10-24% cover
Occasional (O)	5-9% cover
Rare (R)	<5% cover or <5 individuals / clumps within the survey unit

These values relate to the abundance of species within a specific stand of vegetation, so if a species is rare it simply occurs rarely within the stand and is not necessarily rare in a wider geographic context.

Semi-natural Broadleaved Woodland

SPECIES	COMMON NAME
<i>Acer campestre</i>	Field Maple
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Cleavers
<i>Geranium robertianum</i>	Herb Robert
<i>Geum urbanum</i>	Wood Avens
<i>Hedera helix</i>	Ivy
<i>Prunus spinosa</i>	Blackthorn
<i>Quercus robur</i>	Pedunculate Oak
<i>Rubus fruticosus</i> agg.	Bramble
<i>Urtica dioica</i>	Nettle

Broadleaved Plantation Woodland

SPECIES	COMMON NAME
<i>Acer campestre</i>	Field Maple
<i>Acer pseudoplatanus</i>	Sycamore
<i>Agrostis</i> sp	Bent sp
<i>Alnus glutinosa</i>	Alder
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Arrhenatherum elatius</i>	False Oat-grass

SPECIES	COMMON NAME
<i>Betula pendula</i>	Silver Birch
<i>Castanea sativa</i>	Horse Chestnut
<i>Corylus avellana</i>	Hazel
<i>Fagus sylvatica</i>	Beech
<i>Fraxinus excelsior</i>	Ash
<i>Hedera helix</i>	Ivy
<i>Quercus robur</i>	Pedunculate Oak
<i>Rubus fruticosus agg.</i>	Bramble
<i>Sorbus aucuparia</i>	Rowan
<i>Tilia x europaea</i>	Lime
<i>Urtica dioica</i>	Nettle

Scrub

SPECIES	COMMON NAME
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Crataegus monogyna</i>	Hawthorn
<i>Dactylis glomerata</i>	Cocks-foot
<i>Festuca rubra</i>	Red Fescue
<i>Fraxinus excelsior</i>	Ash
<i>Galium aparine</i>	Cleavers
<i>Prunus spinosa</i>	Blackthorn
<i>Rubus fruticosus agg.</i>	Bramble
<i>Taraxacum officinale</i>	Dandelion
<i>Urtica dioica</i>	Nettle

Improved Grassland

SPECIES	COMMON NAME
<i>Arrhenatherum elatius</i>	False Oat-grass
<i>Dactylis glomerata</i>	Cocks-foot
<i>Festuca rubra</i>	Red Fescue
<i>Lolium perenne</i>	Perennial Rye-grass
<i>Plantago lanceolata</i>	Ribwort Plantain

SPECIES	COMMON NAME
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Taraxacum officinale</i>	Dandelion

Poor Semi-improved Grassland (Compartment 1)

SPECIES	COMMON NAME	ABUNDANCE
<i>Agrostis capillaris</i>	Common Bent	F
<i>Anthriscus sylvestris</i>	Cow Parsley	O
<i>Arrhenatherum elatius</i>	False Oat-grass	F
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Dactylis glomerata</i>	Cocks-foot	F
<i>Festuca rubra</i>	Red Fescue	O
<i>Galium aparine</i>	Cleavers	LF
<i>Geranium pratense</i>	Meadow Crane's-bill	O
<i>Lolium multiflorum</i>	Italian Rye-grass	F
<i>Phalaris arundinacea</i>	Reed Canary Grass	R
<i>Ranunculus repens</i>	Creeping Buttercup	F
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Senecio jacobaeae</i>	Common Ragwort	O
<i>Stellaria media</i>	Chickweed	LF
<i>Taraxacum officinale</i>	Dandelion	O
<i>Urtica dioica</i>	Common Nettle	O

Poor Semi-improved Grassland (Compartment 2)

SPECIES	COMMON NAME	ABUNDANCE
<i>Agrostis stolonifera</i>	Creeping Bent	F
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Cirsium vulgare</i>	Spear Thistle	R
<i>Cynosurus cristatus</i>	Crested Dog's-tail	F
<i>Dactylis glomerata</i>	Cocks-foot	F
<i>Festuca rubra</i>	Red Fescue	O
<i>Galium aparine</i>	Cleavers	O
<i>Geranium pratense</i>	Meadow Crane's-bill	O
<i>Ranunculus repens</i>	Creeping Buttercup	F

SPECIES	COMMON NAME	ABUNDANCE
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R
<i>Senecio jacobaeae</i>	Common Ragwort	R
<i>Trifolium repens</i>	White Clover	LF

Marsh/Marshy Grassland

SPECIES	COMMON NAME	ABUNDANCE
<i>Cynosurus cristatus</i>	Crested Dog's-tail	F
<i>Festuca rubra</i>	Red Fescue	LF
<i>Geranium pratense</i>	Meadow Crane's-bill	R
<i>Juncus effusus</i>	Soft Rush	D
<i>Lolium perenne</i>	Perennial Rye-grass	O
<i>Plantago lanceolata</i>	Ribwort Plantain	R
<i>Ranunculus repens</i>	Creeping Buttercup	O
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Trifolium repens</i>	White Clover	O

Arable

SPECIES	COMMON NAME	ABUNDANCE
<i>Anthriscus sylvestris</i>	Cow Parsley	LF
<i>Arrhenatherum elatius</i>	False Oat-grass	A
<i>Cirsium vulgare</i>	Spear Thistle	O
<i>Dactylus glomerata</i>	Cock's-foot	F
<i>Festuca rubra</i>	Red Fescue	F
<i>Galium aparine</i>	Cleavers	LF
<i>Geranium molle</i>	Dove's-foot Crane's-bill	LF
<i>Geranium pratense</i>	Meadow Crane's-bill	LF
<i>Glechoma hederacea</i>	Ground Ivy	R
<i>Hedera helix</i>	Ivy	R
<i>Helminthotheca echioides</i>	Bristly Oxtongue	O
<i>Juncus effusus</i>	Soft Rush	R
<i>Lamium purpureum</i>	Red-dead Nettle	O
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Plantago major</i>	Greater Plantain	O

SPECIES	COMMON NAME	ABUNDANCE
<i>Rumex obtusifolius</i>	Broad-leaved Dock	O
<i>Senecio jacobeeae</i>	Common Ragwort	O
<i>Taraxacum officinale</i>	Dandelion	R
<i>Urtica Dioica</i>	Nettle	O
<i>Veronica persica</i>	Common Field Speedwell	R
<i>Vicia sp</i>	Vetch sp	R

Standing Water

SPECIES	COMMON NAME
<i>Apium nodiflorum</i>	Fool's Water-cress
<i>Glyceria fluitans</i>	Floating Sweet-grass
<i>Juncus effusus</i>	Soft Rush
<i>Lemna minor</i>	Common Duckweed

Ditch

SPECIES	COMMON NAME
<i>Apium nodiflorum</i>	Fool's Water-cress
<i>Chamerion angustifolium</i>	Rosebay Willowherb
<i>Impatiens glandulifera</i>	Himalayan Balsam
<i>Lemna minor</i>	Common Duckweed
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Rubus fruticosus agg.</i>	Bramble
<i>Urtica dioica</i>	Common Nettle



Hallam Land Management

Infinity Garden Village (Wragley Way), Derby

BAT REPORT

May 2019

FPCR Environment and Design Ltd

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Figure 2: Phase 1 Habitat Plan

Figure 3: Nocturnal Survey 1: 22nd August 2018

Figure 4: Nocturnal Survey 2: 29th August 2018

Figure 5: Nocturnal Survey 11th September 2018

Figure 6: Transect Route 1 19th September 2016

Figure 7: Transect Route 2 19th September 2016

Figure 8: Transect Route 3 19th September 2016

Figure 9: Transect Route 1 3rd October 2016

Figure 10: Transect Route 2 3rd October 2016

Figure 11: Transect Route 3 3rd October 2016

Figure 12: Transect Survey: 19th June 2017

Figure 13: Transect Survey: 10th July 2017

Figure 14: Transect Survey: 14th September 2017

Figure 15: Bat Transect Plan 24.05.18 (East)

Figure 16: Bat Transect Plan 24.05.18 (West)

Figure 17: Bat Transect Plan 03.07.18 (East)

Figure 18: Bat Transect Plan 03.07.18 (West)

Figure 19: Bat Transect Plan 25.09.18 (East)

Figure 20: Bat Transect Plan 25.09.18 (West)

APPENDIX

Appendix A: Bat Reference Points

1.0 INTRODUCTION

- 1.1 The following report has been prepared by FPCR Environment and Design Ltd on behalf of Hallam Land Management. The report provides the findings of detailed bat survey work undertaken from 2016-2019 on land off Wragley Way in Derby and accompanies the Ecological Appraisal of the site¹.

Site Context

- 1.1 The site, which is 146ha in size, largely comprised arable land with improved grassland and semi-improved grassland also present on-site. Other habitats present comprise semi-natural broadleaved woodland, broadleaved plantation woodland, hedgerows, dense scrub and ruderal vegetation. The A50, a dual carriageway, runs adjacent to the southern boundary of the site.
- 1.2 The site is located on the southern periphery of Derby, with residential development lying to the north of the site with pasture and arable fields present to the south, east and west of the site.

Development Proposals

- 1.3 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

2.0 METHODOLOGY

Desktop Study

- 2.1 A desk study was undertaken for existing ecological data with the following sources consulted:
- Derbyshire Wildlife Trust (DWT)
- 2.2 Further inspection, using colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.
- 2.3 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 5km around the application area for sites of International Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
 - 2km around the application area for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR)).
 - 1km around the application site for sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINC) / Local Wildlife Sites (LWS) and species records (e.g.: protected, Species of Principal Importance as listed on Schedule 41 of the Natural Environment and Rural Communities Act 2006² (NERC) or other notable species).

¹ FPCR 2019 Land off Wragley Way, Derby, Ecological Appraisal

² The Natural Environment and Rural Communities Act 2006. [Online]. Available from: <http://www.legislation.gov.uk/ukpga/2006/16/contents>

Site Survey

- 2.4 The methodology undertaken during the surveys has taken into account the guidance from English Nature (now Natural England³) and guidelines introduced by the Bat Conservation Trust (BCT⁴) and the JNCC⁵.
- 2.5 The above guidelines aim to provide a guide to the amount of required survey effort, which should be proportional to:
- The type and scale of the proposed development and its predicted impacts on bats;
 - The size, nature and complexity of the development site;
 - The likelihood of bats being present or affected;
 - The species and numbers of individuals concerned, and;
 - The type of roost and/or habitat affected.

General Habitat Suitability

- 2.6 This assessment was carried out on 14th and 20th March 2018 prior to any other bat surveys being undertaken on-site. A walkover survey was subsequently undertaken on 26th April 2019 to update the baseline information. The ecologist walked the site and assessed the potential usage of the site by bats, including what species may be present, what habitats were suitable for bats, any potential roosting locations and potential foraging and commuting areas.
- 2.7 Following the initial assessment it was considered that further surveys would be required in order to determine the level of site usage by bats and to inform any mitigation deemed necessary. The below sections detail the additional surveys undertaken.

Ground-based Assessment of Trees

- 2.8 The trees on-site were assessed for their potential to support roosting bats on 14th and 20th March 2018 and on 28th April 2019 by a suitably experienced bat ecologist from FPCR. Tree assessments were undertaken from ground level, with the aid of a torch and binoculars where required.
- 2.9 During the survey, features considered to provide suitable roost sites for bats, such as the following were sought⁶:
- Natural holes (e.g. knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar;
 - Man-made holes (e.g. cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems);
 - Woodpecker holes;
 - Cracks/splits in stems or branches (horizontal and vertical);

³ Mitchell-Jones A. J. (2004) *Bat Mitigation Guidelines* English Nature

⁴ Collins J. (2016) *Bat Surveys for Professional Ecologists – Good Practice Guidelines (3rd Edition)* The Bat Conservation Trust

⁵ Mitchell-Jones, A. J & McLeish A. P. (ed) (2004) *3rd Edition Bat Workers' Manual* JNCC

⁶ Description based on P16, British Standard 8596:2015 Surveying for bats in trees and woodland, October 2015

- Partially detached, loose or bark plates;
 - Cankers (caused by localised bark death) in which cavities have developed;
 - Other hollows or cavities, including butt rots;
 - Compression of forks with included bark, forming potential cavities;
 - Crossing stems or branches with suitable roosting space between;
 - Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk);
 - Bat or bird boxes; and
 - Other suitable places of rest or shelter.
- 2.10 Certain factors such as orientation of the feature, its height from the ground, the direct surroundings and its location in respect to other features may enhance or reduce the potential value.
- 2.11 The trees were then classified into general bat roost potential groups (high, medium, low or negligible) based on the presence of features listed above. Table 1 (below) broadly classifies the potential categories as accurately as possible as well as discussing the relevance of the features. This table is based upon Table 4.1 and Chapter 6 in *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins 2016)⁷.

Table 1: Classification and Survey Requirements for Bats in Trees

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	A Natural England derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence. Works to tree undertaken under supervision in accordance with the approved good practice method statement provided within the licence. However, where confirmed roost site(s) are not affected by works, work under a

⁷ Bat Conservation Trust, 2016. *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd Edition)

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

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Negligible/No potential	Negligible/no habitat features likely to be used by roosting bats	None.

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

Assessment of Buildings

- 2.12 The exterior of the buildings were visually assessed for potential access points and evidence of bat activity. Features such as small gaps under barge/soffit/fascia boards, raised or missing ridge tiles and gaps at gable ends, which have potential as access points/roost sites, were sought and the abundance of these access points was recorded. Evidence that bats actively used potential access points/roost sites includes staining within gaps and bat droppings or urine staining under gaps, a note being made wherever these were present. Indicators that potential access points/roost sites had not recently been used included the presence of cobwebs and general detritus within potential access points. The visual assessment was carried out following periods of dry weather to maximise recording of visible evidence.
- 2.13 The interior of the buildings, including its roof voids, was also visually assessed (if accessible) for evidence of bat activity and/or for the potential to be used by bats. Evidence of a roost was determined as the presence of a dead or live bat(s), concentrated piles or scattered droppings, food remains such as insect wing fragments as well as scratch marks and/or staining. In addition, any basement/cellar areas were also inspected for the above features.

Nocturnal Surveys

- 2.14 In 2018 three nocturnal surveys consisting of two dusk emergence surveys and a dawn re-entry survey were completed on B1 which had been identified with having high bat roosting potential due to previous records of a roost within the building which would potentially be affected by the proposed development. Surveyors were positioned at various aspects of the building from approximately 15 minutes prior to sunset and 90-120 minutes after or 120 minutes prior until sunrise and 15 minutes after sunrise. The number and species of bats observed emerging or entering the tree was recorded.
- 2.15 During the survey, the species and flight path/direction of travel of bats was recorded. Batbox® Ltd Duet bat detectors were utilised in conjunction with Zoom® H1 Handy Recorder mp3 recorders (therein referred to as Duet detectors). Where necessary, bat calls were analysed using the BatSound® Pro (Pettersson Elektronik) and Wildlife Acoustics, Inc. Kaleidoscope® software packages.
- 2.16 All of the nocturnal surveys were conducted in appropriate conditions, i.e. ambient temperature exceeding 10°C and little wind/rain (Table 2).

Table 2: Nocturnal Survey Conditions

Date	Sunset/Sunrise	Wind (0-5)	Temperature at start and end °C	Cloud Cover %	Rain
22.08.18	20:18	2	20-18	100	Light drizzle at start of survey
29.08.18	06:10	0	14-13	100	No rain
11.09.18	19:31	1	15-15	50	No rain

Bat Activity Surveys (Transects)

- 2.17 The primary objective of the activity surveys was to identify key foraging areas, commuting routes and general species utilisation of the site.
- 2.18 Following the Bat Survey Good Practice Guidelines 2016⁸ (Bat Conservation Trust 2016) this site was considered to have low suitability for bats, the guidelines therefore suggest seasonal transects (spring, summer and autumn) should be conducted. A total of five transect routes were undertaken between 2016 and 2018, it should be noted that the survey area occupies an area of much greater extent than that occupied by the site boundary. During the 2018 bat activity surveys there were a total of two transect routes and on each survey occasion two static detectors were deployed (one per transect route). The static detectors were left out for a minimum of five nights with the detectors being placed in different locations on each survey occasion.
- 2.19 The transect routes were predetermined prior to survey in order to comprehensively cover all areas of the site and the 2018 surveys included point count stops, each point count being 5 minutes in duration, during which time all bat activity was recorded. The point counts were strategically located throughout the site to ensure a comprehensive coverage of habitats present and to assess any potential habitat losses which would result from the proposed development.
- 2.20 Dusk transects commenced at sunset and continued for between 2-3 hours. Each transect was walked at a steady pace and when a bat passed, the species, time and behaviour recorded on a site plan. This information provides a general view of the bat activity present onsite and identifies any key foraging and commuting routes.
- 2.21 All transects were undertaken when conditions were suitable, i.e. when the ambient air temperature exceeded 10°C at sunset and there was little wind and no rain. Full conditions and timings are listed in Table 2 below. Echo Meter Touch® bat detectors were utilised in conjunction with the Echo Meter Touch® app and Apple Inc. iPad®. Bat calls from the 2018 surveys were analysed using Kaleidoscope 5.0.3 whilst the previous surveys were analysed using AnalookW© (Chris Corben) software package by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. Analysis was undertaken by suitably experienced and/or licensed bat ecologists from FPCR. From this, the level of bat activity across the site, in relation to the abundance of individual species foraging and commuting along habitats, were assessed.

Table 3: Nocturnal Survey Timings and Weather Conditions

⁸ Bat Conservation Trust, 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)

Survey Ref/ Date	Start Time	Sunset/ Sunrise Time	Finish Time	Weather Conditions (temp °C; cloud cover %; wind; and rain)
Transect 1 i 19 th September 2016	19:11	19:11	21:22	15°C (start) & 15°C (end); no rain; 80% cloud cover, light air (Beaufort Scale 1).
Transect 2 i 3 rd October 2016	18:37	18:37	20:37	14°C (start) & 12°C (end), no rain, 15% cloud cover, light air (Beaufort Scale 1).
Transect 3 i 19 th June 2017	21:34	21:34	23:49	27°C (start) & 23°C (end); no rain; 40% cloud cover and light air (Beaufort Scale 1)
Transect 4 i 10 th July 2017	21:29	21:29	23:30	16°C (start) & 15°C (finish), no rain, 40% cloud cover and light air (Beaufort Scale 1)
Transect 5 i 14 th September 2017	19:23	19:23	21:23	12°C (start) & 11°C (finish); no rain, 40% cloud cover and light air (Beaufort Scale 1)
Transect 6 i 24 th May 2018	21:11	21:11	23:12	40% cloud cover, light breeze and no rain. 15°C.
Transect 7 i 3 rd July 2018	21:31	21:31	23:32	5% cloud cover, light breeze and no rain. 18°C.
Transect 8 i 25 th September 2018	18:58	18:58	21:17	15% cloud cover, light breeze and no rain. 14°C.

Static Bat Detector Survey

- 2.22 Passive monitoring was undertaken using an automated logging system (Song Meter© SM4BAT FS detector (SM4BAT detector)) with its output saved to an internal storage device. Surveys were undertaken across the same periods as activity surveys, i.e. three seasonal surveys from May to September in 2018, by experienced bat ecologists from FPCR. Commensurate with guidance, units were placed on site during suitable conditions for a minimum of 5 nights (Table 3).
- 2.23 Detectors were programmed to activate 30 minutes before dusk and recorded continuously until 30 minutes following sunrise. The output from this detector was subjected to computer analysis using the Kaleidoscope 5.0.3 software package for the 2018 surveys with the previous surveys analysed using AnalookW© (Chris Corben) software package and/or BatSound® Pro (Pettersson Elektronik) software. To aid in the accurate comparison of survey activity, data has only been included from the first 5 nights of recording during each full occasion in accordance with current BCT guidelines (2016). Any additional data recorded has however been analysed for the presence of any notable species or activity to ensure their presence on site has not been overlooked. This information was used to supplement transect survey data and derive an index of activity and species composition at different points within the site.

Table 4: Static Detector Survey Dates and Locations

Survey Occasion	Periods Recorded	Area Covered
Spring	24 th – 29 th May 2018	One static positioned where hedgerow H34 intersects with hedgerows H33 and H35 and one static placed in hedgerow H22 (Figures 3a and 3b).
Summer	3 rd – 8 th July 2018	One static positioned along the fence line lying adjacent to the access road to Stenson Hill farm in the west of the site and one static placed in the in hedgerow H51 on the eastern boundary of the site (Figures 3c and 3d).
Autumn	21 st – 26 th September 2018	One static positioned on the western edge of hedgerow H36 and one static placed in the central section of hedgerow H17 (Figure 3e and 3f).

Constraints

- 2.24 The analysis of the SM4BAT files recorded can highlight the presence of more than one bat if they are recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximity for an extended period. Therefore, each sound file is counted as a single bat registration. The number of bat registrations does however reflect the relative importance of the location of the detector by calculating the bat registrations per hour. The static detectors record in full spectrum, the data is then transformed and analysed using zero-crossing analysis (Kaleidoscope 5.0.3).
- 2.25 The above is true for the transect surveys unless the surveyors have specifically recorded one or multiple bats continuously foraging/commuting along the same feature without the bat(s) disappearing from view
- 2.26 Due to the variable properties of bat echolocation calls (with static units) and the properties of zero-crossed frequency division recordings, it is not always possible to identify a series of echolocation calls down to species level. In the majority of cases it was possible to identify to genus level which was suitable to allow potential affects to be assessed and appropriate mitigation designed.
- 2.27 Where calls could not be identified to species level, for example due to the lower quality of those recordings or where there are similarities between species echolocation calls (particularly for *Myotis* and *Nyctalus* genus bats) making a definite identification difficult, a likely species identification is provided. This is based on the features displayed by the calls when analysed using the AnalookW data analysis software package and taking in to account the geographical location of the site and the habitats present. It was therefore considered that:
- *Pipistrellus* species bats were either common *pipistrellus* or soprano *pygmaeus*;
 - *Nyctalus* species bats were either noctule or Leisler's *Nyctalus leisleri* bats;
 - *Plecotus* species bats were likely brown long-eared;

- *Myotis* species bats were likely whiskered / Brandt's *Myotis mystacinus* / *brandtii* and Daubenton's *daubentonii* bats / Natterer's *nattereri*.

2.28 Nevertheless, it is considered that the overall dataset obtained is representative of the level of bat activity within the application site. It is unlikely that the above constraints have resulted in a significant detrimental impact on the quality of the data and will have minimal effect on the subsequent conclusions and recommendations provided within the ecological assessment. Therefore, it is considered that the data collected is sufficient to inform the application and its potential impacts upon bats.

3.0 RESULTS

Desktop Study

- 3.1 No statutory or non-statutory sites of nature conservation are present within 2km of the site that are specifically designated for bats.
- 3.2 No records of bats were identified within the site boundary, however, there were a number of previous records for bat roosts and flying bats within 1km of the site boundary. A summary of these are provided in Table 4 with their locations shown on Figure 1.

Table 5: Notable and Protected Species Recorded within 1km of the Site Boundary

Name	Designation	Location
Common pipistrelle <i>Pipistrellus pipistrellus</i>	W&CA, NERC	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 340m south of the site boundary (2011). No records of roosts were returned.
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	W&CA, NERC, LBAP	Numerous records of foraging and commuting common pipistrelles were returned within 1km of the site boundary, the nearest of which is approximately 550m south-west of the site boundary (2012). One record of a small roost was returned approximately 760m north-east of the site boundary (2013).
Unidentified Pipistrelle Bat <i>Pipistrellus</i> sp	W&CA, NERC	Two records were returned within 1km of the site, the nearest of which was approximately 980m south-west of the site boundary.
Brown Long-eared Bat <i>Plecotus auritus</i>	NERC, W&CA, LBAP	Several records of brown long-eared droppings were returned within 1km of the site boundary, the nearest of which was approximately 550m south-west of the site boundary (2012).
Unidentified <i>Myotis</i> sp.	NERC, W&CA, LBAP	Two records were returned located approximately 420m and 750m south-west of the site boundary (2015). No details about these records were provided.
Whiskered Bat <i>Myotis mystacinus</i>	W&CA, NERC	A single record was returned approximately 1km north of the site boundary (2010).
Whiskered Bat <i>Myotis mystacinus</i> / Brandt's Bat <i>Myotis brandtii</i>	W&CA, NERC	A record of a roost was returned from the main farmhouse of Ashlea Farm located approximately 40m east of the site boundary (2005).

Key LBAP = Local Biodiversity Action Plan. NERC = Natural Environment and Rural Communities Act 2006, W&CA = Wildlife and Countryside Act 1981.

Site Survey

General Site Suitability

- 3.3 The open areas of the arable fields, poor semi-improved grassland and improved grassland were considered to offer few opportunities for foraging and commuting bats with more suitable habitat provided by the woodland, hedgerows, mature trees, ponds and ditches.
- 3.4 Connectivity between the site and surrounding area was strongest to the east and west of the site where a network of hedgerows offer commuting and foraging corridors off-site.

Ground-based Assessment of Trees

- 3.5 Thirty-five trees considered to offer bat roosting potential were identified on-site which were all located within the broadleaved plantation woodland. Details of these trees are provided in Table 5 below and the locations are presented in Figure 2.

Table 6: Trees with Bat Potential

Tree ref	Species	Feature(s)	Category
T1	Crack Willow <i>Salix fragilis</i>	1 x south-west facing knot hole approx. 1.5m high South-east facing broken branches approx. 1-2m high Multiple west-facing broken branches approx. 3-4m high	Moderate
T2	Crack Willow <i>Salix fragilis</i>	1 x west facing vertical split approx. 2m high	Moderate
T3	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split on a south-facing branch approx. 2.5m high	Low
T4	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split on south-east facing branch approx. 2m high	Moderate
T5	Crack Willow <i>Salix fragilis</i>	1 x west-facing rot hole approx. 3m high	Moderate
T6	Crack Willow <i>Salix fragilis</i>	Vertical split in stem approx. 2-3m high	Moderate
T7	Crack Willow <i>Salix fragilis</i>	1 x south-facing vertical split approx. 1m high	Low
T8	Crack Willow <i>Salix fragilis</i>	1 x south-facing knot hole approx. 1.5m high	Low
T9	Crack Willow <i>Salix fragilis</i>	1 x south-facing rot hole approx. 2m high	Moderate

Tree ref	Species	Feature(s)	Category
T10-T12	Crack Willow <i>Salix fragilis</i>	Large vertical cracks to the main stems as a consequence of storm damage	Moderate
T13	Pedunculate Oak <i>Quercus Robur</i>	1 x west-facing knot hole located approximately 1.5m high	Moderate
T14	Crack Willow <i>Salix fragilis</i>	1 x west-facing knot hole approx. 5m high 1 x west facing horizontal split approx. 5m high 1 x branch split approx. 6m high 3 x broken branches approx. 5-6m high	Moderate
T15	Crack Willow <i>Salix fragilis</i>	1 x west-facing rot hole approx. 1.5m high Multiple west-facing split branches approx. 4m high Multiple patches of loose bark	Moderate
T16	Crack Willow <i>Salix fragilis</i>	1 x north-east facing branch split approx. 5m high Multiple patches of loose bark	Moderate
T17	Pedunculate Oak <i>Quercus Robur</i>	1 x south-west facing knot hole approx. 3m high	Low
T18	Pedunculate Oak <i>Quercus Robur</i>	1 x north-west facing branch split approx. 5m high	Moderate
T19	Crack Willow <i>Salix fragilis</i>	1 x east-facing vertical split in main stem approx. 1m high	Moderate
T20	Pedunculate Oak <i>Quercus Robur</i>	1 x south-facing branch split approx. 7m high	Moderate
T21	Crack Willow <i>Salix fragilis</i>	1 x north-facing branch tear-out approx. 2m high	Moderate

Tree ref	Species	Feature(s)	Category
T22	Ash <i>Fraxinus excelsior</i>	1 x north-facing rot hole approx. 2m high	Moderate
T23	Crack Willow <i>Salix fragilis</i>	1 x east-facing branch split approx. 5m high	Low
T24	Pedunculate Oak <i>Quercus Robur</i>	1 x east-facing branch split approx. 6m high	Moderate
T25	Ash <i>Fraxinus excelsior</i>	6 x north-facing knot holes between 2-6m high	Moderate
T26	Ash <i>Fraxinus excelsior</i>	1 x north-facing branch tear out approx. 5m high	Moderate
T27	Beech <i>Fagus sylvatica</i>	1 x east-facing rot hole approx. 1.5m high 1 x south-facing vertical split in the main stem approx. 4m high	Low
T28	Pedunculate Oak <i>Quercus Robur</i>	1 x horizontal split along an east-facing branch approx. 6m high 1 x south-east facing rot hole 3.5m high	Moderate
T29	Pedunculate Oak <i>Quercus Robur</i>	1 x north-facing knot hole approx. 1.5m high 1 x north-facing knot hole approx. 4.5m high 1 x south-east facing knot hole approx. 2.5m high	Moderate
T30	Pedunculate Oak <i>Quercus Robur</i>	1 x south-facing rot hole approx. 1.5m high 1 x south-facing vertical branch split approx. 2.5m high 1 x north-facing cavity at the base of two branches approx. 4m high	Moderate
T31	Pedunculate Oak <i>Quercus Robur</i>	1 x vertical split in the main stem from ground level to approx. 3m high	Moderate
T32	Pedunculate Oak <i>Quercus Robur</i>	1 x north-west facing knot hole approx. 2.5m high	Moderate

Tree ref	Species	Feature(s)	Category
T33	Pedunculate Oak <i>Quercus Robur</i>	Multiple east-facing knot holes	Moderate
T34	Ash <i>Fraxinus excelsior</i>	Small areas of south-easting loose bark	Low
T35	Ash <i>Fraxinus excelsior</i>	1 x west-facing branch split approx. 4m high	Moderate

Building Assessment

- 3.6 Building B1 Ashlea Farm was a two-storey brick-built farm building with a clay tile pitched roof. A soffit box was present around the whole of the building which was in good condition and well-sealed. Potential access points included slipped tiles, small gaps under the flashing on the west aspect and small gaps under the flashing on the three chimneys.
- 3.7 A roof void was present in the form of a loft void, it had wooden beams and had recently been lined with bitumen felt. No gaps were recorded within the roof void and there was evidence of the cavity wall having been recently filled in. No evidence of bats was found and was found to have low potential to support roosting bats.
- 3.8 Building B2 was a set of three farm storage buildings made from breeze block with two sections of the building being two storey and one section being one storey, the roof was composed of metal corrugated sheeting. Potential access points included gaps under the flashing and fascia on the east aspect with ventilation gaps on the ridge section of the roof. Many of the windows were broken and one section of the building was open and exposed. The inside of the building comprised steel and wooden support beams.
- 3.9 No roof void was present as the loft had been converted and incorporated into the second storey and as such was well lit. No evidence of bats was recorded and was found to have negligible potential to support roosting bats.
- 3.10 Building B3 was a single storey breeze block farm storage building with corrugated sheet roofing. Potential access points were in ventilation gaps in the ridge of the metal sheeting and where areas of cement between the bricks had come away.
- 3.11 No roof void was present and no evidence of roosting bats was recorded. The building had negligible potential to support roosting bats.
- 3.12 Building B4 was a single storey grain store composed of breeze block and metal corrugated sheet roofing, the building was open and exposed. No roof void was present and no evidence of roosting bats was recorded. The building had negligible potential to support roosting bats.
- 3.13 Building B5 was a large hay barn which was open sided with steel support pillars and a corrugated metal sheet roof. No roof void or cavities were present and the building provided negligible potential to support roosting bats.
- 3.14 Building B6-B11 were single storey wooden chicken sheds with metal corrugated sheet roofs. There were numerous access points in the form of doors, roof shafts and wall vents. Internally the sheds were dark but with no roof voids or cavities. No evidence of bats was recorded and the buildings were considered to have negligible potential to support roosting bats.

- 3.15 Building B12 was a port-a-cabin with a flat roof. No access points or roof void were recorded. The building was considered to provide negligible potential to support roosting bats.

Nocturnal Surveys

- 3.16 Following the completion of the above assessment, only one building provided potential to support roosting bats. Nocturnal surveys were conducted on B1 which was considered to have low potential at the time of survey. Three surveys were undertaken however as past records indicated a bat roost within B1, a dusk survey was undertaken on 22nd August, a dawn survey on the 29th August and another dusk survey on 11th September.

Survey 1: 22nd August 2018 (Figure 3)

- 3.17 During the dusk emergence survey no bats were observed emerging from the building. A number of bats were recorded foraging or commuting within the vicinity of the building which consisted of noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*.
- 3.18 The first bat recorded was a commuting noctule at 20:32 followed by a feeding noctule at 20:36, the last bat recorded before the end of the survey was a commuting soprano pipistrelle at 21:47.
- 3.19 Although light drizzle was recorded throughout the survey it was intermittent and bat activity was still recorded, it is therefore considered that the weather conditions do not pose a constraint to the validity of the data recorded.

Survey 2: 29th August 2018 (Figure 4)

- 3.20 During the dawn re-entrance no bats were observed entering the building during the survey. Only one bat was recorded which comprised a commuting common pipistrelle at 05:26.

Survey 3: 11th September 2018 (Figure 5)

- 3.21 During the dusk emergence survey no bats were observed emerging from the building. A number of common pipistrelle were recorded as commuting or foraging within the vicinity of the building.
- 3.22 The first bat contact was a foraging common pipistrelle at 19:48, the last contact before the survey ended was a commuting common pipistrelle at 20:52.

Bat Activity Surveys (Transects)

19th September 2016 (Figures 6-8, See Appendix A for Bat reference points)

Route 1

- 3.23 The survey started at 19:11 and ended at 21:22. Over 30 contacts were recorded, most were non-visual.
- 3.24 The first contact was a commuting common pipistrelle (seen not heard) at 19:28 recorded along arable margin off-site (west of Arleston Lane). Activity was focused along two arable boundaries perpendicular to Deep Dale Lane (north-west of Ashlea Farm buildings) and at the centre of the route. Bats were recorded here from 19:57 to 20:21 and comprise over 23 contacts; the majority

(over 21 contacts) were from common pipistrelle and soprano pipistrelles and one *Myotis sp.* Three non-visual brown long-eared contacts were also noted within this time span on a perpendicular hedge line to the south.

- 3.25 A further three contacts were recorded on boundary features to the south (east and west of Deep Dale Lane) and at the end of the transect (on Deep Dale Lane), all common pipistrelle bats.

Route 2

- 3.26 The survey started at 19:08 and ended at 21:58. 17 contacts were recorded, all non-visual and one social call was heard.
- 3.27 The first bat contact, a soprano pipistrelle came at 19:46 and comprised two passes along hedgerow. A fairly even spread of bat contacts from both common and soprano pipistrelles was recorded throughout the transect. The last contact within the site was a soprano pipistrelle social call at 21:13 along hedgerow of Sinfin Moor Lane. The final contacts were recorded off-site, also along Sinfin Moor Lane and comprised soprano pipistrelle foraging and common pipistrelle commuting at 21:58.

Route 3

- 3.28 The survey started at 19:11 and ended at 21:13. A total of seven contacts were recorded, all non-visual.
- 3.29 The first contact at 19:56 was a soprano pipistrelle that made five passes along hedgerow adjacent the A50. The remaining contacts were from common pipistrelle recorded at boundary features including habitat adjacent Deep Dale Lane where the last contact was recorded at 21:09.

3rd October 2016 (Figures 9-11. See Appendix A for Bat reference points)

Route 1

- 3.30 The survey started at 18:37 and ended at 20:37. 17 contacts were recorded, all were non-visual and the majority were from common pipistrelles.
- 3.31 The first contact was a common pipistrelle recorded commuting along hedgerow west of Lea Farm buildings at 19:28. A second common pipistrelle was recorded commuting along a parallel hedgerow at 19:33. Further contacts mostly from foraging common and soprano pipistrelle were recorded at boundary features to the north-west of Lea Farm buildings. No bats were recorded south of the A50. The final contact was recorded at 20:25 comprising a common pipistrelle pass along hedgerow adjacent Deep Dale Lane.

Route 2

- 3.32 The survey started at 18:37 and ended at 20:37. A total of 47 contacts were recorded, the majority were non-visual contacts from common and soprano pipistrelles.
- 3.33 The first two contacts were at 19:13 from a soprano pipistrelle foraging along a ditch/hedgerow. Fairly high levels of bat activity were recorded throughout the transect from boundary hedgerows and most activity was along Sinfin Moor Lane between 20:19 and 20:36 (last contact). In this time three *Myotis* passes were recorded and fairly continuous foraging from common and soprano pipistrelles.

Route 3

- 3.34 The survey started at 18:37 and ended at 20:38. A total of 19 contacts were recorded, most were non-visual and from soprano and common pipistrelles. A small number of *Myotis* contacts were noted.
- 3.35 The first contact was at 19:14 comprising a soprano pipistrelle foraging along a ditch/defunct hedge. Further activity was largely from commuting common and soprano pipistrelles recorded at boundary features. Additionally an unidentified *Myotis* bat was recorded commuting at 19:46 along a boundary hedge perpendicular to the A50 and a further four *Myotis* contacts (passes) were recorded at 20:04 along a hedge/ditch centrally within the site. A brown long-eared bat was recorded commuting at 20:05 along the same hedge/ditch feature. The final contact was a commuting common pipistrelle at 20:34 adjacent Deep Dale Lane.

19th June 2017 (Figure 12, See Appendix A for Bat reference points)

Route 1

- 3.36 A total of 25 contacts were recorded comprising 19 common pipistrelle, 5 soprano pipistrelle and one noctule bat. The first contact was a common pipistrelle at 21:55 (21 minutes after sunset).

Route 2

- 3.37 A total of 32 contacts were recorded comprising; 23 common pipistrelle, six soprano pipistrelle, two unidentified pipistrelle species and an unidentified *Nyctalus* species. The first contact was at 22:16 (42 minutes after sunset) and comprised a soprano pipistrelle.

Route 3

- 3.38 A total of 22 contacts were recorded comprising; 10 common pipistrelle, six soprano pipistrelle, five noctule and one unidentified *Nyctalus* species. The first contact was at 22:17 (43 minutes after sunset) and comprised a passing common pipistrelle.

10th July 2017 (Figure 13, See Appendix A for Bat reference points)

Route 2

- 3.39 A total of 21 contacts were recorded comprising; 14 common pipistrelle, four soprano pipistrelle and three unidentified *Myotis* species. The first contact was at 22:15 (46 minutes after sunset) and comprised a foraging common pipistrelle.

Route 3

- 3.40 A total of 14 contacts were recorded comprising; seven common pipistrelle, five soprano pipistrelle, one unidentified pipistrelle species and one unidentified *Myotis* species. The first contact was at 22:03 (34 minutes after sunset) and comprised a foraging soprano pipistrelle.

14th September 2017 (Figure 14, See Appendix A for Bat reference points)

Route 1

- 3.41 A total of four contacts were recorded comprising; one common pipistrelle, two soprano pipistrelle and one brown long-eared bat *Plecotus auritus*. The first contact was at 20:20 (57 minutes after sunset) and comprised a foraging soprano pipistrelle.

Route 2

- 3.42 A total of 13 contacts were recorded comprising eight common pipistrelle and five soprano pipistrelle. The first contact was at 19:55 (32 minutes after sunset) and comprised a foraging soprano pipistrelle.

Route 3

- 3.43 A total of eight contacts were recorded comprising; five common pipistrelle, two soprano pipistrelle and an unidentified *Myotis* species. The first contact was recorded at 19:40 (17 minutes after sunset) and comprised a passing common pipistrelle.

24th May 2018 (Figures 15- 16)

- 3.44 A combined total of 44 bat contacts were recorded during both transect routes, of which 26 were common pipistrelle *Pipistrellus pipistrellus*, 10 were soprano pipistrelles *Pipistrellus pygmaeus*, three were unidentified *Pipistrellus sp* bats, three were unidentified *Myotis sp* bats and two were noctules *Nyctalus noctula*.
- 3.45 The first bat contact during this survey occurred at 21:12 and comprised a commuting *Pipistrellus sp* bat with a single pass, this bat was not visually observed but was recorded close to the south-eastern edge of hedgerow H38. The majority of bat activity was focused along the hedgerow corridor in the central section of the site comprising hedgerows H11, H26, H31, H32 and H36 with the area of semi-natural woodland located within this corridor. Activity here comprised commuting and foraging common pipistrelles and soprano pipistrelle. Bat activity was relatively low elsewhere around the site with commuting and foraging common pipistrelles, soprano pipistrelles, unidentified *Pipistrellus sp* bats, noctules and *Myotis sp* bats

3rd July 2018 (Figures 17-18)

- 3.46 A combined total of 40 bat contacts were recorded during both transect routes, of which 32 were common pipistrelles, five were soprano pipistrelles, two were noctules and one was an unidentified *Nyctalus* species bat.
- 3.47 The first bat contact occurred at 22:02 and comprised a commuting noctule with a single pass, however this bat was not visually observed but was recorded on the western edge of the semi-natural woodland in the central section of the site. Areas of higher bat activity comprised the hedgerow corridor consisting of hedgerows H11, H26 and H49 and also in the western section of the site along hedgerows H38, H39, H40 and H43. The majority of activity here comprised commuting and foraging common pipistrelle with soprano pipistrelles and a noctule also recorded exhibiting commuting and foraging behaviour. No activity was recorded in the south-eastern section of the site.

25th September 2018 (Figures 19-20)

- 3.48 A combined total of 64 bat contacts were recorded during both transect routes, of which 29 were common pipistrelles, 16 were soprano pipistrelles, 11 were *Myotis sp* bats, four were unidentified *Pipistrellus sp* bats, one was a noctule, one was an unidentified *Nyctalus* species bat, one was a brown long-eared bat *Plecotus auritus* and one was an unidentified bat.
- 3.49 The first bat contact occurred at 19:25 and comprised a noctule which was recorded in the south-western corner of the site during the first point count commuting with a single pass, however this bat was not visually observed. Areas of higher bat activity were located along hedgerows H39

and H40 in the western section of the site and along hedgerows H45 and H46 along the southern boundary of the central section of the site. Activity here comprised commuting and foraging common pipistrelles, soprano pipistrelles and *Myotis sp* bats.

Static Detector Surveys

Static Detector Location 1: 24th – 29th May 2018 (Figure 15)

- 3.50 This static was placed within hedgerow H8 in the eastern section of the site. A total of 433 bat registrations were recorded during this survey, of which 328 were common pipistrelles, 52 were soprano pipistrelles, 20 were noctules, 16 were unidentified *Myotis sp* bats, 11 were unidentified *Nyctalus sp* bats and six were unidentified *Pipistrellus sp* bats.
- 3.51 Common pipistrelle formed the vast majority of all bat registrations accounting for approximately 75.8% of all bat activity. This species was recorded throughout each night of the survey period with activity remaining fairly constant throughout the night with slightly elevated activity occurring between 03:00 and 04:00 when approximately 23.8% of all common pipistrelle activity took place.

Static Detector Location 2: 24th – 29th May 2018 (Figure 16)

- 3.52 This static was placed at the intersection between hedgerows H33, H34 and H35 in the western section of the site. A total of 1848 bat registrations were recorded during this survey, of which 1265 were common pipistrelles, 526 were soprano pipistrelles, 20 were unidentified *Myotis sp* bats, 19 were noctules, four were unidentified *Pipistrellus sp* bats and one was a brown long-eared bat.
- 3.53 Common pipistrelle formed the vast majority of all bat registrations accounting for approximately 68.5% of all bat activity. This species was recorded throughout each night of the survey period with activity remaining fairly constant throughout the night with lower levels of activity occurring between 21:00 and 22:00. Soprano pipistrelle were recorded on every night of the survey period with peak activity occurring between 22:00 and 23:00 during which 48.3% of all soprano pipistrelle activity took place.

Static Detector Location 3: 3rd – 8th July 2018 (Figure 17)

- 3.54 This static was placed near the southern edge of hedgerow H51 on the eastern boundary of the site. A total of 1550 bat registrations were recorded during this survey, of which 1043 were common pipistrelles, 215 were soprano pipistrelles, 129 were unidentified *Nyctalus sp* bats, 86 were noctules, 61 were unidentified *Pipistrellus sp* bats, 12 were unidentified *Myotis sp* bats, two were brown long-eared bats and two were unidentified bats.
- 3.55 Common pipistrelle formed the vast majority of all bat registrations accounting for approximately 67.3% of all bat activity. This species was recorded throughout each night of the survey period with peak activity generally occurring between 22:00 and 23:00 when approximately 66.4% of all common pipistrelle activity took place. Soprano pipistrelle were recorded on every night of the survey period with peak activity also occurring between 22:00 and 23:00 during which 68.8% of all soprano pipistrelle activity took place. Noctule activity occurred during every night of the survey period except for the first night, peak activity again occurred between 22:00 and 23:00 when approximately 84.9% of all noctule activity took place.

Static Detector Location 4: 3rd ÷ 8th July 2018 (Figure 18)

- 3.56 This static was placed on a fenceline which lies adjacent to the road which leads to Stenson farm in the west of the site. A total of 423 bat registrations were recorded during this survey, of which 235 were common pipistrelles, 91 were noctules, 53 were soprano pipistrelles, 33 were unidentified *Nyctalus sp* bats, nine were unidentified *Myotis sp* bats, one was a brown long-eared bat and one was an unidentified *Pipistrellus sp* bat.
- 3.57 Common pipistrelle formed the majority of all bat registrations accounting for approximately 55.6% of all bat activity. This species was recorded throughout each night of the survey period with activity remaining fairly constant throughout the night with slightly elevated levels of activity occurring between 22:00 and 23:00 when approximately 33.6% of all common pipistrelle activity took place. Noctules were recorded on every night of the survey period with peak activity also occurring between 22:00 and 23:00 during which 58.2% of all noctule activity took place.

Static Detector Location 5: 21st ÷ 26th September 2018 (Figure 19)

- 3.58 This static was placed in the central section of hedgerow H17 in the south-east of the site. A total of 94 bat registrations were recorded during this survey, of which 30 were common pipistrelles, 30 were soprano pipistrelles, 22 were unidentified *Myotis sp* bats, five were unidentified *Nyctalus sp* bats, four were brown long-eared bats, two were noctules and one was a *Nathusius* pipistrelle.
- 3.59 Common pipistrelle and soprano pipistrelle were recorded in equal numbers accounting for 63.8% of all bat activity between them. Both species were recorded on every night of the survey period with no periods of peak activity identified.

Static Detector Location 6: 21st ÷ 26th September 2018 (Figure 20)

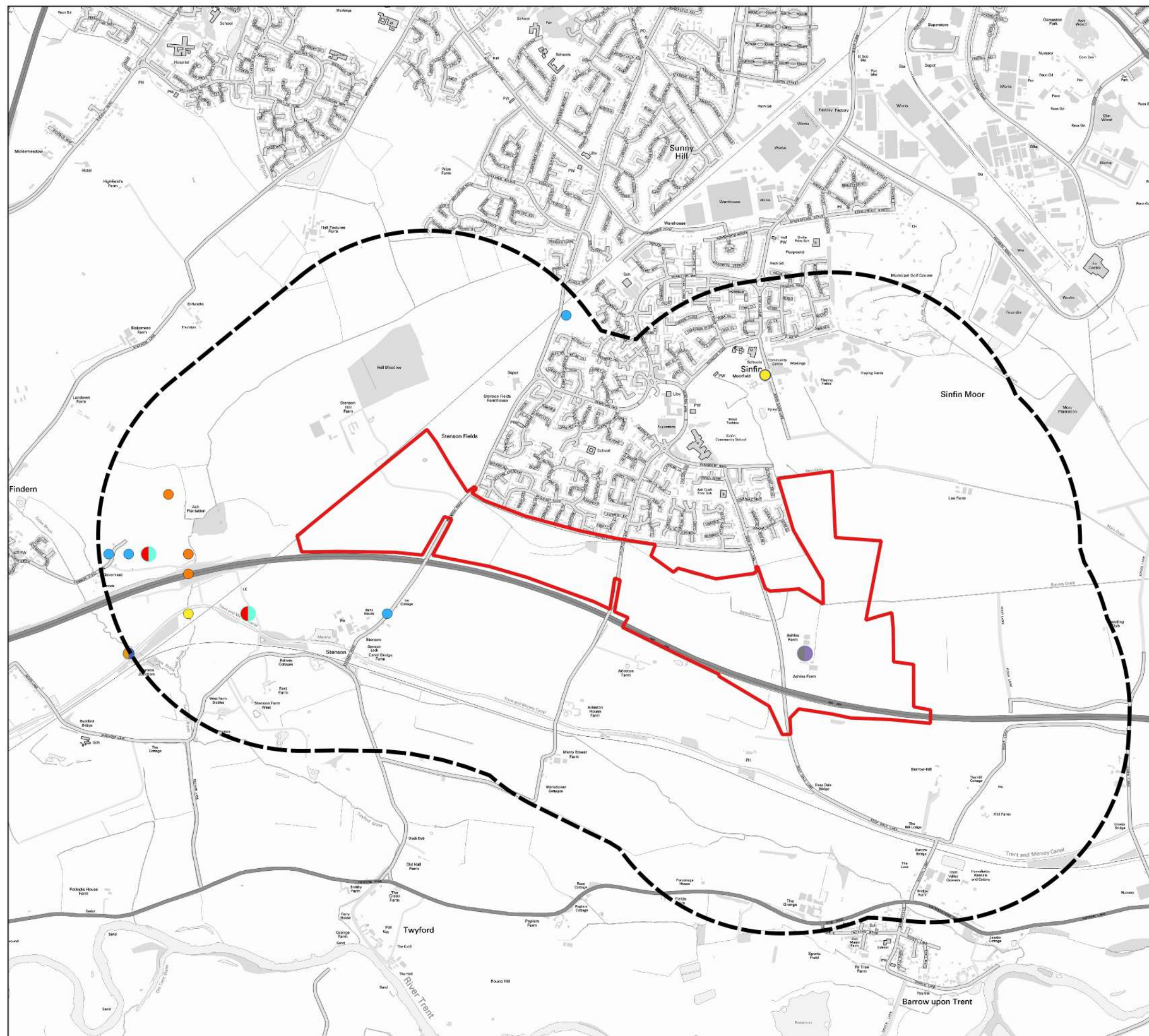
- 3.60 This static was placed on the western periphery of hedgerow H36 in the western section of the site. A total of 1494 bat registrations were recorded during this survey, of which 688 were common pipistrelles, 610 were soprano pipistrelles, 166 were unidentified *Myotis sp* bats, 117 were unidentified *Nyctalus sp* bats, five were brown long-eared bats, four were unidentified *Pipistrellus sp* bats, three were noctules and one was an unidentified bat.
- 3.61 Common pipistrelle and soprano pipistrelle formed the majority of bat activity accounting for 46.1% and 40.8% of all bat activity respectively. Both species were recorded during every night of the survey period with peak activity for common pipistrelle occurring between 02:00 and 04:00 when approximately 41% of all common pipistrelles activity took place. No periods of peak activity were identified for soprano pipistrelle. Unidentified *Myotis sp* bats were recorded during every night of the survey period with no peak periods of activity identified although a lull in activity generally occurred between 23:00 and 02:00.

4.0 DISCUSSION & RECOMMENDATIONS

- 4.1 All bat species and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended). In summary these make it an offence to damage, destroy or obstruct any place used by bats for breeding and shelter, disturb a bat, or kill, injure or take a bat.

- 4.2 A whiskered/Brandt's roost has previously been recorded within a building at Ashlea Farm (within the site) as highlighted by data returned from DWT. No further data on this roost is currently available. There are no additional records of bats on-site but there are records of bats within 1km of the site boundary including common pipistrelle, soprano pipistrelle, brown long-eared bats and unidentified *Myotis* sp. bats.
- 4.3 During the transect and static detector surveys undertaken in 2016-2018 mainly common and widespread bat species were recorded including common pipistrelles, soprano pipistrelles, noctules, brown long-eared bats, unidentified *Myotis* sp bats and unidentified *Nyctalus* sp bats. The static detector surveys highlighted the hedgerow corridors in the central section of the site (static locations 2 and 6) which connect to the small area of semi-natural broadleaved woodland suggesting this hedgerow network acts as an important commuting and foraging resource for the local bat population. The spring 2018 bat transect surveys also highlighted this area of the site as an area of increased bat activity. The static detector located on the eastern boundary of the site (static location 3) also recorded higher levels of bat activity indicating that this hedgerow corridor is an important commuting and foraging resource for the local bat population. These hedgerow networks are to be retained as part of the proposals.
- 4.4 The only notable bat species recorded during the surveys was the single registration recorded of a single Nathusius's pipistrelle in the September static detector survey (static detector location 5 is located in the central section of hedgerow H17 in the south-east of the site). Nathusius's pipistrelle are widespread but rare across the UK, most commonly encountered on migration in late summer/autumn although some do remain all year and breed in the UK. The species is regularly recorded each year during the migration season particularly along watercourses and is being encountered on a regular basis by local bat groups participating in the National Nathusius's pipistrelle project. The September timing of this record combined with only a single recorded registration recorded suggests it is very likely that this was a commuting individual which had remained resident in the UK and the development is unlikely to affect the favourable conservation status given the large amount of similar habitat present around the site. The level of activity associated with this species is consistent with its known abundance at a regional and national scale and is not considered to be significant.
- 4.5 The arable land, improved grassland and poor semi-improved grassland are considered to provide only limited suitability for bat foraging and their loss is considered to have a negligible impact on the Favourable Conservation Status (FCS) of the local bat population. However, the woodland, hedgerows, ponds, mature trees and ditches provide foraging and commuting habitat for the local bat population. The majority of these features are to be retained as part of the proposals except for breaches in several hedgerows to facilitate road access which will maintain connectivity both within the site and into the wider environment.
- 4.6 Design indicates that extensive green infrastructure will be incorporated into the design which will largely be focused along the southern and eastern sections of the site which appears to be a combination of structural planting and grassland areas with three attenuation facilities also included. Proposals also indicate that additional hedgerow planting will be incorporated into the design which will largely be in association with newly created roads. These measures are considered to maintain and enhance the existing commuting and foraging resources present on-site and maintain commuting links off-site, notably to the east and west.

- 4.7 Since the majority of habitats of value to bats, including the woodland, hedgerows and mature trees, are to be retained it is considered that the proposed development will not have a significant negative impact on the local bat population. To minimise the effect that the development will have on the local population of bats, light spill on potential bat flight-lines or foraging habitats should be minimised. Sensitive design of the site's lighting scheme will be of particular benefit to bats which use features such as the woodland, hedgerows and trees for both foraging and commuting, and are listed as species of Principal Importance in England under S41 of the NERC Act (2006).
- 4.8 This will be achieved by a combination of the following steps:
- The direct lighting of existing trees, hedgerows, woodland, dense scrub or proposed landscape planning and areas of open standing water would be avoided;
 - Road and flood lighting would use low pressure sodium or high pressure sodium instead of mercury or metal halide lamps,
 - Lighting will be directional and light spillage will be avoided;
 - Lighting columns would in general be as short as possible, although in some locations taller columns would allow reduced horizontal spill;
 - Lighting levels would be as low as guidelines permit and only used where required for public safety.
- 4.9 There were twelve buildings (B1-B12) located on-site in association with Ashlea Farm and following building surveys it was considered that buildings B2-B12 were of negligible value to bats and therefore no further surveys were undertaken. Following internal inspections of main farmhouse (B1) it was noted that recent roof works had been undertaken and no evidence of roosting bats was recorded. Three nocturnal surveys were undertaken on building B1 in 2018 during which no bats were recorded emerging or re-entering the building and it is considered that the building no longer supports a bat roost. Consequently, it is considered that the demolition of these buildings do not pose a constraint to development regarding roosting bats.
- 4.10 Thirty-five trees (T1-T35) were identified as possessing bat roosting potential which were largely associated with the hedgerows and semi-natural broadleaved woodland. A number of these trees are to be removed (T2, T5, T15-16, T17 and T29) as part of these proposals and therefore it is necessary that these trees are subject to further surveys. This would include an aerial assessment of the trees and if any of these trees are found to possess evidence of a bat roost they would require nocturnal surveys. Any trees found to support a bat roost would likely require a European Protected Species Licence (EPSL) from Natural England to allow their removal. Trees in which no evidence of a bat roost is recorded would require no further surveys and can be removed without constraint if they are removed within six months of the survey, otherwise an updated survey would be required to determine whether a roost is present. During the walkover survey undertaken in April 2019 it was noted that tree T28 had been removed.
- 4.11 The roosting resources within the site could be further enhanced through the provision of bat boxes installed on the existing mature trees and/or incorporated into the built fabric of the residential properties.
- 4.12 It is considered that the above measures would ensure that the Favourable Conservation Status (FCS) of the local bat population would be maintained.



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Key

Site Boundary

Buffer

Brown long-eared bat

Common pipistrelle

Myotis bats

Pipistrelle bats

Soprano pipistrelle

Whiskered/Brandt's

Hallam Land Management
Infinity Garden Village (Wragley Way),
Site Location and Consultation Results Plan



1:20,000

APR / JD

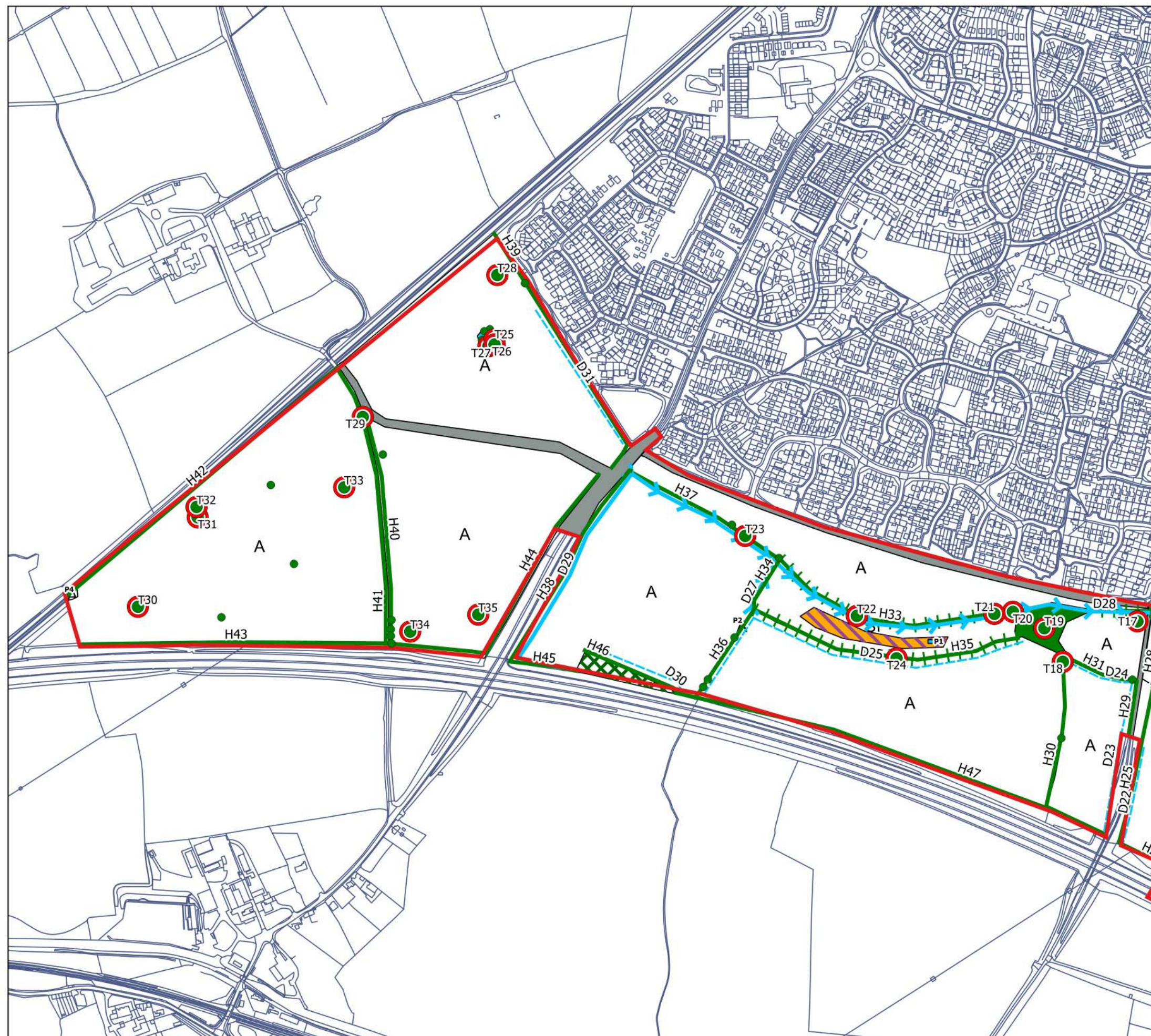
29/5/2019

Figure 1

7315-E-01

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masterplanning ■ environmental assessment ■ landscape design ■ urban design ■ ecology ■ architecture ■ arboriculture



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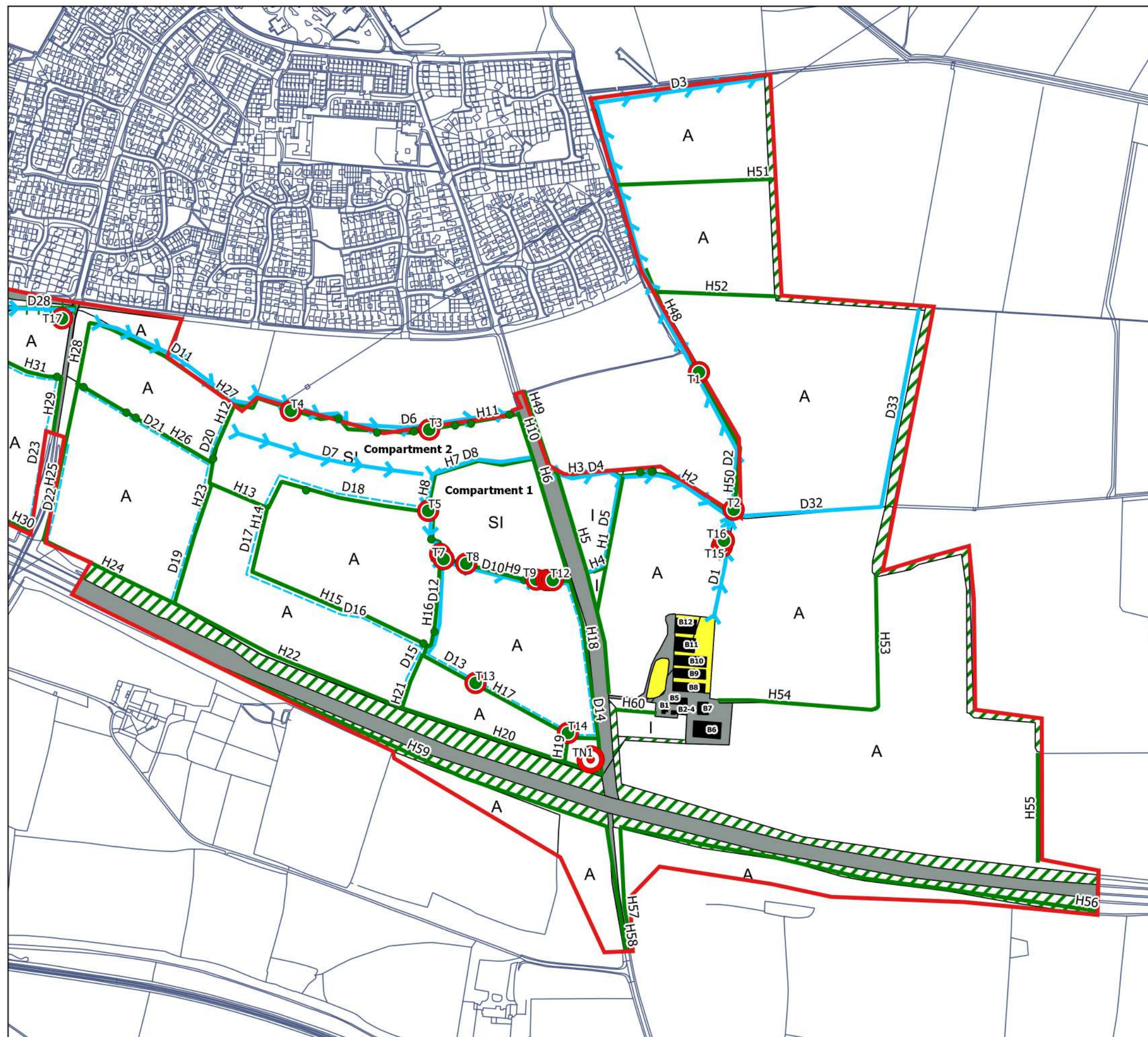
Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Marsh/marshy grassland
- Standing water
- Scrub - dense/continuous
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Intact hedge - species-poor (with ref)
- Hedge with trees - species-poor (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree

client: Hallam Land Management Ltd
project: Infinity Garden Village (Wragley Way), Derby
drawing title: PHASE 1 HABITAT PLAN

scale: 1:6,000
drawing: BJC
issue: 29/5/2019

Figure 2a



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Key

- Built Environment: Buildings/hardstanding
- Buildings (with ref)
- Broadleaved woodland - plantation
- Scrub - scattered
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Hedgerow (with ref)
- Hedgerow with trees (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree

client:
Hallam Land Management Ltd

project:
Infinity Garden Village (Wragley Way),
Derby

PHASE 1 HABITAT PLAN

drawing title:

scale:
1:6,000

drawing / figure number:
Figure 2b

drawn:
BJC

issue:
29/5/2019

rev:
-



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Key:

- ✗ Surveyor Locations
- Flight Arrow (with reference)

Date	21/08/2018
Start Time	20:03
End Time	21:48
Sunset	20:18
Start Temp	20C
End Temp	20C
Start Cloud Cover	100%
End Cloud Cover	100%
Start Wind	1
End Wind	1
Start Rain	1
End Rain	1
Moon	86%

The results shown in the table exclude non visual bat contacts.

Reference	Time	Species	Behaviour	Passes	Comments
1	20:33	Noctule	Commuting	1	Visual
2	20:35	Noctule	Foraging	1	Visual
3	20:36	Noctule	Pass	1	Visual
4	20:42	Common Pipistrelle	Foraging	Continuous	Visual
5	20:43	Common Pipistrelle	Foraging	1	Visual
6	20:45	Pipistrelle Species	Foraging	5	Visual
4	20:47	Soprano Pipistrelle	Foraging	Continuous	Visual
7	20:48	Soprano Pipistrelle	Pass	1	Visual
4	20:50	Common Pipistrelle	Foraging	Continuous	Visual
7	20:50	Soprano Pipistrelle	Pass	1	Visual
6	20:51	Soprano Pipistrelle	Foraging	2	Visual
8	20:55	Common Pipistrelle	Foraging	2	Visual
9	20:55	Common Pipistrelle	Foraging	Continuous	Visual
10	20:55	Pipistrelle Species	Foraging	4	Visual
8	21:00	Common Pipistrelle	Foraging	3	Visual
10	21:00	Pipistrelle Species	Foraging	3	Visual
11	21:12	Common Pipistrelle	Commuting	1	Visual
12	21:13	Common Pipistrelle	Commuting	1	Visual



Hallam Land Management

Infinity Garden Village (Wragley Way),
Derby

Bat Emergence Plan - 21/08/2018

scale @ A3
1:250

drawn
APR / PH

issue
30/5/2019



Figure 3



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Key:

✗ Surveyor Locations

Date	29/08/2018
Start Time	04:44
End Time	06:25
Sunrise	06:10
Start Temp	13C
End Temp	13C
Start Cloud Cover	100%
End Cloud Cover	100%
Start Wind	0
End Wind	0
Start Rain	0
End Rain	0
Moon	80%

The results shown in the table include non visual bat contacts, as no visual bat contacts were recorded during the survey.

Reference	Time	Species	Behaviour	Passes	Comments
NV	05:26	Common Pipistrelle	Commuting	1	Non Visual



Hallam Land Management

Infinity Garden Village (Wragley Way),

Bat Emergence Plan - 29/08/2018

scale @ A3
1:250

drawn
APR / PH

issue
30/5/2019



Figure 4



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Key:

- ✗ Surveyor Locations
- ➔ Flight Arrow (with reference)

Date	11/09/2018
Start Time	19:16
End Time	21:03
Sunest	19:31
Start Temp	16C
End Temp	15C
Start Cloud Cover	50%
End Cloud Cover	100%
Start Wind	2
End Wind	2
Start Rain	0
End Rain	0
Moon	NA

The results shown in the table exclude non visual bat contacts.

Reference	Time	Species	Behaviour	Passes	Comments
1	19:58	Common Pipistrelle	Foraging	3	Visual
2	19:59	Common Pipistrelle	Commuting	1	Visual
3	20:00	Common Pipistrelle	Foraging	1	Visual
4	20:01	Common Pipistrelle	Foraging	Multiple	Visual
5	20:03	Common Pipistrelle	Foraging	3	Visual
6	20:04	Common Pipistrelle	Commuting	1	Visual
7	20:04	Common Pipistrelle	Foraging	3	Visual
8	20:05	Common Pipistrelle	Commuting	1	Visual
5	20:06	Common Pipistrelle	Foraging	1	Visual
9	20:06	Common Pipistrelle	Commuting	1	Visual, 2 bats
10	20:08	Common Pipistrelle	Commuting	1	Visual
5	20:09	Common Pipistrelle	Foraging	1	Visual
11	20:12	Common Pipistrelle	Foraging	1	Visual
12	20:21	Common Pipistrelle	Commuting	1	Visual
5	20:22	Common Pipistrelle	Foraging	2	Visual
13	20:22	Common Pipistrelle	Foraging	3	Visual
14	20:31	Common Pipistrelle	Commuting	1	Visual
14	20:36	Common Pipistrelle	Commuting	1	Visual



Hallam Land Management

Infinity Garden Village (Wragley Way),
Derby

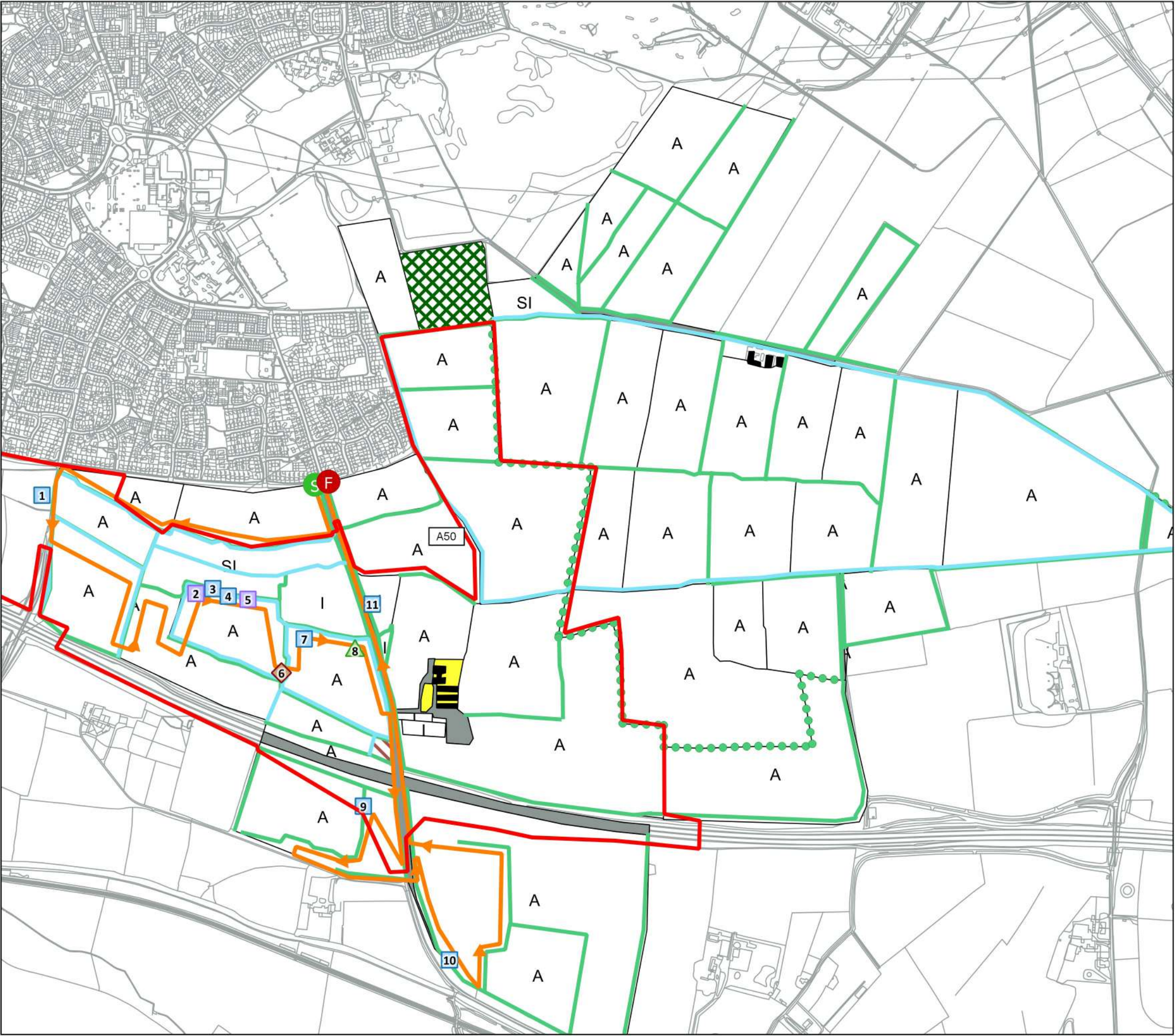
Bat Emergence Plan - 11/09/2018

scale @ A3
1:250

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APR / PH

issued
30/5/2019

drawing / figure number
Figure 5



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Key

Site Boundary

Start point

Finish point

Transect Route

Bat contacts

Common Pipistrelle

Soprano Pipistrelle

Brown Long-eared

Myotis Species

Reference	Time	Species	Behaviour	No. of passes
Start	19:11	-	-	-
1	19:53	Common pipistrelle	Commuting	1
2	19:57	Soprano pipistrelle	Commuting (NV)	1
3	19:59	Common pipistrelle	Commuting (NV)	1
4	20:02	Common pipistrelle	Foraging	Multiple
5	20:03	Soprano pipistrelle	Commuting (NV)	1
6	20:19	Brown long-eared	Foraging (NV)	3
7	20:20	Common pipistrelle	Foraging (NV)	19
8	20:21	Myotis	Commuting (NV)	1
9	20:46	Common pipistrelle	Pass (NV)	1
10	21:06	Common pipistrelle	Pass (NV)	1
11	21:21	Common pipistrelle	Pass (NV)	1
Finish	21:22	-	-	-



Hallam Land Management
Infinity Garden Village (Wragley Way),
Derby

Transect Route 1 19th September 2016

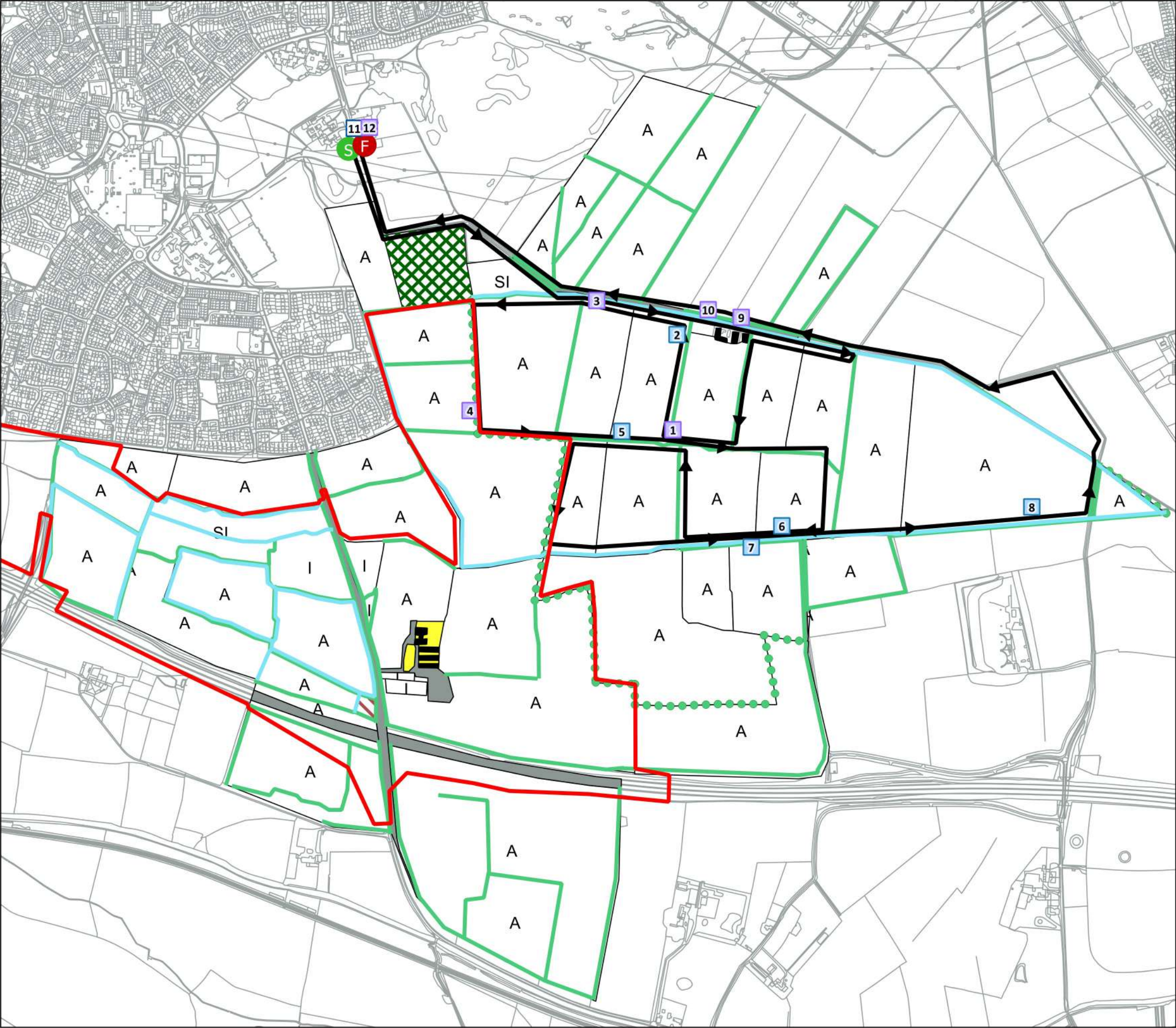
scale @ A3
1:9,500

LTW/PH

31/5/2019



Figure 6 7315-E-06



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Key:

Site Boundary

Transect Route

Start point

Finish point

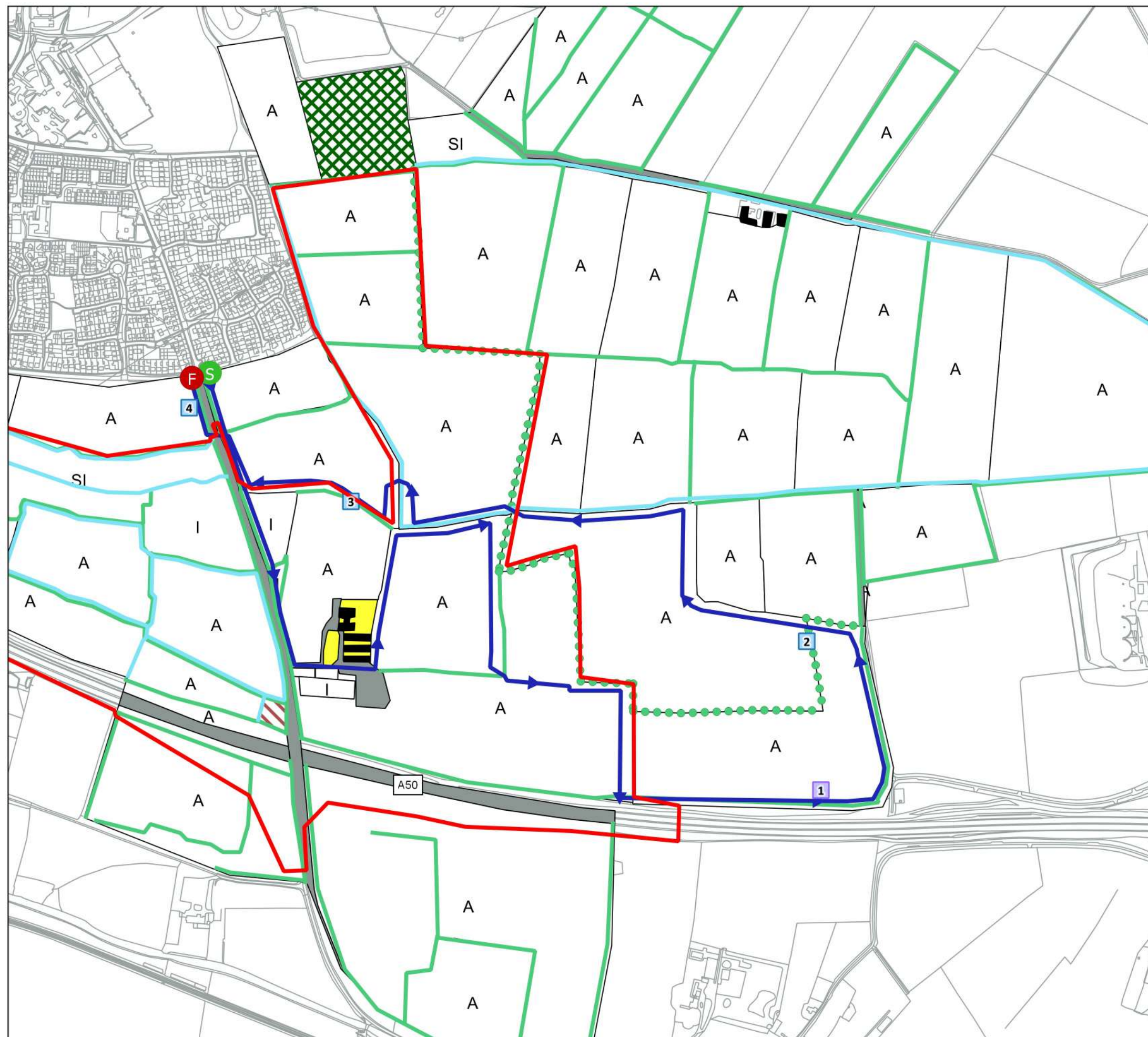
Bat contacts

Common Pipistrelle

Soprano Pipistrelle

Pipistrelle Species

Reference	Time	Species	Behaviour	No. of passes
Start	19:08	-	-	-
1	19:46	Soprano pipistrelle	Foraging (NV)	3
2	19:50	Common pipistrelle	Commuting (NV)	1
3	19:55	Soprano pipistrelle	Commuting (NV)	1
4	20:05	Soprano pipistrelle	Commuting (NV)	1
5	20:13	Common pipistrelle	Foraging (NV)	2
6	20:22	Common pipistrelle	Foraging (NV)	1
7	20:50	Common pipistrelle	Pass (NV)	1
8	20:58	Common pipistrelle	Commuting (NV)	1
9	21:12	Soprano pipistrelle	Commuting (NV)	1
10	21:13	Soprano pipistrelle	Socialising (NV)	1
11	21:58	Pipistrelle species	Commuting (NV)	1
12	21:58	Soprano pipistrelle	Foraging (NV)	3
Finish	21:58	-	-	-



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Key

Site Boundary

→ Transect Route

S Start point

F Finish point

Bat contacts

Common Pipistrelle

Soprano Pipistrelle

Reference	Time	Species	Behaviour	No. of passes
Start	19:11	-	-	-
1	19:56	Soprano pipistrelle	Foraging (NV)	4
2	20:01	Common pipistrelle	Pass (NV)	1
3	20:34	Common pipistrelle	Pass (NV)	1
4	21:09	Common pipistrelle	Pass (NV)	1
Finish	21:13	-	-	-

Hallam Land Mangement
Infinity Garden Village (Wragley Way),
Derby
Transect Route 3 19th September 2016

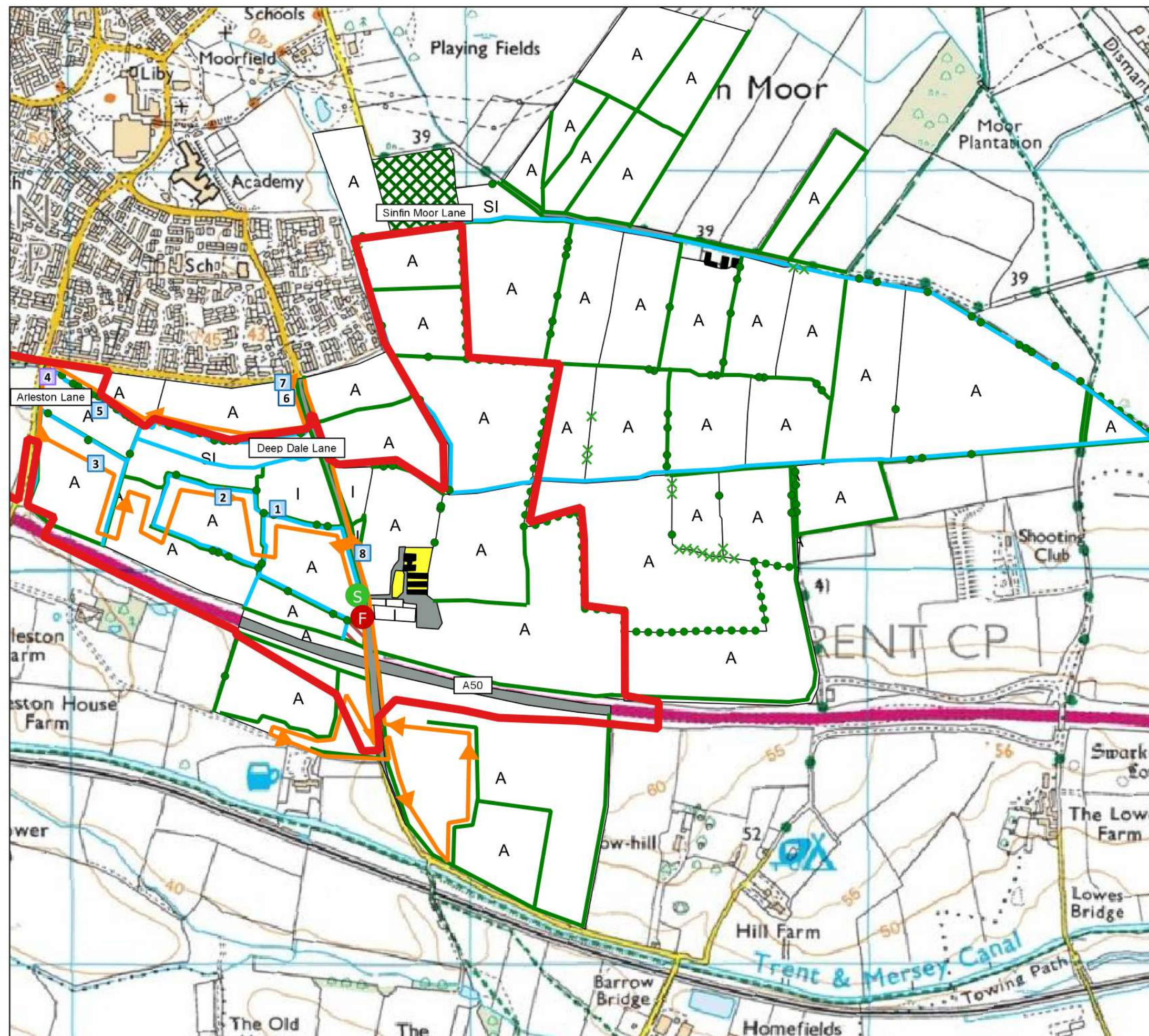
scale: A3
1:7,500

JDH

31/5/2019



Figure 8



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Key

Site Boundary

→ Transect Route

S Start point

F Finish point

Bat contacts

● Common Pipistrelle

● Soprano Pipistrelle

□ Pipistrelle Species

Reference	Time	Species	Behaviour	No. of passes
Start	18:37	-	-	-
1	19:28	Common pipistrelle	Commuting (NV)	1
2	19:33	Common pipistrelle	Commuting (NV)	1
3	19:43	Common pipistrelle	Foraging (NV)	2
4	19:56	Soprano pipistrelle	Foraging (NV)	4
5	19:59	Common pipistrelle	Foraging (NV)	5
6	20:13	Pipistrelle species	Foraging (NV)	1
7	20:13	Common pipistrelle	Foraging (NV)	2
8	20:25	Common pipistrelle	Pass (NV)	1
Finish	20:37	-	-	-

NV=Non-visual

Hallam Land Management
Infinity Garden Village (Wragley Way),
Derby
Transect Survey Route 1 3rd October 2016

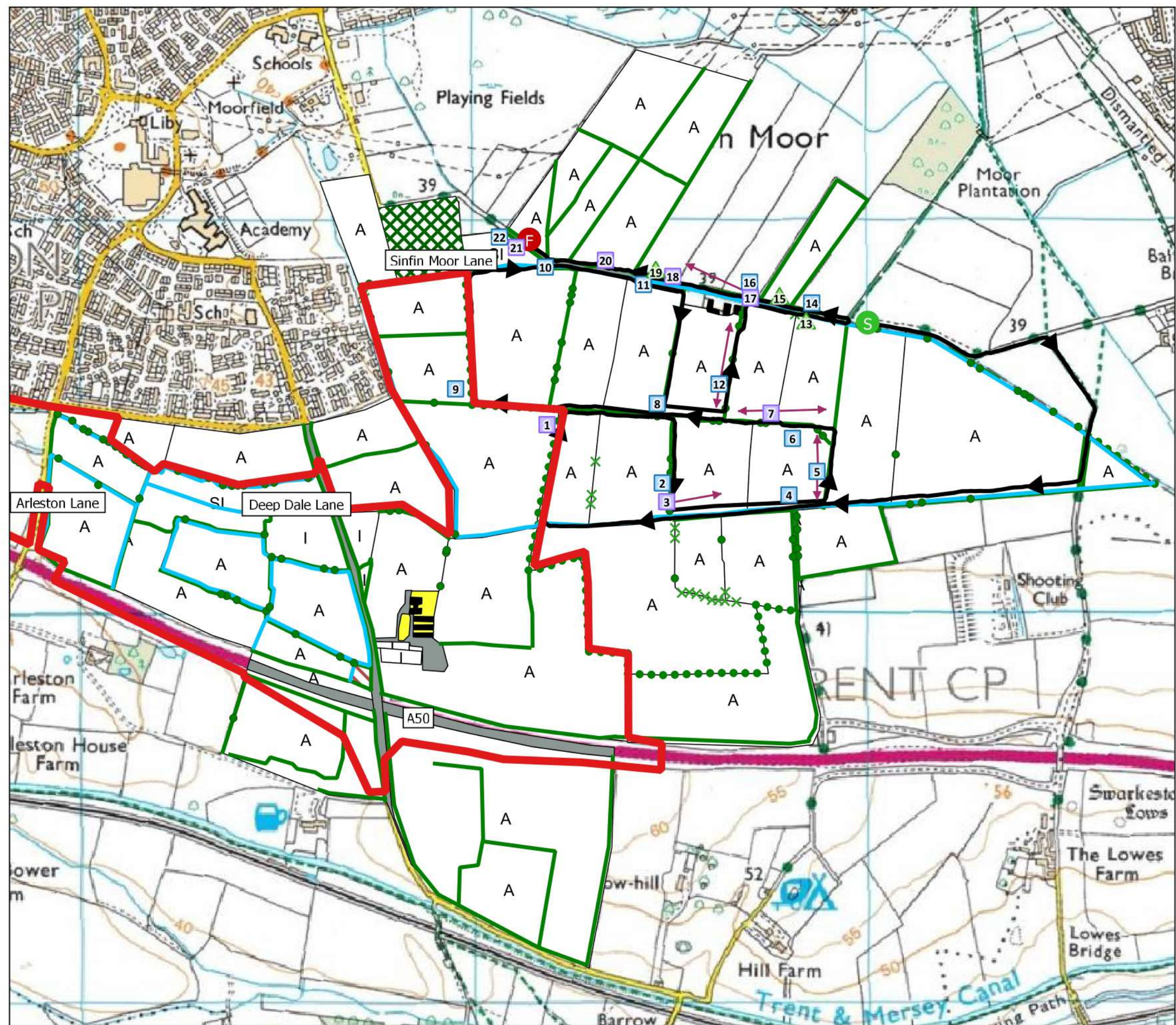
scale @ A3
1:10,000

ABS/AWB

30/5/2019



Figure 9



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Key:

- Transect Route
- Start point
- Finish point
- Flight arrow
- Bat contacts
 - Common Pipistrelle
 - Soprano Pipistrelle
 - Myotis Species

Reference	Time	Species	Behaviour	No. of passes
Start	18:37	-	-	-
1	19:13	Soprano pipistrelle	Foraging (NV)	2
2	19:21	Common pipistrelle	Commuting (NV)	1
3	19:22	Soprano pipistrelle	Foraging	2
4	19:27	Common pipistrelle	Foraging (NV)	2
5	19:28	Common pipistrelle	Foraging	2
6	19:29	Common pipistrelle	Foraging (NV)	5
7	19:31	Soprano pipistrelle	Commuting	1
8	19:37	Common pipistrelle	Commuting (NV)	1
9	19:45	Common pipistrelle	Commuting (NV)	1
10	19:53	Common pipistrelle	Commuting (NV)	1
11	19:58	Common pipistrelle	Foraging (NV)	2
12	20:06	Common pipistrelle	Foraging	4
13	20:19	Myotis	Pass (NV)	1
14	20:21	Common pipistrelle	Foraging (NV)	4
15	20:23	Myotis	Pass (NV)	1
16	20:24	Common pipistrelle	Foraging (NV)	2
17	20:24	Soprano pipistrelle	Foraging	8
18	20:27	Soprano pipistrelle	Pass (NV)	1
19	20:27	Myotis	Pass (NV)	1
20	20:31	Soprano pipistrelle	Pass (NV)	1
21	20:35	Soprano pipistrelle	Foraging (NV)	2
22	20:36	Common pipistrelle	Foraging (NV)	2
Finish	20:37	-	-	-

NV=Non-visual



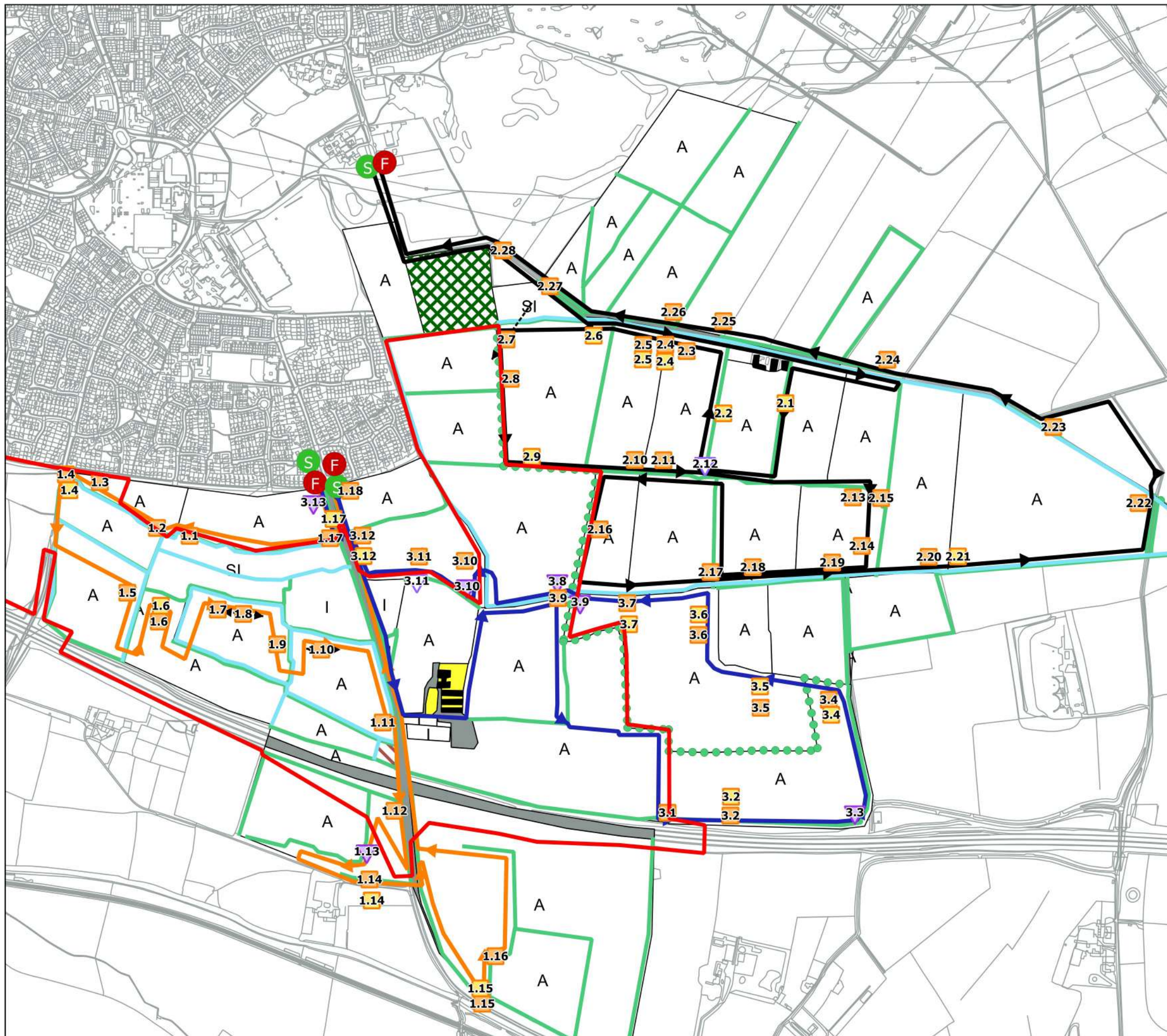
Hallam Land Mangement
Infinity Garden Village (Wragley Way),
Derby
Transect Survey Route 2 3rd October 2016

scale @ A3
1:10,000

ABS/AWB

30/5/2019

Figure 10



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Key

Site Boundary

Start point

Finish point

Transect Route 1

Transect Route 2

Transect Route 3

Flight arrow

Bat Contacts June 2017 Route

Common Pipistrelle

Soprano Pipistrelle

Nyctalus Species

Noctule



Hallam Land Management
Infinity Garden Village (Wragley Way),
Derby
Transect Survey: 19th June 2017

scale: A3
1:9,500

LTW/PH 30/5/2019

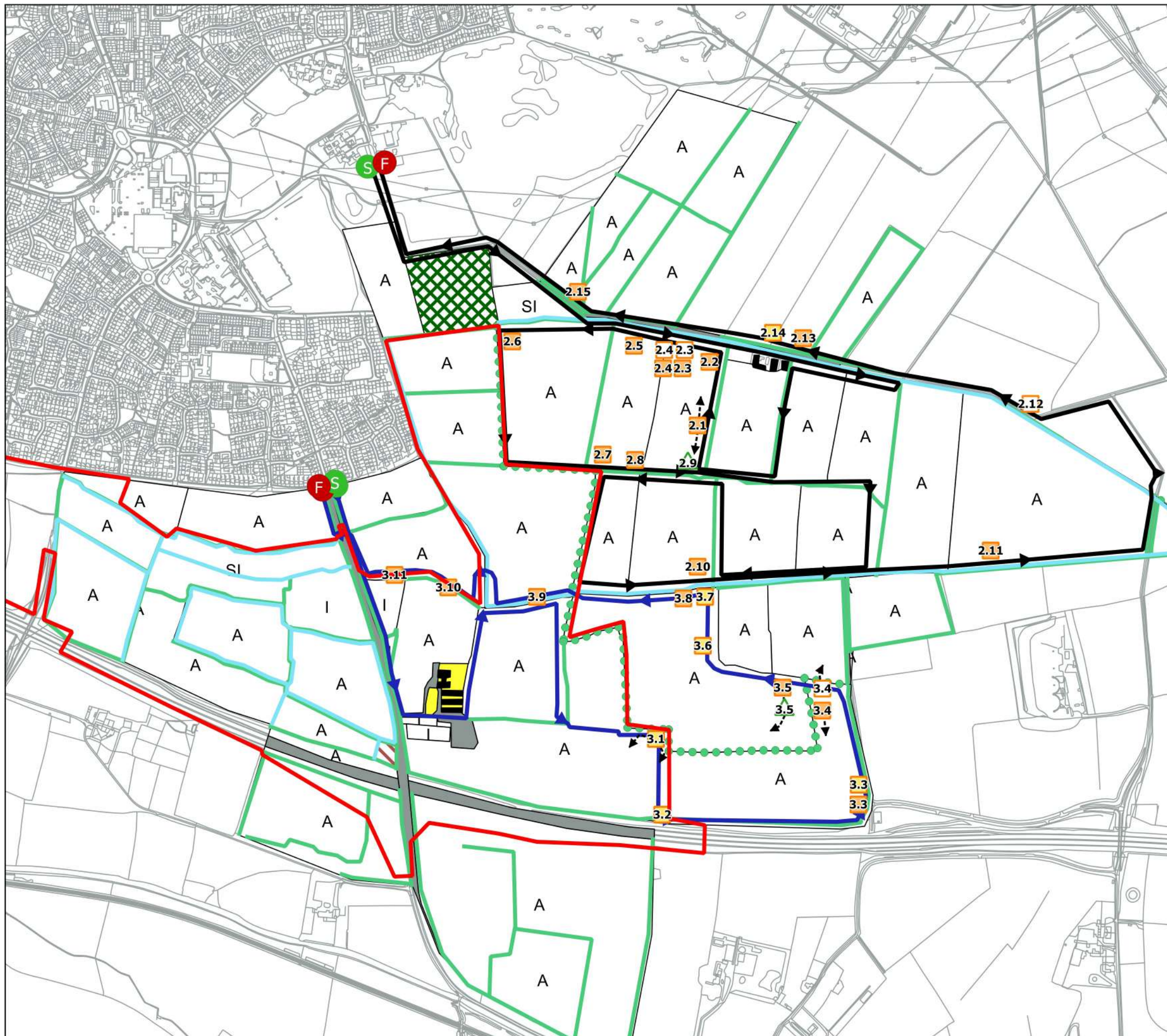


Figure 12 7315-E-12

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masterplanning environmental assessment landscape design urban design ecology architecture arboriculture

J:\7300\7365\QGIS 2.14\Plans\Bat figures\7365-E-01 Transect Plan (19.09.16).qgs



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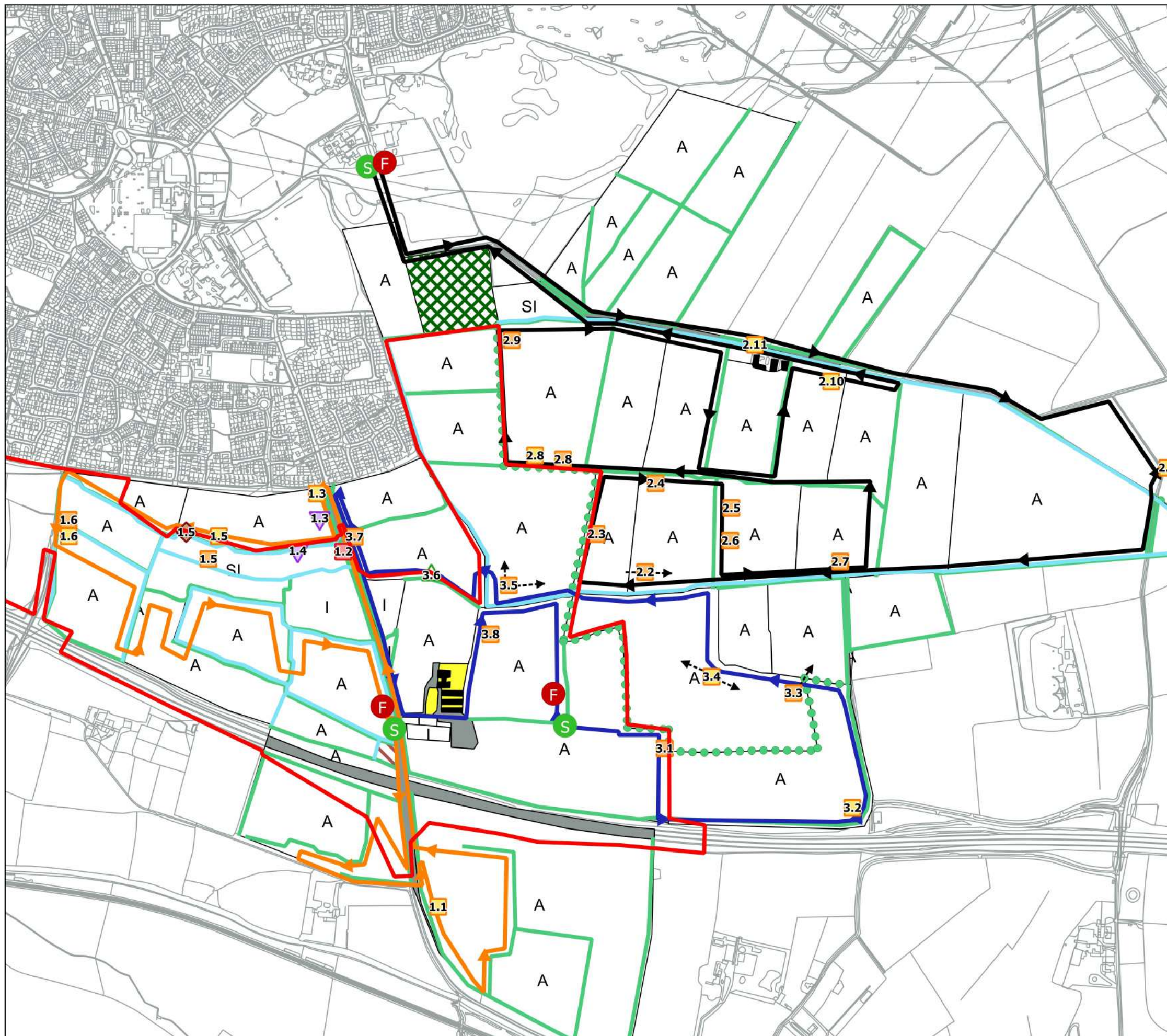
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Key

- Site Boundary
- S Start point
- F Finish point
- Transect Route 2
- Transect Route 3
- Flight arrow

Bat Contacts July 2017 Route 3

- Common Pipistrelle
- Soprano Pipistrelle
- Pipistrelle Species
- Myotis Species



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Key

	Site Boundary	Bat Contacts
	Start point	 Common Pipistrelle
	Finish point	 Soprano Pipistrelle
→	Tansect Route 1	 Nathusius Pipistrelle
→	Tansect Route 2	△ Myotis Species
→	Tansect Route 3	▽ Noctule
- - - →	Flight arrow	 Brown Long-eared

Hallam Land Management
Infinity Garden Village (Wragley Way),
Derby
Transect Survey: 14th September 2017



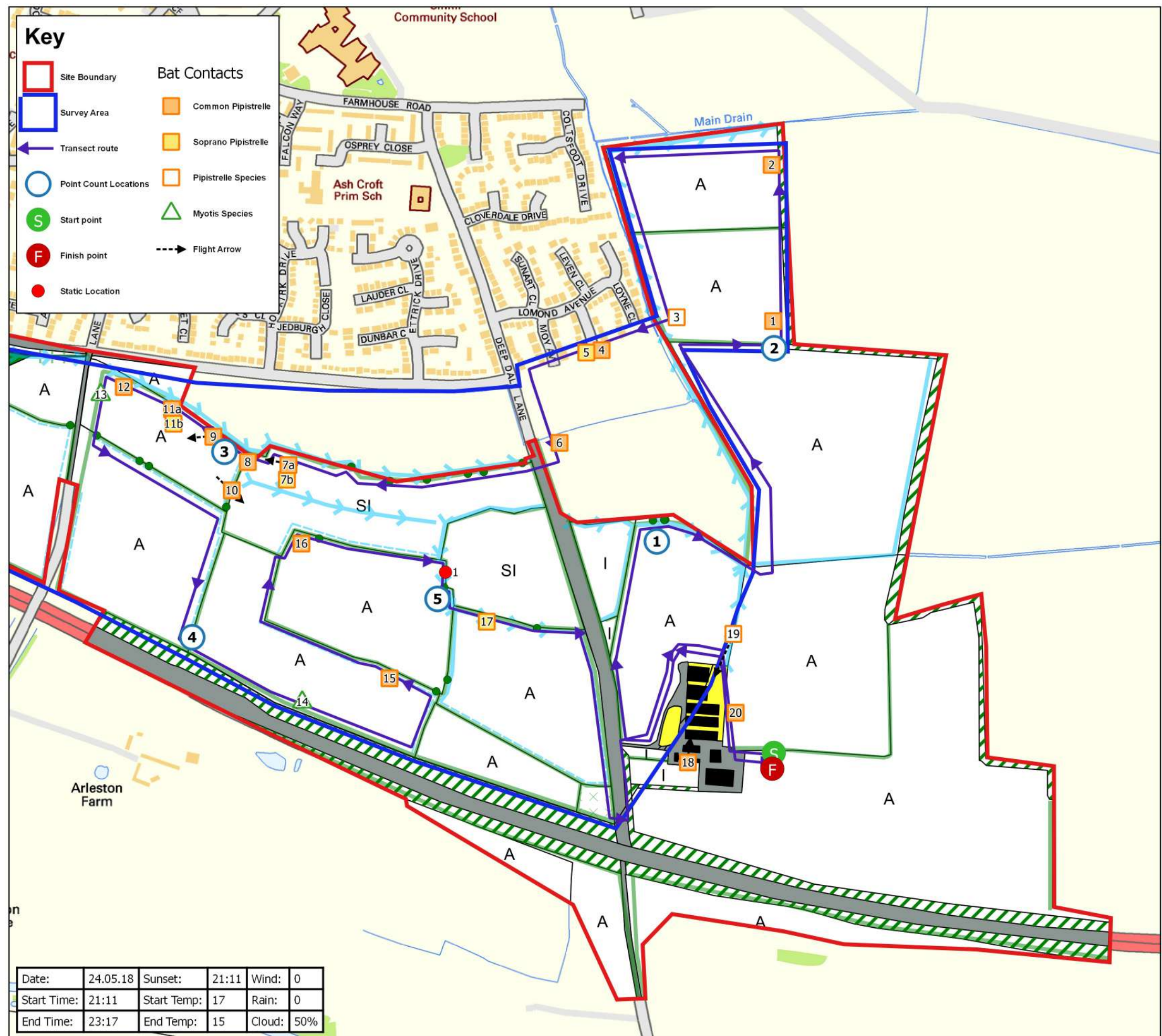
scale: A3
1:9,500

RCO/PH

30/5/2019



Figure 14 7315-E-14

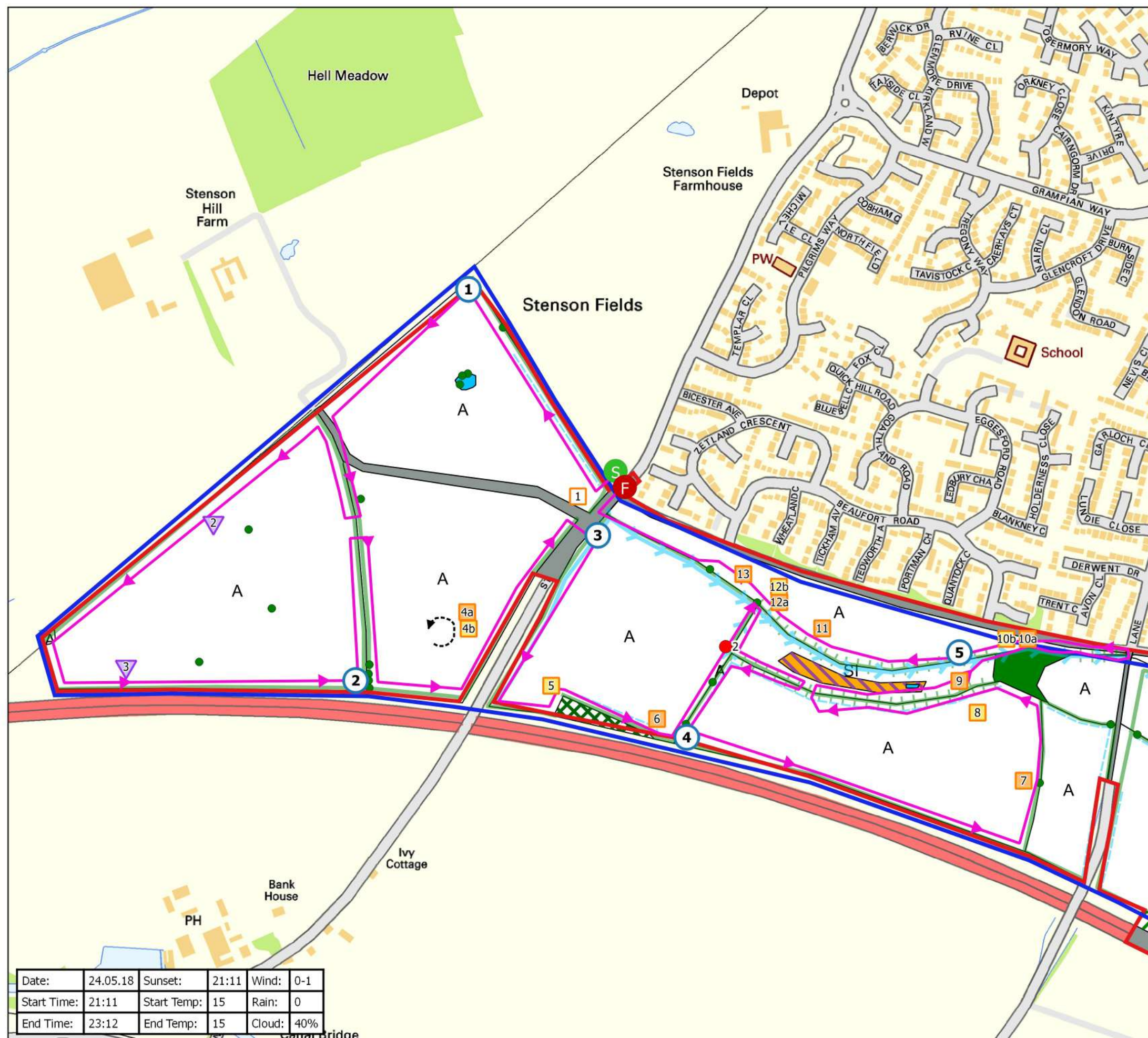


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Bat Contacts

Plan Ref	Time	Species	Passes	Behaviour
PC1	21:24-21:26	No bats		
PC2	21:45-21:47			
Non-vis	21:45-21:46	Common Pipistrelle	2	Foraging
1	21:47	Common Pipistrelle	2	Foraging
2	21:51	Common Pipistrelle	1	Pass
3	21:54-21:57	Pipistrelle Sp.	Cont.	Foraging
4	21:55-21:57	Common Pipistrelle	4	Foraging
5	21:55	Soprano Pipistrelle	1	Foraging
6	22:00	Common Pipistrelle x 2	1	Foraging
7a	22:07	Common Pipistrelle	1	Commuting
7b	22:07	Soprano Pipistrelle	1	Commuting
8	22:09	Common Pipistrelle	1	Commuting
9	22:10-22:11	Common Pipistrelle	3	Foraging
PC3	22:12-22:14			
10	22:12	Common Pipistrelle	Cont.	Foraging
Non-vis	22:14	Myotis	2	Foraging
11a	22:15	Common Pipistrelle	2	Commuting
11b	22:15	Soprano Pipistrelle	2	Commuting
12	22:16-22:19	Common Pipistrelle	1	Foraging
13	22:19	Myotis	1	Foraging
PC4	22:29-22:34	No bats		
Non-vis	22:33	Common Pipistrelle	1	Pass
14	22:37	Myotis	1	Pass
15	22:41-22:42	Common Pipistrelle	Cont.	Foraging
16	22:49-22:50	Common Pipistrelle	Cont.	Foraging
PC5	22:52-22:57			
Non-vis	22:52-22:58	Common Pipistrelle	Cont.	Foraging
Non-vis	22:56	Soprano Pipistrelle	2	Foraging
17	22:58	Soprano Pipistrelle	2	Foraging
18	23:12-23:13	Common Pipistrelle	3	Foraging
19	23:14	Pipistrelle Sp.	1	Commuting
20	23:15-23:16	Common Pipistrelle	3	Foraging



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Key

	Site Boundary		Common Pipistrelle
	Survey Area		Soprano Pipistrelle
←	Transect Route		Pipistrelle Species
	Point Count Locations	▼	Noctule
	Start point	---	Flight Arrow
	Finish point		
	Static Location		

Bat Contacts

Plan Ref	Time	Species	Passes	Behaviour
1	21:12	Pipistrelle Sp.	1	Pass
PC1	21:24-21:26	No Bats		
2	21:37	Noctule	2	Pass
3	21:44	Noctule	1	Pass
PC2	21:50-21:52	No Bats		
4a	22:03-22:07	Common Pipistrelle	Cont.	Foraging
4b	22:05-22:06	Soprano Pipistrelle	2	Foraging
PC3	22:11-22:13	No Bats		
5	22:17-22:18	Soprano Pipistrelle	2	Foraging/ Social
6	22:21	Common Pipistrelle	1	Foraging
PC4	22:31-22:33	No Bats		
7	22:42-22:44	Common Pipistrelle	4	Foraging
8	22:45	Soprano Pipistrelle	1	Foraging
9	22:52	Common Pipistrelle	1	Pass
PC5	22:56-22:58	No Bats		
10a	22:59	Common Pipistrelle	2	Foraging
10b	14:09	Soprano Pipistrelle	1	Pass
11	23:04	Common Pipistrelle	1	Foraging
12a	23:06	Common Pipistrelle	2	Foraging
12b	23:06	Soprano Pipistrelle	1	Pass
13	23:08	Common Pipistrelle	1	Pass

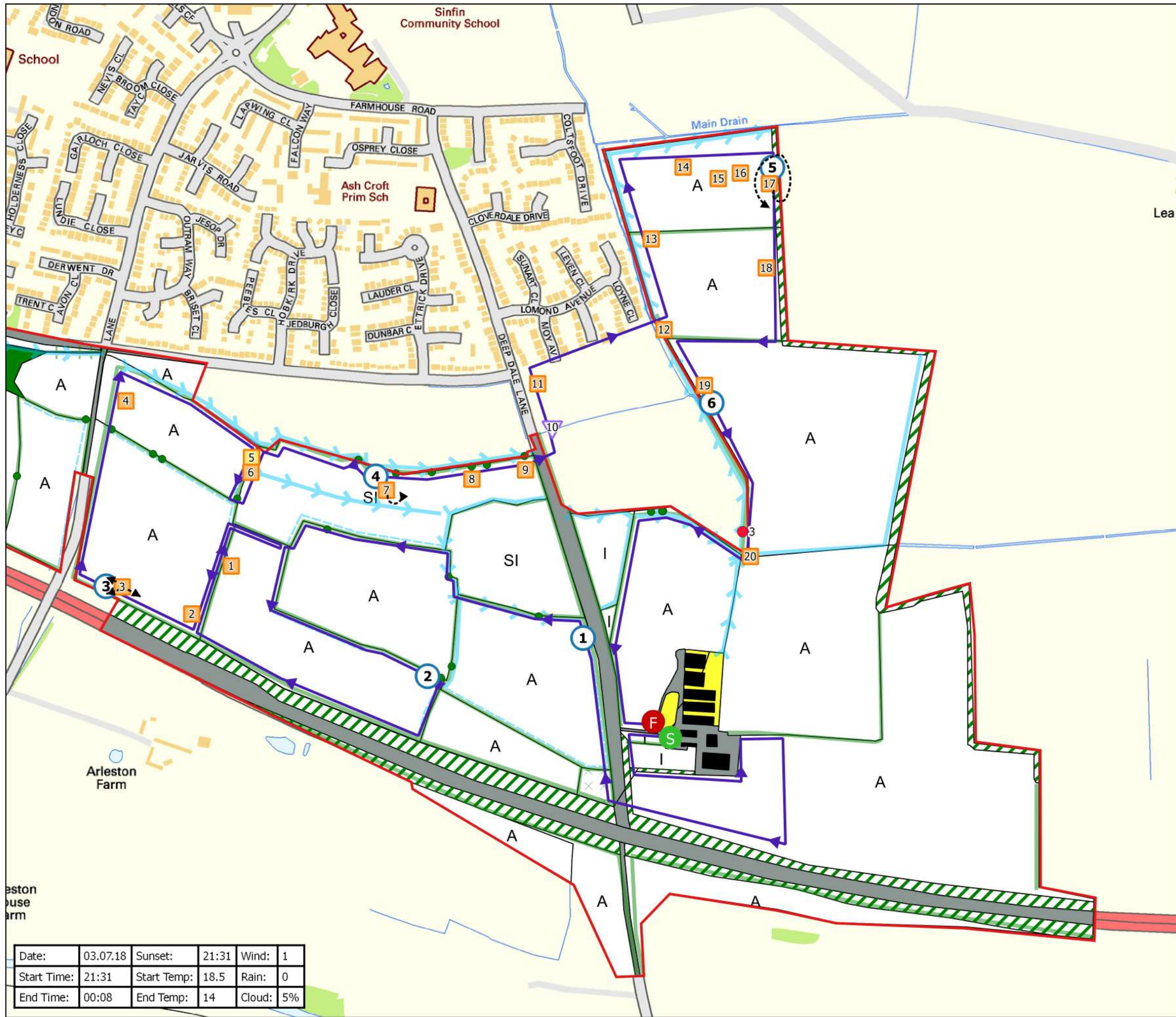
Hallam Land Management
Infinity Garden Village (Wragley Way),
Derby

fpcr Bat Transect Plan 24.05.18 (West)

scale: 0A3
1:6,000

LTV/JD 30/5/2019

Figure 16 **7315-E-16**



Date:	03.07.18	Sunset:	21:31	Wind:	1
Start Time:	21:31	Start Temp:	18.5	Rain:	0
End Time:	00:08	End Temp:	14	Cloud:	5%

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Key

- Site Boundary

Survey Area

Transect Route

Point Count Locations

S

Start point

F

Finish point
- Static Location

Bat Contacts

Common Pipistrelle

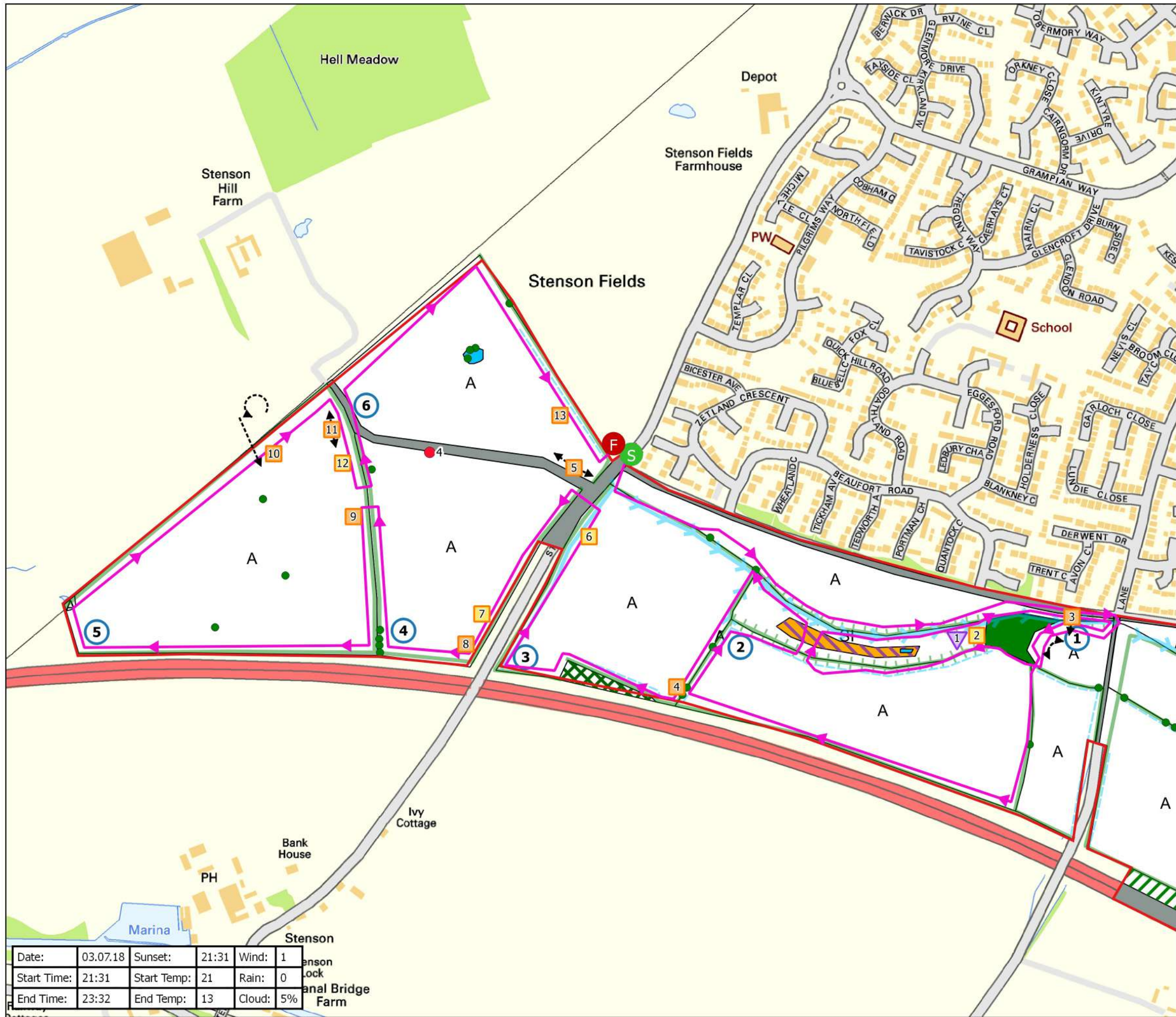
Soprano Pipistrelle

Nyctalus Species

Flight Path

Bat Contacts

Plan Ref	Time	Species	Passes	Behaviour
PC 1	21:55-22:00	No Bats		
PC 2	22:13-22:18	No Bats		
1	22:24	Common Pipistrelle	1	Commuting
2	22:24	Common Pipistrelle	1	Commuting
PC 3	22:32-22:37			
3	22:32- 22:37	Common Pipistrelle	Cont.	Foraging
4	22:44-22:46	Common Pipistrelle	3	Commuting
5	22:45- 22:49	Soprano Pipistrelle	Cont.	Foraging
6	22:48- 22:49	Common Pipistrelle	Cont.	Foraging
PC 4	22:52-22:57			
7	22:53-22:57	Common Pipistrelle	Cont.	Foraging
8	22:58-22:59	Common Pipistrelle	Cont.	Foraging
9	23:00-23:01	Common Pipistrelle	Cont.	Foraging
10	23:05	Nyctalus Sp.	1	Foraging
11	23:12-23:13	Common Pipistrelle	4	Foraging
12	23:18-23:19	Common Pipistrelle	1	Foraging
13	23:23- 23:25	Common Pipistrelle	Cont.	Foraging
14	23:26	Common Pipistrelle	1	Commuting
15	23:27	Common Pipistrelle	1	Commuting
16	23:28	Common Pipistrelle	1	Commuting
PC 5	23:29-23:34			
17	23:29-23:34	Common Pipistrelle	Cont.	Foraging
18	23:35-23:37	Common Pipistrelle	Cont.	Foraging
19	23:51-23:52	Common Pipistrelle	2	Foraging
PC6	23:53-23:58			
Non-vis	23:57	Common Pipistrelle	1	Commuting
20	00:04	Common Pipistrelle	1	Foraging



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Key

- Site Boundary
- Survey Area
- Transect route west
- Point Count Locations
- Start point
- Finish point
- Static Location
- Bat Contacts
 - Common Pipistrelle
 - Soprano Pipistrelle
 - Noctule
- Flight Path

Bat Contacts

Plan Ref	Time	Species	Passes	Behaviour
PC1	21:48-21:53	No Bats		
1	22:02	Noctule	1	Commuting
2	22:04	Soprano Pipistrelle	4	Foraging
3	22:09-22:11	Common Pipistrelle	3	Foraging
PC2	22:20-22:25			
Non-Vis	22:21-22:23	Common Pipistrelle	2	Foraging
4	22:29	Common Pipistrelle	1	Foraging
PC3	22:33-22:38			
Non-Vis	22:34-22:38	Common Pipistrelle	Cont.	Foraging
5	22:43-22:45	Common Pipistrelle	5	Foraging
6	22:43-22:45	Soprano Pipistrelle	2	Foraging
7	22:48	Soprano Pipistrelle	1	Commuting
8	22:49-22:51	Common Pipistrelle	5	Foraging
PC4	22:52-22:57			
Non-Vis	22:52-22:57	Common Pipistrelle	3	Foraging
9	22:58-22:59	Common Pipistrelle	3	Foraging
PC5	23:04-22:09			
Non-Vis	23:07	Common Pipistrelle	1	Foraging
Non-Vis	23:08	Noctule	1	Foraging
10	23:11-23:12	Common Pipistrelle	4	Commuting
11	23:16-23:18	Common Pipistrelle	Cont.	Foraging
12	23:16	Soprano Pipistrelle	1	Foraging
PC6	23:19-23:24			
Non-Vis	23:19	Common Pipistrelle	1	Foraging
13	23:31	Common Pipistrelle	1	Commuting

Date:	03.07.18	Sunset:	21:31	Wind:	1
Start Time:	21:31	Start Temp:	21	Rain:	0
End Time:	23:32	End Temp:	13	Cloud:	5%

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masterplanning environmental assessment landscape design urban design ecology architecture arboriculture

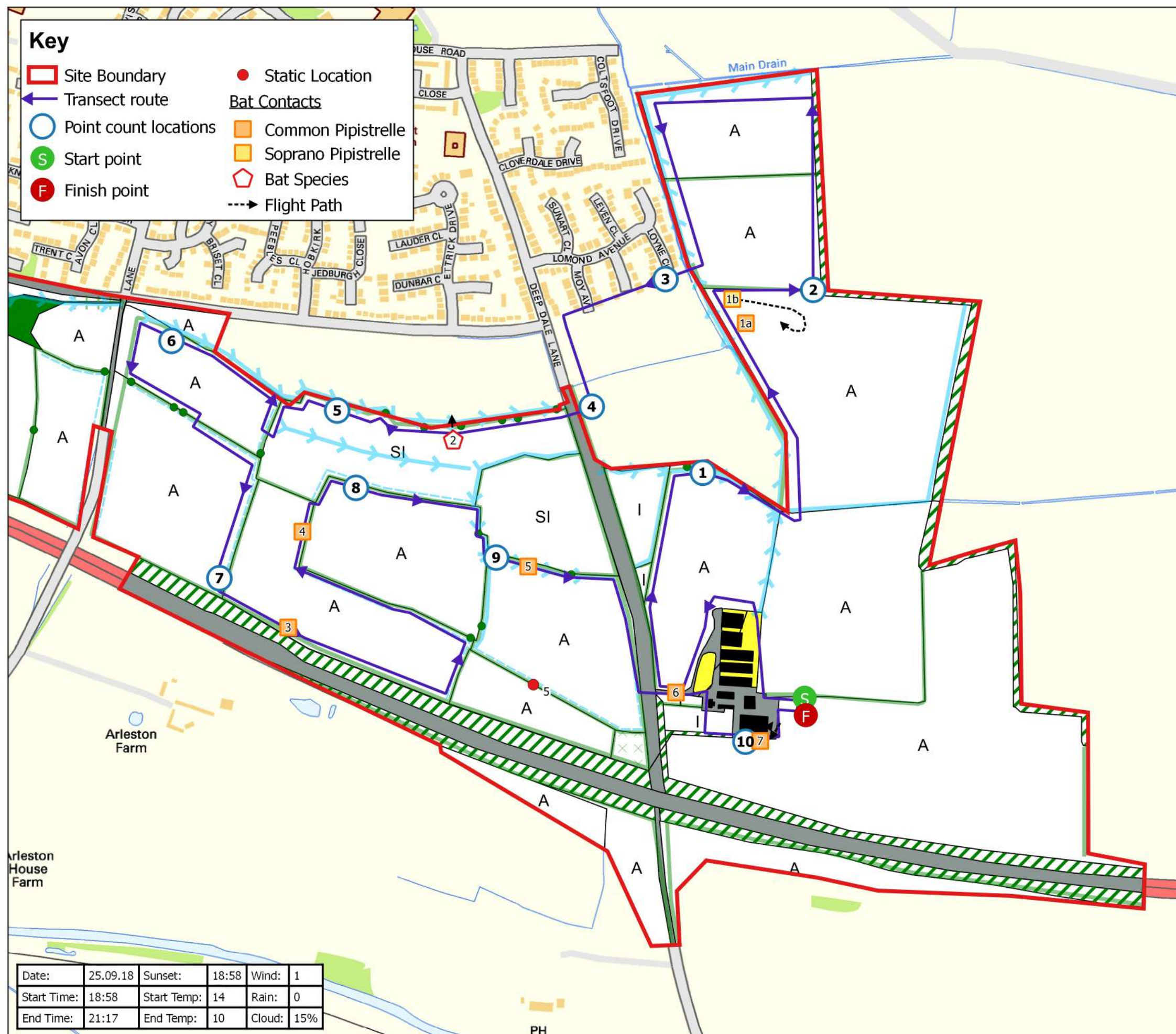
J:\7300\7315\QGIS 2.14\Plans\Bat Figures\7315-E-01 Transect Plan 03.07.18



Hallam Land Management
Infinity Garden Village (Wragley Way),
Bat Transect Plan 03.07.18 (West)
scale: 1:6,000
drawing / figure number
LTW/BJC
30/5/2019

Figure 18

7315-E-18



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Bat Contacts

Plan Ref	Time	Bat Species	Behaviour	Passes
PC 1	19:04-19:09	No bats		
PC 2	19:23-19:28			
Non-vis	19:26	Soprano pipistrelle	Commuting	1
1a	19:30	Common pipistrelle	Foraging	1
1b	19:31	Soprano pipistrelle	Foraging	Cont.
PC 3	19:40-19:45			
Non-vis	19:40	Pipistrelle Sp.	Commuting	1
Non-vis	19:40-19:41	Soprano pipistrelle	Foraging	2
Non-vis	19:40-19:45	Common pipistrelle	Foraging	3
PC 4	19:49-19:54			
2	19:56	Unkown Bat Sp.	Observed- not echolocating	1
PC 5	20:00-20:05			
Non-vis	20:01-20:04	Common pipistrelle	Foraging	3
Non-vis	20:04	Myotis Sp.	Foraging	1
PC 6	20:10-20:15			
Non-vis	20:12	Common pipistrelle	Foraging	2
PC 7	20:25-20:30			
Non-vis	20:26	Myotis Sp.	Foraging	1
Non-vis	20:27-20:29	Common pipistrelle	Foraging	3
Non-vis	20:27-20:29	Pipistrelle Sp.	Foraging	3
3	20:33-20:34	Common pipistrelle	Foraging	3
4	20:41	Common pipistrelle	Foraging	1
PC 8	20:44-20:49			
Non-vis	20:44	Common pipistrelle	Foraging	1
PC 9	20:53-20:58			
Non-vis	20:54	Common pipistrelle	Foraging	1
5	20:59-21:00	Common pipistrelle	Foraging	3
6	21:05-21:06	Common pipistrelle	Foraging	1
6	21:06	Common pipistrelle	Foraging	1
PC 10	21:10-21:15			
7	21:15	Common pipistrelle	Foraging	1

Date:	25.09.18	Sunset:	18:58	Wind:	1
Start Time:	18:58	Start Temp:	14	Rain:	0
End Time:	21:17	End Temp:	10	Cloud:	15%

APPENDIX A: BAT REFERENCE POINTS

June Surveys:

19.06.2017 Route 1

Plan ref	Time	Species	Passes	Behaviour
1.1	21:55	Common Pipistrelle	1	Commuting
1.2	22:04	Common Pipistrelle	1	Commuting
1.3	22:07	Common Pipistrelle	Multiple	Foraging
1.4	22:10	Common & Soprano Pipistrelle	1	Commuting
1.5	22:17	Common Pipistrelle	1	Commuting
1.6	22:27	Soprano Pipistrelle	1	Commuting
1.6	22:29	Common Pipistrelle	1	Commuting
1.7	22:34	Common Pipistrelle	1	Commuting
1.8	22:36	Common Pipistrelle	2	Foraging
1.9	22:39	Common Pipistrelle	Multiple	Foraging
1.10	22:45	Common Pipistrelle x2	Multiple	Foraging
1.11	22:52	Common Pipistrelle	1	Commuting
1.12	22:55	Common Pipistrelle	2	Commuting
1.13	23:05	Noctule	2	Foraging
1.14	23:10	Common Pipistrelle	Multiple	Foraging
1.14	23:11	Soprano Pipistrelle	1	Commuting
1.15	23:21	Common Pipistrelle	1	Commuting
1.15	23:22	Soprano Pipistrelle	1	Commuting
1.16	23:25	Common Pipistrelle	1	Commuting
1.17	23:45	Soprano Pipistrelle	1	Commuting
1.17	23:46	Common Pipistrelle	1	Commuting
1.18	23:48	Common Pipistrelle x 2	Multiple	Foraging

19.06.2017 Route 2

Plan ref	Time	Species	Passes	Behaviour
2.1	22:16	Soprano Pipistrelle	1	Commuting
2.2	22:26	Soprano Pipistrelle	1	Commuting
2.3	22:30	Common Pipistrelle	2	Foraging
2.4	22:32	Common & Soprano Pipistrelle	Multiple	Foraging
2.5	22:34-22:37	Common & Soprano Pipistrelle	Multiple	Foraging
2.6	22:38	Soprano Pipistrelle	2	Foraging
2.7	22:39	Common Pipistrelle	2	Foraging
2.8	22:48	Common Pipistrelle	1	Commuting
2.9	22:55	Soprano Pipistrelle	2	Social calls
2.10	22:59	Common Pipistrelle	1	Commuting
2.11	23:05	Common Pipistrelle	1	Commuting

2.12	23:10	Nyctalus	3	Foraging
2.13	23:24	Common Pipistrelle	1	Commuting
2.14	23:26	Common Pipistrelle	1	Commuting
2.15	23:45	Soprano Pipistrelle	1	Commuting
2.16	23:48	Common Pipistrelle	2	Foraging
2.17	23:51	Common Pipistrelle	3	Foraging
2.18	23:58	Common Pipistrelle	3	Foraging
2.19	00:01	Common Pipistrelle	2	Foraging
2.20	00:02	Common Pipistrelle x 2	3	Foraging
2.21	00:03	Soprano Pipistrelle	1	Commuting
2.22	00:33	Common Pipistrelle	2	Foraging
2.23	00:36	Common Pipistrelle	1	Commuting
2.24	00:39	Common Pipistrelle	3	Foraging
2.25	00:43	Common Pipistrelle x 2	Multiple	Foraging
2.26	00:46	Common Pipistrelle	Multiple	Foraging
2.27	00:48	Common Pipistrelle	3	Foraging
2.28	00:50	Common Pipistrelle	4	Foraging

19.06.2017 Route 3

Plan ref	Time	Species	Passes	Behaviour
3.1	22:17	Common Pipistrelle	1	Pass
3.2	22:25	Common & Soprano Pipistrelle	1	Commuting
3.3	22:28	Noctule	2	Foraging
3.4	22:36	Common & Soprano Pipistrelle	4	Foraging and Social
3.5	22:40	Common & Soprano Pipistrelle (3 bats)	2	Foraging and Social
3.6	22:48	Common & Soprano Pipistrelle	4	Foraging
3.7	22:59	Common & Soprano Pipistrelle	2	Foraging
3.8	23:05	Noctule	3	Foraging
3.9	23:06	Noctule & Common Pipistrelle	6	Foraging
3.10	23:08	Noctule & Common Pipistrelle	3	Foraging
3.11	23:11	Nyctalus & Common Pipistrelle	3	Pass
3.12	23:23	Common & Soprano Pipistrelle	4	Pass
3.13	23:37	Noctule	1	Pass

July Surveys:

10.07.2017 Route 2

Plan ref	Time	Species	Passes	Behaviour
2.1	22:15	Common Pipistrelle	1	Foraging
2.2	22:18	Common Pipistrelle	1	Foraging
2.3	22:19	Common Pipistrelle & Pipistrelle Sp.	3	Foraging
2.4	22:24	Common Pipistrelle & Pipistrelle Sp.	Multiple	Foraging

2.5	22:25	Common Pipistrelle	3	Foraging
2.6	22:29	Common Pipistrelle	1	Foraging
2.7	22:53	Common Pipistrelle	3	Foraging
2.8	22:56	Common Pipistrelle	1	Foraging
2.9	23:08	Myotis	1	Pass
2.10	23:46	Common Pipistrelle	1	Foraging
2.11	23:55	Common Pipistrelle	1	Foraging
2.12	00:12	Pipistrelle Sp.	1	Foraging
2.13	00:24	Common Pipistrelle	1	Foraging
2.14	00:25	Soprano Pipistrelle	1	Foraging
2.15	00:33	Common Pipistrelle	1	Foraging

10.07.2017 Route 3

Plan ref	Time	Species	Passes	Behaviour
3.1	22:03	Soprano Pipistrelle	7	Foraging
3.2	22:09	Soprano Pipistrelle	1	Commuting
3.3	22:21	Soprano & Common Pipistrelle	1 of each	Commuting
3.4	22:31	Common Pipistrelle & Pipistrelle Sp.	3	Foraging
3.5	22:36	Common Pipistrelle & Myotis	Multiple	Foraging & Pass
3.6	22:44	Soprano Pipistrelle	1	Pass
3.7	22:46	Soprano Pipistrelle	1	Pass
3.8	22:50	Common Pipistrelle	1	Pass
3.9	23:03	Common Pipistrelle	Multiple	Foraging
3.10	23:21	Common Pipistrelle	1	Pass
3.11	23:23	Common Pipistrelle	1	Pass

September Surveys:

14.09.2017 Route 1

Plan ref	Time	Species	Passes	Behaviour
1.1	19:48	Soprano Pipistrelle	1	Commuting
1.2	20:11	Nathusius Pipistrelle	1	Commuting
1.3	20:13	Soprano Pipistrelle	1	Commuting
1.3	20:13	Noctule	1	Commuting
1.4	20:16	Noctule	1	Commuting
1.5	20:20	Soprano Pipistrelle	Continuous	Foraging
1.5	20:22	BLE	1	Passing
1.5	20:24	Common Pipistrelle	3	Foraging
1.6	20:32	Common Pipistrelle	Continuous	Foraging + Social
1.6	20:32	Soprano Pipistrelle	Continuous	Foraging + Social

14.09.2017 Route 2

Plan ref	Time	Species	Passes	Behaviour
2.1	19:55	Soprano Pipistrelle	4	Foraging
2.2	20:14	Common Pipistrelle	1	Foraging
2.3	20:25	Common Pipistrelle	2	Passing
2.4	20:29	Common Pipistrelle	1	Passing
2.5	20:33	Common Pipistrelle	1	Passing
2.6	20:36	Common Pipistrelle	3	Passing
2.7	20:41	Common Pipistrelle	2	Passing
2.8	20:54	Common Pipistrelle	3	Foraging + Social
2.8	20:54	Soprano Pipistrelle	3	Foraging + Social
2.9	21:05	Common Pipistrelle	Continuous	Foraging + Social
2.10	21:28	Soprano Pipistrelle	1	Foraging
2.11	21:33	Soprano Pipistrelle	3	Passing
2.11	21:34	Soprano Pipistrelle	2	Foraging + Social

14.09.2017 Route 3

Plan ref	Time	Species	Passes	Behaviour
3.1	19:40	Common Pipistrelle	1	Passing
3.2	20:05	Soprano Pipistrelle	2	Commuting + Social
3.3	20:12	Common Pipistrelle	1	Foraging
3.4	20:15	Soprano Pipistrelle	Multiple	Foraging + Social
3.5	20:27	Common Pipistrelle	2	Foraging + Social
3.6	20:31	Myotis	1	Passing
3.7	20:32	Common Pipistrelle	1	Passing
3.8	20:50	Common Pipistrelle	1	Passing



Hallam Land Management Ltd

Infinity Garden Village (Wragley Way), Derby

BREEDING BIRD REPORT

May 2019

FPCR Environment and Design Ltd

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Figure 1: Breeding Bird Results Plan

APPENDICES

Appendix A: Breeding Bird Survey Results & EOAC Criteria for Categorisation of Breeding Status

1.0 NON-TECHNICAL SUMMARY

- 1.1 FPCR were commissioned by Hallam Land Management Ltd to carry out a breeding bird survey at a site off Wragley Way, Derby where there is a proposal for residential development.
- 1.2 The survey was undertaken between April and June 2018. A total of 47 bird species were recorded within the survey area, of which 18 were considered 'notable' species. Seven species were confirmed as breeding within the survey area, 16 were considered probable breeders and the remaining 24 species were considered possible or non-breeders.
- 1.3 The assemblages of birds within the survey area were typical of the habitats present, with the vast majority of species common and widespread. The assemblage associated with the arable and grassland fields was considered to be of Local level conservation importance, as was the assemblage associated with hedgerows, woodland, scrub and scattered trees.
- 1.4 Seven individual species on site (skylark, mistle thrush, song thrush, linnet, yellowhammer, bullfinch and dunnock) were considered to be of Local level conservation importance based on their conservation status and abundance on site. The remaining species recorded were considered to be of Site level conservation importance.
- 1.5 It is considered the development will have a Local Adverse impact on the farmland birds recorded including skylark, yellowhammer and linnet, since all the arable and grassland fields will be lost. It is likely the proposals will have a Local Beneficial impact on the generalist species which inhabit the hedgerows, woodland, scrub and scattered trees, including mistle thrush, song thrush, bullfinch and dunnock, as the proposals retain the vast majority of these habitat features and create additional habitat within the green infrastructure of the development.
- 1.6 Recommended habitat loss mitigation includes the enhancement of hedgerows and retention of grassy margins, the appropriate management and planting of proposed grassland areas and the provision of kestrel nest boxes.
- 1.7 Mitigation measures are recommended to minimise disturbance impacts to birds; any vegetation clearance will be undertaken outside the bird nesting season (March – September, inclusive). If this is not possible, an ecologist should make a check of any suitable breeding habitat prior to its clearance, with suitable stand-offs (as determined by the ecologist) retained around any active nests until dependant young have fledged.
- 1.8 A range of enhancement opportunities have been suggested based on the habitats and bird species recorded in order to achieve biodiversity gains. These include sensitive planting schemes and the provision of a range of nest boxes.

2.0 INTRODUCTION

- 2.1 The following report has been prepared by FPCR Environment and Design Ltd on behalf of Hallam Land Management Ltd and provides details of a Breeding Bird Survey (BBS) undertaken on a site located off Wragley Way Road, Derby (central OS grid reference: SK 336 304. This report should be read in conjunction with the Ecological Appraisal¹ for the site which details the results of an Extended Phase 1 Habitat Survey.

Site Location and Context

- 2.2 The site (approximately 113ha) largely comprised arable fields with improved grassland and semi-improved grassland fields also present. These fields were bound by hedgerows and dry and wet ditches, and some fields contained scattered mature trees. Other habitats on site comprised small areas of semi-natural broadleaved woodland, broadleaved plantation woodland, dense scrub, marshy grassland and ruderal vegetation. The area surveyed included an additional strip of land adjacent to the east of the site comprising similar habitat of hedgerow bound arable fields in addition to farm buildings (see Figure 1).
- 2.3 The survey area is located on the southern periphery of Derby, with residential development lying to the north of the survey area with pastoral and arable farmland present to the south, east and west.

Site Proposals

- 2.4 The proposals for the site comprise a residential development with associated infrastructure including areas of green infrastructure.

Survey Objectives

- 2.5 The Breeding Bird Survey was carried out between April and June 2018. The objectives of the survey were to:
- Identify the presence, species and distribution of breeding birds within the survey area;
 - Evaluate the conservation importance of habitats within the survey area to local bird populations and identify any areas of ornithological interest and;
 - Make recommendations to minimize the potential impact of development and where feasible to consider opportunities for additional habitat creation.

¹ FPCR Environment and Design Ltd. (2019). *Wragley Way, Derby Ecological Appraisal* On behalf of Hallam Land Management Ltd.

3.0 LEGISLATION AND GUIDANCE

Legislation

- 3.1 The Wildlife and Countryside Act 1981 (as amended)² is the principal legislation affording protection to UK wild birds. Under this legislation all birds, their nests and eggs are protected by law and it is an offence, with certain exceptions to recklessly or intentionally:
- Kill, injure or take any wild bird;
 - Take, damage or destroy the nest of any wild bird while in use or being built;
 - Take or destroy the egg of any wild bird.
- 3.2 Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) receive additional protection against intentional disturbance whilst building or occupying a nest, and against disturbance of dependent young.
- 3.3 Certain species have also been listed as Species of Principal Importance (SPI) for the conservation of biodiversity in England under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006)³. The S.41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.
- 3.4 The survey area falls within the Claylands area of the Lowland Derbyshire Local Biodiversity Action Plan⁴ (LBAP) which identifies a number of targets for UK priority species that occur within this area, however no bird species are included.

Status

- 3.5 In addition to statutory protection, some bird species are classified according to their conservation status, such as their inclusion on the Red and Amber lists of Birds of Conservation Concern (BoCC) in the UK⁵:
- Red list (high conservation concern) species are those that are globally threatened according to IUCN criteria; those whose population has declined rapidly (50% or more) in recent years; and those that have declined historically and not shown a substantial recent recovery.
 - Amber list (medium conservation concern) species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately (between 25% and 49%) in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.

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

³ <http://www.legislation.gov.uk/ukpga/2006/16/contents>

⁴ Lowland Derbyshire Biodiversity Partnership, 2011. *Lowland Derbyshire Biodiversity Action Plan*. [online] Lowland Derbyshire Biodiversity Partnership. Available at: http://www.derbyshirebiodiversity.org.uk/news/files/Lowland_Derbyshire_Biodiversity_Action_Plan_2011-2020.pdf (Accessed 04 February 2019)

⁵ Eaton MA, Aebischer N, Brown A, Hearn R, Lock L, Musgrove A, Noble D, Stroud D and Gregory RD (2015) *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds 108, pp708-746

- Green list (low conservation concern) species fulfil none of the above criteria

4.0 METHODOLOGY

Desk study

- 4.1 In order to compile existing baseline ornithological information, the following organisations were consulted for data regarding statutory and non-statutory designated sites for which birds are a designating feature, and protected / notable bird records:
- Multi Agency Government Information for the Countryside (MAGIC),
 - Derbyshire Wildlife Trust (DWT)
- 4.2 The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
- 5km around the site boundary for sites of International Importance (e.g. Special Protection Areas (SPAs) and Ramsar sites).
 - 2km around the site boundary for sites of National or Regional Importance (e.g. Sites of Special Scientific Interest (SSSIs)).
 - 1km around the site boundary for non-statutory designated sites of County Importance (e.g. Sites of Importance for Nature Conservation (SINCs) / Local Wildlife Sites (LWSs), and protected or otherwise notable species records from 2000 onwards.

Field Survey

- 4.3 To provide a reasonable level of accuracy for determining the population status of the breeding birds in the survey area, three surveys were undertaken by an experienced ornithologist during April, May and June 2018. The survey methodology employed was broadly based on that of territory mapping as developed by the British Trust for Ornithology (BTO) (Bibby *et al.* 2000)⁶. All birds encountered (seen or heard) were recorded on a field survey plan using standard BTO species codes and symbols for bird activities and to denote activity, sex and age where appropriate. Birds were considered to be holding a territory and therefore likely to be utilizing the survey area for breeding activities if they were displaying breeding behaviours, such as: singing, nest building, food carrying or territorial defence. If birds did not display such behaviours, e.g. they were only recorded flying over the survey area, they were considered non-breeders. Breeding evidence used in this report follows EOAC guidelines 1979⁷, as shown in Appendix A.
- 4.4 The survey visits were undertaken between sunrise and 11:00. A route was mapped out prior to the survey being undertaken, with particular attention paid to linear features, such as hedgerows and ditches, and other features such as waterbodies and woodland. The survey was not undertaken in unfavourable conditions such as heavy rain or strong wind, which may

⁶ Bibby, C.J., N.D. Burgess & D.A. Hill, (2000). *Bird Census Techniques*: 2nd Edition. London: Academic Press

⁷ European Ornithological Atlas Committee, 1979. *Categories of Breeding Bird Evidence*. European Ornithological Atlas Committee.

negatively affect the results. Table 1 identifies the dates and weather conditions of the survey.

Table 1: Breeding Bird Survey Dates and Conditions

Survey	Date	Cloud Cover (%)	Rain	Wind	Visibility
1	06.04.18	90	None	Light to gentle breeze	Very good
2	09.05.18	10	None	Light air	Excellent
3	11.06.18	10	Brief light shower	Light air	Very good

- 4.5 In addition due to a red line change in 2019, a small additional area in the east of the site was included which had not been surveyed in 2018. Available data from 2016 was used and bird data located within the additional used to supplement the 2018 data. Given the habitats comprised similar arable land this is not considered a constraint.

Assessment Methodology

- 4.6 The conservation value of bird populations has been measured using two separate approaches: nature conservation value and conservation status. The CIEEM guidance on Ecological Impact Assessment (EIA) assesses nature conservation value within a geographical context. To attain each level of value, an ornithological resource or one of the features (species population or assemblage of species) should meet the criteria set out in Table 2 below. In some cases, professional judgement may be required to increase or decrease the specific value, based upon local knowledge.

Table 2: Evaluation Criteria

Nature Conservation Value	Selection Criteria
International	A species which is part of the cited interest of an SPA and which regularly occurs in internationally or nationally important numbers. A species present in internationally important numbers (>1% of international population).
National	A species which is part of the cited interest of a SSSI and which regularly occurs in nationally or regionally important numbers. A nationally important assemblage of breeding or over-wintering species. A species present in nationally important numbers (>1% UK population). Rare breeding species (<300 breeding pairs in the UK).
Regional	Species of Principle Importance under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above, and which regularly occurs in regionally important numbers. Species present in regionally important numbers (>1% of regional population). Sustainable populations of species that are rare or scarce within a region. Species on the BoCC Red List and which regularly occurs in regionally important numbers.

Nature Conservation Value	Selection Criteria
County	Species of Principle Importance under Schedule 41 of the Natural Environment and Rural Communities (NERC) Act (2006), which are not covered above and which regularly occurs in county important numbers Species present in county important numbers (>1% of county population). Sustainable populations of species that are rare or scarce within a county, or listed as priority species for nature conservation under S41 of the NERC Act. A site designated for its county important assemblage of birds (e.g. a SINC Site). Species on the BoCC Red List and which regularly occur in county important numbers.
Local	Other species of conservation interest (e.g. all other species on the BoCC Red and Amber List or listed as Species of Principle Importance under Schedule 41 of the NERC Act (2006) which are not covered above) regularly occurring in locally sustainable populations. Sustainable populations of species which are rare or scarce within the locality.
Site	Species that are common and widespread

- 4.7 The latest county annual bird report, *Derbyshire Bird Report 2017*⁸ was consulted to inform the assessment. The abundance of species referred to in this report follows the guidelines as used in the county annual bird report:
- Very rare – Fewer than ten records ever;
 - Rare – Ten or more records ever, but less than annual;
 - Scarce – Fewer than ten birds occurring or pairs breeding annually;
 - Uncommon – Between ten and 100 birds occurring or pairs breeding annually;
 - Fairly common – Between 100 and 1000 birds occurring or pairs breeding annually;
 - Common – Between 1000 and 10,000 birds occurring or pairs breeding annually;
 - Abundant – More than 10,000 birds occurring or pairs breeding annually.
- 4.8 The survey area has also been assessed against the LWS criteria for the identification of avian sites in Derbyshire⁹ based on a number of criteria set out for breeding birds. Local Wildlife Sites are recognised by central government as an important tool in promoting sustainable development and protecting biodiversity.
- 4.9 Particular attention has been given to bird species with an associated conservation status such as WCA Schedule 1, SPI and / or BoCC Red or Amber list species. These species are likely to be of the greatest threat in relation to further decline, and are commonly referred to as 'notable' species.

⁸ Derbyshire Ornithological Society, (2017). *Derbyshire Bird Report 2017*

⁹ Derbyshire Wildlife Trust 2003 (Revised 2011). *Guidelines for the Selection of Local Wildlife Sites*. Derbyshire Wildlife Trust

5.0 RESULTS & EVALUATION

Desk Study

Designated sites

- 5.1 One statutory site of relevance to birds was present within the search areas. This was Hell's Meadow Wood Local Nature Reserve (LNR), which is selected for its secondary broad-leaved woodland but its variety of bird life is also highlighted including the amber listed BoCC tawny owl *Strix aluco*. The reserve is located 230 m north-west of the survey area and covers approximately 10 ha.
- 5.2 No non-statutory sites of relevance to birds were present within the search areas.

Protected/notable Species

- 5.3 A total of 20 notable bird species records were identified within 1km of the survey area dating from 2000 onwards through consultation with local environmental record centres. These records comprised song thrush *Turdus philomelos* (16 records), yellowhammer *Emberiza citrinella* (2 records), reed bunting *Emberiza schoeniclus* (1 record) and house sparrow *Passer domesticus* (1 record). These species are all SPI and red/amber listed BOCC, and are all common widespread species typical of the farmland and residential habitats of the surrounding landscape. One of the records of yellowhammer was recorded in a grid reference which partially falls with the survey area boundary, adjacent to Wragley Way in the north-east of the survey area. The remaining records were located outside the survey area boundary, the majority from within the LNR and Local Wildlife Sites surrounding Sinfin.

Field Survey

- 5.4 A total of 47 bird species were recorded within the survey area during the breeding bird survey, 18 of which were considered notable. Seven species were confirmed as breeding within the survey area including the notable mistle thrush *Turdus viscivorus* and dunnoek *Prunella modularis*. Sixteen species were considered probable breeders, including the notable skylark *Alauda arvensis*, willow warbler *Phylloscopus trochilus*, song thrush, yellowhammer and bullfinch *Pyrrhula pyrrhula*. The remaining 24 species recorded were considered possible breeders (11) or non-breeders (13).
- 5.5 Table 3 provides a summary of the notable bird species and their breeding status on site and Figure 1 shows their recorded distribution. A full list of results is provided in Appendix A.

Table 3: Notable Bird Species Recorded and their Recent Status in Derbyshire

Species	Legal/ Conservation Status	Peak Count / No. of Survey Visits Recorded	Breeding status	Recent Status in Derbyshire
Mallard <i>Anas platyrhynchos</i>	Amber list	2/2	Non breeder	A common or abundant resident and winter visitor
Black-headed gull <i>Chroicocephalus ridibundus</i>	Amber list	5/1	Non breeder	An abundant winter visitor and passage migrant. A fairly common breeder in S and NW
Lesser black-backed gull <i>Larus fuscus</i>	Amber list	1 flyover / 1	Non breeder	A common summer visitor, passage migrant and winter visitor
Stock dove <i>Columba oenas</i>	Amber list	6 flyovers / 1	Non breeder	A fairly common resident
Kestrel <i>Falco tinnunculus</i>	Amber list	2 / 2	Possible	A fairly common resident and partial migrant
Skylark <i>Alauda arvensis</i>	Red list NERC SPI	8 + 4 flyovers / 3	Probable	A common resident and passage migrant
Willow warbler <i>Phylloscopus trochilus</i>	Amber list	2 / 2	Probable	A common summer visitor
Starling <i>Sturnus vulgaris</i>	Red list NERC SPI	2 + 2 flyovers / 2	Possible	An abundant resident, passage migrant and winter visitor
Fieldfare <i>Turdus pilaris</i>	Red list WCA Sch.1	37 flyovers / 1	Non breeder	A common winter visitor and passage migrant.
Song thrush <i>Turdus philomelos</i>	Red list NERC SPI	5 / 3	Probable	A common resident and partial migrant
Mistle thrush <i>Turdus viscivorus</i>	Red list	3 / 2	Confirmed	A fairly common or common resident
Dunnock <i>Prunella modularis</i>	Amber list NERC SPI	24 / 3	Confirmed	An abundant resident
House sparrow <i>Passer domesticus</i>	Red list NERC SPI	1 colony / 3	Non breeder	A common but decreasing resident
Meadow pipit <i>Anthus pratensis</i>	Amber list	3 + 1 flyover / 1	Non breeder	In lowlands an uncommon breeder but a common winter visitor passage migrant
Bullfinch <i>Pyrrhula pyrrhula</i>	Amber list NERC SPI	4 + 1 flyover / 2	Probable	A fairly common resident
Linnet <i>Carduelis cannabina</i>	Red list NERC SPI	28 + 28 flyovers / 3	Possible	A common resident and partial migrant
Yellowhammer <i>Emberiza citrinella</i>	Red list NERC SPI	15 + 5 flyovers / 3	Probable	A common resident
Reed bunting <i>Emberiza schoeniclus</i>	Amber list NERC SPI	3 + 2 flyovers / 1	Non breeder	A fairly common resident and passage migrant

Bird Survey Results Description

- 5.6 Internally, fields provided limited breeding opportunities for birds with the exception of skylark, which was recorded in moderate numbers (8-12 individuals across survey visits) and considered a probable breeder. The field boundaries provided breeding opportunities for moderate numbers of other farmland species including the notable species yellowhammer and linnet *Carduelis cannabina*, with the field interiors providing foraging resources for these species, including large flocks of linnet recorded in the first survey visit. Kestrel *Falco tinnunculus* utilised the grassland fields and arable field margins for foraging. The notable species meadow pipit *Anthus pratensis* was recorded within the fields during the first survey visit and were considered to be on passage. Reed bunting was also considered a non-breeder as the habitat is unsuitable and they were recorded in the first survey visit only. Other species which utilised this habitat included foraging buzzard *Buteo buteo*, pheasant *Phasianus colchicus*, pied wagtail *Motacilla alba*, swallow *Hirundo rustica* and corvid species.
- 5.7 The hedgerows, woodland and scrub which bound the field compartments and the scattered trees within the fields provided breeding and foraging opportunities for a range of common and widespread generalist and woodland species. Notable species included dunnoek, mistle thrush, song thrush, bullfinch, willow warbler and starling *Sturnus vulgaris*. House sparrow were noted in this habitat but are considered a non-breeder due to the lack of suitable nesting habitat. Lesser whitethroat *Sylvia curruca*, which is uncommon within the county, was noted as a probable breeder within this habitat. The mature trees within these habitats provide potential nesting sites for kestrel and other birds of prey including buzzard and sparrowhawk *Accipiter nisus*. Other species utilising these habitats included great spotted woodpecker *Dendrocopos major*, goldcrest *Regulus regulus*, robin *Erithacus rubecula*, wren *Troglodytes troglodytes*, blackbird *Turdus merula* and the range of widespread warbler, finch, pigeon, tit and corvid species recorded.
- 5.8 A number of birds were recorded flying over the site only. Notable species included fieldfare *Turdus pilaris*, a winter visitor and passage migrant, in addition to mallard *Anas platyrhynchos*, black-headed gull *Chroicocephalus ridibundus*, stock dove *Columba oenas* and lesser black-backed gull *Larus fuscus*
- 5.9 In addition to the above, data from 2016 surveys covering the additional area added in April 2019 indicates the additional presence of one notable species, within this small extension to the red line, being a single record of a bullfinch.

Evaluation

Local Wildlife Site Selection Criteria

- 5.10 The survey area was assessed against published criteria for LWS selection in the *Derbyshire Local Wildlife Site Selection Guidelines 2003 (amended 2011)* to assess the survey area against the thresholds for county value. There were seven relevant criteria relevant as discussed below:
- 5.11 **Criterion B11:** Any site which regularly supports 0.5% or more of the total British breeding population of any native bird species.

The number of each species recorded within the survey area was considerably less than 0.5% of the total British breeding population.

- 5.12 **Criterion Bi3:** *Any site that regularly supports a breeding population of a species on the UK 'Red List' of Birds of Conservation Concern 3 (Eaton et al, 2009) or the UK BAP Priority Bird species list or subsequent amendments.*

The application of this criterion goes on to explain that "Many of the species included on these lists are common and widespread within the county, making designation inappropriate. Decisions should be based on current knowledge of the distribution, rarity and population trends of individual species at the time, both at national, regional and county level."

Two species that are red listed BoCC and/or SPI were confirmed breeders within the survey area – mistle thrush and dunnock, with a further four species considered probable breeders – skylark, song thrush, bullfinch and yellowhammer. However, since these species are categorised as abundant, common or fairly common within Derbyshire it would be inappropriate to apply this criterion to the survey area.

Criterion Bi4: *Sites that regularly support a breeding population of a species considered as a rare breeding bird in Derbyshire.*

- 5.13 The application of this criterion goes on to explain that "This applies to species with fewer than 20 breeding pairs in Derbyshire or to a species with fewer than 50 breeding pairs restricted to 10 sites or less."
- 5.14 Lesser whitethroat are categorised as uncommon within the county by the Derbyshire Bird Report 2017. However, according to the report at least 50 pairs/singing males were recorded from 55 sites within the county, and it thus does not meet this criterion. All the other species within the survey area considered as confirmed or probable breeders were categorised as fairly common to abundant within the county by the Derbyshire Bird Report 2017.

Criterion Bi5: *Any site which regularly supports a good assemblage of breeding bird species characteristic of the habitat in which they are recorded.*

- 5.15 A good assemblage is one which equals or exceeds the threshold site index values for the relevant habitat. The only habitat listed within the selection criteria that is present within the survey area is Farmland Mosaic. The total score for this habitat within the survey area has been calculated using the BBS data and is shown alongside the "threshold site index value" in Table 4. It should be noted that only species considered probable or confirmed breeders have been included. The total score does not meet the *threshold site index value* for Farmland Mosaic and therefore this criterion is not met.

Table 4: An Assessment of the Breeding Bird Assemblage against the Habitat Thresholds Provided in the Derbyshire Local Wildlife Site Selection Guidelines 2003 (Revised 2011)

Farmland Mosaic	
Species	Score
Yellowhammer	2
Bullfinch	1
Whitethroat	1

Lesser whitethroat	1
Blackcap	1
Skylark	2
Song thrush	2
Total score for site	10
Threshold site index value	13

Criterion Bi6: Any site which regularly supports a significant breeding population of wader species.

- 5.16 No wader species were recorded on Site.

Criterion Bi7: Any site from which the following have been recorded:

a) 45 breeding bird species

- 5.17 Only 23 species were considered as confirmed or probable breeders within the survey area.

Criterion Bi9: Any site that supports a significant population of a colonial nesting bird.

- 5.18 These include species such as swift *Apus apus*, sand martin *Riparia riparia* and grey heron *Ardea cinerea*. Grey heron were found within the survey area but as a non-breeder as they were recorded flying over only.
- 5.19 The survey area does not meet any of the seven relevant criteria and therefore does not qualify for selection as a LWS based on its breeding bird assemblage.

Assemblage Value

- 5.20 The fields and their boundaries provided breeding and foraging opportunities for moderate numbers of farmland birds including skylark, yellowhammer and linnet and provided foraging for kestrel, reed bunting and meadow pipit. As a result of this diversity of notable species, the survey area was considered to be of **Local** level importance for its farmland bird assemblage.
- 5.21 The hedgerows, woodland, scrub and scattered trees on site supported a large range of widespread species typical of this habitat. This included providing breeding and foraging opportunities for mistle thrush, dunnock, song thrush, bullfinch, willow warbler, starling and house sparrow. As a result of this diversity of notable species, the survey area was considered to be of **Local** level importance for its hedgerow/woodland bird assemblage

Individual Species

- 5.22 Table 5 presents the seven bird species on site that are evaluated to be of at least **Local** level nature conservation importance. This evaluation is based on the methodology outlined in Table 1. The other 40 species recorded on site were evaluated to be of **Site** level nature conservation importance. This was due to these species either being considered nationally common and widespread species and/or occurring within the survey area infrequently, in low numbers, in unsuitable breeding habitats or flying over only.

Table 5: Evaluation of Nature Conservation Importance of Birds Recorded within the Survey Area

Name	Status		Importance
	SPI	WCA Sch.1	
Red List			
Skylark	<i>Alauda arvensis</i>	+	Local
Mistle thrush	<i>Turdus viscivorus</i>		Local
Song thrush	<i>Turdus philomelos</i>	+	Local
Linnet	<i>Linaria cannabina</i>	+	Local
Yellowhammer	<i>Emberiza citrinella</i>	+	Local
Amber List			
Bullfinch	<i>Pyrrhula pyrrhula</i>	+	Local
Dunnock	<i>Prunella modularis</i>	+	Local

6.0 DISCUSSION & RECOMMENDATIONS

- 6.1 The following section provides an assessment of the potential impacts of the proposals upon breeding birds and subsequent recommendations for mitigation and enhancement as appropriate.
- 6.2 The recommendations below have been given with the aim of informing development proposals to maintain the conservation status of bird species recorded.

Impact Assessment

- 6.3 The potential impact of the loss or change of habitat upon breeding bird species arising from the effects of development is based upon the following; an understanding of each species' ecological requirements; the type of development; the number of birds recorded on site; their nature conservation criteria based on legislation and current guidance; their county status according to *Derbyshire Bird Report 2017*; and professional judgement.
- 6.4 The following potential impacts to the recorded bird populations and assemblage may result from the proposals:
- Direct loss/change of breeding habitat; and
 - Disturbance during construction and/or operation

Habitat Loss

- 6.5 The current development proposals include the loss of all arable and grassland fields within the site. All hedgerows and woodland will be retained, with the exception of breaches in hedgerows to allow road access. Some scattered trees will be lost. Extensive green infrastructure (GI) is indicated as part of the development, mainly focused along the southern boundary of the site. This comprises a combination of structural planting and grassland areas. Three attenuation features are indicated within the GI, but at this stage it is not known whether these will hold water permanently or seasonally.
- 6.6 The individual species recorded on site that are arguably the most vulnerable to impacts from habitat loss/change are the seven species that are considered to be of at least Local

importance. These comprise notable species that are either specially protected, appear on the BoCC Red/Amber list and/or are listed as SPI, and were recorded in at least locally important numbers.

- 6.7 The total loss of the arable and grassland fields will inevitably have a **Local Adverse** impact on the specialist farmland species recorded on site. This includes the locally important yellowhammer, skylark and linnet which depend on these habitats for nesting and/or foraging. The proposed creation of small areas of grassland within the GI will provide some mitigation for the generalist arable/grassland species.
- 6.8 The vast majority of hedgerows and woodland on site will be retained under current proposals and, there is also the proposed creation of additional structural habitat within the GI. As a result, for the generalist species which inhabit the hedgerows, woodland scrub and scattered trees, including the locally important mistle thrush, dunnock, song thrush and bullfinch, the development will result in a **Local Beneficial** impact. The habitat will remain suitable following development since the species recorded within this assemblage readily habituate to urban environs. In addition, these species will readily inhabit residential areas, particularly once the gardens and green spaces have matured, providing further suitable habitat

Mitigation

- 6.9 As detailed in the ecological appraisal report for the site¹⁰, retained hedgerows will be enhanced which will compensate for the small sections lost. This includes the planting up of gaps with native fruit/nut-bearing species and, together with newly created hedgerows, appropriate management. It is also recommended that where possible grassy margins at least 2 metres wide are retained on either side of hedgerows to continue to provide foraging and nesting opportunities.
- 6.10 To mitigate for the loss of mature trees with potential nesting sites for kestrel, nest boxes specific for this species should be provided. These should be installed at least 5m high on lone mature trees within the GI close to grassland areas and away from potential disturbance.

Disturbance Impacts

- 6.11 Construction operations have the potential to disturb birds using the site for roosting, foraging, and breeding. Operations likely to disturb breeding birds include noise from vegetation clearance, initial ground works and some construction activities, such as piling, which are of low frequency but high amplitude. Active, high level, infrequent disturbance causes most birds to be displaced for short periods¹¹. During the breeding season disturbance may lead to nest desertion or the avoidance of the area and reduce the suitability of retained nesting areas, such as the retained hedgerows or woodland edge. Whilst there is some potential for breeding success to be reduced, this is not expected to affect the local conservation status on the majority of the bird species using the site for breeding.
- 6.12 The increase in domestic animals during the operational phase, particularly cats, may lead to an effect on small bird populations. Recent research is inconclusive as to the actual effect

¹⁰ FPCR Environment and Design Ltd. (2018). *Wragley Way, Derby Ecological Appraisal* On behalf of Mowden Developments Ltd.

¹¹ Hockin, D., Ounsted, M., Gorman, M., Hill, D., Keller, V., and Barker, M. 1992 Examination of the effects of disturbance on birds with reference to the role of environmental impact assessments. *Journal of Environmental Management*, 36, 253–286

that domestic cats can have on wild populations. However, although some species may be more susceptible to predation than others, it is considered unlikely that the increased abundance of cats would alter the conservation status of any of the breeding bird assemblages in this instance, with the magnitude of any such impact reduced by the retention of hedgerows which will continue to provide cover and screening from potential predators. It is therefore considered that the impact of cats will be of negligible significance.

Mitigation

- 6.13 To avoid disturbance to breeding birds, ground clearance works and vegetation removal will where possible be undertaken prior to the bird-breeding season (March to September, inclusive). If this is not possible, the area will be checked prior to removal of vegetation or ground works by a suitably qualified ecologist. If active nests are found, vegetation will be left untouched and suitably buffered from works until all birds have fledged. Specific advice will be provided prior to undertaking the clearance. This would be a statutory requirement due to the protection of all nesting birds and their nests under the Wildlife and Countryside Act (1981, as amended).

Enhancements

- 6.14 The proposed structural planting within the GI and the newly created hedgerows have the potential to provide additional foraging and nesting habitat for a range of bird species. To provide optimal benefits to a wide range of species it is recommended the structural planting comprises a combination of woodland and scrub planting, with the woodland incorporating native understorey planting to provide structural diversity as the habitat matures. Together with the newly created hedgerows, this structural planting should consist of native, fruit and nut-bearing species. Suitable tree species for woodland and hedgerow planting include, but are not limited to, beech *Fagus sylvestris*, penduculate oak *Quercus robur*, ash *Fraxinus excelsior*, wild cherry *Prunus avium*, rowan *Sorbus aucuparia*, crab apple *Malus sylvestris*, alder *alnus glutinosa*, silver birch *Betula pendula* and bird cherry *Prunus padus*. Appropriate shrub species for hedgerow, scrub and woodland understorey planting include, but are not limited to, hawthorn *Crataegus monogyna*, holly *Ilex aquifolium*, honeysuckle *Lonicera periclymenum*, dog rose *Rosa canina*, blackthorn *Prunus spinosa*, guelder-rose *Viburnum opulus* dogwood *Cornus sanguinea* and wild privet *Ligustrum vulgare*.
- 6.15 It is recommended the proposed attenuation features are designed to maximise biodiversity whether dry or wet by planting with native species and by sensitive management. If feasible, permanent water would provide greater benefit to birds. Planting the waterbody with an appropriate native marginal vegetation mix that includes common reed *Phragmites australis* would provide potential nesting opportunities for several species including reed bunting, sedge warbler *Acrocephalus schoenobaenus* and reed warbler *Acrocephalus scirpaceus*.
- 6.16 The erection of additional nest boxes to those recommended for mitigation will provide further enhancement for bird species. The following provides details of suitable nest box types to be erected at suitable locations:
- The inclusion of house sparrow nest terraces and swift *Apus apus* nest boxes within the built environment to encourage them to breed on site;

- Large nest boxes with large holes (45-50 mm) placed on suitable trees to provide additional breeding sites for starling and great spotted woodpecker;
- Stock dove nest boxes placed on mature trees within areas less susceptible to disturbance such as areas adjacent to farmland;
- A mixture of small hole (26mm and 32mm) boxes placed on suitable trees will provide nesting opportunities for species such as blue tit *Cyanistes caeruleus* and great tit *Parus major*. These boxes generally have a high uptake rate;
- Small open fronted nest boxes again should be placed throughout the site especially on trees which support a climber such as ivy which provides a degree of concealment. These boxes typically attract species such as robin and blackbird.

Appendix A: Breeding Bird Survey Results & EOAC Criteria for Categorisation of Breeding Status

All breeding bird results June 2016 (includes additional red line outside site boundary during 2018 surveys).

Vernacular (British) Name	Scientific Name	Number recorded	Conservation status	Breeding Status ¹
		Survey 1		
Blackbird	<i>Turdus merula</i>	3	Green list	Probable
Blackcap	<i>Sylvia atricapilla</i>	1 offsite	Green list	Non breeder
Blue tit	<i>Cyanistes caeruleus</i>	4	Green list	Confirmed
Bullfinch	<i>Pyrrhula pyrrhula</i>	1	Amber list NERC S.41	Possible
Buzzard	<i>Buteo buteo</i>	-	Green list	Non breeder
Carrion crow	<i>Corvus corone</i>	1	Green list	Possible
Chaffinch	<i>Fringilla coelebs</i>	3	Green list	Probable
Chiffchaff	<i>Phylloscopus collybita</i>	2 offsite	Green list	Non breeder
Dunnock	<i>Prunella modularis</i>	1	Amber list NERC S.41	Probable
Feral pigeon	<i>Columba livia</i>	-	Green list	Non breeder
Fieldfare	<i>Turdus pilaris</i>	-	Red list WCA Sch.1	Non breeder
Goldfinch	<i>Carduelis carduelis</i>	4	Green list	Probable
Great tit	<i>Parus major</i>	5	Green list	Probable
Greenfinch	<i>Chloris chloris</i>	-	Green list	Possible
House sparrow	<i>Passer domesticus</i>	Colony	Red list NERC S.41	Probable
Jackdaw	<i>Corvus monedula</i>	-	Green list	Possible
Lesser whitethroat	<i>Sylvia curruca</i>	1	Green list	Possible
Linnet	<i>Carduelis cannabina</i>	2	Red list NERC S.41	Possible
Magpie	<i>Pica pica</i>	2	Green list	Confirmed

Vernacular (British) Name	Scientific Name	Number recorded	Conservation status	Breeding Status ¹
		Survey 1		
Meadow pipit	<i>Anthus pratensis</i>	-	Amber list	Non breeder
Mistle thrush	<i>Turdus viscivorus</i>	--	Red list	Possible
Mute swan	<i>Cygnus olor</i>	1	Amber list	Non breeder
Pheasant	<i>Phasianus colchicus</i>	-	Not listed	Possible
Pied wagtail	<i>Motacilla alba</i>	-	Green list	Possible
Robin	<i>Erithacus rubecula</i>	6	Green list	Probable
Skylark	<i>Alauda arvensis</i>	1	Red list NERC S.41	Non breeder
Song thrush	<i>Turdus philomelos</i>	2	Red list NERC S.41	Probable
Starling	<i>Sturnus vulgaris</i>	2	Red list NERC S.41	Possible
Stock dove	<i>Columba oenas</i>	-	Amber list	Non breeder
Swallow	<i>Hirundo rustica</i>	6	Green list	Non breeder
Whitethroat	<i>Sylvia communis</i>	3	Green list	Probable
Willow warbler	<i>Phylloscopus trochilus</i>	1 offsite	Amber list	Non breeder
Woodpigeon	<i>Columba palumbus</i>	12	Green list	Possible
Wren	<i>Troglodytes troglodytes</i>	7	Green list	Probable
Yellowhammer	<i>Emberiza citronella</i>	3	Red list NERC S.41	Probable
Total		25		

All Breeding Bird Results 2018

Common Name	Scientific Name	Number Recorded			Conservation Status & Protection	Breeding status ¹²
		Survey 1	Survey 2	Survey 3		
Mallard	<i>Anas platyrhynchos</i>	2	1	-	Amber list	Non breeder (F)
Pheasant	<i>Phasianus colchicus</i>	2	1	-	Not listed	Possible (H)
Cormorant	<i>Phalacrocorax carbo</i>	-	-	2	Green list	Non breeder (F)
Grey heron	<i>Ardea cinerea</i>	-	1	-	Green list	Non breeder (F)
Sparrowhawk	<i>Accipiter nisus</i>	-	-	1	Green list	Possible (H)
Buzzard	<i>Buteo buteo</i>	2	2	3	Green list	Probable (P)
Black-headed gull	<i>Chroicocephalus ridibundus</i>	5	-	-	Amber list	Non breeder (F, UH)
Lesser black-backed gull	<i>Larus fuscus</i>	-	-	1	Amber list	Non breeder (F, UH)
Feral pigeon	<i>Columba livia</i>	6	-	-	Green list	Non breeder (F, UH)
Stock dove	<i>Columba oenas</i>	6	-	-	Amber list	Non-breeder (F)
Woodpigeon	<i>Columba palumbus</i>	233	53	56	Green list	Possible (H)
Collared dove	<i>Streptopelia decaocto</i>	2	1	1	Green list	Possible (S, H)
Great spotted woodpecker	<i>Dendrocopos major</i>	1	1	4	Green list	Confirmed (FL)
Kestrel	<i>Falco tinnunculus</i>	2	1	-	Amber list	Possible (H)
Magpie	<i>Pica pica</i>	31	5	9 + family	Green list	Confirmed (FL)
Jay	<i>Garrulus glandarius</i>	4	1	-	Green list	Possible (H)
Jackdaw	<i>Corvus monedula</i>	3	4	2	Green list	Possible (H)
Carrion crow	<i>Corvus corone</i>	23	5	5	Green list	Possible (H)
Goldcrest	<i>Regulus regulus</i>	1	1	-	Green list	Possible (S, H)
Blue tit	<i>Cyanistes caeruleus</i>	23	11	21 + 3 families	Green list	Confirmed (FL, FF)

¹² European Ornithological Atlas Committee, 1979. Categories of Breeding Bird Evidence. European Ornithological Atlas Committee

Great tit	<i>Parus major</i>	13	13	11 + 3 families	Green list	Confirmed (FL, FF)
Skylark	<i>Alauda arvensis</i>	12	9	8	Red list NERC SPI	Probable (T)
Swallow	<i>Hirundo rustica</i>	-	5	2	Green list	Non breeder (UH)
Long-tailed tit	<i>Aegithalos caudatus</i>	10	5	5 + 1 family	Green list	Confirmed (FL)
Chiffchaff	<i>Phylloscopus collybita</i>	5	2	1	Green list	Probable (T)
Willow warbler	<i>Phylloscopus trochilus</i>	-	1	2	Amber list	Probable (T)
Blackcap	<i>Sylvia atricapilla</i>	2	7	6	Green list	Probable (T, P)
Lesser whitethroat	<i>Sylvia curruca</i>	-	-	2	Green list	Probable (P)
Whitethroat	<i>Sylvia communis</i>	-	11	10	Green list	Probable (P, T)
Wren	<i>Troglodytes troglodytes</i>	21	16	16	Green list	Probable (T)
Starling	<i>Sturnus vulgaris</i>	4	2	-	Red list NERC SPI	Possible (H)
Blackbird	<i>Turdus merula</i>	28	19	16	Green list	Probable (P)
Fieldfare	<i>Turdus pilaris</i>	37	-	-	Red list WCA Sch.1	Non breeder (M, F)
Song thrush	<i>Turdus philomelos</i>	4	1	5	Red list NERC SPI	Probable (T)
Mistle thrush	<i>Turdus viscivorus</i>	2	-	3	Red list	Confirmed (FL)
Robin	<i>Erithacus rubecula</i>	26	22	18	Green list	Probable (P, T)
Dunnock	<i>Prunella modularis</i>	24	12	7	Amber list NERC SPI	Confirmed (FF)
House sparrow	<i>Passer domesticus</i>	3	7	1 colony	Red list NERC SPI	Non breeder (UH)
Pied wagtail	<i>Motacilla alba</i>	6	1	-	Green list	Non breeder (UH)
Meadow pipit	<i>Anthus pratensis</i>	4	-	-	Amber list	Non breeder (UH)
Chaffinch	<i>Fringilla coelebs</i>	16	6	7	Green list	Probable (P, T)
Bullfinch	<i>Pyrrhula pyrrhula</i>	-	1	5	Amber list NERC SPI	Probable (P)
Greenfinch	<i>Chloris chloris</i>	2	3	1	Green list	Probable (T)
Linnet	<i>Carduelis cannabina</i>	56	4	4	Red list NERC SPI	Possible (H)

Goldfinch	<i>Carduelis carduelis</i>	39	17	18	Green list	Probable (P, T)
Yellowhammer	<i>Emberiza citrinella</i>	20	7	8	Red list NERC SPI	Probable (T, P)
Reed bunting	<i>Emberiza schoeniclus</i>	5	-	-	Amber list NERC SPI	Non breeder (UH)
Total No. of Species (47)		38	36	33		

Breeding Status evidence can be broken down into four sections, each with their own codes, as defined by the European Ornithological Atlas Committee:

Confirmed breeder -

- Distraction display or injury feigning (DD)
- Used nest or eggshells found from this season (UN)
- Recently fledged young or downy young (FF)
- Adults entering or leaving nest-site in circumstances indicating occupied nest (ON)
- Adult carrying faecal sac or food for young (FF)
- Nest containing eggs (NE)
- Nest with young seen or heard (NY)

Probable breeder - (Evidence accumulated during the survey indicates that the bird species is breeding on site)

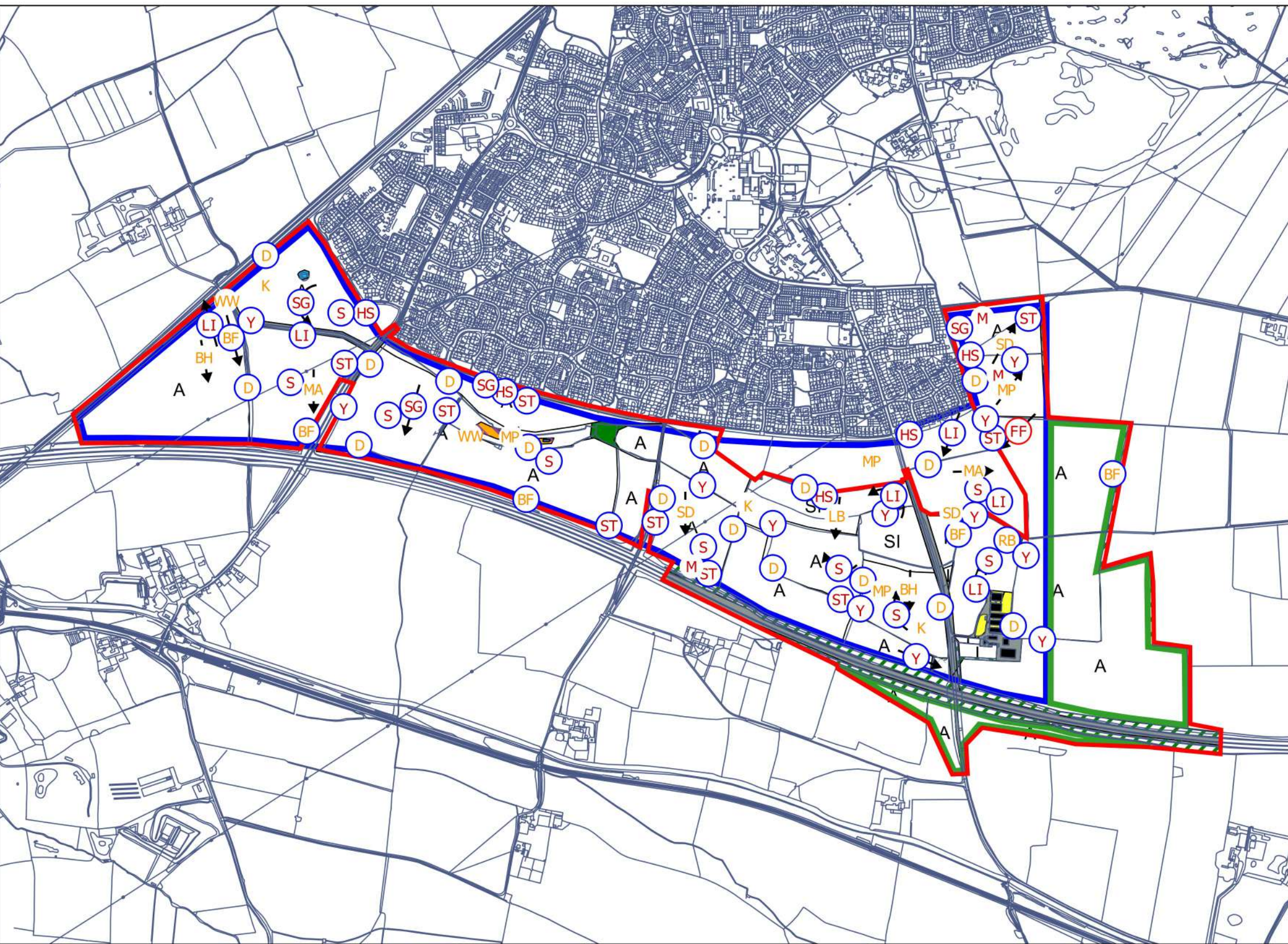
- Pair in suitable nesting habitat (P)
- Permanent territory, defended over at least 2 survey occasions (T)
- Courtship and display (D)
- Visiting probable nest site (N)
- Agitated behaviour (A)
- Brood patch of incubating bird, from bird in hand (I)
- Nest building or excavating nest-hole (B)

Possible breeder - (Evidence accumulated during the survey indicates that the bird species could be breeding on site, but the evidence is less conclusive than that obtained for probable breeders)

- Observed in suitable nesting habitat (H)
- Singing male (S)

Non-breeder -

- Flying over (F)
- Migrant (M)
- Summering non-breeder (U)
- Observed in unsuitable nesting habitat (UH)



Key

- Site Boundary
- 2018 Survey Area
- 2016 Survey Area

→ Fly over only

BoCC Red-Listed Species

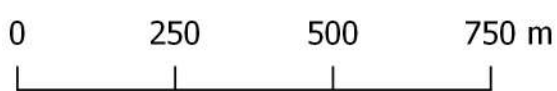
- FF Fieldfare
- HS House Sparrow
- LI Linnet
- M Mistle Thrush
- S Skylark
- ST Song Thrush
- SG Starling
- Y Yellowhammer

BoCC Amber Listed Species

- BH Black-headed Gull
- BF Bullfinch
- D Dunnock
- K Kestrel
- LB Lesser Black-backed Gull
- MA Mallard
- MP Meadow Pipit
- RB Reed Bunting
- SD Stock Dove
- WW Willow Warbler

Additional Protections

- Schedule 1 Species
- NERC Species of Principle Importance





Hallam Land Management

Infinity Garden Village (Wragley Way), Derby

WATER VOLE AND OTTER REPORT

May 2019

FPCR Environment and Design Ltd

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FIGURES

Figure 1: Water Vole and Otter Survey Plan

1.0 INTRODUCTION

- 1.1 The following report has been prepared by FPCR Environment & Design Ltd on behalf of Hallam Land Management Ltd and provides details of water vole and otter surveys undertaken at a site at Wragley Way, Derby (central OS grid reference: SK 336 304).
- 1.2 This report should be read in conjunction with the Ecological Appraisal¹ and associated protected species reports produced for the site.

Site Location and Context

- 1.3 The site, which is 146ha in size, largely comprised arable land with improved grassland and semi-improved grassland also present on-site. Other habitats present comprise semi-natural broadleaved woodland, broadleaved plantation woodland, hedgerows, dense scrub and ruderal vegetation.
- 1.4 The site is located on the southern periphery of Derby, with residential development lying to the north of the site with pasture and arable fields present to the south, east and west of the site.

Development Proposals

- 1.5 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

2.0 LEGISLATION

Water Vole

- 2.1 Water voles are fully protected under section 9 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:-
 - Intentionally kill, injure or take water voles;
 - Intentionally possess or control live or dead water voles or derivatives;
 - Intentionally or recklessly damage, destroy and obstruct access to any structure or place used by water voles for shelter or protection; and/or
 - Intentionally or recklessly disturb water voles whilst they are using such a place.
- 2.2 Water voles are listed as a Species of Principal Importance in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.
- 2.3 National Planning Policy Framework (NPPF), the Government's policy on Biodiversity and Geological Conservation, advises Local Authorities to take measures to protect the habitats of species of principal importance, of which water vole is one, for the conservation of biodiversity.

Otter

¹ FPCR 2019 Wragley Way, Derby Ecological Appraisal.

- 2.4 Otter are fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (*as amended*) due to the protection afforded to their places of shelter and protection. They are afforded protection under Section 9 parts 4(a) and 4(b). This makes it an offence to:
- Intentionally or recklessly kill, injure or take these species
 - Possess or control live or dead species or derivatives
 - Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection
 - Intentionally or recklessly disturb these species whilst occupying a structure or place used for that purpose
 - Sell these species or offer or expose for sale or transport for sale
 - Publish or cause to be published any advertisement which conveys the buying or selling of these species
- 2.5 The otter is also protected by the Habitats and Species Regulations 2017 (as amended). In effect this legal protection makes it an offence to deliberately:
- Kill, take or injure an otter
 - Damage or destroy an otters place of shelter
 - Disturb an otter whilst using such a place
- 2.6 The European otter is listed as a Species of Principal Importance in England under Section 41 of the NERC Act 2006. Otter is also identified as a Priority Species of the Northamptonshire Biodiversity Partnership Action Plan, which aims to improve road bridges to allow otters to pass safely underneath, promote a fish population increase through increased water quality and promote management of watercourses and adjacent habitats to include wet woodland.
- 2.7 Any operations that may lead to either a direct or indirect effect upon otter or their places of rest or shelter require a Natural England European Protected Species (EPS) license. EPS licenses involve the production of a method statement detailing appropriate mitigation and compensation to ensure that the favourable conservation status of otter is not affected during the proposed operations.

3.0 METHODOLOGY

Desktop Study

- 3.1 In order to compile existing baseline information, relevant ecological information was requested from the Derbyshire Wildlife Trust (DWT).

Field Survey

Water Vole

3.2 The survey was undertaken on 25th September 2018 and followed the standard methodology outlined within Strachen *et al* (2011)² and involved searching the banks/margins of the watercourse and wet ditch for evidence of water vole. Field signs searched for included:

- Latrine sites – distinct piles of water vole droppings found near nest sites, at the ranges of territorial boundaries and where the animals enter and leave the water;
- Feeding stations – areas with distinct neat piles of chewed lengths of vegetation along pathways or haul out platforms along the water's edge;
- Burrows – burrow entrances are typically wider than high with a diameter between 4-8cm. Generally these burrow entrances are located at the water's edge;
- Lawns – short grazed areas at the entrances to burrows;
- Prints – identifiable prints in soft margins of the watercourse;
- Runways – low tunnels that are pushed through the vegetation and often leading to burrows or feeding stations.

3.3 Descriptions of the ditches surveyed were also made to aid any enhancement or mitigation recommendations required.

Otter

3.4 Survey methodology attempted to determine the status of otters. The methodology followed that of the full survey detailed in the New Rivers and Wildlife Handbook³. Consideration was given to their potential presence within the entire site during the phase 1 survey although the majority of survey effort focused on the Main, Meadow and Barrow Drains.

3.5 Due to the unlikely event of actual observation, the survey concentrated on locating field signs indicating otter presence or use. Such field signs include:

- Spraints – characteristic sweet-smelling, black tar-like (where fresh/relatively recent i.e. within a few weeks) or grey crumbly (when old) faecal deposits usually containing fish scales, bones and occasionally invertebrate exoskeleton and bird feathers.
- Footprints – In good substrate typically asymmetrical and showing five toes arched around a large pad and, depending on substrate, webbing and claw marks. Poorer, generally coarser substrates do not often enable the identification of otter footprints.

3.6 Additional signs of otter presence may occur, although without additional evidence are usually not conclusive proof of current otter presence:

- Feeding remains – Remains of fish and aquatic invertebrates
- Slides/haul-outs – Routes into and out of the water, which are usually associated with terrestrial routes such as short cuts around meanders or along traditionally, used otter paths/routes.
- Couches/hovers – above ground resting place. Usually associated with cover such as dense scrub, rushes or reed, flood debris or fallen trees. Many couches are rarely used whilst other more so. Difficult to prove use without radio tracking.

² Strachen, R, Moorhouse, T and Gelling, M (2011) Water Vole Conservation Handbook. Third edition

³ RSPB, the National Rivers Authority, and the RSNC 1994

- Holts i below ground resting site usually associated with sprainting. Sometimes used with greater frequency than couches and can be important for breeding (natal holts) where other signs are usually absent. Notoriously difficult to find or prove without radio tracking.

Survey Limitations

- 3.7 The density of vegetation in some small sections within the survey area was relatively high. It is therefore possible that some evidence, including water vole burrows, may not have been recorded in these areas. However, the majority of the banks along the water bodies surveyed were readily accessible, including within the site itself, and it is considered highly unlikely that the presence of these species would have been overlooked.

4.0 RESULTS

Desktop Study

- 4.1 The DWT provided several historic water vole records (1998 to 2000) approximately 570m north-east of the site boundary and additional record was returned within Stenson Bubble Marina approximately 540m south (2007).

Field Survey

Habitat Assessment

- 4.2 During the Phase 1 Survey undertaken in March 2018 10 ditches, (D1-D4, D6-D7, D9-D11 and D27) were identified as possessing some suitability for supporting water vole. These ditches were subject to further survey in September 2018 and are described below with these descriptions based on their condition at the time of the water vole survey. The on-site ponds (P1-P4) were not considered to be suitable for water vole with no further surveys on them considered necessary. Pond P1 was a collection of small, shallow pools and was therefore deemed to be of negligible value for water vole. Pond P2 supported no aquatic or marginal vegetation with an absence of suitable banks for burrowing rendering it of low suitability for this species. Pond P3 supported some aquatic vegetation in the form of floating sweet-grass *Glyceria fluitans* with banks present which could potentially be suitable for burrowing. However, since this pond was located within an arable field it was considered to be isolated from other areas of suitable habitat and therefore water vole colonisation is highly unlikely. Pond P4 was located in the corner of an arable field at its lowest point and consequently its water level fluctuates significantly, this pond was absent of aquatic and marginal vegetation with limited suitable burrowing available for water vole.
- 4.3 The remaining ditches present on-site were considered to be of negligible suitability for water vole due to being dry and absent of aquatic and marginal vegetation. These ditches were therefore not considered for further survey.

Ditch D1

- 4.4 Ditch D1 forms part of the eastern boundary of the site and is approximately 1m wide and 1.5m deep with a water depth of less than 5cm with no aquatic or marginal vegetation recorded. The

channel base was heavily sedimented and the banks were steep and penetrable with grass coverage and common nettle *Urtica dioica* present.

Ditch D2

- 4.5 Ditch D2 partially forms the eastern boundary and measures approximately 1m in width and 1.5m in height with a water depth of approximately 10cm. The channel base was heavily sedimented with common reed *Phragmites australis* and reed canary grass *Phalaris arundinacea* present, with occasional water cress *Rorippa nasturtium-aquaticum* also recorded. The banks were steep and penetrable with the eastern bank largely covered by grass species whilst the west was hedgerow lined which was largely composed of hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. This ditch was partially shaded due to hedgerow overgrowth and mature crack willow *Salix fragilis* trees.

Ditch D3

- 4.6 Ditch D3 forms part of the main located along the north-eastern boundary of the site. Its channel measures approximately 1m in width and 1.5m in depth with an approximate water depth of 10-60cm deep with its base being heavily sedimented. Water flow within the drain was generally slow to slack. Vegetation surrounding the banks comprised rough grassland, tall ruderal and small amounts of scattered scrub. Marginal and emergent vegetation was present with reed canary grass, common reed, Great willowherb *Epilobium hirsutum* and bulrush *Typha latifolia* present.

Ditch D4

- 4.7 Ditch D4 is connected to ditches D1 and D2 in the eastern section of the site. The northern bank of this ditch was dominated by a managed hedgerow and immature trees comprising hawthorn, blackthorn, holly *Ilex aquifolium*, elder *Sambucus nigra* and sessile oak *Quercus petraea*. The channel measured approximately 0.5m wide and 1.5m in depth with a water depth of approximately 10cm with a heavily sediment channel base. Its southern bank was penetrable and dominated by grasses with great willowherb and common nettle also recorded. Aquatic vegetation comprised common duckweed *Lemna minor* and reed canary grass.

Ditch D6

- 4.8 Ditch D6 was not accessible due to a dense hedgerow (H11) blocking access to the ditch on the south side with the north side part of an existing building site. This ditch was approximately 0.5m in width and 1m in depth with a water depth of less than 5cm. Himalayan balsam was recorded within this ditch.

Ditch D7

- 4.9 Ditch D7 forms part of Barrow Drain which was largely dry at the time of survey. The channel width measured between approximately <0.5m to 0.5m and approximately 1m in depth and was heavily overgrown with common reed and reed canary grass.

Ditches D9 and D10

- 4.10 Ditches D9 and D10 were a continuation of Barrow Drain and were dry at the time of survey. These ditches were largely absent of aquatic and marginal vegetation with limited pendulous sedge *Carex pendula* recorded. These ditches were heavily overgrown with bramble and crack willow in sections.

Ditch D11

- 4.11 Ditch D11 was largely dry at the time of survey with very little vegetation present on the banks. This ditch was approximately 0.5m in width and 1m in depth with a water depth of less than 5cm.

Ditch D28

- 4.12 Ditch D28 was a continuation for ditch D11 which was dry at the time of survey and was heavily shaded within the woodland. There was no aquatic or marginal vegetation present and very little bankside vegetation.

Field Signs

Water Vole

- 4.13 No evidence to confirm the presence of water vole such as latrines and feeding stations, were found during the survey.

Otter and Other Mammal Evidence

- 4.14 No evidence to confirm the presence of otter was found during the survey.

5.0 DISCUSSION AND RECOMMENDATIONS

Discussion

Water Vole

- 5.1 Agricultural drains within the survey area are considered to provide suitable habitat for water vole. Consequently due to direct connections to these drains and other drains within the wider landscape the on-site ditches are also considered to offer suitable habitat for water vole, particularly in events of high water vole populations. It is also considered that the area, particularly ditches D2-D4, provides sufficient vegetative cover to have the potential to support movement, shelter and feeding. The banks include penetrable earth that could support burrow systems. However this could be devalued if the vegetative management of the banks was intensive.
- 5.2 No evidence of active water vole was identified during the survey which was undertaken in September when numbers are considered to be at their highest based on their life cycle. A survey was also undertaken in September 2016 on ditches D1-6, D7 and D9-D10 during which no evidence of water vole was recorded. Ditches D2, D3 and D4 were considered to be of higher value to water vole since they supported aquatic and marginal vegetation and held water, albeit mainly shallow at the time of the survey. The remaining ditches surveyed were considered to be

of limited value for water vole due to them being dry at the time of survey whilst supporting very limited marginal vegetation.

- 5.3 Based upon the above evidence it is considered that water voles are likely to be absent from the survey area and site and do not present a statutory constraint at this time. Guidance recommends that a second survey is undertaken between mid-April and June, however since no evidence of water vole was recorded in the 2016 or 2018 surveys it is considered unlikely that water vole are present on-site and this additional survey is therefore considered unnecessary.
- 5.4 However, water vole do have the potential to colonise the on-site ditches if natural influences allow. The dispersal of water voles can see new areas colonise rapidly with factors such as water level fluctuations and predation affecting the rate and speed of dispersal. Consequently, as a precautionary measure it is considered that a pre-commencement survey should be undertaken in advance of any works being carried out within 5m of the ditches. The survey will confirm the presence / absence of water vole and confirm any change in statutory constraints at that time. This survey should be undertaken by an experienced ecologist and according to the methodology described above.
- 5.5 Proposals see the retention of the majority of the ditches and therefore minimal impacts are anticipated. Indirect impacts such as incidental pollution are possible and it is therefore suggested that best practice is adopted to ensure that the risk of incidental damaging events are reduced. These are discussed further within Mitigation Measures below.

Otter

- 5.6 No recent evidence was observed within the site or immediately adjacent habitat. Evidence that otter is present locally has been observed in the past, which is consistent with the occasional use of the drains by otter, which is not unexpected given the extensive and expanding range often seen in the UK by this species. The majority of the habitats within the site are open and exposed and therefore provide sub-optimal habitat for otter. No evidence of any places of rest or shelter were noted and the site was considered to represent a potentially suitable commuting route for otter between areas of suitable habitat in the surrounding landscape only.

Mitigation Measures

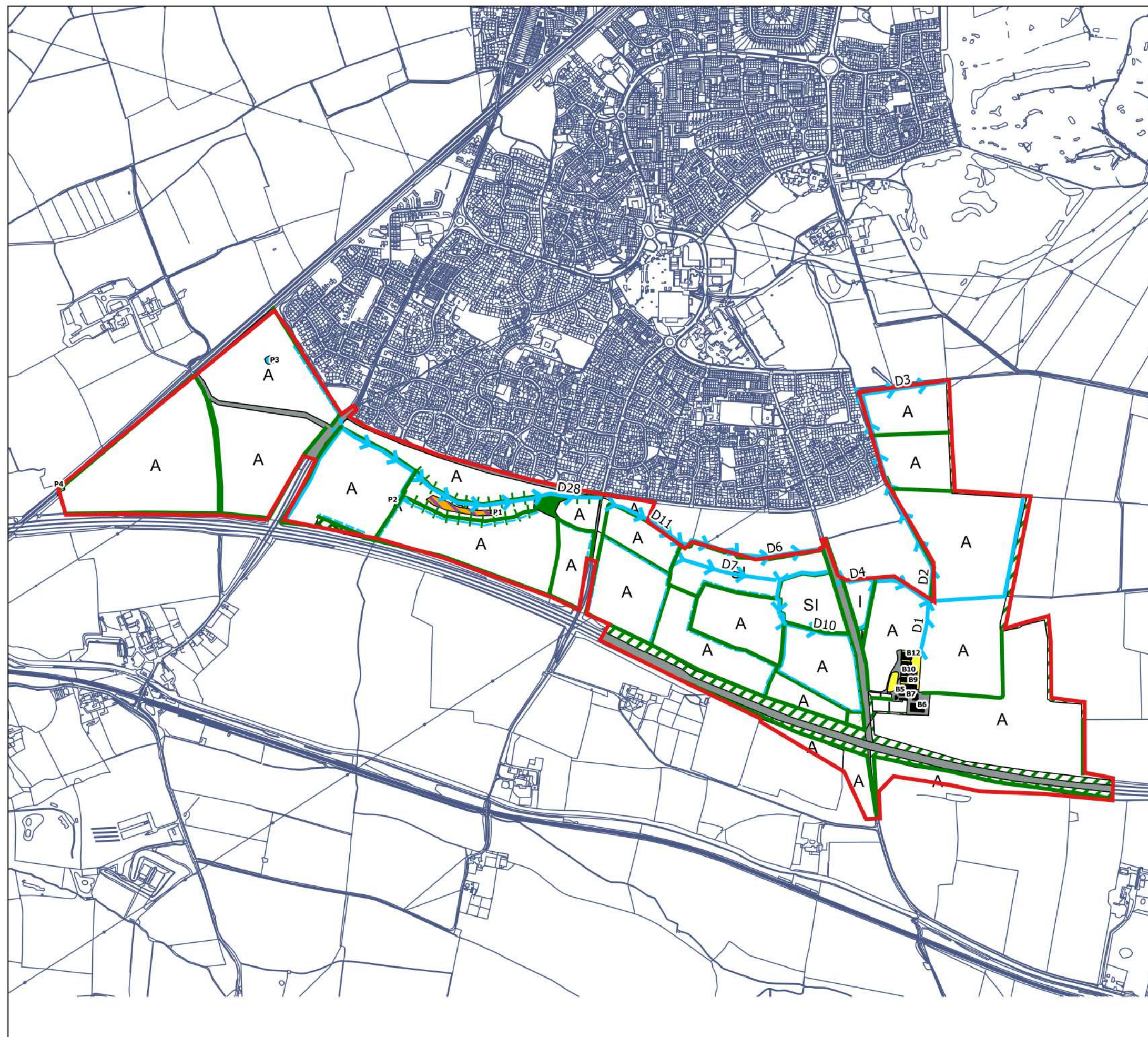
General Considerations

- 5.7 Prior to any works within a floodplain, such as the creation of the open space, any relevant consents should be in place prior to works and best practice followed to ensure that pollution events are reduced and the appropriate protocol is in place and adopted to minimise risk in the event they should occur. This should include ensuring that all retained aquatic habitats are protected during construction. Best practice should follow the recommendations of the Guidance for Pollution Prevention (GPP⁵) or similar subsequent best practice guidance
- 5.8 It is recommended that where possible the use of rodenticides is avoided as these can be harmful to local wildlife that utilise the site and its riparian habitats.
- 5.9 If, during the pre-commencement survey, water vole absence is confirmed then no further survey is necessary, unless in the event that works are not undertaken immediately following the further survey.

- 5.10 If the presence of water vole was confirmed on-site mitigation would be necessary to discourage or remove water vole from the affected area of works. Any mitigation that may be necessary should be carried out according to best practice detailed in The Water Vole Mitigation Handbook (2016) and agreed with the relevant nature conservation consultees.
- 5.11 In brief, mitigation measures would involve either the ~~passive displacement~~ or physical trapping of water vole. Passive displacement involves the sensitive management of vegetation on no more than 50m habitat to discourage water vole from the working area. The period for undertaking passive displacement is outside of the breeding season, i.e. only within the period from mid-February to mid-April, and supervised by a licenced water vole worker. If passive displacement of water voles is required outside of this period a site-specific licence would need to be obtained from Natural England. Physical trapping of water vole requires the fencing of affected habitat, followed by trapping and relocation of individuals to a suitable receptor area. In some instances a suitable receptor area requires creation and establishment and trapping can only be undertaken under a Natural England Licence and outside of the period of lactating females, i.e. only carried out during the period mid-April to mid-June or, as a last resort, mid-September to November, inclusive.
- 5.12 In the event that mitigation was required this will seek to ensure that the conservation status of the local population is maintained and enhanced in the long term. It is considered that with the implementation of the methods above and the extent of extensive green space proposals (including suggested enhancements discussed below), suitable habitat mitigation and management would be provided.

Management Timings

- 5.13 Sensitivity towards timings of work to minimise disturbance to fauna using aquatic habitats would be recommended. Vegetation management should be on a rotation to allow development and maintenance of tall and dense swards in places. Ideally management works should be undertaken throughout the winter months when wildlife are least active and there is no threat to the breeding season.
- 5.14 Vegetative management within the ditches, created waterbodies and bankside vegetation should be undertaken on a rotational basis to ensure that there is a continual supply of mature vegetation. No more than 50% should be stripped back in any one year. Any vegetation removed should be left on the bankside for 48 hours to allow movement back into the aquatic habitats.
- 5.15 If management during the winter months is not feasible then a minimum of a 5m bankside strip from the ditches or created waterbodies should be left to provide food, shelter and commuting areas for local wildlife. These should be managed on a rotational basis only cutting a maximum of 50% vegetation to maintain cover.



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Key

- Site Boundary
- Built Environment: Buildings/hardstanding
- Buildings
- Broadleaved woodland - plantation
- Standing water
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- Poor semi-improved grassland
- Cultivated/disturbed land - arable
- Hedgerow
- Hedgerow with trees
- Standing water
- Running water
- Dry ditch

client:
Hallam Land Management Ltd
project:
Infinity Garden Village (Wragley Wav),
drawing title:
WATER VOLE AND OTTER SURVEY PLAN



scale:
1:12,000
drawing / figure number:
BJC
issue:
31/5/2019

Figure 1



Hallam Land Management Ltd

Infinity Garden Village (Wragley Way), Derby

Reptile Report

May 2019

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TABLES

Table 1: Survey Dates and Weather Conditions 2017

Table 2: Survey Dates and Weather Conditions 2018

FIGURES

Figure 1: Reptile Refugia Location Plan

1.0 INTRODUCTION

- 1.1 The following report has been prepared by FPCR Environment & Design Ltd on behalf of Hallam Land Management Ltd and provides details of reptile surveys undertaken at a site at Wragley Way, Derby.
- 1.2 This report should be read in conjunction with the Ecological Appraisal¹ and associated protected species reports produced for the site.

Site Location and Context

- 1.3 The site, which is 146ha in size, largely comprised arable land with improved grassland and semi-improved grassland also present on-site. Other habitats present comprise semi-natural broadleaved woodland, broadleaved plantation woodland, hedgerows, dense scrub and ruderal vegetation.
- 1.4 The site is located on the southern periphery of Derby, with residential development lying to the north of the site with pasture and arable fields present to the south, east and west of the site.

Development Proposals

- 1.5 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

2.0 LEGISLATION

- 2.1 All common reptile species, including slow worm *Anguis fragilis*, common lizard *Zootoca vivipara*, grass snake *Natrix helvetica* and adder *Vipera berus*, are partially protected under Sections 9(1) and 9(5) of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)². This legislation protects these animals from:
- Intentional killing and injury,
 - Selling, offering for sale, possessing or transporting for the purpose of sale or publishing advertisements to buy or sell a protected species.
- 2.2 This partial protection does not directly protect the habitat of these reptile species. Where these animals are present on land that is to be affected by development, the implications of legislation are that providing that killing can reasonably be avoided then an operation is legal.
- 2.3 All reptile species are Species of Principal Importance under Section 41 of the NERC Act (2006)³.

¹ FPCR 2019 Wragley Way, Derby Ecological Appraisal.

² The Wildlife and Countryside Act 1981 (as amended). [Online]. London: HMSO Available at <http://www.legislation.gov.uk/ukpga/1981/69> [Accessed 02/12/2014]

³ The Natural Environment and Rural Communities Act 2006. [Online]. London: HMSO Available at: <http://www.legislation.gov.uk/ukpga/2006/16/contents> [Accessed 02/12/2014]

3.0 METHODOLOGY

Desk Study

- 3.1 As part of the desk study the Derbyshire Wildlife Trust was consulted during April 2018 for information on existing ecological data regarding existing reptile records within a 1km radius of the site.

Field Survey

- 3.2 A strategic reptile presence/absence survey was undertaken in areas identified as being of potential suitable reptile habitat within the application site boundary. The survey was undertaken based on current best practice guidelines as detailed within the Herpetofauna Workers Manual⁵ and Froglife Advice Sheet 10 'Reptile Survey'⁶. A total of 170 artificial refugia were placed within the survey area. The indicative locations are shown in Figure 1.
- 3.3 Surveys were undertaken between April and June 2017 on the eastern section of the site and between May and June 2018 on the rest of the site by suitability experienced ecologists. Surveys were conducted in suitable weather conditions i.e. at a temperature of between 9°C and 18°C and when there was no strong wind or heavy rain. The prevailing weather conditions at the time of the 2017 surveys are provided in Table 1 and the 2018 surveys in Table 2.
- 3.4 In addition, the surveys also followed the guidelines/recommendations by:
- Using regularly spaced roofing felt (0.5m²) as artificial refugia, with a black upper side,
 - Approaching refugia from downwind and avoiding casting a shadow and with care so as to not disturb basking animals when checking,
 - That lifting and replacing naturally occurring or artificial refugia, to check for the presence of reptiles, is undertaken with care as to avoid potential harm to any animals.

Table 1: Survey Dates and Weather Conditions 2017

Survey Occasion	Date	Start Time	Weather
1	11.04.17	11.20pm	50% cloud cover, light breeze, no rain, 10°C
2	02.05.17	9.15am	40% cloud cover, light breeze, no rain 15°C
3	08.05.17	5.305pm	60% cloud cover, light wind, no rain 10°C
4	24.05.17	9.15.00am	20% cloud cover, light wind, no rain, 14°C
5	26.05.17	9.00am	0% cloud cover, no wind or rain, 14°C
6	31.05.17	9.15am	40% cloud cover, no wind or rain, 13°C
7	14.06.17	8.30am	40% cloud cover, 14°C, light wind, no rain, 13°C

⁵ (2003) Herpetofauna Workers Manual

⁶ Froglife (1999) Reptile Survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation. *Froglife Advice Sheet 10*.

Table 2: Survey Dates and Weather Conditions 2018

Survey	Date	Temp. (°C)	Cloud (%)	Rain	Wind
1	09.05.18	12	30-40	None	Slight breeze
2	14.05.18	15	0-10	None	Slight breeze
3	17.05.18	10	10-20	None	Slight breeze
4	24.05.18	18	20-30	None	None
5	05.06.18	11	70	None	Slight breeze
6	07.06.18	11	75	None	Slight breeze
7	20.06.18	17	40	None	Slight breeze

Limitations

- 3.5 One of the surveys in 2017 and three of the surveys in 2018 were carried out outside of the recommended optimal survey period (April, May and September) but were undertaken during June. June is generally considered to be a sub-optimal month to conduct presence/absence reptile surveys due to the typically higher temperatures during this month which reduces the need for reptiles to use the artificial refugia to increase their body temperature. Consequently, the likelihood of reptiles being recorded using the artificial refugia during the surveys decreases which reduces the effectiveness and legitimacy of the surveys. However, surveys undertaken during June were carried out in accordance with the weather conditions recommended in the guidelines (temperature range of 9 - 18°C, no/little wind and no/little rain) and consequently the results of these surveys are considered to be valid.

4.0 RESULTS

Desk Study

- 4.1 Consultation with Derbyshire Wildlife Trust returned no records of reptiles within 1km of the site boundary.

Field Survey

Habitat Assessment

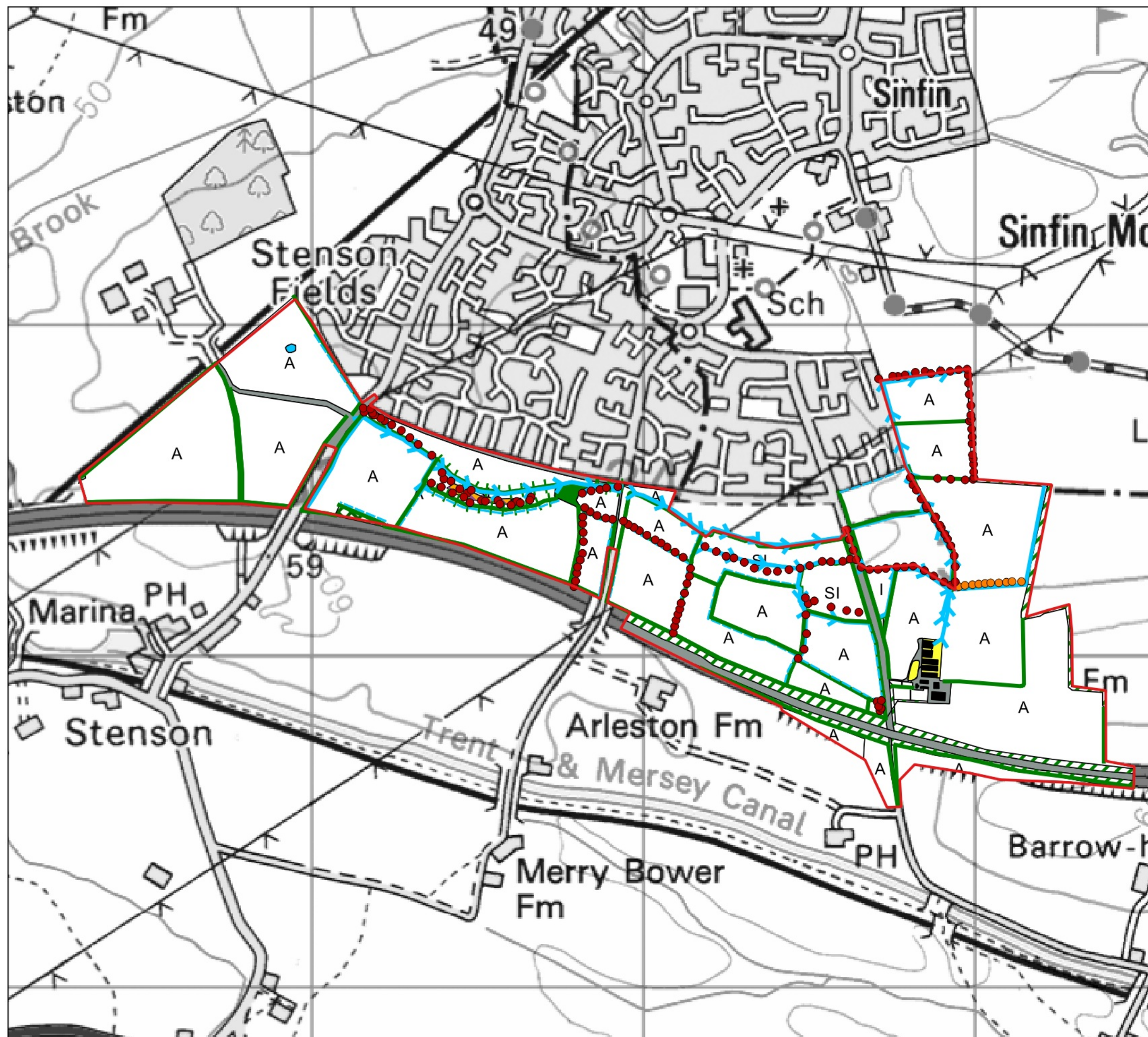
- 4.2 The on-site habitats including arable land and improved grassland were considered to be of low value lacking the structure that this species group typically requires. The woodland offered suitable hibernation/refuge habitat and the hedgerows and scrub offered suitable commuting, foraging and refuge habitat. Additionally the field margins and marshy grassland offered suitable commuting and foraging habitat whilst the ditches offered suitable commuting habitat, particularly for grass snake.

Reptile Survey

- 4.3 During the course of the surveys in both 2017 and 2018 no reptiles were recorded.

5.0 DISCUSSION

- 5.1 Habitats within the boundary of the site were largely of low suitability for reptiles. The woodland, field margins, scrub, hedgerows and ditches, as well as the nearby marshy grassland areas offered some suitable hibernation, commuting, foraging and refuge habitat for reptiles, particularly grass snake.
- 5.2 Full reptile surveys of the site undertaken in 2017 and 2018 confirmed their absence from site habitats, therefore they do not pose a constraint to the proposals. As such no further survey or mitigation is recommended at this time, however it is considered that the proposed GI, primarily located in the southern and eastern sections of the site which will comprise grassland, structural planting and attenuation features will provide additional commuting, foraging and refuge opportunities for reptiles.



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Key

- Site Boundary
- Reptile Refugia Locations 2017
- Reptile Refugia Locations 2018
- Built Environment: Buildings/hardstanding
- Buildings
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Marsh/marshy grassland
- Standing water
- Scrub - scattered
- Scrub - dense/continuous
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- Poor semi-improved grassland
- Cultivated/disturbed land - arable
- Standing water
- Running water
- Intact hedge - species-poor
- Hedge with trees - species-poor
- Dry ditch

client
Hallam Land Management Ltd

project
Infinity Garden Village (Wragley Way),
Derby

drawing title
Reptile Refugia Location Plan

scale
1:12,000

drawn
APR / BJC

issue
29/5/2019



Figure 1



Hallam Land Management Ltd

Infinity Garden Village (Wragley Way), Derby

GREAT CRESTED NEWT REPORT

June 2019

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Table 4: Determining Population Size-Class

Table 5: Pond and Ditch Descriptions

Table 6: HSI Summary

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Figure 1: Pond Location Plan

APPENDICES

Appendix A: Habitat Suitability Index (HSI) Assessment

Appendix B: Aquatic Survey Results

1.0 INTRODUCTION

- 1.1 This report has been prepared by FPCR Environment and Design Ltd. on behalf of Hallam Land Management and provides details of great crested newt *Triturus cristatus* (GCN) surveys undertaken in 2016, 2017 and 2018 in respect of land off Wragley Way, Derby (central OS grid reference: SK 336 304, referred to herein as the site).

Site Context

- 1.2 The site, which is 146ha in size, comprises arable land, improved grassland and small areas of poor-semi-improved grassland, semi-natural woodland, plantation woodland and marshy grassland. Other habitats present on-site comprise scrub and hedgerows.
- 1.3 The site is located on the southern periphery of Derby, with residential development lying to the north and arable fields present to the east, south and west. The A50 runs adjacent to the southern boundary of the site.

Development Proposals

- 1.4 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

2.0 METHODOLOGY

Desktop Study

- 2.1 In order to compile existing baseline information regarding amphibians, relevant ecological information was requested from the Derbyshire Wildlife Trust (DWT)
- 2.2 Further inspection, using colour 1:25,000 OS base maps and aerial photographs (www.ordnancesurvey.co.uk) was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider countryside.

Field Survey

- 2.3 Any waterbodies found within the site were noted and described and their suitability to support an amphibian population, including GCNs noted. Where access was granted, and where suitable connectivity was considered to be present, ponds within a 500m radius of the site were also surveyed and assessed from suitability. These ponds were assessed using the Habitat Suitability Index (HSI).

Habitat Suitability Index

- 2.4 The Habitat Suitability Index provides a measure of the likely suitability that a waterbody has for supporting great crested newts (Oldham *et al* 2002)¹. In general, ponds with a higher score are more likely to support GCNs than those with a lower score, and there is a positive correlation

¹ Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155pp

between HSI scores and ponds with newts recorded. Ten separate attributes are assessed for each pond:

- Geographic location
- Pond drying
- Shade
- Presence of fish
- Terrestrial habitat
- Pond area
- Water quality
- Presence of water-fowl
- Number of linked ponds
- Macrophytic coverage

- 2.5 A score is assigned according to the most appropriate criteria level set within each attribute and a total score calculated of between 0 and 1. Pond suitability is then determined according to the scale shown in Table 1.

Table 1: HSI Scores as a Measure of Pond Suitability

HSI score	Pond Suitability
<0.5	Poor
0.5 - 0.59	Below Average
0.6 - 0.69	Average
0.7 - 0.79	Good
>0.8	Excellent

eDNA Surveys

- 2.6 Environmental DNA (eDNA) sampling was undertaken to determine the presence / absence of GCN in accordance with the guidance set out in Analytical and Methodological Development for Improved Surveillance of the Great Crested Newt, WC1067, Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA [1]. This methodology has been approved by Natural England for the determination of GCN presence/ absence.
- 2.7 Sampling was undertaken on the 30th June 2016 by appropriately licenced ecologists who collected a sample of water from ditch D4. Sampling was undertaken using kits obtained from FERA (Food and Environment Research Agency). This comprised taking samples of agitated water from 20 locations around each pond and mixing thoroughly, 15 ml of this water was then placed into each of the 6 sterile sample tubes containing preservative, precipitates and a DNA sequence that was used for degradation control. All samples were stored in accordance with the protocols provided by the laboratory. The samples were then transported under suitable conditions to FERA's laboratory for analysis. Following analysis, results provided by the laboratory could have one of three outcomes which are described in Table 2 below.

Table 2: Description of Possible Results of eDNA Analysis

Result	Description
Positive	A positive result means that eDNA from GCN was detected and they have been present within the water in the 20 days preceding sampling. An eDNA score would be provided indicating the number of positive replicates from a series of twelve.

Negative	DNA from GCN was not detected; in the case of negative samples the DNA extract is further tested for PCR inhibitors and degradation of the sample.
Inconclusive	Controls indicate degradation or inhibition of the sample, therefore the lack of detection of GCN DNA is not conclusive evidence for determining the absence of the species in the sample provided. Degradation can occur through poor storage of the samples or kits and inhibition can occur through unexpected chemicals in the sample.

Aquatic Surveys (Figure 1)

- 2.8 To determine the presence/absence of GCNs in the surveyed waterbodies an initial four surveys were performed using three of the below four survey methodologies where possible (upon confirmation of the presence of GCN only two methods (ideally bottle trapping and torching) are subsequently undertaken). A completion of the two additional surveys on waterbodies (if the presence of GCNs was confirmed or records of GCN existed) allows a population size-class assessment to be undertaken as per Natural England guidance, as detailed in the *GCN Mitigation Guidelines* (English Nature, 2001) (GCNMG)².
- 2.9 A total of 13 ponds (P1 to P5 and P8-P15) were surveyed in 2018, ponds P1-4 located on-site whilst the remaining ponds were located within 500m of the site boundary. Additionally, ditch D27 was surveyed which was located in the central section of the site.
- 2.10 Surveys were undertaken on ditches D2, D4 and D32 in 2017 which are located in the eastern section of the site.
- 2.11 All surveys were conducted by appropriately licensed ecologists and were completed during suitable conditions i.e. when the ambient air temperature exceeded 5°C, with little/no wind and rain. (Table 3.)

Table 3: Survey Dates and Survey Conditions (2017 and 2018)

2017						
Survey Occasion	Ditches Surveyed	Survey Date	Air Temp (approx. °C)	Water Temp (approx. °C)	Rain	Wind
1	2,4 & 32	30/03/2017	14	12	None	Light
2	2,4 & 32	04/04/2017	13	12	None	Light
3	2,4 & 32	26/04/2017	5	7	None	Light
4	2,4 & 32	02/05/2017	14	12	None	Light
5	2,4 & 32	04/05/2017	9	8	None	Light
6	2,4 & 32	08/05/2017	12	10	None	Light/moderate

² English Nature (2001) Great Crested Newt Mitigation Guidelines, English Nature, Peterborough.

2018						
Survey Occasion	Ponds Surveyed	Survey Date	Air Temp (approx. °C)	Water Temp (approx. °C)	Rain	Wind
1	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13 & 15	03/04/2018	11	8	Light	Light
2	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13 & 15	09/04/2018	10	9	Light	Light
3	2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13 & 15	26/04/2018	13	11	None	Light
4	2, 3, 4, 5, 6, 8, 9, 10, 11, 13 & 15	08/05/2018	14	12	Light	Light

2.12 The following provides details of the survey methodologies undertaken.

Bottle Trapping

2.13 Bottle traps were set within the waterbody in the evening at densities of one trap per two metres of shoreline (where feasible) and left overnight for inspection in the morning. Traps were partially submerged in the water leaving an air bubble in the bottle and secured by a cane marked with a high visibility tape to ensure relocation the following day. Care was taken to ensure that trapping did not occur during excessively warm weather, when the temperature inside the trap could rise considerably, reducing oxygen levels and potentially suffocating the newts.

Sweep Netting

2.14 Long handled sweep-nets were used to sample the margins of the pond for GCNs, with approximately 15 minutes of netting per 50m of shoreline.

Torching

2.15 Torching involved searching the waterbody after dusk using high-powered torches to scan the margins and potential display areas for newts. The perimeter of the pond was walked slowly recording any newts observed. Torch surveys are unsuitable within heavily vegetated and/or turbid ponds or after periods of heavy rain as visibility is diminished.

Egg Searching

2.16 Newts lay single eggs on leaves of aquatic plants or other suitable pliable material, after which the material is folded over the egg to protect it. GCN eggs can be distinguished from those of the other newts by their size, shape and colour. Submerged vegetation was examined for newt eggs and folded leaves gently opened to check for eggs. Once a GCN egg is identified, no further leaves need to be examined to minimise any further potential disturbance.

Population Size-Class Assessment

3.11 Where a population of GCNs was confirmed, a population size-class assessment was completed in accordance with Natural England's standard guidance within the *Great Crested Newt Mitigation*

Guidelines. This assessment is based on the highest maximum count of GCNs across connected ponds observed on a single survey occasion (Table 4).

Table 4: Determining Population Size-Class

Population size class	Highest number of observations for one night
Low	0-10 animals
Medium	11-100 animals
Large	>101 animals

Survey Limitations

- 2.17 Pond P1 was only subject to two surveys as it dried up in mid-April and pond P12 was only subject to three surveys as it dried by in early May, consequently these ponds were considered to offer negligible aquatic and breeding habitat for GCN. This is therefore not considered to represent a constraint to the survey effort.

3.0 RESULTS & ASSESSMENT

- 3.1 Complete habitat descriptions are provided in the separate Ecological Appraisal (FPCR, 2019). In brief, the site consists predominantly of arable land with areas of semi-natural woodland, plantation woodland, grazed improved grassland, poor semi-improved grassland, ponds, scrub and hedgerows also present.

Desktop Study (Figure 2)

- 3.2 Consultation with Derbyshire Wildlife Trust identified no statutory or non-statutory sites of nature conservation interest within 2km of the site that had been specifically designated for the population(s) of GCN that they support.
- 3.3 No records of GCN were returned within 1km of the site boundary.

Field Survey

- 3.4 There were a total of 16 ponds identified within 500m of the site boundary, of which four (P1-P4) were located on-site. Further surveys were not considered necessary on ponds P6-7 and P16. Pond P6 was located approximately 60m south of the site boundary, however this pond was separated from the site by the busy main road (A50) which was considered to represent a significant barrier to dispersal. Consequently this pond was considered to be isolated from the site.
- 3.5 No further surveys were undertaken on Pond P7 due to the intervening distance (approximately 210m) with limited connecting habitat between this pond and the site. Additionally, an area of woodland is present approximately 65m north of the pond which represents optimal terrestrial habitat for this species providing suitable foraging, refuge and hibernation habitat. It is considered highly likely that, should GCN be present in this pond, they would either remain in very close proximity to the pond during the terrestrial phase of their lifecycle since this pond is surrounded by trees which offer suitable terrestrial habitat or they would commute north into the woodland

rather than commute to the site where largely sub-optimal habitats are present. This is supported by findings within published literature by Franklin, 1993; Oldham and Nicholson 1986; Jehle (2000) which determined a terrestrial zone of 63m, within which 95% of summer refuges were located. In addition to this Jehle and Arntzen, (2000)³ discovered that following the breeding season 64% of newts were recorded within 20m of the pond edge.

- 3.6 This is supported by research conducted by English Nature (now Natural England) in 2004 (English Nature Research Report Number 576) to assess the value of different habitats for GCN states in the non-technical summary that

'By far the most captures were recorded within 50 m of ponds and few animals were captured at distances greater than 100m.'

It also goes on to say:

'Captures on fences (and by other methods) at distances between 100 m and 200 – 250 m from breeding ponds tended to be so low as to raise serious doubts about the efficacy of this as an approach, although a small number of projects did report captures on significant linear features at distances approximately 150 – 200 m from ponds.'

- 3.7 It is was therefore considered that, should GCN be present in Pond P7, that it is highly unlikely that they would commute to the site and therefore no further surveys were considered necessary.
- 3.8 Pond P16 was located approximately 360m north-west of the site boundary from the site and is separated from the site by a residential development. Consequently should GCN be present in this pond they would not be able to commute directly to the site, if a realistic route was considered it is likely that GCN would have to commute in excess of 400m to reach the site. Additionally, the pond is surrounded by trees which offer suitable terrestrial habitat for GCN and immediately to the north and west of the pond there is amenity grassland and residential buildings are present immediately to the south and east of the pond which are of sub-optimal and negligible value to GCN respectively. It is was therefore considered that, should GCN be present in Pond P16, that it is highly unlikely that they would commute to the site and therefore no further surveys were considered necessary.

Pond and Ditch Descriptions

- 3.9 Descriptions of the ponds and ditches surveyed are provided in Table 5.

Table 5: Pond and Ditch Descriptions

Pond Ref.	Description
P1	Pond P1 was located in the central section of the site within an area of marshy grassland and comprised a collection of small pools. These pools were absent of aquatic vegetation but supported soft rush <i>Juncus effusus</i> . This pond dried out during the survey season and dries out annually.
P2	Pond P2 was located adjacent to the central section of hedgerow H36 within the central section of the site. It was approximately 10m x 3m in size and the surface was covered with duckweed <i>Lemna minor</i> with no other aquatic or marginal vegetation recorded.

³ Jehle, R. & Arntzen, J. W. Post-breeding migrations of newts with contrasting ecological requirements. *Journal of Zoology, London*, 251, pp 297-306

Pond Ref.	Description
P3	Pond P3 was located in a small area of broadleaved woodland located within an arable field in the western section of the site. This pond was heavily shaded with some aquatic vegetation recorded comprising common duckweed and floating sweet-grass <i>Glyceria fluitans</i> . No marginal vegetation was recorded with bankside vegetation dominated by dense bramble <i>Rubus fruticosus</i> agg.
P4	Pond P4 was located in the south-western corner of the site in the corner of an arable field. This pond was approximately 8m x 3m in size and was largely devoid of aquatic and marginal vegetation with only common duckweed recorded. Dense bramble scrub bordered the pond on its western aspect with arable land to the east.
P5	Pond P5 was a large attenuation pond located adjacent to the north-western site boundary. This attenuation feature was heavily vegetated including large, dense stands of bulrush <i>Typha latifolia</i> , reed canary grass <i>Phalaris arundinacea</i> and water mint <i>Mentha aquatica</i> .
P8	Pond P8 was a small pond located on a woodland edge approximately 245m north of the site boundary. This pond was largely absent of marginal and aquatic vegetation.
P9	Pond P9 was a large pond located approximately 330m north-east of the site boundary, aquatic and marginal vegetation was recorded in this pond largely comprising common reed <i>Phragmites australis</i> .
P10	Pond P10 was a small pond located approximately 310m north-east of the site boundary which was largely absent of aquatic and marginal vegetation.
P11	Pond P11 was a long, linear pond located near a hedgerow and outgrown scrub approximately 320m north-east of the site boundary. This pond was largely absent of aquatic and marginal vegetation.
P12	A small, ephemeral pond located approximately 330m north-east of the site boundary which was absent of aquatic and marginal vegetation.
P13	A small pond located approximately 330m north-east of the site boundary which was largely absent of aquatic and marginal vegetation.
P14	A small pond located approximately 340m north-east of the site boundary which supported some aquatic and marginal vegetation in the form of soft rush <i>Juncus effusus</i> and reed canary grass.
P15	A small, ephemeral pond located approximately 330m north-east of the site boundary which was absent of aquatic and marginal vegetation.
D2	Ditch D2 was located alongside the eastern boundary of the site and contained shallow, slow flowing water (approx. 10cm in depth). This ditch supported common reed <i>Phragmites australis</i> with no other aquatic or marginal vegetation present.
D4	Ditch D4 was located in the eastern section of the site and contained slow-flowing water with a depth of approximately 20cm. Common reed was recorded in this ditch with no other aquatic or marginal species recorded.
D27	Ditch D27 was located in the central section of the site and contained slow-flowing water in its western section where its depth was approximately 50cm but became progressively shallower in the easterly direction. This ditch was largely absent of aquatic and marginal vegetation and was overgrown by bramble in sections.
D32	Ditch D32 was a continuation of ditch D4.

Habitat Suitability Index (HSI)

- 3.10 Full HSI scores are provided in Appendix A, with Table 6 summarising the results of the assessment of all ponds surveyed within 500m of the site boundary. Pond P9 achieved an **Excellent** suitability for supporting GCN whilst ponds P3, P5, P13-14 and ditches D2-4 achieved a **Good** suitability for supporting GCN. All the remaining ponds and ditches achieved either **Below Average** or **Poor** suitability for GCN.

Table 6: HSI Summary

Pond Ref.	HSI score	Pond suitability	Predicted presence
P1	0.49	Poor	3%
P2	0.56	Below Average	20%
P3	0.73	Good	79%
P4	0.59	Below Average	20%
P5	0.79	Good	79%
P9	0.87	Excellent	55%
P10	0.65	Average	55%
P11	0.67	Average	55%
P12	0.61	Average	55%
P13	0.70	Good	79%
P14	0.77	Good	79%
P15	0.62	Average	55%
D2	0.73	Good	79%
D4	0.77	Good	79%
D27	0.55	Below Average	20%
D32	0.77	Good	79%

eDNA

- 3.11 The results of the eDNA analysis undertaken in 2016 found that GCN eDNA was detected in the sample submitted for ditch D4, indicating that they were present in this ditch.

Aquatic Survey

- 3.12 As a consequence of the positive eDNA result in ditch D4 in 2016, a series of six aquatic surveys were undertaken on ditches D2, D4, and D32 in 2017. However, these aquatic surveys found GCN to be absent in these ditches with only a single smooth newt recorded in ditch D2 on a single survey occasion. Additionally, small numbers of common frog and common toad were

recorded in both ditches. During these surveys it was also noted that sticklebacks *Gasterosteus aculeatus* were present in these ditches.

- 3.13 Small number of smooth newts *Lissotriton vulgaris* were recorded in most ponds (maximum count 20). Additionally, small numbers of common frog and common toad were recorded from pond P3 in Sinfin Moor Park.
- 3.14 Additionally, low numbers of common frog *Rana temporaria* were recorded in ponds P4 and P5.

Terrestrial Habitat (Figure 3)

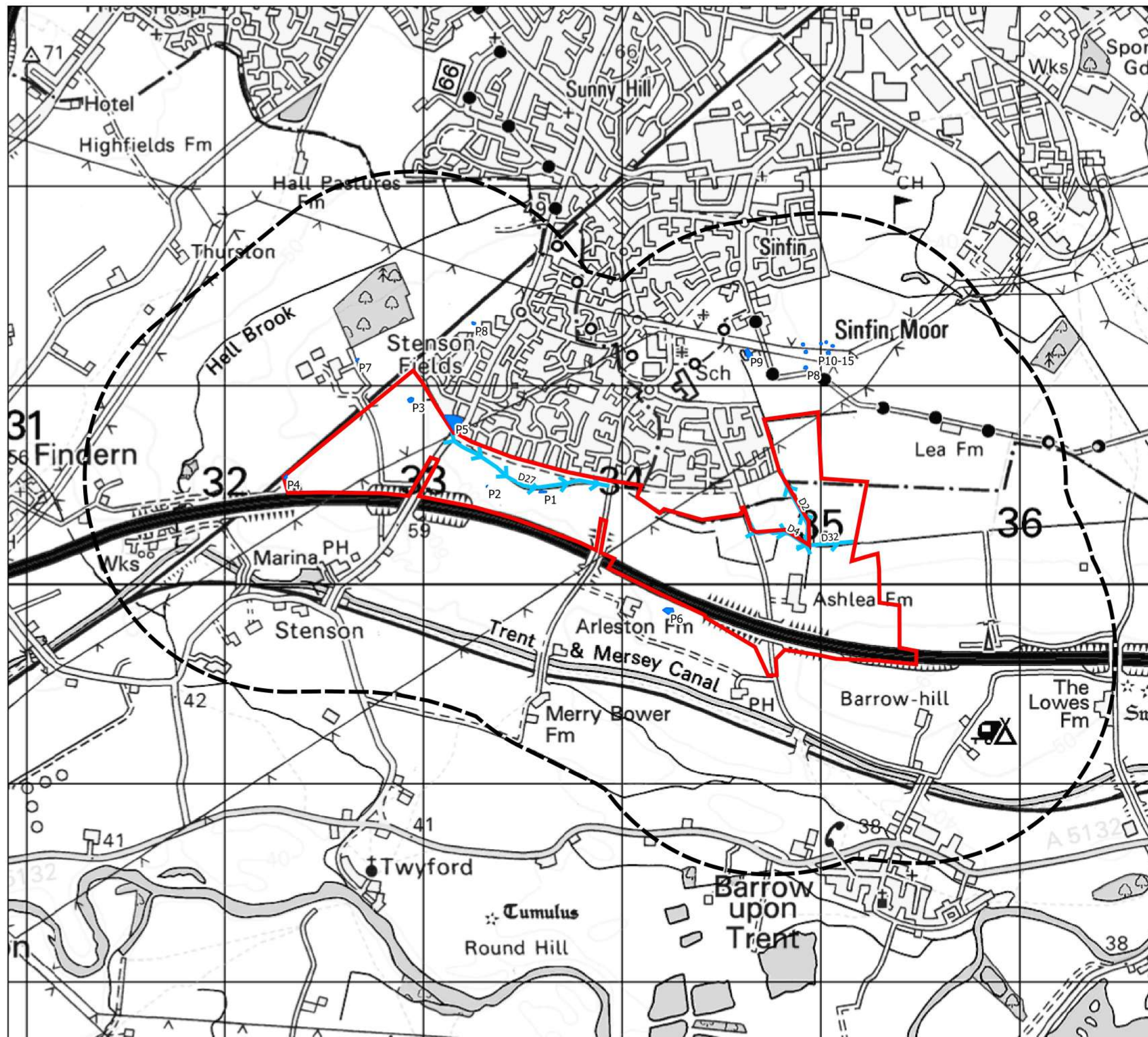
- 3.15 Suitable terrestrial habitat was present on-site in the form of woodland, hedgerows, scrub and field margins which offer suitable commuting, foraging and refuge/hibernation habitat. The majority of the site comprised arable land with improved grassland and semi-improved grassland also present which are of limited/negligible value to this species to their poor structure.

4.0 DISCUSSION AND RECOMMENDATIONS

- 4.1 Four ponds (P1-4) and three ditches (D2, D4 and D27) were present within the site boundary which contained standing water during the GCN survey season and were considered suitable for GCN. However pond P1 dried up in mid-April after two survey occasions. The on-site ponds, ditches D2, D4 and D27 and the off-site ponds P5 and P8-P15 were subject to a detailed HSI assessment in 2018, the results of which showed that pond P9 was of excellent suitability for GCN, ditches D2 and D4 and ponds P3, P5, P11 and P14 were of good suitability for GCN, ponds P8, P10, P12-P13, P15 and ditch D7 were of average suitability whilst pond P1 was of poor suitability and ponds P2 and P4 and ditch D27 were of below average suitability for GCN.
- 4.2 Additional ponds were located within 500m of the site which were not considered for further survey (Ponds P6-7 and P16). Pond P6 is located approximately 60m south of the site boundary, however this pond was separated from the site by the busy main road (A50) and was therefore considered to be isolated from the site. No further surveys were undertaken on pond P7 due to the intervening distance (approx. 210m) with poor connecting habitat to the site and the availability of optimal terrestrial habitat nearby the pond which were superior to the majority of habitats present on-site. No further surveys were undertaken on pond P16 due to the intervening distance between the pond and the site (approx. 360m), although due to a residential development located between the pond and the site the likely route is in excess of 400m. Additionally, the pond is surrounded by high quality terrestrial habitat, in the form of trees, with poor habitats further afield comprising amenity grassland and a residential development and therefore it is considered likely that, should GCN be present, they would spend the terrestrial phase of the lifecycle in the locality of the pond.
- 4.3 During the 2018 aquatic surveys, GCN were found to be absent from ponds P1-5 and ponds P8-15 and in ditch D27 whilst a medium population of smooth newts was recorded in pond P3 and small populations of smooth newts were recorded in ponds P4 and P5.
- 4.4 Despite a positive result from an eDNA test on ditch D4 in 2016, aquatic surveys undertaken in 2017 on ditches D2 and D4 also found GCN to be absent in these ditches. During the aquatic surveys, large numbers of sticklebacks were recorded inhabiting these ditches and given sticklebacks predate upon juvenile GCN their presence in these ditches greatly reduces the

suitability of ditches D2 and D4 for supporting GCN. Consequently, and given GCN were not recorded in other ponds or ditches surveyed, it is considered that GCN are likely to be absent from these ditches despite the earlier positive eDNA result, which suggests a likely erroneous false positive eDNA result in 2016.

- 4.5 Based on the above, it is considered that the presence of GCN can be reasonably discounted from within the site and therefore no constraints to development are posed from this species.



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Key

- Site Boundary
- Pond (with ref)
- Ditch (with ref)

client:
Hallam Land Management Ltd
project:
Infinity Garden Village (Wragley Way),
drawing title:
POND LOCATION PLAN



scale:
1:20,000
drawing:
BJC
issue:
3/6/2019

Figure 1

Appendix A: Habitat Suitability Index (HSI) Assessment

Table 1: Results of Habitat Suitability Index (HSI) Assessment

Pond/Ditch	SI -1		SI - 2		SI -3		SI -4		SI -5		SI -6		SI -7		SI -8		SI -9		SI -10		HSI score	Pond suitability	Predicted presence
	geographical location		pond area		pond drying		water quality		shade (perimeter)		fowl		fish		ponds		terrestrial habitat		macrophytes				
	Field result (A,B,C)	SI score	Field result (m2)	SI score	Field result	SI score	Field result	SI score	Field result %	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score	Field result	SI score			
P1	A	1	20	0.1	Annually	0.1	Poor	0.3	0	1	Absent	1	Absent	1	7	0.85	Moderate	0.67	50	0.8	0.49	Poor	3%
P2	A	1	30	0.1	Rarely	1	Poor	0.3	50	1	Absent	1	Absent	1	7	0.85	Moderate	0.67	5	0.35	0.56	Below Average	20%
P3	A	1	160	0.3	Never	0.9	Moderate	0.67	80	0.6	Absent	1	possible	0.67	7	0.85	Good	1	40	0.7	0.73	Good	79%
P4	A	1	20	0.1	Rarely	1	Poor	0.3	40	1	Absent	1	Absent	1	7	0.85	Good	1	5	0.35	0.59	Below Average	20%
P5	A	1	1600	0.9	Never	0.9	Moderate	0.67	60	1	Minor	0.67	Absent	1	7	0.85	Poor	0.33	70	1	0.79	Good	79%
P9	A	1	450	0.9	Never	0.9	Moderate	0.7	50	1	Absent	1	Absent	1	6	0.82	Moderate	0.7	50	0.8	0.87	Excellent	93%
P10	A	1	25	0.1	Sometimes	0.5	Moderate	0.7	50	1	Absent	1	Absent	1	6	0.82	Good	1	70	1	0.65	Average	55%
P11	A	1	50	0.1	Rarely	1	Good	1	50	1	Absent	1	Absent	1	6	0.82	Moderate	0.7	40	0.7	0.67	Average	55%
P12	A	1	25	0.1	Sometimes	0.5	Good	1	0	1	Absent	1	Absent	1	6	0.82	Moderate	0.7	25	0.6	0.61	Average	55%
P13	A	1	8	0.1	Rarely	1	Good	1	0	1	Absent	1	Absent	1	6	0.82	Good	1	40	0.7	0.70	Good	79%
P14	A	1	150	0.3	Rarely	1	Moderate	0.7	50	1	Absent	1	Absent	1	6	0.82	Moderate	0.7	40	0.7	0.77	Good	79%
P15	A	1	70	0.1	Sometimes	0.5	Moderate	0.7	50	1	Absent	1	Absent	1	6	0.82	Moderate	0.7	60	0.9	0.62	Average	55%
D2	A	1	400	0.8	Rarely	1	Moderate	0.67	60	1	Absent	1	Major	0.01	7	0.85	Moderate	0.67	20	0.5	0.52	Below Average	20%
D4	Dry	Dry	400	0.8	Never	0.9	Moderate	0.67	60	1	Absent	1	Major	0.01	7	0.85	Moderate	0.67	60	0.9	0.55	Below Average	20%
D27	A	1	50	0.1	Sometimes	0.5	Moderate	0.7	80	0.6	Absent	1	Absent	1	7	0.9	Good	1	5	0.4	0.56	Below Average	20%
D32	Dry	Dry	400	0.8	Never	0.9	Moderate	0.67	60	1	Absent	1	Major	0.01	7	0.85	Moderate	0.67	60	0.9	0.55	Below Average	20%

Appendix B

Aquatic Survey Results 2018

Pond Number	Survey Date	Bottle Trapping																Torching																Netting																Egg Search (G,S,P,T,F)			
		GCN				Smooth Newt				Common Toad				Common Frog				Other	GCN				Smooth Newt				Common Toad				Common Frog				Other	GCN				Smooth Newt				Common Toad				Common Frog				Other	
		M	F	J	U	M	F	J	U	M	F	J	U	M	F	J	U		M	F	J	U	M	F	J	U	M	F	J	U		M	F	J	U	M	F	J	U	M	F	J	U										
P1	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F							
P1	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P2	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P2	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P2	26/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P2	08/05/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P3	03/04/2018	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P3	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P3	26/04/2018	-	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P3	08/05/2018	-	-	-	-	19	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P4	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P4	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
P4	26/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P4	08/05/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
P5	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P5	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P5	26/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tadpoles	-	-	-	-	-	-	-	-	-	-	Tadpoles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
P5	08/05/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tadpoles	-	-	-	-	-	-	-	-	-	-	Tadpoles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P8	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F								
P8	10/04/2018	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P8	26/04/2018	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P8	08/05/2018	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P9	03/04/2018	-	-	-	-	3	5	-	-	-	-	-	-	-	-	1	-	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P9	09/04/2018	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P9	26/04/2018	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P9	08/05/2018	-	-	-	-	2	11	-	-	-	-	-	-	-	-	-	-	-	4	11	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P10	03/04/2018	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P10	09/04/2018	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	2	10	-	-	6	6	-	3	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P10	26/04/2018	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P10	08/05/2018	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P11	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P11	09/04/2018	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P11	26/04/2018	-	-	-	-	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P11	08/05/2018	-	-	-	-	5	4	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P12	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P12	09/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P12	26/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P13	03/04/2018	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P13	10/04/18	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P13	26/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P13	08/05/2018	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P14	03/04/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none								
P14	09/04/2018	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	9	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							

[illegible]

Aquatic Survey Results 2017

Ditch Number	Survey Date	Bottle Trapping																Torching																Netting																Egg Search (G,S,P,T,F)			
		GCN				Smooth Newt				Common Toad				Common Frog				Other	GCN				Smooth Newt				Common Toad				Common Frog				Other	GCN				Smooth Newt				Common Toad				Common Frog				Other	
		M	F	J	U	M	F	J	U	M	F	J	U	M	F	J	U		M	F	J	U	M	F	J	U	M	F	J	U		M	F	J	U	M	F	J	U	M	F	J	U										
D2	30/03/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	Fish	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	19	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none		
D2	04/04/2017	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F						
D2	26/04/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D2	02/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none			
D2	04/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D2	08/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D4	30/03/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	Fish	-	-	-	-	-	-	-	-	-	-	4	-	-	-	8	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none			
D4	04/04/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D4	26/04/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D4	02/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none			
D4	04/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	none				
D4	08/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D32	30/03/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	10	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none				
D32	04/04/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D32	26/04/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none							
D32	02/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none			
D32	04/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	none				
D32	08/05/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	none					

Appendix A - Tree Schedule

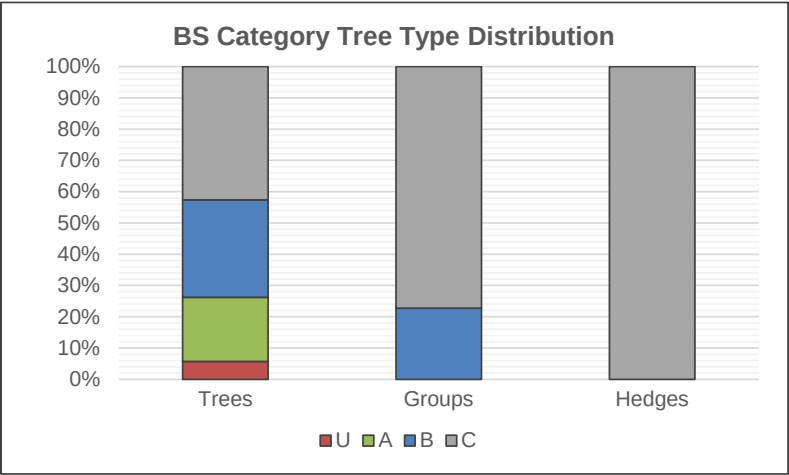
Measurements	Age Class	Overall Condition	Root Protection Area (RPA)
Height - Measured using a digital laser clinometer (m)	YNG: Young trees up to ten years of age	G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention	• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	F - Fair: Trees with minor rectifiable defects or in the early stages of stress from which it may recover	
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Early mature trees 1/3 – 2/3 life expectancy	P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term	
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Mature trees over 2/3 life expectancy	D - Dead: This could also apply to trees in an advanced state of decline and unlikely to recover	
	OM: Over mature declining or moribund trees of low vigour	The BS category particular consideration has been given to the following • The health, vigour and condition of each tree • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	
	V: Veteran tree possessing certain attributes relating to veteran trees		

Structural Condition
The following is an example of considerations when inspecting structural condition: - The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay - Soil cracks and any heaving of the soil around the base - Any abrupt bends in branches and limbs resulting from past pruning - Tight or weak 'V' shaped forks and co-dominant stems - Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994) - Cavities as a result of limb losses or past pruning - Broken branches or storm damage - Damage to roots - Basal, stem or branch / limb cavities - Crown die-back or abnormal foliage size and colour

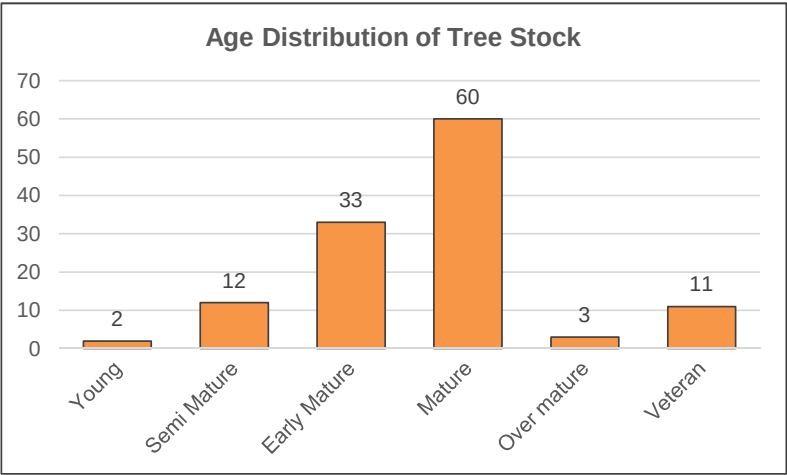
Quality Assessment of BS Category
Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.
Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U	T9, T28, T44, T82, T83, T84, T106	7		0
Category A	T12, T15, T19, T39, T49, T50, T52, T53, T54, T55, T56, T69, T75, T76, T85, T92, T94, T95, T102, T103, T104, T105, T109, T114, T117	25		0
Category B	T6, T7, T8, T10, T11, T13, T14, T16, T17, T20, T22, T23, T32, T33, T34, T35, T36, T42, T48, T51, T59, T60, T87, T89, T90, T91, T93, T96, T97, T98, T99, T100, T101, T110, T115, T116, T118, T120	38	G1, G11, G13, G15, G25, G28, G32, G33, G34, G41	10
Category C	T1, T2, T3, T4, T5, T18, T21, T24, T25, T26, T27, T29, T30, T31, T37, T38, T40, T41, T43, T45, T46, T47, T57, T58, T61, T62, T63, T64, T65, T66, T67, T68, T70, T71, T72, T73, T74, T77, T78, T79, T80, T81, T86, T88, T107, T108, T111, T112, T113, T119, T121,	52	G2, G3, G4, G5, G6, G7, G8, G9, G10, G12, G14, G16, G17, G18, G19, G20, G21, G22, G23, G24, G26, G27, G29, G30, G31, G35, G36, G37, G38, G39, G40, G42, G43, G44, H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35	69
Total		122	Total	79



BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.



Age Distribution of Tree Stock shows the number of trees in each age category across the tree stock allowing assessment of their longevity to be made.

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	Crack Willow Salix fragilis	9	7x 250	N - 1 S - 8 E - 5 W - 5	EM	P	Branch stubs evident Broken branches evident Close cultivation of the soil Minor dead wood evident in the crown (<75mm) Multi leadered form Suppressed crown form	198	7.9	C (i)
T2	Crack Willow Salix fragilis	14	est 1500	N - 10 S - 7 E - 6 W - 6	V	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present	1590	22.5	C (iii)
T3	Crack Willow Salix fragilis	5	est 600	3	M	P	Epicormic growth evident within the crown Recently cut back to 2m with regrowth	163	7.2	C (i)
T4	Crack Willow Salix fragilis	15	580	6	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	152	7.0	C (i)
T5	Hawthorn Crataegus monogyna	6	300	2	EM	F	Bark wounds noted Branch stubs evident Broken branches evident	41	3.6	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T6	Crack Willow Salix fragilis	18	est 2000	N - 2 S - 4 E - 3 W - 4	V	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Large snapped out branches at base	2827	30.0	B (iii),C (iii)
T7	Ash Fraxinus excelsior	16	650	7	EM	F	Base obscured Characteristic for species Light ivy cover Minor dead wood evident in the crown (<75mm)	191	7.8	B (i)
T8	Ash Fraxinus excelsior	15	450	5	EM	F	Base obscured Characteristic for species Light ivy cover Minor dead wood evident in the crown (<75mm)	92	5.4	B (i)
T9	Ash Fraxinus excelsior	10	310	3	SM	D	No live growth	N/A	N/A	U
T10	Crack Willow Salix fragilis	14	440 440 400	9	M	P	Branch stubs evident Broken branches evident Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	248	8.9	B (i)
T11	Crack Willow Salix fragilis	14	440 440 420	9	M	P	Branch stubs evident Broken branches evident Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	255	9.0	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T12	Crack Willow Salix fragilis	12	2240	N - 7 S - 8 E - 8 W - 8	V	P	Bark wounds noted Basal cavity observed Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Delaminating bark on main stem Epicormic growth evident within the crown Included bark union Major dead wood evident in the crown (>75mm) Multi leadered form Storm damage present	3547	33.6	A (iii)
T13	English Oak Quercus robur	12	450	5	EM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	92	5.4	B (i)
T14	English Oak Quercus robur	12	450	5	EM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	92	5.4	B (i)
T15	Crack Willow Salix fragilis	18	est 1900	8	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0317	2552	28.5	A (iii)
T16	Ash Fraxinus excelsior	10	est 390	5	EM	F	Even crown form No major defects were noted	69	4.7	B (i)
T17	Ash Fraxinus excelsior	8	est 300	5	EM	F	Even crown form No major defects were noted	41	3.6	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T18	Ash Fraxinus excelsior	4	est 180	3	EM	F	Even crown form No major defects were noted	15	2.2	C (i)
T19	Crack Willow Salix fragilis	17	est 1350	6	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present	1288	20.3	A (iii)
T20	Crack Willow Salix fragilis	17	est 1250	11	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present Phellinus ignarius Willow bracket	1104	18.8	B (iii)
T21	Crack Willow Salix fragilis	17	est 1000	11	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T22	Crack Willow Salix fragilis	17	Over ivy 480 800 850	10	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi stemmed from base Pruning wounds noted Storm damage present Tag 0302 large hanging dead limb	1126	18.9	B (iii)
T23	Crack Willow Salix fragilis	18	Over ivy 900 1000	8	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Twin stemmed from base	1279	20.2	B (iii)
T24	Ash Fraxinus excelsior	7	200	3	SM	F	No major defects were noted	18	2.4	C (i)
T25	English Oak Quercus robur	7	180	3	SM	F	No major defects were noted	15	2.2	C (i)
T26	Ash Fraxinus excelsior	9	310	4	SM	F	No major defects were noted	43	3.7	C (i)
T27	Hybrid Black Poplar Populus x canadensis	14	380	5	SM	F	Flail damage evident Low crown form No major defects were noted	65	4.6	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T28	Ash Fraxinus excelsior	15	840	9	OM	P	Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Heartwood exposed Major dead wood evident in the crown (>75mm) Storm damage present No live growth visible	N/A	N/A	U
T29	Ash Fraxinus excelsior	12	510	5	EM	P	Branch stubs evident Broken branches evident Heartwood exposed Major dead wood evident in the crown (>75mm) Storm damage present	118	6.1	C (ii)
T30	Hybrid Black Poplar Populus x canadensis	18	550	5	SM	F	Basal suckers present Flail damage evident Low crown form No major defects were noted	137	6.6	C (i)
T31	Hybrid Black Poplar Populus x canadensis	17	470	4	SM	F	Basal suckers present Flail damage evident Low crown form No major defects were noted	100	5.6	C (i)
T32	English Oak Quercus robur	6	400	3	EM	F	Base obscured Branch stubs evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm)	72	4.8	B (i)
T33	English Oak Quercus robur	7	420	4	EM	F	Base obscured Branch stubs evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Stem at angle growing out of ditch	80	5.0	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T34	English Oak Quercus robur	12	Over ivy 1000	6	OM	P	Basal cavity observed Base obscured Branch stubs evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Tag 0307 Remove ivy from around the base for better inspection	452	12.0	B (iii)
T35	English Oak Quercus robur	13	est 850	7	M	F	Basal cavity observed Base obscured Branch stubs evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	327	10.2	B (ii)
T36	English Oak Quercus robur	17	850	7	M	F	Base obscured Branch stubs evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0319	327	10.2	B (i)
T37	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T38	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T39	English Oak Quercus robur	10	590	7	M	F	Base obscured Branch stubs evident Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0322	157	7.1	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T40	Ash Fraxinus excelsior	14	600	6	M	F	Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Flail damage evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	163	7.2	C (i)
T41	Blackthorn Prunus spinosa	6	est 80 80 80 100	3	EM	F	Outgrown hedgerow specimen	13	2.1	C (i)
T42	English Oak Quercus robur	9	est 300	5	EM	G	Characteristic for species No major defects were noted	41	3.6	B (i)
T43	Holly Ilex aquifolium	8	est 200 200	4	EM	F	Branch stubs evident Broken branches evident Flail damage evident Low crown form	36	3.4	C (i)
T44	Ash Fraxinus excelsior	17	est 820	N - 7 S - 8 E - 3 W - 6	M	P	Bark wounds noted Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Delaminating bark on main stem Dense ivy cover on main stem Limited future potential Major dead wood evident in the crown (>75mm) Storm damage present Inonotus hispidus Shaggy bracket present within the crown	N/A	N/A	U
T45	Ash Fraxinus excelsior	8	220 270 200	4	EM	F	Branch stubs evident Multi stemmed from base No major defects were noted	73	4.8	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T46	Ash Fraxinus excelsior	8	300 250 210	4	EM	F	Branch stubs evident Multi stemmed from base No major defects were noted Tag 0347	89	5.3	C (i)
T47	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T48	English Oak Quercus robur	16	Over ivy 860	8	M	P	Base obscured Branch socket cavities observed Branch stubs evident Broken branches evident Dense ivy cover on main stem Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Fire damage on main stem to the north Remove ivy from base of stem for better inspection	335	10.3	B (i)
T49	English Oak Quercus robur	17	750	8	M	F	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Typical crown form	254	9.0	A (i)
T50	English Oak Quercus robur	15	est 1000	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form	452	12.0	A (i)
T51	English Oak Quercus robur	8	520	7	SM	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form	122	6.2	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T52	English Oak Quercus robur	12	est 900	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	366	10.8	A (i)
T53	English Oak Quercus robur	12	est 1000	9	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Even crown form Minor dead wood evident in the crown (<75mm) Typical crown form	452	12.0	A (i)
T54	English Oak Quercus robur	11	790	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form Tag 1037	282	9.5	A (i)
T55	English Oak Quercus robur	12	820	6	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	304	9.8	A (i)
T56	English Oak Quercus robur	7	450 270	5	M	F	Branch stubs evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form Tag 0336	125	6.3	A (i)
T57	Ash Fraxinus excelsior	10	500	N - 5 S - 3 E - 2 W - 5	EM	P	Branch stubs evident Broken branches evident Sparse / thinning crown	113	6.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T58	Ash Fraxinus excelsior	12	700	7	EM	P	Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Sparse / thinning crown	222	8.4	C (i)
T59	English Oak Quercus robur	8	380 380	4	EM	F	Branch stubs evident Flail damage evident No major defects were noted	131	6.4	B (i)
T60	Crack Willow Salix fragilis	15	1340	N - 9 S - 6 E - 5 W - 13	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted	1269	20.1	B (iii)
T61	Crack Willow Salix fragilis	11	est 1300	N - 1 S - 5 E - 3 W - 8	V	P	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Fire damage at union	1195	19.5	C (iii)
T62	Crack Willow Salix fragilis	9	est 1000	5	V	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present	707	15.0	C (iii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T63	Crack Willow Salix fragilis	16	est 900	7	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form	366	10.8	C (i)
T64	Crack Willow Salix fragilis	16	est 460 500	N - 8 S - 8 E - 12 W - 12	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Large failed limb to the east	209	8.2	C (i)
T65	Crack Willow Salix fragilis	15	est 1000	9	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form	452	12.0	C (i)
T66	Crack Willow Salix fragilis	12	est 1000	N - 8 S - 4 E - 6 W - 10	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s) Large decay cavity in main stem at base	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T67	Crack Willow Salix fragilis	5	est 700	4	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s) Large amounts of failed limbs to the east	222	8.4	C (i)
T68	Crack Willow Salix fragilis	12	est 900	N - 6 S - 4 E - 6 W - 2	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s)	366	10.8	C (i)
T69	English Oak Quercus robur	17	690	8	M	G	Branch stubs evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi stemmed from base	215	8.3	A (i)
T70	Crack Willow Salix fragilis	11	250 250 220	4	EM	F	Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	78	5.0	C (i)
T71	Crack Willow Salix fragilis	11	250 250 220	4	EM	F	Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	78	5.0	C (i)
T72	Elder Sambucus nigra	2	200 200 200	1	EM	P	Flailed as if part of hedge	54	4.2	C (ii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T73	Ash Fraxinus excelsior	5	150	2	SM	F	No major defects were noted	10	1.8	C (i)
T74	Ash Fraxinus excelsior	5	180	2	SM	F	No major defects were noted	15	2.2	C (i)
T75	English Oak Quercus robur	18	870	8	M	F	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	342	10.4	A (i)
T76	English Oak Quercus robur	20	est 900	8	M	F	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	366	10.8	A (i)
T77	Crack Willow Salix fragilis	17	est 800 1000	10	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Phellinus igniarius fungal brackets present on lower limbs	707	Capped at 15m	C (i)
T78	Crack Willow Salix fragilis	14	avg 7x 380	9	M	F	Branch stubs evident Broken branches evident Light ivy cover Multi stemmed from base	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T79	Crack Willow Salix fragilis	17	est 1100	N - 8 S - 8 E - 10 W - 6	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Hollowing stem	547	13.2	C (i)
T80	Crack Willow Salix fragilis	17	est 1000	7	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Dense ivy cover on main stem Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Hollowing stem	452	12.0	C (i)
T81	English Oak Quercus robur	5	160	3	SM	G	No major defects were noted	12	1.9	C (i)
T82	Crack Willow Salix fragilis	15	est 900	8	M	D	No live growth present	N/A	N/A	U
T83	Crack Willow Salix fragilis	15	est 700	5	M	D	No live growth present	N/A	N/A	U
T84	Crack Willow Salix fragilis	15	est 700	5	M	D	Dead tree on its side	N/A	N/A	U

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T85	English Oak <i>Quercus robur</i>	17	900	9	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Loss of large leader to the west	366	10.8	A (i)
T86	Ash <i>Fraxinus excelsior</i>	15	640	7	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Inonotus hispidus Shaggy bracket present on the largwer limbs and stem	185	7.7	C (i)
T87	English Oak <i>Quercus robur</i>	10	540	5	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted	132	6.5	B (i)
T88	Austrian Pine <i>Pinus nigra</i> ssp. <i>Nigra</i>	12	380	N - 4 S - 1 E - 1 W - 1	M	P	Branch stubs evident Broken branches evident Storm damage present Large bark wound at base of stem	65	4.6	C (i)
T89	Austrian Pine <i>Pinus nigra</i> ssp. <i>Nigra</i>	15	400	4	M	F	Branch stubs evident Broken branches evident Typical crown form	72	4.8	B (i)
T90	Austrian Pine <i>Pinus nigra</i> ssp. <i>Nigra</i>	15	400	4	M	F	Branch stubs evident Broken branches evident Typical crown form	72	4.8	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T91	English Oak Quercus robur	10	650	7	EM	F	Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present within the crown Close cultivation of the soil at base	191	7.8	B (i)
T92	English Oak Quercus robur	12	740	8	M	F	Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Close cultivation of the soil at base	248	8.9	A (i)
T93	English Oak Quercus robur	12	740	N - 7 S - 9 E - 6 W - 7	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Cavity at base with decayed fungi Latetiporus sulphureus fungal bracket present at the base of the main stem	248	8.9	B (i)
T94	English Oak Quercus robur	14	610	9	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted	168	7.3	A (i)
T95	English Oak Quercus robur	10	520	7	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted	122	6.2	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T96	English Oak Quercus robur	8	270 310	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Twin stemmed from base Typical crown form	76	4.9	B (i)
T97	English Oak Quercus robur	8	280	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form	35	3.4	B (i)
T98	English Oak Quercus robur	8	320 360	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Twin stemmed from base Typical crown form	105	5.8	B (i)
T99	English Oak Quercus robur	8	340	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form	52	4.1	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T100	English Oak Quercus robur	13	640	8	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form Close cultivation of the soil at base	185	7.7	B (i)
T101	English Oak Quercus robur	10	760	8	M	P	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form Possible lightning strike running down main stem Chard and burnt branches in crown	261	9.1	B (i)
T102	English Oak Quercus robur	14	790	9	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	282	9.5	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T103	English Oak Quercus robur	13	820	7	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	304	9.8	A (i)
T104	English Oak Quercus robur	13	820	9	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	304	9.8	A (i)
T105	English Oak Quercus robur	13	690	8	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	215	8.3	A (i)
T106	Crack Willow Salix fragilis	12	est 900	N - 4 S - 9 E - 4 W - 4	OM	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Hollow stem Signs of ptheonix regeneration on failed limbs	N/A	N/A	U

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T107	Ash Fraxinus excelsior	7	avg 6x 90	3	EM	P	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Multi leadered form Regrowth from stump	22	2.6	C (i)
T108	Ash Fraxinus excelsior	19	avg 400 400 400 400	9	M	F	Basal suckers present Base obscured Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Sparse / thinning crown	290	9.6	C (i)
T109	English Oak Quercus robur	14	700	7	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	222	8.4	A (i)
T110	English Oak Quercus robur	12	est 650	6	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form Cable attached to stem	191	7.8	B (i)
T111	English Oak Quercus robur	4	180	2	Yng	G	No major defects were noted	15	2.2	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T112	Rowan Sorbus aucuparia	4	150	2	Yng	G	No major defects were noted	10	1.8	C (i)
T113	English Elm Ulmus procera	14	300 280 190 340 300	7	M	F	Close cultivation of the soil Limited future potential Minor dead wood evident in the crown (<75mm) Multi stemmed from base	186	7.7	C (i)
T114	English Oak Quercus robur	14	est 780	9	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	275	9.4	A (i)
T115	English Oak Quercus robur	9	est 450	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	92	5.4	B (i)
T116	English Oak Quercus robur	10	410	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	76	4.9	B (i)
T117	English Oak Quercus robur	16	920	9	M	F	Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) No major defects were noted Typical crown form	383	11.0	A (i)
T118	English Oak Quercus robur	10	est 400	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	72	4.8	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T119	English Oak Quercus robur	14	900	8	M	P	Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Pruning wounds noted Situated offsite Storm damage present Fungi in high canopy wound, unable to identify Decay and hollowing throughout main stem, ground level to approx. 8m	366	10.8	C (i)
T120	English Oak Quercus robur	10	350	4	EM	F	Branch stubs evident Broken branches evident Characteristic for species Minor dead wood evident in the crown (<75mm) No major defects were noted Failed stem at base	55	4.2	B (i)
T121	Ash Fraxinus excelsior	8	est 6x 90	3	SM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base Outgrown from hedgerow	22	2.6	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Hybrid Black Poplar Populus x canadensis	28	avg 600	6.5	M	F	Branch stubs evident Broken branches evident Characteristic for species Interlocking crowns Minor dead wood evident in the crown (<75mm) Overhead cables Typical crown form 4m spacing between trees Ditch to the west Hawthorn understory 4 topped trees for cables present to the north of the group	163	7.2	B (ii)
G2	Hawthorn Crataegus monogyna	6	90 90 90 90	2	EM	F	Un-maintained hedgerow Typical forms Interlocking crowns	15	2.2	C (ii)
G3	Hawthorn Crataegus monogyna	6	90 90 90 90	2	EM	P	Un-maintained hedgerow Poor forms	15	2.2	C (ii)
G4	Ash Fraxinus excelsior Hawthorn Crataegus monogyna	6	upto 150	2.5	EM / M	F	Broken branches evident Flail damage evident Multi leadered form Outgrown hedgerow	10	1.8	C (ii)
G5	Ash Fraxinus excelsior Crack Willow Salix fragilis	12	upto 240	4	SM	F	Included bark union Minor dead wood evident in the crown (<75mm) Multi leadered form Pruning wounds noted	26	2.9	C (i)
G6	Hawthorn Crataegus monogyna	6	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G7	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G8	Hawthorn Crataegus monogyna	5	upto 150	2.5	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G9	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G10	Lombardy Poplar Populus nigra 'Italica'	29	700	4	M	F	Base obscured Branch stubs evident Characteristic for species Situated offsite	222	8.4	C (ii)
G11	Crack Willow Salix fragilis Hawthorn Crataegus monogyna Hybrid Black Poplar Populus x canadensis Silver Birch Betula pendula	20	avg 500	6	EM / M	F	Bark wounds noted Basal suckers present Branch stubs evident Broken branches evident Failed trees Minor dead wood evident in the crown (<75mm) Storm damage present	113	6.0	B (ii)
G12	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G13	Crack Willow Salix fragilis	17	upto 900	8	M	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	366	10.8	B (ii)
G14	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G15	Ash Fraxinus excelsior Hawthorn Crataegus monogyna	15	upto 560	6	EM	F	Interlocking crowns Light ivy cover Minor dead wood evident in the crown (<75mm) No major defects were noted	142	6.7	B (ii)
G16	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G17	Ash Fraxinus excelsior Hawthorn Crataegus monogyna English Elm Ulmus procera	11	upto 400	4	SM	F	Flail damage evident Included bark union Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted Dead elm in group	72	4.8	C (ii)
G18	Hawthorn Crataegus monogyna Ash Fraxinus excelsior Blackthorn Prunus spinosa	6	upto 60 60 60	3	SM	F	Flail damage evident Included bark unions Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow surrounding paddock area Pruning wounds noted	5	1.2	C (ii)
G19	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	2	upto 100	1	SM	F	Flail damage evident Included bark union Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Pruning wounds noted Dead elm in group	5	1.2	C (ii)
G20	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G21	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G22	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G23	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G24	English Oak Quercus robur Field Maple Acer campestre Hawthorn Crataegus monogyna Hazel Corylus avellana	10	avg 180	4	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	15	2.2	C (ii)
G25	Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	10	upto 400	4	EM	F	Branch stubs evident Characteristic for species Compacted ground at the base Minor dead wood evident in the crown (<75mm) No major defects were noted	72	4.8	B (ii)
G26	Elder Sambucus nigra Hawthorn Crataegus monogyna	6	upto 200	3	EM	F	Crossing and rubbing branches Minor dead wood evident in the crown (<75mm) Outgrown hedgerow	18	2.4	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G27	Elder Sambucus nigra Hawthorn Crataegus monogyna	7	upto 200	3	EM	F	Crossing and rubbing branches Minor dead wood evident in the crown (<75mm) Outgrown hedgerow	18	2.4	C (ii)
G28	Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna Hazel Corylus avellana	12	upto 500	5	SM / EM	F	Branch stubs evident Broken branches evident Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Light ivy cover Minor dead wood evident in the crown (<75mm)	113	6.0	B (ii)
G29	Blackthorn Prunus spinosa Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	7	avg 100 100 100	3	EM	F	Branch stubs evident Broken branches evident Close cultivation of the soil Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Outgrown hedgerow	14	2.1	C (ii)
G30	Ash Fraxinus excelsior Field Maple Acer campestre Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus Hazel Corylus avellana English Oak Quercus robur Alder Alnus glutinosa	9	avg 100	2	SM	F	Interlocking crowns No major defects were noted Buffer planting adjacent to A50	5	1.2	C (ii)
G31	Elder Sambucus nigra Hawthorn Crataegus monogyna	5	avg 100	2	SM	F	Flail damage evident Interlocking crowns No major defects were noted Outgrown hedgerow	5	1.2	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G32	Ash Fraxinus excelsior Crack Willow Salix fragilis Hawthorn Crataegus monogyna	15	avg 400	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	72	4.8	B (ii)
G33	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	15	avg 500	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	113	6.0	B (ii)
G34	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	15	avg 400	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	72	4.8	B (ii)
G35	Hawthorn Crataegus monogyna	5	avg 100	2	EM	F	No major defects were noted Outgrown hedgerow	5	1.2	C (ii)
G36	Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	6	avg 150	3	EM	F	No major defects were noted Outgrown hedgerow	10	1.8	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G37	Crack Willow Salix fragilis Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	15	avg 300	5	EM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Outgrown hedgerow	41	3.6	C (ii)
G38	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	6	avg 150	3	EM	F	No major defects were noted Outgrown hedgerow	10	1.8	C (ii)
G39	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna Hazel Corylus avellana	6	avg 150	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow Buffer strip	10	1.8	C (ii)
G40	Ash Fraxinus excelsior English Oak Quercus robur Hawthorn Crataegus monogyna English Elm Ulmus procera	5	upto 180	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow	15	2.2	C (ii)
G41	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna English Elm Ulmus procera	9	upto 160	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow Plantation group	12	1.9	B (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G42	Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	7	est 100 100	2	EM	F	Outgrown hedgerow adjacent to railway	9	1.7	C (ii)
G43	Ash Fraxinus excelsior Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	7	est 100 100	2	EM	F	Outgrown hedgerow adjacent to railway	9	1.7	C (ii)
G44	Ash Fraxinus excelsior Hawthorn Crataegus monogyna English Elm Ulmus procera	12	upto 500	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Potential Roost Features (PRF) Woodpecker holes observed Group formed around pond	113	6.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H2	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow One large outgrown budleigha	2	0.8	C (i)
H3	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H4	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H5	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H6	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H7	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H8	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H9	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H10	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H11	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H12	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H13	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow Typical form with no obvious defects	2	0.8	C (i)
H14	Elder Sambucus nigra Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H15	Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H16	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H17	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H18	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H19	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H20	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H21	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H22	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H23	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H24	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H25	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H26	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H27	Hawthorn Crataegus monogyna	2	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H28	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H29	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H30	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H31	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H32	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Gaps present in hedgerow Maintained hedgerow	3	1.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H33	Elder Sambucus nigra Hawthorn Crataegus monogyna	4	avg 50 50 50	1.5	M	F	Outgrown hedgerow	3	1.0	C (ii)
H34	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H35	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (ii)

Infinity Garden Village (Wragley Way)

Environmental Statement

Chapter I: Ecology

Appendix I8 – Arboricultural Assessment

5th June 2019

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Appendix A: Tree Schedule

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Appendix D: Veteran Tree Schedule

1.0 Introduction

- 1.1 This Arboricultural Assessment has been prepared by FPCR on behalf of Hallam Land Management ("the Applicant"). This Assessment assesses the likely impacts of the Proposed Development upon existing tree coverage across the site, and the likely significance of such impacts during its operational and construction phases.

About the Author

- 1.2 Harry Raffle: Senior Arboriculturalist, FPCR

Qualifications

- 1.3 ABC Level 4 Diploma in Arboriculture
- 1.4 Technician member of the Arboricultural Association
- 1.5 Level 2 Diploma in Forestry and Arboriculture
- 1.6 CS38 Tree Climbing and Aerial Rescue
- 1.7 CS30 Chainsaw Maintenance

2.0 Policy Context

Scope of Assessment

- 2.1 The tree survey and assessment of existing trees has been carried out in accordance with guidance contained within British Standard 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendations' (hereafter referred to as BS5837). The guidelines set out a structured assessment methodology to assist in determining which trees would be deemed either as being suitable or unsuitable for retention.
- 2.2 The guidance also provides recommendations for considering the relationship between existing trees and how those trees may integrate into designs for development; demolition operations and future construction processes so that a harmonious and sustainable relationship between any retained trees and built structures can be achieved.
- 2.3 The purpose of the report is therefore to firstly, present the results of an assessment of the existing trees' arboricultural value, based on their current condition and quality and to secondly, provide an assessment of impact arising from the proposed development of the site.
- 2.4 This report has been produced to accompany an Environmental Statement and has included an assessment of any impact to the tree cover. The survey has therefore focused on any trees present within or bordering the site that may potentially be affected by the future proposals or will pose a constraint to any proposed development.

National Planning Policy Framework 2019

- 2.5 National Planning Policy is defined by the National Planning Policy Framework (NPPF). This sets out the Government's most current and up to date planning policies for England and how these should be applied. The current NPPF is dated February 2019.
- 2.6 Paragraph 11 of the NPPF states that there is a presumption in favour of sustainable development and states that for decision making, the LPA should be 'c) approving development proposals that accord with an up-to-date development plan without delay'. In the absence of a development plan or the development plan is out of date, the acting LPA should grant planning consent so far as the development proposals do not breach the policies and guidance outlined in the NPPF.
- 2.6 In relation to arboriculture, the NPPF also states that:

- 175(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 provides specific guidance that:

- 175(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'.

- 2.7 Examples of what is deemed to be 'wholly exceptional' are included within Footnote 58 and provides the examples of 'infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat'.

Statutory Considerations

- 2.8 Local authorities have a Duty under the Town and Country Planning Act to create Tree Preservation Orders (TPO) in order to protect and preserve specific trees and woodlands that bring significant amenity benefit to a particular site or location. Under a TPO it is a criminal offence to cut down, top, lop, uproot or willfully destroy a tree protected by that Order, or to cause or permit such actions, if carried out without the prior written consent of the acting LPA. Anyone found guilty of such an offence is liable and in serious cases, may result in prosecution and incur an unlimited fine.
- 2.9 Following consultation with the Local Planning Authority, South Derbyshire District Council, it is understood that there is a Tree Preservation Order, namely TPO 51 Stenson Fields Farm, Stenson, which applies to a number of trees present within the assessment area and therefore statutory constraints may apply to the development in respect of trees.

3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

- 3.1 The survey of trees has been carried out in accordance with the criteria set out in Chapter 4 of BS5837. The survey has been undertaken by a suitably qualified and experienced arboriculturalist and has recorded information relating to all those trees within the site and those adjacent to the site which may be of influence to any proposals. Trees were assessed for their arboricultural quality and benefits within the context of the proposed development in a transparent, understandable and systematic way.
- 3.2 Trees have been assessed as groups or hedgerows where it has been determined appropriate. The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.
- 3.3 For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime. A tree survey in accordance with BS5837 does not assess hedgerows against the Hedgerow Regulations 1997 or specifically from an ecological perspective, and is outside the scope of this assessment.
- 3.4 An assessment of individual trees within groups or hedgerows has been made where a clear need to differentiate between them, for example, in order to highlight significant variation between attributes including physiological or structural condition or where a potential conflict may arise.

Veteran Trees

- 3.5 Veteran trees and Ancient Woodland are important components of the landscape, their importance can be for a number of reasons including that of their ecological, social, cultural and historic value. Veteran Trees and Ancient Woodlands are material considerations within the planning process and their importance is specifically recognised within the National Planning Policy Framework 2019.

- 3.6 This assessment, and the criteria for identification of attributable veteran features, has been based on currently published guidance and resources. Reference has been made to Reed, H. (2000). *Veteran Trees: A Guide to Good Management*. English Nature and more recently Lonsdale, D (ed.) (2013) *Ancient and other Veteran Trees: Further Guidance on Management*, The Tree Council & Ancient Tree Forum. Reference has also been made to the Specialist Survey Methodology (SSM) which provides a standardised framework for recording veteran trees.
- 3.7 For the purpose of affording these trees greater protection the RPA calculation has been calculated in accordance with the guidelines detailed within *Ancient and other Veteran Trees: Further Guidance on Management* (Lonsdale, D (ed.) (2013). The Tree Council & Ancient Tree Forum. The RPA is defined as a distance equal to 15 times the trees stem diameter, or five metres beyond the canopy, whichever is the greater (Read, 2000).
- 3.8 Where this assessment has identified veteran trees, further survey work of those trees and their communities will be required. From an ecological perspective veteran trees provide a rare and specialist niche habitat and therefore preservation of this habitat is considered highly important. Veteran trees and many of their associated specialised species are becoming increasingly rare within the landscape and therefore some veteran tree landscapes and their associated species are now protected, both nationally and Europe wide through the Natura 2000 Directive.

BS5837 Categories

- 3.9 Trees have been divided into one of four categories based on Table 1 of BS5837, 'Cascade chart for tree quality assessment'. For a tree to qualify under any given category it should fall within the scope of that category's definition (see below).
- 3.10 Category U trees are those which would be lost in the short term for reasons connected with their physiology or structural condition. They are, for this reason not considered in the planning process on arboricultural grounds. Categories A, B and C are applied to trees that should be of material considerations in the development process. Each category also having one of three further sub-categories (i, ii, iii) which are intended to reflect arboricultural, landscape and cultural or conservation values accordingly.

3.11 Category (U) – (Red): Trees which are unsuitable for retention and are in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years. Trees within this category are:

- Trees that have a serious irremediable structural defect such that their early loss is expected due to collapse and includes trees that will become unviable after removal of other category U trees.
- Trees that are dead or are showing signs of significant, immediate or irreversible overall decline.
- Trees that are infected with pathogens of significance to the health and/ or safety of other nearby trees or are very low-quality trees suppressing adjacent trees of better quality.
- Certain category U trees can have existing or potential conservation value which may make it desirable to preserve.

3.12 Category (A) – (Green): Trees that are considered for retention and are of high quality with an estimated remaining life expectancy of at least 40 years with potential to make a lasting contribution. Such trees may comprise:

- Sub category (i) trees that are particularly good examples of their species, especially if rare or unusual, or are essential components of groups such as formal or semi-formal arboricultural features for example the dominant and/or principal trees within an avenue.
- Sub category (ii) trees, groups or woodlands of particular visual importance as arboricultural and / or landscape features.
- Sub category (iii) trees, groups or woodlands of significant conservation, historical, commemorative or other value for example veteran or wood pasture.

3.13 Category (B) – (Blue): Trees that are considered for retention and are of moderate quality with an estimated remaining life expectancy of at least 20 years with potential to make a significant contribution. Such trees may comprise:

- Sub category (i) trees that might be included in category A but are downgraded because of impaired condition for example the presence of significant though remediable defects, including unsympathetic past management and storm damage.
- Sub category (ii) trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals or trees occurring as

collectives but situated so as to make little visual contribution to the wider locality.

- Sub category (iii) trees with material conservation or other cultural value.

3.14 **Category (C) – (Grey):** Trees that are considered for retention and are of low quality with an estimated remaining life expectancy of at least 10 years or young trees with a stem diameter below 150mm. Such trees may comprise:

- Sub category (i) unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories.
- Sub category (ii) trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value or trees offering low or only temporary / transient screening benefits.
- Sub category (iii) trees with no material conservation or other cultural value.

Tree Schedule

3.15 Appendix A presents details of any individual trees, groups and hedgerows found during the assessment including heights, diameters at breast height, crown spread (given as a radial measurement from the stem), age class, comments as to the overall condition at the time of inspection, BS5837 category of quality and suitability for retention and the root protection area.

3.16 The term group has been applied where trees form cohesive arboricultural features either aerodynamically, visually or culturally including biodiversity or habitat potential for example parkland or wood pasture.

3.17 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The tree survey conducted, in accordance with BS5837, does not assess hedgerows against the Hedgerow Regulations 1997 or specifically from an ecological perspective, and is outside the scope of this assessment.

3.18 For the purposes of this assessment, a hedgerow is described as any boundary line of trees or shrubs less than 5m wide at the base and are managed under a regular pruning regime. Hedgerows and substantial internal or boundary hedges (including evergreen screens) have been recorded including lateral spread, height and stem diameter(s). Where trees are present within a

hedgerow that are significantly different in character from the remainder, these have been identified and recorded separately.

- 3.19 General observations particularly of structural and physiological condition for example the presence of any decay and physical defect and preliminary management recommendations have also been recorded where appropriate.

Site Plans

- 3.20 The individual positions of trees and groups have been shown on the Tree Survey Plan. The positions of trees are based on a topographical / land survey, as far as possible, supplied by the client.
- 3.21 Where topographical information has not identified the position of trees these have been plotted using a global positioning system and aerial photography to provide approximate locations. The crown spread, root protection area and shade pattern (where appropriate) are also indicated on this plan.
- 3.22 As part of this assessment, a Tree Retention Plan has been prepared to show the proposed layout in relation to the existing tree cover allowing an assessment of any potential conflicts. The plan also identifies which trees would be required to be removed or retained as part of the proposed development.

Tree Constraints and Root Protection Areas

- 3.23 Below ground constraints to future development are represented by the area surrounding the tree containing sufficient rooting volume for the specimen to have the best chance of survival in the long term which is identified as the root protection area (RPA). The RPA has been calculated in accordance with section 4.6 of BS5837 and requires suitable protection in order for the tree to be successfully incorporated into any future scheme.
- 3.24 Where applicable the shape of the Root Protection Area has been modified to consider the presence of any nearby obstacles (existing or past) which may have restricted root growth and the likely root distribution i.e. the presence of hard standing, structures and underground apparatus.

- 3.25 Where groups of trees have been assessed, the Root Protection Area has been shown based on the maximum sized tree in any one group and so may exceed the Root Protection Area required for some of the individual specimens within the group. Further detailed inspection of the individual trees forming a group may be required where development impacts upon the group.
- 3.26 Above ground constraints such as the current crown spread of the trees and an illustration of the shade pattern (where appropriate) have been considered and identified within the Tree Survey Plan and Tree Retention Plan indicates their potential area of shading influence.

Considerations and Limitations of the Tree Survey

- 3.27 The survey was completed from ground level only and from within the boundary of the site. Aerial tree inspections or an assessment of the internal condition of the stem/s or branches were not undertaken at this stage as this level of survey is beyond the scope of the initial assessment.
- 3.28 The statements made in this report regarding defects in assessed trees does not take into account the effects of extreme / adverse weather conditions, changes in land use prior to the site's development as detailed within Section 4.0, unforeseen accidents or anti-social behaviors, such as vandalism, which occur since the date of the survey. As such, the assessment of tree condition given within applies to the date of survey and cannot be assumed to remain unchanged.
- 3.29 It will be necessary to review all comments and observations made within this report, in accordance with sound arboricultural practice, within two years of the date of survey (unless explicitly stated elsewhere within this report). Further review may also be necessary where site conditions change or works to trees are carried out which have not been specified in detail within this report.
- 3.30 It may be necessary during detailed design to undertake further assessment and accurate positioning of woody species within tree groups to assist structural calculations for foundation design of structures in accordance with current building regulations. Knowledge of soil type was not known at the time of this tree assessment. If a current soil survey of the site has taken place then it must be read in conjunction with the results of the tree survey.

- 3.31 The exact position of individual trees or species included as part of a tree group should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths in accordance with NHBC Chapter 4.2 Building near Trees.

4.0 Results

4.1 A total of 121 individual trees, 44 groups of trees and 35 hedgerows were surveyed as part of the Arboricultural Assessment. Trees were surveyed as individual trees and groups of trees where examples are clearly present as per the description. Refer to the Tree Survey Plan and Appendix A – Tree Schedule for full details of the trees included in this assessment. The table below summarises the trees assessed.

4.2 Several of the trees have been discussed in more detail following the table, owing to their physical condition or arboricultural significance.

Table 1: Summary of Trees by Retention Category

	Individual Trees	Total	Groups of Trees	Total
Category U - Unsuitable	T9, T28, T44, T82, T83, T84, T106	7		0
Category A (High Quality / Value)	T2, T6, T12, T15, T19, T20, T22, T23, T39, T49, T50, T52, T53, T54, T55, T56, T60, T61, T62, T69, T75, T76, T85, T92, T94, T95, T102, T103, T104, T105, T109, T114, T117	33		0
Category B (Moderate Quality / Value)	T7, T8, T10, T11, T13, T14, T16, T17, T32, T33, T34, T35, T36, T42, T48, T51, T59, T87, T89, T90, T91, T93, T96, T97, T98, T99, T100, T101, T110, T115, T116, T118, T120	33	G1, G11, G13, G15, G25, G28, G32, G33, G34, G41	10

	Individual Trees	Total	Groups of Trees	Total
Category C (Low Quality / Value)	T1, T3, T4, T5, T18, T21, T24, T25, T26, T27, T29, T30, T31, T37, T38, T40, T41, T43, T45, T46, T47, T57, T58, T63, T64, T65, T66, T67, T68, T70, T71, T72, T73, T74, T77, T78, T79, T80, T81, T86, T88, T107, T108, T111, T112, T113, T119, T121	48	G2, G3, G4, G5, G6, G7, G8, G9, G10, G12, G14, G16, G17, G18, G19, G20, G21, G22, G23, G24, G26, G27, G29, G30, G31, G35, G36, G37, G38, G39, G40, G42, G43, G44, H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35	69

Individual trees

- 4.3 The majority of category A trees on site were specimens of English oak *Quercus robur*, these were situated within field compartments or around the site boundaries. These trees were considered to hold a future life expectancy of at least a further forty years in their current growing environment and held a large physical presence within the local landscape. Although typical defects such as dead wood and storm damage were noted within their crowns, these trees were still considered to be of high arboricultural value.
- 4.4 The next highest collection of category A trees where those considered to be of a veteran status and therefore recorded as category Aiii. These are discussed in more detail below.

Tree Groups

- 4.5 G1 was a large group of hybrid black poplar *Populus x Canadensis* which had been planted along a field boundary within the centre of the site. The trees in this group reached up to twenty-eight metres in height and held dense interlocking crowns due to the close planting of the trees. This group was considered to be a category B group of moderate arboricultural value due to the visual impact that these trees hold on the local landscape.

- 4.6 G32, G33 and G34 formed a large wooded area in the centre of the site. These groups were mainly formed by specimens of crack willow. The trees within this group showed no signs of past management leading to a dense under story forming obscuring the view further within. Many failed trees were noted within these groups that now hung within the surrounding canopies. Although defects such as dead wood and failed specimens were noted within these groups, they were graded as category B for their collective visual presence on the local landscape.
- 4.7 Other tree groups considered to be of moderate quality included G28 a linear tree group and G41, a triangular group to the west. Both contained a diverse range of native species and were of semi mature to early mature proportions.

Hedgerows

- 4.8 The field boundaries that formed the site held typical managed and outgrown hedgerow groups that were dominated by specimens of hawthorn. The managed hedgerows had been recently flailed to heights of 1.5metres, whereas the outgrown boundaries averaged at heights of 5 metres from ground level. These were all graded as category C groups and hedgerows due to their limited arboricultural value and impact on the local landscape.

Trees Unsuitable for Retention

- 4.9 Trees T9, T28, T44, T82, T83, T84 and T106 were all considered to be unsuitable for retention in the current context of the site. Therefore, it would be recommended that these trees are removed as part of general countryside management, removing the risk of potential future failures.

Veteran Trees

- 4.10 For the purpose of affording these trees greater protection the RPA calculation has been calculated in accordance with the guidelines detailed within Ancient and other Veteran Trees: Further Guidance on Management (Lonsdale, D (ed.) (2013). The Tree Council & Ancient Tree Forum. The RPA is defined as a distance equal to 15 times the trees stem diameter, or five metres beyond the canopy, whichever is the greater (Read, 2000).
- 4.11 Where this assessment has identified veteran trees, further survey work of those trees and their communities will be required. From an ecological

perspective veteran trees provide a rare and specialist niche habitat and therefore preservation of this habitat is considered highly important. Veteran trees and many of their associated specialised species are becoming increasingly rare within the landscape and therefore some veteran tree landscapes and their associated species are now protected, both nationally and Europe wide through the Natura 2000 Directive.

- 4.12 Trees T2, T6, T12, T15, T19, T20, T22, T23, T60, T61, T62 were considered to be veteran specimens due to their large stem size, form, the amount of dead wood within their crowns, hollowing of the stem and visible decay of the timber, and bark loss. These were all specimens of Crack willow *Salix fragilis* that showed signs of past management through pollarding but this management has lapsed for some time. Many of these trees have failed and through the species habit of phoenix regeneration, now held large limbs laying on the ground with new growth developing from them. It would be recommended that these trees are suitably managed to preserve the current habitat they provide and also make them structurally safe. This could be done by either coppicing them down to ground level, removing all large limbs/stems and laying them elsewhere on site. This would retain the habitat they provide and allow the trees to re-grow from the coppice stool. Where main stems are more structurally sound then pollarding can be reinstated.

5.0 Arboricultural Impact Assessment

- 5.1 The following paragraphs present a summary of the tree survey and discussion of particular trees and groups recorded in the context of any proposed development in the form of an Arboricultural Impact Assessment in accordance with section 5.4 of BS5837. Any final tree retentions will need to be reconciled with the advice contained within this report.
- 5.2 The AIA has been based upon the Infinity Garden Village (Wragley Way) Parameters Plan (Drawing No. 13.060/19a) and seeks to outline the relationship between the proposals and the existing trees and hedgerows. The drawing shows the proposals for a residential development with associated school, retail, employment and open space areas. An overlay of the layout has been incorporated in the Tree Retention Plan to assist in identifying the relationship and any potential conflicts between the proposals and the existing trees and hedgerows.

New junction and link road

- 5.3 The slip road access from A50 will directly impact upon trees T15, T16, G19, G20, G21, G22, G23, G24, H5, H6, H7, H8, H9, H10 and H18. These generally consisted of groups of buffer material for the A50 and would be unlikely to cause objection on arboricultural grounds if removed. However, T15 was a mature specimen of crack willow that was considered to be a veteran specimen due to its size, girth and habitat features such as hollowing stem and bark wounds. The translocation of this tree is recommended along with others across the site. Further details are provided below.
- 5.4 The new road alignment runs through G26, a typical outgrown hedgerow group which would lead to a section of this category C group to be removed. This section of road would also directly impact upon T19, another mature specimen of crack willow that was considered to be a veteran. T22 was a further specimen of crack willow considered to be of veteran status will need to be removed to facilitate the roundabout construction. These trees are also recommended for translocation.
- 5.5 A section of G1, a large boundary group of hybrid black poplar would require removal to allow for the road alignment to pass through, along with further sections of outgrown boundary hedgerows G6, G7 and G17. Due to the large nature of the trees within G1, it would be recommended that these trees are managed in the future to reduce their height. Hybrid black poplar hold the

species habit of fast growth which leads to weaker timber than some other tree species. Reducing their height would allow them to survive with a reduced risk of future failures.

- 5.6 To the north of the site, sections of G7, G8 G12 and G14 will require removal to facilitate the road and proposed new wetland area. Again, these were typical outgrown boundary hedgerows and their removal would be unlikely to raise objection on arboricultural grounds.
- 5.7 To the west of the site H3 and H13 would require removal due to the alignment of another wetland area. These were considered to be of low arboricultural value due to their limited impact on the local landscape.

Road/Pedestrian access links

- 5.8 To provide access throughout the site, sections of tree cover will need to be removed, these comprise of H1, H4, H19, H21, H24, H28, H29, H30, H31, H32, G28 G29, G32, G37 and G40. Individual trees T45, T46, T71, T72, T73, T74 and T81 would also be impacted by these access points and would require removal. With the exception of G32, this was all considered to be low value tree material and graded as category C. G32 was the only group graded as a category B group of moderate arboricultural value due to its size and visual impact on the local landscape.
- 5.9 Due to the dense, outgrown nature of groups G32, G33 and G34 it would be recommended that a detailed management plan is created to identify clear objectives in improving the quality of trees within the groups through thinning and replanting.

Other impacts to trees

- 5.10 T37 and T38 were large stumps of willow that had formed dense bushy epicormic regrowth. It would be recommended that this regrowth is cut back and the stumps are removed or relocated elsewhere on site to continue contributing to the local ecological resources.
- 5.11 T47 was a similar stump shown to be within the Local Centre area of the proposals, this tree would require removal to facilitate the development. This stump could again be relocated in a similar fashion to trees T37 and T38.

- 5.12 It would be recommended that trees T3, T21, T61, T63 and T64 are all managed through the practice known as pollarding, this would involve much of the crown material to be removed leaving approximately 2m of the stem and allow it to redevelop over time. This would remove the large amount of the dead wood that these willow trees hold. This management has been carried out in the past to these trees and would allow them to be retained and continue to contribute to the local environment.
- 5.13 Several mature trees are shown to be within the developable areas of the site. At the detailed design stage of the application, extra care must be taken to allow for these trees and their rooting environment to be incorporated. Areas of incidental open space will need to be designed around these trees to allow them and their roots to continue to survive in similar growing conditions. Addition care during the construction of the site will also need to be taken and should be identified within an Arboricultural Method Statement.

Veteran Trees

- 5.14 T15, T19 and T22 will need to be removed to facilitate the development. Whilst this comprises a loss of these veteran trees it is considered to be 'wholly exceptional' due to the significance of the 'infrastructure project involved and the public benefit would clearly outweigh the loss or deterioration of these habitats.
- 5.15 Due to the species habit of willow to 'phoenix regenerate' it is recommended that these trees are translocated to another area of the site where they can continue to exist as habitat features. This work would need to be detailed within an arboricultural method statement however in general terms stem material can be removed in large section and translocated along with the main stem and root ball of the tree.
- 5.16 T2, T6, T20, T23, T60 and T62 are all to be retained within the proposed development however in their current form there is a greater risk of future failure and deterioration. It is recommended that pollard works are carried out however in a sympathetic manner as not to destroy any ecological resource these trees offer. These works should be provided within a site wide Veteran Tree Management Plan.

Conclusion

- 5.17 In summary, the only trees of high quality and habitat value that would require removal would be T15, T19 and T22 for the proposed link road. It would be possible to translocate these trees and retain the habitat value they contain if the stems of these trees were moved to the flood areas to the north and allowed to naturally regenerate, which can be achieved with specimens of willow.
- 5.18 The largest amount of tree material that would require removal would be from around the A50 to facilitate the proposed new slip roads. This material acted as a buffer to the carriageway and new planting on the new embankments would go some way to mitigate the loss of the material and provide a new buffer. Much of the tree stock on site will not be affected by the road layout or flood areas and can continue to contribute to the local landscape.
- 5.19 The only other losses of tree material on the site would be to facilitate the access of roads/paths through the existing field boundaries. The loss of this material can be mitigated for with the new planting shown within the generous landscape buffer running adjacent to the southern boundary of the site. This new planting will increase the overall green cover on site and soften the built element of the proposals.

Tree Management

- 5.20 All retained trees should be subjected to sound arboricultural management as recommended within section 8.8.3 of BS5837 Post Development Management of Existing Trees, where there is a potential for public access in order to satisfy the landowner's duty of care. Additionally, inspections annually and following major storms should be carried out by an experienced arboriculturalist or arborist to identify any potential public safety risks and to agree remedial works as required.
- 5.21 All tree works undertaken should comply with British Standard 3998:2010 and should therefore be carried out by skilled tree surgeons. It would be recommended that quotations for such work be obtained from Arboricultural Association Approved Contractors as this is the recognised authority for certification of tree work contractors.

- 5.22 All vegetation and, particularly, woody vegetation proposed for clearance should be removed outside of the bird-breeding season (March - September inclusive) as all birds are protected under the Wildlife and Countryside Act, 1981 (as amended) whilst on the nest.
- 5.23 Where this is not possible, vegetation should be checked for the presence of nesting birds prior to removal by an experienced ecologist.

6.0 Mitigation and Monitoring

- 6.1 As part of the development proposals a quantity of structured tree planting has been demonstrated predominantly within a generous landscape buffer to the south and areas of public open space. The purpose and function of this new tree planting should be understood from the start of any design stages so that key objectives from a landscape perspective can also be achieved.

Trees

- 6.2 The landscaping scheme should consider the use of both native tree species (for their low maintenance requirements and nature conservation value) and ornamental species (for their contribution to urban design and amenity value). Species choices should be selected on the basis of their suitability for the final site use. Furthermore, during the design process consultation should be made with the Local Planning Authority to obtain information on their tree strategy and incorporate the planting proposals with any local policies and initiatives and/or Biodiversity Action Plans (BAP).
- 6.3 In line with the NPPF all schemes should aim achieve a net gain in biodiversity value. Nationally recognised biodiversity metrics allow for the inclusion of, not limited to, newly planted scattered trees, woodlands and hedgerows as a means of compensating for loss of habitat as part of the development. Tree and shrub planting can therefore be used to contribute to this biodiversity gain.
- 6.4 To maximise biodiversity value (and contribution to net gain) native species or varieties should be specified. Such provisions can be incorporated into both the hard and soft landscaping of the scheme. It is recommended that tree and hedgerow specifications are made following consultation with guidance published by the Local Planning Authority.
- 6.5 When designing upon suitable tree species, careful consideration would need to be given to the following: ultimate height and canopy spread, form, habit, density of crown, potential shading effect, colour, water demand, soil type and maintenance requirements in relation to both the built form of the new development and existing properties.
- 6.6 Through careful species selection, the landscape scheme shall reduce the risk of trees being removed in the future on the grounds of nuisance. Nuisance can be perceived in a number of ways and vary from person to person

however most commonly, within the context of trees, low overhanging branches, excessive shading, seasonal leaf fall and the misinformed perception that trees close to buildings cause damage.

Hedgerows

- 6.7 Hedgerows are identified as a Habitat of Principle Importance (HPI) as listed within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Consequently, it is important that the proposed scheme delivers a net gain in terms of linear hedgerows through new planting to compensate for any losses. Species should be native, and characteristic of the locality.
- 6.8 Recommended species for native hedgerow planting are as follows:
- *Crataegus monogyna*
 - *Prunus spinosa*
 - *Cornus sanguinea*
 - *Corylus avellana*
 - *Acer campestre*
 - *Quercus robur*
 - *Euonymus europaeus*

Rooting Environment and Soil Volumes

- 6.9 The success of any landscaping scheme relies on an adequate provision of a high-quality rooting environment within which trees can thrive and reach their full potential. Planting trees with due care and consideration can, in the long term, provide a greater return on a schemes green investment and ensure trees remain healthy and grow to mature proportions. Healthy mature trees integrate well into the built environment; increase the maturity of the landscape; help provide a natural green and leafy urban environment in which people would want to reside whilst also benefiting local wildlife.
- 6.10 The planting of trees within confined urban environments should consider the use of appropriately designed planting pits specifically engineered to promote tree health and longevity. Crucially the aim will be to provide an adequate volume of quality soil for roots to suitably develop by calculating the amount of available soil volumes needed and selecting species whose mature size is compatible with the site. This is an integral component of the planning stage (Lindsey & Bassuk, 1991).

- 6.11 In a natural environment free from constraints to growth, it has been proven through research that root systems can extend up to three times the radius of the tree crown and although in an urban environment there is often insufficient space to accommodate the extent of the full potential for root growth, all efforts should be made to at least provide as much soil volume as possible. One researched method of calculating the minimum required soil volume is as follows:

Table 2: Example of calculating Soil Volume for New Tree Planting (Source: CIRIA C712 and Calculating Target Soil Volumes – Green Blue Urban)

Projected canopy area of mature tree (m) x depth 0.6m		
Calculation 1	Projected mature canopy diameter (metres)	= 3 (Diameter)
Calculation 2	Projected mature canopy area (square metres), ($n \times \text{Radius}^2$)	= 7.1 (Area)
Calculation 3	Target soil volume (cubic metres), (Area x 0.6m)	= 4.24 (Volume)
	Target soil volume	= 4.24m ³

General Planting Recommendations

- 6.12 Wherever possible, following discussions with the developer and utility companies, common service trenches should be specified to minimise land take associated with underground service provision and facilitation access for future maintenance.
- 6.13 Tree planting should be avoided where they may obstruct overhead power lines or cables. Any underground apparatus should be ducted or otherwise protected at the time of construction to enable trees to be planted without resulting in future conflicts.

General Design Principles in Relation to Retained Trees

- 6.14 In a subsequent Reserved Matters application following the final layout of the scheme, assessment of the distance of proposed development in relation to the calculated root protection area of retained trees should be made which will inform the final layout.
- 6.15 The use of “no-dig” construction methods should be considered prior to decisions being made as to the removal of each tree concerned, where

conflicts between trees identified for retention and the layout arise. Such methods of construction and the use of industry led specialist engineering solutions i.e. three dimensional “load bearing” cellular confinement systems can be used particularly in the case of carriageways, footways and driveways in order to avoid unnecessary losses of trees.

- 6.16 The routing of below ground services should also be considered with regard to the retained trees as part of a subsequent reserved matters application pursuant to layout. As recommended by the guidance given in section 7.7 of BS5837 services, where possible, should not encroach within the Root Protection Areas of retained trees. If below-ground services are proposed within a Root Protection Area, modifications to the alignment of the service route may need to be made in order to minimise adverse effects on root stability and overall tree health.
- 6.17 Consideration may also need to be given to the potential for tree roots of newly planted trees and hedgerows to affect or compromise the future services. As far as feasible, it would be preferable that proposed services near both the existing and any new planting should be ducted for ease of access and maintenance and grouped together to minimise any future disturbance.

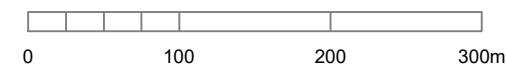
7.0 Summary & Conclusions

- 7.1 The site consists of an area of farmland generally to the south of Wragley Way, Derby. The tree stock is generally restricted to the boundaries of the site with occasional mature specimens within the field parcels.
- 7.2 The tree species on site were formed by a number of naturalised species with crack willow, English oak and hawthorn being the most prominent in numbers.
- 7.3 To facilitate the development proposals as defined by the Parameters Plan, the only trees of high quality and habitat value that would require removal would be T15, T19 and T22 for the proposed link road. It would be possible to translocate these trees and retain the habitat value they contain if the stems of these trees were moved to the flood areas to the north and allowed to naturally regenerate, which can be achieved with specimens of willow.
- 7.4 The largest amount of tree material that would require removal would be from around the A50 to facilitate the proposed new slip roads. This material acted as a buffer to the carriageway and new planting on the new embankments would go some way to mitigate the loss of the material and provide a new buffer. Much of the tree stock on site will not be affected by the road layout or flood areas and can continue to contribute to the local landscape.
- 7.5 The only other losses of tree material on the site would be to facilitate the access of roads/paths through the existing field boundaries. The loss of this material can be mitigated for with the new planting shown within the generous landscape buffer running adjacent to the southern boundary of the site. This new planting will increase the overall green cover on site and soften the built element of the proposals.



- KEY**
-  Category U - Trees / Groups Unsuitable for Retention (BS 5837:2012)
 -  Category A - Trees / Groups of High Quality (BS 5837:2012)
 -  Category B - Trees / Groups of Moderate Quality (BS 5837:2012)
 -  Category C - Trees / Groups of Low Quality (BS 5837:2012)
 -  Hedgerow (Colour indicates BS5837:2012 Category)
 -  Root Protection Area (The RPA has been altered where appropriate to reflect underground constraints)
 -  Veteran Tree Root Protection Area (in accordance with Ancient and Other Veteran Trees: Further Guidance on Management)
 -  Individual / Group Number and BS5837:2012 Category
 -  Indicative Shade Pattern (in accordance with BS5837:2012 where appropriate)

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project
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Wragley Way**

drawing title
TREE SURVEY PLAN

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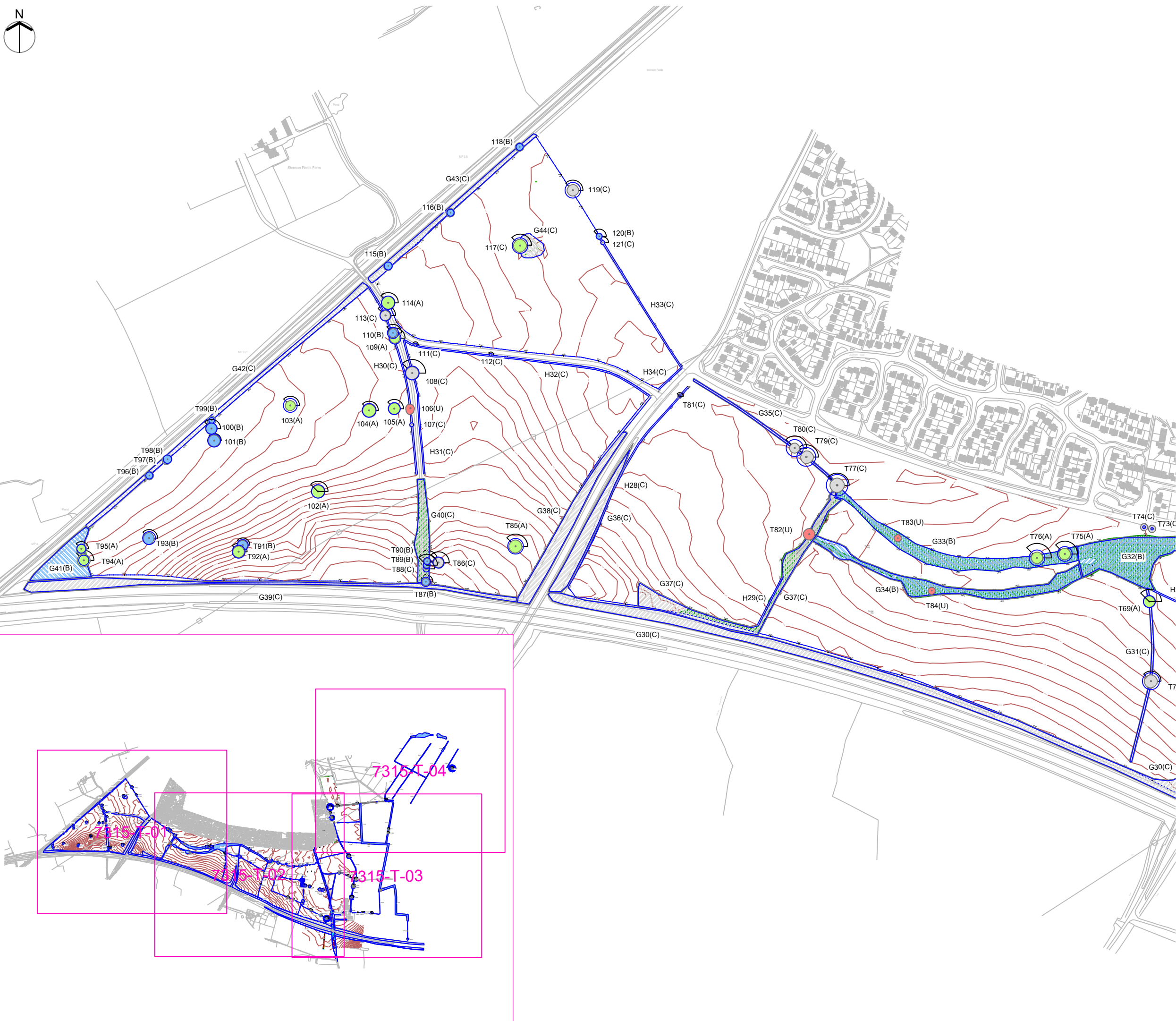
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Wragley Way

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TREE SURVEY PLAN

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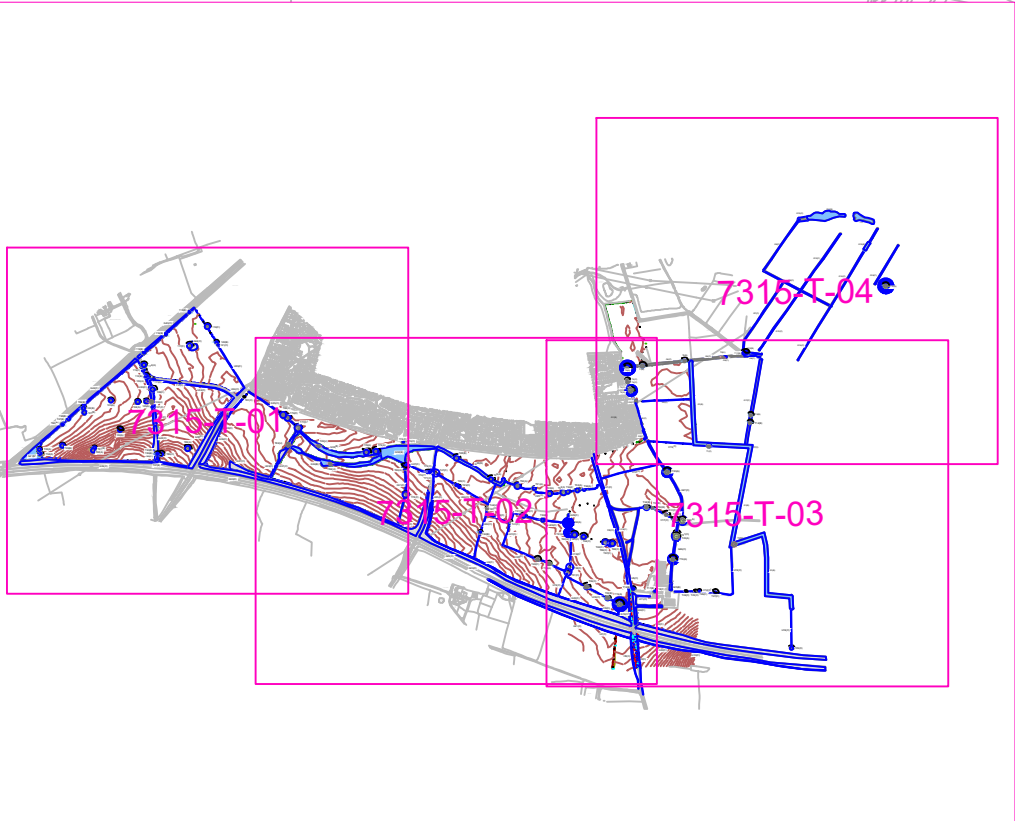
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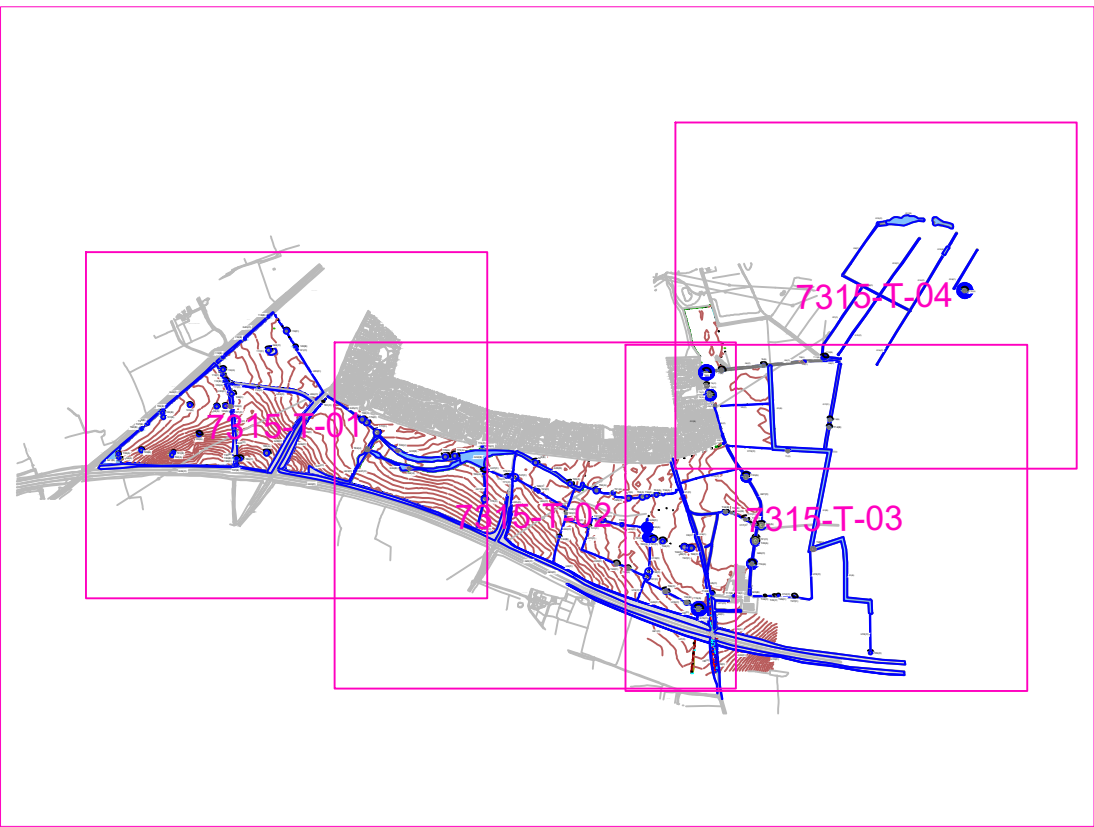
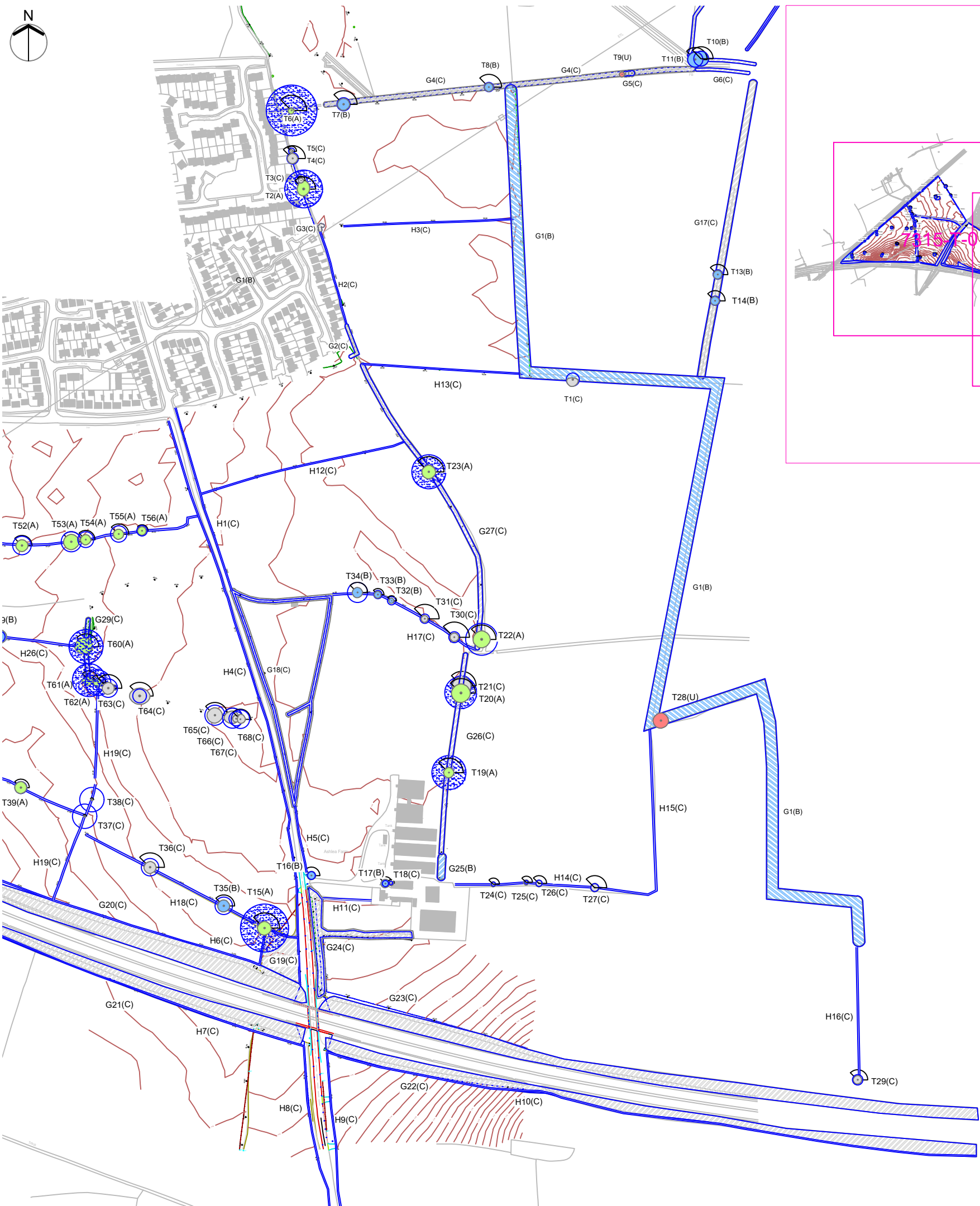
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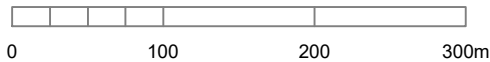




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project

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Wragley Way

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TREE SURVEY PLAN

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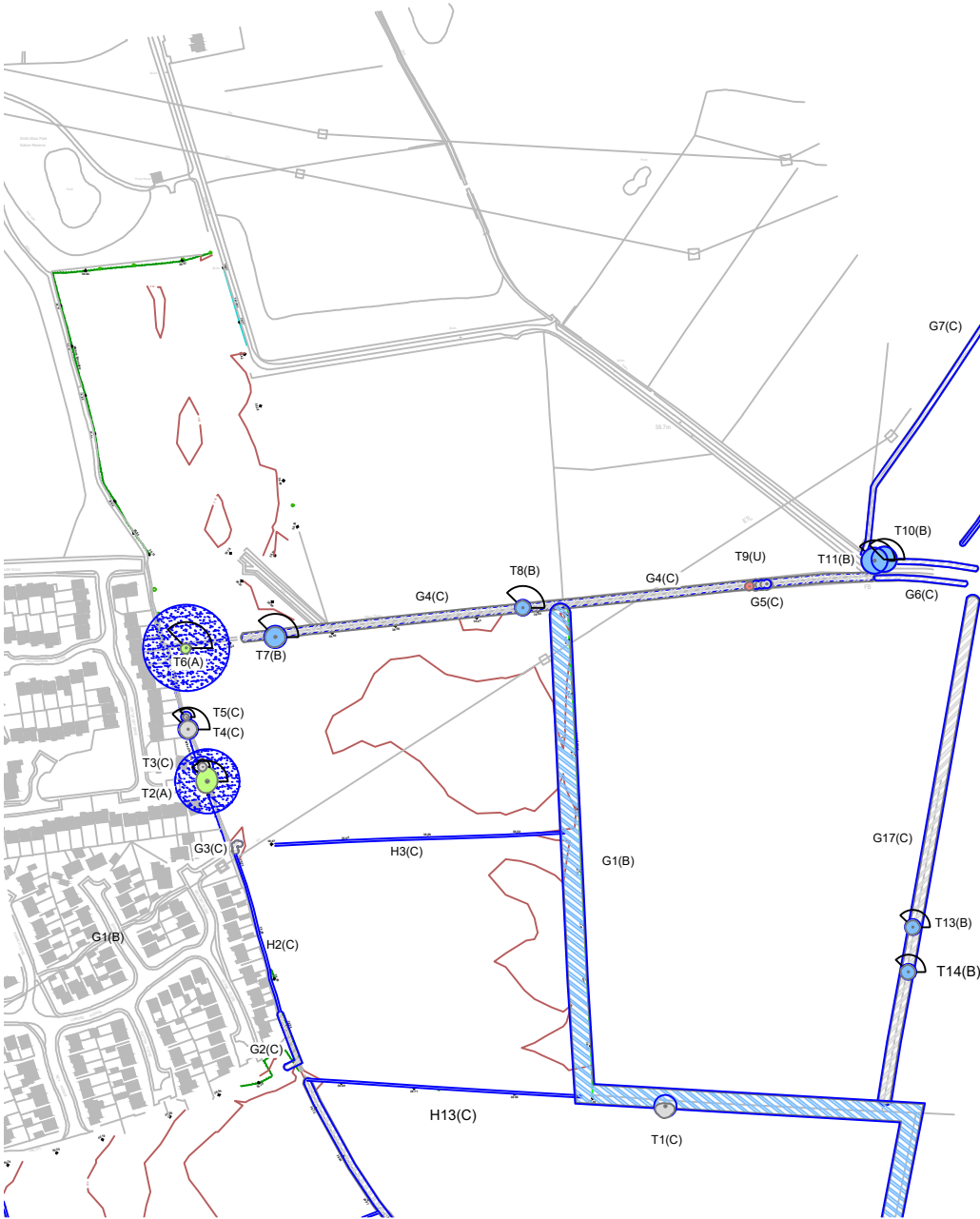
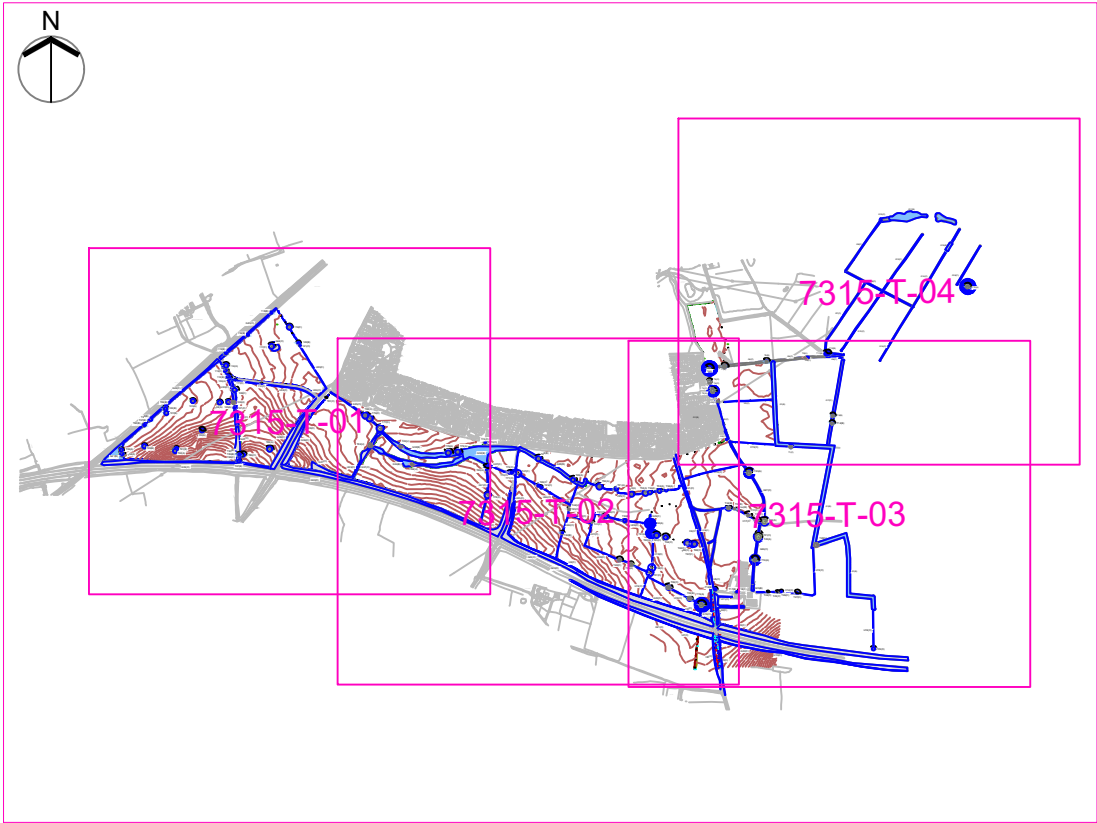
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KEY

Category U - Trees / Groups Unsuitable for Retention
(BS 5837:2012)

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(BS 5837:2012)

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Category C - Trees / Groups of Low Quality
(BS 5837:2012)

Hedgerow
(Colour indicates BS5837:2012 Category)

Root Protection Area (The RPA has been altered
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Veteran Tree Root Protection Area (in accordance with
Ancient and Other Veteran Trees: Further Guidance on
Management)

T1 (A)
G1 (A)

Individual / Group Number and BS5837:2012 Category

Indicative Shade Pattern (in accordance with
BS5837:2012 where appropriate)

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0

100

200

300m

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Wragley Way**

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TREE SURVEY PLAN

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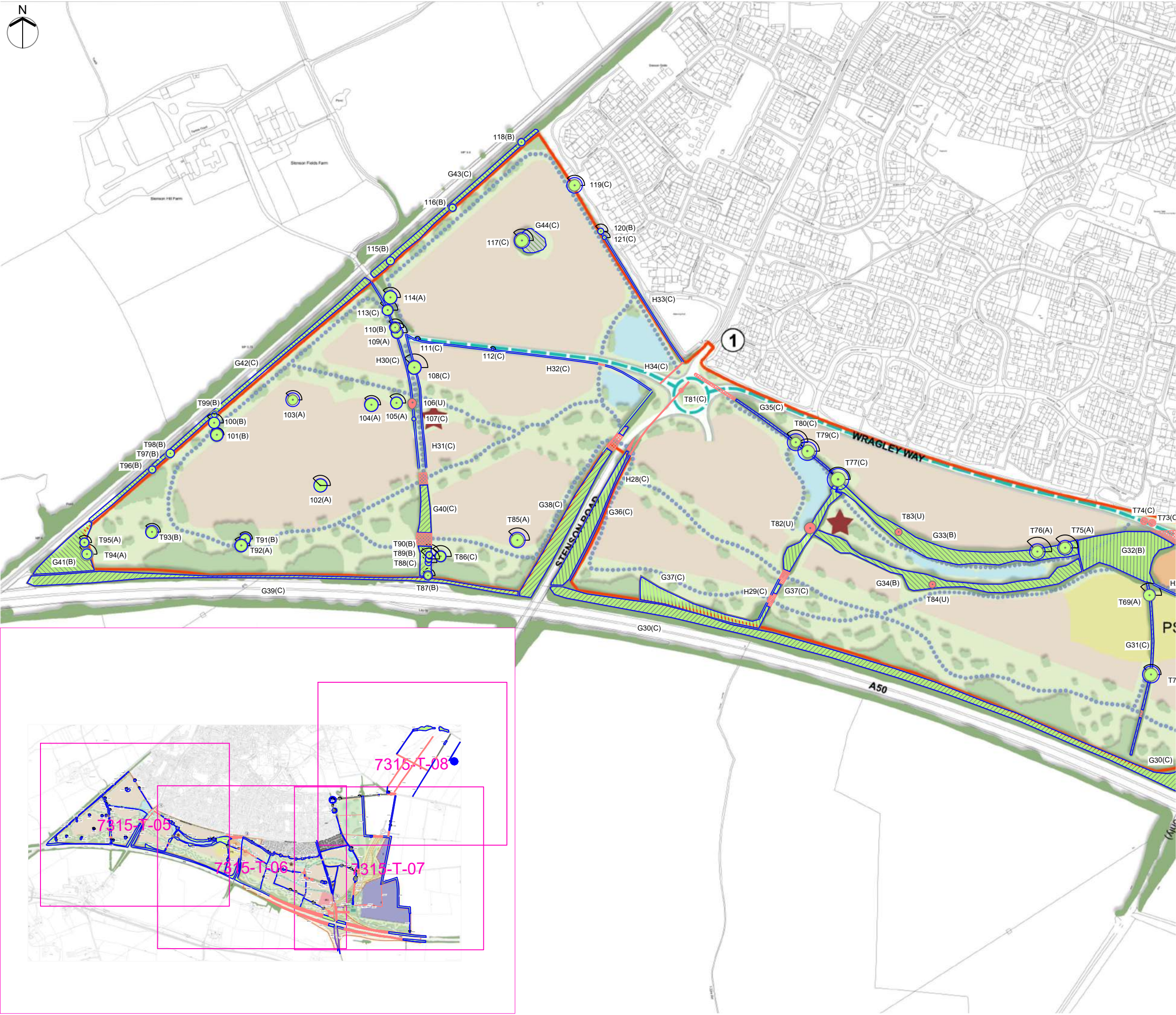
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KEY

-  Tree/Group to be Retained
-  Tree/Group to be removed to facilitate the proposals
-  Category U - Unsuitable for retention on arboricultural grounds
-  Hedgerow Proposed to be Retained and Incorporated into the New Development
-  Hedgerow Proposed to be Removed to Facilitate the Development upon Approval of the Application
-  Root Protection Area (Shown for retained trees only)
-  Veteran Tree Root Protection Area (in accordance with Ancient and Other Veteran Trees: Further Guidance on Management)
-  T1 (A)
G1 (A) Individual / Group Number and BS Category
-  Indicative Shade Pattern (where appropriate)

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TREE RETENTION PLAN

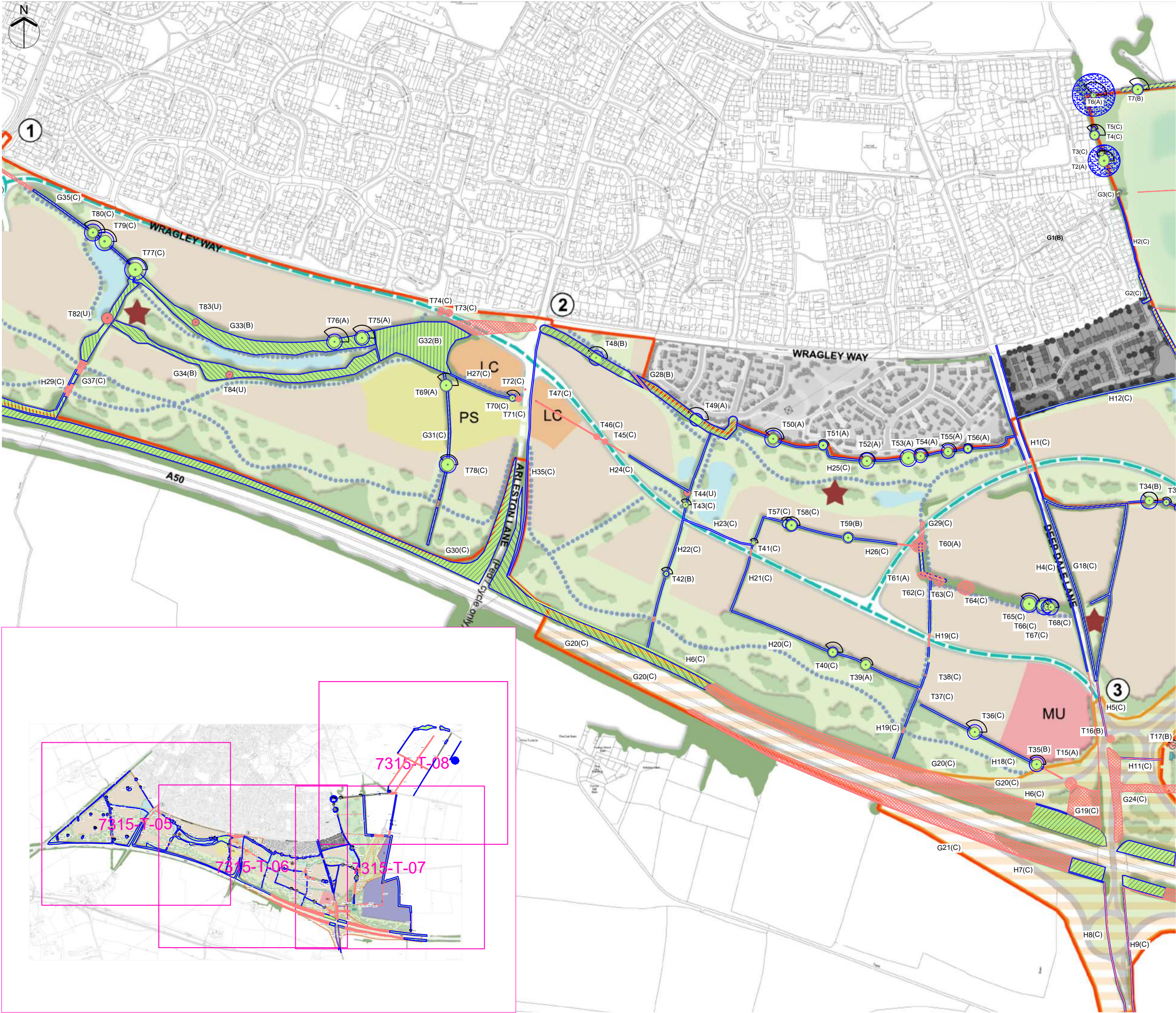
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KEY

Tree/Group to be Retained

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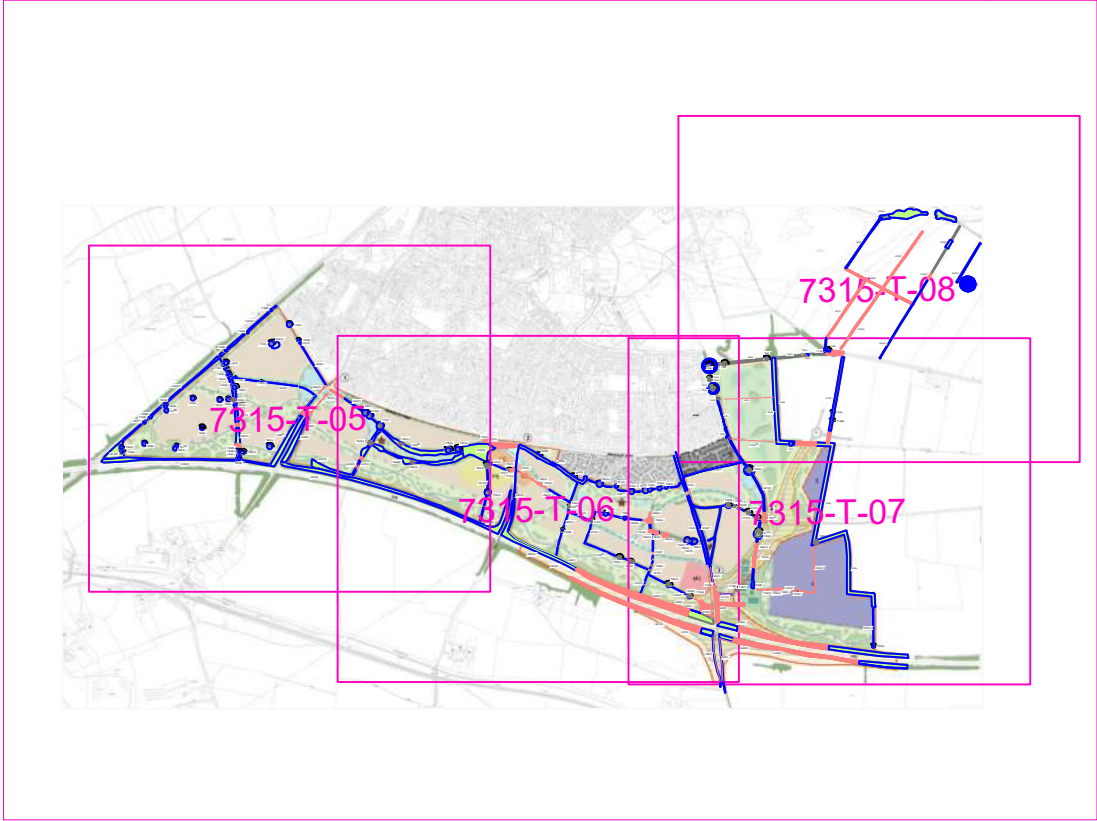
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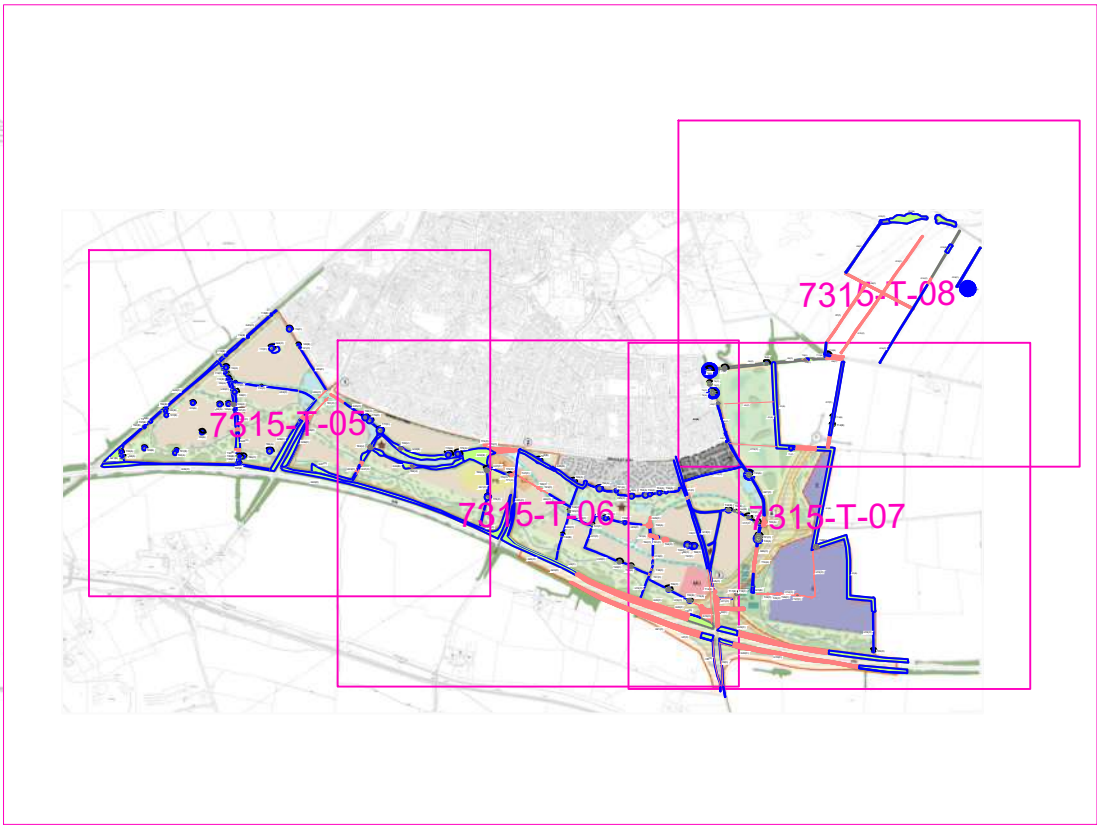
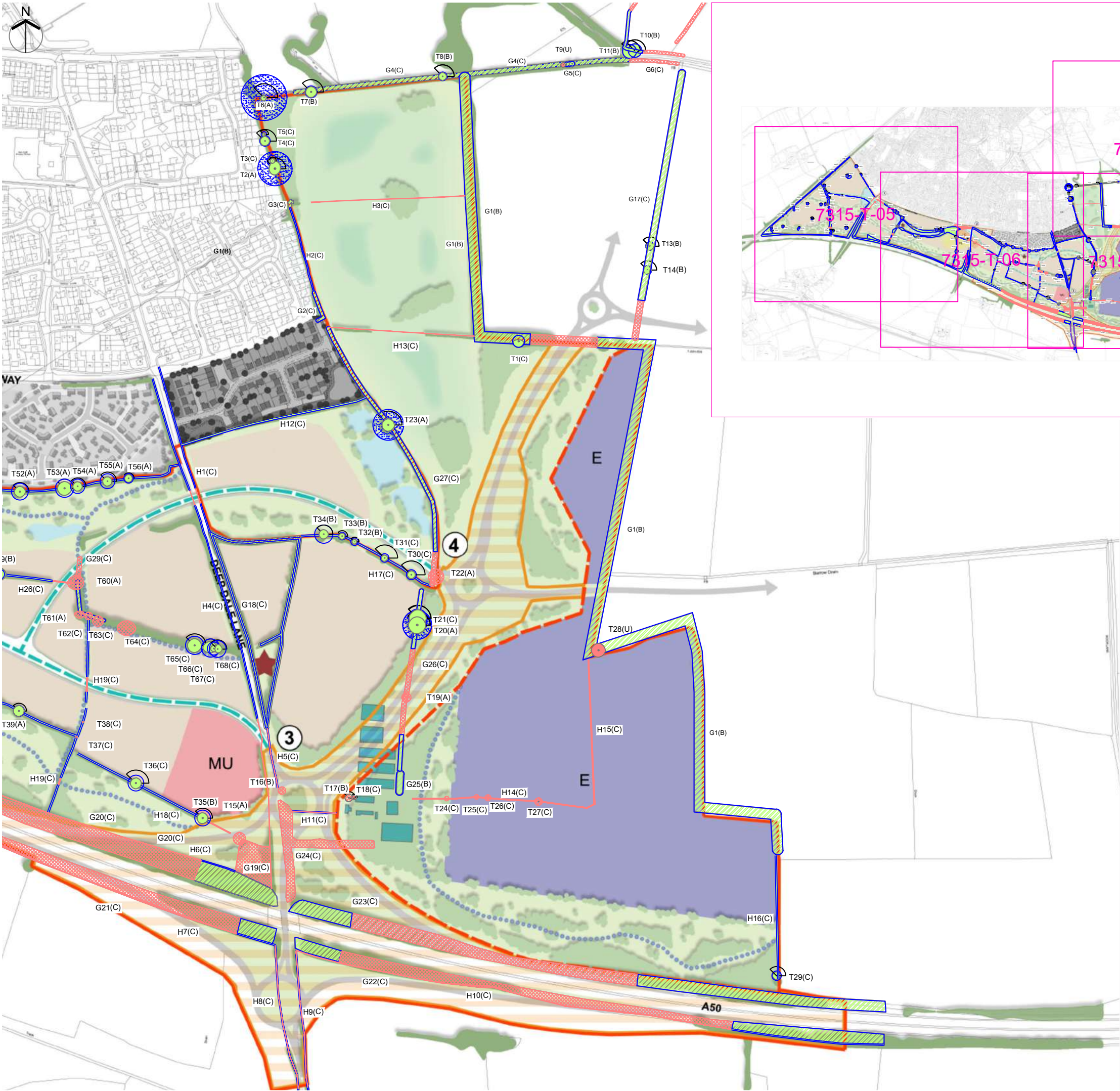
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- KEY**
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 - Tree/Group to be removed to facilitate the proposals
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-	05.06.19	First Issue	HR
rev	date	description	by

- masterplanning
- environmental assessment
- landscape design
- urban design
- ecology
- architecture
- arboriculture

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client
Hallam Land Management

project
**Infinity Garden Village
Wragley Way**

drawing title
TREE RETENTION PLAN

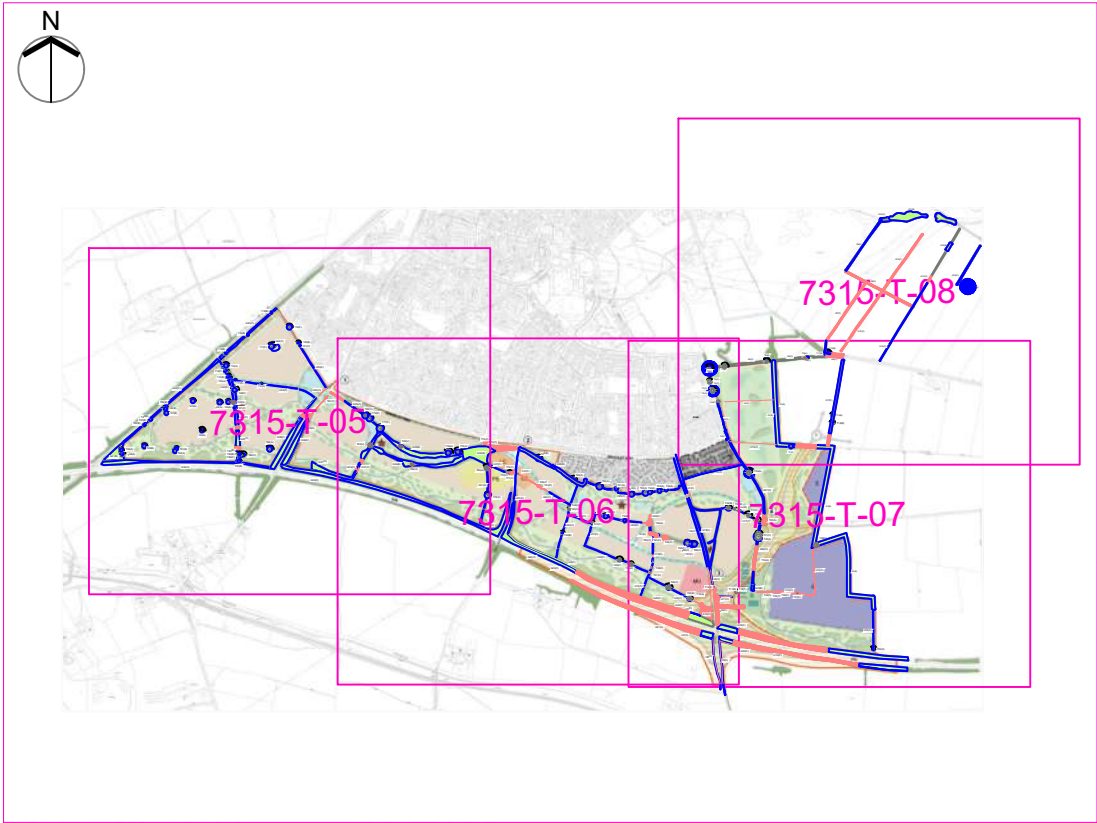
scale
1:5000 @ A3

drawn/checked
HR/TCB

date
May 2019

drawing number
7315-T-07

rev
-



KEY

Tree/Group to be Retained

Tree/Group to be removed to facilitate the proposals

Category U - Unsuitable for retention on arboricultural grounds

Hedgerow Proposed to be Retained and Incorporated into the New Development

Hedgerow Proposed to be Removed to Facilitate the Development upon Approval of the Application

Root Protection Area (Shown for retained trees only)

Veteran Tree Root Protection Area (in accordance with Ancient and Other Veteran Trees: Further Guidance on Management)

T1 (A)
G1 (A)

Individual / Group Number and BS Category

Indicative Shade Pattern (where appropriate)

Scale 1:5000 @ A3

0

100

200

300m

NOTES

All dimensions to be verified on site. Do not scale this drawing, use figured dimensions only. All discrepancies to be clarified with project Arboriculturalist. Drawing to be read in conjunction with Arboricultural Assessment and Appendix A - Tree Schedule.

Drawing has been produced in colour and is based on digital information in .dwg format, aerial images and/or GPS location where appropriate. A monochrome copy should not be relied upon. The exact position of individual trees or species included as part of a tree group, woodland or hedgerow should be checked and verified on site prior to any decisions for foundation design, tree operations or construction activity being undertaken. Further survey work would be required for calculating foundation depths.

Trees are living organisms that change over time, the condition of all trees illustrated herein, are to be checked by the project Arboriculturalist should works commence 12 months after the date of this survey.

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TREE RETENTION PLAN

scale

1:5000 @ A3

drawn/checked

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date

May 2019

drawing number

7315-T-08

rev

-

CAD file:

J:\7300\7315\ARB\Plans\Tree Retention Plan.dwg

Appendix A - Tree Schedule

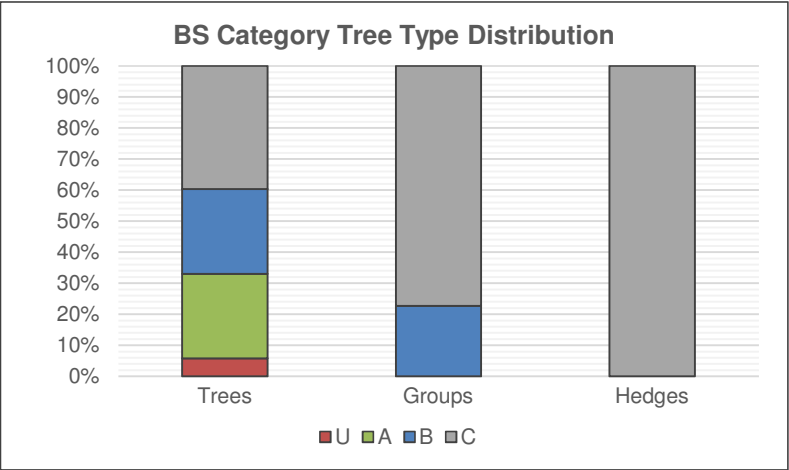
Measurements	Age Class	Overall Condition	Root Protection Area (RPA)
Height - Measured using a digital laser clinometer (m)	YNG: Young trees up to ten years of age	G - Good: Trees with only a few minor defects and in good overall health needing little, if any attention	• The RPA Radius column provides the extent of an equivalent circle from the centre of the stem (m). • The RPA is calculated using the formulae described in paragraph 4.6.1 of British Standard 5837: 2012 and is indicative of the rooting area required for a tree to be successfully retained. Tree roots extend beyond the calculated RPA in many cases and where possible a greater distance should be protected. • Where veteran trees have been identified the RPA has been calculated in accordance with Natural England guidance i.e. 15x the stem diameter, uncapped.
Stem Dia. - Diameter measured (mm) in accordance with Annex C of the BS5837	SM: Semi-mature trees less than 1/3 life expectancy	F - Fair: Trees with minor rectifiable defects or in the early stages of stress from which it may recover	
Crown Radius - Measured using a digital laser clinometer radially from the main stem (m)	EM: Early mature trees 1/3 – 2/3 life expectancy	P - Poor: Trees with major structural and/or physiological defects such that it is unlikely the tree will recover in the long term	
Abbreviations est - Estimated stem diameter avg - Average stem diameter for multiple stems upto - Maximum stem diameter of a group	M: Mature trees over 2/3 life expectancy	D - Dead: This could also apply to trees in an advanced state of decline and unlikely to recover	
	OM: Over mature declining or moribund trees of low vigour	The BS category particular consideration has been given to the following • The health, vigour and condition of each tree • The presence of any structural defects in each tree/group and its future life expectancy • The size and form of each tree/group and its suitability within the context of a proposed development • The location of each tree relative to existing site features e.g. its screening value or landscape features • Age class and life expectancy	
	V: Veteran tree possessing certain attributes relating to veteran trees		

Structural Condition
The following is an example of considerations when inspecting structural condition: - The presence of fungal fruiting bodies around the base of the tree or on the stem, as they could possibly indicate the presence of possible internal decay - Soil cracks and any heaving of the soil around the base - Any abrupt bends in branches and limbs resulting from past pruning - Tight or weak 'V' shaped forks and co-dominant stems - Hazard beam formations and other such biomechanical related defects (as described by Claus Mattheck, Body Language of Trees HMSO Research for Amenity Trees No. 4 1994) - Cavities as a result of limb losses or past pruning - Broken branches or storm damage - Damage to roots - Basal, stem or branch / limb cavities - Crown die-back or abnormal foliage size and colour

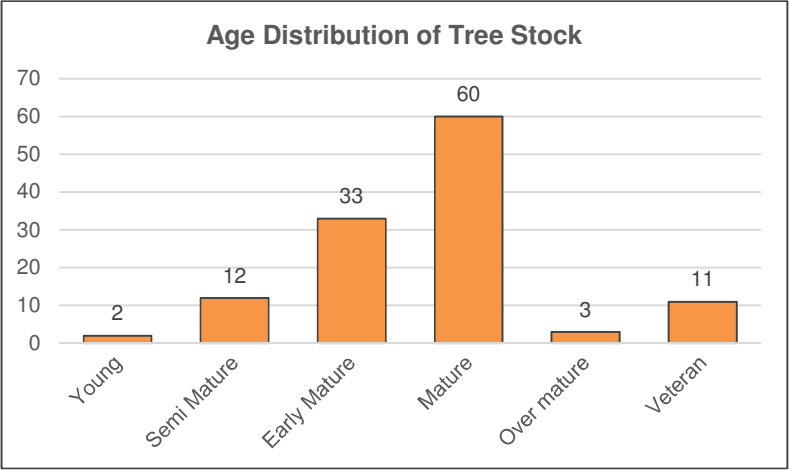
Quality Assessment of BS Category
Category U - Trees in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years.
Category A - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category B - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category C - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.
Sub-categories: (i) - Mainly arboricultural value (ii) - Mainly landscape value (iii) - Mainly cultural or conservation value

Appendix Summary

	Individual Trees	Totals	Tree Groups and Hedgerows	Totals
Category U	T9, T28, T44, T82, T83, T84, T106	7		0
Category A	T2, T6, T12, T15, T19, T20, T22, T23, T39, T49, T50, T52, T53, T54, T55, T56, T60, T61, T62, T69, T75, T76, T85, T92, T94, T95, T102, T103, T104, T105, T109, T114, T117	33		0
Category B	T7, T8, T10, T11, T13, T14, T16, T17, T32, T33, T34, T35, T36, T42, T48, T51, T59, T87, T89, T90, T91, T93, T96, T97, T98, T99, T100, T101, T110, T115, T116, T118, T120	33	G1, G11, G13, G15, G25, G28, G32, G33, G34, G41	10
Category C	T1, T3, T4, T5, T18, T21, T24, T25, T26, T27, T29, T30, T31, T37, T38, T40, T41, T43, T45, T46, T47, T57, T58, T63, T64, T65, T66, T67, T68, T70, T71, T72, T73, T74, T77, T78, T79, T80, T81, T86, T88, T107, T108, T111, T112, T113, T119, T121	48	G2, G3, G4, G5, G6, G7, G8, G9, G10, G12, G14, G16, G17, G18, G19, G20, G21, G22, G23, G24, G26, G27, G29, G30, G31, G35, G36, G37, G38, G39, G40, G42, G43, G44, H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35	69
Total		121	Total	79



BS Category Tree Type Distribution displays the proportion of trees assessed in each type to enable a better understanding of the category distribution.



Age Distribution of Tree Stock shows the number of trees in each age category across the tree stock allowing assessment of their longevity to be made.

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
INDIVIDUAL TREES										
T1	Crack Willow Salix fragilis	9	7x 250	N - 1 S - 8 E - 5 W - 5	EM	P	Branch stubs evident Broken branches evident Close cultivation of the soil Minor dead wood evident in the crown (<75mm) Multi leadered form Suppressed crown form	198	7.9	C (i)
T2	Crack Willow Salix fragilis	14	est 1500	N - 10 S - 7 E - 6 W - 6	V	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present	1590	22.5	A (iii)
T3	Crack Willow Salix fragilis	5	est 600	3	M	P	Epicormic growth evident within the crown Recently cut back to 2m with regrowth	163	7.2	C (i)
T4	Crack Willow Salix fragilis	15	580	6	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	152	7.0	C (i)
T5	Hawthorn Crataegus monogyna	6	300	2	EM	F	Bark wounds noted Branch stubs evident Broken branches evident	41	3.6	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T6	Crack Willow Salix fragilis	18	est 2000	N - 2 S - 4 E - 3 W - 4	V	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Large snapped out branches at base	2827	30.0	A (iii)
T7	Ash Fraxinus excelsior	16	650	7	EM	F	Base obscured Characteristic for species Light ivy cover Minor dead wood evident in the crown (<75mm)	191	7.8	B (i)
T8	Ash Fraxinus excelsior	15	450	5	EM	F	Base obscured Characteristic for species Light ivy cover Minor dead wood evident in the crown (<75mm)	92	5.4	B (i)
T9	Ash Fraxinus excelsior	10	310	3	SM	D	No live growth	N/A	N/A	U
T10	Crack Willow Salix fragilis	14	440 440 400	9	M	P	Branch stubs evident Broken branches evident Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	248	8.9	B (i)
T11	Crack Willow Salix fragilis	14	440 440 420	9	M	P	Branch stubs evident Broken branches evident Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	255	9.0	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T12	Crack Willow Salix fragilis	12	2240	N - 7 S - 8 E - 8 W - 8	V	P	Bark wounds noted Basal cavity observed Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Delaminating bark on main stem Epicormic growth evident within the crown Included bark union Major dead wood evident in the crown (>75mm) Multi leadered form Storm damage present	3547	33.6	A (iii)
T13	English Oak Quercus robur	12	450	5	EM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	92	5.4	B (i)
T14	English Oak Quercus robur	12	450	5	EM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Pruning wounds noted	92	5.4	B (i)
T15	Crack Willow Salix fragilis	18	est 1900	8	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0317	2552	28.5	A (iii)
T16	Ash Fraxinus excelsior	10	est 390	5	EM	F	Even crown form No major defects were noted	69	4.7	B (i)
T17	Ash Fraxinus excelsior	8	est 300	5	EM	F	Even crown form No major defects were noted	41	3.6	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T18	Ash Fraxinus excelsior	4	est 180	3	EM	F	Even crown form No major defects were noted	15	2.2	C (i)
T19	Crack Willow Salix fragilis	17	est 1350	6	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present	1288	20.3	A (iii)
T20	Crack Willow Salix fragilis	17	est 1250	11	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present Phellinus ignarius Willow bracket	1104	18.8	A (iii)
T21	Crack Willow Salix fragilis	17	est 1000	11	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pollarded form(s) Pruning wounds noted Storm damage present	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T22	Crack Willow Salix fragilis	17	Over ivy 480 800 850	10	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi stemmed from base Pruning wounds noted Storm damage present Tag 0302 large hanging dead limb	1126	18.9	A (iii)
T23	Crack Willow Salix fragilis	18	Over ivy 900 1000	8	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Crossing and rubbing branches Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Twin stemmed from base	1279	20.2	A (iii)
T24	Ash Fraxinus excelsior	7	200	3	SM	F	No major defects were noted	18	2.4	C (i)
T25	English Oak Quercus robur	7	180	3	SM	F	No major defects were noted	15	2.2	C (i)
T26	Ash Fraxinus excelsior	9	310	4	SM	F	No major defects were noted	43	3.7	C (i)
T27	Hybrid Black Poplar Populus x canadensis	14	380	5	SM	F	Flail damage evident Low crown form No major defects were noted	65	4.6	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T28	Ash Fraxinus excelsior	15	840	9	OM	P	Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Heartwood exposed Major dead wood evident in the crown (>75mm) Storm damage present No live growth visible	N/A	N/A	U
T29	Ash Fraxinus excelsior	12	510	5	EM	P	Branch stubs evident Broken branches evident Heartwood exposed Major dead wood evident in the crown (>75mm) Storm damage present	118	6.1	C (ii)
T30	Hybrid Black Poplar Populus x canadensis	18	550	5	SM	F	Basal suckers present Flail damage evident Low crown form No major defects were noted	137	6.6	C (i)
T31	Hybrid Black Poplar Populus x canadensis	17	470	4	SM	F	Basal suckers present Flail damage evident Low crown form No major defects were noted	100	5.6	C (i)
T32	English Oak Quercus robur	6	400	3	EM	F	Base obscured Branch stubs evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm)	72	4.8	B (i)
T33	English Oak Quercus robur	7	420	4	EM	F	Base obscured Branch stubs evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Stem at angle growing out of ditch	80	5.0	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T34	English Oak Quercus robur	12	Over ivy 1000	6	OM	P	Basal cavity observed Base obscured Branch stubs evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Tag 0307 Remove ivy from around the base for better inspection	452	12.0	B (iii)
T35	English Oak Quercus robur	13	est 850	7	M	F	Basal cavity observed Base obscured Branch stubs evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	327	10.2	B (ii)
T36	English Oak Quercus robur	17	850	7	M	F	Base obscured Branch stubs evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0319	327	10.2	B (i)
T37	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T38	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T39	English Oak Quercus robur	10	590	7	M	F	Base obscured Branch stubs evident Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Storm damage present Tag 0322	157	7.1	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T40	Ash Fraxinus excelsior	14	600	6	M	F	Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Flail damage evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	163	7.2	C (i)
T41	Blackthorn Prunus spinosa	6	est 80 80 80 100	3	EM	F	Outgrown hedgerow specimen	13	2.1	C (i)
T42	English Oak Quercus robur	9	est 300	5	EM	G	Characteristic for species No major defects were noted	41	3.6	B (i)
T43	Holly Ilex aquifolium	8	est 200 200	4	EM	F	Branch stubs evident Broken branches evident Flail damage evident Low crown form	36	3.4	C (i)
T44	Ash Fraxinus excelsior	17	est 820	N - 7 S - 8 E - 3 W - 6	M	P	Bark wounds noted Basal suckers present Branch socket cavities observed Branch stubs evident Broken branches evident Delaminating bark on main stem Dense ivy cover on main stem Limited future potential Major dead wood evident in the crown (>75mm) Storm damage present Inonotus hispidus Shaggy bracket present within the crown	N/A	N/A	U
T45	Ash Fraxinus excelsior	8	220 270 200	4	EM	F	Branch stubs evident Multi stemmed from base No major defects were noted	73	4.8	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T46	Ash Fraxinus excelsior	8	300 250 210	4	EM	F	Branch stubs evident Multi stemmed from base No major defects were noted Tag 0347	89	5.3	C (i)
T47	Crack Willow Salix fragilis	2	est 1200	1	M	F	Pollarded willow with new regrowth present	651	14.4	C (ii)
T48	English Oak Quercus robur	16	Over ivy 860	8	M	P	Base obscured Branch socket cavities observed Branch stubs evident Broken branches evident Dense ivy cover on main stem Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Storm damage present Fire damage on main stem to the north Remove ivy from base of stem for better inspection	335	10.3	B (i)
T49	English Oak Quercus robur	17	750	8	M	F	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Typical crown form	254	9.0	A (i)
T50	English Oak Quercus robur	15	est 1000	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form	452	12.0	A (i)
T51	English Oak Quercus robur	8	520	7	SM	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form	122	6.2	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T52	English Oak Quercus robur	12	est 900	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	366	10.8	A (i)
T53	English Oak Quercus robur	12	est 1000	9	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Even crown form Minor dead wood evident in the crown (<75mm) Typical crown form	452	12.0	A (i)
T54	English Oak Quercus robur	11	790	7	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form Tag 1037	282	9.5	A (i)
T55	English Oak Quercus robur	12	820	6	M	F	Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	304	9.8	A (i)
T56	English Oak Quercus robur	7	450 270	5	M	F	Branch stubs evident Dense ivy cover on main stem Minor dead wood evident in the crown (<75mm) Typical crown form Tag 0336	125	6.3	A (i)
T57	Ash Fraxinus excelsior	10	500	N - 5 S - 3 E - 2 W - 5	EM	P	Branch stubs evident Broken branches evident Sparse / thinning crown	113	6.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T58	Ash Fraxinus excelsior	12	700	7	EM	P	Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Sparse / thinning crown	222	8.4	C (i)
T59	English Oak Quercus robur	8	380 380	4	EM	F	Branch stubs evident Flail damage evident No major defects were noted	131	6.4	B (i)
T60	Crack Willow Salix fragilis	15	1340	N - 9 S - 6 E - 5 W - 13	V	F	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted	1269	20.1	A (iii)
T61	Crack Willow Salix fragilis	11	est 1300	N - 1 S - 5 E - 3 W - 8	V	P	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Fire damage at union	1195	19.5	A (iii)
T62	Crack Willow Salix fragilis	9	est 1000	5	V	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense ivy cover on main stem Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present	707	15.0	A (iii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T63	Crack Willow Salix fragilis	16	est 900	7	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form	366	10.8	C (i)
T64	Crack Willow Salix fragilis	16	est 460 500	N - 8 S - 8 E - 12 W - 12	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Large failed limb to the east	209	8.2	C (i)
T65	Crack Willow Salix fragilis	15	est 1000	9	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form	452	12.0	C (i)
T66	Crack Willow Salix fragilis	12	est 1000	N - 8 S - 4 E - 6 W - 10	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s) Large decay cavity in main stem at base	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T67	Crack Willow Salix fragilis	5	est 700	4	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s) Large amounts of failed limbs to the east	222	8.4	C (i)
T68	Crack Willow Salix fragilis	12	est 900	N - 6 S - 4 E - 6 W - 2	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Dense undergrowth at the base Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi leadered form Pollarded form(s)	366	10.8	C (i)
T69	English Oak Quercus robur	17	690	8	M	G	Branch stubs evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Multi stemmed from base	215	8.3	A (i)
T70	Crack Willow Salix fragilis	11	250 250 220	4	EM	F	Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	78	5.0	C (i)
T71	Crack Willow Salix fragilis	11	250 250 220	4	EM	F	Flail damage evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base	78	5.0	C (i)
T72	Elder Sambucus nigra	2	200 200 200	1	EM	P	Flailed as if part of hedge	54	4.2	C (ii)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T73	Ash Fraxinus excelsior	5	150	2	SM	F	No major defects were noted	10	1.8	C (i)
T74	Ash Fraxinus excelsior	5	180	2	SM	F	No major defects were noted	15	2.2	C (i)
T75	English Oak Quercus robur	18	870	8	M	F	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	342	10.4	A (i)
T76	English Oak Quercus robur	20	est 900	8	M	F	Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Typical crown form	366	10.8	A (i)
T77	Crack Willow Salix fragilis	17	est 800 1000	10	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Phellinus igniarius fungal brackets present on lower limbs	707	Capped at 15m	C (i)
T78	Crack Willow Salix fragilis	14	avg 7x 380	9	M	F	Branch stubs evident Broken branches evident Light ivy cover Multi stemmed from base	452	12.0	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T79	Crack Willow Salix fragilis	17	est 1100	N - 8 S - 8 E - 10 W - 6	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Hollowing stem	547	13.2	C (i)
T80	Crack Willow Salix fragilis	17	est 1000	7	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Dense ivy cover on main stem Heartwood exposed Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Hollowing stem	452	12.0	C (i)
T81	English Oak Quercus robur	5	160	3	SM	G	No major defects were noted	12	1.9	C (i)
T82	Crack Willow Salix fragilis	15	est 900	8	M	D	No live growth present	N/A	N/A	U
T83	Crack Willow Salix fragilis	15	est 700	5	M	D	No live growth present	N/A	N/A	U
T84	Crack Willow Salix fragilis	15	est 700	5	M	D	Dead tree on its side	N/A	N/A	U

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T85	English Oak <i>Quercus robur</i>	17	900	9	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present Loss of large leader to the west	366	10.8	A (i)
T86	Ash <i>Fraxinus excelsior</i>	15	640	7	M	P	Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Inonotus hispidus Shaggy bracket present on the largwer limbs and stem	185	7.7	C (i)
T87	English Oak <i>Quercus robur</i>	10	540	5	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted	132	6.5	B (i)
T88	Austrian Pine <i>Pinus nigra ssp. Nigra</i>	12	380	N - 4 S - 1 E - 1 W - 1	M	P	Branch stubs evident Broken branches evident Storm damage present Large bark wound at base of stem	65	4.6	C (i)
T89	Austrian Pine <i>Pinus nigra ssp. Nigra</i>	15	400	4	M	F	Branch stubs evident Broken branches evident Typical crown form	72	4.8	B (i)
T90	Austrian Pine <i>Pinus nigra ssp. Nigra</i>	15	400	4	M	F	Branch stubs evident Broken branches evident Typical crown form	72	4.8	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T91	English Oak Quercus robur	10	650	7	EM	F	Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Storm damage present within the crown Close cultivation of the soil at base	191	7.8	B (i)
T92	English Oak Quercus robur	12	740	8	M	F	Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Close cultivation of the soil at base	248	8.9	A (i)
T93	English Oak Quercus robur	12	740	N - 7 S - 9 E - 6 W - 7	M	F	Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Pruning wounds noted Cavity at base with decayed fungi Latetiporus sulphureus fungal bracket present at the base of the main stem	248	8.9	B (i)
T94	English Oak Quercus robur	14	610	9	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted	168	7.3	A (i)
T95	English Oak Quercus robur	10	520	7	M	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted	122	6.2	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T96	English Oak Quercus robur	8	270 310	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Twin stemmed from base Typical crown form	76	4.9	B (i)
T97	English Oak Quercus robur	8	280	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form	35	3.4	B (i)
T98	English Oak Quercus robur	8	320 360	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Twin stemmed from base Typical crown form	105	5.8	B (i)
T99	English Oak Quercus robur	8	340	6	EM	F	Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form	52	4.1	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T100	English Oak Quercus robur	13	640	8	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form Close cultivation of the soil at base	185	7.7	B (i)
T101	English Oak Quercus robur	10	760	8	M	P	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Minor dead wood evident in the crown (<75mm) No major defects were noted Pruning wounds noted Typical crown form Possible lightning strike running down main stem Chard and burnt branches in crown	261	9.1	B (i)
T102	English Oak Quercus robur	14	790	9	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	282	9.5	A (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T103	English Oak Quercus robur	13	820	7	M	F	Bark wounds noted Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Epicormic growth evident within the crown Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	304	9.8	A (i)
T104	English Oak Quercus robur	13	820	9	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	304	9.8	A (i)
T105	English Oak Quercus robur	13	690	8	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	215	8.3	A (i)
T106	Crack Willow Salix fragilis	12	est 900	N - 4 S - 9 E - 4 W - 4	OM	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Epicormic growth evident within the crown Major dead wood evident in the crown (>75mm) Hollow stem Signs of pheonix regeneration on failed limbs	N/A	N/A	U

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T107	Ash Fraxinus excelsior	7	avg 6x 90	3	EM	P	Branch stubs evident Broken branches evident Minor dead wood evident in the crown (<75mm) Multi leadered form Regrowth from stump	22	2.6	C (i)
T108	Ash Fraxinus excelsior	19	avg 400 400 400 400	9	M	F	Basal suckers present Base obscured Branch socket cavities observed Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Sparse / thinning crown	290	9.6	C (i)
T109	English Oak Quercus robur	14	700	7	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	222	8.4	A (i)
T110	English Oak Quercus robur	12	est 650	6	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Low crown form Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form Cable attached to stem	191	7.8	B (i)
T111	English Oak Quercus robur	4	180	2	Yng	G	No major defects were noted	15	2.2	C (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T112	Rowan Sorbus aucuparia	4	150	2	Yng	G	No major defects were noted	10	1.8	C (i)
T113	English Elm Ulmus procera	14	300 280 190 340 300	7	M	F	Close cultivation of the soil Limited future potential Minor dead wood evident in the crown (<75mm) Multi stemmed from base	186	7.7	C (i)
T114	English Oak Quercus robur	14	est 780	9	M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Close cultivation of the soil Minor dead wood evident in the crown (<75mm) Pruning wounds noted Typical crown form	275	9.4	A (i)
T115	English Oak Quercus robur	9	est 450	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	92	5.4	B (i)
T116	English Oak Quercus robur	10	410	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	76	4.9	B (i)
T117	English Oak Quercus robur	16	920	9	M	F	Branch stubs evident Broken branches evident Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) No major defects were noted Typical crown form	383	11.0	A (i)
T118	English Oak Quercus robur	10	est 400	6	EM	G	Low crown form Minor dead wood evident in the crown (<75mm) No major defects were noted Situated offsite	72	4.8	B (i)

Tree No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
T119	English Oak Quercus robur	14	900	8	M	P	Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Pruning wounds noted Situated offsite Storm damage present Fungi in high canopy wound, unable to identify Decay and hollowing throughout main stem, ground level to approx. 8m	366	10.8	C (i)
T120	English Oak Quercus robur	10	350	4	EM	F	Branch stubs evident Broken branches evident Characteristic for species Minor dead wood evident in the crown (<75mm) No major defects were noted Failed stem at base	55	4.2	B (i)
T121	Ash Fraxinus excelsior	8	est 6x 90	3	SM	F	Branch stubs evident Minor dead wood evident in the crown (<75mm) Multi stemmed from base Outgrown from hedgerow	22	2.6	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
GROUPS OF TREES										
G1	Hybrid Black Poplar Populus x canadensis	28	avg 600	6.5	M	F	Branch stubs evident Broken branches evident Characteristic for species Interlocking crowns Minor dead wood evident in the crown (<75mm) Overhead cables Typical crown form 4m spacing between trees Ditch to the west Hawthorn understory 4 topped trees for cables present to the north of the group	163	7.2	B (ii)
G2	Hawthorn Crataegus monogyna	6	90 90 90 90	2	EM	F	Un-maintained hedgerow Typical forms Interlocking crowns	15	2.2	C (ii)
G3	Hawthorn Crataegus monogyna	6	90 90 90 90	2	EM	P	Un-maintained hedgerow Poor forms	15	2.2	C (ii)
G4	Ash Fraxinus excelsior Hawthorn Crataegus monogyna	6	upto 150	2.5	EM / M	F	Broken branches evident Flail damage evident Multi leadered form Outgrown hedgerow	10	1.8	C (ii)
G5	Ash Fraxinus excelsior Crack Willow Salix fragilis	12	upto 240	4	SM	F	Included bark union Minor dead wood evident in the crown (<75mm) Multi leadered form Pruning wounds noted	26	2.9	C (i)
G6	Hawthorn Crataegus monogyna	6	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G7	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G8	Hawthorn Crataegus monogyna	5	upto 150	2.5	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G9	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G10	Lombardy Poplar Populus nigra 'Italica'	29	700	4	M	F	Base obscured Branch stubs evident Characteristic for species Situating offsite	222	8.4	C (ii)
G11	Crack Willow Salix fragilis Hawthorn Crataegus monogyna Hybrid Black Poplar Populus x canadensis Silver Birch Betula pendula	20	avg 500	6	EM / M	F	Bark wounds noted Basal suckers present Branch stubs evident Broken branches evident Failed trees Minor dead wood evident in the crown (<75mm) Storm damage present	113	6.0	B (ii)
G12	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G13	Crack Willow Salix fragilis	17	upto 900	8	M	P	Bark wounds noted Basal cavity observed Branch socket cavities observed Branch stubs evident Broken branches evident Characteristic for species Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm)	366	10.8	B (ii)
G14	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G15	Ash Fraxinus excelsior Hawthorn Crataegus monogyna	15	upto 560	6	EM	F	Interlocking crowns Light ivy cover Minor dead wood evident in the crown (<75mm) No major defects were noted	142	6.7	B (ii)
G16	Hawthorn Crataegus monogyna	5	upto 150	2	SM	F	Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted	10	1.8	C (i)
G17	Ash Fraxinus excelsior Hawthorn Crataegus monogyna English Elm Ulmus procera	11	upto 400	4	SM	F	Flail damage evident Included bark union Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow Pruning wounds noted Dead elm in group	72	4.8	C (ii)
G18	Hawthorn Crataegus monogyna Ash Fraxinus excelsior Blackthorn Prunus spinosa	6	upto 60 60 60	3	SM	F	Flail damage evident Included bark unions Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Outgrown hedgerow surrounding paddock area Pruning wounds noted	5	1.2	C (ii)
G19	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	2	upto 100	1	SM	F	Flail damage evident Included bark union Interlocking crowns Minor dead wood evident in the crown (<75mm) Multi leadered form Pruning wounds noted Dead elm in group	5	1.2	C (ii)
G20	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G21	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G22	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G23	English Oak Quercus robur Hawthorn Crataegus monogyna Alder Alnus glutinosa Hazel Corylus avellana	8	avg 150	2	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	10	1.8	C (ii)
G24	English Oak Quercus robur Field Maple Acer campestre Hawthorn Crataegus monogyna Hazel Corylus avellana	10	avg 180	4	SM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Buffer planting	15	2.2	C (ii)
G25	Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	10	upto 400	4	EM	F	Branch stubs evident Characteristic for species Compacted ground at the base Minor dead wood evident in the crown (<75mm) No major defects were noted	72	4.8	B (ii)
G26	Elder Sambucus nigra Hawthorn Crataegus monogyna	6	upto 200	3	EM	F	Crossing and rubbing branches Minor dead wood evident in the crown (<75mm) Outgrown hedgerow	18	2.4	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G27	Elder Sambucus nigra Hawthorn Crataegus monogyna	7	upto 200	3	EM	F	Crossing and rubbing branches Minor dead wood evident in the crown (<75mm) Outgrown hedgerow	18	2.4	C (ii)
G28	Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna Hazel Corylus avellana	12	upto 500	5	SM / EM	F	Branch stubs evident Broken branches evident Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Light ivy cover Minor dead wood evident in the crown (<75mm)	113	6.0	B (ii)
G29	Blackthorn Prunus spinosa Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	7	avg 100 100 100	3	EM	F	Branch stubs evident Broken branches evident Close cultivation of the soil Crossing and rubbing branches Dense undergrowth at the base Interlocking crowns Outgrown hedgerow	14	2.1	C (ii)
G30	Ash Fraxinus excelsior Field Maple Acer campestre Hawthorn Crataegus monogyna Sycamore Acer pseudoplatanus Hazel Corylus avellana English Oak Quercus robur Alder Alnus glutinosa	9	avg 100	2	SM	F	Interlocking crowns No major defects were noted Buffer planting adjacent to A50	5	1.2	C (ii)
G31	Elder Sambucus nigra Hawthorn Crataegus monogyna	5	avg 100	2	SM	F	Flail damage evident Interlocking crowns No major defects were noted Outgrown hedgerow	5	1.2	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G32	Ash Fraxinus excelsior Crack Willow Salix fragilis Hawthorn Crataegus monogyna	15	avg 400	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	72	4.8	B (ii)
G33	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	15	avg 500	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	113	6.0	B (ii)
G34	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna	15	avg 400	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Interlocking crowns Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Dense group that requires management	72	4.8	B (ii)
G35	Hawthorn Crataegus monogyna	5	avg 100	2	EM	F	No major defects were noted Outgrown hedgerow	5	1.2	C (ii)
G36	Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	6	avg 150	3	EM	F	No major defects were noted Outgrown hedgerow	10	1.8	C (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G37	Crack Willow Salix fragilis Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	15	avg 300	5	EM	F	Interlocking crowns Minor dead wood evident in the crown (<75mm) No major defects were noted Outgrown hedgerow	41	3.6	C (ii)
G38	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	6	avg 150	3	EM	F	No major defects were noted Outgrown hedgerow	10	1.8	C (ii)
G39	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna Hazel Corylus avellana	6	avg 150	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow Buffer strip	10	1.8	C (ii)
G40	Ash Fraxinus excelsior English Oak Quercus robur Hawthorn Crataegus monogyna English Elm Ulmus procera	5	upto 180	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow	15	2.2	C (ii)
G41	Ash Fraxinus excelsior Crack Willow Salix fragilis English Oak Quercus robur Hawthorn Crataegus monogyna English Elm Ulmus procera	9	upto 160	3	EM	F	Dense undergrowth at the base Interlocking crowns No major defects were noted Outgrown hedgerow Plantation group	12	1.9	B (ii)

Group No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
G42	Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	7	est 100 100	2	EM	F	Outgrown hedgerow adjacent to railway	9	1.7	C (ii)
G43	Ash Fraxinus excelsior Elder Sambucus nigra English Oak Quercus robur Hawthorn Crataegus monogyna	7	est 100 100	2	EM	F	Outgrown hedgerow adjacent to railway	9	1.7	C (ii)
G44	Ash Fraxinus excelsior Hawthorn Crataegus monogyna English Elm Ulmus procera	12	upto 500	6	EM / M	F	Bark wounds noted Branch socket cavities observed Branch stubs evident Broken branches evident Failed trees Major dead wood evident in the crown (>75mm) Minor dead wood evident in the crown (<75mm) Potential Roost Features (PRF) Woodpecker holes observed Group formed around pond	113	6.0	C (ii)

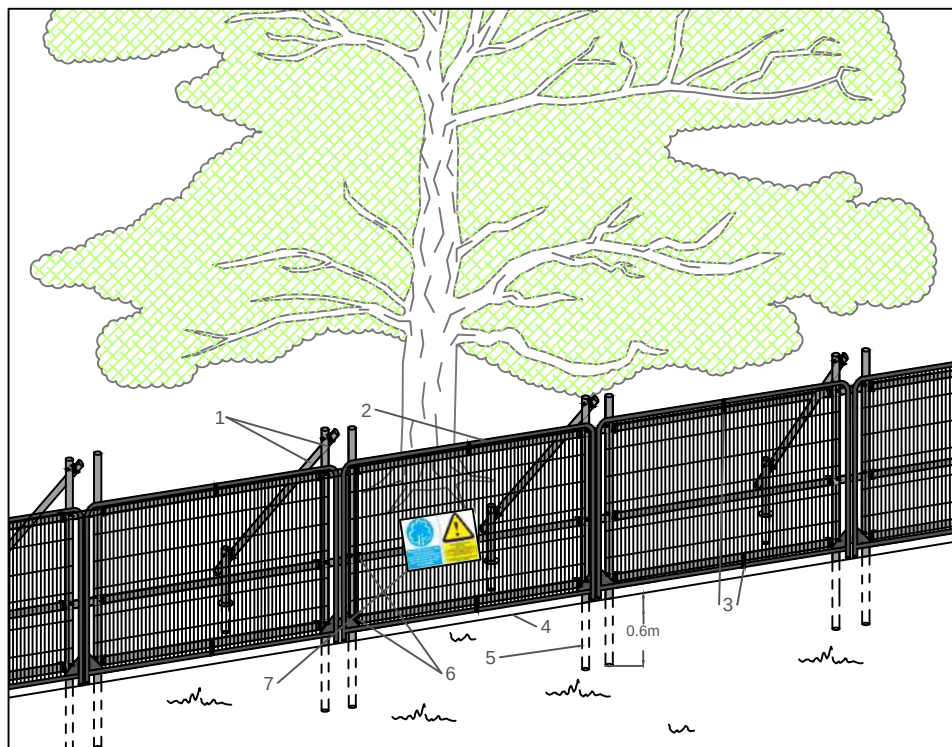
Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
HEDGEROWS										
H1	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H2	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow One large outgrown budleigha	2	0.8	C (i)
H3	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H4	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H5	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H6	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H7	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H8	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H9	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H10	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H11	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H12	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (i)
H13	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow Typical form with no obvious defects	2	0.8	C (i)
H14	Elder Sambucus nigra Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H15	Blackthorn Prunus spinosa Elder Sambucus nigra Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H16	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H17	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H18	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H19	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H20	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H21	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H22	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H23	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H24	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H25	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)

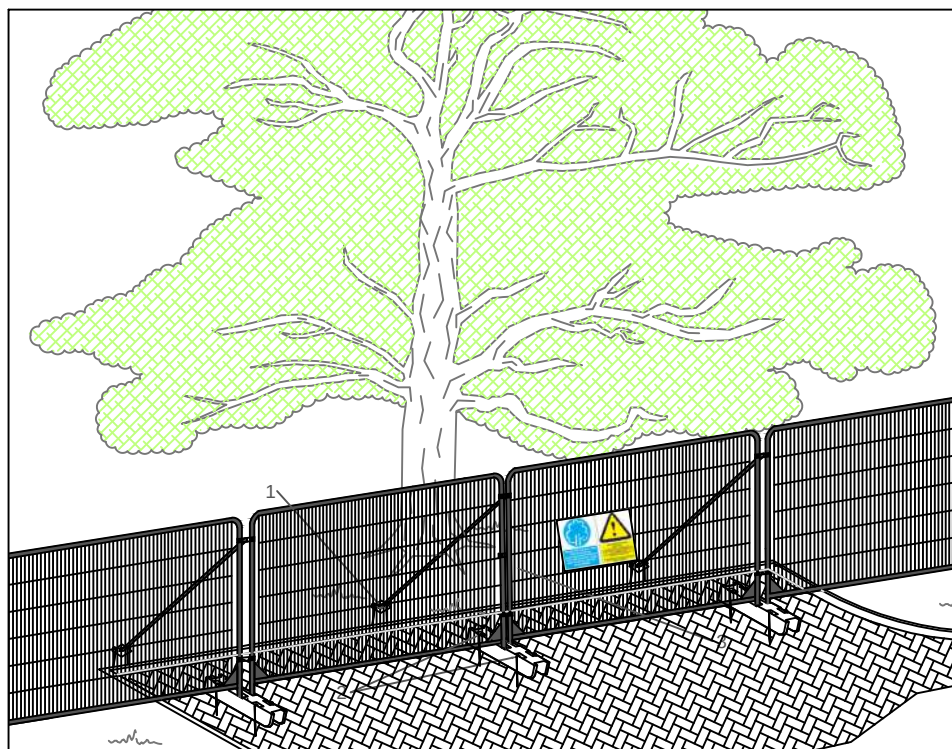
Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H26	Blackthorn Prunus spinosa Hawthorn Crataegus monogyna English Elm Ulmus procera	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H27	Hawthorn Crataegus monogyna	2	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H28	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H29	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H30	Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H31	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H32	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Gaps present in hedgerow Maintained hedgerow	3	1.0	C (ii)
H33	Elder Sambucus nigra Hawthorn Crataegus monogyna	4	avg 50 50 50	1.5	M	F	Outgrown hedgerow	3	1.0	C (ii)

Hedge No	Species	Height	Stem Dia.	Crown Radius	Age Class	Overall Condition	Structural Condition	RPA	RPA Radius	BS5837 Cat
H34	Blackthorn Prunus spinosa Elder Sambucus nigra Field Maple Acer campestre Hawthorn Crataegus monogyna	1.5	avg 50 50 50	1	M	F	Flail damage evident Maintained hedgerow	3	1.0	C (ii)
H35	Elder Sambucus nigra Hawthorn Crataegus monogyna	1.5	est 40 40 40	0.5	SM	F	Maintained hedgerow	2	0.8	C (ii)



Standard specification for protective barrier

1. Standard scaffold poles
2. Heavy gauge 2m tall galvanized tube and welded mesh infill panels
3. Panels secured to scaffold frame with wire ties
4. Ground level
5. Uprights driven into the ground until secure (min depth of 0.6m)
6. Standard scaffold clamps
7. Construction Exclusion Zone signs



Above ground stabilising systems

1. Stabiliser strut with base plate secured with ground pins
2. Feet blocks secured with ground pins
3. Construction Exclusion Zone signs

NOTES

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APPENDIX B PROTECTIVE FENCING SPECIFICATIONS

CAD file: S:\Arb resources\Basic Templates\Tree Protection\Appendix B - Protective Fencing A4.dwg

FIRST SCHEDULE

TREES SPECIFIED INDIVIDUALLY

T1	Willow	T65	Oak
T2	Willow	T66	Oak
T3	Hawthorn	T67	Oak
T4	Oak	T68	Oak
T5	Apple	T69	Oak
T6	Willow	T70	Oak
T7	Willow	T71	Ash
T8	Willow	T72	Oak
T9	Willow	T73	Oak
T10	Field Maple	T74	Oak
T11	Ash	T75	Oak
T12	Oak	T76	Oak
T13	Oak	T77	Oak
T14	Oak	T78	Oak
T15	Willow	T79	Oak
T16	Oak	T80	Oak
T17	Ash	T81	Oak
T18	Ash	T82	Ash
T19	Ash	T83	Ash
T20	Ash	T84	Oak
T21	Ash	T85	Oak
T22	Oak	T86	Oak
T23	Oak	T87	Oak
T24	Willow	T88	Ash
T25	Willow	T89	Oak
T26	Willow	T90	Oak
T27	Ash	T91	Oak
T28	Oak	T92	Oak
T29	Ash	T93	Oak
T30	Ash	T94	Oak
T31	Ash	T95	Oak
T32	Ash	T96	Oak
T33	Willow	T97	Oak
T34	Oak	T98	Oak
T35	Ash	T99	Oak
T36	Oak	T100	Oak
T37	Ash	T101	Oak
T38	Ash	T102	Willow
T39	Oak	T103	Oak
T40	Oak	T104	Oak
T41	Ash	T105	Oak
T42	Ash	T106	Willow
T43	Oak	T107	Ash
T44	Ash	T108	Oak
T45	Ash	T109	Oak
T46	Oak	T110	Oak
T47	Oak	T111	Oak
T48	Oak	T112	Oak
T49	Oak	T113	Oak
T50	Oak	T114	Ash
T51	Oak	T115	Ash
T52	Ash	T116	Ash
T53	Oak	T117	Scots Pine
T54	Oak	T118	Oak
T55	Ash	T119	Oak
T56	Willow	T120	Oak

T57	Oak	T121	Oak
T58	Oak	T122	Oak
T59	Oak	T123	Oak
T60	Ash	T124	Oak
T61	Holly	T125	Scots Pine
T62	Oak	T126	Oak
T63	Oak	T127	Ash
T64	Crab Apple		

TREES SPECIFIED BY REFERENCE TO AN AREA

None

GROUPS OF TREES

Trees of whatever species within G1, predominantly ash, oak and hawthorn.

WOODLANDS

Trees of whatever species within W1.

SECOND SCHEDULE

This Order shall not apply so as to require the consent of the authority to

(1) the cutting down of any tree on land which is subject to a forestry dedication covenant where

(a) any positive covenants on the part of the owner of the land contained in the same deed as the forestry dedication covenant and at the time of the cutting down binding on the then owner of the land are fulfilled ;

(b) the cutting down is in accordance with a plan of operations approved by the Forestry Commission under such deed.

(2) the cutting down of any tree which is in accordance with a plan of operations approved by the Forestry Commission under the approved woodlands scheme or other grant scheme under Section 4 of the Forestry Act 1967 except a scheme which applies to a forestry dedication covenant.

(3) the cutting down, uprooting, topping or lopping of a tree

(a) in pursuance of the power conferred on the Post Office by virtue of Section 5 of the Telegraph (Construction) Act 1908 ;

(b) by or at the request of

(i) a statutory undertaker where the land on which the tree is situated is operational land as defined by the Act and either works on such land cannot otherwise be carried out or the cutting down, topping or lopping is for the purpose of securing safety in the operation of the undertaking ;

(ii) an electricity board within the meaning of the Electricity Act 1947, where such tree obstructs the construction by the board of any main transmission line or other electric line within the meaning respectively of the Electricity (Supply) Act 1919, and the Electricity Lighting Act 1882, or interferes or would interfere with the maintenance or working of any such line ;

(iii) a river authority established under the Water Resources Act 1963 or a drainage board constituted or treated as having been constituted under the Land Drainage Act 1930, where the tree interferes or would interfere with the exercise of any of the functions of such river authority, or drainage board, in relation to the maintenance improvement or construction of water courses or of drainage works ; or

(iv) the Secretary of State for Defence, the Secretary of State for Trade and Industry or the Board of Trade where in the opinion of such Secretary of State or Board the tree obstructs the approach of aircraft to, or their departure from, any aerodrome or hinders the safe and efficient use of aviation or defence technical installations ;

(c) where immediately required for the purpose of carrying out development authorised by the planning permission granted on an application made under Part III of the Act, or deemed to have been so granted for any of the purposes of that Part ;

(d) which is a fruit tree cultivated for fruit production growing or standing on land comprised in an orchard or garden ;

NOTE : Section 62(1) of the Act requires, unless on application of the owner the local authority dispense with the requirement, that any tree removed or destroyed under Section 60(6) of the Act, shall be replaced by another tree of appropriate size and species. In order to enable the planning authority to come to a decision, on whether or not to dispense with the requirement, notice of the proposed action should be given to the local planning authority which except in a case of emergency shall be of not less than five days.

THIRD SCHEDULE

Provisions of Part III of the Act as adapted and modified to apply to this Order.

33. Effect of planning permission

(1) Without prejudice to the following provisions, as to the revocation or modification of consents, any consent under the Order, including any direction as to replanting given by the authority on the granting of such consent, shall (except in so far as the consent otherwise provides), enure for the benefit of the land and of all persons for the time being interested therein.

35. Reference of applications to the Secretary of State

(1) The Secretary of State may give directions to the authority requiring applications for consent under the Order to be referred to him instead of being dealt with by the authority.

(2) A direction under this Section may relate either to a particular application or to applications of class specified in the direction.

(3) Any application in respect of which a direction under this section has effect shall be referred to the Secretary of State accordingly.

(4) Where an application for consent under the Order is referred to the Secretary of State under this section, the provisions of Articles 4 and 5 of the Order shall apply as they apply to an application which falls to be determined by the authority.

(5) Before determining an application referred to him under this section the Secretary of State shall, if either the applicant or the authority so desire, afford to each of them an opportunity of appearing before, and being heard by, a person appointed by the Secretary of State for the purpose.

(6) The decision of the Secretary of State on any application referred to him under this section shall be final.

36. Appeals against decisions

(1) Where an application is made to the authority for planning permission for the development of land or in pursuance of a condition of a planning permission or required under a development order giving consent under the Order and that consent is refused by that authority or is granted by them subject to conditions, or where any certificate or direction is given by the authority, the applicant, if he is aggrieved by their decision on the application, or by any such certificate, or the person directed if he is aggrieved by the direction, may by notice under this section appeal to the Secretary of State.

(2) A notice under this section shall be served in writing within twenty-eight days from the receipt of notification of the decision, certificate or direction, as the case may be, or such longer period as the Secretary of State may allow.

(3) Where an appeal is brought under this section from a decision, certificate or direction of the authority, the Secretary of State, subject to the following provisions of this section, may allow or dismiss the appeal, or may reverse or vary any part of the decision of the authority, whether the appeal relates to that part thereof or not, or may cancel any certificate or cancel or vary any direction and may deal with the application as if it had been made to him in the first instance.

(4) Before determining an appeal under this section, the Secretary of State shall, if either the appellant or the authority so desire, afford to each of them an opportunity of appearing before, and being heard by, a person appointed by the Secretary of State for the purpose.

37. Appeal in default of decision

Where any such application as is mentioned in Section 36(1) of this Act is made to a Local Planning Authority for consent under the Order, then unless within two months from the date of receipt of the application, or within such extended period as may at any time be agreed upon in writing between the applicant and the authority, the authority either -

- (a) give notice to the applicant of their decision on the application ; or
- (b) give notice to him that the application has been referred to the Secretary of State in accordance with directions given under Section 35 of the Act ;

the provisions of the last preceding section shall apply in relation to the application as if the consent to which it relates had been refused by the authority, and as if notification of their decision had been received by the applicant at the end of the said period of two months, or at the end of the said extended period, as the case may be.

45. Power to revoke or modify the consent under the order

(1) If it appears to the authority that it is expedient to revoke or modify any consent under the Order granted on an application made under Article 3 of the Order, the authority may by Order revoke or modify the consent to such extent as they consider expedient.

(2) Subject to the provisions of Sections 46 and 61 of the Act an Order under this section shall not take effect unless it is confirmed by the Secretary of State; and the Secretary of State may confirm any such Order submitted to him either without modification or subject to such modifications as he considers expedient.

(3) Where an authority submit an Order to the Secretary of State for his confirmation under this section, the authority shall furnish the Secretary of State with a statement of their reason for making the Order and shall serve notice together with a copy of the aforesaid statement on the owner and on the occupier of the land affected, and on any other person who in their opinion will be affected by the Order, and if within the period of twenty-eight days from the service thereof any person on whom the notice is served so requires, the Secretary of State, before confirming the Order, shall afford to that person and to the authority, an opportunity of appearing before, and being heard by, a person appointed by the Secretary of State for the purpose.

(4) The power conferred by this section to revoke or modify a consent may be exercised at any time before the operations for which consent has been given have been completed ;

Provided that the revocation or modification of consent shall not affect so much of those operations as has been previously carried out.

(5) Where a notice has been served in accordance with the provisions of subsection (3) of this section, no operations or further operations as the case may be, in pursuance of the consent granted, shall be carried out pending the decision of the Secretary of State under subsection (2) of this section.

46. Unopposed revocation or modification of consent

(1) The following provisions shall have effect where the local planning authority have made an Order (hereinafter called "such Order") under Section 27 above revoking or modifying any consent granted on an application made under a tree preservation order but have not submitted such Order to the Secretary of State for confirmation by him and the owner and the occupier of the land and all persons who in the authority's opinion will be affected by such Order have notified the authority in writing that they do not object to such Order.

(2) The authority shall advertise the fact that such Order has been made and the advertisement shall specify (a) the period (not less than twenty-eight days from the date on which the advertisement first appears) within which persons affected by such Order may give notice to the Secretary of State that they wish for an opportunity of appearing before and being heard by, a person appointed by the Secretary of State for the purpose and (b) the period (not less than 14 days from the expiration of the period referred to in paragraph (a) above) at the expiration of which, if no such notice is given to the Secretary of State, such Order may take effect by virtue of this section and without being confirmed by the Secretary of State.

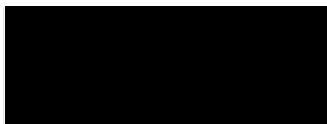
(3) The authority shall also serve notices to the same effect on the persons mentioned in subsection (1) above.

(4) The authority shall send a copy of an advertisement published under subsection (2) above to the Secretary of State, not more than three days after the publication.

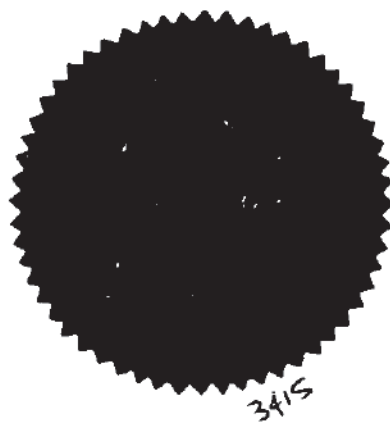
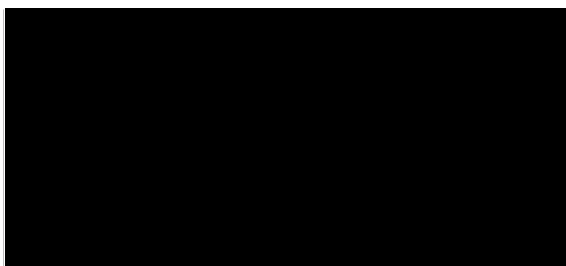
(5) If within the period referred to in subsection (2) (a) above no person claiming to be affected by such Order has given notice to the Secretary of State as aforesaid and the Secretary of State has not directed that such Order be submitted to him for confirmation, such Order shall at the expiration of the period referred to in subsection (2) (b) of this section, take effect by virtue of this section and without being confirmed by the Secretary of State as required by section 10(4) of the Act.

(6) This section does not apply to such Order revoking or modifying a consent granted or deemed to have been granted by the Secretary of State under Part III, Part IV or Part V of the Act.

GIVEN under the COMMON SEAL of the
SOUTH DERBYSHIRE DISTRICT COUNCIL
the 23rd day of May in the year
One Thousand Nine Hundred and Eighty-
six in the presence of :



Chairman of the Council

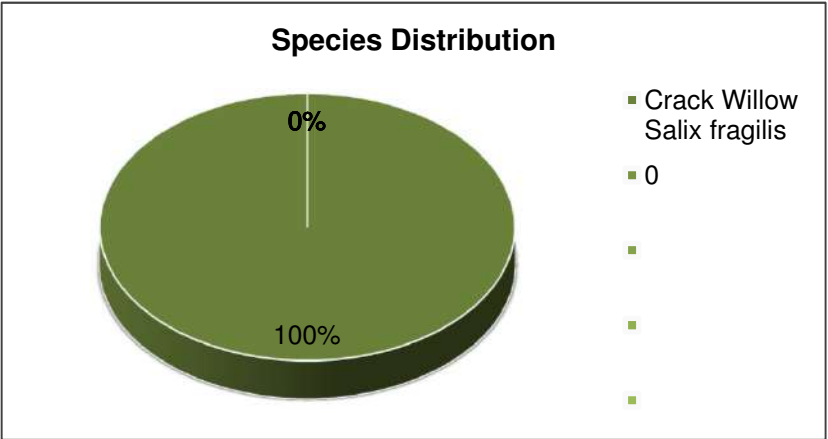
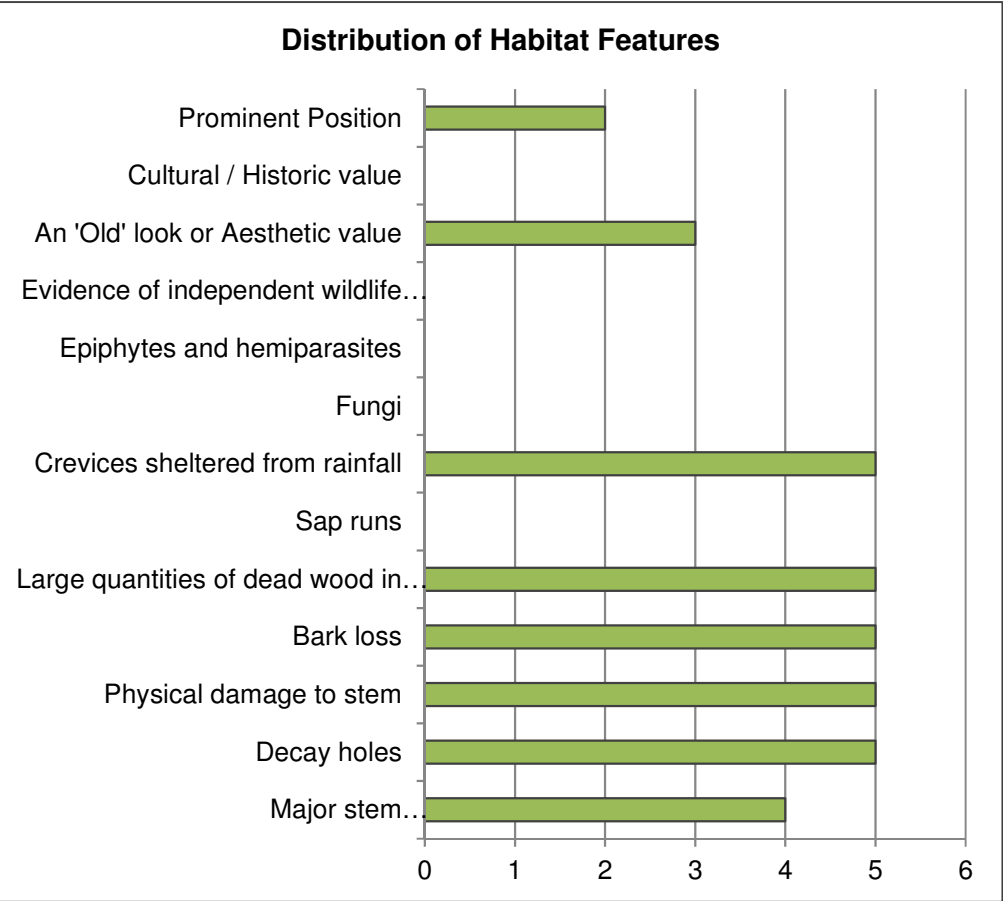


Appendix D - Veteran Tree Schedule

Key	Dimensions and Habitat Features		Associated Wildlife	Aesthetics
Tree considered Veteran	DBH (mm) - Stem diameter measured at 1.5m above ground level in mm	Major trunk cavities - Cavity to exceed 30% of stem diameter or to be progressively developing	Crevices sheltered from rainfall - Dry, potential invertebrate habitat	An old look or Aesthetic value - Striking form or particularly gnarled
Tree considered Future Veteran	Large girth for species - as described by the Veteran Tree Initiative	Large quantities of dead wood in canopy - More than 50% of crown dead or dying back	Evidence of independent wildlife species - Droppings, nests, pellets	Cultural/historic value - Parkland tree, field or road marker
	P - Pollard P - Pollard P - Pollard M - Maiden LP - Lapsed Pollard MS - Mult-Stemmed MS - Mult-Stemmed MS - Mult-Stemmed M - Maiden P - Pollard	Physical damage to trunk - Often as a result of storm damage	Fungi - Polypores or Basidio-mycetes on or around tree	Prominent Position - Visually prominent in its landscape
		Decay Holes - Branch socket cavities on limbs or main stem	Epiphytes or Hemiparasites - lichen, liverworts, ivy, mistletoe	
		Epicormic Growth - Strong vigorous epicormic growth present about the tree		
		Bark Loss - Bark missing from main stem in large quantities		
		Sap Runs - Either from cracks in bark or cavities		

This document should be read in conjunction with the Arboricultural Assessment. The National Planning Policy Framework, a key government policy document, stresses the importance of Ancient and Veteran trees. From an ecological perspective veteran trees provide a rare and very specialist niche habitat and therefore preservation of this habitat is considered highly important. It would therefore be recommended that a detailed assesment be undertaken of the veteran habitat and this schedule should only be used as a guide to the presence of veteran trees on the site.

Distribution of Habitat Features - Displays the total of each habitat feature present in the surveyed tree cover. The proportion of trees with these features can be used to determine the condition and risks to the veteran tree stock.	Veteran Population - Provides the mix of Veteran/Future Veteran and non-veteran specimens across the surveyed tree stock.
	Species Distribution - Shows the proportion of Veteran and Future Veterans for each species found during the assessment.



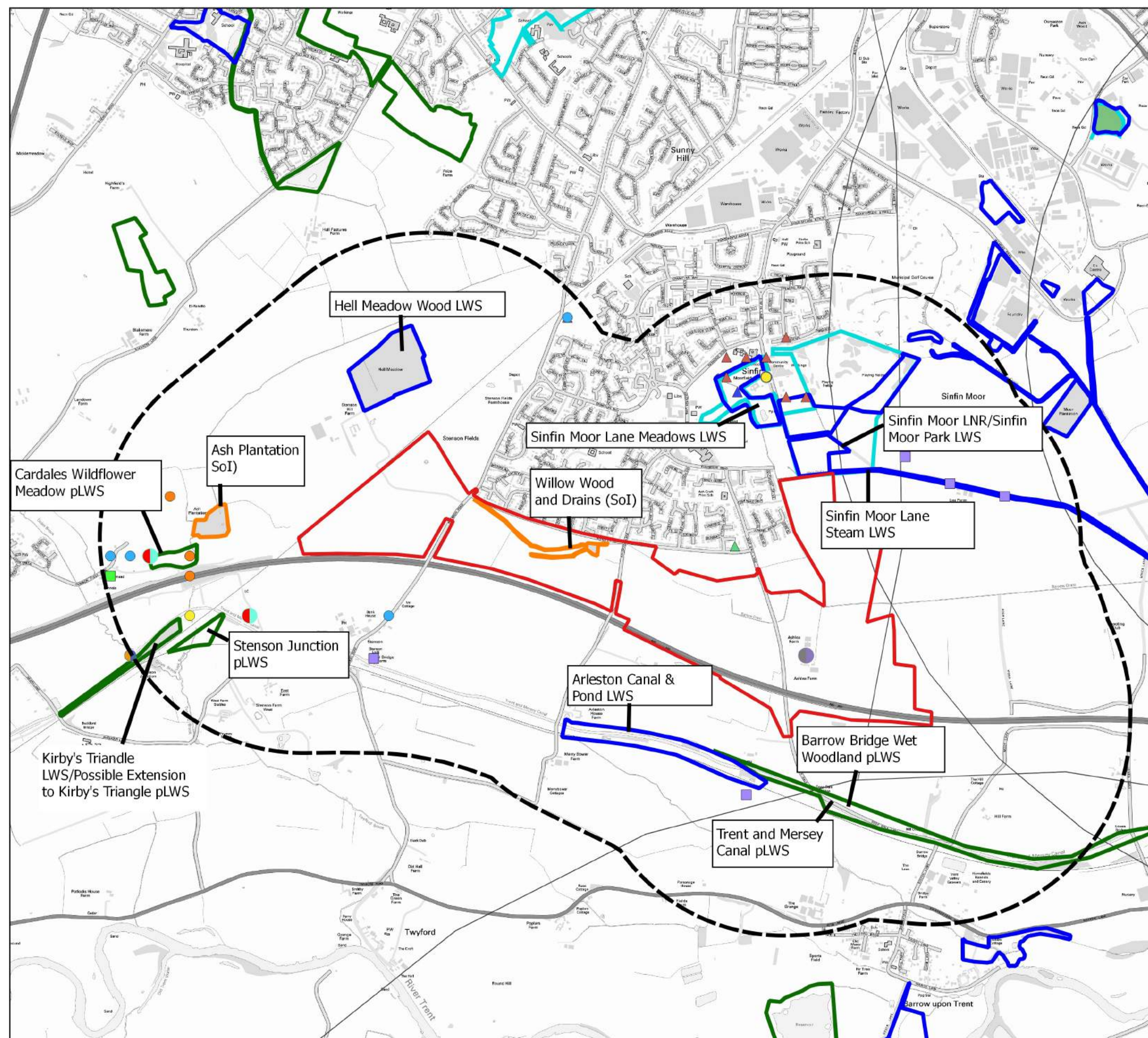
Identification		Dimensions				Habitat Features							Associated Wildlife				Aesthetics		
Tree No	Species	Large girth for species	Girth (cm)	Measurement height (m)	Form	Major stem cavities / hollowing	Decay holes	Physical damage to stem	Bark loss	Epicormic Growth	Large quantities of dead wood in canopy	Sap runs	Crevices sheltered from rainfall	Fungi	Epiphytes and hemiparasites	Evidence of independent wildlife species	An 'Old' look or Aesthetic value	Cultural / Historic value	Prominent Position
T2	Crack Willow Salix fragilis	Yes	471.2	1.5m	P	✓	✓	✓	✓	✓	✓		✓				✓		
T6	Crack Willow Salix fragilis	Yes	628.3	1.5m	P		✓	✓	✓	✓	✓		✓						
T12	Crack Willow Salix fragilis	Yes	628.3	1.5m	P	✓	✓	✓	✓	✓	✓		✓				✓		✓
T15	Crack Willow Salix fragilis	Yes	596.9	1.5m	M	✓	✓	✓	✓	✓	✓		✓				✓		✓
T19	Crack Willow Salix fragilis	Yes	424.1	1.5m	LP	✓	✓	✓	✓	✓	✓		✓						
T20	Crack Willow Salix fragilis	Yes	392.7	1.5m	MS		✓	✓	✓	✓	✓		✓	✓					
T22	Crack Willow Salix fragilis	N/A	0.314	1.5m	MS		✓	✓	✓	✓			✓	✓					
T23	Crack Willow Salix fragilis	N/A	0.314	1.5m	MS		✓	✓	✓	✓			✓	✓					
T60	Crack Willow Salix fragilis	N/A	421	1.5m	M	✓	✓	✓	✓	✓			✓						
T61	Crack Willow Salix fragilis	Yes	408.4	1.5m	P	✓	✓	✓	✓	✓	✓		✓						

Infinity Gardens,
Wragley Way

Job No: 7315
Rev: -

Date of Survey
25th and 26th April 2019

T62	Crack Willow Salix fragilis	No	314.2	1.5m	P	✓	✓	✓	✓	✓	✓		✓					
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Key

- Site Boundary
- 1 km buffer
- Local Nature Reserves (LNR)
- Local Wildlife Sites (LWS)
- Potential Local Wildlife Site (pLWS)
- Sites of Interest (SoI)
- Common pipistrelle
- Soprano pipistrelle
- Unidentified Pipistrelle Species
- Brown long-eared bat
- Unidentified Myotis sp Bat
- Whiskered Bat
- Whiskered/Brandt's
- Brown Hare
- Water Vole
- ▲ Reed Bunting
- ▲ Song Thrush
- ▲ Yellowhammer

Hallam Land Management
Infinity Garden Village (Wragley Way),
Site Location and Consultation Results Plan

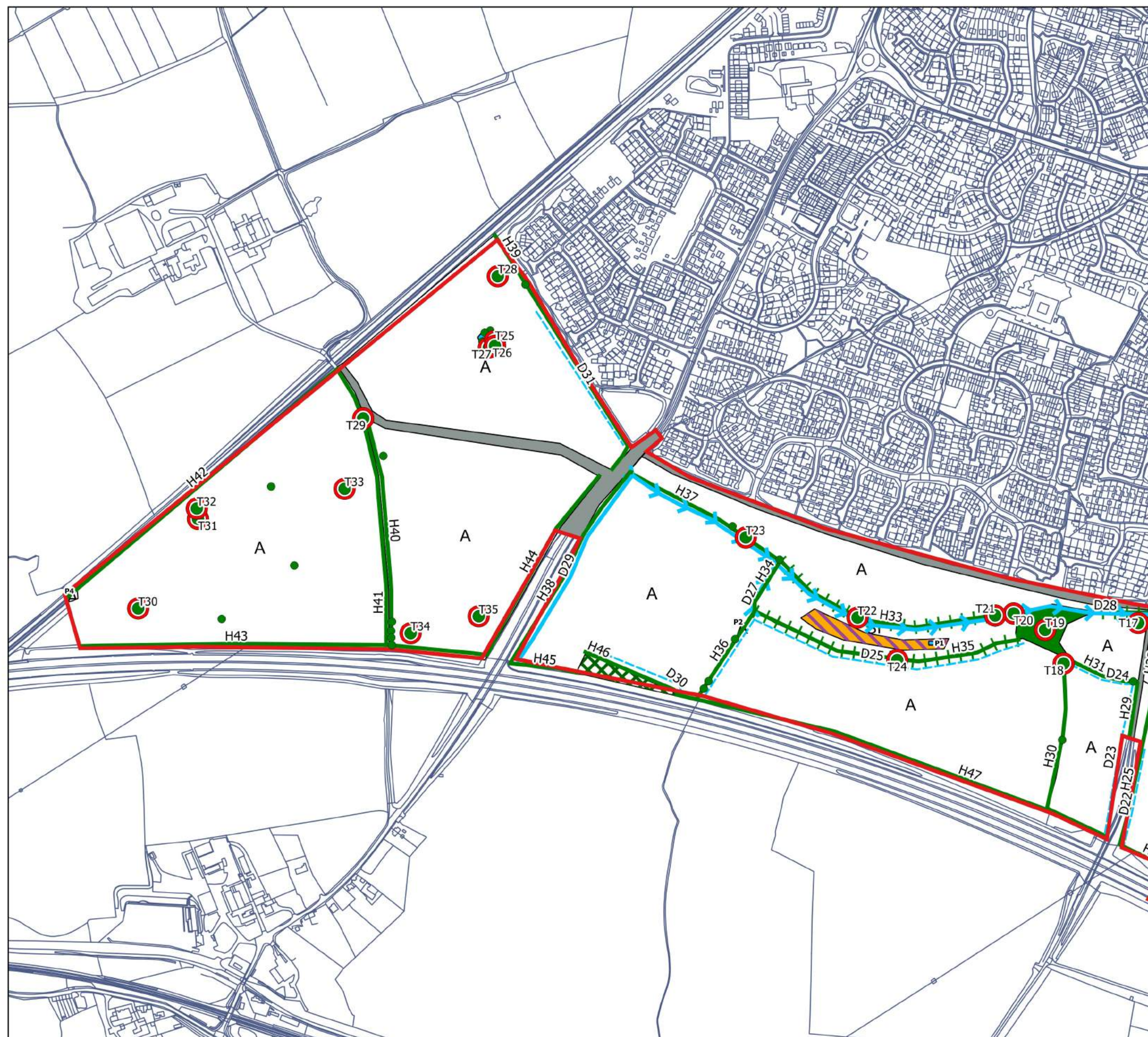
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Figure 1 **7315-E-01**

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Key

- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Marsh/marshy grassland
- Standing water
- Scrub - dense/continuous
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Intact hedge - species-poor (with ref)
- Hedge with trees - species-poor (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree



client
Hallam Land Management Ltd

project
Infinity Garden Village (Wragley Way),
Derby

drawing title
PHASE 1 HABITAT PLAN

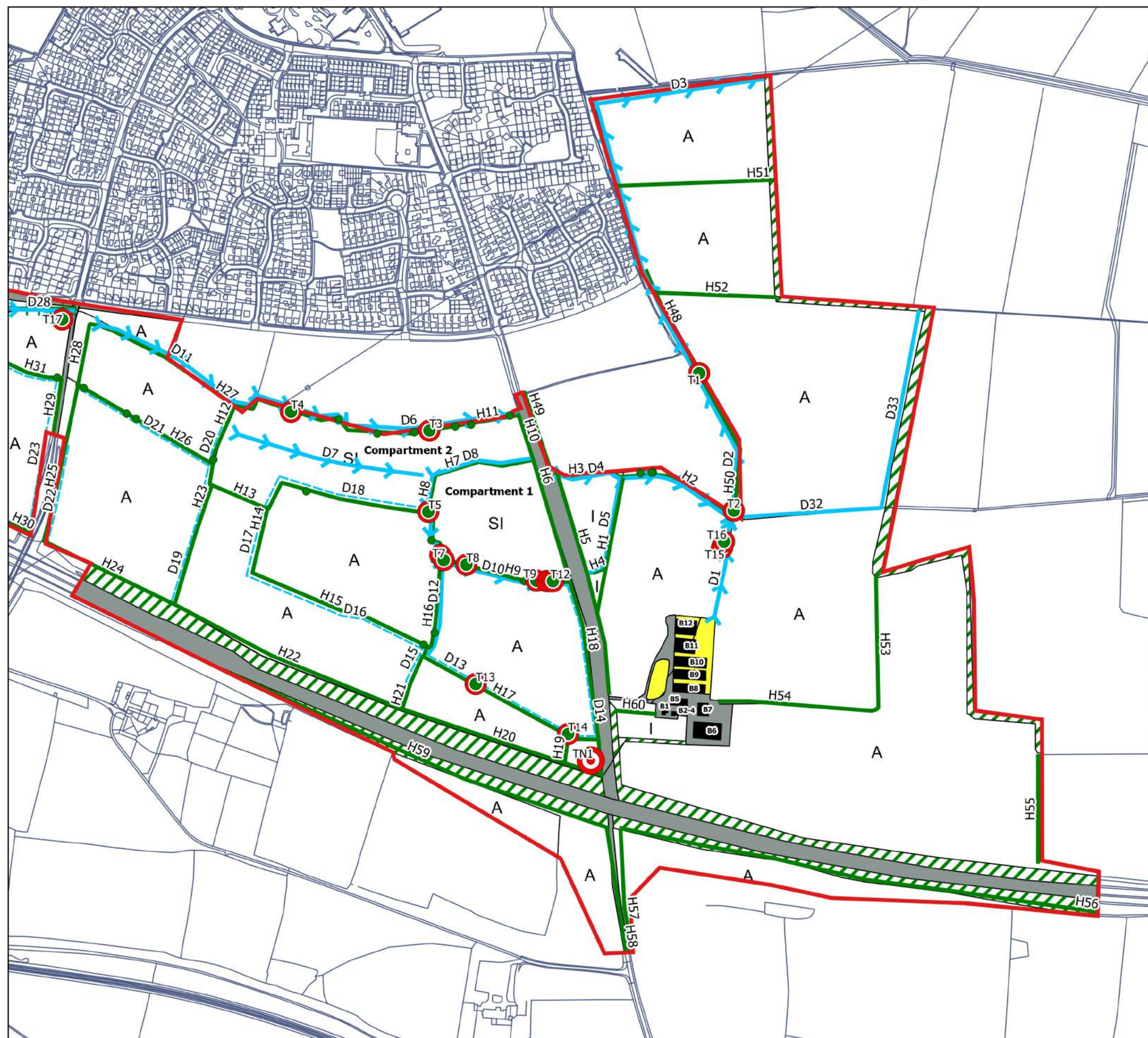
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drawing / figure number
Figure 2a

drawn
BJC

date
29/5/2019

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Key

- Built Environment: Buildings/hardstanding
- Buildings (with ref)
- Broadleaved woodland - plantation
- Scrub - scattered
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- SI Poor semi-improved grassland
- A Cultivated/disturbed land - arable
- Standing water (with ref)
- Running water (with ref)
- Hedgerow (with ref)
- Hedgerow with trees (with ref)
- Dry ditch (with ref)
- Tree with bat potential (with ref)
- Target note (with ref)
- Broadleaved tree

client
Hallam Land Management Ltd

project
Infinity Garden Village (Wragley Way),
Derby

PHASE 1 HABITAT PLAN

drawing title

scale
1:6,000

drawing / figure number
BJC

date
29/5/2019

rev
-

Figure 2b



Hallam Land Management

Infinity Garden Village (Wragley Way), Derby

CONFIDENTIAL BADGER REPORT

March 2019

FPCR Environment and Design Ltd

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Rev	Issue Status	Prepared / Date	Approved/Date
-	Draft 1	BJC / 08.02.19	JD / 14.03.19
	Draft 2	BJC / 29.05.19	JD / 30.05.19

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FIGURES

Figure 1: Badger Survey Plan

1.0 INTRODUCTION

- 1.1 The following report has been compiled by FPCR Environment and Design Ltd on behalf of Hallam Land Management and provides an assessment of the badger *Meles meles* activity on land off Wragley Way, Market Harborough (Central OS Grid Ref. SK 336 304).
- 1.2 An assessment of badger evidence was made in conjunction with any potential effects of the proposals upon this species. A walkover survey was undertaken on the 26th April 2019 to update the baseline information following the surveys undertaken in conjunction with the Phase 1 Habitat Survey on 14th and 20th March 2018. These surveys allow an accurate assessment of the sites importance to the local badger population in order to inform a proposed planning application. A survey was also undertaken in conjunction with the Phase 1 Habitat Survey undertaken on 23rd June 2016, the results of which have been included in this report to provide additional context.
- 1.3 The results of the badger surveys have not been included within the Ecological Appraisal (FPCR, February 2019) due to the sensitive nature of these species and potential effects that could result from releasing badger evidence and sett locations. Therefore this document is to be considered confidential and should not be released into the public domain.

Site Context

- 1.1 The site, which is 146ha in size, largely comprised arable land with improved grassland and semi-improved grassland also present on-site. Other habitats present comprise semi-natural broadleaved woodland, broadleaved plantation woodland, hedgerows, dense scrub and ruderal vegetation.
- 1.2 The site is located on the southern periphery of Derby, with residential development lying to the north of the site with pasture and arable fields present to the south, east and west of the site.

Development Proposals

- 1.3 The proposals for the site comprise a mixed development of residential housing and employment with associated infrastructure and areas of green infrastructure.

2.0 LEGISLATION

- 2.1 Badgers are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from persecution by baiting and deliberate harm or injury. The act makes it 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. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.
- 2.2 A sett is defined as:

“Any structure or place that displays signs indicating current use by a badger”.

- 2.3 Work that disturbs badgers whilst occupying a sett is illegal without a licence, badgers may be disturbed by work near the sett even if there is no direct interference or damage to the sett. Generally the types of activity requiring a licence include:
- Using heavy machinery (generally tracked vehicles) within 30m of any entrance to an active sett;
 - Using lighter machinery (generally wheeled vehicles), particularly for any digging operation within 20m; and
 - Light work such as scrub clearance or hand digging within 10m.
- 2.4 However, guidance from Natural England states that the potential for such disturbance might not be as great as originally assumed due to the relatively high tolerance levels expressed by certain clans of badgers. Whether disturbance will be caused should take into account the sett characteristics, current usage and proposed extent of works with the need for a licence being assessed on a site-by-site basis.
- 2.5 Licences only allow works to be carried out between July and November inclusive.

3.0 METHODOLOGY

- 3.1 In order to compile existing baseline information, relevant ecological information was requested from both statutory and non-statutory nature conservation organisations including:
- Multi Agency Geographic Information for the Countryside (MAGIC) website (www.magic.defra.gov.uk);
 - Derbyshire Wildlife Trust (DWT)
- 3.2 Further inspection, using colour 1:25 000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for badgers.

Field Surveys

- 3.3 Signs of badger were noted during the walkover survey undertaken in April 2019 and during the Extended Phase 1 Habitat Survey undertaken in March 2018 (Ecological Appraisal, FPCR February 2019 for further details). Signs of badger were also noted during the Extended Phase 1 Survey undertaken in June 2016. The standard methodology as recommended by Harris, Creswell and Jefferies (1989)¹ was followed to complete a thorough search for evidence which would indicate the presence of badgers both on the site and locally (within 30 m of the site boundary where accessible), including the identification of:
- Setts: including earth mounds, evidence of bedding and runways between setts;
 - Latrines: often close to setts, at territory boundaries or adjacent to favoured feeding areas
 - Prints and paths or trackways
 - Hairs caught on rough wood or fencing

¹ Harris, S. Cresswell, P and Jefferies, D. (1989). *Surveying Badgers*, Mammal Society.

- Other evidence: including snuffle holes, feeding and playing areas and scratching posts
- 3.4 Where setts are found, their status and level of activity is noted. Sett status is broadly categorised as follows:
- *Main sett* – usually continuously used with many signs of activity around, a large number of holes and conspicuous spoil mounds
 - *Annexe sett* – usually located close to a main sett and connected to it by well used paths. Annexe's may not be continuously occupied
 - *Subsidiary sett* – lesser used setts comprising a few holes and without associated well-used paths. Subsidiary setts are not continuously occupied
 - *Outlier sett* – one or two holes without obvious paths. These are used sporadically.
- 3.5 Level of activity is described as:
- *Well used* – clear of debris, trampled soil mounds and obviously active, with signs of activity such as presence of prints, dislodged guard hairs around the entrances;
 - *Partially used* – some associated debris or plants at the entrance. Could be used with minimal excavation and usually with signs of activity within the vicinity, for example, badger pathways;
 - *Disused* – partially or completely blocked entrances

4.0 RESULTS

Desk Study

- 4.1 No records of badger setts were returned within the last 10 years, however records of six historical badger setts were returned within 1km of the site boundary, ranging between 1980 and 1994, none of which were located on-site.

Field Survey (Figure 1: Badger Survey Plan)

Habitat Suitability

- 4.2 The hedgerows, woodland, arable land, improved grassland and semi-improved grassland offer suitable permanent and seasonal foraging habitat for this species whilst the woodland also offers suitable sett creation habitat. Additionally, the woodland and hedgerows act as commuting corridors, both on-site and into the wider environment.

Field Signs

- 4.3 During the survey a total of four badger setts were recorded within the site boundary, Sett S1 was located off-site immediately to the north of ditch D4 whilst setts S2 and S3 were recorded in association with the broadleaved plantation woodland belt on the eastern boundary of the site with both setts both facing into the development site. Sett S4 was located on the north-eastern boundary of the site facing north towards ditch D3 (Sinfin Moor Lane Stream LWS).

- 4.4 Sett S1 was considered to be an outlier sett comprising one hole which went underneath a tree facing southwards towards the banks of ditch. This sett was considered to be well-used due to a lack of debris in the entrance hole and the presence of two small, recently used latrines in the vicinity of the sett.
- 4.5 Sett S2 was considered to be a subsidiary sett comprising two holes which were considered to be well-used due to bedding being recorded within the entrance holes which were also clear of leaf litter and other debris. Additionally, three badger runs, numerous snuffle holes and two active latrines were recorded in close proximity to this sett.
- 4.6 Sett S3 was considered to be an outlier sett comprising one entrance hole which was considered to be partially-used due to it being fairly well maintained with snuffle holes recorded in its vicinity, however some leaf litter and cobwebbing was present in the entrance hole.
- 4.7 Sett S4 was considered to be an outlier sett comprising two holes which were considered to be well-used due to the presence of bedding within the entrance holes with fresh spoil mounds recorded at the entrances. No other evidence of badger was recorded in association with this sett.
- 4.8 Other badger evidence recorded on-site comprise two latrines, both of which were small and recently used with one located on the eastern edge of hedgerow H26 and the other located on the western edge of hedgerow H17.
- 4.9 No other badger evidence was recorded within the site or within 30m of the boundary (where accessible).
- 4.10 During the survey undertaken in June 2016 no badger setts were recorded, however badger prints were recorded adjacent to hedgerows H14, H23 and H24. In addition, three small, recently used latrines were recorded, two of which were located on the southern edge of hedgerow H23 and one was located on the western edge of hedgerow H15.

5.0 DISCUSSION AND RECOMMENDATIONS

- 5.1 The arable land, improved grassland and semi-improved grassland on-site were considered to offer limited refuge or opportunities for sett construction but were considered to provide foraging and commuting resources for this species. The woodland was considered to offer suitable sett construction and refuge habitat.
- 5.2 Sett S1 was considered to be an outlier sett comprising one hole, which appeared to be well-used due to the absence of debris and vegetation in the entrance hole with two small, recently used latrines recorded in close proximity to the sett. Sett S2 was considered to be a subsidiary sett consisting of two holes, which were deemed to be well-used due to the holes being clear of debris with bedding also recorded. Additionally, other badger activity was recorded in association with this sett including three runs, numerous snuffle holes and two latrines. Setts S3 and S4 were both considered to be outlier setts consisting of one partially-used entrance hole and two well-used entrance holes respectively. Other evidence of badger recorded on-site comprises two small, recently used latrines were recorded adjacent to hedgerows H17 and H25. No other evidence of badger was recorded during the surveys undertaken in 2018 or 2019. During the surveys undertaken in June 2016, no badger setts were recorded, however badger footprints

were recorded in association with hedgerows H14, H22 and H23 and three latrines were recorded adjacent to hedgerows H15 and H22.

Potential Impacts of Development in the Absence of Mitigation

- 5.3 Setts S1 and S4 are to be retained within areas of greenspace as part of the proposals, however in the absence of appropriate mitigation, construction of the proposed development could result in some indirect disturbance to the badger sett through plant movement etc. with a potential risk of killing or injury were badgers to enter site during the construction phase. The woodland belt which setts S2 and S3 are to be retained, however since the tunnels for both setts both face into the development site with the proposed employment area lying within close proximity to these setts, it is likely that these setts will be disturbed/destroyed as a consequence of the development.
- 5.4 Aside from the setts, limited badger activity was recorded on-site but the arable land, grassland and hedgerows could represent an occasional foraging and commuting resource. The woodland and hedgerows are largely to be retained whilst the arable land and grassland are to be lost to the development. This is not expected to have a significant impact on the local badger population due to the low levels of evidence of activity on site and due to the presence of other suitable habitat for foraging outside of the site, most notably to the east. Due to the low level of sett activity observed it is considered that the site most likely forms the outer limits of the local clans range.
- 5.5 On completion of development, some disturbance through recreational activity could result in negative effects on the clan in the absence of the implementation of appropriate mitigation, given the levels of activity recorded currently, this is considered unlikely to be significant for the local clan.
- 5.6 It is recommended that a pre-commencement badger survey is undertaken approximately 3 months prior to the commencement of works and during peak badger activity season to further confirm the status of these setts.
- 5.7 In the event that setts S1 and S4 are confirmed as active, it will be necessary to carry out mitigation measures to ensure that they are not disturbed or destroyed during the construction phase of the development. If setts S2 and S3 are confirmed as active, it is likely that they will need to be destroyed to facilitate the development.
- 5.8 The following sections provide mitigation measures to be implemented during construction and operational phases of development to minimise any potential effects of the development on the local badger population ensuring the conservation status of this species on site is maintained.
- 5.9 In the event that the pre-commencement surveys consider that both setts are no longer active then no such measures would be required (although the planting enhancements etc. would still be recommended)

Mitigation Strategy

Construction

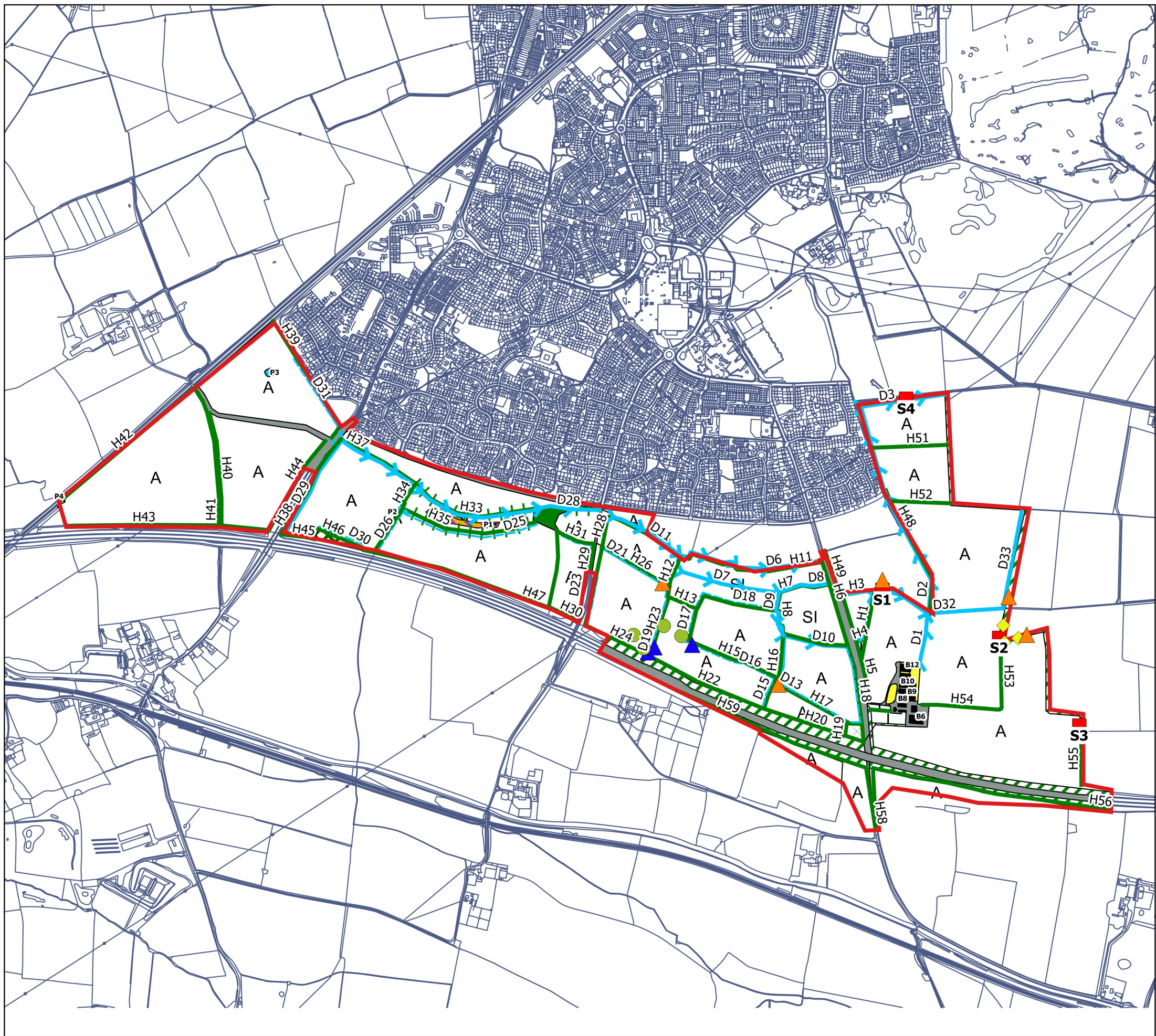
- 5.10 Mitigation associated with the development will focus on ensuring that badgers are not disturbed (where possible) and suffer no unnecessary harm or stress during any development process.

- 5.11 If excavation works are required for clearance and construction or use of heavy machinery within 30m of the badger setts is proposed, it is considered that there would be a possibility that the badger setts will suffer disturbance. If this is the case then it is considered that a Licence from Natural England may be required to temporarily close the affected sett during the period of potential disturbance caused by construction.
- 5.12 The Licence application would allow the installation of one-way gates over the sett for 21 days prior to the commencement of works, with the gates remaining *in-situ* for the duration of any works that may disturb the sett. Such closure can only take place between July and November inclusive and the gates would need regular checking to ensure no attempt at re-entry had been made. Any works near the sett would also be supervised to minimise any risk of direct impact upon the sett. Upon completion of the works the gates would be removed and badgers allowed to re-occupy the sett.
- 5.13 Similarly, if a badger sett is to be destroyed to facilitate the development, which is anticipated to be the case for setts S2 and S3 (if they remain active), a Licence from Natural England would be required to close and subsequently destroy the sett. Similar to the temporary closure of a sett, one way gates will be installed over the sett for a period of 21 days between July and November with regular checks to ensure that no attempt at re-entry has been made. Following the 21 day period the sett can then be carefully destroyed using a JCB (or similar excavator) under the supervision of a suitably experienced ecologist.
- 5.14 It is recommended that general precautionary measures be implemented during the construction phase to ensure that badgers are not indirectly harmed through isolation or injured from falls into excavations such as trenches, holes and ditches. Therefore these should be covered outside of working hours or, where excavations are too large to cover, a means of escape should be provided, such as sloping banks or wooden planks. Pipes over 250mm in diameter should be capped overnight, this will reduce the possibility of badgers and other mammals becoming trapped and injured.
- 5.15 During the construction phase, construction operations should also be restricted to daylight hours where they are in proximity to semi-natural habitats in order to reduce the potential for adverse effects through disturbance to badger (and other nocturnal and crepuscular wildlife). Construction offices, material compounds and security buildings should also be located in appropriate locations away from retained habitats in order to reduce the potential for accidental damage to habitats whilst all waste materials should be appropriately stored, in particular domestic waste from construction site welfare units that may attract badgers should be stored in heavy duty bins with lids.

Operation

- 5.16 It is recommended that the retained badger setts are buffered from the development through additional scrub planting to ensure that anthropogenic disturbance is minimised, this can be achieved through native thorny shrub planting being incorporated on all aspects of the setts. This would include the planting of hawthorn *Crataegus monogyna* and holly *Ilex aquifolium*.
- 5.17 Further new habitats will be designed to ensure the foraging resource for badgers is enhanced and varied, providing year-round opportunities. Enhancement and creation of species-rich and tussock-forming grassland within hedgerow buffers will provide good conditions for earthworms which make up a large proportion of badgers diets. Tussocky grassland also provides

opportunities for small mammals which provide a food source for many animals, including badgers. In addition, the hedgerows will be gapped up and bolstered using native species bearing nectar, berries, fruit and nuts.



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Key

- Site Boundary
- Built Environment: Buildings/hardstanding
- Buildings
- Broadleaved woodland - plantation
- Standing water
- Improved grassland
- Cultivated/disturbed land - amenity grassland
- Poor semi-improved grassland
- Cultivated/disturbed land - arable
- Standing water
- Running water
- Hedgerow
- Hedgerow with trees
- Dry ditch
- Tree with bat potential
- Broadleaved tree
- Badger Setts (with ref)
- Badger latrines
- Badger latrines 2016
- Badger Prints 2016
- Badger Run

client
Hallam Land Management Ltd

project
Infinity Garden Village (Wragley Wav),

drawing title
BADGER SURVEY PLAN

scale
1:12,000

drawn
BJC

issue
29/5/2019

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Figure 1